

**MEASURING KNOWLEDGE OF ADHD AMONGST SAUDI MALE
PRIMARY SCHOOL TEACHERS IN JEDDAH CITY IN KINGDOM OF
SAUDI ARABIA (KSA): DESIGN, DEVELOPMENT AND EVALUATION OF
A TRAINING PROGRAMME TO ENHANCE KNOWLEDGE**

By

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ABSTRACT

ADHD is a neurological disorder which can cause disruption to attention or hyperactivity or both. Whilst studies in KSA have shown ADHD prevalence between 11.6% and 16.4% amongst schoolchildren, Saudi educators have a poor level of knowledge of ADHD. It has been established that teachers play a significant role in supporting children with ADHD to achieve their educational potential. Therefore, it is crucial that schoolchildren learn in an environment free from barriers to their educational achievement. Teachers that possess a good level of knowledge about ADHD are needed in KSA to overcome barriers children with ADHD can face at school.

The purpose of the study was to enhance the level of ADHD knowledge amongst SpLD and General primary schoolteachers in Jeddah, KSA, in order to help them better support children with ADHD to reach their educational potential at school. Studies that measured the level of ADHD knowledge amongst primary school teachers as well as studies that designed and/or delivered an intervention to primary schoolteachers to enhance their level of ADHD knowledge were systematically reviewed in this study. An instructional design model was used to create an in-service teacher training programme to enhance teachers' knowledge of ADHD and classroom management strategies. The effectiveness of the intervention to enhance knowledge was measured pre-and post-training. By using a mixed method approach the study measured knowledge of ADHD amongst 130 teachers and interviewed 10 SpLD and 10 General teachers (20 in total) to elicit their views on what could be done in general to overcome their lack of knowledge and specifically seek their opinions on training as a method of enhancing knowledge. The researcher designed and delivered a training programme to teachers and measured the effectiveness of the training as a way on enhancing teachers' knowledge by redistributing questionnaires used in the first stage of the study.

The results of this study demonstrate that training can enhance the level of knowledge of ADHD and, also improve misconceptions about the disorder

amongst teachers. The positive impact of training was further supported by allowing teachers the opportunity to contribute towards the design of training. The findings of this study have a potential significant impact on teaching practice of children with ADHD in KSA. This research can play a key role in the development of ADHD in-service training initiatives for Saudi teachers in general.

DEDICATION

The work in its entirety is dedicated to the following people: my mother Jamelah who has been the greatest support to me throughout my life; to my wife Amal and sons Hamodi and Abodi who are all the loves of my life and thank you for putting up with my late nights, please forgive me for any attention I have paid to this PhD above you. I would like to thank all those people close to me.

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List of Definitions and/or Abbreviations

ADDIE	Analysis, Design, Development, Implementation and Evaluation
ADHD	Attention Deficit Hyperactivity Disorder
AFTA	ADHD Society of Saudi Arabia
APA	American Psychiatric Association
ASD	Autism Spectrum Disorder
EBD	Emotional and Behavioural Disorders
DGSE	Directorate General of Special Education
DSE	Department of Special Education
DSM	Diagnostic Manual of Mental Disorders
GSSE	General Secretariat for Special Education
IDEA	Individuals with Disabilities Education Act
IEI	Intellectual Education Institute
IEP	Individual Educational Plan
ISD	Instructional Systems Development
ITS	Index of Teaching Stress
KADD-Q	Knowledge Attention Deficit Disorder Questionnaire
KADDS	Knowledge of Attention Deficit Disorder scale
KSA	Kingdom of Saudi Arabia
KSU	King Saud University
LD	Learning Disabilities/ Learning Difficulties/ Learning Disorders
LDs	Learning Disabilities
LEA	Local Education Authority
MHGAP-IG	Mental Health Gap Action Programme Intervention Guide
MoE	Ministry of Education
MoH	Ministry of Health
MoM	Ministry of Media
MoSA	Ministry of Social Affairs
NPDCAD/HD	National Project for Dealing with Children with Attention Deficit

OCD	Obsessive Compulsive Disorder
RMSN	Regulatory Manual for Special Needs
RSEIP	Regulations of Special Education Institutes and Programmes
SASA	Scale of ADHD-Specific Attitudes
SEN	Special Education Needs
SETs	Special Education Teachers
SLD	Specific Learning Disability
SpLD	Specific Learning Difficulties/Specific Learning Disorder
TS	Tourettes Syndrome
TU	Taif University
UPIAS	Union of the Physically Impaired Against Segregation
EF	Executive Function
GAD	Generalized Anxiety Disorder
DMDD	Disruptive Mood Dysregulation Disorder
AAIDD	Association on Intellectual and Developmental Disabilities
IDEA	Individuals with Disabilities Education Improvement Act
NIHCE	National Institute for Health and Care Excellence
GPs	General Practitioners
MMAT	Mixed Methods Appraisal Tool
CHADD	Children and Adults with Attention Deficit Disorder
RCTs	Randomized Control Trials
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
PAF	Principal Axis Factoring

CHAPTER 1

Introduction

1. Introduction

The aim of this chapter is to provide an overview of the thesis so that the reader has a clear idea of the issue that the research is seeking to address. This chapter will also inform the reader why it is important to address the problem that has been identified by the researcher, and will set out the aims of the study and the research questions that it will answer.

1.1 The nature of the problem

I, as a Special Needs Teacher in KSA, have first-hand experience of the impact that a lack of knowledge about ADHD amongst teachers can have on their motivation and self-efficacy, which can lead to teacher frustration. Whilst the focus of the research is Saudi primary schoolteachers and their knowledge of ADHD, it is anticipated that Saudi schoolchildren with ADHD of these teachers could benefit from being taught by teachers with enhanced knowledge and improved attitudes towards ADHD.

Children with ADHD often perform poorly at school compared to their non-ADHD peers and teachers can play a key role in helping children with the disorder to achieve their full educational potential (Cantwell and Baker, 1991; Rabiner and Malone, 2004; Graham and Harris, 2005; Mayes and Calhoun, 2006). However, where teachers lack knowledge of ADHD the impact upon the educational development of a child can be adversely affected (Currie and Stabile, 2004; Todd, Sitdhiraksa, Reich et al., 2002; Loe and Feldman, 2007).

Whilst some international studies on ADHD knowledge amongst primary school teachers have shown they possess a good level of ADHD knowledge (Jerome, Gordon and Hustler, 1994; Anderson, Watt, Noble et al., 2012; Stampoltzis and Antonopoulou, 2013; Blotnicky-Gallant, Martin, Corkum, 2015; Soroa, Gorostiaga and Balluerka, 2016) the majority of the identified international studies show a lack of ADHD knowledge amongst primary school teachers (Hepperlen, Clay, Henly et al., 2002; Kos, Richdale and Jackson, 2004; Ghanizadeh, Bahredar and Moeini, 2006; Perold, Louw and Lleynhans, 2010; Nur and Kavakc, 2010; Rodrigo, Perera, Eranga et al., 2011; Al-Hakeem, Al-

Othman, Al-Jamea et al., 2013; Muanprasart, Traivaree, Arunyanart et al., 2014; Youssef, Hutchinson and Youssef, 2015, Kern, Amod, Seabi et al, 2015, Al-Omari, Al-Motlaq, Al-Modallal, 2015; Liang and Gao, 2016; Shroff, Hardikar-Sawant, Prabhudesai, 2017; Padilla, Cuartas, Henao et al., 2018).

Studies have shown ADHD prevalence of 11.6% to 16.4% amongst schoolchildren in Saudi Arabia (Al-Modayfer and Alatiq, 2015; Al-Hamed, Taha, Sabra et al., 2008) and that Saudi primary schoolteachers have a poor level of knowledge of ADHD (Alkhatani, 2013; Abed, Pearson, Clark et al., 2014). This has led to the recommendation that Saudi schoolteachers increase their knowledge of ADHD to deal more effectively with Saudi school children (Alkhatani, 2013; Munshi, 2014; Abed et al., 2014; Abaoud and Almalki, 2015).

1.2 Rationale and significance of the study

Studies have shown primary schoolteachers in KSA possess amongst the lowest global knowledge of ADHD (Sciutto et al, 2016), and there have been a number of recommendations that Saudi teachers need to enhance their knowledge of the disorder. This study responds to the lack of knowledge of ADHD amongst Saudi primary school teachers and the researcher has investigated what can be done generally to enhance knowledge based on teachers' perspectives, and if teacher-training can enhance their knowledge of ADHD.

This study is significant for a number of reasons:

1. To the best of my knowledge, it is the first study to conduct a systematic literature review of studies that have measured the level of knowledge of ADHD amongst teachers of primary school children, and their attitudes towards children with ADHD.
2. To the best of my knowledge, it is the first study to conduct a systematic literature review to identify and evaluate the effectiveness of school-based non-pharmacological interventions to enhance primary school teachers' knowledge of ADHD.

3. It is the first study to perform factor analysis of the Knowledge of Attention Deficit Disorder Scale (KADDS) (Scuitto, Terjesen and Bender, 2000).
4. It is the first study in KSA to develop, design and deliver a teacher-training programme to enhance the level of ADHD knowledge amongst Saudi primary school teachers, and to measure the effectiveness of such training.
5. To the best of my knowledge, it is the first study to interview Saudi primary school teachers for their contribution towards the design and development of an ADHD teacher-training programme.
6. To the best of my knowledge, it is the first study in KSA to compare the level of knowledge and misconception about ADHD across three domains/factors amongst male Saudi general and Specific Learning Difficulties (SpLD) primary school teachers in the same study.

Training schoolteachers to enhance their knowledge of ADHD as well as introducing them to effective behavioural and educational strategies for school children with ADHD can help them to address problems faced by school children with ADHD such as rejection from class or punishment (Alqahtani, 2010). In addition, enhancing their knowledge can help schoolteachers with early recognition and management of the disorder during a child's educational development (Abu Taleb and Farheen, 2013). It is likely that a child with ADHD could receive better support if they are taught by teachers that possesses enhanced knowledge of ADHD and demonstrate a positive attitude towards the disorder (Ohan, Cormier, Hepp et al., 2008).

To ensure schoolchildren with ADHD have the best opportunity to achieve their full educational potential it is crucial that their teacher possesses knowledge of ADHD so that they can identify children who may have the disorder, contribute towards the diagnostic process for ADHD and have knowledge of effective

educational strategies to deal with these children appropriately to help them reach their potential.

1.3 Aims of the study

The study primarily aimed to design, develop and deliver a teacher training programme about ADHD to overcome the lack of Knowledge by enhancing both male Saudi SpLD and General teachers' awareness in primary schools in Jeddah, KSA.

In order to measure the effectiveness of the ADHD teacher training programme designed for Saudi schoolteachers in this study, it was important to first investigate and compare the current level of ADHD knowledge amongst Saudi teachers pre-training and subsequently post participation in the training intervention. In addition to measuring the effectiveness of teacher-training about ADHD on enhancing knowledge, teachers were also asked to identify what they believe can be done in general to enhance their knowledge of the disorder and particularly through a training intervention designed for teachers.

A further aim of the study was to give teachers the opportunity to contribute towards the design of the ADHD training intervention.

1.4 Research Questions

There are three research questions in this study as follows:

1. What knowledge and misconceptions regarding ADHD do male SpLD and General primary schoolteachers in Jeddah KSA have?
2. From a teacher's perspective what can be done to overcome the lack of knowledge and misconceptions of ADHD amongst SpLD and General teachers in primary schools in Jeddah, KSA?
3. Can a training programme enhance the level of knowledge of and attitudes toward ADHD amongst SpLD and General teachers in KSA?

1.5 Overview of the Thesis

This thesis is divided into nine chapters. This **first chapter** introduces the reader to the nature of the problem, the reason for it, and the significance of the study along with the research questions. **Chapter 2** presents an overview of ADHD from definition of the disorder to comorbidity, aetiology, developmental considerations, how symptoms of the disorder may impact children in the classroom and the features of ADHD amenable to environmental modification. **Chapter 3** will shed light on the Saudi context of Special Education Needs (SEN), its development and policies and ADHD in KSA. A systematic literature review of studies that look at the level of ADHD knowledge held amongst primary school teachers as well as a review of studies that have looked at the efficacy of non-pharmacological ADHD interventions for primary school teachers to enhance their knowledge of the disorder will be presented in **Chapter 4**. The methodology of the study can be found in **Chapter 5** and includes detail on research design, methods, sample, rationale for using KADDS and factor structure of the scale, collecting, processing and analysing both quantitative and qualitative data.

Chapter 6 presents, step by step, the Analysis Design Development Implementation and Evaluation model (ADDIE) for developing, designing and delivering a training programme on ADHD to enhance knowledge amongst Saudi teachers. It will also review teacher's evaluation of receiving ADHD training. Presentation of findings from the study can be found in **Chapter 7** for all phases of data collection: measuring the level of ADHD knowledge amongst male Saudi SpLD and General teachers in primary mainstream schools in Jeddah; conducting semi-structured interviews with a sample of male Saudi primary school teachers; and evaluation of the training programme and effectiveness to enhance the knowledge of ADHD of male Saudi teachers who participated in training. **Chapter 8** provides thorough discussion of each phase, including statistical and thematic analysis to elaborate on the results of numerical data, and semi-structured interviews to make connections with existing literature. The chapter also contains discussion of the effectiveness of the ADHD training programme for Saudi primary school teachers. The social

constructivist theory of ADHD will provide an explanation for the impact of the ADHD training programme on Saudi teachers' knowledge of ADHD, with reference to cultural and societal considerations in KSA. Chapter 9 is an evaluation chapter that critique conception, study development, data collection, stakeholder involvement, intervention development, and evaluation and interpretation. The final **Chapter 10** will make conclusions and set out recommendations for future research and overall contribution of the study along with implications for practice, training and research in the field of special education and ADHD in KSA.

CHAPTER 2

Attention Deficit Hyperactivity Disorder (ADHD)

2. An overview of ADHD

2.1 Introduction

ADHD is a neurobehavioural developmental disorder that is characterized by the co-existence of attention problems and hyperactivity and affects between 2.2 and 7.1% children globally (Erskine et al, 2013; Polanczyk, Lima, Horta et al, 2007; Polanczyk, Salum, Sugaya et al, 2015; Willcutt, 2012). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM V), the disorder occurs in most cultures in roughly 5% of children (APA, 2013). A child with ADHD can find it difficult to function academically, socially, and behaviourally in the home or school setting which can lead to truancy and even drop out (APA, 2013; DuPaul et al, 2010; DuPaul et al, 2008).

This chapter will mainly give an overview of the perspectives towards ADHD. It will describe the definition and structure of the disorder and discuss the comorbidity of ADHD with other disorders. In addition, it will look at the aetiology of ADHD to include both genetics and environmental explanations of the disorder such as the role played by Executive Function (EF) and Delay Aversion. There will be discussion of how ADHD symptoms might impact upon children's behaviour in the classroom and of the features of the disorder that might be amenable to environmental modifications.

2.2 Definition of ADHD

Barkley (1990) recommends that a definition of ADHD should be sufficiently broad so that it encapsulates a number of factors and should not be too narrow. The definition of the disorder under the Diagnostic and Statistical Manual of Mental Disorders (DSM), which is the most widely used source of defining ADHD, comes from a behavioural perspective based on a number of characteristics (Gregg and Scott, 2000; APA, 2013). The first-time that a focus was placed on a combination of problems with attention, impulsivity and hyperactivity which together could form ADHD was in DSM III published in 1980

(APA, 1980) with the revised version of DSM III later introducing the term ADHD and eliminating Attention Deficit Disorder (ADD) without hyperactivity.

To keep up to date with regard to ADHD it is important to review its definition based on both DSM IV (APA, 1994) and latest version of DSM V (APA, 2013) and discussing the changes.

DSM IV (APA, 1994) defined ADHD as:

A persistent pattern of inattention and/or hyperactivity – impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable age of development.

From this definition it can be seen that DSM IV (1994) introduced three subtypes of the disorder: Inattentive, hyperactive-impulsive, and combined. The inattentive subtype is when the individual has serious inattention problems such as not paying attention for a sustained period of time, however there is no presentation of problems with hyperactivity or impulsivity. The difficulty in maintaining attention is considered to be one of the most common traits of the disorder and children with such inattention are easily distracted by external stimuli (APA, 2000). Evidence has suggested that children with this type of ADHD may be more impaired academically (Weiss, Worling, & Wasdell, 2003) as they often have a shorter attention span compared to their peers and can find it challenging to complete tasks (Rief, 2005; Carlson and Mann, 2000).

On the other hand, hyperactive-impulsive disorder is where the individual has serious problems with hyperactivity-impulsivity but has no problem with inattention. It is considered to be the most visible characteristic of ADHD (Rafalovich, 2004) and behaviour includes fidgeting, making noises and running around (Parker, 1992; Green & Chee, 1994; Lougy, De Ruvo & Rosenthal, 2007). A child with hyperactive-impulsive characteristics has difficulty with controlling their impulses and will often act prior to thinking about the consequences of such actions (Parker, 1992). Impulsivity can be viewed as a dimension of normal personality (Eysenck & Eysenck, 1977). It is related to

impulsive control behaviour and loss of control (Hollander and Rosen, 2000) and is broadly described as any action without foresight, which can be a component of several psychiatric disorders including ADHD (Winstanley, Eagle and Robbins, 2006). Daruna and Barnes (1993) defined the term as “encompass[ing] actions that appear poorly conceived, prematurely expressed, unduly risky, or inappropriate to the situation and that often result in undesirable consequences” (p.23). Due to the range of behaviours that the term impulsivity describes, it has been suggested that impulsivity is not a unitary construct (Evenden, 1999; Moeller et al, 2001), however the nature or extent of impulsivity can depend upon different biological mechanisms (Evenden, 1999). An increase in aspects of impulsivity might represent different subtypes of ADHD (Nigg, 2003, Sonuga-Barke, 2002). Individuals with ADHD can show elevated levels of impulsivity (Solanto, 1998) and children with ADHD are slower to inhibit their responses than normal children (Nigg, 1999, Purvis and Tannock, 2000, Schachar and Logan, 1990, Schachar et al., 1995).

According to DSM V (APA, 2013), ADHD was characterised by “***a persistent pattern of inattention and/or hyperactivity/impulsivity that interferes with functioning or development***”.

When determining either subtype, the individual should present at least 6 symptoms as shown below, under the subtype for at least a period of 6 months. Finally, the combined subtype is where the individual exhibits both inattention and hyperactivity/impulsivity that has been observed for at least 6 months (DSM IV, 1994). The latest DSM V (APA, 2013) made minor changes to the previous DSM IV (APA, 1994) in terms of the disorder but made it easier for diagnosis in children and adults. There is no requirement to go as far back as childhood to check for the onset of symptoms, and there was a change in terminology used from ‘subtypes’ to ‘presentations’ since the latter term better reflects the effects of the disorder on the individual in different stages of their life.

Inattention

- (a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
- (b) often has difficulty sustaining attention in tasks or play activities
- (c) often does not seem to listen when spoken to directly
- (d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)
- (e) often has difficulty organizing tasks and activities
- (f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
- (g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
- (h) is often easily distracted by extraneous stimuli
- (i) is often forgetful in daily activities

Hyperactivity

- (a) often fidgets with hands or feet or squirms in seat
- (b) often leaves seat in classroom or in other situations in which remaining seated is expected
- (c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings or restlessness)
- (d) often has difficulty playing or engaging in leisure activities quietly
- (e) is often “on the go” or often as if “driven by a motor”
- (f) often talks excessively
- (g) often blurts out answers before questions have been completed
- (h) often has difficulty waiting turn
- (i) often interrupts or intrudes on others (e.g. butts into conversations or games)

Source: American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC, American Psychiatric Association, 1994.

2.3 The potential discrepancy between parent and teacher rating of ADHD

It is vital that the symptoms of ADHD can be diagnosed in multiple settings (APA, 1987) however the setting and person conducting the evaluation may impact upon the prevalence of ADHD symptoms (Soma et al. 2009). Information gathered by parents and teachers through the use of rating scales designed to evaluate impairments associated with ADHD is fundamental to making a clinical diagnosis of the disorder. A clinician will use information gathered by teachers in a school setting, and parents/guardians in a home setting and if findings from a clinical setting agree with two these will help to make a final decision. Therefore, in order to best capture the types of information within these different settings, rating scales are used where teachers and parents/guardians rate the behaviour of a child with, or suspected of having, ADHD. There are many parent and teacher ratings scales that are reliable and demonstrate validity (DuPaul, 1991) such as Vanderbilt and Conners Ratings Scales (Soma et al, 2009).

However, if there is a discrepancy in the ratings between teachers and parents/guardians (Soma et al, 2009; Mcloughlin, Rijdsdijk, Asherson, 2011) this could create difficulty in making a decision. According to Murray et al in 2007 any discrepancy may also impact upon "*the valid characterisation of the disorder...in young children*" (p606). Studies have shown low cross-cultural levels of agreement between parents' and teachers' rating (Widenfelt et al, 2003; Murray et al, 2007;) and that parents reported more emotional and conduct problems than teachers (Papageorgiou et al, 2008) which could be linked to the expectations of how the child should act at home (Soma, 2009). Whilst some studies show a lack or low to moderate concordance in ratings between teachers and parents/guardians (Papageorgiou et al, 2008; Murray et al, 2007; Mitsis et al, 2000), however Narad et al, in 2015 found a high rate of agreement between teachers and parents/guardians when rating hyperactivity and inattention symptoms.

A possible reason for such discrepancy could be: (i) that parents/guardians are less informed on the behaviour of their child in a classroom setting (Nijs et al,

2004) and vice versa with teachers being less familiar with a child's behaviour at home (Murray et al, 2007); (ii) children behave differently in different settings (Nijs et al, 2004; Saudino, Ronald and Plomin, 2005; McLoughlin et al, 2011); (iii) younger children may exhibit more typical symptoms compared to older an older child (Murray et al, 2007) (iv) the variety of Rating Scales each with their own methodological approaches (Murray et al, 2007) and (v) symptom presentation might be different through various stages of development (Narad et al, 2015).

2.4 Comorbidity and Associated Problems

Where ADHD is comorbid with another disorder, this will result in more significant functional impairment (Leitner, 2014; Mulraney, Schilpzand, Hazell et al., 2016; Poh, Payne, Gulenc et al., 2018). It has been accepted that ADHD has a varied comorbidity and can occur alongside conduct, mood and anxiety disorders, autism spectrum disorder (ASD) and intellectual disabilities (ID) as well as learning disability (LD) (Biederman, Newcorn and Sprich, 1991; Hastings, Beck, Daley and Hill, 2005; Spencer, 2006; Saul, 2014; Masi and Gignac, 2015; Alkhateeb and Alhadidi, 2016; Alnema et al, 2016; Melegari, Bruni, Sacco et al., 2018). It is no wonder that it has been commented that associated problems with ADHD have an enormous impact on society (Biederman, Newcorn and Sprich, 1991) and studies have found that as much as 80% of children with ADHD have co-morbid conditions (Mash & Wolfe, 2002). Research has suggested that individuals with ADHD may encounter comorbid conduct problems (Glass, Flory & Martin et al, 2011) and low self-esteem (Edbom et al, 2006).

In their work looking specifically at comorbidity of ADHD with conduct and oppositional defiant disorder. Biederman, Newcorn and Sprich (1991) found that the majority of evidence suggests that ADHD and conduct disorder are partially independent and in fact children with ADHD and conduct disorder have a severe form of ADHD. Oppositional defiant disorder is another antisocial behaviour defined as a pattern of negativistic, hostile and defiant behaviour (APA, 1994) and in a child that also has ADHD, it could lead to a higher rate of

school dysfunction compared with those who only have ADHD (Faraone, Biederman, Keenan et al, 1991). Both of these disorders are found to be present in children with ADHD (Peterson, Pine, Cohen et al, 2001).

Children with ADHD are also at a high risk of developing mood disorders (Jensen and Rosen, 2004; Carroll, Houghton, Taylor et al., 2006) and have been found to be as high as 75% in children with ADHD in both epidemiological and clinical samples (Anderson, Williams, McGee et al, 1987; Bird, Canino, Rubio-Stipec et al, 1988; Biederman, Faraone, Keenan et al, 1990). It has also been found that ADHD and major depressive disorder share common vulnerabilities (Biederman et al, 1989). Further to this, with regards to the comorbidity of ADHD and mood disorders, a link has been found between ADHD and anxiety disorders (Sylvester, Hyde, & Reichler, 1987; Biederman, Faraone, Keenan et al, 1991; Jensen, 2001; Mitchison and Njardvik, 2015; Shea, Lee, Lai et al., 2018) however anxiety disorders in children could go undetected if the child is overactive (Spencer, Biederman, Mick, 2007). It has been said that having both anxiety disorder and ADHD may substantially worsen the outcomes of children (Spencer et al,2007). In the study conducted by Wilens, Nigg, Pennington et al. in (2002) they found that 33% of schoolchildren with ADHD had two or more anxiety disorders such as generalized anxiety disorder (GAD) or social phobia (Melegari, Bruni, Sacco et al., 2018). Children with ADHD and disruptive mood dysregulation disorder (DMDD) had poorer self-control and exhibited bullying behaviours compared with children who had ADHD without DMDD (Mulraney, Schilpzand, Nicholson et al., 2016).

ASD, like ADHD, is considered a heterogeneous condition and the link between ASD and ADHD was recognised in DSM-5 (APA, 2013). Again like ADHD, ASD is a neurodevelopmental disorder that has significant impact on cognitive and socio-emotional development (APA, 2013). Studies have found the presence of strong genetic correlation between the two disorders in children and adolescents (Goldstein & Schwebach, 2004; Simonoff, Pickles, Charman et al., 2008; Ronald, Simonoff, Kuntsi et al., 2008; Ronald, Edelson, Asherson et al., 2010; Taylor, Charman, Ronald, 2015; Pinto, Rijdsdijk, Ronald et al., 2016;

Jokiranta-Olkonemi, Cheslack-Postava, Sucksdorff et al., 2016; Grove, Ripke, Als et al., 2017; Ghirardi, Petterson, Taylor et al., 2018) and in a review of 33 studies a prevalence of symptoms of ADHD in children with ASD was 33-37% (Berenguer, Miranda-Casas, Pastor-Cerezuela, et al., 2015).

ID has been defined by the World Health Organisation (1992) as:

‘arrested or incomplete development of the mind which is especially characterized by impairment of skills manifested throughout the developmental period which contributes to the overall level of intelligence e.g. cognitive, language, social abilities’

whilst the current definition by the American Association on Intellectual and Developmental Disabilities (AAIDD) characterizes ID as “a disability with significant limitations in both intellectual functioning and adaptive behaviour that covers everyday social and practical skills” (AAIDD, 2019: para, 1). Whilst studies that have looked specifically at the overlap between ID and ADHD have identified that children with mild or borderline ID have ADHD in 8-39% of cases (Emerson, 2003; Baker, Neece, Fenning et al., 2010). It has been found that ADHD is one of the most common forms of psychopathology in children with ID (Baker, Neece, Fenning et al., 2010) and there have been suggestions that individuals with ADHD and ID have an increased comorbidity of conduct disorder and oppositional defiant disorder (Ahuja, Martin, Langley et al., 2013).

Before discussing comorbidity between ADHD and Learning Disabilities (LD), it is necessary to provide some background to the terminology used to refer to ‘learning disabilities’ or ‘learning difficulties’. Over the past 40 years there has been continuing refinement of the term LD and how to identify these in individuals (Kavale, Spaulding and Beam, 2009; Buttner and Hasselhorn, 2011). For example, within a period of five years (2006-2010) there were over 2500 publications on LDs worldwide (Buttner and Hasselhorn, 2011). According to Buttner and Hasselhorn (2011) students with LDs comprise the largest single category of students with special education needs in most countries. A study in the United States found that 50% of children identified for special education

services had a learning difficulty (Kavale and Forness, 2006). An individual can be identified as having LDs at any time in their life and not only during childhood. People with LDs may suffer with low self-esteem and research has shown that children with learning disabilities experience lower level acceptance from their classmates than non-learning-disabled students (Zhao, Zhang and Yu, 2008; Roffman, 2007).

The American definition of Specific Learning Disability (SLD) is defined in the Individuals with Disabilities Education Improvement Act (IDEA) of 2004. In the legislation, the definition of LD is a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written language, which may manifest itself in an imperfect ability to listen, speak, read, write, spell, or do mathematical calculations (Al-Yagon, Cavendish, Cornoldi et al, 2013).

However, a second definition of SLD primarily used by medical practitioners in their diagnostic process comes from the Diagnostic Manual of Mental Disorders (DSM) published by (APA, 2013). Instead of using the term 'specific learning disability' (SpLD) in IDEA the DSM definition uses the term 'specific learning disorder'. The definition provides:

“The diagnosis requires persistent difficulties in reading, writing, arithmetic, or mathematical reasoning skills during formal years of schooling. Symptoms may include inaccurate or slow and effortful reading, poor written expression that lacks clarity, difficulties remembering number facts or inaccurate mathematical reasoning”
(APA, 2013).

Whilst one definition refers to learning disability and the other to learning difficulty, either is an umbrella term used for a variety of learning problems. It is important to point out that having a learning disability does not mean the individual has an intellectual impairment or lacks motivation to learn. On the contrary, such people have a neurological difference in how they receive and process information compared to those who are non-learning disabled. Both definitions include problems that individuals with learning disabilities have such

as reading, writing, arithmetic, listening and speaking. Individuals may be disabled in one or a combination of these and this will differ from person to person, however they are all learning disorders. KSA has paid attention to the discourse on the definition of learning disability (Alnaim, 2015), and the country has adopted the American definition of the term. In 2002 the General Secretariat for Special Education (GSSE) in the Ministry of Education (MoE) defined Learning Disabilities (LD) as:

‘Disorders in one or more of the basic psychological processes involved in understanding or using spoken and written language which is manifested in disorders in listening, thinking, talking, reading, writing, spelling, or arithmetic and it is not due to factors related to mental retardation, visual or hearing impairments, or educational, social, and familial factors’ (MoE, 2002).

Whilst the terms ‘learning disability’ (LD), ‘specific learning disability’ (SpLD) and ‘specific learning disorder (SLD) refer to similar conditions this study will use the term SpLD to refer to specialist teachers of children with LD in mainstream schools.

In terms of comorbidity between ADHD and LD, ADHD is a common associated disorder that can make learning at school difficult (Greenhill, Pliszka, Dulcan et al, 2002; Wilens and Spencer, 2010). Both LD and ADHD are considered to be high-incidence disorders commonly seen in childhood (Pham and Riviere, 2015). The fact that a child has a LD does not mean he or she also has ADHD, however a child with ADHD will most likely have a LD since the two conditions can interact (Cantwell and Baker, 1991; Rief, 2005; Pham and Riviere, 2015). Whilst not a learning disorder itself, ADHD can disrupt a child’s ability to learn and can therefore negatively impact upon a child’s academic development and performance (Barry, Lyman, and Klingler, 2002; Faraone, Sergeant, Gillberg, and Biederman, 2003; Currie and Stabile, 2004; Todd et al., 2002; Loe and Feldman, 2007).

LD deficits in children with ADHD tend to fall under three broad sub-categories: reading disorder, written language disorder and mathematics disorder (Pham

and Riviere, 2015; Pennington, 2006). DuPaul and Stoner (2003) reviewed 17 studies between - 1978 and 1993 and found a 31% prevalence of learning difficulties amongst children with ADHD. They also found that on average, children with ADHD are about three times more likely to have a LD compared to their non-ADHD classmates (DuPaul, Gormley and Laracy, 2013). In the same sample, there was a 38.2% prevalence rate for ADHD among children with a LD. This shows that children with ADHD are at a higher risk of having a LD. Research has found that the inattentive type of ADHD has a greater impact upon academic achievement compared to hyperactive-impulsive disorder (Masseti, Lahey, Pelham et al, 2007).

In reviewing studies between 2001 and 2011 regarding comorbidity of ADHD and LD, DuPaul et al (2013) found that the most common LD in children with ADHD was writing disorder with a rate from 59% to 65% (Mayes and Calhoun, 2004, 2006, 2007) and from 24% to 38% (Capano, Minden, Chen et al, 2008; Faraone, Biederman, Monuteaux et al 2001; Langberg, Vaughn, Brinkman et al, 2010). This was followed by reading disorder which had a comorbidity of between 11% and 52% (Capano et al., 2008; Del'Homme, Kim, Loo et al., 2007; Langberg et al., 2010; Mayes and Calhoun, 2006, 2007; Miranda, Soriano, Fernández and Meliá, 2008; Wisniewska, Baranowska, and Wendorff, 2007). The comorbidity rates for mathematics ranged from 5% to 30% (Capano et al., 2008; Del'Homme et al., 2007; Langberg et al., 2010; Mayes and Calhoun, 2006, 2007; Miranda et al., 2008). Overall, DuPaul et al (2013) found 31% to 45% of students with ADHD have LD and vice versa.

2.5 ADHD as a pervasive disorder

Information about ADHD symptoms in different settings whether in home, school or in community may help to establish that these symptoms are pervasive and not a result of a particular environmental context (Mahajan et al, 2012). However, whilst there is a lack of studies that discuss whether ADHD is a pervasive disorder, there have been limited studies that investigated an overlap and relationship between ADHD and Pervasive Developmental Disorder (PDD) (Millichamp, 2006; Frazier et al, 2001; Campbell et al, 1990; Frankhauser et al, 1992; Kolmen et al, 1995; Hattori et al, 2006; Gadow,

DeVincent & Pomeroy, 2006; Reichow, Volkmar & Bloch, 2013; Zablotsky, Bramlett & Blumberg, 2017).

PDD, is a group of disorders which have an impact on development such as communication or the ability to socialise (DSM-IV APA, 1994) and more recently includes Autism Spectrum Disorder (DSM-V APA, 2013). In their review Reichow, Volkmar & Bloch reported that the comorbidity of ADHD symptoms in individuals with PDD is between 30 – 50% (Sinzig et al, 2009; Leyfer et al, 2006; Simonoff et al, 2008) and even higher (Frazier et al, 2001).

Since children with PDD can manifest ADHD-like symptoms there is an overlap between the two conditions meaning that children with PDD who show ADHD symptoms could be diagnosed with ADHD (Frazier et al, 2001; Campbell et al, 1990; Frankhauser et al, 1992; Kolmen et al, 1995; Hattori et al, 2006) and vice versa (Millichamp, 2006). However, it should also be noted that not all children with PDD demonstrate the same degree of ADHD symptoms yet there is some linkage between the extent of ADHD-like symptoms and co-occurring psychiatric symptoms (Gadow et al, 2006). According to the systematic review conducted by Reichow, Volkmar & Bloch in 2013 children with PDD and ADHD-like symptoms may benefit from the same treatment that has been effective in treating ADHD. However, According to Frazier et al in 2001 children with PDD that exhibit ADHD-like symptoms but do not have ADHD could mean that any treatment intended for ADHD might be problematic in the treatment of PDD (Frazier et al, 2001). Recommendations have been made for future studies to compare children diagnosed with ADHD with children diagnosed with PDD but exhibit ADHD-like symptoms (Zablotsky et al, 2017).

2.6 Aetiology of ADHD

There is no consensus amongst researchers on what is directly responsible for ADHD (Purdie, Hattie & Carroll, 2002) and it has been widely said that there is no single cause of ADHD (Visser & Jehan, 2009; Thapar, Cooper, Jefferies et al., 2012; Thapar, Cooper, Eyre et al., 2013). Epidemiology of the disorder is broad and can be associated with biomedical, psychological and sociological contexts (Visser & Jehan, 2009). Despite this, the biomedical model of ADHD

has been dominant in the literature (Barkley, 1998; Barkley, 2000; Forness and Kavale, 2001; Dryer, Kiernan, and Tyson, 2006; Visser & Jehan, 2009), with a focus of research on genetics as a possible cause of ADHD (Tannock, 1998; Faraone and Doyle, 2001; Faraone, 2005; Thapar, O'Donovan and Owen, 2006; Hay, Bennett, Levy et al., 2007; Thapar, Langley, Asherson et al., 2007; Thapar, Cooper, Jeffries et al., 2012; Thapar, Cooper, Langley, 2013). Another possible contributing cause of ADHD is environment and specifically pregnancy issues such as smoking and alcohol of the carrying mother, low birthweight and exposure to toxins (Greven, Merwood, Jolanda, 2016; Thapar et al., 2012; Thapar, O'Donovan and Owen, 2005; Thapar et al., 2007; Ghirardi et al., 2018; Visser & Jehan, 2009; Forness and Kavale, 2001; Efron, 2019).

2.6.1 Genetics

ADHD is highly heritable (Faraone et al, 2005) with a range of 60-91% (Thapar, Holmes, Poulton et al., 1999; Thapar et al., 2007). This means that family studies have shown higher rates of the disorder and therefore reinforce heritability of the disorder (Thapar et al., 2012; Thapar et al, 2017). Studies have shown that first degree relatives of affected individuals show higher rates of ADHD (Kahn, Khoury, Nichols et al., 2003; Biederman, 2005) and are two to eight times more likely than relatives of unaffected individuals to also show ADHD (Faraone et al, 2005). The central importance of genetic influences on ADHD (Daley, Sonuga-Barke, Thompson et al., 2008) has led to the majority of molecular genetics research suggesting the underlying cause of ADHD is dysfunctional genes (Tannock, 1998; Faraone, 2005; Hay et al, 2007) and whilst several genes are seen as statistically more likely to cause ADHD than others (Frank-Briggs, 2011; Daley, Sonuga-Burke, Thompson et al., 2008), research has consistently identified the dopaminergic system as relevant to ADHD (Thapar et al., 2005; Thapar et al., 2007; Thapar et al, 2012; Forness and Kavale, 2001; Efron, 2019).

2.6.2 Environmental

Inherited factors are not the only explanation of ADHD; research has shown that there are also environmental considerations that may contribute towards

the disorder (Greven, Merwood, Jolanda, 2016; Thapar et al., 2012; Thapar, O'Donovan and Owen, 2005; Thapar et al., 2007; Ghirardi et al., 2018; Visser & Jehan, 2009; Forness and Kavale, 2001; Efron, 2019). Thapar et al. (2012) identified environmental factors could be distinguished as pre and post-natal. Smoking and consumption of alcohol and drugs during pregnancy, in addition to stress and bleeding during pregnancy, have been highlighted in studies as possibly contributing environmental factors towards ADHD (Langley, Rice, Van den Bree, 2005; Thapar et al, 2005; Braun, Kahn, Froehlich et al., 2006; Efron, 2019). Post pregnancy there have been a number of potential environmental risk factors of ADHD such as premature birth or low birth weight, diet and parental upbringing or parental practices (Bhutta, Cleves, Casey et al., 2002; Franz, Bolat & Bolat, 2018). However, environmental risks alone are not a predictor of ADHD (Forness and Kavale, 2001; Biederman and Faraone, 2002; Thapar et al., 2007; Efron, 2019). In addition to these, peers and the school environment have also been identified as environmental impacts of ADHD (APA, 2000; Irene, Loe, Heidi et al, 2007).

2.6.3 Gene-Environmental interaction (G x E)

The interplay between genetics and environment in the aetiology of ADHD is significant and complex (Thapar et al., 2005, 2007). Studies have shown that one has effect over the other e.g. environmental risks can alter gene function and genetic factors can be influenced by environmental factors (Rutter, Moffitt & Caspi, 2006; Thapar et al, 2012; Ghirardi et al., 2018). Further to this, Daley et al. (2008) identified that gene-environmental interplay can be categorized into two types: synergistic and antagonistic. The first describes when genetic and environmental risks interplay to increase the probability of ADHD; whilst the second describes when interplay lowers the probability of ADHD. Daley et al., 2008 have argued that improving poor parenting could reduce ADHD symptoms and preventing the development of behavioural problems in children with ADHD.

2.6.4 Dual pathway model of ADHD

A significant theoretical model in the heterogeneity of ADHD was proposed by Sonuga-Barke (2002) who indicated that the disorder develops along two pathways: cognitive and motivational. The cognitive part of this dual pathway is often associated with executive functioning (EF) whilst the motivational pathway relates to functional expression such as delay aversion.

In terms of the first pathway EF, it has been defined as *“the ability to maintain an appropriate problem set for attainment of future goals”* (Welsh & Pennington, 1989 p.201) and refers to a wide range of central cognitive functions that play a critical role in the management of daily life (Brown, 2009). Another way of looking at EF has been through an individual’s ability to resolve conflict where two responses are simultaneously called for by stimuli (Swanson, 2003). It is widely discussed that children with ADHD have impairment with EF (Biederman, Monuteaux, Doyle et al., 2004) and this will have a negative impact on psychiatric, social and academic outcomes associated with ADHD (Barkley, Fischer, Edelbrock et al., 1990; Biederman et al., 1996; Cantwell, 1985; Edelbrock, Costello & Kessler, 1984; Faraone et al., 1993; Greene, Biederman, Faraone et al., 1997; Hart, Lahey, Loeber et al., 1995).

The study by Biederman et al. (2004) found that in children irrespective of gender, those with ADHD were more likely to have EF disorder compared to children without ADHD. Such findings are consistent with previous studies that also found increased EF impairments in children with ADHD compared to those without ADHD (Barkley, 1997; Douglas 1972; Seidman, Biederman, Faraone et al., 1997; Seidman, Biederman, Monuteaux et al., 2000). This would indicate that EF disorder enhances difficulties in educational functioning already faced by children with ADHD (Biederman et al., 2004).

With regard to the motivational pathway, Haenlein and Caul (1987) suggested dysfunction in reward and motivation plays a role in ADHD; this means that the significance of incentives could be judged as greater to children with ADHD compared to children without the disorder (Kollins, Lane and Shapiro, 1997). Delay aversion challenges the notion that the major underlying cause of ADHD

is a cognitive deficit in executive control (Antrop, Stock, Verte et al., 2006). Children with ADHD experience a greater sensitivity to delay than their peers therefore they are more likely to select an immediate reward instead of waiting for a larger delayed reward (Sjowall, Roth, Lindqvist et al., 2013). Marco, Schlotz, Melia et al. (2009) hypothesizes that such an aversion to delay in children with ADHD is based on the negative feelings such as frustration and agitation amongst children with the disorder when delay is imposed.

The common finding in studies that children with ADHD often find tasks uninteresting due to boredom (Barkley, 1990) may suggest that any impairment in motivation in such children could contribute to the severity of inattentive symptoms of ADHD (Volkow, Wang, Newcorn et al., 2011). Volkow et al (2011) in their study pointed out that dysfunctions in motivation contribute to inattention in ADHD which strongly suggests that ADHD is not only deficit of attention and hyperactivity but also of motivation that reflects a dysfunctional delay aversion reward pathway.

Timing impairment is also considered as a cognitive deficit commonly associated with ADHD, and there has been a considerable number of studies that have highlighted children with ADHD are prone to experiencing difficulties with timing (Marx, Reis and Berger, 2019). According to Barkley (1997) individuals with ADHD have an impaired ability to withhold immediate behaviours which then makes it impossible to bring their behaviours under the control of their EF. This is shown in those with ADHD by their likelihood to have a deficit in basic time processing abilities such as planning and allocating sufficient time to activities (Marx, Reis and Berger, 2019). According to Noreika, Falter and Rubia (2013), the ability to effectively manage time and also the perception of time is impaired when ADHD is observed. In other words, time perception for example, as a key skill of temporal processing, which, in association with time estimation, time discrimination, temporal production and time reproduction, is likely to play a significant role in the deficits of ADHD (Smith, Taylor, Rogers et al., 2002). For instance, deficits in time estimation may underline numerous issues of impulsiveness such as issues with waiting

behaviours and delaying responses (Barkley, 1997; Sonuga-Barke, Taylor, Sembi and Smith, 1992).

According to McInerney & Kerns (2003) lower motivation towards tasks often found in children with ADHD raises the question of whether such children actually have impaired sense of time or whether they lack persistence to endure delay – as described by Sonuga-Barke in 2002. However, it has been widely accepted that impairment with timing often characterized in children with ADHD, can impact upon other behaviours and cognitive processes as well as motor timing (Smith, Taylor, Rogers et al., 2002).

According to Thorell (2007) both EF and delay aversion are independently related to ADHD symptoms and impairments or issues of EF and delay aversion manifest themselves early on in development. Thorell goes on to find that cognitive deficits such as EF had independent effect on inattention, whereas hyperactivity/impulsivity could be independently affected by delay aversion (Thorell, 2007; Sonuga-Barke, Bitsakou, Thompson, 2010). This in turn supports the view that EF and delay aversion are separate pathways to ADHD (Sonuga-Barke, 2002; Thorell, 2007).

EF has been found to make a greater contribution to academic underachievement than delay aversion (Thorell, 2007) therefore children with ADHD who have EF impairment might be more likely to face academic difficulties (Daley and Birchwood, 2009). Previous studies have shown that children and adults who have ADHD and EF performed significantly poorer academically when compared to individuals who had ADHD but not EF, and those who had ADHD and EF were 3 times more likely to have an LD (Biederman et al., 2004).

2.7 Developmental considerations

The individual's development stage of ADHD determines the disorder's impact on their everyday functioning (Cherkasova, Sulla, Dalena et al., 2013). It is suggested that typically the onset of the disorder occurs during childhood and has the potential to be lifelong. Early studies have found ADHD could only be

diagnosed during a child's school years. It has now been accepted that the disorder can be diagnosed at any stage of life from preschool (Egger, Kondo & Angold, 2006; Posner, Melvin, Murray et al., 2007) to adulthood (Faraone, Biederman, & Mick, 2006) as well as individuals carrying impairment from school years into adulthood (Barkley, Murphy & Fischer, 2008). Longitudinal studies have found that children and teenagers with ADHD carry the disorder into adulthood (Sibley, Pelham, Molina et al., 2012a; Sibley, Pelham, Molina et al., 2012b), it has been identified that children with ADHD frequently experience problems of adjustment during adolescence, as well as adulthood difficulties with social interaction and academic underachievement (Willoughby, 2003; O'Callaghan, Reitman, Northup et al., 2003; Barry, Lyman & Klinger, 2002).

Following the publication of DSM-5 (APA, 2013) the definition of ADHD was slightly changed so that it could be diagnosed in both children and adults. This made it easier to diagnose the disorder in adults and teens, and there was no longer any requirement to check the childhood onset of ADHD symptoms of an adult suspected of having the disorder. The latest version of DSM also provides examples of how ADHD can present itself in adolescence and adulthood and the effects that the disorder can have on the individual at different stages in their life. This would reinforce the view that ADHD is a developmental disorder and it has been shown that ADHD symptoms can decrease with age (Willcutt, Nigg, Pennington et al., 2012; Biederman et al, 2004; Galera, Cote, Bouvard et al., 2011; Larsson, Dilshad, Lichenstein et al., 2011; Pingault, Viding, Galera et al., 2015).

However, current debate is emerging about adults with ADHD who met the criteria for the disorder in adolescence or adulthood but not childhood (Asherson and Agnew-Blais, 2019). Prevalence for individuals in this category is 1-2% whilst the prevalence for adult ADHD is 3-4% (Asherson and Agnew-Blais, 2019). This raises the interesting question about the severity of adult onset ADHD being potentially different to early onset of the disorder, it has already been suggested that symptoms of ADHD are likely to have more significant detrimental effect in a younger child compared to an older one and could be more prominent in a school setting (Sonuga-Barke and Fearon, 2019).

This then raises the question whether early and late onset ADHD have the same impact on the individual or are seen as the same problem. Whilst longitudinal studies that look at the impact of adult ADHD in individuals that did not present ADHD symptoms according to DSM criteria are still ongoing, emerging results do indicate that it would no longer be valid to say that late-onset ADHD must be based on childhood symptoms of the disorder (Asherson and Agnew-Blais, 2019).

2.8 The impact of ADHD symptoms on children's behaviour in the classroom

A child with ADHD will not only display behaviours at home and family but also demonstrate such behaviours within the school environment to their teachers and to classmates. It is within the school setting that pupils will be expected to have skills in planning and coordination as well as having appropriate interactions with classmates, however children who have not developed sufficient self-regulatory control are likely to find such an environment challenging (Miranda, Jargue and Tarraga, 2006). ADHD is likely to be more noticeable in the classroom owing to structure and the expectation that pupils concentrate and are required to sit still for a long periods of time (Andrews, 2000; Brice, 1998; Kendall, Hatton, Beckett et al., 2003).

Studies have shown that teachers are more likely to report children with ADHD as having conduct problems, disruptive behaviour and poorer social skills than their peers who do not have the disorder (Dupaul, Volpe, Jitendra et al., 2004). According to Loe and Feldman (2007), it is a key feature of ADHD that children with the disorder will encounter problems in school and the evidence that ADHD is associated with poor academic outcomes is overwhelming (Loe and Feldman, 2007). There is considerable literature that suggests poor academic achievement and attainment of children with ADHD (Hinshaw, 1992a; Barry, Lyman et al., 2002; Fergusson and Horwood, 1995; Fergusson, Horwood and Lynsky, 1993; Hinshaw, 1992b; Rapport, Scanlan and Denney, 1999).

Several specific areas of academic underperformance amongst schoolchildren with ADHD have been identified in the literature: these are communication,

reading, writing and numeracy. Children with ADHD have been referred to as poor communicators since they have difficulty in using and regulating their language and expression (Cantwell and Baker, 1991; Rabiner and Coie, 2000). Such children often struggle reading long words and tend to exhibit slow reading (McGee, Partridge, Williams et al., 1991; Ghelani, Sidhu, Jain and Tannock, 2004). Writing requires a child to maintain sustained attention and therefore children with inattentive ADHD are likely to struggle (Rodriguez, González-Castro, Cerezo and Álvarez, 2012; Graham and Harris, 2005) and children with the hyperactivity subtype are likely to struggle with command of appropriate motor skills to write fluently and accurately (Mercer and Mercer, 2005; Henderson and Sugden, 1992). Finally issues with memory and attention can lead to poor mathematical problem solving (Swanson and Beebe-Frankenberger, 2004).

2.9 The role of environment and features of ADHD that might be amenable to environmental modification

Children are motivated to engage with their environment (Piaget, 1966) and the extent to which they learn from it may determine its role and the level of impact it has on both a child's behaviour and education (Gur, 2014). Any interaction by a child with the environment, individuals, curriculum and place (Gur, 2014) can influence their social/emotional, cognitive and physical development (Ferguson et al, 2013), and personal actions (Moore, Lane et al., 1994). ADHD symptoms in a child can manifest to different degrees depending upon the environment in which they are expressed such as at home or school (Soma et al, 2009). Since it has been found that the two environments in which a child spends most of their time are home and school (Jeon et al, 2014; Deb et al, 2015; Taylor et al, 2017). It is important to appreciate the role of environment and why environmental modifications at home and school should lead to change in ADHD symptom expression. A change in the environment within which the child engages could lead to modification of their behaviour patterns and it has been found that interventions including such environmental modifications and behavioural management techniques can lead to improved educational and behavioural outcomes for children with ADHD (South Australia Department for

Education, 2020). Environmental modifications have been defined as: “*structuring a child’s environment, and having supports in place that enable a child to be more successful in various areas of their life*”, meaning that effective management of the environment could *have* a positive effect on the management of ADHD (Betker 2017, p. 2).

When considering the home environment, it has been said that it is more likely to have a strong correlation with behaviour and control processes of children (McCarty et al, 2005). Several studies have found that the quality of home environment was key to a child’s cognitive and socioemotional development (Bradley & Corwyn, 2006; Evans, Wells, & Moch, 2003; Iltus, 2007) and specifically parent-child interaction was significant (Bradley & Corwyn, 2006). In a 2013 study Mulligan et al found a correlation between the home life of children and ADHD ratings given by teachers of those children. Based on the findings of their study they concluded that a more supportive home environment was associated with less symptoms of ADHD specifically hyperactive/impulsivity. It has been found that enhancing the level of support at home and making the home environment stimulating can develop crucial skills necessary for self-regulation in children (Schmiedeler, Niklas & Schneider, 2014). In addition, positive parenting is linked with a child’s ability to maintain attention and self-control (Eisenberg et al, 2005; Le Cuyet-Maus and Houck, 2002).

Environmental modification at School, which is the focus of this research, can have a beneficial impact not only on the academic performance of schoolchildren but also their behaviour (DuPaul & Stoner, 2003; Mautone et al, 2011). In a school setting making use of modifications should be specific to the circumstances of each child with ADHD based on the assessment of their needs (NIHCE, 2018) and within the classroom context to improve the behaviours of ADHD (Ervin, Kern, Clarke et al., 2000). Such modifications within the school setting can also include making adaptations to the curriculum and task modification.

In the classroom, teachers should try to reduce possible stimuli that could easily distract children with ADHD; it is known that such children are easily distracted and could lose focus. A way that teachers can manage such children in the classroom is by ensuring it is structured appropriately and this could mean that children with ADHD are seated closer to the teacher, with quiet peers or away from areas likely to distract them such as windows and doors (Lichter, 1993; Wolraich & DuPaul, 2010; Betker, 2017). Another example is the physical environment, or furniture within the classroom; if this is not appropriate then children with ADHD are more likely to squirm or fidget. Therefore, teachers should ensure that desks and chairs are the right size for children in their class (Betker, 2017). Another way in which teachers can modify the environment of children in the classroom is by increasing the movement of children with ADHD. This can be done by using movement breaks or at least try to introduce some short-term physical activity such as asking the child to take a message to the school office which will require them to get up and move (Betker, 2017).

Modification of the curriculum is another classroom environmental adaptation that can be made by teachers to support children with ADHD (Mulligan, 2001). Studies have found that curricular modifications of functional assessment can be used to decrease problem behaviours in class, and these have been effective with children with ADHD (Broussard and Northup, 1995; Lewis and Sugai, 1996; Umbreit, 1995). Teachers can make adaptations to the content of lessons; it has been found that selecting topics that are of particular interest to children with ADHD could be effective to them learning the topic (Zentall, 1993). Teachers can also think about the manner in which they present curriculum content to children with ADHD, for example using both audio and visual means of delivering content (Taylor and Larson, 1998).

Task modification involves adapting tasks in order to help children with ADHD increase their chance of task completion (Raggi and Chronis, 2006) and to lessen influence of ADHD on the child's performance (Eiraldi, Mautone and Power, 2012). One common way of modifying tasks can be by changing the duration of a task or providing additional time to ensure that a child with ADHD does not feel overwhelmed with a task (Betker, 2017). Another method is

deconstructing tasks into smaller parts and encouraging children to only move onto the next stage once they have completed the necessary part (Zentall, 1993; Taylor and Larson, 1998).

CHAPTER 3

Overview of Special Education Needs (SEN) and ADHD in Kingdom of Saudi Arabia (KSA)

3. Introduction

This chapter will mainly focus on the Saudi context and will be divided into two sections. The first section will present an overview of Special Education Needs (SEN) in KSA by taking a historical overview of SEN in addition to enactment of special education legislation and policy in KSA. Moreover, it will discuss special education teaching. The second section will discuss ADHD in KSA and its prevalence as well as the provision of services for individuals with ADHD. Finally, it will review the role of SpLD/SEN and General teachers in educating children with ADHD in KSA.

3.1 Overview of Special Education Needs (SEN) and ADHD in KSA

3.1.1 A historical overview of SEN in KSA

Prior to 1958 there was no provision of special education aimed at children and individuals who had disabilities in KSA (Aldabas, 2015). In 1960, special education provision supported men with blindness followed by boys with either visual impairment or blindness (Al-Wabli, 1996). In 1962 the Department of Special Education (DSE) was founded purposely to extend the educational, professional and social services for the visual and hearing impaired and the intellectually disabled (Al-Mousa, 1999). In 1964 The Ministry of Education (MoE) in KSA set up three Institutions in Alhofouf, Anaeza and Mecca, and opened up special education services to girls with visual impairment or blindness (Al-Kheraigi, 1989). Special education in KSA became one step towards being more inclusive in 1964 through the introduction of programmes for children with hearing impairments and deafness. It was not until 1971 that the MoE opened the Intellectual Education Institute (IEI) to educate children with intellectual disabilities with the aim of improving the social behaviour and communication skills of students (Aldabas, 2015). In 1972 the DSE became the Directorate General of Special Education (DGSE) and in 1984 gained two new departments for planning and provision of textbooks for students with disabilities. According to Al-Kheraigi (1989) by 1987, there were 27 special education schools and institutes open in KSA supporting different types of disabilities compared to only one school for the blind in 1960. Between the period of 1987 and 2000 the number rose to 54.

In the context of special education in KSA, significant improvements occurred in 1990 with the creation and use of resource rooms to help students with disabilities and the placing of children with learning difficulties into separate special education provision within mainstream schools (Aldabas, 2015; Al-Mousa, 2010). It is standard now to have special education classrooms within mainstream schools in KSA. According to Aldabas there are currently over 746 state schools that have special education classrooms for children with mild to moderate intellectual disabilities and over 47 programmes for students with mild to moderate autism (Aldabas, 2015). Currently special schools exist for students with severe and multiple disabilities (Alquraini, 2011), however it should be noted that as yet there are no separate special education services for Emotional and Behavioural Disorders (EBD) and subsequently ADHD in KSA.

3.1.2 The Enactment of special education legislation in KSA

The first legislative measure for people with disabilities in KSA was introduced in 1987 and safeguarded their equal rights in society. It resulted in the creation of organisations aimed at servicing the needs of people with special education needs and other disabilities. Article 1 is an important part of the legislation since it dealt with assessment and identification of those eligible for SEN services in KSA (Prince Salman Centre for Disability Research, 2004; Ministry of Health, 2012).

The Provision Code for People with Disabilities in KSA was issued in 2000 and guaranteed the rights of students with disabilities to a free and appropriate education as well a right to health services and rehabilitation provided by public organisations (Alruwali, 2016). In 2001 the enactment of Law Number 44 – *Regulations of Special Education Institutes and Programmes (RSEIP)* was closely aligned with the United States' federal programme entitled, *Individuals with Disabilities Education Act (IDEA) 1990* (Bin Battal, 2016; Murray and Alqahtani, 2015). The RSEIP specifies how schools must provide special education services for students with disabilities and therefore it is the RSEIP that governs the quality assurance of such services to students with special needs in KSA (Alquraini, 2011). This led to the development of SEN policy

relevant to both male and female disabled people in KSA and allowed the Government to set aims that involved improving the organisation of education and increasing the level of services provided for SEN students (Al-Mousa, 2005).

3.1.3 SEN Policy in KSA

The term special educational need is defined as those who *'are different from their peers in their cognitive, physical, emotional, sensory, behavioural, academic or communicative abilities'* (Al-Mousa, 1999: p41). The approach of KSA towards the development of special education policy has been described as cautious towards creating inclusive educational policy (Al-Mousa, 2005). A possible reason for this has been the effect of the country's conventions and principles on special education (Abed and Alrawajfh, 2017). The MoE is responsible for the provision of free education and services for all students (MoE, 2008) and in 1995 issued guidance on the aims of special education in KSA:

(a) discover each child's skills and abilities, in order to develop through appropriate programs and activates; (b) give children every opportunity for education and help them achieve their highest potential; (c) raise children with an awareness of Islamic teachings and morals; (d) develop acceptable social behaviour and prepare children for a stable life; (e) provide stability for children with disabilities and needed medical, psychological, and social care, and help children become as independent as possible; (f) prepare children for possible work in order for them to be productive and self-supporting members of society; (g) educate the general public about disabilities an foster greater understanding of how to interact with children with disabilities (As cited in Al-Ajmi, 2006).

In 2002 the DGSE published a strategy to provide additional support for students with SEN in KSA and had ten distinct themes:

- (1) Activating the roles of public schools in the field of education for students with SEN
- (2) Expanding the role of special education schools
- (3) Developing human resources within special education and mainstream schools
- (4) Developing curricula, study plans and textbooks within special education institutes and schools
- (5) Introducing modern technology to serve special categories
- (6) Developing the organisational structure of the DGSE
- (7) Reviewing and developing existing regulations and preparing new rules for future mainstreaming programmes
- (8) Reviving the role of special education in educational departments in Local Education Authorities (LEAs) in KSA
- (9) Motivating the role of scientific research in the field of special education
- (10) Coordination and cooperation of the key bodies involved, inside and outside KSA (Al-Kahtani, 2015).

Whilst in theory a policy for SEN students does exist in KSA the extent to which those students are fully included still depends heavily on the extent of their disability (Weber, 2012).

Teaching Special Education in KSA

The slow but sure development of special education in KSA came with it the requirement for appropriately skilled professionals to facilitate it. Originally the majority of Special Education Teachers (SETs) were non-Saudi or educated in America (Bin Battal, 2016). The introduction in 1996 of Learning Disabilities (LD) into the Saudi educational system provided further clarity not only on what the notion meant but also on how to best meet the needs of people with such difficulties (Al-Hano, 2006). King Saud University (KSU) was the first to offer training that resulted in a teaching degree specifically in LD. Until 2002 only two universities provided training for teachers to work with SEN in KSA and as a result there became a growing need to establish more departments so as to train more teachers to meet the needs of students (Al-Mousa, 1999). In 2012

The DSE issued guidance on the responsibility of SETs to promote, amongst other things, students' social and intellectual development. To do this they should work with General Teachers to provide assistance to each student with special needs (DSE in KSA, 2012).

To become a SpLD teacher, individuals must complete a four-year programme to prepare them for a career either in special education or to facilitate inclusion in mainstream schools. Part of the programme requires the individual to be placed in a school for at least one semester. According to Algarni (2012), the majority of participants on these courses are either pre-service teachers studying for their basic teacher qualification or existing in-service teachers who now want to specialise in special education. The training of SETs is closely monitored by the MoE, in addition to the content of the programmes and the skills that they will learn (Al-Kahtani, 2015).

It is vital to ensure training deals with practical problems that can be posed by children with special needs and not just focused on the theoretical implications of teaching children with special needs. A study in 2013 found that special education programmes at Saudi Universities concentrated more on theoretical issues in special education rather than practical issues and that such programmes lacked key performance indicators necessary to measure the quality of such as a means of ensuring SETs were appropriately educated in dealing with special needs children (Al-Zoubi and Abdel Rahman, 2013).

3.1.4 Special Education and Mainstream School Settings in KSA

There are two types of educational setting for students with SEN in KSA: mainstream schools or special education institutions (Al-Mousa, 2010). Mainstreaming is still in the early stages in KSA but is considered effective educationally, socially, and psychologically (Al-Mousa, 2010). According to the MoE it is *“educating children with special educational needs in regular education schools and providing them with special education services”* (MoE, 2002).

Mainstreaming can be divided into two types: partial and full (Al-Mousa, 2010). Partial mainstreaming is the establishment of self-contained classes in regular schools and gives students the opportunity to be partially taught alongside and engage with non-disabled peers (Al-Mousa, 2010). Within partial mainstreaming there are two types of self-contained class: independent classes that follow the curriculum related to special education institutions, and classes that implement the school curriculum (Al-Mousa, 2010; Shahrani, 2006). Full mainstreaming is where students with disabilities are taken out of regular classes only to receive special education in subjects that cannot be taught by general education teachers (Al-Mousa, 2010). Mainstreaming provides an educational setting for students with mild to moderate disabilities to fully participate in the general educational curriculum whilst at the same time allowing for some modification and accommodation (Alquraini, 2010). The education of SEN students in a mainstream environment allows them to still reside with their parents whilst at the same time maintaining interaction with their peers who are likely to be accepting of them and involve them in classroom activities (Al-Kahtani, 2015).

Children unable to participate in mainstream education are those with severe disabilities. They are taught in specialist educational settings designed to support them with their disability and as a consequence do not interact with non-disabled peers as they would within an inclusive setting (Alquraini, 2010). Children taught at such institutions remain there during the week and go home at weekends since it is not feasible due to distance for many families to take their children to school on a daily basis.

3.2 ADHD in KSA

3.2.1 Introduction

Whilst ADHD is one of the most common neurobehavioural development disorders amongst children there has not been an abundant number of studies looking at the existence of the disorder amongst Saudi schoolchildren. The improvement of current practice and management of ADHD is reliant on an increase in awareness of the disorder in KSA (Alghamdi, Alharbi, Susi, and

Thani, 2017). A recent study in Madina city, KSA found that the majority of people had heard about ADHD (71.8%) through sharing of experiences instead of written sources of information about the disorder (Alghamdi et al., 2017). There should be an automatic increase in knowledge about ADHD as the number of studies that highlight its existence in KSA grows.

3.2.2 Prevalence of ADHD

There have only been a few studies conducted in KSA that look at the prevalence of ADHD in general, and even fewer that concentrate on Saudi schoolchildren. This has led to what some have considered to be a paucity of information that is not greatly detailed (Sayal, Hornsey, Warren, et al, 2006; Jenahi, Khalil and Bella, 2012). Studies that have looked at prevalence of ADHD but not amongst schoolchildren show a range between 6.2% (Al-Modayfer and Alatiq, 2015) to as high as 25.5% (Al-Haidar, 2003) amongst adolescents or patients. Meanwhile studies that have included Saudi schoolchildren range from 2.68% (Alqahtani, 2010); 11.3% (Al-Modayfer and Alatiq, 2015); 11.6% (Homidi, Obaidat and Hamaidi, 2013) and 16.4% (Al-Hamed, Taha, Sabra and Bella, 2008). A recent KSA study in 2018 found a prevalence of 5% (Al-Zaben et al., 2018). Of those studies that specifically looked at prevalence of ADHD amongst both male and female schoolchildren, it can be seen that there was a higher prevalence of ADHD in boys compared to girls (Alqahtani, 2010; Abu Taleb and Farheen, 2013; Homidi et al., 2013). Of the two Saudi studies that looked at boys and girls, it was found that the prevalence of ADHD amongst boys was 16.4% (Al Hamed et al., 2008) and 3.5% in girls (Jenahi et al., 2012). However, the study conducted by Al-zaben et al. (2018) found the opposite: Saudi schoolgirls (5.3%) had a higher prevalence rate compared to boys (4.7%).

3.2.3 Services provision for individuals with ADHD

3.2.3.1 ADHD Policy

More attention has been paid in recent years towards ADHD in KSA. Whilst there is still a lack of service provision for children with ADHD compared to other countries there are more medical and educational services than in

previous years. In addition, ADHD is now included under the category of special education in KSA (MoE, 2017; Kamal, 2016).

The ADHD Society of KSA (AFTA Society) was established in 2008 and officially registered at the Ministry of Social Affairs (MoSA) on 9 September 2009. Its aim is to increase awareness of ADHD amongst parents, educators and health care professionals to improve the lives of individuals with the disorder and their families (AFTA, 2009). AFTA have done this through the development of laws and regulations to guarantee the rights of individuals with ADHD; securing specialist services related to ADHD; and organising local and international conferences to discuss ADHD (AFTA, 2009).

Whilst KSA hosted the first Middle Eastern Symposium for ADHD in 2004, it was not until 2011 that the first ADHD conference on ADHD in KSA took place. Both were aimed at health professionals, educators, parents and individuals with ADHD (Middle East ADHD Symposium, 2004). In 2009 the National Project for Dealing with Children with Attention Deficit and Hyperactivity Disorder (NPDCAD/HD) was established after being officially accepted by the Saudi Government. The creation of the project followed a recommendation from the 2004 Middle Eastern Symposium on ADHD to establish and improve services in KSA for individuals with the disorder.

The Council of Ministers on behalf of the Saudi Government in 2009 called for:

1. The allocation of centres and clinics for diagnosis and treatment for cases of ADHD; the provision of appropriately qualified professionals and experts in the field of ADHD to help individuals in KSA with the disorder.
2. The granting, by the MoE, of licenses and authorization to open private centres for ADHD if the service is for both male and female schoolchildren; or by the MoSA if it is a charitable centre. The Ministry of Health (MoH) will supervise the licensing aspects for professionals that work in such private centres for ADHD (Saudi Arabia Ministry of Foreign Affairs, 2009).

According to AFTA, children with ADHD find it difficult to adapt, make friendships and are prone to academic failure; this can lead to 30% of children unable to complete high school study in KSA (AFTA, 2017).

The National project stated that the provision of services for individuals with ADHD should be continuous and that it would work to coordinate, improve and evaluate services to increase efficiency in the provision of educational, social and medical services.

The National Project required the following Ministries in KSA to collaborate and work together. The Project was dated prior to the amalgamation in 2015 of the MoE, which previously only governed schools in KSA, and the Ministry of Higher Education that regulated Colleges and Universities (MoE, 2017). The National Project directed that the MoE ensure the provision of early intervention programmes for pre-school age children with ADHD. Also, schools were to admit both male and female children with ADHD into mainstream schools and existing LD's programmes, a multidisciplinary team should diagnose those children and provide each child with an individual education plan (IEP). The Project made it clear that the MoE and schools should take into account the individual differences of children with ADHD, particularly with regard to examinations. In addition, the MoE was given responsibility for the provision of introductory lectures and workshops on ADHD for teachers and was expected to establish closer communication between schools and families of children with ADHD.

The then MoE in KSA was directed by the National Project to grant scholarships to individuals who would pursue bachelors, masters and doctoral studies in the field of ADHD. The Ministry was to encourage colleges and universities to include content about ADHD into teaching degrees, and to establish specialist education departments to focus on ADHD. The Ministry would also be responsible for developing ADHD research in KSA and establish diagnostic tools for the disorder.

Under the National Project for ADHD the MoH was required to establish specialist treatment centres and provide staff that are specially qualified. It was

envisaged that international experts would be attracted by the establishment of such centres and provide necessary training for staff. There was also the requirement that the MoH supports the conduct of studies to determine the prevalence of the disorder and is prepared to sponsor recommendations from such studies. The MoH must support families of individuals with ADHD by familiarizing them with the nature of ADHD as a disorder and educate them in how to deal with it. Through the use of therapeutic or behavioural intervention it would control some of the symptoms associated with developmental disorders. It would ensure that an individual with ADHD referred by a medical professional to either the MoE or MoSA is based on a medical, psychological and social report and official diagnostic results according to International Classification of Psychiatric Disorders (ICD-10). Finally, the MoH would hold local and regional conferences and seminars to identify ADHD and methods of diagnosis and treatment.

The MoSA through the National Project was required to provide support for children and students outside the school environment by helping to prepare them for entering work and society in general. The Saudi government would provide a financial incentive to fund the activities of private and charitable organisations, as well as studies that develop initiatives which support individuals with ADHD.

3.2.3.2 Current academic provision for schoolchildren with ADHD

Following formal approval of the National Project in July 2009, ADHD became one of the categories of Special Education (MoE, 2017; Kamal, 2016). However, the MoE did not approve the ADHD programme in mainstream primary schools for children with ADHD until 2015, initially 30 programmes opened (Bin Battal, 2016) in Riyadh, Jeddah, Dammam, Assir and Hail (MoE, 2017). These began at primary school level with the expectation that provision would expand to further levels and to more cities in KSA (MoE, 2017).

The goal of the programme was to maximize educational opportunities for children with ADHD to perform to the best of their ability and have the best possible chance to integrate into society. In order to achieve this goal it is important that children with ADHD are educated in mainstream schools with

their peers who do not have ADHD since it provides a normal and natural educational, social and psychological environment (MoE, 2017). Educating children with ADHD in mainstream schools can follow one of four approaches:

- Standard classroom teaching with additional support from a teacher counselor
- Standard classroom teaching with additional support from a visiting teacher counselor
- Standard classroom teaching with access to a resource room
- Separate/private classroom

MoE guidance in 2017 stated that time spent by a child with ADHD in a resource room should not be more than 50% of the school day (MoE, 2017).

3.2.4 The role of SpLD/SEN and General teachers in educating children with ADHD

According to the Regulatory Manual for Special Needs (RMSN) published by the MoE in KSA (2015) SpLD/SEN teachers are those who provide academic services to students with learning difficulties through specific learning programmes whilst General teachers can be defined as those who ensure an educational and stimulating learning environment for students.

According to the MoE both SpLD/SEN and General teachers are required to possess a bachelor's degree in education, however SpLD/SEN teachers must possess a bachelor's degree in special education. In addition, both should possess knowledge of psychological and social issues that affect children with learning disorders; know about strategies for positive behaviour; have knowledge of individual differences amongst children; and be tolerant towards children in general and towards children with learning disorders (MoE, 2017). However SpLD/SEN teachers are required to identify the basic needs of a child on a special education programme; participate in the diagnosis process of children with special needs; collaborate with others in the special education programme to design and implement a Special Educational Plan for each child; provide specific teaching and skills that cannot be taught by General teachers;

help children with special education needs to overcome their learning disabilities; help children develop the necessary communicative and social skills to help them be successful at school and outside of school; provide General teachers with advice and guidance about educational strategies for children with LD and update them with relevant information; work with parents and families of children with learning disabilities and provide them with useful guidance and information; and provide an appropriate educational environment in which the child can reach their full potential (MoE, 2017).

General teachers play a number of important roles, however for the purposes of this chapter we will focus on the main ones in order to contrast with the SpLD/SEN teacher. General teachers are responsible for teaching the school curriculum; using appropriate teaching strategies and providing support and guidance for children generally in the classroom and activities out of class such as homework. The teacher should provide feedback to children both on their work at school and at home, and feedback should help to improve educational prospects and address weaknesses of children in their class. General teachers should work with school administrators to ensure the environment is beneficial for and conducive to educational learning. They should attend educational training and workshops as instructed by their school or directed by the MoE. By observing children in class, General teachers should be able to identify problems that may prevent the child from progressing academically (MoE, 2017).

General teachers are responsible for the day-to-day teaching of all children whilst SEN teachers are used specifically as a consultant and additional resource to teach the child with ADHD in a specific way (Al-Zoubi and Abdel Rahman, 2016). To support schoolchildren with ADHD in a mainstream school setting it is essential that General teachers work in collaboration with SEN teachers (Oznacar and Dagli, 2015) since this collaboration ensures children with ADHD receive the appropriate level of support and education (Al-Zoubi and Abdel Rahman, 2016; Van Garderen, Stormont and Goel, 2012).

CHAPTER 4

Systematic Literature Review

4. Systematic Literature Review

Abstract

Objective - To identify the level of knowledge and attitudes towards ADHD amongst primary school teachers. In addition, to identify the effectiveness of school based non-pharmacological ADHD interventions on teachers' knowledge of the disorder. Methods – seven databases were searched from their date of inception up until April 2020 and studies that were in English and peer reviewed only were included. Results – 43 studies were identified within the inclusion criteria; 33 on ADHD knowledge amongst primary schoolteachers and 10 on non-pharmacological interventions designed to enhance teachers' knowledge of the disorder. Of the 33 studies that looked at knowledge a majority showed a lack of ADHD knowledge amongst teachers. Nearly all non-pharmacological intervention studies showed an improvement in teacher's knowledge post intervention. Conclusions – Generally there is still a lack of ADHD knowledge amongst teachers and particularly knowledge of treatment for the disorder. From the intervention studies found in this review, it can be suggested that non-pharmacological interventions have been limited and successful in enhancing teachers' knowledge of ADHD however it is difficult to draw firm conclusions from the findings due to methodological differences between studies.

Title:

Effectiveness of school-based interventions designed to enhance teachers' knowledge and attitudes towards Attention Deficit Hyperactivity Disorder (ADHD) to support them in dealing with children with or, suspected of having, ADHD in the classroom: A systematic review

4.1 Systematic Review Question

What school-based interventions have been developed to support teachers' knowledge and attitudes towards children with, or suspected of having, ADHD in school and classroom?

- A. What is the level of knowledge and attitudes towards ADHD amongst primary school teachers?

- B. Are school-based interventions developed to support teachers of children with, or suspected of having, ADHD effective in improving their Knowledge and Attitudes?

4.2 Aims and Objectives

To accurately measure the level of knowledge amongst teachers of primary school children with ADHD and their attitudes towards them, and their knowledge of non-pharmacological treatment in the classroom.

Objectives of Question A:

- To measure what teachers know about ADHD in general, causes of the disorder along with diagnosis and treatment
- To discover teachers' beliefs towards ADHD

To identify and evaluate the effectiveness of school-based non-pharmacological interventions for primary school teachers of children with, or at the risk of having ADHD. Of primary consideration for the researcher was

whether the intervention was effective by enhancing knowledge of ADHD and improving teachers' attitudes towards the disorder.

Objectives of Question B:

- To identify and summarise all evidence pertaining to interventions designed to support teachers' knowledge in dealing with children with, or suspected of having, ADHD in school
- To evaluate whether such interventions developed and delivered in educational settings for supporting teachers in dealing with children with, or suspected of having, ADHD are effective
- To explore features of programmes that may increase the effectiveness of training

4.3 Introduction

Enhancing teachers' knowledge of ADHD can help them to play a vital part in the child's management of the disorder such as the early identification of ADHD during their educational development (Abu Taleb and Farheen, 2013). Further to this it has been said that children with ADHD are likely to receive a better level of support if they are taught by a teacher who possesses enhanced knowledge and demonstrates a positive attitude towards the disorder (Ohan, Cormier, Hepp et al, 2008).

The delivery of training to teachers whilst teaching at school can be used to strengthen their knowledge and improve their practice (James, 1973) as well as change their behaviour and attitudes (Ronald, 2004; Omar, 2014). It can not only benefit the learning needs of pupils that ultimately are taught by teachers that have received training but also offers professional development to staff (Rashid, 1996). It has been recognised that providing training to teachers whilst they are on the job is an extremely important method of enhancing their knowledge of ADHD, improving attitudes and reducing negative beliefs and behaviours of teachers towards the disorder (Bekle, 2004; Moldavsky and Sayal, 2013).

4.4 Significance of this systematic literature review

Due to the absence of any previous systematic reviews on the level of teachers' knowledge and attitude towards ADHD, this review is not only the first to be conducted which examines the level of knowledge and attitudes towards ADHD amongst primary schoolteachers globally but also it is the first to examine the effectiveness of delivering an ADHD intervention to enhance the level of knowledge held amongst primary schoolteachers.

4.5 Previous Systematic Reviews

Prior to conducting my own systematic review on teachers' knowledge of ADHD and non-medical interventions aimed at teachers to potentially enhance their knowledge of the disorder, the researcher came upon a limited number of studies that have conducted systematic investigations within the field. Initially when checking PROSPERO there was no prior systematic review registered and therefore a systematic search on the following was conducted: *What systematic review has already been done on interventions that have been developed to support teachers with the requisite knowledge to cope with children that have ADHD, or are at risk of the disorder, in schools?* In order to answer this the researcher searched the following databases: SCOPUS, Web of Science, ERIC, PUBMED and PsycINFO with the following search terms: Teacher, Knowledge, Attitude, Interventions, ADHD, Systematic Literature Review. The search yielded six studies: Montoya et al., 2010; Moore et al., 2015; Richardson et al., 2015; Moore et al., 2016; Tatlow-Golden et al., 2016; and Gaastra et al., 2016.

Moore et al's study in 2015 brought together four systematic reviews including 138 studies that focused on non-pharmacological interventions for ADHD in school settings. This study focused on the effectiveness of interventions for ADHD, attitudes toward and experience of school-based interventions for ADHD. Within this review there were two quantitative and two qualitative reviews. The focus of the quantitative reviews was either or effectiveness of non-pharmacological interventions in school settings or on attitudes toward school-based non-pharmacological interventions themselves. The two qualitative reviews looked at the attitudes and experiences of pupils, teachers

and parents using ADHD interventions in school settings; and the experience of the disorder itself by children, parents and teachers. In 2016 Gaastra et al conducted a meta-analytic review to determine the effectiveness of several types of classroom intervention that can be applied by teachers to decrease disruptive classroom behaviour of children with, or at risk of ADHD. In addition, the review sought to identify whether classroom interventions directly or indirectly affected the behaviour and academic outcomes of children with, or at the risk of the disorder. Montoya et al's qualitative review in 2010 focused on the therapeutic outcomes of psychoeducational interventions in children and adolescents with ADHD, and ultimately to provide patients and families with coping skills.

Tatlow-Golden et al in 2016 conducted a systematic review to identify knowledge and attitudes towards ADHD amongst General Practitioners (GPs). In 2016 Moore et al qualitatively researched the experiences and attitudes towards non-pharmacological interventions delivered in school-settings of children with ADHD, their parents, teachers and peers. The study identified 33 previous studies which related to interventions used with children who have ADHD in a school setting. It was between these studies that Moore et al. identified themes such as: (1) individualising interventions, (2) structure of intervention, (3) barriers to effectiveness, (4) perceived moderators and impact of interventions. Richardson et al. (2015) conducted an overarching systematic review of 149 studies to assess the effectiveness of non-pharmacological interventions delivered in school settings for pupils with, or at risk of, ADHD and to explore factors that may enhance, or limit, their delivery.

These systematic reviews were published between 2010 (Montoya et al, 2010) and 2016 (Moore et al, 2016, Gaastra et al, 2016) whilst at first may seem to be potentially related to my research area it became apparent that almost none of them directly correlated with my research aim. Several of these reviews focused on the possible improvement of attitudes and behaviour of children with, or at risk of, ADHD within school settings as a consequence of non-pharmacological interventions. Four of the systematic reviews focused on non-

pharmacological interventions within school settings, these studies were more relevant to the reduction of ADHD symptoms and impact of them on children within educational settings, as opposed to the effectiveness of school-based interventions for teachers to enhance their knowledge of ADHD (Moore et al, 2015; Montoya et al, 2010; Moore et al, 2016; and Richardson et al, 2015). From reviewing these systematic reviews, it was apparent that none of them examined teachers' knowledge of ADHD and the impact of a school-based intervention on their understanding of the disorder. The focus of sample studies within these reviews was on children with, or at risk of ADHD, themselves, their parents and peers (Gaastra et al, 2016; Montoya et al, 2010) as opposed to teachers (Moore et al, 2015; Moore et al, 2016; Richardson et al, 2015) with one systematic review focusing solely on ADHD knowledge and awareness amongst GPs (Tatlow-Golden et al, 2016).

4.6 Materials and Methods

The researcher composed the search according to PROSPERO guidelines (<http://www.crd.york.ac.uk/prospero>) and registration number CRD42018106320. Overall, all reporting items were compliant with PRISMA (2009 checklist) (See appendix A) and as many eligible studies as possible were initially included and subsequently refined applying inclusion and exclusion criteria.

4.6.1 Search strategy and data resources

A systematic search of literature was undertaken by the lead researcher using seven databases: PsycINFO (1967), SCOPUS, Web of Science, ERIC, British Education Index, MEDLINE and PUBMED. The keywords used for the search were: Attention Deficit/Hyperactivity Disorder; ADHD; intervention; knowledge; attitude; teachers. The search also included Boolean operators (AND; OR). Search results were restricted to published and peer reviewed studies in English language only and there is no restriction on country or socio demographics of recipient teachers (See appendix B).

A breakdown of the search terms used for the search strategy can be found below:

Table 4.1: Search terms

Term	Search terms
Knowledge	“Awareness” or “Understanding” or “Appreciation” or “Know*”
Attitude	“Perspective*” or “Belief” or “Belie*” or “Perception” or “Point of View” or “Attitude*” or “View”
Teacher	“Educator”
Attention Deficit Hyperactivity Disorder	“Attention Deficit/Hyperactivity Disorder” or “Attention-Deficit/Hyperactivity Disorder” or “ADHD” or “ADD” or “Inattention” or “Impulsivity” or “Hyperactivity” or “Hyperkinesis” or “Hyperkinetic Disorder”
Intervention	“Education” or “Program” or “Training” or “Course” or “Support” or “Practic*” or “Strateg*” or “Guidance” or “Modification”

4.6.2 Selection Criteria

To address the first research question for this systematic review all types of studies whether qualitative, quantitative or mixed that include data reported in educational settings were included. In comparison when addressing research on interventions developed to support teachers of children with, or suspected of having, ADHD all experimental (group or single case) studies, randomised control trials, cross sectional studies, cohort studies and case control studies with baseline data were considered for inclusion. However, studies that did not include baseline measures were not considered for inclusion. An intervention for the purposes of inclusion in the review must either have been facing or non-facing and non-pharmacological in nature and delivered to general or special education needs (SEN) primary schoolteachers within mainstream schools.

Only studies in English language were included; they had to be published in peer-reviewed journals at any time from the inception of the database up to and including April 2020. The search did not include conference abstracts, reviews and opinion pieces. Studies were excluded for the following reasons: (1) the study did not include primary schoolteachers; (2) it included only medical practitioners and parents; (3) it did not include schoolchildren with, or suspected of having, ADHD aged between 5 to 11 old years; (4) it focused only on pharmacological interventions; (5) it was not based within educational settings.

4.6.3 Identification of Selected Studies

Endnote 8.1 software was used to identify duplicated studies so that the researcher could undertake de-duplication of records. Subsequently a list of references was then uploaded to Rayyan QCRI which is an application designed to facilitate the completion of systematic review through the collaboration of reviewers of identified studies for subsequent classification. All titles and abstracts yielded through the selection criteria were screened by the lead researcher followed by the independent review (by two reviewers) of the full text belonging to eligible studies. A third reviewer was used to reconcile any disagreement about the study inclusion between the first and second reviewer.

4.6.4 Data Extraction and Synthesis

Data were extracted from all articles included in the study using parameters in a standardized format in Microsoft Excel. The data extracted from each study was reviewed and checked independently of the researcher (AA) by a second reviewer (JA) for completeness and accuracy. The type of data extracted was different for knowledge and attitudes compared to intervention. The following data were extracted for knowledge and attitude: country, sample, design, scale of measurement, experience and primary and secondary outcomes. For the intervention studies the following data were extracted: country, study design, sample, scale of measurement, type of intervention (content and activities),

duration, follow up and post intervention duration, effectiveness of intervention in increasing knowledge and secondary outcomes.

4.6.5 Risk of Bias Assessment

According to Khan et al. in 2003 the term quality when used in the context of a systematic literature review is the degree to which a study uses measures to minimise bias in its design, conduct and analysis. To assess the quality, or strength of the included studies, the researcher looked at a variety of quality assessment tools. A leading factor in making this decision was that the tool selected has been validated and checked (Boland et al., 2017). The Mixed Methods Appraisal Tool (MMAT) was validated by Pace et al., 2011 from the original proposed tool (Pluye et al., 2009). The purpose of the tool is the quality assessment of qualitative, quantitative and mixed methods studies. It rates the methodological quality of the subdivided domains: randomized controlled, non-randomized, and descriptive. Corresponding criteria (five per domain) to the selected domain of study is given in the guide to using Mixed Methods Appraisal Tool (MMAT) and it provides a clear way for the researcher to consider the quality of studies and put them into rank order. It is encouraged, but not necessary, to give each study an overall mark but at the very least the researcher should provide overall descriptive commentary on the strength of the study.

Each criteria question within the three domains is worth 20% and each study can score a maximum of 100%. All included studies were put through MMAT and independently scored by a second reviewer (NH) who met with the first reviewer to discuss and resolve any disagreement when scoring studies. If a study only scored 20% on MMAT it would suggest a very high level of bias, if a study scored 40% it suggested a high level, whilst a score of 60% suggested a moderate risk of bias and a score of 80% indicated there was a low chance of bias in the study.

After the decision to use MMAT the researcher/first reviewer (AA) conducted a pilot of two studies (Jerome et al, 1994; and Barbaresi and Olsen, 1998) to test the instrument (Boland et al., 2017). Results were reviewed and cross-checked by the second reviewer (NH). When rating a study using MAAT there are two screening questions that seek to ensure the study can be appraised using the tool. Based on the information in the study the assessor is then asked to indicate yes, no or can't tell to each question in MMAT. Helpful indicators are provided in the user guide associated with the tool but it is useful to point out that the list given in MMAT is not exhaustive (Hong et al, 2018). The researcher (AA) agreed the necessary indicators to consider with the second reviewer (NH). Subsequently when completing the quality assessment of all included studies the second reviewer (NH) cross-checked the ratings given by the first reviewer (AA) (Boland et al., 2017). The researcher and second reviewer then independently scored the other studies using MMAT.

Table of MMAT results for quality assessment of studies on ADHD knowledge:

Table 4.2: Quantitative descriptive studies

Study	Is the sampling strategy relevant to address the research question?	Is the sample representative of the target population?	Are the measurements appropriate?	Is the risk of nonresponse bias low?	Is the statistical analysis appropriate to answer the research question?	LEVEL OF BIAS
Jerome et al, 1994	√	√		√		Moderate
Kos et al, 2004	√	√	√	√	√	Low
Anderson et al, 2012	√	√	√		√	Low
Shroff et al, 2017		√	√		√	Moderate
Padilla et al, 2018	√		√	√	√	Low
Munshi, 2014	√	√	√	√	√	Low

Ward et al, 2014			√	√	√	Moderate
Stampoltzis & Antonopoulou, 2013	√		√		√	Moderate
Al-Hakeem et al, 2013	√	√				High
Perold et al, 2010	√	√	√	√	√	Low
Nur & Kavakc, 2010	√	√	√	√	√	Low
Vereb et al, 2004	√	√	√		√	Low
Al-Omari et al, 2015	√	√			√	Moderate
Muanprasart et al, 2014	√	√	√	√	√	Low
Rodrigo et al, 2011	√	√	√	√	√	Low
Ghanizadeh et al, 2006	√	√	√	√	√	Low
Hepperlen et al, 2002	√	√	√		√	Low
Frigerio et al, 2014	√	√		√	√	Low
Bekle et al, 2004	√	√			√	Moderate
Soroa et al, 2016	√	√	√	√	√	Low
Alkahtani, 2013	√	√	√		√	Low
Lee & Witruk, 2016	√	√	√		√	Low
Youssef et al, 2015		√	√		√	Moderate
Topkin et al, 2015	√	√	√	√	√	Low
Blotnicky-Gallant et al, 2015	√	√	√		√	Low
Kern et al, 2015	√	√	√		√	Low
Sciutto, 2000			√	√	√	Moderate
Woyessa et al, 2019	√		√	√	√	Low
Alfageer et al, 2018	√	√	√	√	√	Low
Alajmi et al, 2018		√			√	High

Table 4.3: Mixed methods studies

Study	Is there an adequate rationale for using mixed methods design to address the research question?	Are the different components of the study effectively integrated to answer the research questions?	Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	LEVEL OF BIAS
Liang & Gao, 2016	√	√	√	√	√	Low
Guerra et al, 2017	√	√	√	√	√	Low
Abed et al, 2014	√	√	√	√	√	Low

From the above tables it can be seen that 30 studies out of 33 were categorized as quantitative descriptive studies and three were mixed methods. Of the 30 studies only two were scored as being of high risk (Al-Hakeem, et al, 2013 and Alajmi et al, 2018) with the majority (20) rated as scoring a low-level risk of bias. The remaining eight studies were found to be moderate risk of bias. The three mixed methods studies were all scored as being low-level.

Table of MMAT results for quality assessment of studies on ADHD interventions:

Table 4.4: Randomized control trials

Study	Is randomization appropriately performed?	Are the groups comparable at baseline?	Are there complete outcome data?	Are outcomes assessors blinded to the intervention provided?	Did the participants adhere to the assigned intervention?	LEVEL OF BIAS
Barbaresi & Olsen, 1998			√		√	High
Lasisi et al, 2017	√	√	√		√	Low
Sarraf et al, 2011	√	√	√		√	Low
Worthington et al, 1997	√		√	√	√	Low

Table 4.5: Non-randomized control trials

Study	Are the participants representative of the target population?	Are measurements appropriate regarding both the outcome and intervention (or exposure)?	Are there complete outcome data?	Are the confounders accounted for in the design and analysis?	During the study period, is the intervention administered (or exposure occurred) as exposure occurred?	LEVEL OF BIAS
Barnett et al, 2012		√		√	√	Moderate
Syed & Hussain, 2010		√	√		√	Moderate
Giannopoulou et al, 2017	√	√	√	√	√	Low
Aguiar et al, 2014	√	√	√	√	√	Low

Shehata et al, 2016	√	√	√		√	Low
Latouche and Gascoigne, 2017		√		√	√	Moderate

It can be seen above that four intervention studies were categorized as randomized control trials and six non-randomized control trial studies. One randomized control study (Barbaresi and Olsen, 1998) was scored as a high risk of bias and the other three studies all low risk of bias. Three non-randomized control trials were scored as having a moderate risk of bias (Barnett et al, 2012; Syed and Hussain, 2010; Latouche and Gascoigne, 2017) and three as scoring a low risk of bias.

4.7 Results

The search of seven databases resulted in 2481 citations identified by the researcher with the number of studies for each database (See appendix Ac) as follows: EBESCOHOST search engine for British Education Index + ERIC + MEDLINE (n=60), PUBMED (n=200), PsycINFO (n=595), SCOPUS (n=491), WEB OF SCIENCE (n=1135). After removal of duplicates through EndNote, 2137 studies were moved and input through Rayyan software after which 220 studies were found to be duplicated and then deleted. The titles and abstracts of 1917 studies were reviewed, of which 1831 were excluded as they did not match the inclusion criteria.

86 studies were deemed as suitable for full text screening after which 50 were excluded because they did not match the inclusion criteria such as wrong subject, wrong population, not available in English, wrong outcomes, or no empirical data etc. Of these 50 excluded studies the researcher sent a request to 12 authors for access to the full text of their studies, however only 3 authors replied. Two studies were excluded as they did not match the inclusion criteria and one study was not in English (German). The remaining 36 studies were classified into two groups: 28 studies related to knowledge of and attitudes towards ADHD amongst teachers; and eight studies were associated with

ADHD interventions for teachers. Seven additional studies added to the review, 5 were from reference lists of the included studies and two studies were suggested by experts. Two studies were not available for free (Jerome et al 1994 and Barbaresi and Olsen, 1998). Overall, the total of studies in the review was 43.

The rule for adding studies to the review was mentioned in the protocol for this review. It states: "following full inclusion assessments, forward and backwards reference searches will be carried out for all included papers; checking the reference lists and citation records of similar reviews and all studies included until no new eligible articles are found". In addition to this, the rule was further enhanced by seeking guidance from ADHD experts who would give recommendations of any further articles that had not been included in the review so far. An expert for the purposes of this review has been defined as someone with specialist experience, of at least 5 years, and has published within the area.

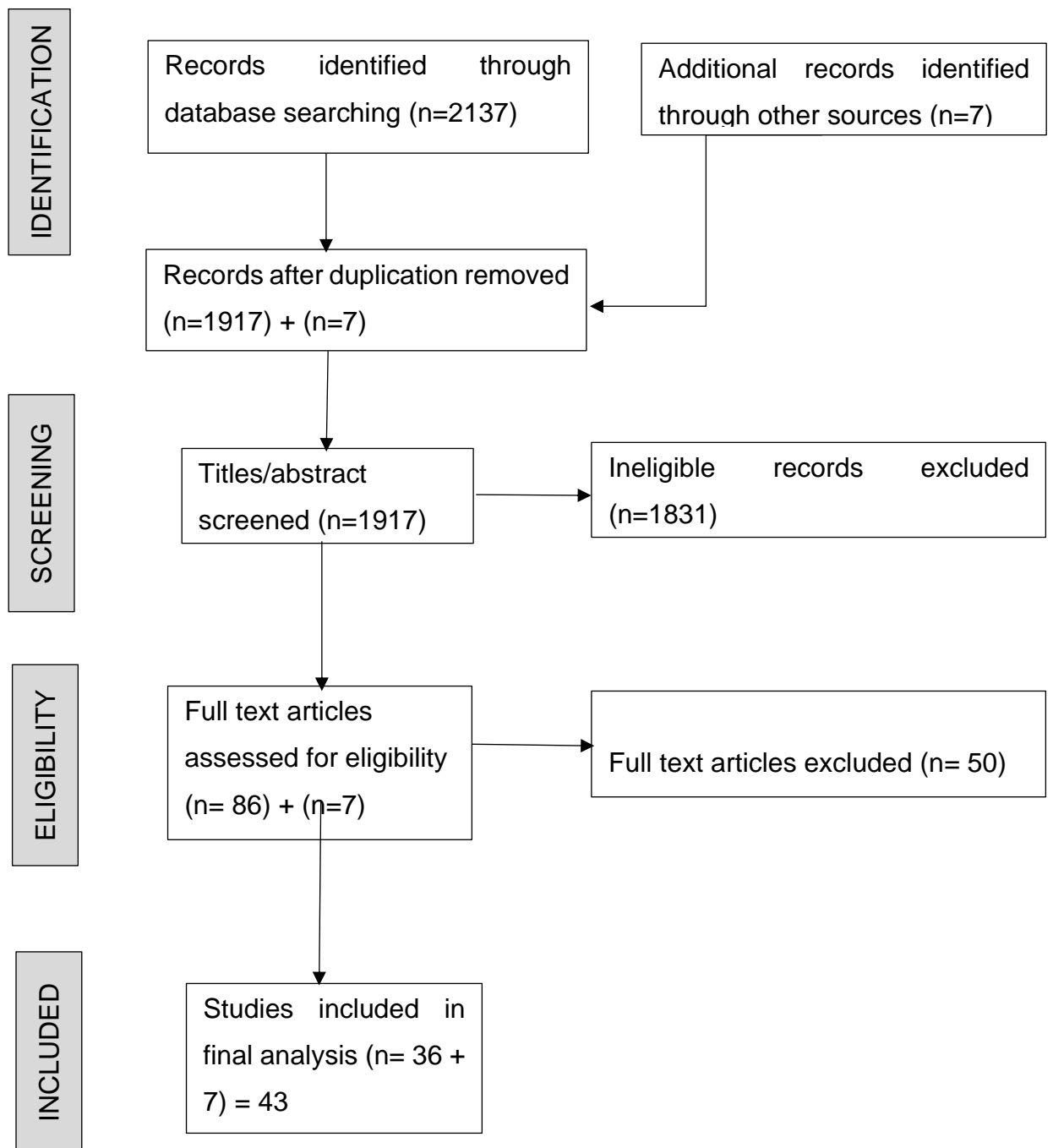


Figure 4.1: PRISMA diagram describing the search process for identifying relevant literature (Moher, D. Liberati, A., Tetziaff, J. Altman, D.G. The PRISMA Group (2009)

4.7.1 Knowledge and attitudes (RQ/A):

Studies that examined the level of knowledge and attitudes toward ADHD have been systematically reviewed in this section and the table of study characteristics can be found in (Appendix C).

4.7.1.1 Countries

Studies that measured the knowledge and attitude towards ADHD amongst primary school teachers, whilst not plentiful, do span a number of countries of which the most popular is US (5) followed by South Africa (3), Australia (4), Saudi Arabia (5), then Canada (2), Spain (1), Hong Kong (1), Korea (1), Germany (1), Caribbean (1), Italy (1), Jordan (1), Thailand (1), Sri Lanka (1), Ireland (1), Colombia (1), India (1), Iran (1), Turkey (1), Ethiopia (1), Bahrain (1), and Greece (1).

4.7.1.2 Design

The vast majority of studies (30) used quantitative descriptive design (Jerome et al, 1994; Sciutto 2000; Hepperlen et al, 2002; Vereb et al, 2004; Kos et al, 2004; Bekle et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci, 2010; Rodrigo et al, 2011; Anderson et al, 2012; Stampoltzis and Antonopoulou, 2013; Al-Hakeem et al, 2013; Alkahtani, 2013; Munshi, 2014; Ward et al, 2014; Muanprasart et al, 2014; Frigerio et al, 2014; Al-Omari et al, 2015; Youssef et al, 2015; Topkin et al, 2015; Botnick-Gallant et al, 2015; Kern et al, 2015; Soroa et al, 2016; Lee et al, 2016; Shroff et al, 2017; Latouche and Gascoigne, 2017; Padilla et al, 2018; Alfageer et al, 2018; Alajmi et al, 2018 and Woyessa et al, 2019) with the remaining three adopting a mixed methods approach (Abed et al, 2014; Liang and Gao, 2016; and Guerra et al, 2017).

4.7.1.3 Scale of Measurement

Of the selected studies the most common way of measuring the level of ADHD knowledge amongst primary school teachers has been through the Knowledge of Attention Deficit Disorder Scale known as KADDS. The tool for assessing the level of knowledge of ADHD and was developed in America by Scuitto, Terjesen and Bender in 2000. In 1994 Scuitto and Terjesen had previously developed a 27-item scale to test the level of knowledge of ADHD amongst 73 pre-school and elementary teachers. In that scale teachers were required to give a 'true' or 'false' answer to a number of statements. However, in 2000 the wording across several items was modified and 9 new items were added to develop KADDS. It is now a 36-item scale, which measures three areas of knowledge, associated with ADHD: general knowledge on the disorder (nature, causes and impact); symptoms/diagnosis; and treatment. Instead of just two answer options there are three responses; 'true' 'false' and 'don't know'.

Ten of the selected studies chose to use this tried and tested tool to measure knowledge (Scuitto et al, 2000; Perold et al, 2010; Alkahtani, 2013; Muanprasart et al, 2014; Ward et al, 2014; Topkin et al, 2015; Botnick-Gallant et al, 2015; Guerra et al, 2017; Shroff et al, 2017 and Padilla et al, 2018). Nine of the included studies used scales that were based on or adapted from KADDS in so far as introduction of a third answer option of 'don't know' whilst measuring the ADHD knowledge of teachers (Kos et al, 2004; Vereb et al, 2004; Anderson et al, 2012 Stampoltzis and Antonopoulou, 2013; Abed et al, 2014; Youssef et al, 2015; Soroa et al, 2016; Alfageer et al, 2018 and Alajmi et al, 2018). Six included studies followed the true or false only options introduced by Jerome et al in 1994 (and included here) (Jerome et al, 1994; Ghanizadeh et al, 2006; Al-Hakeem et al, 2013; Frigerio et al, 2014; Al-Omari et al, 2015 and Liang and Gao, 2016). Three studies used a measurement tool based on a Likert scale (Lee et al, 2016; Rodrigo et al, 2011; and Munshi, 2014) and three used multiple choice answers (Kern et al, 2015; Hepperlen et al, 2002; and Nur and Kavakci, 2010). One study only followed the options of Yes and No (Alajmi et al 2018).

Primary outcomes

To be included in this review all studies had to measure the level of ADHD knowledge amongst primary school teachers in mainstream schools. Overall, 33 studies measured the level of knowledge amongst 8,742 primary school teachers in mainstream schools.

4.7.1.4 Primary Outcomes - The level of ADHD knowledge amongst primary schoolteachers

Given the methodological and design differences of these studies such as the method chosen to measure level of knowledge, 18 of the included studies showed a lack of ADHD knowledge amongst teachers (Sciutto et al, 2000; Hepperlen et al, 2002; Kos et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci, 2010; Rodrigo et al, 2011; Al-Hakeem et al, 2013; Alkahtani, 2013; Muanprasart et al, 2014; Abed et al, 2014; Youssef et al, 2015; Kern et al, 2015; Al-Omari et al, 2015; Liang and Gao, 2016; Shroff et al, 2017; Padilla et al, 2018 and Woyessa et al 2019). Seven studies suggested that teachers possessed an adequate level of knowledge (Bekle et al, 2004; Vereb et al, 2004; Munshi, 2014; Frigerio et al, 2014; Ward et al, 2014; Topkin et al, 2015 and Alajmi et al 2018). Finally, seven studies found that primary school teachers had a good level of ADHD knowledge (Jerome et al, 1994; Anderson et al, 2012; Stampoltzis and Antonopoulou, 2013; Botnick-Gallant et al, 2015; Soroa et al, 2016; Lee and Witruk, 2016 and Alfageer et al 2018).

Knowledge of ADHD characteristics and causes

Notwithstanding the discussion above regarding the different scales of measurement between the studies in this review, within the 33 studies included in this review there are 12 studies which specifically mention the level of participants' knowledge within this domain. Whilst some of these have indicated the level of knowledge as a percentage, other studies have given an indication of how the researcher rates their scores. Four studies (Abed et al, 2014; and Munshi, 2014; Topkin et al, 2015 and Blotnick-Gallant et al, 2015) showed knowledge of ADHD characteristics ranged between 86.2% (Munshi et

al. 2014) and 61% (Blotnicky-Gallant, 2015). Two studies found that teachers had a sound or adequate knowledge of this ADHD domain (Bekle, 2004; and Ward, 2014).

Five studies explicitly stated that teachers had poor knowledge of ADHD characteristics (Sciutto et al, 2000; Alkhantani, 2013; Soroa et al, 2016; Shroff et al, 2017 and Padilla et al., 2018). Between these studies teachers scored from 16.8% (Alkhanti, 2013) to 43% (Sciutto et al, 2000). Four studies specifically made reference to teachers' knowledge of ADHD aetiology and causes, these ranged from adequate (56.2% Soroa et al, 2016) to poor (29.2% Perold et al, 2010).

Knowledge of symptoms and diagnosis of the disorder

13 studies gave specific mention to the level of knowledge in relation to symptoms of, and the diagnosis of ADHD. Of these studies, eight found teachers' knowledge to be 60% or higher (97.7% Munshi, 2014; 80% Blotnicky Gallant, 2015; 72.4% Soroa et al, 2016; 71.6% Ward, 2014; 69.3% Padilla et al, 2018; Woyessa et al 2019; 63% Shroff et al, 2017 and 62.87% Sciutto et al, 2000). None of the these studies showed an adequate level of knowledge regarding the symptoms and diagnosis with the remaining 5 all showing a poor level of knowledge (36% Topkin and Roman, 2015; 25.2% Perold et al, 2010; and 18.1% Alkahtani, 2013; and Guerra et al, 2017).

Knowledge regarding the treatment of ADHD

Two studies were highlighted by the researcher in the review as mentioning that teachers in their study had a high level of knowledge in terms of treatment of ADHD. Soroa et al. (2016) found that 83.5% of participants answered correctly about treatment and 68.8% in the study carried out by Blotnicky Gallant et al, 2015 68.8%. There were no studies that indicated participants had a good level of knowledge in this area. There were 9 studies that showed a poor level of knowledge regarding treatment of the disorder and have been ranked from highest to lowest: 49% Ward, 2014; 44% Shroff et al, 2017; 45.30% Padilla et al, 2018; 43.12% Sciutto et al, 2000; 40% Topkin and Roman, 2015;

33% Abed et al, 2014; 19% Woyessa et al 2019; 16% Alkahtani, 2013; 13.1% Munshi, 2014).

4.7.1.5 Teachers attitudes towards children with ADHD

Over half of the included studies contained discussion on the types of attitudes held amongst teachers towards the disorder: Jerome et al, 1994; Sciutto et al, 2000; Bekle et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Rodrigo et al, 2011; Stampoltzis and Antonopoulou, 2013; Alkhtani, 2013; Ward, 2014; Frigerio et al, 2014; Al-Omari et al, 2014; Abed et al, 2014; Liang and Gao, 2016; Lee & Witruck, 2016; Shroff et al, 2017; Padilla et al, 2018; Alfageer et al, 2018 and Woyessa et al, 2019). Studies were classified as demonstrating positive attitudes where teachers scored no more than 35% incorrect answers about ADHD. The suggestion of giving an incorrect response would suggest that a misconception is held.

The majority of the studies above demonstrated that teachers generally held a positive attitude towards children with ADHD (Jerome et al, 1994; Sciutto et al, 2000; Perold et al, 2010; Rodrigo et al, 2011; Stampoltzis and Antonopoulou, 2013; Alkhtani, 2013; Ward, 2014; Liang and Gao, 2016; Lee & Witruck, 2016; Shroff et al, 2017; Padilla et al, 2018 and Alfageer et al, 2018). Whilst in 6 studies teachers held negative attitudes towards children with ADHD (Bekle et al, 2004; Ghanizadeh et al, 2006; Frigerio et al, 2014; Al-Omari et al, 2014; Abed et al, 2014 and Woyessa et al 2019).

Most common responses from teachers about ADHD

The most common features of knowledge amongst teachers that were identifiable amongst the included studies, in order of most common included: diet (13 studies), parental spoiling (9 studies), ADHD children tending to fidget (6 studies), and hereditary issues (6 studies).

It is clear from the included studies that the most obvious lack of knowledge in terms of ADHD is related to diet (Jerome et al, 1994; Sciutto et al, 2000; Bekle, 2004; Perold et al, 2010; Alkhatani, 2013; Al-Hakeem et al, 2013; Abed et al,

2014; Ward, 2014 Youssef et al, 2015 and Kern et al, 2015). Amongst these 10 studies the deficit in knowledge amongst primary school teachers in this area was as high with incorrect responses from teachers scoring as high as 75.6% (Ward, 2014). There were 3 studies that demonstrated teachers possessed a good level of knowledge when it came to diet in relation to the disorder (Stampoltzis and Antonopoulou, 2013; Topkin and Roman, 2015 and Shroff et al, 2017).

Only two of these studies showed that teachers possess a good level of knowledge that parental spoiling was not a cause of ADHD (Youssef et al, 2015; and Jerome et al, 1994). From the seven studies that demonstrated teachers think the disorder can be caused by parental spoiling, these ranged from 80% of teachers (Rodrigo et al, 2011) to 65.5% (Nur and Kavakci, 2010). The five remaining studies pointed out that teachers still believe poor parenting is a cause of ADHD (Sciutto et al, 2000; Ghanizadeh et al, 2006; Al-Omari et al, 2014; Kern et al, 2015 and Liang and Gao, 2016).

Three studies (Jerome et al, 1994; Al-Hakeem et al, 2013 and Liang and Gao, 2016) showed that 50% or more teachers in the respective study thought a child with ADHD would outgrow the disorder whilst the minority (31.9%) of teachers surveyed by Perold et al in 2010 thought children could outgrow ADHD. In relation to studies that identified fidgeting as a characteristic of ADHD, five studies demonstrated teachers possessed a high level of knowledge (95.6% Ward, 2014; 89.3% Sciutto et al, 2000; 85% Topkin and Roman, 2015; 82% Shroff et al, 2017 and 75% Perold et al, 2010). One study showed teachers had poor knowledge that children with the disorder are prone to fidget (Alkhatani, 2013). 75% of teachers in the study conducted by Al-Omari et al in 2014 correctly identified that ADHD is related to biological and genetic factors whereas in five other studies the majority of teachers dismissed the idea that the disorder is based on biological or hereditary factors (Sciutto et al, 2000; Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Ward, 2014; and Topkin and Roman, 2015).

4.7.1.6 Secondary Outcomes

From the included studies presented in the knowledge portion of this review, 10 studies discussed the relationship between knowledge and attitudes in their results (Bekle et al, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Al-Omari et al, 2014; Youssef et al, 2015; Blotnicky-Gallant et al, 2015; Lee & Witruk, 2016; Liang and Gao, 2016 and Alfageer et al, 2018). More than half of these studies (6) found that there was a positive correlation between the knowledge of ADHD amongst teachers and their attitude towards the disorder (Bekle et al, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Lee & Witruk, 2016; and Alfageer et al, 2018). The remaining 4 studies found that such a correlation between knowledge and attitude was not present in teachers (Al-Omari et al, 2014; Youssef et al, 2015; Blotnicky-Gallant et al, 2015 and Liang and Gao, 2016).

When looking at the existence of a relationship between knowledge of ADHD amongst teachers compared with their experience of teaching, 16 studies determined whether such a relationship existed (Sciutto et al, 2000; Kos et al, 2004; Vereb and DiPerna, 2004; Perold et al, 2010; Anderson et al, 2012; Alkhatani, 2013; Al-Hakeem et al, 2013; Stampoltzis and Antonopoulou, 2013; Ward, 2014; Al-Omari et al, 2014; Munshi, 2014; Youssef et al, 2015; Lee and Witruk, 2016; Guerra et al, 2017; Shroff et al, 2017 and Alfageer et al, 2018). The majority of studies found that there was no correlation between teachers' knowledge of ADHD and their experience of teaching (Kos et al, 2004; Perold et al, 2010; Al-Hakeem et al, 2013; Stampoltzis and Antonopoulou, 2013; Al-Omari et al, 2014; Munshi, 2014; Shroff et al, 2017; Guerra et al, 2017; and Alfageer et al, 2018) with seven studies saying that knowledge was linked with teaching experience (Sciutto et al, 2000; Vereb and DiPerna, 2004; Anderson et al, 2012; Alkhatani, 2013; Ward, 2014; Youssef et al, 2015; and Lee and Witruk, 2016).

Sources of ADHD knowledge identified by Teachers

There were several sources of ADHD knowledge cited by teachers across the included studies (Jerome et al, 1994; Hepperlen et al, 2002; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Anderson et al, 2012; Al-Hakeem et al, 2013; Al-Omari et al, 2014; Muanprasart et al, 2014; Abed et al, 2014; Kern et al, 2015; Topkin and Roman, 2015; Liang and Gao, 2016; Guerra et al, 2017; Padilla et al, 2018; Alajmi et al, 2018 and Alfageer et al, 2018). Amongst these 18 studies the most common source of ADHD knowledge cited by teachers was training (Jerome et al, 1994; Hepperlen et al, 2002; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Anderson et al, 2012; Al-Omari et al, 2014; Abed et al, 2014; Kern et al, 2015; Topkin and Roman, 2015; Liang and Gao, 2016; Padilla et al, 2018 and Alajmi et al, 2018). Amongst these 13 studies whilst the majority received some form of training there were studies at either end of the scale whereby in one study 83.87% of teachers indicated that knowledge of the disorder was gained through training (Padilla et al, 2018) whereas only 5.7% of teachers in the study conducted by Ghanizadeh et al. in 2006 cited knowledge of ADHD through training.

Reading books, journals and printed materials on ADHD was another popular source of teachers' knowledge with eight studies mentioning these (Jerome et al, 1994; Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Muanprasart et al, 2014; Al-Omari et al, 2014; Liang and Gao, 2016; Alajmi et al, 2018 and Alfageer et al, 2018). Five studies identified that a common source of information about ADHD amongst teachers is through the media such as television and radio (Ghanizadeh et al., 2006; Nur and Kavakci, 2010; Al-Omari et al, 2014; Muanprasart et al, 2014 and Alfageer et al, 2018). Four studies found that a source of knowledge used by teachers about the disorder was professionals, including medical professionals and Special Education teachers (Ghanizadeh et al., 2006; Nur and Kavakci, 2010, Al-Hakeem et al, 2013 and Guerra et al, 2017). Three studies identified that a source of teachers' knowledge is friends and relatives (Nur and Kavakci, 2010; Al-Omari, 2014 and

Al-fageer et al, 2018), while information about ADHD found on the internet was another source of teachers' knowledge (Muanprasart et al, 2014; and Al-fageer et al, 2018).

4.7.1.7 Recommendations for teacher training in ADHD:

When extracting data from the included studies the researcher also looked at recommendations made across the studies in relation to the development of training as a beneficial means of increasing the knowledge of ADHD amongst teachers. Almost all studies (31) mentioned training in ADHD when discussing recommendations (Jerome et al, 1994; Sciutto et al, 2000; Kos et al, 2004; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Perold et al, 2010; Rodrigo et al, 2011; Anderson et al, 2012; Al-Hakeem et al, 2013; Stampoltzis and Antonopoulou, 2013; Alkhatani, 2013; Ward, 2014; Munshi, 2014; Abed et al, 2014; Al-Omari et al, 2014; Frigerio et al, 2014; Muanprasart et al, 2014; Youseef et al, 2015; Topkin and Roman, 2015; Botnick-Gallant et al, 2015; Kern et al, 2015; :Liang and Gao, 2016; Soroa et al, 2016; Lee and Witruk, 2016; Guerra et al, 2017; Shroff et al, 2017; Padilla et al, 2018; Al-fageer et al, 2018 and Woyessa et al 2019).

Some of these recommendations mentioned that training should be comprehensive (Sciutto et al, 2000; Nur and Kavakci, 2010; Stampoltzis and Antonopoulou, 2013; Guerra et al, 2017 and Shroff et al, 2017), include behavioural and academic classroom strategies (Abed et al, 2014; Botnick-Gallant et al, 2015; and Shroff et al, 2017) promote collaboration between stakeholders (such as Ministries of Health and Education) (Ghanizadeh et al, 2006; Al-Hakeem et al, 2013; Al-Omari et al, 2014 and Kern et al, 2015), provide teachers with the opportunity to express their concerns and worries about ADHD (Figerio et al, 2014) and involve medical professionals (Jerome et al, 1994; Al-Omari et al, 2014).

4.7.2 School-based non-pharmacological interventions (RQ/B):

Studies that examined the effectiveness of training programmes designed to enhance teachers' knowledge and attitudes toward ADHD have been systematically reviewed in this section and the table of study characteristics can be found in (Appendix D).

4.7.2.1 Country

There were fewer studies that had delivered training to primary school teachers about ADHD and were from the following countries: US (2), Australia (1) Nigeria (1), Canada (1), Greece (1), Iran (1), Pakistan (1), Brazil (1), and Egypt (1). In total there were 10 studies that matched the inclusion criteria.

4.7.2.2 Sample and study design

As above, the sample was based solely on primary school teachers in mainstream schools and in total 852 teachers were identified in these studies. The size of the sample could not be determined in one study (Worthington et al, 1997). Of the 10 studies included 4 were Randomised Control Trials (RCT) (Worthington et al, 1997; Barbaresi and Olsen, 1998; Sarraf et al, 2011 and Lasisi et al, 2017). The remaining 6 studies were quantitative non-randomized studies (Syed and Hussein, 2010; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Giannopoulou et al, 2017 and Latouche and Gascoigne 2017).

4.7.2.3 Scale of intervention measurement

All ten studies used a variety of ways to measure the level of ADHD knowledge amongst primary school teachers both pre and post intervention. Five studies used measurement of knowledge that originated from the KADDS scale (Scuitto et al, 2000) in that they offered three answer options of true, false and don't know. The third option of don't know was introduced by Scuitto to reduce the risk of participants guessing the correct answer (Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; Giannopoulou et al, 2017 and Latouche and Gascoigne 2017). Three studies made use of the scale designed by Jerome et al. in 1994 which had only two answer options of true or false (Barbaresi and Olsen, 1998; Syed and Hussein, 2010 and Aguiar et al,

2014). The remaining two studies did not contain detail other than the use of surveying teachers on their knowledge and interaction post intervention (Worthington et al, 1997; and Barnett et al, 2012).

4.7.2.4 Post intervention redistribution of knowledge measurement and follow up

Six studies measured the level of knowledge post intervention ranging from immediately after the intervention (Aguiar et al, 2014; Shehata et al, 2016 and Lasisi et al, 2017) to one month (Barbaresi and Olsen, 1998 and Latouche and Gascoigne 2017) or six months (Syed and Hussein, 2010). One study was ongoing over a number of years (Worthington et al, 1997) and the remaining three studies whilst recording a post intervention measurement of knowledge did not state how long after delivering the intervention they measured the knowledge of participants who received the intervention (Sarraf et al, 2011; Barnett et al, 2012 and Giannopoulou et al, 2017). Three studies (Sarraf et al, 2011 and Lasisi et al, 2017 and Latouche and Gascoigne 2017) offered a post intervention follow up or booster whilst the remaining studies did not.

4.7.2.5 Primary Outcomes

Effectiveness/Was Teacher Knowledge Enhanced/Attitudes Improved?

Nearly all studies (nine) demonstrated that the use of an intervention designed to enhance ADHD knowledge amongst teachers raised their level of knowledge (Worthington et al, 1997; Barbaresi and Olsen, 1998; Syed and Hussain, 2010; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; and Giannopoulou et al, 2017 and Latouche and Gascoigne 2017). Whilst one study found knowledge had not significantly increased following the intervention, teachers' attitudes towards ADHD had significantly improved (Sarraf et al, 2011).

The studies that reported an increase in knowledge following the use of an intervention about ADHD were either RCTs (Worthington et al, 1997; Barbaresi and Olsen, 1998; Lasisi et al, 2017) or non-randomized control trials (NRCT) (Syed and Hussain, 2010;

Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Giannopoulou et al, 2017 and Latouche and Gascoigne 2017). Of the included intervention studies six did not conduct a pilot study (Worthington et al, 1997; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; Giannopoulou et al, 2017; and Latouche and Gascoigne 2017).

Six of the nine studies included in the review demonstrated a change in teachers' attitudes towards ADHD post intervention (Barbaresi and Olsen, 1998; Sarraf et al, 2011; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; and Lasisi et al, 2017). The other four studies did not specifically mention teachers' attitudes towards the disorder had either improved or changed post intervention (Worthington et al, 1997; Syed and Hussain, 2010; Giannopoulou et al, 2017 and Latouche and Gascoigne 2017).

4.7.2.6 Secondary outcomes: Intervention factors

Content and activities

The overwhelming majority of studies (eight) used face to face delivery for the ADHD intervention (Barbaresi & Olsen, 1998; Sarraf et al, 2011; Syed & Hussain, 2010; Aguiar et al, 2014; Shehata et al, 2016; Giannopoulou et al, 2017; Lasisi et al, 2017; and Latouche and Gascoigne 2017). One study used written materials as the main method of delivery (Worthington et al, 1997) and one was fully online (Barnett et al, 2012). Eight studies included content within the intervention relating to general ADHD information (characteristic's and etiology) causes of the disorder, symptomology and treatment (Worthington et al, 1997; Barbaresi & Olsen, 1998; Syed & Hussain, 2010; Sarraf et al, 2011; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; and Latouche and Gascoigne 2017). All of these studies included content relating to classroom management strategies to support teachers of children with, or at risk of, ADHD.

Amongst these interventions for teachers, the most common activity through which to engage with the target audience was the presentation of information via lecture or presentation of information (Aguiar et al, 2014; Shehata et al, 2016; Barnett et al, 2012; Lasisi et al, 2017; and Latouche and Gascoigne 2017) and discussion groups amongst

teacher-participants (Barbaresi & Olsen, 1998; Barnett et al, 2012; Shehata et al, 2016; Lasisi et al, 2017; and Latouche and Gascoigne 2017). These were followed by (in order of popularity) vignettes (Aguiar et al, 2014 and Lasisi et al, 2017), videos (Syed & Hussain, 2010; Lasisi et al, 2017; Latouche and Gascoigne 2017) and role play (Shehata et al, 2016 and Lasisi et al, 2017). Other activities contained in the included interventions were: issuing handouts (Syed and Hussain, 2010), use of case studies (Barbaresi and Olsen, 1998; Syed and Hussain, 2010), inclusion of a clinical psychologist (Syed and Hussain, 2010) and useful weblinks on ADHD information (Syed and Hussain, 2010; and Latouche and Gascoigne 2017).

Development and delivery

Six of the included studies contained interventions developed by the researchers themselves (Worthington et al, 1997; Syed & Hussain, 2010; Sarraf et al, 2011; Aguiar et al, 2014; Shehata et al, 2016; and Latouche and Gascoigne 2017). Whereas other studies (four) included interventions developed by parties other than the researcher, including the World Health Organisation's Mental Health Gap Action Programme (MhGAP-IG) (Lasisi et al, 2017) and specialists in ADHD (Barnett et al, 2012). The study conducted by Giannopoulou et al in 2017 used a training programme on ADHD developed by Martinussen et al, 2005. Barbaresi and Olsen in 1998 used an intervention developed by Children and Adults with Attention Deficit Disorder (CHADD) which is a national resource for ADHD in America.

Eight studies contained interventions that were either exclusively delivered by the researchers or the researchers took a lead role in delivering the intervention to teachers (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al, 2011; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; Giannopoulou et al, 2017; and Latouche and Gascoigne 2017). Of these studies three involved the researchers using specialists in child psychology, psychiatry and paediatrics to assist them in delivery (Syed and Hussein, 2010; Sarraf et al, 2011; and Aguiar et al, 2014). Two studies did not provide any detail on who delivered the intervention (Worthington et al, 1997; and Barnett et al, 2012).

Duration of intervention

Included interventions ranged in duration from hours (Barbaresi and Olsen, 1998; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; and Latouche and Gascoigne 2017), days (Syed and Hussein, 2010; Sarraf et al, 2011; Giannopoulou et al, 2017) weeks (Barnett et al, 2012) and even years (Worthington et al, 1997). Taking into account these studies, excluding Worthington et al in 1997 due to the duration of the intervention in years, the average duration in days between the included studies is around 3.3 days (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al, 2011; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017 and Giannopoulou et al, 2017). The success of these interventions in enhancing teachers' knowledge of ADHD could suggest that such a duration may be adequate to deal with and cover requisite intervention content.

4.8 Discussion

The objective of the review was twofold: first to systematically review studies that have measured the level of ADHD knowledge amongst primary schoolteachers; and secondly to review systematically studies that have examined the effectiveness of ADHD training interventions for teachers. The review was mostly made up of quantitative research studies with the remaining mixed methods studies. The review of studies that looked at the level of ADHD knowledge amongst primary school teachers was much greater in volume (33) compared with the studies that measured the effectiveness of an intervention to enhance the ADHD knowledge of primary schoolteachers (10).

4.8.1 Knowledge of ADHD amongst primary schoolteachers (A):

It is not surprising that half of the studies in this review are Western, however the most recent studies were conducted in Colombia (Padilla et al, 2018), Saudi Arabia (Alfageer et al, 2018 and Alajmi et al, 2018) and Ethiopia (Woyessa et al, 2019).

Of the studies in this review that showed a low level of knowledge, ten used KADDS and seven KADD-Q which is based on KADDS and included a third answer option of

don't know in order to reduce the chance of a participant guessing the answer to an item. This was first done in KADDS. Therefore, one half of the studies in this review on knowledge of ADHD amongst primary schoolteachers used a tool based on KADDS. This helps to support that it is a reliable and valid scale on which to measure the level of ADHD knowledge amongst primary school teachers (Ward, 2018). A clearer picture of what the level of actual ADHD knowledge is can be deciphered by using scales of measurement linked to KADDS.

Following synthesis of the 33 included studies in relation to ADHD knowledge of primary school teachers, the researcher identified the following themes: level of ADHD knowledge; attitudes towards ADHD; relationship between knowledge and attitudes of ADHD; relationship between teaching experience and level of ADHD knowledge; and sources of ADHD knowledge amongst teachers. This systematic review has found that the majority of studies support the general view that primary school teachers have a lack of knowledge about ADHD (Hepperlen et al, 2002; Kos et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci, 2010; Rodrigo et al, 2011; Al-Hakeem et al, 2013; Alkahtani, 2013; Muanprasart et al, 2014; Abed et al, 2014; Youssef et al, 2015; Kern et al, 2015; Al-Omari et al, 2015; Liang and Gao, 2016; Shroff et al, 2017; Padilla et al, 2018; and Woyessa et al 2019). In finding that their level of knowledge is low the review further supports 6 studies that also found low levels of ADHD knowledge amongst schoolteachers (White et al, 2011; Kang et al, 2011; Anderson et al, 2012; Bradshaw and Kamal, 2013; Tyagi et al, 2013 and Sciotto et al, 2016).

The most interesting finding for the researcher when looking at teachers' knowledge of ADHD was that not a single study that specifically mentioned knowledge of treatment (9) found teachers had a good level of knowledge in this domain. These findings also support studies conducted by West et al in 2005 and Kamal (2016) that found teachers possessed low levels of knowledge about ADHD treatment. Increasing teachers' knowledge of treatment in relation to children with ADHD could result in them being more effective at managing children with the disorder (Kos et al, 2004; Lee et al, 2015; Shehata et al, 2016). When discussing the impact of teachers' attitude towards ADHD on a child with ADHD, the findings of the review that half of the included studies make no mention of attitudes support the view that there is a lack of literature

that specifically looks at teachers attitudes towards ADHD (Sciutto et al, 2000; Anderson et al., 2012; Al-Omari, 2015; Mulholland, 2016). This is somewhat surprising given the general acceptance that attitudes of teachers towards children with ADHD can have an effect on the child's educational performance (Bekle, 2004; Rodrigo et al., 2011; Liang and Gao, 2016; Eckert and Hintze, 2000; Wilson and Jennings, 1996; Wickstrom et al, 1998).

Findings in this systematic review confirm the suggestion in current literature that teachers continue to hold the negative belief that ADHD is caused through poor dietary management or that the disorder can be treated through an improvement in the child's diet (Jerome et al, 1994; Sciutto et al, 2000; Bekle, 2004; Perold et al, 2010; Alkhatani, 2013; Al-Hakeem et al, 2013; Abed et al, 2014; Ward, 2014 Youssef et al, 2015 and Kern et al, 2015). This shows that it is of fundamental importance that teachers have appropriate attitudes towards diet and ADHD as this could negatively impact upon their development of more positive attitudes towards the disorder (Jerome et al, 1994; Ohan et al., 2008). In addition to beliefs about diet, teachers continue to hold the view that the child's family or upbringing may be a cause of ADHD or contribute towards the disorder. This was supported by the result in this review that found such a belief was the second most common response from teachers when measuring their knowledge of ADHD (Sciutto et al, 2000; Ghanizadeh et al, 2006; Al-Omari et al, 2014; Kern et al, 2015 and Liang and Gao, 2016; Rodrigo et al., 2011; Nur and Kavakci, 2010). It can be said that allocating blame to the parents or family of a child with ADHD could result in the teacher being less likely to want to work collaboratively with parents or communicate with them effectively on the appropriate management of the child's disorder (Jerome et al., 1994; Kasten, Coury and Heron, 1992; Barbaresi and Olsen, 1998).

The other most common response found in this review suggests teachers continue to believe that ADHD is not biological (Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Ward, 2014; and Topkin and Roman, 2015) or that the child will grow out the disorder (Jerome et al, 1994; Al-Hakeem et al, 2013 and Liang and Gao, 2016). This suggests that teachers may not see ADHD as a legitimate disorder (Jerome et al., 1994; Brook et al., 2000; Ohan et al., 2008) and could feel that the behaviour of the child at school

is due to a lack of effort or will. This could also lead teachers to believe that a child is acting out of malice (Rodrigo et al., 2011). A teacher who does not view ADHD as a legitimate disorder may be intolerant towards a child and may not appreciate that they have additional needs.

When examining the effect knowledge of ADHD has on attitude towards the disorder, it is shown in this review that the majority of the studies that discussed if a link existed did find a positive correlation between knowledge and attitude. Therefore, any increase in the level of knowledge about ADHD held by primary schoolteachers will be likely to improve their attitudes towards the disorder. Equally if teachers possess a limited knowledge of ADHD, they are likely to hold poor attitudes which could dissuade them from seeking accurate information about the disorder (Ohan et al., 2008).

Factors such as knowledge and experience have been identified as potential key players in measuring the strength of attitude (Wood, Rhodes and Bick, 1995; Eagly and Chaiken, 1998) and therefore it is necessary to look at the interplay between these factors. Findings in this review from studies which discussed the existence of a link between knowledge of ADHD and teaching experience found no link. This is the opposite of studies that found a link does exist (Lee and Witruk, 2016; Youssef et al, 2015; Vereb and DiPerna, 2004; Alkhatani, 2013; Anderson et al, 2012; Ward, 2014). It is likely that teachers with greater experience of teaching are more likely to have previously taught a child with ADHD and to hold more accurate knowledge of the disorder (Scuitto, 2000).

It has been said that training provides a structured way of increasing knowledge (James, 1973) so it is not surprising to see that amongst studies in this review the most common source of ADHD knowledge amongst teachers was training (Jerome et al, 1994; Hepperlen et al, 2002; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Anderson et al, 2012; Al-Omari et al, 2014; Abed et al, 2014; Kern et al, 2015; Topkin and Roman, 2015; Liang and Gao, 2016; Padilla et al, 2018; and Al-ajmi et al, 2018). This suggests it is a useful way in which teachers can know more about the disorder. The next most common way teachers gain knowledge of ADHD is through self-reading and may suggest they prefer sources that are easy to access and

can be used at their own convenience (Jerome et al, 1994; Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Muanprasart et al, 2014; Al-Omari et al, 2014; and Liang and Gao, 2016). Attributing knowledge from the media such as television, radio or the internet suggests such methods of communicating information about ADHD can reach a large audience and as a result provide easily accessible knowledge (Ghanizadeh, 2006; Nur and Kavakci, 2010; Al-Omari et al, 2014; Muanprasart et al, 2014; and Al-ajmi et al, 2018). The review also shows that teachers can seek information about the disorder from other parties through formal ways i.e. from professionals (Ghanizadeh, 2006; Nur and Kavakci, 2010, Al-Hakeem et al, 2013 and Guerra et al, 2017; Latouche and Gascoigne 2017) or informal (Nur and Kavakci, 2010 and Al-Omari, 2014). Regardless, seeking information from medical professionals or specialists in ADHD as well as friends or relatives with direct experience of the disorder can provide accessible sources.

The findings of this review of the level of ADHD knowledge amongst primary schoolteachers unanimously supported training as a way of increasing teachers knowledge of the disorder, in fact all except one study recommended it (Jerome et al, 1994; Kos et al, 2004; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Perold et al, 2010; Rodrigo et al, 2011; Anderson et al, 2012; Al-Hakeem et al, 2013; Stampoltzis and Antonopoulou, 2013; Alkhatani, 2013; Ward, 2014; Munshi, 2014; Abed et al, 2014; Al-Omari et al, 2014; Frigerio et al, 2014; Muanprasart et al, 2014; Youseef et al, 2015; Topkin and Roman, 2015; Botnick-Gallant et al, 2015; Kern et al, 2015; :Liang and Gao, 2016; Soroa et al, 2016; Lee and Witruk, 2016; Guerra et al, 2017; Shroff et al, 2017; Padilla et al, 2018; Al-fageer et al, 2018; and Woyessa et al, 2019). This clearly supports the point made earlier that training is an effective way to enhance knowledge, however it adds specificity in that training teachers about ADHD should increase their level of knowledge about the disorder. Doing so could mean teachers are better equipped to implement behavioural and academic classroom management techniques when teaching children with ADHD (Abed et al, 2014; Botnick-Gallant et al, 2015; and Shroff et al, 2017). Whilst it is accepted by the reviewer that training is not the only way to increase knowledge (Guerra et al, 2017), the results of the review make it very clear that teachers may consider it to be the most realistic way to enhance their knowledge of ADHD. Whilst these included studies measured the level of knowledge amongst teachers and many

of the studies in this review that measured the level of knowledge and found a lack of knowledge, recommended increasing teachers' knowledge through training however there are limited studies that actually delivered an ADHD training programme to teachers.

4.8.2 ADHD interventions to enhance level of knowledge amongst teachers (B)

Ten studies were identified in the review where a training programme on ADHD was delivered to primary schoolteachers (Worthington et al, 1997; Barbaresi and Olsen, 1998; Sarraf et al, 2011 and Lasisi et al, 2017; Syed and Hussein, 2010; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Giannopoulou et al, 2017; and Latouche and Gascoigne 2017). Five of these studies used scales that originated from KADDS as it offered participants three answer options (True, False, Don't know) to measure the level of ADHD knowledge amongst primary schoolteachers prior to implementing an ADHD intervention (Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; Giannopoulou et al, 2017; and Latouche and Gascoigne 2017). This again could support the appropriateness of KADDS as a valid and reliable tool to measure the level of ADHD knowledge amongst teachers. The rest of the included intervention studies selected less reliable ways of measuring knowledge such as only offering a true or false answer option and therefore increased the chance of participants guessing the correct answer.

All of the above ten studies except for one (Sarraf et al, 2011) found that teachers' level of knowledge of ADHD had enhanced significantly post-delivery of a training intervention, this supports the recommendations for training in the above section. It is worth noting that the majority of studies which reported a significant increase in knowledge post training did not use a pilot study to test the intervention prior to actual delivery (Worthington et al, 1997; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; Latouche and Gascoigne 2017 and Giannopoulou et al, 2017). The lack of a pilot in these studies seems to have had no detrimental impact upon the effectiveness of the intervention to enhance knowledge in five of these six studies. However, most studies were quantitative NRCTs a question could be raised regarding their variable sample sizes and lack of the use of control groups in these studies (Syed and Hussain, 2010; Barnett et al., 2012; Aguiar et al., 2014; Shehata et al., 2016;

Giannopoulou et al., 2017 and Latouche and Gascoigne 2017). Therefore, non-randomized intervention studies, although showing an increase in knowledge post intervention, have limited findings which will be used with due caution when reaching conclusions. When looking more closely at RCTs and non RCTs in the review in a combined way it may be more difficult to draw specific conclusions, however it may be possible to identify whether ADHD interventions are effective in enhancing the level of knowledge amongst schoolteachers.

In order to provide a critical synthesis of these interventions, it is necessary to identify the crucial factors associated with such training programmes. Firstly it can be seen in this review that the originality of the training does not determine its success, in fact studies that delivered ADHD training programmes developed prior to the study but delivered by the researcher were just as effective in increasing knowledge as training original to the study (Lasisi et al, 2017; Barnett et al, 2012; Giannopoulou et al, 2017; Barbaresi and Olsen, 1998). This further supports the position that the delivery of an intervention designed to enhance ADHD knowledge is more likely to achieve this objective than not. When looking at the duration of the intervention, it is fair to say that the recipients of the programme are more affected by this. For example if the intervention is too long then this might cause participants to not take in the information or cause participants to switch off (Arcia et al, 2000; Evans et al., 2004). This, however, does need to be balanced with the time needed to adequately cover the intended training content. Based on the findings of this review an average duration of about 3 days was appropriate (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al, 2011; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017 and Giannopoulou et al, 2017).

It was encouraging to see that all interventions included classroom management strategies and it has been suggested that teachers need to know how to deal more effectively with children who have the disorder in their classroom (Hutchings, Martin-Forbes, Daley and Williams, 2013). No studies in the review found that teachers had a good level of knowledge about ADHD treatment, and a further 10 studies found that teachers possessed a poor level of treatment knowledge which suggests any ADHD intervention should contain information about treatment of the disorder (Scuitto et al,

2000; Ward, 2014; Shroff et al, 2017; Padilla et al, 2018; Topkin and Roman, 2015; Abed et al, 2014; Alkhatani, 2013; Munshi, 2014; and Woyessa et al, 2019).

This review of interventions provided a useful picture of activities commonly employed in interventions designed for delivering knowledge about ADHD to primary schoolteachers. However, there is no clear evidence as to which activity had the most significant impact on the effectiveness of the intervention. Nonetheless there are types of activity, which if used in the intervention could create opportunities for participants to engage with training by the trainer providing them with a presentation on which to focus, getting teachers to work in groups, to facilitate discussion amongst participants and expose them to media sources (audio and visual) (Aguiar et al, 2014; Shehata et al, 2016; Barnett et al, 2012 and Lasisi et al, 2017; Barbaresi & Olsen, 1998; Syed & Hussain, 2010).

The review found that amongst studies which clearly stated the time period between delivery of the intervention and post-delivery measurement of knowledge there was no average length of time at which to take such a measurement. Those that measured knowledge immediately post intervention saw the most significant increase in knowledge (Syed and Hussein, 2010; Aguiar et al, 2014; Shehata et al, 2016 and Lasisi et al, 2017) compared to those that took measurement a one month after delivery. However after 4 weeks teachers still showed improvement from a pre-test score of 77% compared with a post-test score of 85% ($p < .001$) (Barbaresi and Olsen, 1998) with 6 months post intervention pre-test average score from 10.7 *SE* to 11.6 *SE* meaning that the improvement was significant even after this period of time. Therefore, the period post intervention when knowledge is remeasured may not have any negative impact upon demonstrating the effectiveness of the intervention in increasing ADHD knowledge amongst primary schoolteachers.

4.8.3 Teachers' Knowledge of and attitudes towards ADHD in KSA

In recent years there has been an emerging effort to examine ADHD amongst school children in KSA (Al Hamed et al., 2008 and Alqahtani, 2010) and more recently a focus has been placed on evaluating teachers' knowledge of the disorder. Of those studies included in the systematic review, having a closer look at the studies conducted in

KSA it can be seen that there are only five studies measured the level of knowledge and attitudes amongst primary schoolteachers (Alkahtani, 2013; Munshi, 2014; Abed et al, 2014; Al-ajmi et al, 2018; and Al-fageer et al, 2018) and no studies designed and/or delivered a training to enhance teachers' knowledge of ADHD in KSA.

According to Munshi (2014) in her 2011 study 60.8% of teachers in Mecca had excellent knowledge of diagnosis and symptoms of ADHD whilst 57.7% had good general knowledge of ADHD yet only 13.1% had excellent knowledge regarding treatment of ADHD. Alkahtani (2013) was the first of these five to use KADDS to measure the level of knowledge amongst teachers in the middle region of KSA. The study revealed the percentage of teachers admitting to not knowing an answer was 59.8%. With regards to teachers' knowledge of symptoms and diagnosis of ADHD, Alkahtani found that 59.1% of teachers responded they did not know two items within this section of KADDS. For the item: "ADHD children often fidget or squirm in their seats" 38.9% gave a correct response meaning that over 61% of teachers either did not know or were not aware of the hallmark symptoms of ADHD. In addition, 77.9% of teachers had no knowledge of the subtypes of ADHD. In terms of teachers' knowledge of treatment 16.6% responded correctly, while 20.4% were incorrect and 63% of teachers did not know how to respond to questions on treatment. These ranged from knowledge of a multifaceted approach to treatment being the best (26.3% of teachers agreed that the approach is important in treating ADHD), and diet (26.8% of teachers incorrectly believed reduction of ADHD symptoms was through reducing sugar intake).

The study conducted by Abed et al. in 2014 looked at SEN teachers' knowledge of ADHD in Jeddah, KSA. Using KADD-Q the questionnaire looked at three specific domains for ADHD inquiry: characteristics, causes and interventions and was completed by 54 teachers followed by structured interviews with a sample of eight SEN teachers. After analyzing the questionnaires, 68% of participants provided correct responses to items related to their knowledge of the characteristics of ADHD compared with 37% of correct responses on the causes of ADHD subscale and 33% of correct responses regarding knowledge of ADHD treatment.

The most recent studies were conducted in 2018 by Al-ajmi et al, and Al-fageer et al. These studies were descriptive and were carried out in the capital city of Saudi Arabia, Riyadh. In Al-ajmi et al's study (2018), 51 female teachers participated from 3 primary

schools only. However, 141 male teachers from 17 schools took part in Al-fageer et al' study (2018). Al-ajmi and colleagues developed their own scale that contains yes and no options, whereas Al-fageer et al, (2018) adopted their instrument from KADDS.

With reference to the results of these previous studies conducted in KSA that measured the level of knowledge of ADHD amongst teachers, Al-fageer et al (2018) and Al-ajmi et al (2018) examined the general knowledge of ADHD and Munshi (2014) focused on the examination of general knowledge of ADHD with its coexisting conditions and management of the disorder amongst teachers. However, Alkahtani (2013) and Abed et al (2014) focused entirely on three main items to examine the level of knowledge; the nature and characteristics of ADHD, causes and diagnosis, and treatment.

Any discrepancy in results may refer to the use of different scales in each study. For instance, in terms of the general knowledge and nature of ADHD, Munshi (2014) indicates that 57.7% of participants showed a good general knowledge. Abed et al's 2014 study was deeper and used mixed methods of questionnaire and interviews to obtain more substantial information. It showed that 68% of SEN teachers have a general knowledge of ADHD which is similar to the results of Al-fageer et al's 2018 study that showed a good level of ADHD knowledge amongst teachers 60%. However, in Al-ajmi et al's 2018 study a high proportion of participants demonstrated moderate level of knowledge about the disorder.

On the other hand, Alkahtani's 2013 study showed contrary results in terms of teachers' general knowledge of ADHD whereas 57% teachers answered "they don't know" 26.2% answered incorrectly. His study's results show an obvious contrast to the others and suggest there is a clear lack of general knowledge.

A distinguishing feature of Munshi's study in 2014 is the inclusion of a question that allowed teachers to rate their own knowledge of ADHD as poor, moderate, or excellent. This could lead to an increased number of teachers rating their knowledge higher than what it actually is. This could also be the potential reason for the knowledge of causes and diagnosis being excellent - at 60.8% in Munshi's study.

In respect of the knowledge of diagnosis and symptoms in ADHD, Alkahtani (2013) stated that 59.1% of the teachers answered they “don’t know” and similarly Abed et al., (2014) found 63% answered incorrectly. This supports the findings of studies in the review that show a poor level of knowledge in this domain (36% Topkin and Roman, 2015; 25.2% Perold et al, 2010).

In terms of the teachers' knowledge of treatments and interventions, Munshi (2014) found only 13% of teachers gave accurate responses on this component, compared to 20.4% incorrect responses and 63% of teachers not knowing how to respond to questions on treatment in Alkahtani's study in 2013. Results were similar in the study by Abed et al. (2014), where 67% of teachers gave incorrect responses within this domain. Both Alkahtani's, 2013 large-scale study and Abed et al's investigation of both general and SETs indicate a significant drop on the level of treatment knowledge for ADHD amongst teachers in KSA. Findings from these studies provide support for those in the review above that also found a poor level of teacher knowledge of treatment (Ward, 2014; Shroff et al, 2017; Padilla et al, 2018 and Topkin and Roman, 2015).

Putting the Saudi Arabian studies of teachers' ADHD knowledge into context with studies contained in this review, it can be seen that there is a general lack of ADHD knowledge amongst primary schoolteachers (Hepperlen et al, 2002; Kos et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci,, 2010; Rodrigo et al, 2011; Al-Hakeem et al, 2013; Muanprasart et al, 2014; Youssef et al, 2015; Kern et al, 2015; Al-Omari et al, 2015; Liang and Gao, 2016; Shroff et al, 2017; and Padilla et al, 2018). Saudi Arabian studies on teachers' knowledge of ADHD have chosen to adopt the methods of knowledge measurement that best distinguish real or accurate knowledge from misconceptions. Using such measurement has shown the general level of knowledge of ADHD amongst teachers in KSA is lacking, a finding that was supported by Scitutto et al. (2016) in a cross-national study that found KSA was one of the three lowest ranking countries out of the nine when measuring the level of teacher's ADHD knowledge according to KADDS. In the study, there was a 70% rate of 'don't know' response amongst Saudi teachers indicating a strong need to give teachers greater access to accurate information on ADHD (Scitutto et al., 2016).

In terms of teachers' attitudes towards ADHD in KSA, although there is a limited number of studies that currently exist specifically on teachers and children with ADHD in KSA, a number of parallel attitudes can be drawn from Saudi teachers with those generally identified above (Alkahtani, 2013; Munshi, 2014; Abed et al., 2014; and Al-fageer et al, 2018). Teachers of children with ADHD show positive attitudes in general (Al-fageer et al, 2018) and towards the recognition of ADHD as a real or valid medical diagnosis in addition to possible positive effects of medication on children (Abed et al., 2014). However, one study indicated Saudi teachers believed children outgrow ADHD and this rather worryingly suggests that the severity of the disorder may be overlooked (Munshi, 2014). Findings from Alkahtani (2013) and Abed et al. (2014) show Saudi teachers attitudes towards dietary management and ADHD support similar misconceptions as those from teachers in studies mentioned previously (Jerome et al, 1994; Bekle, 2004; Perold et al, 2010; Al-Hakeem et al, 2013; Ward, 2014 Youssef et al, 2015 and Kern et al, 2015). In one study, more than a fourth of Saudi teachers held the mistaken belief that ADHD symptoms will be reduced as a consequence of a reduction in sugar (Alkahtani, 2013).

ADHD can be an obstacle to educational success for a child (Abed et al., 2014) and Munshi (2014) found that only 66.2% of teachers were aware children with ADHD might have difficulties in learning. Alkahtani (2013) found that only a third of teachers believed children with ADHD are more likely to encounter difficulties in achieving academic success. Such poor attitudes and awareness of academic difficulties suggest that Saudi schoolchildren with ADHD will most likely not receive the additional support needed to achieve their potential. This is almost certain where teachers take the attitude that managing the behaviour of children with ADHD is problematic (Abed et al., 2014).

One study in KSA illustrated positive attitudes among teachers towards working with parents and health professionals as part of a multidisciplinary team (Munshi, 2014). By contrast, Saudi teachers have shown a poor appreciation of multifaceted approaches to treatment (Alkahtani, 2013). Positive attitudes are necessary to foster collaborative treatment relationships between teachers, parents and health professionals; however, it is suggested that the degree of success in achieving multidisciplinary working will depend upon teachers' knowledge (Munshi, 2014). It can

be said that schoolteachers in KSA hold negative attitudes towards ADHD and that attitudes amongst teachers show similar misconceptions to universal studies in this review (Bekle et al, 2004; Ghanizadeh et al, 2006; Frigerio et al, 2014; Al-Omari et al, 2014).

Overall, it can be concluded from these KSA studies that Saudi schoolteachers have a lack of knowledge about ADHD and hold negative attitudes towards ADHD. This has led the researcher to question the impact that such a lack of knowledge amongst teachers has on their attitudes towards, and teaching children, with ADHD in mainstream primary schools and how these could be enhanced.

In-service ADHD training for teachers in KSA:

Among the limited number of Saudi Arabian studies that look at this issue there have been recommendations for an increase in the level of ADHD knowledge amongst teachers. Teachers need to receive training to support their ongoing professional development and understanding of ADHD (Alkahtani, 2013), to increase teachers' capability to screen children with ADHD (Munshi, 2014), increase their knowledge about the implementation of treatment and educational interventions for ADHD (Abed et al., 2014), and enhance teachers' perceptions about behavioural problems that manifest in children with ADHD (Abaoud and Almalki, 2015).

Whilst KSA studies discussed above recommend enhancing teachers' knowledge of ADHD as a way of improving education outcomes for Saudi schoolchildren with ADHD (Alkahtani, 2013; Munshi, 2014; Abed et al., 2014; and Al-fageer et al, 2018)). At the time of conducting this study, there is no in-service training intervention designed to enhance ADHD knowledge amongst teachers in KSA. This finding is supported by findings in the systematic review.

4.9 Strengths and Limitations of the review

To the best of my knowledge this is the first systematic review measuring the level of ADHD knowledge and attitudes amongst primary schoolteachers globally. In addition, it is the first to look at ADHD interventions designed to enhance knowledge of disorder amongst primary schoolteachers. A strength of the search strategy used for the review was that inclusion terms were not restricted to a specific time period, country or method

of study design. Whilst there has been some caution explained above regarding the quality and level of possible bias in some studies, they were not excluded from the study. The review indicates that KADDS is a reliable and valid tool that can be used when measuring the level of ADHD knowledge amongst teachers. It includes a review of both knowledge and attitudes of primary schoolteachers towards ADHD and for studies that have delivered an intervention to enhance knowledge, there is a measurement of the level both before and after the intervention.

Using a recognised quality assessment tool like MMAT has meant the findings from studies rated as having moderate to high risk of bias have been used with caution. However, the inclusion of these weaker studies did not impair the overall findings of the review. Specifically, the review of interventions to enhance ADHD knowledge amongst primary schoolteachers demonstrated that the intervention can have a positive result despite not using a pilot study prior to delivery of the intervention.

Since the review did include studies that varied in the size of sample used this could mean the inclusion of smaller scale studies may show a more significant treatment effect compared with larger scale studies. It is recognised that the review is limited by focusing solely on primary schoolteachers and not teachers in general and it focuses only on ADHD and not any associated disorder. It is accepted that children with ADHD commonly have other disorders such as autism and intellectual disabilities (Biederman, Newcorn and Sprich, 1991; Hastings, Beck, Daley and Hill, 2005; Spencer, 2006; Saul, 2014; Masi and Gignac, 2015; Alkhateeb and Alhadidi, 2016; Alnemary et al, 2016), however these were not the focus of the review. Because the review contained studies that use different methods of measuring the level of ADHD knowledge amongst primary schoolteachers then caution should be used when drawing general conclusions about knowledge of ADHD and attitudes towards the disorder. The review did not look at whether teachers post participation in an intervention used any gained knowledge in their teaching practice. When searching for studies to include in the review these were limited to those that had been published in English and peer-reviewed.

4.10 Future work and implications for practice

It is recommended that any future systematic review of ADHD knowledge amongst teachers or non-pharmacological interventions designed to enhance knowledge of ADHD amongst teachers should include other types of teachers and not only primary schoolteachers which were the focus of this review. Recommended future research into the level ADHD knowledge amongst teachers should distinguish between enhancing knowledge through intervention of special education primary schoolteachers compared to that of general teachers working with the same level of children with, or at risk of, the disorder. Teacher education by way of an ADHD intervention may have a positive impact on improving the level of knowledge and potential ability of primary schoolteachers to more effectively educate and deal with children with, or at the risk of ADHD. However, it can be said that training and improvement of ADHD knowledge amongst primary schoolteachers is not the only way to enhance their knowledge of ADHD (Guerra et al, 2017).

4.11 Conclusion

There is clearly a general gap in knowledge of ADHD amongst primary schoolteachers resulting in a significant volume of research that calls for a general improvement of knowledge as a way of better supporting teachers of schoolchildren with, or at risk of ADHD. Whilst there can be a number of ways primary schoolteachers can enhance their knowledge of ADHD which could help them to play an enhanced role in the identification and management of ADHD in their classroom (Wheeler et al, 2008; Al-Omari et al, 2015), this review has shown that the limited number of studies that used an intervention designed to enhance ADHD knowledge amongst primary schoolteachers are effective in achieving this. However, it is accepted that differing factors between studies in the review could make it difficult to draw firm conclusions from the data.

CHAPTER 5

Methodology

5. Introduction

In this chapter, there will be a comprehensive discussion of the approaches used to facilitate the four-phases of this study. The chapter will also justify why a mixed methodology was chosen to address the individual research questions and discuss the collection and analysis of data along with its reliability and validity. In discussing the four specific phases of the study there will be full acknowledgement and examination of the ethical issues involved.

5.1 Research questions to be addressed in each phase of the study

In this part, the research questions will be clarified in order to develop a suitable research design to fully answer these and reach appropriate conclusions. It is important that any research question is clear and feasible (Fraenkel, Wallen and Hyun, 2012) so as to avoid later misunderstandings or ambiguity (Bogdan and Biklen, 2007). Where the question is rather broad then this should be divided into smaller and sub-questions as this will assist the researcher in selecting the methods of data collection (Cooper and Schindler, 2006).

With regards to the current investigation, the first research question was formulated and subdivided into smaller specific questions, and then a suitable methodology was established, as set out below:

RQ1 What knowledge and misconceptions regarding ADHD do male SpLD and general primary schoolteachers in Jeddah KSA have?

SubQ1 What is the level of knowledge and misconceptions about ADHD amongst male SpLD and general teachers in primary schools in Jeddah, KSA?

SubQ2 Do male SpLD and general teachers differ in their knowledge and misconceptions about ADHD?

RQ2 From a teacher's perspective what can be done to overcome the lack of knowledge and misconceptions of ADHD amongst SpLD and general teachers in primary schools in Jeddah, KSA?

RQ3 Can a training programme enhance the level of knowledge of ADHD and attitudes toward the disorder amongst SpLD and General teachers in KSA?

The first main research question is concerned with measuring the knowledge and misconceptions of Saudi SpLD and General teachers about ADHD and children with the disorder. Taking a positivist approach to seeking objective knowledge of teachers in order to determine a correlation (Gephart, 1999), the KADDS questionnaire instrument was adapted and disseminated amongst teachers in Jeddah. The findings from phase one of the study addresses sub questions one and two.

When addressing the second main research question the researcher utilised interpretivism to explore what teachers think can be done to overcome a possible lack of ADHD knowledge through using semi-structured interviews. Teachers in Jeddah were asked questions on the following themes: Familiarity with ADHD, Perspectives towards training and ways of enhancing teachers' knowledge of ADHD.

For the third main research question data collected from questionnaires and interviews informed the design and development of a training programme to overcome the lack of knowledge amongst teachers by enhancing their level of ADHD knowledge. A pre and post-test design was used to determine the effectiveness of the training intervention.

5.2 Justification for selecting schools in Jeddah

I first worked as a SpLD teacher in KSA for three years before moving into Higher Education as a lecturer at Taif University (TU), which is located in the western part of KSA. Jeddah was chosen as representative of a developing, diverse and significant city in KSA with approximately 4.1 million people (Jeddah CPI Profile, 2018). KSA is a country with a very different education system, culture, views and potentially different attitudes towards ADHD. In recent years there has been heavy investment made in the number of schools and teachers in Jeddah making it an ideal place to conduct this study.

5.3 Justification for selecting SpLD and general teachers

There are several reasons for selecting SpLD and General teachers: (i) the literature already indicated a lack of knowledge of ADHD amongst SpLD/SEN teachers (Abed et al., 2014) and General teachers (Alkhatani, 2013) separately, and for the purposes of this study it was necessary to measure again the level of knowledge amongst SpLD alongside General teachers; (ii) since previous Saudi studies have not examined the difference in the level of ADHD knowledge between SpLD and General teachers in the same study, measuring the level of both SpLD and General teachers allowed this to be done whilst Abaoud and Almalki in 2015 looked only at General and SEN teachers' perceptions of behavioural problems that appear in pupils with ADHD; and (iii) since no previous study has developed a training programme to enhance teachers' knowledge of the disorder in KSA, the researcher measured the effectiveness of designing and delivering a ADHD training programme for teachers. Due to the comorbidity of ADHD and LDs/SpLD it was important for SpLD teachers to be targeted in this study (Biederman, Newcorn and Sprich, 1991; Spencer, 2006; DuPaul and Stoner, 2014; Saul, 2014; Masi and Gignac, 2015; Alkhateeb and Alhadidi, 2016).

5.4 Theoretical Framework: Theory of social constructivism and ADHD

The researcher conducted the study following a social constructivist framework as the theoretical underpinning (Burr, 1995). According to Gergen (1985) what we believe exists is through social and interpersonal interaction; as a theory, it places focus on the social influences of life. Therefore, culture is important in understanding what occurs in society and the subsequent construction of knowledge (Derry, 1999) as learning cannot be divorced from social interaction (Vygotsky, 1978). The process of social construction is whereby the beliefs and values of individuals or communities provide a framework within which they behave in reality and how they relate to each other (Timimi and Timimi, 2015; Robson, 2013). Resultant knowledge through a social construction of reality is where individuals have given meaning to the world around them and their behaviour in it (Hicks, 1996).

According to the statement made by the Union of the Physically Impaired Against Segregation (1976) 'society disables physically impaired people'. In the statement UPIAS declared that the term 'disability' was imposed and caused the unnecessary isolation and exclusion of people from fully participating in society. The social model

of disability has gained much support generating terms such as marginalization (Finkelstein, 1980), oppression (Abberley, 1987; Oliver, 1986, 1993) and participation (Oliver, 1990). A more recent view of disability is that it lies in both biology and society, and how they interact (French, 1993; Anastasiou and Kauffman, 2013).

The medical model of disability generates concepts such as prevention, cure and rehabilitation (Davis, 2013) in contrast with the removal of barriers, introduction of legislation or independent living which are all associated with the social model. To this end Davis (2013) states that under the social model, the problems faced by disabled people are due to oppression and exclusion, not their individual deficits. This therefore places a moral responsibility on society to remove any burdens so that disabled people can participate in society. Davis goes on to say that the social model has also helped increase the self-confidence of those living with disability because it focuses on the individual as well as their limitations by changing the perception of the disabled. "*The problem of the disability is relocated from the individual, to the barriers and attitudes, which disable them. The individual does not have to change, but society does*" (Davis, 2013 p217).

Similarly, there are two models of ADHD, namely the medical and social model. This study favours the latter, however it is useful to briefly mention the medical model of ADHD. Accordingly, Forness and Kavale (2001) state a medical model of ADHD has been traditionally vilified by many special educational professionals (Singh, 2008; Foroushani, 2008) whilst others claim diagnosis of the disorder does not help those responsible for educating a child with ADHD (Armstrong, 1999; Graham, 2010; Weaver and Landers. 1998). The medical approach to the disorder was centralized by scientific thinking and consequently individual experiences could be overlooked since the use of medication was considered to be in the best interests of the child and such created a form of dependency on medical expertise (Marks, 1999). The over medicalization of children with ADHD has undermined inclusive education and fails to deal with the real problem of children with ADHD, namely, their difficulties in learning (Graham, 2008; Whitely, 2010; McGee and Share, 1988). The use of medication to treat ADHD implies that the disorder lies with the individual and not their environment, and therefore of significance to this study is the argument that a strictly medical

approach towards ADHD fails to acknowledge social obstacles to the educational success of children with ADHD (Prosser et al., 2002).

According to Ewalt (1994) the medical model of ADHD is entrenched in both policy and practice and remains primarily a biologically based disorder (Levine, 1997: p,200). However, little has been given to the context in which symptoms of ADHD actually occur (Levine, 1997), more specifically the lack of significance given to environmental factors and their contribution towards diagnosis of the disorder. A consequence of this is a narrow approach to intervention that overlooks societal concerns that can include behaviour in the school environment (Levine, 1997; Barkley, 1991; Palombo, 1994; Timimi and Taylor, 2004).

On the other hand, the social model of ADHD looks at the difficulties of the individual as opposed to solely the disorder itself or that the person is somehow deficient. Therefore, in the context of schoolchildren with ADHD this study looked at teachers' interaction and management of schoolchildren with ADHD, along with their knowledge and attitudes. In accordance with the social model of ADHD, teachers have a responsibility to ensure that children with ADHD have a full opportunity to learn, by removing any barriers to their educational development in the school environment and particularly the classroom (Kunter, et al., 2013; Reyes et al., 2012). Equally teachers are encouraged to use a wider range of strategies to ensure the classroom is inclusive of children with disorders such as ADHD (Roux et al., 1998).

To ensure the appropriate support of children with ADHD so that they can achieve their potential, it is crucial those responsible for the delivery of education, specifically teachers, possess accurate knowledge, hold positive attitudes and can implement appropriate interventions to facilitate learning (Anderson et al., 2012; Reid et al., 1994; Bekle, 2004; Sherman et al., 2008). Those without accurate knowledge, possess misconceptions of ADHD as a disorder or lack awareness of what they can do as a teacher to promote learning in an inclusive classroom, can inhibit learning (Jerome et al., 1994; Barbaresi and Olsen, 1998; Sciotto et al., 2000; Kos et al., 2004). Therefore, enhancing the level of accurate knowledge held by teachers about ADHD may result in them showing more favourable sentiments and having a stronger positive attitude towards the disorder and children with ADHD (Eagly and Chaiken, 1993; Krosnick and Petty, 1995; Wood et al., 1995).

Exposing teachers to the latest information in a particular area such as ADHD, in addition to providing structured development and training, might lead to enhancement in knowledge amongst recipients (James, 1973). This enhancement in knowledge by way of training in this study could also lead to a positive change in teachers' behaviours and attitudes (Ronald, 2004; Omar, 2014). There should be a commitment to quality assurance in the training (Marsha and Naftaly, 1999) and where possible it should contain practical elements to help recipients contextualize information as relevant to them (Ngala and Odebero, 2010). It has been recognized that effectiveness of training is enhanced where participants have had the ability to contribute towards the design or development of it (Minan, 1995; Sandholtz, 2002).

This study looks at the social construction of ADHD in a very different country to the West. KSA is culturally different to America or Europe and therefore the researcher was mindful that the teacher's constructions of reality will differ and so too will their knowledge, opinions and attitudes towards ADHD within a cultural context (Lee and Gilbert, 1999; Dudley-Marling, 2004). Having looked at most existing studies published in KSA on ADHD, the medical model has been given almost exclusive consideration (Abed, 2014; Munshi, 2014; Alkahtani, 2013) with little mention of the social model construction of the disorder.

Since social constructivism when applied to ADHD looks at non-medical or non-biological causes of the disorder, the acknowledgement of environmental causes is welcomed by the researcher as it is less narrow or strict. According to Levine (1997) a person-in-environment approach to assessment and intervention of ADHD is needed even though it holds less authority among practitioners than a medical model. However, taking a broader approach than just a medical one to ADHD can result in less intrusive forms of intervention which can be more beneficial for the child.

5.5 Overall research design

According to Thomas (2013) there are a number of research frames that can be used to conduct research. In this study the researcher used cross-sectional, exploratory and experimental designs during the phases of this study. The study looked at SpLD and General teachers at one specific moment in time as opposed to a longitudinal design, and have been selected based on existing differences (in their role as a teacher)

instead of randomly choosing any type of teacher. It measured differences between the two types. It is acknowledged that using a cross-sectional design means an inability to establish a cause and effect relationship (Salkind, 2010). Phase one employed the use of a statistical tool as a research instrument that is compatible with a cross-sectional design so as to measure level of knowledge and misconceptions of ADHD held amongst SpLD and General teachers to draw a comparison.

Given the fact that there is a number of previous studies where a training programme has been designed and delivered to enhance knowledge of ADHD amongst teachers (Worthington et al, 1997; Barbaresi and Olsen, 1998; Syed and Hussain, 2010; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; and Giannopoulou et al, 2017) there are none that involve teachers in the actual design and content of a training programme. Consequently, this study employed an exploratory design that allowed the researcher to actively involve teachers not only in the participation of a training programme to enhance their knowledge of ADHD but also to collaborate with them on its design and content. In the second phase, an exploratory research design was used to gather insight and ideas from SpLD and General teachers prior to the testing of a training programme (Creswell et al, 2003; Morgan, 1998). Data from in-depth interviews to elicit knowledge and perspectives from teachers on what can be done to overcome the lack of knowledge of ADHD in KSA informed the design and content of a training instrument that was an essential part of this study (Creswell, Fetters, and Ivankova, 2004).

Both quantitative and qualitative data were used equally in addressing research questions one and two, however quantitative data was given priority for research question three. The study collected data at different stages and therefore used multiphase combination timing to achieve this (Creswell et al, 2003).

Thirdly, using a quasi-experimental design, findings from phase two contributed towards phase three and the hypothesis that the development and delivery of a training programme is effective in enhancing awareness of ADHD amongst male Saudi SpLD and General teachers. The researcher had control over design, development and subsequent delivery of training as an intervention to a group of SpLD and General teachers, aimed at enhancing their level of knowledge (Kirk, 2013). The researcher, when using such design, must take into consideration important features such as the

reliability of results, the validity of data and practicality of designing or running the experiment and try to strike a balance between them (Seltman, 2015). Taking a quasi-experimental design allowed the researcher to assess the effects of an intervention (Tharenou, Donohue and Cooper, 2012) and this will be discussed in depth when addressing RQ3 (Chapter 8).

5.6 Justification for adopting a mixed methodology to address the research questions

The design of this study uses quantitative and qualitative forms of inquiry at different points in the study (Greene et al., 1989). The first quantitative phase employs an objectivist epistemology and interpretivist in the second qualitative phase.

The features of using survey questionnaires and interviews counteracted the weaknesses of the other. For example, whilst the use of KADDS provided valuable numerical data that can be measured and analysed, it did not elicit detailed views, ideas or beliefs. The use of interviews made up for this lack. In addition, any subjectivity of the researcher in conducting interviews was counterbalanced by the objectivity of quantitative data gathered in phase one (Teddlie and Tashakkori, 2009).

5.7 Research methodology

The researcher used a quantitative approach to examine the level of ADHD knowledge and misconceptions of the disorder held by male Saudi SpLD and General teachers. Adopting a qualitative approach, the second phase gave these teachers an opportunity to give opinions on what they need and what would enhance their level of knowledge of ADHD.

5.8 Phase One: quantitative approach

5.8.1 Quantitative data collection

Quantitative research is defined as social research that uses empirical methods and statements; these refer to descriptive statements and are typically expressed in numerical terms (Cohen and Manion, 1980). Such numerical data can be used to explain a particular phenomenon and therefore such phenomena can be explained quantitatively. However, it is often the case that the research itself does not 'naturally' produce quantitative data but instead is represented numerically or statistically at a

later stage (Sukamolson, 2007). This type of research is often referred to as 'scientific' or 'positivistic' since it is not concerned with what *ought* to be but in fact what it *is* (Carr, 1994).

This type of research is structured so that it can be represented numerically and therefore focuses on data that can be measured (Goertzen, 2017). Typically, quantitative research will highlight trends across a group or study set as opposed to the motivation behind observed behaviour. In order to 'fill the gap' of missing data, qualitative methods such as interviews are effective to discover additional or deeper knowledge (Goertzen, 2017). Advantages of quantitative data include the aim to be objective, it is an effective means of representing data considered complex and results can be generalized and compared (Goertzen, 2017). However, as a method of data it also has limitations; quantitative data does not explain *why* the subject acts a certain way and the collection of sufficient data may take a long time e.g. longitudinal studies.

5.8.1.1 Quantitative methods of data collection: Questionnaires

Using questionnaires as a tool allows the researcher to not only collect data from a large group of people but also in a relatively short time enabling the researcher to identify trends among participants completing the questionnaire (Newby, 2010). When using questionnaires, the researcher should plan the content, layout and covering letter appropriately (Kelley, Clark, Brown et al, 2003).

The fact that a questionnaire offers a structured way in which the researcher can determine the questions that are asked and the range of answers that are given (Gillham, 2007) makes it an ideal tool to measure the level of knowledge amongst teachers since questions relate to ADHD and also directly link to the objectives of the study (Smith, Morrow and Ross, 2015). In addition, by using a questionnaire the researcher had already decided on the possible answers of participants and wanted to know which answer has been selected.

The use of standardized questioning which is common with the use of questionnaires ensures all respondents are presented with the same questions therefore the researcher can control the stimulus presented to all respondents (Munn and Drever, 1990). However, there is no opportunity for the respondent to clarify any

misunderstanding with the researcher as the latter is absent (Munn and Drever, 1990) so therefore questions must be clear to minimize this risk (Krosnick, 1999). It is important to point out that when using questionnaires, the researcher cannot control how respondents will interpret questions.

When designing a questionnaire, the type of questions used is important. As opposed to open questions that seek to gather opinions or views closed questions are more appropriate when using questionnaires. Doing so is better where responses sought by participants are factual as opposed to beliefs and opinions (Gillham, 2007). Analyzing the responses of closed questions is easier since it generates quantitative and descriptive data, which is simpler and less time consuming compared to the analysis of qualitative data. With regards to the type of questionnaire these can vary and can take the form of postal or self-administered, and according to Oppenheim (2000), although the use of mailed questionnaires is both low cost in terms of administration (especially if it is to be sent abroad) and processing it can lead to low response rates compared to a self-administered questionnaire. Munn and Drever (1990) comment that the return of postal questionnaires is usually low because the researcher is remote from their respondents.

In this study, the use of a questionnaire in phase one provided the level of knowledge and misconceptions held by SpLD and General teachers. Based on the quantitative data produced the level of knowledge amongst the sample was measured.

5.8.1.2 Knowledge of Attention Deficit Disorder Scale (KADDS)

The KADDS scale mentioned previously in the systematic review (4.7.1.3) is a known tool for assessing the level of knowledge of ADHD and was developed in America by Scuitto, Terjesen and Bender in 2000.

When selecting KADDS as the most appropriate rating scale to use in this study comparison was made with the 131-item KADD-Q (Kos, Richdale and Jackson, 2004). The latter questionnaire contained elements from the scale used by the one developed by Jerome et al in 1994 and KADDS (Scuitto et al, 2000) as well as additional items developed by Kos et al. Unlike KADDS the KADD-Q contained a section on teaching strategies for children with ADHD, the beliefs of teachers should they have a child with ADHD in their class and a case study accompanied with multi choice questions. The

latter scale was rejected as inappropriate for this study because it is far too long and the attempted measurement across several categories makes the questionnaire quite complex. In the opinion of the researcher this could result in survey fatigue and the failure of participants to be interested in completing the scale.

The use of KADDS is based on a number of reasons as follows: (I) it is widely used in studies on ADHD knowledge (Perold et al, 2010; Alkahtani, 2013; Muanprasart et al, 2014; Ward et al, 2014; Topkin et al, 2015; Botnick-Gallant et al, 2015; Guerra et al, 2017; Shroff et al, 2017 and Padilla et al, 2018); (II) Sciutto (2000 p117) himself said that a deliberate effort was made to only include items that were “well documented and empirically supported”; (III) using three answer options (true, false and don’t know) allowed for measurement of differentiation of what the participants did not know from what they believed to be incorrect; (IV) it is an internally consistent measure and has a high degree of intercorrelation amongst the three subscales– based on Sciutto’s results in 2000; and (V) in comparison with KADD-Q using KADDS is more realistic to expect teachers to complete since it is shorter scale (Breach, 2009) and still covers key areas that measure the level of knowledge of ADHD.

For the purposes of this study and following guidance of DSM 5 (APA, 2013), which states some hyperactive-impulsive or inattentive symptoms of ADHD can present in children as young as 4 years old, the researcher amended item 5 in the KADDS survey: *In order to be diagnosed with ADHD, the child’s symptoms must have been present before age 7.*

To ensure KADDS was suitable to be used with Saudi teachers in this study it had to be translated into Arabic and checked for authenticity with the original scale. The researcher employed the services of two English language specialists (see appendix E). The first stage was to send KADDS for translation into Arabic and the second stage was translation back to English from Arabic. The researcher had oversight of translation to ensure that the Arabic translation was equivalent in meaning to the original KADDS (Brislin, 1970).

Despite the features of KADDS as a scale to measure the level of ADHD knowledge, its validity still needs to be examined by conducting factorial analysis. From the findings of the systematic review those studies that used KADDS, whether or not they

matched the inclusion criteria (Perold et al, 2010; Alkahtani, 2013; Muanprasart et al, 2014; Ward et al, 2014; Topkin et al, 2015; Gallant et al, 2015; Guerra et al, 2017; Shroff et al, 2017 and Padilla et al, 2018) did not conduct factor analysis of KADDS (see appendix F).

The researcher made contact with Professor Mark Scuitto who created KADDS to ask whether, to the best of his knowledge, any previous study had conducted factor analysis of KADDS. To date (email received 18th July 2018) no study had conducted factor analysis of the scale. He cited the reason for this that “no one has done this work with a sufficient sample size to draw valid conclusions about the factor structure’ (see appendix G).

5.8.1.3 Sample design of phase one

According to Cohen, Manion and Morrison (2000) research quality is directly linked with appropriateness of the methodology used and with the suitability of sampling adopted in the research. Two major types of sampling exist in research: probability and non-probability sampling. The first type is also known as random sampling and means that participants have an equal chance of becoming part of the sample and therefore is designed to demonstrate generalizability and representativeness (Teddlie & Yu, 2007). Examples of probability sampling include systematic random sampling and stratified random sampling. However, non-probability sampling is when participants in the sample have been deliberately identified, it is non-random since the researcher chooses who might best represent a population. Examples of non-probability sampling include purposive and quota sampling (McMillan & Schumacher, 2010).

In this study the researcher used purposive sampling for phase one as it is necessary to produce data specifically on SpLD and General teachers and their level of knowledge regarding ADHD. The aim of the first phase of this study was to survey SpLD and General teachers across 30 primary schools in the Northern, Eastern, Central, Southern and Western parts of Jeddah, KSA. Each geographical area in the study contained 6 primary schools. 10 teachers from each primary school were invited to participate in the completion of a questionnaire about ADHD therefore up to 300 responses could be gathered.

5.8.1.4 Procedure for administering KADDS

After identifying the sample the researcher had to write a letter to the Saudi Cultural Bureau that provided an outline of the study to include the proposed timetable for a field trip to KSA (See appendix H), a copy of KADDS, and the consent form each participant would be given when invited to take part (See appendix I). Once satisfied the Cultural Bureau provided the researcher with a letter intended to facilitate the study (See appendix J), which was sent to the MoE in KSA. Permission was granted by the MoE to visit the Educational Centre in Jeddah (See appendix K) as well as permission to contact the head teacher of the schools identified in this study (See appendix L).

After arriving in Jeddah and collecting a signed letter of permission from the MoE I met with head teachers from each of the 30 schools identified. Each meeting was designed to introduce myself and outline the nature and purpose of my study with the intention of getting the head teacher's support in accessing teachers at the school. After the meeting, the head teacher was issued with a soft copy of the consent letter and a link to the KADDS survey as I had previously uploaded it to Google Forms to make it easily accessible for teachers and to enable them to answer it in their own time.

The consent letter issued to participants gave a brief summary of the study and a clear explanation of the aim (See appendix M). They were made aware of what taking part involved and were given assurance that their responses were not traceable and would only be used to achieve the purposes of the study. At the beginning of the online KADDS survey and before participants were given access to the items, participants were reminded again about the aim of the study and what their participation involved. If participants accepted this, then they would be able to access KADDS. After completing 36 items (KADDS) participants were given four options: attend interviews, attend training, attend both, or do not participate any further.

5.8.1.5 Ethical and socio-cultural issues

The researcher adhered to ethical considerations throughout the design, development and completion of the study. The study was granted ethical approval and the topic, design and methods were seen as appropriate (See appendix Z). A vital part of the ethical application was the assurance that participants' data would be secure, their contribution was anonymous, and their responses would only be used for the purpose

of this study; this was made clear in the participant consent form. In order for participants to start completing the KADDS survey they were first required to give their consent to participate in phase one of the study. In terms of using the KADDS scale in this study in KSA, permission was granted by Scuitto (See appendix Aa), however I was asked not to reproduce the scale in its entirety in any published document including my thesis.

KSA, as an Islamic and conservative country, can pose challenges for the researcher in gaining access to female teachers since male and females are not allowed to mix in educational environments. Therefore, for the purposes of this study the researcher had interacted only with male teachers, as this was easier. Saudis value their privacy and would not be willing to express personal views if they suspected any views disclosed to an outsider would be published.

5.8.2 Analysis of data

There are a number of ways that raw facts or figures can be analysed to provide meaningful data so that it may be interpreted by the researcher. Analysis will often refer to classifying and organising the data so that it will assist the researcher to reach outcomes and make conclusions (Bland, 2015). Quantitative data was subjected to two stages of analysis: the first stage was the preparing and processing of data including: data scoring, data entry, and data screening and preliminary analysis. In the second stage, statistical analysis was conducted including: factor analysis, alpha Cronbach, descriptive statistics and inferential statistics.

5.8.2.1 First stage: Preparing and processing data (KADDS)

Before starting the data analysis, the dataset should be prepared through several processing steps including:

Data scoring

Coding is the method of assigning numerical values to represent categories so as to convert the data into a readable format for subsequent computer analysis (Newton & Rudestam, 1999). According to De Vaus (2002) poor data coding can have a negative impact on the quality of subsequent analysis, therefore to ensure analysis was

appropriate, a coding framework for questionnaire data was developed meaning that numeric scores were assigned to relevant responses (Rubin, 2012).

In this study a three-point scale allowed responses from ‘true’ ‘false’ and ‘don’t know’ and each was attributed a score: True = 1, False = 2 and Don’t know = 3. A misconception is defined as an incorrect response (i.e. answering false to a question for which true is the correct answer). Don’t know responses are not considered misconceptions. For instance, in the first statement “Most estimates suggest that ADHD occurs in approximately 15% of school age children” someone giving the correct answer would respond that the statement is false. To give a total subscale and scale score, correct answers for each statement were recoded to give a score of 1 and incorrect and don’t know answers got a score of 0. A codebook of the dataset is presented in table 5.1.

Table 5.1: Codebook of the dataset

Variable name	Level of measurement	value
Age	Ordinal	20-30 year = 1 31-40 year = 2 41-50 year = 3 50 year and above =4
Qualification	Ordinal	Diploma =1 Bachelor = 2 Master = 3 PhD = 4
Type of Teacher	Nominal	General = 1 SPLD= 2
Years of experience	Ordinal	1-5 Y = 1 6 - 10 Y = 2 11 - 15 Y = 3 16-20 Y = 4 21 + = 5
Answer options	Nominal	True = 1 False = 2 Don't Know = 3

Data entry

Data entry is the process of computerizing the data (Bourque and Clark, 1992), SPSS is a widely used software program in research for the analysis of data (Brace et al., 2006). Prior to inputting data into SPSS, it is necessary to prepare it into a recognized format such as using Microsoft Excel (Microsoft Office 2016, Redmond, WA, USA).

In terms of data entry of KADDS responses, the researcher selected SPSS version 25 as the most suitable through which to process the data from KADDS including demographic data of participants. This software allows all data to be gathered simultaneously and manipulated to ensure thorough analysis as well as electronically storing data from questionnaires (Babbie, Halley & Zaino, 2003). In addition, the use of SPSS has assisted the researcher to conduct factor analysis and subsequent analyses (Costello and Osborne, 2005).

In this study the completed questionnaires were collected 21 days after distribution between January and February 2016. From a possible 300 participants, the researcher received 130 returns meaning the response rate was 43.3%. Data gathered were downloaded from Google Forms in the form of Microsoft Excel and statistically processed and analyzed using SPSS. Out of the 130 returns 45 responses were from SpLD teachers and almost twice as many (85) General teachers participated in this phase of the study.

Data screening and preliminary analysis

Preliminary analysis involves preparing the data in a way that the researcher can check if the collection of data was done appropriately and without bias. A common way of doing this is known as screening which should ensure that data are ready for analysis to draw reliable and usable results (Hair et al, 2010). This screening process includes accounting for missing data, checking for outliers and assessing assumptions of normality to ensure the accuracy of data in the study. The researcher should check original data against computer software generated data to discover any hidden errors that could be overlooked when using non-computerized methods (Hair et al, 2010). Further detail for this important stage can be found in the findings chapter (Chapter Seven).

5.8.2.2 Second stage: Validity and reliability of the scale

After completing the preliminary stage of organising and managing data to check and ensure that the data is accurate, the next step is to select and conduct statistical analysis in order to test the validity and reliability of the instrument used. The choice of statistical technique is based upon the research questions and the nature of the data (Pallant, 2007). Internal consistency method (Hussey and Hussey, 1997) was conducted to examine the reliability of the KADDS construct after identifying the factors by exploratory factor analysis. There are several techniques that can help to assess the reliability of the scale however, in this study, Cronbach 's Alpha was used to measure the reliability of KADDS scale. Description of the process and methods used for establishing the validity of scale is presented in the findings chapter (Chapter seven).

5.8.2.2.1 Statistical analyses:

In the following subsections the researcher discusses the statistical methods used to analyse the data involving factor analysis, alpha Cronbach level, descriptive and inferential analyses.

Factor analysis

Factor analysis is a statistical technique designed to categorise strongly related variables set amongst a larger number of variables with the strongly associated ones known as factors (Hair, Black, & Babin, 2015). Since the process is used to analyse a number of variables, it is a way of analysing whether a number of items, for example a questionnaire, adequately represent a smaller number of underlying factors (Hair et al., 2015). There are two main types of factor analysis, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) (Tabachnick & Fidell, 2007).

EFA is used when correlations between observed variables or latent factors are uncertain or unknown. This means the analysis is characterized by its 'exploratory' nature and will determine how and to what degree observed variables are related to

their associated latent factors (Byrne, 1998). These correlations are represented by factor loading estimates (Hair et al., 2015) and by reducing the number of variables to a smaller set of representative factors, this will allow the researcher to conduct further analysis (Ho, 2006).

Unlike EFA, CFA is used not as a way of exploration but to confirm or reject prior knowledge of correct factor loadings based on the variables associated with a factor structure (Lattin, Carroll, & Green et al, 2003). The reasons why EFA as opposed to CFA was the most appropriate for this study was that no other study has conducted EFA of KADDS and the researcher did not intend to design a new instrument (Harrington, 2009), and the correlations between variables found in KADDS were uncertain, therefore subsequent analysis had to be exploratory.

By conducting EFA the researcher was able to reduce the number of variables in KADDS to a smaller set of domains or latent variables which can then be used for further analysis, in addition to carefully considering several points such as methods of extracting factors, methods of rotation, and the reliability of final construct (Tabachnick and Fidell, 2007). These key components, including use of Varimax Rotation and Principal Axis Factoring (PAF) will be discussed and applied to explore the structure of KADDS in the findings chapter.

Alpha Cronbach

One of the most popular ways to determine internal consistency or average correlation of items in a scale to examine reliability is Cronbach's Alpha (Cronbach, 1951). Therefore, internal consistency can indicate the degree to which items in a scale measure the same construct. It has been suggested that Cronbach's alpha value of at least 0.7 will produce good reliability (Kline, 2010), however a score of 0.6 has also been accepted as reliable in exploratory research (Nunnally, 1978; Hair et al., 2015). The exploratory nature of this research means that the internal alpha consistency of 0.6 for KADDS has been interpreted as acceptable.

Descriptive and inferential analysis

Descriptive analysis is a process conducted prior to making inferential statistical comparison. It is a statistical numerical and tabular technique used to present and summarize data (Argyrous, 2005). Computer software is a way in which the researcher can become more familiar with the data when producing descriptive statistics (Woodrow, 2014), or by organising data based on frequency of responses, which occur in the data more often than others (Denscombe, 1998). Examples of descriptive statistics used in this study are frequency and percentage distributions.

Conversely, inferential analysis is described as a numerical technique for the purpose of drawing an overall picture or statement, in other words conclusion, of a population inferred from the data that has been collected already (Argyrous, 2005). In this study, inferential statistical tests Mann-Whitney and Wilcoxon were used to answer RQ1 and RQ3.

5.9 Phase Two: Qualitative approach

5.9.1 Using semi-structured interviews

Interviews can be used to capture a conversation (Robson, 2002) for the purposes of the research and is a method of collecting qualitative data commonly used in social science. There are three types of interview that can be used; structured, semi structured and unstructured. Structured interviews seek to get exact answers so will use closed questions that generate short answers. Such interviews will be used where the researcher seeks very specific answers (Gall, Gall & Borg, 2003). On the other hand, unstructured interviews are a conversation where the researcher may ask a certain question yet there is no definite set of questions. This means that the participants' answers usually indicate what is known on the subject being researched (Lodico, Spaulding & Veogtle, 2006).

In order to gather qualitative data from the sample the researcher conducted semi-structured individual interviews with each teacher. Unlike with a structured interview (as typically found in a questionnaire) there is a degree of flexibility for the researcher whilst at the same time he or she can gather comparable information from interviewees (Edwards and Holland, 2013). According to Mason (2002) semi-structured interviews

have the following core features: interactive dialogue exchange; a thematic or topic-centred approach by the researcher.

In accordance with the design of a typical semi-structured interview, the researcher created a list of questions that would cover a range of themes. The use of semi-structured interviews by the researcher allowed the interviewees to give answers on their own terms, whilst at the same time allowing the researcher to make comparison across interviewees through set questions. (Edwards and Holland, 2013; Radnor, 1994). The researcher would then modify questions or seek further information as appropriate in the interview meaning that questions could be asked of teachers that had not been anticipated at the start of the interview (Gray, 2004). Using a semi structured format will also allow the interviewer to repeat, explain and provide further or more specific detail in the interview in addition to seek clarification in the answers of participants.

The purpose of interviewing participants in this phase of the study was to elicit the perspectives of teachers on what can be done to overcome a lack of knowledge of ADHD. Through a series of preset open ended questions (Jamshed, 2014) and interaction between the interviewer and interviewees, knowledge was produced from their responses that can provide explanation based on their perspectives (Yanow and Schwartz-Shea, 2006).

5.9.2 Interview sample, design and schedule

Sample

From the sample of 130 responses to KADDS 2 teachers responded that they would be willing to participate in interviews only (2%), 22 teachers responded that they would only participate further in the study to attend training (17%) and 28 teachers responded that they would like to participate in both interviews and training (21%). 78 or 60% of teachers did not want to take any further part in the study.

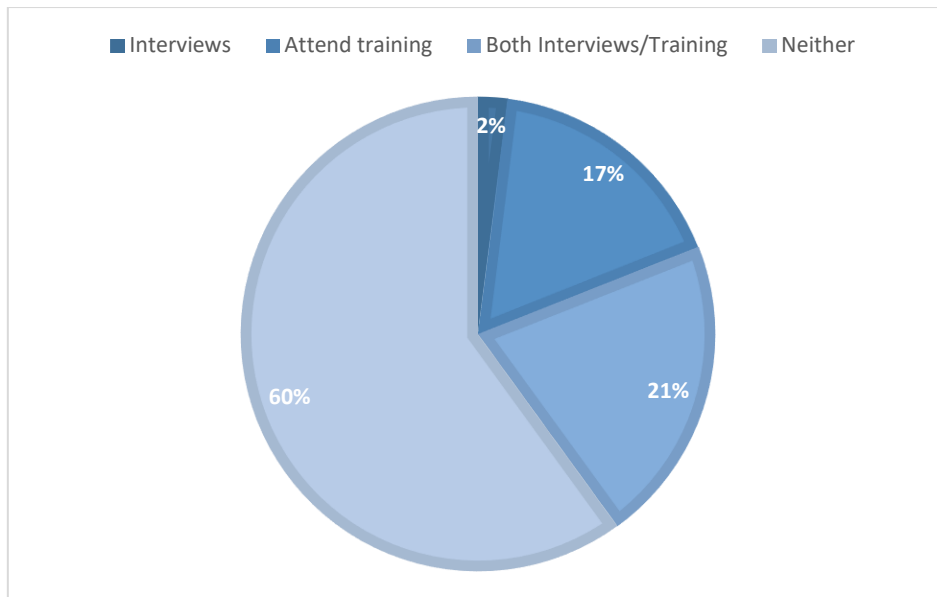


Figure 5.1: overview of the sample

When broken down by type of teacher, 0% (zero number) of SpLD teachers consented to just participating in interviews only, 13% (6 SpLD teachers) consented to participate in training only and 27% (12) of SpLD teachers indicated that they wanted to participate in both interviews and training. Conversely 2% (2) of General Teachers wanted to participate only in interviews, 15.5% (16) consented to training only and 19% (16) of General teachers expressed their consent to be involved with in both interviews and training.

The researcher used quota sampling to find a suitable sample size for this phase of the study. This type of sampling allowed the researcher to divide the population into categories and subjects could be selected from each category (Acharya, Prakash, Saxena and Nigam, 2013). The purpose for this was to allow for the analyses of sub-groups of teachers. This required the researcher to establish a sample that contained equal numbers of both SpLD and General teachers. Each SpLD or General teachers who indicated their intent to be involved in both interviews and training had an equal probability of being chosen within their specific field to create a sample for phase two. To do this the researcher used random sampling to give each teacher an equal chance of inclusion from the two samples of teacher type.

Out of 28 teachers (both SpLD and General) who indicated they would like to participate in interviews and training, the researcher selected an interview sample of

20. This was broken down to 10 teachers of each type. This was done by randomly selecting 10 SpLD teachers from 15 responses who said they would like to participate in interviews and training. The researcher took a similar approach to randomly selecting 10 General teachers from a pool of 13 teachers who responded that they wished to participate in interviews and training. This was done by alphabetizing each respondent and writing the corresponding letter on a piece of paper and a lottery was conducted to produce a sample of 20 participants.

The researcher chose from the pool of teachers who had indicated an interest in participating in interviews and training.

Table 5.2: Teachers who participated in interviews and training

No	Code	Age Group	Highest Qualification	Teacher Type	Years of Experience
1	TT/A1S	31 - 40	Bachelor	SpLD	6-10
2	MAS/A2S	31 - 40	Bachelor	SpLD	6-10
3	MG/A6S	21 - 30	Bachelor	SpLD	1 - 5
4	MHG/A12S	31 - 40	Bachelor	SpLD	6 - 10
5	AM/A13S	31 - 40	Bachelor	SpLD	6 - 10
6	HA/A14S	31 - 40	Masters	SpLD	6 - 10
7	ASH/A15S	31 - 40	Bachelor	SpLD	6 - 10
8	BG/A17S	31 - 40	Bachelor	SpLD	6 - 10
9	NZ/A18S	41 - 50	Bachelor	SpLD	21 +
10	SZ/A19S	31 - 40	Bachelor	SpLD	6 - 10
11	ASG/A3	31 - 40	Masters	General	11 - 15
12	AG/A4	41 - 50	Bachelor	General	21 +
13	SA/A5	41 - 50	Bachelor	General	21 +
14	AAM/A7	31 - 40	Bachelor	General	11 - 15
15	BSG/A8	31 - 40	Bachelor	General	6 - 10
16	ABM/A9	31 - 40	Bachelor	General	11 - 15
17	NTH/A10	31 - 40	Bachelor	General	11 - 15
18	MSH/A11	31 - 40	Bachelor	General	6 - 10
19	MSS/A16	31 - 40	Bachelor	General	11 - 15
20	ASHG/A20	31 - 40	Bachelor	General	6 - 10

Design

When designing the interview questions, the researcher acted in accordance with accepted guidelines for qualitative research interviewing (Kvale, 1996) so as to maximize the quality of results. According to guidelines the researcher should be knowledgeable about the topic under investigation, clear, open and critical. Having had nine years' experience as an academic working within a Special Needs department at TU in KSA and during that time has built up and developed his knowledge and experience as well as his capacity to be open, transparent and approachable. These qualities are important to build a trusting relationship with interviewees, which was necessary throughout this stage of the study. As a PhD researcher he has undergone specific training in research methods and part of this was developing skills required to conduct interviews appropriately.

The design of the interview questions came primarily from the gaps identified in the literature review for this study and from recommendations by previous researchers. In addition studies have identified teacher training as a useful method of enhancing knowledge of ADHD amongst teachers (Jerome et al., 1994; Kos et al., Vereb and DiPerna, 2004; Bekle, 2004; Ghanzadeh et al, 2006; Nur and Kavakci, 2010; Perold et al, 2010; Rodrigo et al, 2011; Anderson et al, 2012; Al-Hakeem et al., 2013; Stampoltzis and Antonopoulou, 2013;; Ward, 2014; Abed et al, 2014; Al-Omari et al, 2014; Frigerio et al, 2014;; Muanprasart et al, 2014; Youseef et al, 2015; Topkin and Roman, 2015; Botnick-Gallant et al, 2015; Kern et al, 2015; Liang and Gao, 2016; Soroa et al, 2016; Lee and Witruk, 2016; Guerra et al, 2017; Shroff et al, 2017; and Padilla et al, 2018). A few studies have identified that such a programme does not exist in KSA and recommended that training would be useful to enhance knowledge (Alkahtani, 2013; Munshi, 2014; Abed et al., 2014).

Currently there is no teacher-training designed, delivered and evaluated in KSA to enhance knowledge of ADHD amongst teachers and secondly teachers have not been given an opportunity to help inform the design or creation of such a training programme (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al, 2011; Froelich et al., 2012; Aguiar et al., 2014; Shehata et al, 2016; Giannopoulou et al, 2017 and Lasisi et al, 2017). The draft interview questions proposed by the researcher were discussed with his lead supervisor and agreed.

Interview questions were sent in English first to an English language teacher at Umm Al Qura University in KSA (see appendix N) to translate into Arabic. This was followed by back translation from Arabic to English by another English language teacher at Umm Al Qura University. This was done to increase the reliability and validity of interview results and to ensure that the context of terms or meanings of words was not lost in translation since this could have invalidated teachers' responses. If the researcher had not checked the quality of translation then he might have made inaccurate conclusions or misrepresented teachers' responses (Brislin, 1970).

Schedule for conducting interviews

Having a schedule for the interviews increased the chance of avoiding meaningless long-winded responses from participants and to ensure the maximum amount of benefit was made of time interviewing teachers. There was a finite amount of time with each teacher so it was important to ensure that it was not wasted. The schedule also allowed the researcher to be organized with taking notes and audio recording responses so that during the transcription process there was no information lost (Bennett, Glatter & Levacic, 1994). The order of questions was preset and such planning helped to ensure a consistent approach was taken across interviews (Hammersley & Atkinson, 2007).

The researcher contacted each of the 20 teachers who were randomly selected to take part in phase two. Contact was made directly with each teacher and bearing in mind the typical responsibilities of teachers such as paperwork, production of lesson plans and administrative responsibilities the researcher discussed a convenient time for each participant to take part in an interview. In order to do this the length of the interview (30 minutes) was disclosed and made clear so that the teacher could allocate sufficient time to fully participate in the interview.

All participants were visited by the researcher and interviewed in their own school and a recording was taken of each interview to ensure the accuracy of responses during the retrieval process and translation from Arabic into English. Recordings were made on an iPhone and securely uploaded to a secure repository after each one. In order to make freehand notes the researcher used a printed Arabic copy of the interview

questions with each participant (See Appendix O). The schedule was agreed with the researcher's lead supervisor prior to embarking upon this phase of the study.

5.9.3 Ethical and cultural issues in phase two

5.9.3.1 Conducting interviews

The Social Research Association's ethical guidelines (2003) state that the researcher must take ethical issues into consideration with dealing with participants. All participants in this stage of the study had given their consent to participate in interviews with the researcher. In the protocol issued to participants at the start of the study all teachers were reminded of their right to pull out of the study at any time as well as their right to refuse to answer any questions during the interview. Equally all participants were assured that data collection was strictly for the purpose of this research study only.

The researcher made written notes during each interview as well as making an audio recording. The recording was for the benefit of the researcher to ensure that no information was lost whilst taking notes and during the retrieval process for translation from Arabic into English. Therefore, the recording sought to ensure the transcript was as faithful as possible to the responses provided by interviewees. By doing this the researcher did not have to go back to any of the participants because of a lack of clarity in their response. Each interviewee was given assurance about the safe and secure storage of the written and digital recording of the interview and to ensure the anonymity of teachers the researcher used codes to refer to participants.

As already mentioned previously, a major factor in conducting research in KSA is the fact that females require the permission of a male guardian to meet with a male researcher, and therefore this would cause considerable delay to the completion of phase two. Therefore, the researcher, as a male, only selected male teachers to participate in this study so that there was not any delay in conducting interviews when the researcher was in KSA. Whilst interviewing male teachers in KSA it was also necessary to assure them that data collected during this phase would not be shared with the Ministry of Education or any other party. It was vital to do this so that teachers

were not apprehensive in the responses they gave and were comfortable with the researcher.

5.9.4 Qualitative data

Typically, qualitative data is non-numerical in type and is produced, for example, through observations or interviews, however as a form of data it can be linked to statistical enquiry or can be completely separate (Huberman and Miles, 1984). As a form of data it can generate patterns or categories based on the attributes of a thing. It is known as a staple in disciplines such as social science and is identified as a source of data that is 'well-grounded and provides rich description and explanation in an identifiable local context' (Miles and Huberman, 1994). Qualitative data allows the researcher to go beyond initial conceptions of the data and it is the meaningfulness that qualitative data can generate which can be seen as more convincing to the audience as opposed to a group of numbers. The illumination provided by qualitative data (Huberman and Miles, 1984) is best seen when the use of the data is aimed at creating answers to the issues being addressed. As a type of data it is considered as dynamic in how it can link together problems, theories and methods (Bryman and Burgess, 2002).

5.9.5 Analysis of qualitative data

The analysis of qualitative data should aim to provide an in-depth, contextual and detailed description and interpretation of the research topic (Holloway and Wheeler, 2010; Smith, Bekker and Cheater, 2011). It has been indicated that a researcher who seeks to analyse qualitative data does so continually since they are considered in the field collecting the data and consequently cannot ignore what they have heard or seen (Pope, Ziebland and Mays, 1999). Whilst the use of different methods such as observations and interviews can produce qualitative data, the transcript produced itself whilst descriptive will not provide an explanation of the issue, however it is the researcher who will explore the data so as to interpret it (Pope et al, 1999).

Analysis of qualitative data can be done manually (Burnard and Gill, 2008) or through a suitable computer software package such as Nvivo. Such packages can help the

researcher to manage and put in order the data for example by extracting quotes (Seale, 2000) however it should be noted that the software is merely a tool to facilitate analysis of qualitative data and cannot confirm or deny the value or quality of the data itself (Burnard and Gill, 2008).

According to Denscombe (2010) the analysis of qualitative data becomes more efficient where the data is put into a succinct structure so that the researcher can organize and determine the data upon which to focus. In theory this should allow the researcher post analysis of the data when giving a summary of it to clearly show the relationship with the research objectives of the study (Alhojailan, 2012). In this study the researcher chose not to use computer software when conducting analysis of qualitative data generated from interviews as it was felt doing so would create distance between the researcher and data as well as the use of software posing a risk of being too mechanistic (Bazeley and Jackson, 2013). On a more practical note the use of small numbers during this phase of the study meant the use of Nvivo was deemed less appropriate.

In order to best interpret the qualitative data generated by the interview responses of teachers I had to critically evaluate methods of qualitative data analysis best suited to small sample sizes and that focus on detailed data as opposed to data generated by larger scale studies. It is intended that the researcher will identify emerging patterns from the interview data so as to provide description of the phenomenon of teachers' perspectives towards enhancing their knowledge of ADHD (Daly, Kellehear, & Gliksman, 1997) in order to address the specific research questions in this study.

The transcription of interview data was a fundamental and necessary stage of phase two. It is important that transcription is as accurate as possible to the actual interview dialogue so that the analyst is able to return to it at a later stage for subsequent analysis (Heritage, 1984). All 20 interviews were transcribed verbatim and in full. This manual process was captured using Microsoft Word. Attention to detail was paid to make sure words of the interviewees were accurately captured. The researcher used a different highlighter to identify each sub-theme and theme so that they could be easily distinguished when scanning through interview data. This also allowed similar

responses to be grouped where appropriate in anticipation of recording emerging patterns amongst the interview responses.

5.9.5.1 Thematic analysis

Adopting an interpretivism paradigm (Silverman, 1993) to explore what teachers think can be done to enhance knowledge made it clear for the researcher that thematic analysis was the most suitable method to analyse the qualitative data from this stage. The approach was described as a process for “encoding qualitative information” (Boyatzis, 1998) and has often been considered one of the most common ways to perform analysis of qualitative data (Holstein and Gubrium, 1994). After conducting interviews that generated the qualitative data, I found that using thematic analysis provided a positive experience since it allowed me to ‘discover’ themes and concepts in the data (Rubin and Rubin, 2011). Despite being a widespread way to analyse qualitative data it has been rarely acknowledged (Boyatzis, 1998) however more recently researchers such as Braun and Clarke (2006) have sought to provide frameworks within which thematic analysis can be used in a flexible and accessible way. In fact, they referred to thematic analysis as a method as opposed to a methodology (Braun and Clarke, 2006; Clarke and Braun, 2013) and it is less well known than other forms of qualitative analysis such as narrative analysis or grounded theory. At the same time, they acknowledged there is no standard way of conducting thematic analysis and this had led to disagreement between researchers about how it should be done (Attride-Stirling, 2001; Boyatzis, 1998; Tuckett, 2005). Braun and Clark (2006) aimed to bring clarity to the conduct of thematic analysis using a method which involves a number of choices that are not obvious but which need to be explicitly considered and discussed.

The conceptual framework for conducting interviews was built upon the theoretical position of Braun and Clarke (2006) since the researcher found it best supported investigation of the interview data from two perspectives relevant to this study: first, coding data in a deductive way; and second seeing if the data produced was consistent with the research question. In order for the researcher to identify themes within the data it was first necessary to understand what is meant by a theme. This

has been defined as “*capturing something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set*” (Braun and Clarke, 2006 p82). Using a ‘top down’ or deductive approach to the thematic analysis (Boyatzis, 2008; Hayes, 1997) means it will be more analyst-driven (Braun and Clarke, 2006) when identifying what can be done to enhance knowledge of ADHD amongst teachers in KSA, and particularly through a teacher training programme.

Arguably their 6-step framework to conducting thematic analysis is the most influential approach to this method of analysis (Maguire and Delahunt, 2017).

5.9.5.2 Research data subject to thematic analysis

In phase two of the study the researcher conducted 20 interviews with teachers randomly selected to participate in this stage of the study. The interviews were conducted with 10 SpLD and 10 General Teachers who were asked the same questions. The purpose of the interview was to obtain teachers’ perspectives on ways to enhance their knowledge of ADHD and particularly through a teacher training programme.

Thematic analysis according to Braun and Clarke (2006)

As discussed above, in the present study it was found that following the six clear steps in the approach provided structure by which the researcher undertook the significant task of analysing the qualitative data by hand:

Stage	Description
1. Familiarize yourself with your data	Immerse yourself in the data in order to be familiar with it by read and re-read data, note initial ideas, and for verbal data conduct transcription
2. Generate initial codes	Code interesting features of the data by organising it in a meaningful and systematic way, reduce data into chunks (codes) of meaning
3. Search for themes	Sort different codes into potential themes and collate all relevant codes within the theme

4. Reviewing themes	Modify and develop themes (from step 3) as appropriate, does the data support the theme and work in the context of the data set?
5. Defining and naming themes	Further refine themes and data within so as to identify the 'essence' of each theme which could result in creation of sub-themes, conduct a detailed analysis of each theme and identify the 'story' told by the data. Important to clearly define each theme.
6. Producing the report	Provide concise and coherent account of the data ensuring that themes are supported by the data using vivid examples that link back to the research question

5.9.5.3 Conducting thematic analysis

The researcher collected the data by audio recording interviews and then transcribing each one from Arabic to English and in doing so fully familiarized himself with the data. When reading and re-reading back each transcript in English he was able to note any additional ideas as appropriate. Moving onto the second stage of conducting thematic analysis and using a deductive approach, initial analysis of the data set from stage one involved creating a codebook (See appendix P) that could be used to test for applicability and reliability of terms in the data. The codebook was created based from theory derived from the study's literature review (Crabtree & Miller, 1999; DeCuir-Gunby, Marshall & Mcculloch, 2011) and can be regarded as a tool for managing data to help with subsequent interpretation of that data (Yukhymenko, Brown, Lawless et al., 2014).

The codebook produced by the researcher was independently reviewed by two further researchers based on their random selection of 4 interview transcripts and example of these transcripts can be seen in (Appendix Ab). After independent review there was agreement with the initial codes generated and just a suggested change of terminology of three codes. This involved changing the word "Facilitators" to "Sources" in the context of sources of information about ADHD awareness; "Facilitators" to "Ways" when looking at general methods to enhance knowledge of ADHD; and "Facilitators"

to “Stakeholders” when looking at specific ways to enhance knowledge of ADHD. The resultant codes were checked for consistency against the research question so as to ensure they were appropriate to enhancing teachers’ knowledge of ADHD.

Once coding of the data set was confirmed, based on those codes the researcher identified emerging themes that were representative of the different codes and was able to fit all of these within the proposed themes. Based on these coding groups the researcher began to identify and generate initial themes and sub-themes, and also linking these to the research question. It is important to note that the generation of codes was based on the entire dataset of 20 interviews and therefore the generation of initial themes and sub-themes was not based on the data of merely a handful of interviews. The initial themes and sub-themes proposed were independently reviewed in light of 4 interview transcripts to ensure they were an accurate representation of the codes yet at the same time ensuring it was still possible to distinguish between the themes (Braun and Clarke, 2006). Following this process, the themes and sub-themes were refined and named.

From creating the codebook and going through the necessary stages of thematic analysis as set out in the Braun and Clarke (2006) model, it took the researcher 30 days from the period of generating initial codes to naming and refining themes and sub-themes. During this time the researcher met with his research team who independently reviewed and confirmed codes that had been generated. In addition to conducting independent review of these codes which increased transparency (Joffe, 2012), the initial themes and sub-themes generated by the researcher were added to, following independent review. A suggested theme of Familiarity was created with sub-themes of satisfaction, sources and knowledge of ADHD terminology. In addition, two suggested sub-themes were added to themes on enhancing teachers’ knowledge of ADHD through training and general ways to enhance Teachers’ knowledge of ADHD compared to specific ways.

Going through the stages of independent review and discussion helped to ensure the researcher’s reflexivity and awareness of any bias on his part in order to remain critically reflective of any bias when dealing with the data (Mills, Durepros and Wiebe,

2010). The ability for the researcher to be reflective was further supported by going back through interview data over a period of several weeks to ensure the same patterns could be found.

5.9.5.4 Validity and Reliability

According to Morse et al in 2002, there are a number of key features of qualitative research that make it trustworthy and confirmed, and as pointed out by Patton (2001) reliability and validity are appropriate for attaining rigour in qualitative research. The parallel concept of trustworthiness of qualitative data was introduced by Lincoln and Guba (1985) and contained four aspects: credibility, transferability, dependability, and confirmability. Credibility of the data refers to ensuring that what is being researched is accurately recognized and that it is described precisely. Transferability relates to the extent to which data findings can be generalized or made relevant to another context. Dependability is increased when outcomes can be replicated by another researcher so that they are able to validate the data analysis. Confirmability represents the extent to which the outcomes of a study can be confirmed by the collected data (Cohen et al., 2007).

Therefore, in order to determine if the research is reliable and valid there should be an evaluation of its overall significance, relevance, impact and how the research is to be used (Morse et al, 2002). Further to this Campbell (1997) states that consistency of the data is achieved when steps of the research are verified through examination of raw data, reduction and process notes. It is pertinent at this point to remind ourselves of what is meant by reliability of qualitative data in so far as the real question at hand is whether the results gathered in the study are consistent with the data collected (Lincoln and Guba, 1985; Merriam, 1995).

The reliability and validity of this phase of the study was increased through internal peer examination (Merriam, 1995). After development of a codebook in the first stage of thematic analysis, it was independently checked by two researchers based on their random selection of 4 interview transcripts (both researchers reviewed the same transcripts) and the codebook was confirmed as appropriate. Initial themes and sub-themes generated by the researcher were reviewed and confirmed by two independent researchers again based on the review of 4 interview transcripts (see

appendix Q). This meant that there had been independent review and agreement on 20% of the data generated and would appear to be a rigorous way to ascertain reliability (Joffe, 2012). Agreement was reached on the themes and sub-themes and therefore helped to ensure subsequent analysis of the data demonstrated dependability and rigour (Miles and Huberman, 1994) and concordance between reviewers (Joffe, 2012). External validity was achieved through using thick descriptions of the data and context (Lincoln and Guba, 1985; Merriam, 1995). I offered detailed and clear explanations of the study's data collection methods, sample, and setting as well as those included in the appendices. In addition, providing verbatim transcripts from the participants' interviews presented a clear view of the factual data. Quotations and extracts from the interviews were used to give the reader access to part of the original data and also to justify the researchers' interpretation of emergent patterns and subthemes. However, the purpose of social constructivism research is not to generalize results, yet to provide unique views which are based on context (Elshabrawy, 2010), and the lessons gained from this might be transferred to a similar setting (Lincoln and Guba, 1985).

Moreover, recording accurately and listening a lot as well as getting feedback so as to check for comprehension and accuracy used to assure the validity of qualitative approach (Wolcott, 2009).

5.10 Phase Three: design and development of a teacher training programme

This stage of the study involved the researcher designing, developing and delivering a training programme to both SpLD and General teachers. The training programme was intended to enhance the level of ADHD knowledge amongst participants. It also addressed the barriers to participation identified during phase two of the study within the social model of ADHD.

5.10.1 Sample design for the training programme

This stage of the research adopts a quasi-experimental design but lacks use of a control group. The researcher chose the participants for the training programme and ensured an equal representation of SpLD and General teachers. Consequently, a random assignment made by the researcher is missing, however a causal reference for the data must still be identified in the absence of a control group whilst at the same

time reducing the plausibility of alternative causal explanations (Shadish, Cook and Campbell, 2002). In short, the researcher was looking at the cause-and-effect relationship between independent and dependent variables (Sousa, Driessnack and Mendes, 2007).

Adopting the one-group pre-test-post-test design is relatively straightforward, widely used in educational research, and considered superior to observational studies (Campbell and Stanley, 1963; Grimshaw, 2000). In this study, the researcher made an observation of teachers who completed KADDS to measure their level of knowledge (O1), delivered an intervention (X) to a group of SpLD and general teachers, all of whom had submitted a KADDS return, and after training required all participants to complete another KADDS survey four weeks after attending the programme (O2). The one-group pre-test-post-test design can be symbolised by the following:



Figure 5.2: One-group pre-test-post-test design (Shadish, Cook and Campbell 2002)

In order to provide a strong causal inference in the study the pre-test allows the researcher to show the level of knowledge prior to the training intervention (Shadish et al. 2002). 17 teachers from 20 who participated in interviews (O1) attended a training programme (X) delivered by the researcher and after four weeks post training completed KADDS again (O2).

The researcher was unable to create a control group prior to the training programme intervention due to the length of time between completion of the KADDS questionnaire, creation of sample for interviews and then redistribution of KADDS to participants in the training intervention. Due to the practicalities of the study it would not be possible to use a control group during the 8 weeks duration of the research. It is accepted by the researcher that maturation could have taken place amongst teachers due to the length of time between the pretest, intervention and post-test.

5.10.2 Design and foundations of the training programme: Adoption of the ADDIE model

The researcher used the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model of training to create the training intervention as it provided a systematic way of creating an instructional development (Molenda, 2003). The model contains the five processes of Instructional Systems Development (ISD): Analysis, Design, Development, Implementation, and Evaluation. The process of gathering and analyzing collective and individual training needs using a systematic approach ensured that the learning programme and underpinning materials were developed to meet the needs of KADDS (Branson, 1975).

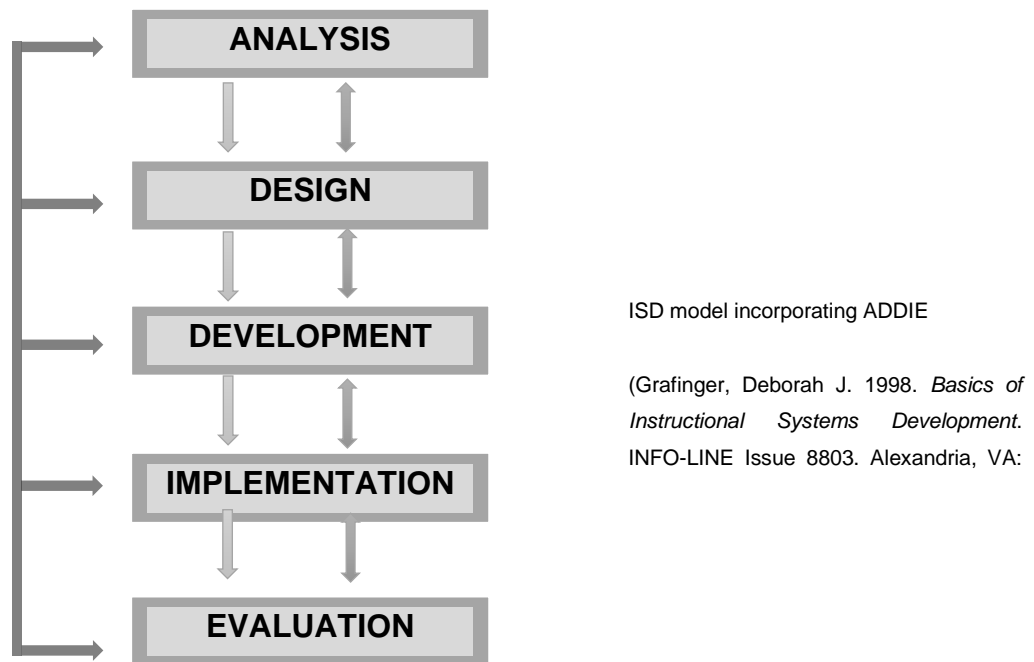


Figure 5.3: ISD model incorporating ADDIE

The researcher will not go into detail at this point about the development of the training programme designed to enhance the level of ADHD knowledge as this will be dealt with fully in the next chapter. Instead a general overview of the ADDIE model will follow.

Five processes of ADDIE:

- **First process: Analysis**

This first process required an understanding of what needed to be done (Rossett and Sheldon, 2001) and the identification of objectives of the training. The objectives should be designed with consideration of individual needs of the audience, who they are, and why they should be involved in such training. In this first stage of ADDIE there should be analysis of the proposed methods of information transfer and subsequent dissemination to participants of how they will learn content. This should equally apply to analyzing issues that could prevent the effective transmission of information to those receiving training. It is also important to conduct an analysis of the timeline for the programme and the frequency and duration of training since. Analysis at this first stage of participant attitudes will be influential in the design stage (Shibley et al., 2011).

- **Second process: Design**

In defining an approach to take, information gathered during the analysis stage should be used to determine how training would be achieved, and part of this should be to identify the intended learning outcomes of participants on the programme. This process includes looking at the types of tools used to disseminate knowledge to underpin the learning process, and how participants may be assessed to ensure learning. Training content is an important feature of the design process and requires planning and deciding what information will be communicated to participants and in what manner this will be done. When designing training it is also necessary to think about how participants will interact with training materials so that they are as effective as possible (Molenda, 2003).

The design process makes it possible to create a draft of what the programme could look like in order to evaluate it against criteria identified in the analysis stage. Doing this means that any issues or problems can be rectified before producing training materials.

- **Third process: Development**

This process seeks to ensure information gathered as part of the analysis and design stages are appropriately disseminated to participants when training is delivered. Content that will be received by participants is created to include activities that help facilitate and support participants' learning. Depending on the nature and type of delivery, the creation process may also require the development of more flexible and innovative forms of learning if face-to-face interaction is not required. Upon the completion of the design stage, the trainer should be able to see if the training materials flow well and work as intended and to reflect back on the training objectives and needs of the audience to ensure that these have been suitably met (Visscher-Voerman and Gustafson, 2004).

- **Fourth process: Implementation**

This is where participants actually receive training and materials designed and prepared for them. It is an important process in the ADDIE model as it is at the implementation stage where learning of participants occurs (Visscher-Voerman and Gustafson, 2004). After delivering training following the stages of creation, design and development, it is now over to participants and how well they receive the training and materials. It will be down to the trainer at this stage to ensure they make observations on whether the programme meets predicted outcomes, if it has run to time and what did participants get out of it (Shibley et al., 2011).

- **Fifth process: Evaluation**

Evaluation runs throughout the ADDIE model as it encourages formative and not only summative evaluation. As a final stage, this refers to the official evaluation of training whereby questions are asked if objectives for the programme are being met. Commonly this will take the form of assessing participants at the end of training, the results of which can be directly compared against training and learning outcomes to see if participants have met these based on the information and materials they have been exposed to. Evaluation can also be used as a way of measuring the effectiveness of a specific part of the training programme. These have been broadly categorized into

the following: reaction (perception of the programme amongst learners) learning (skills, attitudes or knowledge acquired by participants), behaviour (was a change in the participant) and results (impact from the learning) (Kirkpatrick, 1994).

It is crucial to take a structured approach when attempting to create and implement a training programme intended to provide a positive and lasting influence on participants. Through separate and yet connected processes, ADDIE offers ongoing opportunities for reflection and evaluation so as to ensure objectives are met to the benefit of participants. Taking a staged methodological journey from analysis through design, development, implementation and finally evaluation, ADDIE provides pragmatic guidance for the development of training.

5.10.3 Cultural and ethical issues in phase three

The MoE granted the researcher permission and physical facilities to deliver the training programme however was unable to provide refreshments. The researcher took it upon himself to purchase snacks for the participants.

In the protocol issued to participants at the start of the study all teachers were reminded of their right to pull out of the study at any time. Three teachers decided to withdraw from the study at this point prior to the training programme. On the first day of training and before the programme started, the researcher asked each participant if they were happy for a video recording of the training programme to be made as documentary evidence to assist the researcher when writing up the study. This reinforces the protocol in the first and second phase that data will only be used for the study.

Whilst the researcher ensured the anonymity of participants throughout phases one to three of the study, the MoE informed the researcher that they were prepared to issue participants who had completed training with a certificate of participation. At the start of the first day the researcher made the announcement to participants of this and stated that any teachers interested in receiving a certificate could give their name and receive a certificate at the end of training. All participants wanted to receive a certificate from the Ministry of Education. The training itself was delivered in Arabic however the programme was originally written in English and translated to Arabic.

Since the researcher was required to get permission from the MoE for the participation of teachers as they were required to be taken out of teaching to be involved in this study, teachers were given permission only once to attend the training programme (See appendix R).

5.11 Phase Four: Redistribution of post-test KADDS questionnaire

5.11.1 Sample design

The researcher was not required to construct a new sample since participants in this phase were the same as in the previous phase, namely, teachers who had participated in the training intervention. Three teachers were absent due to unforeseen circumstances from this phase of the research meaning that 17 teachers took part.

5.11.2 Procedure for redistribution of KADDS

In terms of the procedure for redistribution of KADDS to teachers who participated in the training intervention, both the email address and mobile telephone number of each teacher were given to the researcher on the final day of training. This was solely to be used for the redistribution of KADDS and was fully explained to participants and stored securely. All participants were given one week to complete the redistributed KADDS. The researcher sent one text message to all 17 teachers to remind them of the survey and to follow the link.

5.11.3 Comparison of findings pre-and post-intervention

By comparing KADDS results pre-and post-intervention for these 17 teachers, the researcher was able to conclude the extent to which the design, development and delivery of a training intervention helped teachers enhance their knowledge of ADHD in order to possibly remove social barriers of ADHD. The comparison also looked at the possible effect of the training to address misconceptions of ADHD amongst participants so as to foster positive attitudes towards the disorder as well as empowering teachers to employ effective educational interventions with their pupils.

5.11.4 Summary

By adopting the social model of ADHD, the detrimental impact of a lack of knowledge about the disorder amongst Saudi teachers was explored. Using a social constructivist approach, the researcher identified barriers that exist in KSA preventing teachers from positively contributing to the educational achievement of Saudi schoolchildren with ADHD. To get the desired type of data that would not only measure the current level of knowledge about ADHD amongst teachers but would also elicit their responses to ways to increase knowledge in general and through the use of training, it was necessary to use a mixed methodology. Therefore, the researcher used a quantitative approach in phases one and four and qualitative in phase two. (Phase three was the actual delivery of training). Doing this also required the researcher to use a combination of data analysis methods such as SPSS and thematic analysis.

Due to the restrictions on the availability of teachers and the variance in the sample size during each phase of the study, in phases two and four it was necessary to use a combination of random and quota sampling. The limitation on the availability of teachers prevented the researcher conducting a pilot study of the training intervention so he therefore adopted a one-group pretest-posttest design to compare teachers' knowledge based on KADDS prior to and after participating in training. The adoption of the ADDIE instructional training model provided a clear and systematic framework to design the training intervention for teachers.

CHAPTER 6

Designing, Developing and Delivering an ADHD Training Programme for Teachers

6. Using the ADDIE model to design a training programme for enhancing ADHD Knowledge amongst Saudi primary schoolteachers

In this chapter, the researcher will discuss using the ADDIE model to design, develop and deliver a training programme for teachers in KSA intended to enhance their level of knowledge of ADHD. At the same time the programme will introduce teachers to useful behavioural classroom management strategies they can use. Whilst there was an overview of the ADDIE model in the methodology chapter, this chapter will focus specifically on creating an ADHD training programme for teachers in KSA. The first stage of ADDIE requires the researcher to understand the issues that the training programme will address; identify an appropriate framework for the training to include goals and objectives for the programme; design principles of training to include content, duration and activities; and consider the manner in which training will be delivered to participants along with the level of interactivity amongst participants and their collaboration with the trainer. Finally, the evaluation as a stage of ADDIE will be discussed in the context of designing, delivering and implementing a training programme. Analysis of data gathered in phases one and two along with findings of the systematic review in this study will help inform the final design of the training programme developed in this stage.

6.1. ADDIE Stage One: Analysis

Studies in the systematic review identified specific areas of concern about teachers' knowledge of and perceptions about ADHD; the majority show that primary school teachers lacked ADHD knowledge (Hepperlen et al, 2002; Kos et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci, 2010; Rodrigo et al, 2011; Al-Hakeem et al, 2013; Alkahtani, 2013; Muanprasart et al, 2014; Abed et al, 2014; Youssef et al, 2015; Kern et al, 2015; Al-Omari et al, 2015; Liang and Gao, 2016; Shroff et al, 2017; and Padilla et al, 2018). More specifically, 12 studies in the review discussed knowledge of ADHD characteristics and causes and several studies found teachers had a lack of knowledge in this area (Alkahtani, 2013; Soroa et al, 2014; Soroa et al, 2016; Shroff et al, 2017 and Padilla, 2018).

A number of studies measured knowledge of ADHD symptoms and diagnosis amongst primary school teachers and found they had a poor level of knowledge in this domain

(37% Soroa et al, 2014; 36% Topkin and Roman, 2015; 25.2% Perold et al, 2010; and 18.1% Alkhatani). No studies in the systematic review indicated primary school teachers had a good level of knowledge in regard to ADHD treatment, with several making specific reference to this absence of knowledge amongst teachers (Ward, 2014; Shroff et al, 2017; Padilla et al, 2018; Topkin and Roman, 2015; Abed et al, 2014; Soroa et al, 2014; Alkhatani, 2013; Munshi, 2014). It was also apparent that studies in the review demonstrated that teachers held misconceptions towards children with ADHD. For example, teachers believe that poor parenting is a cause of ADHD (Sciutto et al, 2000; Ghanizadeh et al, 2006; Al-Omari et al, 2014; Kern et al, 2015 and Liang and Gao, 2016) and parental spoiling (Rodrigo et al, 2011 and Nur and Kavakci, 2010), or they think a child with ADHD would outgrow the disorder (Jerome et al, 1994; Perold et al, 2010; Al-Hakeem et al, 2013 and Liang and Gao, 2016).

Nine studies of non-pharmacological interventions designed to enhance the level of ADHD knowledge amongst primary school teachers were systematically identified and analysed in the current study. Eight of the studies showed teachers enhanced their knowledge of the disorder after participating in training (Worthington et al., 1997; Barbaresi and Olsen, 1998; Syed and Hussain, 2010; Barnett et al., 2012; Aguiar et al., 2014; Shehata et al., 2016; Lasisi et al., 2017; Giannopoulou et al., 2017) and one study did not find any significant increase in knowledge or attitudes towards ADHD amongst teachers post training (Sarraf et al., 2011). The review also found that the majority of interventions for teachers had improved teachers' attitudes towards the disorder (Barbaresi and Olsen, 1998; Sarraf et al., 2011; Barnett et al., 2012; Aguiar et al., 2014; Shehata et al., 2016; Lasisi et al., 2017).

Most ADHD training programmes designed to enhance the level of ADHD knowledge amongst primary school teachers were designed and developed by the researcher(s) (Worthington et al., 1997; Syed & Hussain, 2010; Sarraf et al., 2011; Aguiar et al., 2014; Shehata et al., 2016) whilst some programmes were designed by a third party but delivered by the researcher(s) or specialist(s) in ADHD.

The majority of studies in the systematic review that delivered training as a way to enhance primary school teachers' knowledge of ADHD did so through face-to-face interaction with teachers (Barbaresi and Olsen, 1998; Sarraf et al., 2011; Syed &

Hussain, 2010; Aguiar et al., 2014; Shehata et al., 2016; and Giannopoulou et al., 2017) which suggests that this would be a successful way of delivering training. Research has shown that the dissemination of information in ADHD training created to enhance knowledge of the disorder amongst primary school teachers could use be through presentations supported by handouts which allow participants to keep for their own reference (Aguiar et al., 2014; Froelich et al., 2012; Barnett et al., 2012, Lasisi et al., 2017). Training that has enhanced teachers' knowledge of ADHD should offer the opportunity for primary school teachers to discuss their own views and understanding of issues and information with each other as well as expose them to technology such videos that highlight ADHD issues (Barbaresi and Olsen, 1998; Barnett et al., 2012; Shehata et al., 2016; and Lasisi et al, 2017). Successful training that has enhanced the level of ADHD knowledge amongst primary school teachers has involved the use of case studies that have allowed participants to apply ADHD information to real life examples as well as expose teachers to specialists in child psychology (Barbaresi and Olsen, 1998; Syed and Hussain, 2010).

An important consideration when delivering training of any form is that it should not be too long in duration as this may cause participants to lose interest or disengage (Arcia et al., 2000; Evans et al., 2004). The systematic review of ADHD interventions for primary school teachers in this study found that the duration of training between studies varies widely (Barbaresi and Olsen, 1998; Aguiar et al., 2014; Shehata et al., 2016; Lasisi et al., 2017) to days (Sayed & Hussain, 2010; Sarraf et al., 2011; Giannopoulou et al., 2017) and even longer (Barnett, et al., 2012; Worthington et al., 1997). Overall, these studies found that the average duration of an intervention to enhance primary school teachers' knowledge of ADHD was 3.3 days.

Nearly all intervention studies in the review contained general information on ADHD, characteristics of the disorder, symptomology and treatment (Worthington et al., 1997; Barbaresi and Olsen, 1998; Syed & Hussain, 2010; Sarraf et al., 2011; Aguiar et al., 2014; Shehata et al., 2016; Lasisi et al., 2017). It is important to note that all interventions contained content that relates to classroom management strategies to support primary school teachers in dealing with school children with or at risk of ADHD.

Looking at the studies conducted in KSA, primary school teachers either scored a low level of knowledge in all three of these domains or there was a recommendation that

the level of ADHD knowledge amongst primary school teachers needed to be improved. Across the studies, Saudi primary school teachers also demonstrated poor attitudes towards school children with or at risk of ADHD (Alkahtani, 2013; Abed et al., 2014; Munshi, 2014). Currently there is no in-service ADHD training programme for Saudi primary school teachers to enhance their knowledge of the disorder or on how to deal with school children either with or at risk of ADHD in KSA. This is despite all existing Saudi studies on ADHD knowledge amongst primary school teachers in KSA recommending an increase in the level of ADHD knowledge amongst teachers and that this should be achieved through training.

6.2 ADDIE Stage Two: Design

The analysis stage highlighted not only that a general lack of knowledge amongst primary school teachers of ADHD but also that non-pharmacological interventions created to enhance teachers' knowledge are successful in achieving that aim. It was also established that there was a lack of ADHD knowledge amongst Saudi primary school teachers and that there had been no study to date that had designed and delivered a training programme to primary school teachers in KSA intended to enhance their level of knowledge of the disorder. This is despite the limited studies that have measured knowledge of ADHD amongst Saudi primary school teachers all having made recommendations to enhance the level of knowledge through the delivery of training. Under this stage of ADDIE, goals for the ADHD teacher training programme for Saudi primary school teachers were determined and set out what training was seeking to achieve. It was hypothesised that an in-service training programme delivered to teachers will enhance their level of knowledge on ADHD and provide them with useful information on educational interventions as a form of treatment for the schoolchildren with ADHD or at risk of the disorder.

6.2.1 In-service training

The continuing professional development of teachers to include the deepening of knowledge and skills is fundamental to the future of education (Ainscow, 1994; Garet, Porter, Desimone et al., 2001). In-service training can be used to strengthen teachers' knowledge and therefore help improve their practice (James, 1973) as well as change their behaviour and attitudes (Ronald, 2004; Omar, 2014). As a desirable activity,

schools should commit the necessary resources to ensure that training is available for teachers (Ronald, 2004) to support not only the learning needs of pupils but also ensure personal and career development of staff (Rashid, 1996).

Therefore, it is necessary to define what in-service training actually is. Put simply it is an activity with an aim of improving teachers' knowledge and performance skills (Glencross, 1986) and considered to be more effective when teachers are involved in the planning of training activities (Sandholtz, 2002). The effects of in-service training go beyond improving teaching practice (Freeman, 1982; Joyce and Showers, 1980), quality of education (Hayes, 2000; Leiberman and Pointer-Mace, 2008) and teachers' effectiveness (Ngala and Odebero, 2010). It is also said that in-service training can help teachers to feel more comfortable in their role (Ong, 1993).

In order that in-service training can empower teachers to possibly make them more effective (Owen, 1990) it should be done in a systematic and quality-driven way (Marsha and Naftaly, 1999). To do this the training should have a practical element based on real issues affecting teachers in their place of work (Ngala and Odebero, 2010) as well as the knowledge and skills of the facilitator (Omar, 2014). According to Minan (1995) suitable content will only be achieved through observation, listening and feedback from potential participants by the facilitator. An important factor in determining the effectiveness of training could be the material and resources used during training such as handouts and media (Woodward, 1991; Fullan, 1982; Harland and Kinder, 1997; Hayes, 2000; Woodward, 1991; Uysal, 2012).

In-service training has a positive impact on teachers (Freeman, 1982; Joyce and Showers, 1980; Owen, 1990; Thompson, 1992; Ong, 1993; Samupwa, 2008; Kazmi, Pervez and Mumtaz, 2011; Jahangir, Saheen and Kazmi, 2012; Ekpoh, Edet and Nkama, 2013). It should be comprehensively well planned (Omar, 2014), have suitable objectives and use appropriate training materials (Omar, 2014; Uysal, 2012). Therefore, the planner must ensure that the desired outcomes of the training are suitably met through the contents (Joyce and Showers, 2002). Joyce and Showers (2002) placed the outcomes of in-service training in an ascending order ranging from (1) simple awareness of theory or practice, (2) new understandings concerning the content and about oneself which relate to the subject, (3) skill and proficiency with the

materials, and (4) the transfer of new signs and understandings in the participants' own instructional setting (Joyce and Showers, 2002 p.72).

6.2.2 Goals and objectives of the ADHD training programme

Training goals should be based on what the trainer intends that the participant should be able to demonstrate post completion of the training, and these should be measurable (Hannum and Hansen, 1989). In addition, goals will help to describe the outcomes of the training programme (Hannum and Hansen, 1989). There will be a better chance of success if training methods are carefully selected so that objectives can be achieved (Wentling, 1992).

Before describing goals and outcomes of the training programme for teachers in KSA it is useful to briefly discuss learning outcomes in a general context. A learning outcome is a statement of what the learner is expected to know, understand or be able to demonstrate at the end of the period of learning (Gosling and Moon, 2001). They are broad statements (Harden, 2002) and can be divided into three categories: knowledge, skills and attitudes (Bloom and Engelhart, 1956; Kratwohl, Bloom and Masia, 1964). Learning outcomes should be written in plain language, contain action verbs and should not be too long (Fry et al., 2000).

Goal: To enhance teachers' knowledge of and attitudes towards ADHD

Objectives:

1. Enable teachers to recognize the key types of ADHD, its symptoms characteristics and causes
2. Familiarise teachers with the process for diagnosis and identification of ADHD
3. Help teachers to identify ADHD treatment and interventions
4. Ensure inaccurate information and misperceptions about ADHD are recognized

Training outcomes

- ✓ Teachers will know what ADHD is and recognize the three types
- ✓ Teachers will know the possible causes of ADHD

- ✓ Teachers will understand the role that they play in the diagnostic process for ADHD
- ✓ Teachers will be aware of the criteria for a diagnosis of ADHD
- ✓ Teachers will recognize medical treatment of ADHD
- ✓ Teachers will know how to adopt behavioural, educational and effective classroom strategies
- ✓ Teachers will demonstrate a positive attitude towards children with ADHD

6.2.3 Contribution of teachers to programme design

A combination of responses from phase two, findings of phase one and the systematic literature review were used to complete the overall design of the ADHD training programme for Saudi primary school teachers. Given the lack of knowledge amongst primary school teachers of ADHD as demonstrated clearly in the systematic review (Chapter 4), and the confirmation of a poor level of knowledge amongst male Saudi primary school teachers in phase one, it was essential that any training designed to enhance ADHD knowledge amongst Saudi primary school teachers contained accurate and up to date information about the disorder.

The need for training content to contain accurate and up to date information on ADHD etiology, diagnosis and symptomology was confirmed in phase two. All male Saudi primary school teachers responded they were dissatisfied with their current level of ADHD knowledge and wanted to know more about the disorder. Therefore, it was necessary to at least cover the recognized domains of ADHD during training. Taking the views of teachers onboard when designing training helps to contextualize how teachers can apply what they are learning and experiencing with their own practice. (Wallace, 1991 and Reagan and Osborn, 2002).

During phase two, male Saudi primary school teachers were given the opportunity to share their views of teacher-training and in particular what they consider to be important factors of an in-service training programme designed to overcome a lack of ADHD knowledge. This allowed them to collaborate with the researcher on how best to design training as opposed to just leaving this to the one giving instruction (Uysal,

2012; Bax, 1997). When designing the programme, common ADHD myths and history of the disorder would be dealt with at the beginning of training since these did not require teachers to possess any prior knowledge of ADHD or experience of teaching children with or at risk of the disorder. All participants in phase two said they wanted to know how to recognize a child with ADHD and to be able to manage children with ADHD or at risk of the disorder in their classroom. Therefore, part of training would focus on specific classroom management methods that teachers can use to support children with or at risk of ADHD.

All male Saudi teachers in phase two gave their perspective on the duration of in-service teacher training on ADHD. There was a variety of responses from teachers ranging from hours to days, together with findings from the systematic review of non-pharmacological interventions designed to enhance the level of ADHD knowledge amongst primary school teachers. Taking this all into account the duration of training was three days. So that training was as engaging for participants as possible, the views of teachers of what activities ADHD training should contain as well as findings from the systematic review informed how interactive training would be in addition to indicating what types of activities would be used throughout training. A leading factor in making sure training was engaging would be the way in which information is presented to teachers. The researcher would lead training and present information through PowerPoint which will be separate to participants each receiving a handout of the training materials. When *designing in* opportunities for interaction with the trainer as well as between participants to discuss the information, such examples would include group tasks, case studies, videos and the contribution of specialists. The presentation of training by the researcher would allow him to share his own knowledge of ADHD and experience as a Teacher and also Lecturer in special needs. It is anticipated that teachers who participate in the training programme would attach value to this experience (Gravani and John, 2005; Sandholtz, 2002).

6.2.4 Quality of the ADHD training programme

By using an established model of instructional design such as ADDIE, credibility of content was supported through the use of up to date and leading sources of ADHD information and diagnosis such as DSM IV (APA, 2013), other reliable ADHD studies in the literature review and sources recommended by experts. Incorporating sources

of information helped to design an evidenced-based ADHD training programme that has been created to enhance the level of knowledge of ADHD amongst Saudi primary school teachers. The participation of a psychologist in the training programme led by the researcher who was himself, a Teacher and Lecturer in Special Needs added to the credibility of the training programme. The selection of non-pharmacological interventions that teachers can use in their classroom to manage school children with or at risk of ADHD have originated from published and peer-reviewed sources that demonstrate the effectiveness of these techniques in managing and supporting the educational achievement of such children (Sanders, 1994).

The accuracy of the ADHD training programme designed in this study is supported by clearly documenting what it is intended that teachers will learn during training, the methods that will be used to support their engagement with the content, and the providing of a handout of training contents including step by step guidance (Sanders, 1994) on how Saudi primary school teachers can use classroom management strategies to support children with or at risk of ADHD. Reliability of the training programme could be further supported by the qualitative evaluation of both the trainer in leading the programme, and also by participants who completed training which will be discussed in the final stage of ADDIE. The reliability of training with regards to the objective to enhance ADHD knowledge amongst Saudi primary school teachers is further supported through the redistribution of KADDS 4 weeks after training and the subsequent analysis of teacher's scores post attendance of training and this will be discussed later (Chapter 8).

To ensure that training is suitable for the intended audience it is necessary to ensure it is appropriately written and delivered in the teachers' native language so that it can be understood. In the development stage and prior to implementation of training, it was necessary to translate the entire training programme from English into Arabic which involved the services of English language specialists to then perform back translation of the programme to ensure meanings and content had not been changed or were inaccurate (Brislin, 1970). After the Arabic version of the ADHD training programme was considered by The Training and Scholarship Centre in Jeddah, the MoE approved that it was appropriate and could be delivered to Saudi primary

schoolteachers. This involved the Centre examining the contents and rationale for training prior to confirming that it was suitable.

6.3 ADDIE Stage Three: Development

The merits of using in-service training as a method to be used for the delivery of the ADHD training programme to teachers has already been discussed. In order to ensure that the intended training outcomes of the designed ADHD programme are delivered it is necessary to move to the third stage of ADDIE and to the development and content of the programme itself.

It is worth re-emphasizing that the training programme intends to support the ongoing professional development of Saudi primary school teachers in KSA to gain a better understanding of ADHD (Alkahtani, 2013), increase their capability of identifying children with the disorder (Munshi, 2014), implement effective treatment or educational interventions for Saudi school children with ADHD (Abed et al., 2014), and deal practically with schoolchildren who have the disorder (Abaoud and Almalki, 2015).

As already identified in the literature there is a general gap in knowledge amongst teachers regarding ADHD (Hepperlen et al, 2002; Kos et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci, 2010; Rodrigo et al, 2011; Al-Hakeem et al, 2013; Muanprasart et al, 2014; Youssef et al, 2015; Kern et al, 2015; Al-Omari et al, 2015; Liang and Gao, 2016; Shroff et al, 2017; and Padilla et al, 2018). This gap in teachers' knowledge of ADHD has further been identified amongst Saudi primary school teachers (Alkahtani, 2013; Munshi, 2014; Abed et al., 2014) in similar areas.

6.3.1 Overview of the ADHD training programme:

Day	Objective	Outcome
One	Recognizing ADHD, its characteristics and causes	Teachers will know what ADHD is and recognize the three types and their characteristics; and teachers will know the possible causes of ADHD.

Two	Familiarization with identification and diagnostic processes	Teachers will be aware of the criteria for diagnosis of ADHD; and understand the role that they play in the diagnostic process of ADHD.
Three	Help teachers to identify ADHD treatment and interventions	Teachers will recognize medical treatment of ADHD; and teachers will know how to adopt behavioural, educational and effective classroom management strategies.

Day One

So that teachers can begin with the recognition that ADHD is a valid disorder (Algozzine, 1980; Coleman and Gilliam, 1983) it was necessary to present to teachers common myths and misperceptions on ADHD. This led to the invitation to them to discuss their opinion on ADHD since beliefs of ADHD are linked to misperceptions (Scuitto et al., 2000; Snider et al., 2003; Al-Omari et al., 2014). Examples of the myths discussed with teachers ranged from whether ADHD even existed; if the disorder is a result of poor parenting (Johnston and Patenaude, 1994; Barkley, 1998) or due to poor diet or over exposure to sugar (Passmore, 2014).

In order to give teachers an appreciation of how long ADHD has existed as a disorder it was necessary to present a brief timeline dating back to 1902 to 2013 when APA released their latest diagnostic manual that recognizes ADHD in both children and adults (DSM 5).

It is crucial to provide teachers with the most recognized and authoritative definition of ADHD. DSM V (APA, 2013) gives the definition of ADHD and its types: inattentive, hyperactive-impulsive and combined. Subsequently DSM 5 now recognizes that both children and adults can be affected by ADHD. In addition, DSM-IV contains criteria for the identification of ADHD as either inattention, hyperactivity or combined. Finally, the suspected causes of the disorder were presented and discussed with the participants. These include brain injury (Fisher and Beckley, 1998), genetics (Lynn et al., 2005),

exposure to toxins (Boris and Mandel, 1994) and nutritional deficiency (Arnold and DiSilvestro, 2005).

Day Two

Building upon knowledge developed on day one, teachers were introduced how to recognize and diagnose a child with ADHD (Sciutto et al., 2000; Snider et al., 2003; Alkahtani, 2013; Abed et al., 2014; Munshi, 2014). It was crucial to discuss with teachers not only the importance of making a suitable diagnosis of ADHD but also the impact of making a late diagnosis or failing to diagnose the disorder at all (Wender, 2000; Faraone et al., 2003; Barkley, Murphy and Fischer, 2008).

When looking at the impact of ADHD on a child's quality of life it is necessary to do so from an emotional, social, familial and educational perspective since these combine make up the overall quality of a child's life. Since the training was aimed at teachers in the school environment specific emphasis was put on the impact upon the child's academic ability in the classroom to help participants appreciate such impact (Cantwell and Baker, 1991; Rabiner and Malone, 2004; Graham and Harris, 2005; and Mayes and Calhoun, 2006).

In order to enhance participants' understanding of the role that they can play in the diagnostic process of ADHD and for teachers to appreciate how important their contribution is to diagnosis, training dealt with what is meant by a multidisciplinary approach to diagnosis and how it would work. This was aimed at helping participants to foster better collaborative relationships with healthcare professionals and parents of children with ADHD (Bussing et al., 2003; Sayal, Ford and Goodman, 2010; Zhu et al., 2014) that should support the diagnosis process. Participants were given the chance to apply their understanding of multidisciplinary diagnosis by taking part in a short group activity in which they were asked to evaluate the importance of teachers working closely with parents to make a diagnosis of ADHD.

In the final part of the day participants were introduced to tools that they and parents could use to rate the behaviour of a child suspected of having ADHD. It was also envisaged that teachers would appreciate the importance of such scales to making a final clinical diagnosis of ADHD. Evidence that might be observed in the classroom but

not necessarily in a clinic and therefore its contribution to making an affirmative diagnosis was considered. For the purposes of the training the Vanderbilt ADHD rating scale was selected since it has a version for both parents and teachers.

Day Three

Building further upon the knowledge developed over days one and two, the final day looked specifically at the treatment of ADHD so that teachers could not only identify between types of treatment but also appreciate the importance of early intervention when using such treatment (Childress and Berry, 2012). Whilst an overview of medical treatment for the disorder is crucial for teachers to know, a large volume of literature on ADHD deals with medication (Fitzpatrick et al., 1992; Doherty et al., 2000; Greenhill et al., 2002; Dulcan, 2007 Ryan et al., 2008). The training programme looked at the benefits of a multi-modal approach to treatment whereby teachers can play a vital role in treating a child with ADHD.

After briefly looking at a medical perspective on treating ADHD teachers were introduced to behavioural treatment and the benefit this can offer as opposed to solely treating ADHD with drugs (Schweitzer et al., 2012; Wolraich et al., 2011; Jensen et al., 2001; Molina et al., 2009). Participants briefly looked at diet as a form of treatment for children with ADHD and discussed the fact that there is no definitive proof that diet is a cause of or cure for ADHD (Ghanizadeh and Haddad, 2015).

The main focus of day three was how teachers can support the academic achievement of children with ADHD, for example with their reading and writing (Zentall, 2006). Teachers were introduced to three practical examples of how they could help with these areas and also deal with children with ADHD in the classroom. The first of these was peer tutoring, followed by task modification and finally, token economy. Each example was given with a clear illustration of how teachers could use them. These activities were specifically chosen to help Saudi teachers address practical difficulties of teaching children with ADHD (Abaoud and Almalki, 2015; Kamal, 2016).

6.3.2 Activities for participants

The training programme will contain structured opportunities for group interaction between participants through open discussion to allow them to share their individual

experiences (Froelich et al., 2012). The final activity is a fictional case study of a Saudi child (Khalid) with ADHD (see appendix S), designed to provide teachers with the opportunity to apply what they have learnt over three days training (Barbaresi and Olsen, 1998; Syed and Hussain, 2010; Aguiar et al., 2014). Details of the activities used in the training are briefly detailed below:

Table 6.1: Activities for participants

Day	Activity	Details and instructions
1	Introduction and ice breaker	It is crucial that participants are made to feel as comfortable as possible at the start of the programme to help them enjoy the experience and obtain optimum knowledge about ADHD and how they can help children through effective educational interventions. At the start of day one each participant will be asked to introduce himself and inform the rest of the group if they have any previous experience of teaching or dealing with children with ADHD.
	Identifying challenges for children with ADHD	Participants to be put into groups and given a handout of the DSM-IV criteria for identifying ADHD. So as to categorize each type as posing challenges to social, behavioural or educational life of a child with ADHD whilst at school.
	Discussing the possible impact of ADHD on a child's life	After discussing DSM-IV (APA, 2013) criteria of different types of ADHD participants will be shown a short video of a child with ADHD and the impact on their academic and home life.
2	Why is it important to make a diagnosis and do it early!	This will be the discussion of a statement about the importance of making an early and valid diagnosis of a child with ADHD. Participants will be asked to consider why this is important.
	Effect of ADHD on academic and performance	Participants will be given time to consider what impact ADHD can have on a child's academic ability and performance.

	Vital role of teachers in diagnostic process	Teachers participating in the training programme will be required to reflect upon their understanding and appreciation of a multidisciplinary approach to diagnosing ADHD. Specifically, they will consider the contribution parents and teachers make to a successful diagnosis and what significance do teachers have in this approach to diagnosis.
3	Khalid case study	In the final part of the training programme participants will be required to apply their knowledge and understanding to a real-life fictional case study. Teachers will be required to read the brief story of Khalid a 7 year-old boy and advise his teacher based on the facts given on what they consider to be: (1) Khalid's strengths (2) any concerns about his behaviour and (3) the types of intervention that Khalid's teacher could use at school and any other types of treatment of ADHD that Khalid's teacher could advise to Khalid's father.

6.4 ADDIE Stage Four: Implementation

Prior to travelling to KSA to deliver training I randomly selected 20 teachers (10 SpLD and 10 General) from the results of the semi-structured interviews performed earlier in the year. These were teachers who had expressed a willingness to further participate in my study and attend a training programme on ADHD developed in the study.

When I arrived in KSA I then had to seek additional permission for the 20 teachers whom I had identified to undergo training. This required the MoE to provide me with a letter that I could present to the head of various schools so as to allow participants to take part in the training (See appendix T). Once I had been issued with permission by the MoE I then had to present it to the Training and Scholarship Center in Jeddah so that suitable space could be allocated to deliver training.

6.4.1 Trainer's Report on delivery of ADHD training programme

The following account by the researcher will provide an actual commentary on the delivery of the ADHD training programme to male Saudi teachers intended to enhance their knowledge of the disorder:

✓ Day One

I arrived at the training venue one hour prior to the commencement of training to print handouts for participants, ensure that the physical environment (i.e. tables) were set up to facilitate group discussion, and that PowerPoint and wifi were working correctly.

- **Welcome and Introduction**

After welcoming participants to the session, I introduced myself and my research and gave an overview of the training programme. Teachers were given the timetable for the training programme (See appendix U) and they were presented with its aims and intended outcomes, with specific emphasis on the objective for the first day: *recognizing ADHD, its characteristics and causes*. As an ice-breaker for teachers and to help them get to know each other I asked everyone to introduce themselves and tell the group what, if any experience they had in dealing with children who have ADHD.

- **Content: Common myths about ADHD, history of the disorder, definition, types and causes**

Participant teachers were presented with a collection of common myths associated with ADHD to encourage discussion in the early stages of the programme. This involved displaying the myth separately to the true answer so as to give teachers time to discuss. Following this, teachers were given a brief timeline of ADHD up to the present day and the official definition of the disorder as given in DSM IV (APA, 2013). Having given teachers the medical definition of the disorder they were then presented with more specific detail relating to the types of ADHD that then led to them looking at possible causes of the disorder.

- **Activities**

The first substantive activity required teachers to use DSM-IV criteria for ADHD to classify whether the subtype of the disorder would impact upon a child's social, behavioural or educational life within the school environment. To do this activity I had to physically divide teachers into three groups and assign each one with a topic on which to focus (either social, behavioural or educational). This required the provision of clear verbal instruction as well as monitoring the time allocated for this. During the 20 minutes given for the activity I made sure I interacted with each group equally. After the end of the allocated time I invited each group to give their responses and discuss these before I went through the correct answers with teachers at the end.

- ✓ **Day Two**

I began day two with a brief overview from day one of the training programme and some time for teachers to ask any questions they had before moving on to presenting the training objective of day two: *familiarization with the identification and diagnosis process*.

- **Content: Diagnosis, importance of early diagnosis, impact upon quality of life and academic performance, multidisciplinary approach to diagnosis**

Teachers were presented with general information about diagnosis so as to give a background understanding of why it is important to make an accurate and early diagnosis of ADHD. Given the specific context of the training programme teachers looked at the impact of either making a late, or no diagnosis on the academic ability of a schoolchild with ADHD. This moved to a specific focus on the multidisciplinary approach to diagnosis whereby teachers work closely with medical professionals and parents.

- **Activities**

After discussion of diagnosis I asked teachers why they believed making an early diagnosis was beneficial and gave them 10 minutes to consider this. I invited teachers to give their response to the group and me. Once teachers had looked at the impact

of ADHD on a child's reading, writing and numeracy I gave them 10 minutes to consider what impact the disorder can have on a child's academic ability and performance. Again, I invited teachers to give their response to the group and me. The primary activity on the second day of training required teachers to use their knowledge and understanding of the multidisciplinary approach to diagnosis to explain the contribution of parents and teachers to the approach.

✓ **Day Three**

I began Day Three with a brief overview of the second day of training and gave time for teachers to ask any questions they had before moving on to presenting the training objective of Day Three: *help teachers to identify ADHD treatment and interventions.*

- **Content: Treating ADHD, types of intervention/treatment, educational intervention for children with ADHD**

I began by presenting to participants the general rationale for the treatment of ADHD as a disorder and distinguishing between medical and behavioural treatments. Teachers were introduced to behaviour management in the classroom as one alternative to traditional treatment for ADHD before focusing on educational interventions as a form of treatment for schoolchildren with the disorder. In the final stage of the training programme I presented three examples of educational interventions that participants could implement in their own classroom: peer tutoring, task modification, and token economy.

- **Activities**

On Day Three I facilitated three activities directly related to each educational intervention presented to teachers. Having shown participants how peer tutoring works they were then asked to consider any challenges for them or students in using it. This was followed by a presentation on task modification as an intervention after which I led discussion and consideration of potential challenges in using it. Finally, having looked at token economy as an intervention for ADHD, participants were shown an example of how to implement such a system in the classroom and asked to identify the potential challenges of such an intervention.

In the latter stage of the final day, I split participants into new groups to work on a fictional case study that required them to use the knowledge they had developed during the training programme. Teachers were given 30 minutes to work in their group and answer two questions based on the Khalid case study and each group was asked to present their findings to the rest of the training cohort.

- **Summary of training programme**

On each day I was able to provide participants with clear objectives and I am pleased to see that the positive abilities of teachers to engage in the activities could suggest that training outcomes were met each day. Teachers reacted positively to interacting not only with the trainer but also each other, and fully got involved with all activities. Days 2 and 3 provided a brief overview of training content from Days 1 and 2.

- **Close**

I thanked teachers for their participation in the training programme and their contribution to activities. Before leaving I distributed a short training evaluation questionnaire (See appendix V) and asked them to complete this so that I could measure the appropriateness of the training programme and also the satisfaction of participants. Each teacher was given a certificate of participation by the MoE for attending the training programme (See appendix W).

Training presentation and materials

All participants were given a training handout of materials to not only support the PowerPoint presentation but also to expand upon topics covered in the programme (See appendix X). This also gave teachers the opportunity to read about ADHD in further detail than what could be explored during the programme. In addition, teachers received step by step guidance on how to implement the three non-pharmacological treatments for schoolchildren with ADHD or at risk of the disorder.

6.4.2 Teachers' Feedback of training post-implementation

After the completion of Day Three participants were asked to complete a brief questionnaire that related to content of the training programme and duration with a score from 1 = very dissatisfied to 5 = very satisfied.

From the 17 participants that attended the training 12 completed the short evaluation of the programme and the results were as follows:

Table 6.2: Teachers' evaluation of training

Question	Score	Frequency	Percentage
Q:1 Objectives and outcomes for the training programme were clearly defined	Very satisfied	12	%100
	Satisfied	0	%0
	Neither	0	%0
	Dissatisfied	0	%0
	Very dissatisfied	0	%0
Q2: Participation and interaction were encouraged	Very satisfied	11	%91.7
	Satisfied	1	%8.3
	Neither	0	%0
	Dissatisfied	0	%0
	Very dissatisfied	0	%0
Q3: The materials were well organized and useful	Very satisfied	9	75.0
	Satisfied	3	25.0
	Neither	0	%0
	Dissatisfied	0	%0
	Very dissatisfied	0	%0
Q4: The content of the training programme will help me with my job	Very satisfied	11	91.7
	Satisfied	1	8.3
	Neither	0	%0
	Dissatisfied	0	%0
	Very dissatisfied	0	%0
Q5: The trainer was well prepared and delivered the programme well	Very satisfied	12	100
	Satisfied	0	%0
	Neither	0	%0
	Dissatisfied	0	%0
	Very dissatisfied	0	%0
Q6: The time given for the training was sufficient	Very satisfied	9	%75.0
	Satisfied	2	%16.7
	Neither	1	%8.3
	Dissatisfied	0	%0
	Very dissatisfied	0	%0
Q7: Accommodation for the training programme was adequate	Very satisfied	7	%58.3
	Satisfied	5	%41.7
	Neither	0	%0
	Dissatisfied	0	%0
	Very dissatisfied	0	%0

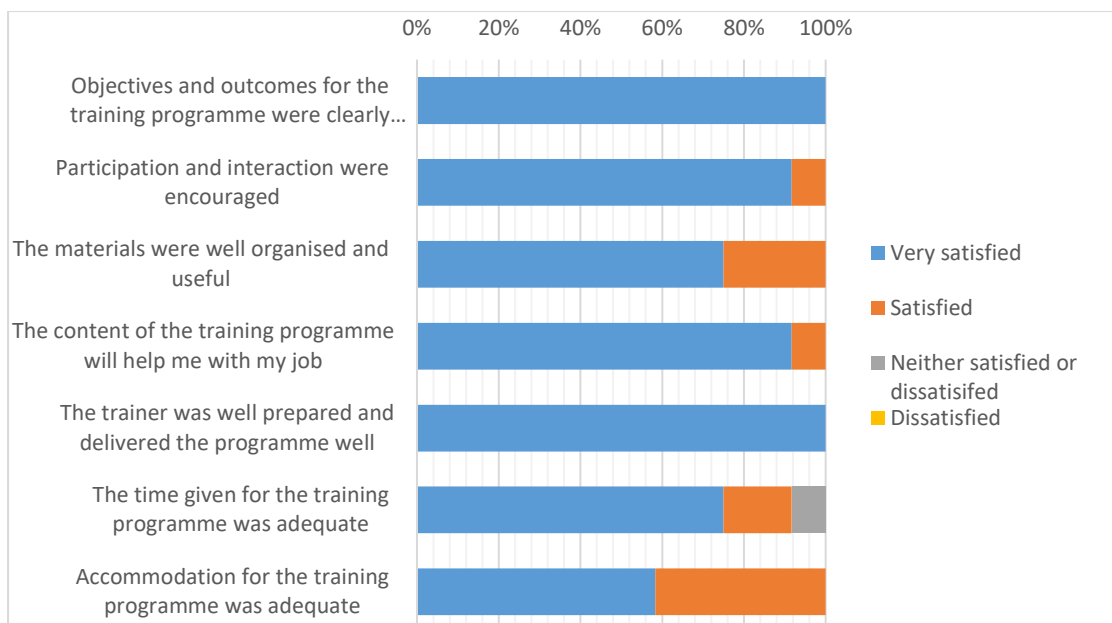


Figure 6.1: Evaluation of ADHD training programme for teacher's feedback

Brief analysis

Twelve participants provided feedback on the training programme through seven closed and four open-ended questions. It is important to note that five teachers did not complete the training evaluation questionnaire. The evaluations revealed that the course participants overall were very satisfied with the course. All twelve stated that they were very satisfied that the trainer was well prepared and delivered the programme well and that the objectives and outcomes for the training programme were clearly identified. Eleven (91.7%) of participants stated that they were very satisfied that participation and interaction were encouraged and nine (75.0%) were very satisfied that the materials were well organised and useful.

All participants felt that the content of the training would help them with their job and eleven (91.7%) stated they were very satisfied with training. One teacher said they were satisfied with training. Eleven teachers were satisfied with the three days duration of training (two teachers very satisfied and nine satisfied) and one felt neither satisfied nor dissatisfied with the time given for the training course. Overall participants were happy with the accommodation provided with seven (58.3%) stating they were very satisfied and the remaining five satisfied.

In the short post intervention evaluation, participants were asked four open-ended questions: *“What did you like most about this ADHD training programme for teachers?”* All participants provided a response to this question and of those nine were directly related to the trainer and the delivery of the course. Participants highlighted that they felt the course was well prepared and organised, the trainer was competent and knowledgeable, and information was presented in a clear way which was easy to understand. See appendix (Y) for the exact responses relating to the trainer and programme delivery. See also appendix (Y) for the remaining three participants who identified the knowledge they gained in learning to deal with children with ADHD as being what they liked the most. Participants were also asked: *“What aspects of the training programme do you think could be improved?”* Eleven of the participants provided a response to this question, and of those eight stated that there were no weaknesses or that nothing could be improved. Of the remaining three participants, two felt that the duration of the programme could be improved (although gave no indication as to whether a longer or shorter duration would be more desirable) and that more training materials could be supplied. The third respondent felt that more time dedicated to group discussions would be useful. See also appendix (Y) for the statements provided by these three respondents.

When asked *“How do you hope to change/improve/ develop your teaching practice as a result of this training programme?”* Ten of the twelve respondents provided a response to this question. All ten respondents stated that they would make positive changes in their teaching practice, though many did not give an indication of what changes they would make. One participant stated they will *“be more tolerant and understanding”* when dealing with children with ADHD. Two participants also linked improvements in practice to the new knowledge they gained through training, with one stating that they will *“use the knowledge I have learnt and apply it”* and the other would *“better my own teaching practice after I now know about children with ADHD”*. See also appendix (Y) for the responses provided by all participants.

Finally, participants were asked whether they had *“And suggestions”*. Only one participant provided a response: *“the training should be given to all Early Years/Primary grade teachers”*.

A reflection on the teacher's evaluation of the training intervention

It is very pleasing that all teachers who attended the intervention were very satisfied with the programme. This in itself supports that the content of the training programme (introduction, types, myths, diagnosis, types of treatment and education interventions) has met their expectations. As pointed out in my trainer reflection, when I asked participants on day one what they hoped to achieve from the training programme the unanimous response from teachers was to learn more about ADHD as a disorder, to understand children with ADHD and how to better support them in the classroom.

The programme had specific activities incorporated into it which gave participants opportunity to reflect and discuss information presented not only with the trainer but also amongst each other. This was a strategic aim of the researcher as since the training cohort was made up of both general and SpLD teachers it was crucial for them to cooperate with each other. 91.7% of participants agreed with the statement that the programme incorporated interactive activities and the trainer encouraged their participation. A good example of participation came when teachers were encouraged to talk about their experience of children with ADHD and to share that experience with others present at the training. Discussion amongst the cohort became even more animated when teachers gave their opinions of the common myths associated with ADHD.

Particular feedback I was keen to receive came in terms of the duration of training since previous studies have indicated that how long this is can have a direct impact on not only satisfaction but also on the level of engagement from participants. It was pleasing that nearly all teachers thought the three-day duration was appropriate. Each training day although 6 hours long, included short breaks which worked well to break up any prolonged periods of information transfer.

The main purpose of the training was to have a positive impact on teachers through enhancing their knowledge of ADHD, educating them about the important role that they can have in the diagnosis of a child with the disorder and giving examples of educational interventions that can be used in the classroom. To this end 100% of teachers felt satisfied (very satisfied n=11, satisfied n=1) that they would be able to

use the knowledge developed during training in their future teaching practice to better support children with ADHD or at risk of the disorder.

I am very satisfied that my impression of how teachers received the training programme was reflected in their evaluation particularly since the majority (n=9) of comments related to me as a trainer and the way that I delivered the programme (*“the method of the trainer used to present the information was helpful and easy to understand”*, *“the way that the trainer conveyed the ideas and information was perfect”*). This directly emphasizes the key role of the facilitator in presenting information that can be digested and understood by participants particularly when that information is new or unknown. It is worth pointing out that three specific comments from teachers suggested they now had an enhanced ability to deal with such children in the future.

In the evaluation from participants there was no specific mention of the two weaknesses I had previously identified as punctuality of participants and difficulties with the projector when presenting. Two comments related to the duration of training which is a factor I gave great consideration to when designing the training programme, yet neither comment gave specific detail on whether the current training was too long or too brief. The one comment that I did find slightly surprising was that the training programme did not offer enough opportunity for discussion.

For me, the most significant of the open-ended questions asked participants to reflect on how they hope to change their future practice as a result of the training programme. In essence, the question was asking how useful participants felt training was to them as a teacher of children with ADHD or at risk of the disorder. I was extremely pleased that the overwhelming majority (n=10) said they would implement a positive change to their teaching practice, specific terms used by teachers were that they would be *“more tolerant and understanding”*, *“apply new knowledge”* and *“work more closely with children who have ADHD”*. This alone shows the positive impact that the programme has had on the confidence of teachers to support children with ADHD and their intention to use the knowledge that they have learnt.

It was important to give participants the opportunity to make suggestions of what should be taken into better consideration in general awareness training of ADHD

amongst teachers. Only one participant gave the suggestion that training on ADHD should be given to all Early Years/Primary grade teachers. It is clear from this comment that teachers in general would greatly benefit from knowing more about ADHD as a disorder and educational interventions they can employ in their classrooms.

Overall, I am extremely satisfied with the evaluation from participants of the ADHD training programme. The feedback suggests that the content was pitched at the right level and was highly useful for teachers. Using interactive activities and media helped to break the training schedule up which was appreciated by participants and created the opportunity for SpLD teachers to share their experience with General teachers and likewise. The programme has provided teachers with knowledge of the disorder as well as possible interventions, which has given them the confidence to possibly implement this new knowledge into their own practice and better support children with ADHD.

6.5 ADDIE Stage Five: Evaluation

Firstly, in terms of adherence to the intervention, the researcher delivered the intervention as intended and participants were given a timetable for the ADHD training programme. A significant factor that helped the researcher to ensure delivery of the intervention was as intended was the production of a comprehensive set of PowerPoint slides that acted as a prompt throughout training. These slides were in addition to training materials however introduced participants to ADHD concepts and relevant information that was more deeply explained in the written handout provided to each teacher who participated in training.

At the start of the first day and during introductions by all participants, the researcher was able to talk about his experience as a special needs teacher in KSA and his expertise of ADHD. I believe it was important to do this so that attendees were reassured that I knew what I was talking about in addition to requests from Saudi primary school teachers to interact with a trainer that had experience of ADHD. This helped to ensure there was a positive start to the training programme and naturally led on to me presenting the goals and outcomes of the ADHD training programme. Prior to presenting information on ADHD history and common myths, teachers were invited

to say that they hoped to get out of attending training and their responses further confirmed the need for accurate and up to date information about the domains of ADHD.

When presenting teachers with DSM IV criteria on which to diagnose ADHD and the different subtypes of the disorder it was interesting that the majority of general teachers were not aware of these and thought there was only one type of ADHD. Dealing with ADHD myths on day one created the opportunity for participants to talk about their own misperceptions and discuss any different beliefs or experiences compared to the accurate information given by me. Teachers were enthusiastic to discuss their reactions to watch a video on the impact of ADHD on a child at school. Managing group work between SpLD and General teachers on the DSM IV criteria task went well and gave teachers the opportunity to interact with each other. The opportunity for interaction throughout the ADHD training programme for teachers was a popular response in phase two and contributed towards the design of the programme.

Day Two started with a recap of the first day and a discussion about new knowledge teachers had gained during Day One. Some participants said that the first day had addressed misconceptions they had such as diet and parental spoiling, whilst others felt they had changed their opinion on how ADHD was caused. The substantive focus of Day Two was diagnosis of ADHD, making a diagnosis of the disorder and the impact of late or non-diagnosis on a child's life. Teachers were very responsive when asked why making an early diagnosis was important and it was pleasing most of them understood or appreciated the impact ADHD can have on a child's academic performance in school. However, presentation of APA criteria on how to diagnose ADHD highlighted poor knowledge of how to accurately and appropriately diagnose the disorder amongst teachers. Some teachers felt regret at their lack of knowledge about ADHD because of how they had reacted previously to children they had taught whom they now suspect had the disorder, but they did not think so at the time. During the second part of the day training looked at the multidisciplinary approach to diagnosis and the key role teachers can play when diagnosing children with ADHD. Interactivity amongst participants was encouraged through completion of a group activity that looked at collaboration between teachers and parents in the ADHD

diagnosis process of a child. Feedback was gathered from each group and shared with the training cohort, it was pleasing to hear participants had applied accurate knowledge and awareness of their role in making a diagnosis of ADHD in children they teach.

Day Three began again with a brief summary of the previous day and to take any questions teachers had from day two. The focus of the final day was ADHD treatment and specifically educational interventions that primary school teachers could use to support school children with or at risk of the disorder. First, to present the medical treatment aspect of children with ADHD, an educational psychologist was invited to deliver this portion of training. Teachers reacted positively to the inclusion and contribution of a medical professional and the opportunity it provided for them to meet a professional involved in the medical diagnosis of children with ADHD. Moving on to non-pharmacological interventions for teachers, whilst it became apparent to the researcher that whilst some teachers were aware that these existed, they did not know how to implement or use such strategies since many teachers viewed management of school children with ADHD as external to the classroom. When presenting three educational interventions that teachers could implement in their classroom: peer tutoring, task modification and token economy, I found some teachers were aware of task modification and token economy but none of them had knowledge of peer tutoring.

The final activity of training was a case study that had been created specifically for participants to apply ADHD information delivered across all three days of training. The task required teachers to apply knowledge of ADHD characteristics, symptoms and treatment that they had gained during training so as to advise the teacher of a Saudi boy who was experiencing difficulties at school. To do this they had to identify issues with the child based on his actions and suggest appropriate interventions that his teacher could use to benefit him at school. All teachers engaged fully with the task and the trainer contributed to overall discussion on the correct advice to give the boy's teacher. The success of this task across all groups indicated to the researcher that content seemed realistic and appeared to programme objectives and satisfy training outcomes.

As demonstrated above when applying the ADDIE model to develop this ADHD training programme, it is important to note that all attendees of the training were Saudi primary school teachers as was intended. In addition, all attendees had also participated in phase two and had had the opportunity to contribute towards the final design of the ADHD intervention. This supported the view that the ADHD training programme for Saudi primary school teachers was directly relevant to them and could support implementation fidelity of the intervention (Carrol et al., 2006). Throughout training, participants were given the opportunity to interact with the trainer, their peers and a specialist in activities designed for them to apply information about ADHD that was presented to them during the programme.

In the evaluation of the ADHD training programme participants were asked to give feedback post completion of the intervention that would help the researcher make any amendments should there be any disconnect between the desired objectives of the programme and actual training outcomes of teachers. This also provided teachers with an opportunity at the end of training to comment on how far they perceive training to have met their expectation (Hitt, Robbins, Galbraith et al., 2006). Results of the self-report given to teachers after the intervention show all teachers were satisfied that training objectives had been clearly defined. This supports the suggestion that they were satisfied that training intended to enhance their level of ADHD knowledge. Given that teachers in phase two identified an important factor of a training programme in enhancing knowledge of the disorder was interactivity, nearly all teachers during the evaluation of the intervention responded that the participation and interaction of teachers had been actively encouraged throughout training. A good example of participation came when teachers were encouraged to talk about their experience of children with ADHD and to share that experience with others. Training purposely contained a number of activities throughout the programme as per the design stage of ADDIE (discussed previously), ranging from group work, cohort-wide discussion and participation in case studies.

There was positive evaluation by teachers of the high-quality training materials used to support the ADHD training programme and this was demonstrated by the wide research undertaken of suitable and up to date information about ADHD and non-pharmacological treatment and also by nearly all teachers saying they were very

satisfied with the materials. Again, this is important since teachers contributed to the design of training by their responses in phase two of what content they would want to see incorporated into training. All teachers were confident they could use what they have learnt about ADHD in their respective teaching practice. This is an interesting piece of evaluation and whilst this study does not explore if teachers applied that knowledge they gained from training it is worth mentioning the sentiment of teachers that attended training. Another feature of training that received positive feedback by all participants was duration. Three days was in line with the systematic review of ADHD intervention studies in Chapter 4 as well as responses from teachers in phase two of this study. Teachers felt that the duration of the training programme was suitable to deliver the specific content as well as participate in the five ADHD-related activities designed for the programme. Each day of six hours was broken up into smaller sessions by using breaks and activities.

It was satisfying that the majority of teachers that attended training commented that they felt it would help them to implement a positive change to their teaching practice, evaluative comments at the end of training included: [they would be] “*more tolerant and understanding*”, “*apply new knowledge*” and “*work more closely with children who have ADHD*”. These comments help to suggest that after training teachers felt more confident to support school children with ADHD and they intended to use the knowledge they had been given. It is acknowledged that no research was carried out to investigate if these teachers actually applied this knowledge to their teaching, however it does suggest that training had a positive impact upon their willingness to use what they had learnt during training.

6.5.1 Summary of Evaluation

Adherence to the intervention was demonstrated by the researcher and supported using a comprehensive PowerPoint presentation that gave teachers a level of detail about ADHD that was deepened by the provision of a training handout that teachers could read in their own time. It was important at the start of training to briefly inform teachers of my qualifications and expertise of Special Needs Education in KSA and expertise of ADHD. This also developed a feeling of trust amongst teachers and the trainer. Presenting goals for the training gave the trainer the opportunity to clarify the nature of training and the intended outcomes for participants. It was noticeable quite

early on that the incorporation of group interaction gave teachers the opportunity to discuss their views and opinions with each other and with the trainer.

The duration of training was sufficient to cover content on ADHD characteristics, symptoms/diagnosis, and treatment with a focus on non-pharmacological interventions for primary school teachers. Training gave teachers the opportunity to discuss and reflect upon the information they were receiving, and at times the researcher was able to witness the impact of new knowledge such as when teachers realized they could play a vital role in the multidisciplinary approach to diagnosis of a child with ADHD. The involvement of an educational psychologist provided teachers with information about ADHD from a professional medical viewpoint and led appropriately onto the focus of the final day which was classroom management strategies for teachers of children with ADHD or at risk of the disorder. Creating a case study of a Saudi schoolboy was an effective way of allowing teachers to apply the knowledge they have developed during the training programme. The success of teachers in participating and completing this task helps to support the view that training fully met the objectives for the programme and allowed teachers to demonstrate intended outcomes.

It was pleasing that the MoE granted approval for the delivery of training and also viewed the programme as highly relevant to Saudi primary school teachers which was supported by their willingness to endorse training through the provision of certificates to attendees. This certainly added to the credibility of the intervention in the estimations of Saudi primary school teachers who participated in training.

6.5.2 Limiting factors in the delivery of the training

Whilst the training programme had overwhelming strengths it did have some unavoidable weaknesses. Jeddah is a large busy city; therefore, traffic each morning was heavy and had an impact on the ability for all teachers to attend on time. This meant that some teachers on each day missed the first 15-20 minutes or so. Fortunately, the first part of day two and three was a summary of the previous day and therefore teachers who were late did not miss new content. The other issue encountered during delivery was technology related. First there was a problem with the projector on Day One, and whilst the problem did not affect the use and display of

PowerPoint once it was fixed, encountering a problem with the projector did cause slight anxiety for the trainer since the majority of participants for the intervention had mentioned their preference for using PowerPoint during phase two. A more significant problem with technology and the effect of no battery in the recorder meant that part of the video footage of Day Two was lost.

CHAPTER 7

Findings

7. Introduction:

This chapter includes five sections. The first section will present the process of data processing and screening and the second section will present the process of establishing KADDS validity and reliability including conducting EFA. However, the third section describes the results for Research Question One (RQ1) and section four will present the results for Research Question Two (RQ2). Finally results for Research Question Three (RQ3) will be described in section five.

7.1 Section One: The process of data processing and screening

First of all, quantitative data were prepared and processed before conducting any statistical analysis through several steps including data scoring, data entry, and data screening as presented below:

7.1.1 Data processing:

Coded data gathered from the demographic questionnaire and KADDS were inputted into SPSS and analysed. The significance was considered when the p-value was less than 0.05 ($p < 0.05$).

7.1.2 Data Screening:

Missing data

Missing data in Social Sciences research is a common problem (Allison, 2002), therefore it is important to check for missing data. Following an investigation of missing data using SPSS Missing Values Analysis 25, no missing data were found.

Outliers

This refers to an observation in the data which differs greatly from the majority of a set of data. In this study, outliers were checked to spot the incidence of any univariate, when there is an extreme score witnessed on a variable, and multivariate outliers, referring to the identification of unique variable combinations (Tabachnick & Fidell, 2007). The data were examined for outliers by calculating Z-scores and looking for scores exceeding 4, as suggested by Hair et al (2010). There were no scores greater than 4, which indicated no outliers exist in the dataset.

Normality

In empirical research, there are assumptions that are typically tested to ensure the accuracy of conclusions from such research; one of these assumptions is the normality assumption. Gravetter and Wallnau (2000) indicated that normality is used to describe a symmetrical, bell shaped curve, which has the greatest frequency of scores in the middle, with smaller frequencies towards the extremes. Since the normality assumption is an important aspect of most statistical procedures, it is necessary to devise a highly robust and generally acceptable technique to perform this test such as Shapiro-Wilk. The Shapiro-Wilk *W* test is the preferred test of normality because of its good power properties as compared to a wide range of alternative tests (Shapiro, Wilk, & Chen, 1968).

Table 7.1: Test of normality

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
item 3	.511	130	.000	.432	130	.000
item 8	.450	130	.000	.565	130	.000
item 9	.534	130	.000	.311	130	.000
item 10	.480	130	.000	.514	130	.000
item 11	.514	130	.000	.421	130	.000
item 12	.408	130	.000	.611	130	.000
item 15	.423	130	.000	.597	130	.000
item 16	.498	130	.000	.472	130	.000
item 20	.404	130	.000	.614	130	.000
item 21	.473	130	.000	.528	130	.000
item 25	.427	130	.000	.593	130	.000
item 26	.473	130	.000	.528	130	.000
item 28	.431	130	.000	.589	130	.000
item 31	.498	130	.000	.472	130	.000
item 32	.447	130	.000	.570	130	.000
item 34	.536	130	.000	.293	130	.000
item 35	.400	130	.000	.617	130	.000
item 36	.344	130	.000	.636	130	.000

The null hypothesis of this test is that the population is normally distributed. Thus, on the one hand, if the p value is less than 0.05, then the null hypothesis is rejected and there is evidence that the data tested are not normally distributed. On the other hand, if the p value is greater than 0.05, then the null hypothesis that the data came from a normally distributed population cannot be rejected. As can be seen from table 7.1, all items are not normally distributed (p value less than 0.05) indicating that nonparametric statistical should be used in inferential analysis.

7.2 Section Two: The Process of Establishing KADDS Validity and Reliability

7.2.1 Factor analysis of the scale (KADDS):

In the present study the researcher conducted EFA to identify the factors underlying the KADDS construct (Hair et al., 2015). There are several methods for applying EFA for the extraction and rotation of the factors (Tabachnick and Fidell, 2007). In this study the researcher applied the Principal Axis Factoring (PAF) with Varimax Rotation method. In EFA, communality refer to the percentage of each variable's variance that can be explained by the factors. It is sensible to eliminate any item with a communality score below 0.2 (Child, 2006). There are several extraction methods that can be used to explore the factors. According to Field (2013) PAF method is advisable only when the sample will be used for further analysis where the Maximum Likelihood or Kaiser's alpha factoring is used when trying to develop an instrument to be used with other data sets in the future. In EFA, there are also many different types of rotations that can be used after the initial extraction of factors, such as orthogonal rotations with choice of varimax and equimax for example, which impose the restriction that the factors cannot be correlated, and oblique rotations with choice of promax, which allow the factors to be correlated with one another.

The most popular orthogonal rotation technique is varimax. According to Field (2013), it is advisable to suppress factor loadings less than 0.3 and any item with all scores suppressed should be removed. Scores greater than 0.4 are considered stable (Guadagnoli and Velicer, 1988). Items should not cross-load too highly between factors (measured by the ratio of loadings being greater than 75%). There should be as many factors as possible with at least 3 non-cross-loading items with an acceptable loading score. Items should be removed one by one until the solution satisfies all the requirements. The number of extracted factors may need to be reduced during the process. After the EFA has been conducted and the stable solution was reached, a validation process should be carried out.

7.2.2 Process of Conducting Exploratory Factor Analysis:

1. First step checking the bivariate correlation matrix of all items. This is because high values are signs of multicollinearity (Rockwell, 1975). As Multicollinearity is a phenomenon in which two or more independent variables are highly correlated with each other. Field (2013) recommends removing one of a pair of items with bivariate correlation scores above 0.8. as it can be seen from the table 7.2. no score above 0.8 was identified.

Table 7.3: communalities check in the first iteration

Communalities		
	Initial	Extraction
item1	.306	.276
item2	.494	.620
item3	.407	.433
item4	.291	.376
item5	.304	.355
item6	.311	.470
item7	.410	.444
item8	.333	.351
item9	.414	.405
item10	.459	.492
item11	.402	.521
item12	.548	.630
item13	.383	.488
item14	.361	.333
item15	.421	.638
item16	.473	.513
item17	.421	.524
item18	.321	.490
item19	.377	.404
item20	.376	.344
item21	.466	.431
item22	.371	.520
item23	.283	.506
item24	.350	.478
item25	.420	.746
item26	.599	.726
item27	.347	.286
item28	.423	.441
item29	.238	.439
item30	.354	.540
item31	.568	.634
item32	.461	.543
item33	.448	.542
item34	.365	.483
item35	.454	.516
item36	.431	.389

Extraction Method: Principal Axis Factoring.

2. An EFA was then run on the 36 items using a PAF technique with a varimax rotation, providing the KMO statistics and determinant of the correlation matrix, retaining all factors with eigenvalues greater than 1 and suppressing all factor coefficients less than 0.3
3. The communalities of the initial solution were observed. As it can be seen from table 7.3, All were larger than 0.2 so all the items were retained.

4. After running the EFA, the initial solution comprising of 14 factors. However the 14th ,13th ,12th ,11th ,10th , 9th ,8th , 7th and 6th factors did not have 3 items with loadings > 0.4 in the rotated factor matrix so they were excluded and the analysis re-run to extract 5 factors only, giving the output shown on the table 7.4.

Table 7.4: Rotated factor matrix in the second iteration.

		Rotated Factor Matrix ^a													
		Factor													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
item 1												.334			
item 2			.333												
item 3	.362										.479				
item 4					.580										
item 5															
item 6													.615		
item 7											.337				
item 8			.348												
item 9	.552														
item 10											.584				
item 11		.365							.369						
item 12		.532							.310						
item 13					.411				.302						
item 14															
item 15			.756												
item 16	.410							.405							
item 17					.541										
item 18										.665					
item 19				.508											
item 20			.330			.335									
item 21	.508														
item 22				.661											
item 23															.661
item 24		.411													
item 25						.811									
item 26	.749														
item 27										.325					
item 28		.416													
item 29														.634	
item 30											.662				
item 31	.704														
item 32	.471												.363		
item 33								.703							
item 34									.609						
item 35		.661													
item 36		.501													

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 36 iterations.

5. Next step, checking communalities and should be again above $>.2$, however, it can be seen from the table 7.5 item 1 , 5 , 6 , 18 , 23 , 27 , 29 , 30 and 33 have low communalities lower than (0.20) and should be removed and then rerun EFA.

Table 7.5: communalities check in the 3rd iteration

Communalities		
	Initial	Extraction
item 1	.306	.079
item 2	.494	.292
item 3	.407	.285
item 4	.291	.203
item 5	.304	.123
item 6	.311	.095
item 7	.410	.274
item 8	.333	.273
item 9	.414	.284
item 10	.459	.257
item 11	.402	.254
item 12	.548	.484
item 13	.383	.289
item 14	.361	.260
item 15	.421	.340
item 16	.473	.308
item 17	.421	.413
item 18	.321	.159
item 19	.377	.387
item 20	.376	.371
item 21	.466	.409
item 22	.371	.311
item 23	.283	.162
item 24	.350	.206
item 25	.420	.429
item 26	.599	.464
item 27	.347	.162
item 28	.423	.297
item 29	.238	.092
item 30	.354	.095
item 31	.568	.510
item 32	.461	.349
item 33	.448	.162
item 34	.365	.252
item 35	.454	.295
item 36	.431	.281

Extraction Method: Principal Axis Factoring.

6. After running EFA, it can be seen from the table 7.6 the 5th factor loads was less than 3 items with loading >0.4 and excluded and then the analysis re-run to extract 4 factors only

Table 7.6: Rotated factor matrix in the 4th iteration

Rotated Factor Matrix ^a					
	Factor				
	1	2	3	4	5
item 2				.416	
item 3	.500				
item 4					.535
item 7		.319			.350
item 8			.453		
item 9	.505				
item 10	.458				
item 11		.452			
item 12		.632		.304	
item 13					.324
item 14		.347			.302
item 15			.500		
item 16	.500				
item 17					.480
item 19				.538	
item 20			.519		
item 21	.573				
item 22				.492	
item 24		.427			
item 25			.641		
item 26	.602				
item 28		.480			
item 31	.733				
item 32	.557				
item 34		.310		.359	
item 35		.512			
item 36	.321	.426			

Extraction Method: Principal Axis Factoring.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 8 iterations.

7. After running EFA, it can be seen from the table 7.7 item 4, 22,24 have low communalities (lower than (0.20) and should be removed and then rerun EFA.

Table 7.7: communalities check in the 4th iteration

Communalities		
	Initial	Extraction
item 2	.378	.233
item 3	.346	.290
item 4	.247	.121
item 7	.342	.315
item 8	.301	.260
item 9	.364	.279
item 10	.399	.232
item 11	.311	.243
item 12	.480	.554
item 13	.325	.287
item 14	.295	.227
item 15	.369	.339
item 16	.363	.300
item 17	.346	.381
item 19	.320	.228
item 20	.330	.353
item 21	.402	.385
item 22	.333	.140
item 24	.245	.094
item 25	.389	.519
item 26	.504	.400
item 28	.358	.289
item 31	.514	.548
item 32	.413	.327
item 34	.309	.221
item 35	.391	.215
item 36	.382	.302

Extraction Method: Principal Axis Factoring.

- After running EFA, it can be seen from the table 7.8, item 14 have low communalities lower than (0.20) and should be removed and then rerun EFA.

Table 7.8: communalities check in the 5th iteration

Communalities		
	Initial	Extraction
item 2	.335	.220
item 3	.331	.285
item 8	.262	.224
item 9	.336	.293
item 10	.380	.249
item 11	.294	.258
item 12	.458	.577
item 13	.291	.268
item 14	.231	.155
item 15	.318	.317
item 16	.352	.329
item 17	.292	.383
item 19	.294	.309
item 20	.324	.366
item 21	.347	.375
item 25	.360	.537
item 26	.499	.394
item 28	.311	.241
item 31	.498	.529
item 32	.386	.317
item 34	.291	.237
item 35	.347	.232
item 36	.370	.312

Extraction Method: Principal Axis Factoring.

9. After running EFA, it can be seen from the table 7.9 all factor loads were at least 3 items with loading >0.4. However, item 17 was removed due to cross loading >75%. And then the analysis re-run to extract 4 factors only.

Table 7.9: Rotated factor matrix in the 6th iteration

Rotated Factor Matrix ^a				
	Factor			
	1	2	3	4
item 2		.402		
item 3	.509			
item 8			.412	
item 9	.512			
item 10	.466			
item 11		.467		
item 12		.741		
item 13				.466
item 15			.455	
item 16	.525			
item 17	.302			.525
item 19				.479
item 20			.516	
item 21	.570			
item 25			.702	
item 26	.563			
item 28		.473		
item 31	.717			
item 32	.537			
item 34		.451		
item 35		.458		
item 36		.468		

Extraction Method: Principal Axis Factoring.
 Rotation Method: Varimax with Kaiser Normalization.^a
 a. Rotation converged in 6 iterations.

10. After running EFA, it can be seen from the table 7.10 the 4th factor loads was less than 3 items with loading >0.4 and excluded and then the analysis re-run to extract 3 factors only

Table 7.10: Rotated factor matrix in the 7th iteration

Rotated Factor Matrix ^a				
	Factor			
	1	2	3	4
item 2		.349		.371
item 3	.517			
item 8			.468	
item 9	.514			
item 10	.471			
item 11		.467		
item 12		.727		
item 13				.406
item 15			.504	
item 16	.540			
item 19				.589
item 20			.519	
item 21	.564			
item 25			.620	
item 26	.568			
item 28		.461		
item 31	.700			
item 32	.531			
item 34		.427		
item 35		.472		
item 36		.509		

Extraction Method: Principal Axis Factoring.
 Rotation Method: Varimax with Kaiser Normalization.^a
 a. Rotation converged in 6 iterations.

11. After rerun EFA, it can be seen from the table 7.11, the communalities of items 13 and 19 were lower than 0.20 and should be removed and then rerun EFA.

Table 7.11 communalities check in the 8th iteration

Communalities		
	Initial	Extraction
item 2	.323	.211
item 3	.325	.282
item 8	.227	.230
item 9	.335	.293
item 10	.365	.249
item 11	.261	.212
item 12	.441	.534
item 13	.239	.148
item 15	.316	.363
item 16	.347	.278
item 19	.279	.153
item 20	.320	.364
item 21	.340	.366
item 25	.309	.302
item 26	.494	.393
item 28	.299	.231
item 31	.484	.519
item 32	.372	.317
item 34	.285	.251
item 35	.342	.235
item 36	.367	.329

Extraction Method: Principal Axis Factoring.

12. After rerun EFA, it can be seen from the table 7.12, the communalities of item 2 was lower than 0.20 and was removed and then rerun EFA.

Table 7.12: communalities check in the 9th iteration

Communalities		
	Initial	Extraction
item 2	.274	.178
item 3	.310	.289
item 8	.222	.280
item 9	.326	.288
item 10	.336	.243
item 11	.240	.238
item 12	.441	.566
item 15	.271	.342
item 16	.339	.295
item 20	.319	.373
item 21	.335	.368
item 25	.308	.350
item 26	.445	.398
item 28	.284	.226
item 31	.469	.506
item 32	.347	.321
item 34	.249	.223
item 35	.328	.235
item 36	.329	.304

Extraction Method: Principal Axis Factoring.

13. Next step, it can be seen from table 7.13 that, the final stable solution met all criteria:

Table 7.13: Rotated factor matrix of the final model.

Rotated Factor Matrix^a			
	Factor		
	1	2	3
item 3	.514		
item 9	.519		
item 11	.466		
item 16	.516		
item 32	.536		
item 21	.566		
item 26	.585		
item 31	.699		
item 28	.491		
item 8			.511
item 15			.542
item 20			.543
item 25			.559
item 10		.467	
item 12		.697	
item 35		.493	
item 36		.479	
item 34		.443	

Extraction Method: Principal Axis Factoring.
 Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

14. Next step is checking the Scree plot. A Scree Plot is a single line segment plot that determines the portion of the total variance in the dataset. It is a plot, in descending order of magnitude, of the eigenvalues of a correlation matrix. In the context of factor analysis, a Scree Plot assists the analyst to visualize the relative importance of the factors, a sharp decline in the plot signs that subsequent factors are ignorable.

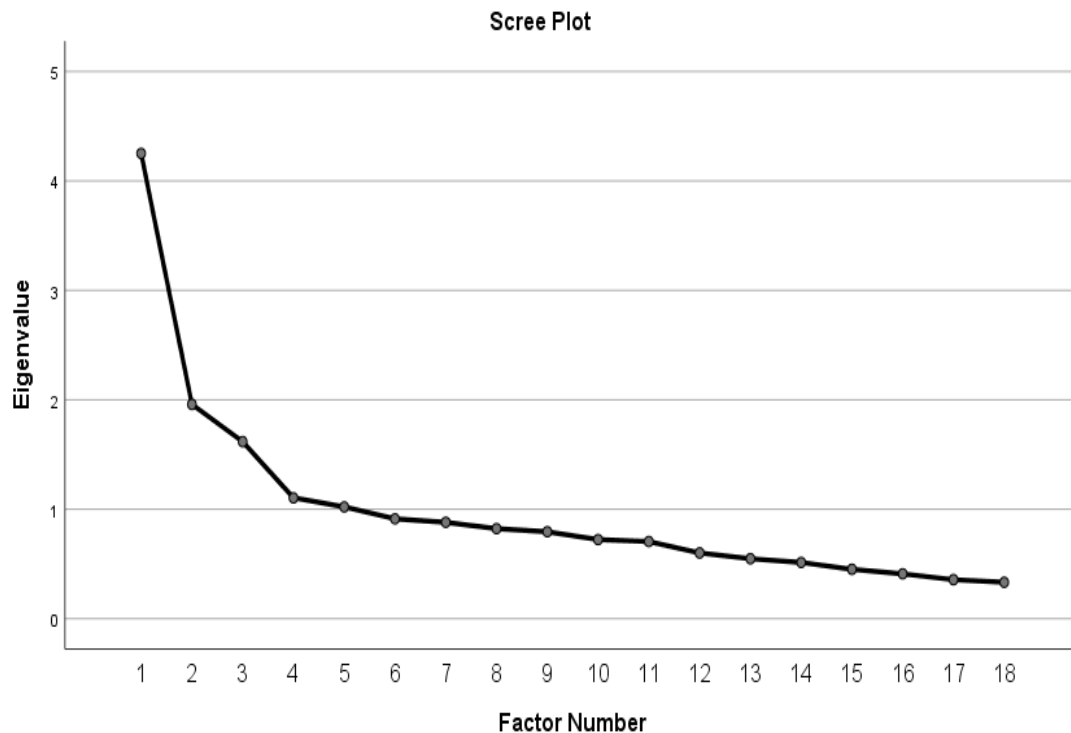


Figure 7.1 Total variance explained by three factors on Scree plot

The Scree Plot is represented by two lines: the lower line presents the proportion of variance for each factor, while the upper line presents the cumulative variance explained by the first N factors. The factor components are distributed in decreasing order of variance, so the most crucial principle component is always placed first. Figure 7.1 shows the visual inspection of the scree plot of eigenvalues which indicates three components should be retained.

7.2.3 Validation of the model:

After conducting EFA and reaching the final model, validation process should be conducted through checking:

- The KMO statistic > 0.5 (Kaiser, 1974),
- The correlation matrix determinant should be > 0.00001 (Field, 2013: 686),
- The total percentage of variance explained > 27.5% (Chin, 1998),
- Factors correlation citation

- The alpha Cronbach: internal alpha consistency of 0.6 for individual scale (Nunnally, 1978; Hair et al., 2015).

At this stage of the analysis all items communalities are above 0.2 and all three factors load more than 3 items above 0.4. In terms of the adequacy of the sample size using the KMO, it can be seen from the table 7.14 the KMO value .770 which is acceptable. The determinant of the correlation matrix was 0.015 and the total percentage of variance explained was %32.44 (see table 7.15).

Table 7.14 KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.770
Bartlett's Test of Sphericity	Approx. Chi-Square	513.107
	df	153
	Sig.	.000

Table 7.15 Total variance Explained of the model

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	4.251	23.619	23.619	3.597	19.983	19.983	2.686	14.922
2	1.958	10.879	34.497	1.292	7.176	27.160	1.817	10.095	25.017
3	1.617	8.984	43.482	.951	5.283	32.442	1.337	7.425	32.442
4	1.104	6.134	49.616						
5	1.021	5.674	55.290						
6	.912	5.066	60.356						
7	.881	4.893	65.249						
8	.822	4.568	69.817						
9	.794	4.412	74.229						
10	.723	4.015	78.245						
11	.705	3.914	82.159						
12	.601	3.337	85.495						
13	.548	3.042	88.538						
14	.514	2.854	91.392						
15	.451	2.507	93.899						
16	.409	2.274	96.173						
17	.356	1.979	98.153						
18	.332	1.847	100.000						

Extraction Method: Principal Axis Factoring.

- Checking factors correlation between factors. The closer the coefficients are to +1.0 and -1.0, the greater the strength of the relationship between the factors (field, 2013). it can be seen from the table 7.16, all three factors come up with moderate factor correlation

Table: 7.16: Factor correlation for 3 factors

Construct	Correlation
Factor 1	0.567
Factor 2	0.619
Factor 3	0.696

- Checking alpha Cronbach for individual scale.

After the structure of KADDS has been identified through EFA, the reliability of the structure needs to be checked. Therefore, internal consistency reliability was calculated to investigate the homogeneity of all items in this new scale. All three factors in the scale scored greater than 0.6 which is acceptable as shown in the table 7.17 below:

Table 7.17: Alpha Cronbach for individual scale

Construct	Number of items	Alpha Cronbach
Factor 1	9	0.801
Factor 2	5	0.763
Factor 3	4	0.675

Content validity:

In addition to determine the validity of the factors identified in performing EFA of KADDS, it was necessary to determine the content validity of the resulting factors in this process. In order to complete this important and necessary step

the researcher collaborated with a number of independent experts in ADHD and special needs. "Content validity is known as the extent to which the test may be said to measure a theoretical construct or trait" (Anastasi and Urbina, 1997 p126) and performing this step will help to establish the representativeness of items when conducting factorial validity (McGartland Rubio, Berg-Weger, Tebb et al., 2003). A combination of experts in ADHD and special education in addition to lay individuals was used to examine and subsequently label the factors extracted from KADDS. The number of experts used to conduct content validity will depend upon the diversity and level of expertise required in the process (Grant and Davis, 1997). For this study, the number of experts used to conduct content validity was within the suggested range of minimum and maximum number of experts needed to conduct content validity of the factorial analysis (Gable & Wolf, 1993; Walz, Strickland & Lenz, 1991).

Eight independent individuals were contacted and participated in either the classification of KADDS items in each factor or labelling each resultant factor of EFA. These individuals included: lead supervisor as content expert (Professor in Equity and Inclusion) from University of Birmingham, five content experts from KSA and UK, and two lay experts. A content validity was established for each factor and two content experts and also two lay individuals (academics) were asked to label the three factors (Factor 1: (9 items), Factor 2: (5 items) and Factor 3: (4 items). The participation of these experts and lay individuals in order to determine domain representation and domain relevance is essential in supporting the content validity of the factorial analysis performed on KADDS (Sireci, 1998a).

The four people involved in the labelling stage of establishing the content validity of each factor were given a list of items from KADDS that the researcher had extracted through EFA as within each factor and based upon this information they were asked to label the factor. After this process and to make a final decision, all responses were gathered and a label for each factor was confirmed with a lead expert. Now that the labels for each factor had been established it was necessary to determine the representativeness of these in

relation to the items from KADDS allocated to each factor. During this classification process it was vital that the task of gathering ratings from experts was not too burdensome (Sireci, 1998b) so each individual was provided with the factor labels under which to classify items (Factor 1: *Associated Features/Symptoms and Diagnosis*, Factor 2: *Non-medication Treatment*, and Factor 3: *Medication Treatment*).

The experts that would conduct classification of items within each factor were given all 18 items from KADDS (post EFA) with the three labelled factors. There was agreement between three experts about the classification of items in accordance with the factor best associated with them. Only one expert classified item 10 under Factor 3 as opposed to Factor 2 as had been classified under EFA. It is worth noting that all items in KADDS (pre EFA) had already been determined since items had been classified as part of a subscale where at least 75% of a sample of upper level doctoral students in Psychology was in agreement (Scuitto, 2000). The result of this process was the validation of three new Factors each containing items that previously had been classified under different subscales in KADDS. An example of this is the treatment subscale pre EFA which is now divided into two Factors (Factor 2: *Non-medication Treatment*, and Factor 3: *Medication Treatment*) following EFA. In addition, the first and second subscale of KADDS (pre EFA) has now been combined into Factor 1: *Associated Features/Symptoms and Diagnosis* (post EFA) in this study. The final structure of KADDS post EFA includes (18 items) as below:

Factor (1): Associated Features (i.e., general information about ADHD and prognosis of ADHD), Symptoms and diagnosis

Post EFA No.	Pre EFA No.	Item from KADDS
1	3	ADHD children are frequently distracted by extraneous stimuli
2	9	ADHD children often fidget or squirm in their seats

3	11	It is common for ADHD children to have an inflated sense of self-esteem or grandiosity
4	16	Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity
5	21	In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school)
6	26	ADHD children often have difficulties organizing tasks and activities
7	28	There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD
8	31	Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.
9	32	The majority of ADHD children evidence some degree of poor school performance in the elementary school years.

Factor (2): Non-medication Treatment

Post EFA No.	Pre EFA No.	Item from KADDS
10	10	Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment
11	12	When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.
12	34	Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.
13	35	Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.

14	36	Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD
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Factor (3): Medication Treatment

Post EFA No	Pre EFA No	Item from KADDS
15	8	Antidepressant drugs have been effective in reducing symptoms for many ADHD children
16	15	Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction
17	20	In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.
18	25	Stimulant drugs are the most common type of drug used to treat children with ADHD.

7.3 Section Three: Results for Research Question One (RQ1)

RQ1 What knowledge and misconceptions regarding ADHD do male SpLD and General primary schoolteachers in Jeddah KSA have?

The present study aimed to examine male Saudi SpLD and General primary schoolteachers' knowledge and misconceptions about ADHD. It was also designed to explore whether male Saudi SpLD and General primary schoolteachers differ in their knowledge and misconceptions about the disorder.

This first main research question was divided into two sub-questions,

SubQ1 What is the level of knowledge and misconceptions about ADHD amongst male SpLD and General teachers in primary schools in Jeddah, KSA?

SubQ2 Do male Saudi SpLD and General primary schoolteachers differ in their knowledge and misconceptions about ADHD?

7.3.1 Sub-section One: Results for Sub-Question One (Sub-Q1)

SubQ1 What is the level of knowledge and misconceptions about ADHD amongst male SpLD and General teachers in primary schools in Jeddah, KSA?

Demographic information of (130) male Saudi SpLD and General primary school teachers was first gathered and analyzed, including teacher age, qualification, type of teacher and years of experience. The first sub-question was addressed by analyzing the descriptive statistics of percentage and frequency for primary schoolteachers' scores on the KADDS to examine their knowledge and misconceptions about ADHD, overall knowledge and most common responses to KADDS. Teachers answered each item by choosing from one of three options: True (T), False (F), or Don't Know (DK).

7.3.1.1 Demographic characteristics of the participants (N = 130).

As shown in table 7.18, 54.6% of teachers were aged between 31-40; 24.6% were aged between 41-50; 15.4% were between ages 20-30; and 5.4% were 50 years and above. In terms of participants' qualification, the majority had a bachelor's degree (73.8%, n = 96); 17.7% had a Masters' degree; 3.8% a Diploma and 4.6% of participants possessed a PhD. Of the 130 participants, 65 (66.4%) were general education teachers, and 46 (34.6%) were SpLD teachers. The majority of respondents (28.5%) had 6-10 years of experience followed by 21.5% with 11-15 years of experience; 17.7% had between 1-5 years of experience; 16.9% had 21 years and more experience; and 15.4% teachers had between 16-20 years of experience.

Table 7.18: The demographic characteristics of the participants ($N = 130$).

Variable	Frequency (n)	Percentage (%)
Age:		
(20-30) yrs	20	15.4
(31-40) yrs	70	54.6**
(41-50) yrs	32	24.6
50 yrs and above	7	5.4
Qualification:		
Bachelor degree	96	73.8**
Diploma	5	3.8
Masters degree	23	17.7
PhD	6	4.6
Type of teacher:		
General	85	65.4**
SpLD	45	34.6
Years of experience:		
(1-5) yrs	23	17.7
(6- 10) yrs	37	28.5**
(11- 15) yrs	28	21.5
(16- 20) yrs	20	15.4
21 yrs and above	22	16.9

** Response with the highest frequency in each row

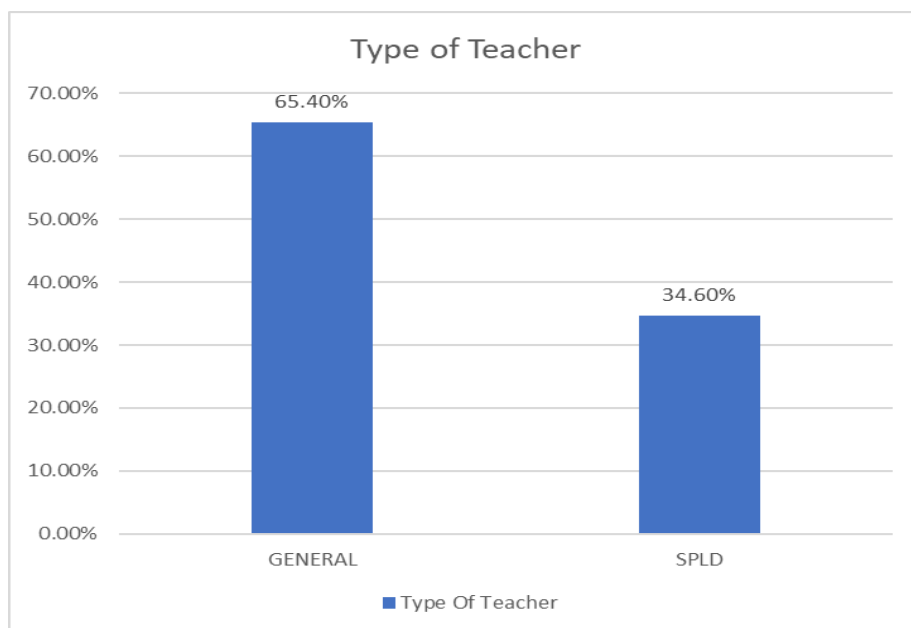


Figure 7.1 Response by teacher type

7.3.1.2 Participants' Knowledge and Misconceptions about ADHD

This section analyses and describes all Items of the teachers' knowledge and misconceptions about ADHD (N= 130). Firstly, table 7.19 describes teachers' responses to 9 items within Factor 1 of KADDS – Associated features, symptoms and diagnosis of ADHD. Secondly, table 7.20 describes teachers' responses to 5 items within Factor 2 of KADDS – Non-medication treatment to reduce ADHD symptoms. Finally, table 7.18 describes teachers' responses to 4 items within Factor 3 of KADDS – Medication treatment.

The highest percent of correct responses within factor 1, (91.5%, n = 119) was for item 9 “ADHD children often fidget or squirm in their seats” and the lowest correct response was for item 11 “It is common for ADHD children to have an inflated sense of self-esteem or grandiosity”. However, item 11 scored the highest incorrect response (30.8% n = 40) and the lowest scoring incorrect items were 3 (2.3% n = 3) “ADHD children are frequently distracted by extraneous stimuli” and 9 (2.3% n = 3) “ADHD children often fidget or squirm in their seats”. Teachers scored the highest ‘don't know' responses in this factor for item 11 (54.6% n = 71) and the lowest for item 9 (6.2% n = 8).

Table 7.19: Teachers' responses to 9 items within Factor 1 of KADDS – Associated features, symptoms and diagnosis of ADHD (N = 130).

Items		Correct Answer	Correct (have knowledge)	Don't Know (lack of knowledge)	Incorrect (Misconception)
3	ADHD children are frequently distracted by extraneous stimuli.	T	110 84.6%	17 13.1%	3 2.3%
9	ADHD children often fidget or squirm in their seats.	T	119 91.5%	8 6.2%	3 2.3%
11	It is common for ADHD children to have an inflated sense of self-esteem or grandiosity.	F	19 14.6%	71 54.6%	40 30.8%
16	Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity.	T	106 81.5%	20 15.4%	4 3.1%
21	In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).	T	99 76.2%	20 15.4%	11 8.5%
26	ADHD children often have difficulties organizing tasks and activities.	T	99 76.2%	16 12.3%	15 11.5%

28	There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD.	F	42 32.3%	50 38.5%	38 29.2%
31	Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.	T	106 81.5%	15 11.5%	9 6.9%
32	The majority of ADHD children evidence some degree of poor school performance in the elementary school years.	T	92 70.8%	24 18.5%	14 10.8%

With regard to teachers' responses to 5 items within Factor 2 of KADDS, the highest percent of correct responses was for item 10 (77.7% n = 101) "Parent and teacher training in managing an ADHD child is generally effective when combined with medication treatment". Whilst the lowest correct score from teachers in this factor was item 34 "Behavioural/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention". The highest incorrect responses amongst teachers in this factor was also for item 34 (60% n = 78) however the lowest incorrect response was for item 10 (6.2% n = 8). Teachers scored the highest don't know for item 35 (38.5% n = 50) "Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD". The lowest 'don't know' response from teachers (16.2% n = 21) was for item 10.

Table 7.20: Teachers' responses to 5 items within Factor 2 of KADDS – Non-medication treatment (N = 130).

Items		Correct Answer	Correct (have knowledge)	Don't Know (lack of knowledge)	Incorrect (Misconception)
10	Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.	T	101 77.7%	21 16.2%	8 6.2%
12	When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.	F	48 36.9%	67 51.5%	15 11.5%
34	Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.	F	10 7.7%	42 32.3%	78 60%
35	Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.	F	50 38.5%	69 53.1%	11 8.5%
36	Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.	F	66 50.8%	37 28.5%	27 20.8%

However, the highest number of correct responses amongst teachers under the third factor was for item 20 (37.7% n = 49) "In severe cases of ADHD, medication is often used before other behaviour modification techniques are attempted". However, the lowest correct response was for item 8 "Antidepressant drugs have been effective in reducing symptoms for many ADHD children". Whilst the highest incorrect answer amongst teachers was for item 25 (25.4% n = 33) "Stimulant drugs are the most common type of drug used to treat children with ADHD". The lowest incorrect response (7.7% n = 10) was to item 15 "Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction". The most common 'don't know' responses from teachers (58.5% n = 76) was the same for items 8 and 15, with the lowest score for item 20 "In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted" answered by 38.5% or 50 teachers.

Table 7.21: Teachers' responses to 4 items within Factor 3 of KADDS – Medication treatment (N = 130).

Items		Correct Answer	Correct (have knowledge)	Don't Know (lack of knowledge)	Incorrect (Misconception)
8	Antidepressant drugs have been effective in reducing symptoms for many ADHD children.	T	37 28.5%	76 58.5%	17 13.1%
15	Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction.	T	44 33.8%	76 58.5%	10 7.7%
20	In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.	T	49 37.7%	50 38.5%	31 23.8%
25	Stimulant drugs are the most common type of drug used to treat children with ADHD.	T	43 33.1%	54 41.5%	33 25.4%

7.3.1.3 Participants' Overall Knowledge and Misconceptions about ADHD

Here we will look at the overall total knowledge of ADHD and misconceptions of the disorder amongst male Saudi primary school teachers across the three Factors of KADDS. This will include presentation of total knowledge scores in addition to teachers' scores for each of these.

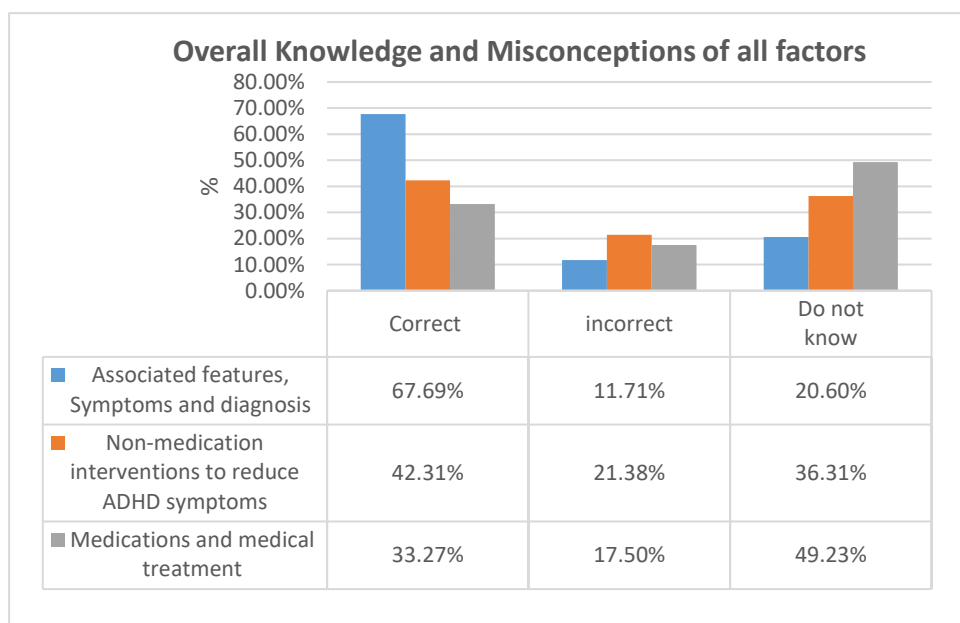


Figure 7.2: Percentage of teachers' score of the correct, incorrect, and don't know responses on KADDS subscales.

From figure 7.2 above it can be seen that the highest correct scores amongst male Saudi primary schoolteachers was in the associated features, symptoms and diagnosis Factor (67.69%) however teachers scored lowest in their knowledge of medication and medical treatment, or Factor three (33.27%). With regards to incorrect answers amongst teachers, it can be seen that the highest incorrect answers were given on the non-medication treatments to reduce ADHD symptoms subscale (21.38%) and teachers scored the lowest incorrect answers for associated features, symptoms and diagnosis (11.71%). When it came to do not know responses from teachers, it can be seen that don't know score was 20.60% for the associated features, symptoms and diagnosis, whereas the highest percentage of don't know responses was scored for the medication and medical treatments subscale (49.23%).

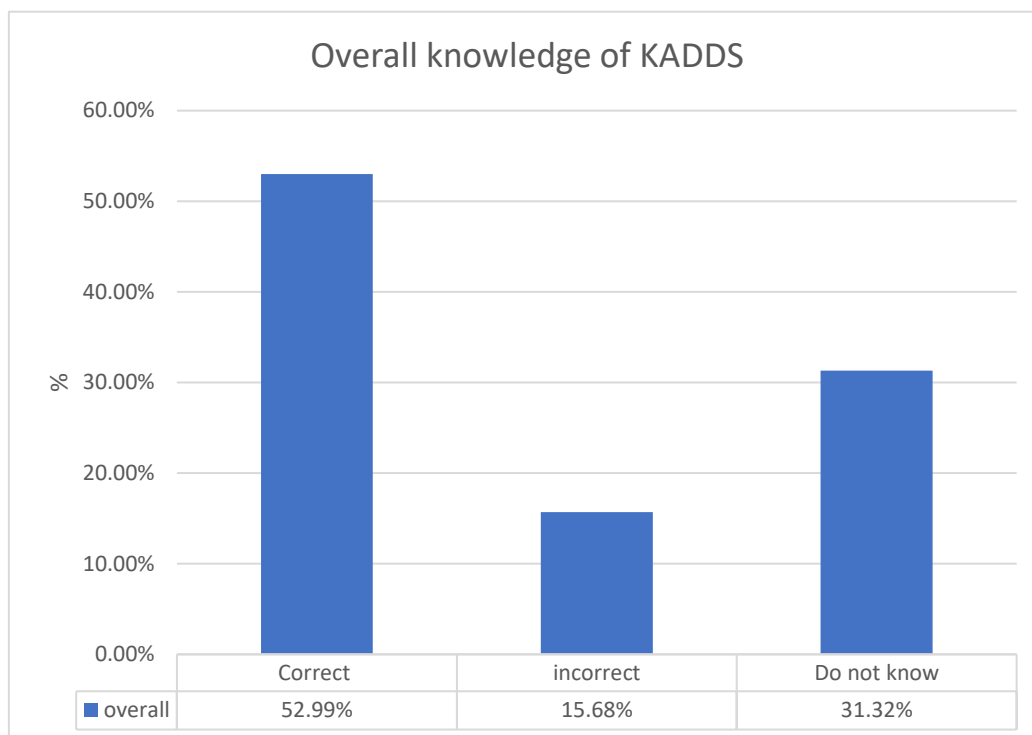


Figure 7.3: Teachers' overall knowledge of ADHD (n = 130)

The overall teachers' knowledge score for KADDS is presented in Figure 7.3. Don't know responses was 31.32% - this suggest a lack of knowledge, incorrect responses was 15.68% which indicate misconceptions and correct responses was 52.99%. The responses from teachers were grouped to represent the three Factors of ADHD knowledge.

7.3.1.4 Participants' Most common responses to KADDS

This section will look at the most common responses amongst teachers during this phase of the study. It will first look at correct responses that suggest accurate knowledge amongst teachers, incorrect responses which demonstrate misconceptions and don't know responses which show a lack of knowledge. The highest responses will be identified for each response and where there is an equal response rate for an any items within these top responses, then all items will be presented.

Most common correct responses

The most common items responded to correctly by teachers were items 9, 3, 16 and 31. All of these items were within the associated features, symptoms and diagnosis Factor and of these, item 9 received the highest correct answers with 91.5% or 119 teachers out of 130. The second highest item that received the most correct answers from teachers was item 3 (84.6% n = 110) followed by both items 16 and 31 that both scored 81.5% (n = 106).

Table 7.22: Items with the highest correct answers by teachers

Item No	Item Description	Factor	frequency percentage
9	ADHD children often fidget or squirm in their seats	Associated features, Symptoms and diagnosis – F1	119 (91.5%)
3	ADHD children are frequently distracted by extraneous stimuli	Associated features, Symptoms and diagnosis – F1	110 (84.6%)
16	Current wisdom about ADHD suggests two clusters of symptoms: one of inattention and other consisting of hyperactivity/impulsivity	Associated features, Symptoms and diagnosis – F1	106 (81.5%)
31	Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation		

Most common incorrect responses

When it came to the most common incorrect answers amongst teachers, the highest was item 34 (60% n = 78) and belonged to the Non-medication treatments Factor. The next highest incorrect answer was almost half that of highest; item 11 (30.8% n = 40) and third highest incorrect response was for item 28 (29.2% n = 38) that scored slightly lower than item 11.

Table 7.23: Items with the highest incorrect answers by teachers

Item No	Item Description	Factor	frequency percentage
34	Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention	Non-medication treatment – F2	78 (60%)
11	It is common for ADHD children to have an inflated sense of self-esteem or grandiosity	Associated features, Symptoms and diagnosis – F1	40 (30.8%)
28	There are specific physical features which can be identified by medical doctors (e.g. paediatrician) in making a diagnosis of ADHD	Associated features, Symptoms and diagnosis – F1	38 (29.2%)

Most common don't know responses

Looking at don't know responses, it can be seen that two items that scored the highest and both belonged to Factor 3 Medication treatments; items 8 and 15 both received don't know responses from 76 teachers (58.5%). Item 11 received the next highest don't know response from teachers (54.6% n = 71) and this item sits within the Associated features, Symptoms and diagnosis Factor. Finally, 53.1% teachers responded don't know to item 35 in the Non-medication treatment Factor.

Table 7.24: Items with the highest don't know answers by teachers

Item No	Item Description	Factor	frequency percentage
8	Antidepressant drugs have been effective in reducing symptoms for many ADHD children	Medication treatments – F3	76 (58.5%)
15	Side effects of stimulant drugs used for ADHD may include mild insomnia and appetite reduction		
11	It is common for ADHD children to have an inflated sense of self-esteem or grandiosity	Associated features, Symptoms and diagnosis – F1	71 (54.6%)
35	Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD	Non-medication treatment – F2	69 (53.1%)

7.3.2 Sub-section Two: Results for Sub-Question Two (Sub-Q2)

SubQ2 Do male Saudi SpLD and General primary schoolteachers differ in their knowledge and misconceptions about ADHD?

The second sub-question was addressed by analyzing the inferential statistics that used Man Whitney U test to determine whether male Saudi SpLD and General primary schoolteachers differ in their knowledge and misconceptions about ADHD.

Mann-Whitney U test

The Mann-Whitney U test was used in this study in order to answer RQ1 and to statistically examine whether there are significant differences in the knowledge between SpLD teachers and General teachers. This type of test is used when the researcher intends to investigate any differences between two populations through the

gathered data (Tsybakov, 2008). The Mann-Whitney U test is a nonparametric test that can be used in place of an unpaired t-test. It is used to test the null hypothesis that two samples come from the same population (Tsybakov, 2008). The null hypothesis is based directly on reflection of research questions and assumes that whatever the researcher is trying to prove did not happen and states that there is no association or differences between the tested variables. It is the hypothesis that is tested when using an inferential statistical test (Hanna and Dempster, 2012). Since the distribution of the overall sample (N=130) is not normally distributed (see 7.1.2), the Mann-Whitney U test was the most appropriate test to use in this study.

Null Hypothesis H0 (1) states that “Male Saudi SpLD and General primary schoolteachers do not differ in their knowledge about ADHD”.

The null hypothesis within the three factors of ADHD knowledge and overall:

H1.1 Null hypothesis: Associated features, symptoms and diagnosis knowledge of ADHD is the same across SpLD and General primary schoolteachers

Table 7.25: Independent-Samples Mann- Whitney U Test of associated features, symptoms and diagnosis knowledge in SpLD and general teachers

associated features, symptoms and diagnosis	type of teacher	N	Mean Rank	Sum of Ranks		
	GENERAL	85	58.01	4930.50	Mann-Whitney U	1275.500
	SPLD	45	79.66	3584.50	Z	-3.188
	Total	130			Sig.	.001*

*Significant at $p < 0.05$

As shown in the table 7.22 and figure 7.4, applying the Mann-Whitney U test showed that there was a significant difference ($U = 1275.500$, $p = 0.001$) between General Teachers compared to SpLD Teachers with regards to Factor 1. The mean of SpLD teacher was 79.66 compared to 58.01 suggesting that the SpLD teachers possess higher knowledge of associated features, symptoms and diagnosis than General Teachers. Therefore, the null hypothesis is rejected.

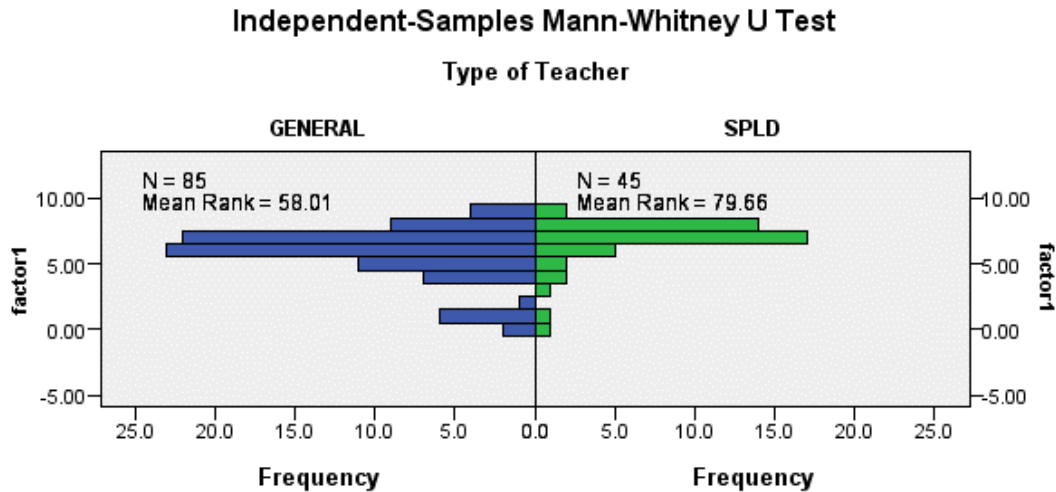


Figure 7.4: Independent-Samples Mann-Whitney U Test of associated features, symptoms and diagnosis knowledge in SpLD and general teachers

H1.2 Null hypothesis: Non-medication treatment knowledge of ADHD is the same across SpLD and General primary schoolteachers

Table 7.26: Independent-Samples Mann-Whitney U Test of non-medication treatment knowledge in SpLD and general teachers

	type of teacher	N	Mean Rank	Sum of Ranks		
Non-medication treatment	GENERAL	85	58.76	4995.00	Mann-Whitney U	1340.500
	SPLD	45	78.22	3520.00	Z	-2.862
	Total	130			Sig.	.004*

*Significant at $p < 0.05$

As shown in the table 7.23 and figure 7.5, applying the Mann-Whitney U test found there was a significant difference ($U = 1340.500$, $p = .004$) between General Teachers and SpLD teachers in their knowledge of non-medication treatment. The median of SpLD Teachers was 78.22 compared to 58.76 suggesting that the SpLD Teachers have higher knowledge of Factor/Domain 2 than General Teachers. Therefore, the null hypothesis is rejected.

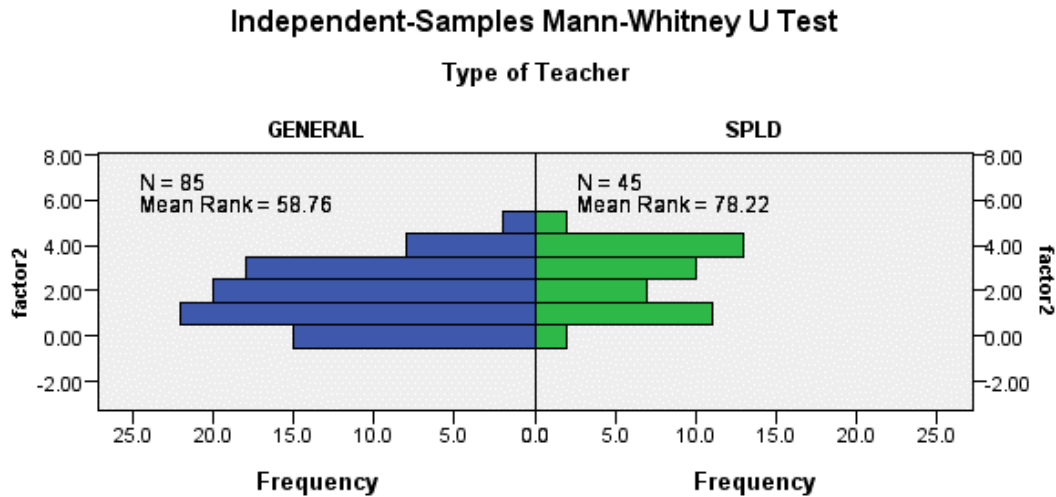


Figure 7.5: Independent-Samples Mann-Whitney U Test of non-medication treatment in SpLD and general teachers.

H1.3. Null hypothesis: Medication treatment knowledge of ADHD is the same across SpLD and General primary schoolteachers

Table 7.27: Independent-Samples Mann-Whitney U Test of medication treatment knowledge in SpLD and general teachers

	type of teacher	N	Mean Rank	Sum of Ranks		
medication treatment	GENERAL	85	63.35	5385.00	Mann-Whitney U	1730.000
	SPLD	45	69.56	3130.00	Z	-.926
	Total	130			Sig.	.354*

*Significant at $p < 0.05$

As shown in the table 7.24 and figure 7.6, application of the Mann-Whitney U test found there was no significant difference ($U = 1730.000$, $p = 0.354$) between general teachers and SpLD Teachers knowledge of medication treatment. The median of SpLD Teacher was 69.56 compared to 63.35 suggesting that SpLD teachers and general teachers have the same knowledge of medication treatment. Therefore, the null hypothesis is retained.

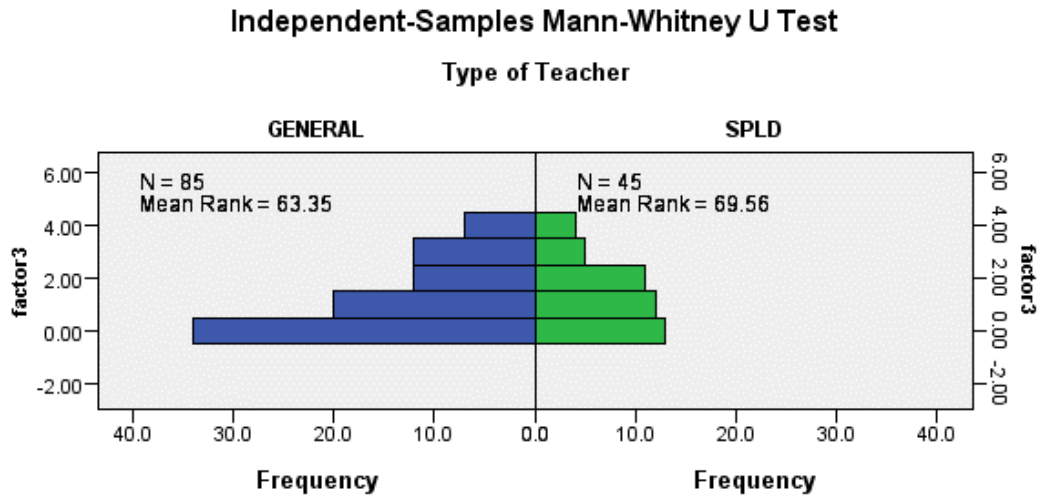


Figure 7.6: Independent-Samples Mann-Whitney U Test of medication treatment knowledge in SpLD and general teachers

H1.4. Null hypothesis: Overall knowledge of ADHD is the same across SpLD and General primary schoolteachers

Table 7.28: Independent-Samples Mann-Whitney U Test of overall knowledge in SpLD and general teachers

overall	type of teacher	N	Mean Rank	Sum of Ranks		
	GENERAL	85	58.01	4958.50	Mann-Whitney U	1303.500
	SPLD	45	79.66	3556.50	Z	-3.003
	Total	130			Sig.	0.003*

*Significant at $p < 0.05$

As shown in the table 7.25 and figure 7.7, applying the Mann-Whitney U test found there was a significant difference ($U = 1303.500$, $p = 0.003$) between general teachers and SpLD teachers of overall knowledge. It was found that the mean rank of SpLD Teacher was 79.66 compared to 58.01 for general teachers which suggested SpLD teachers have more overall knowledge than general teachers. This would mean that the null hypothesis was rejected.

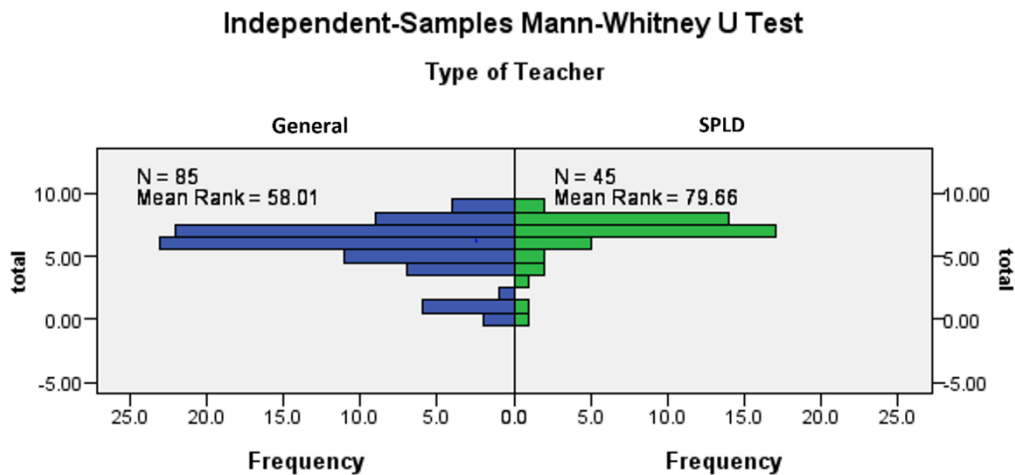


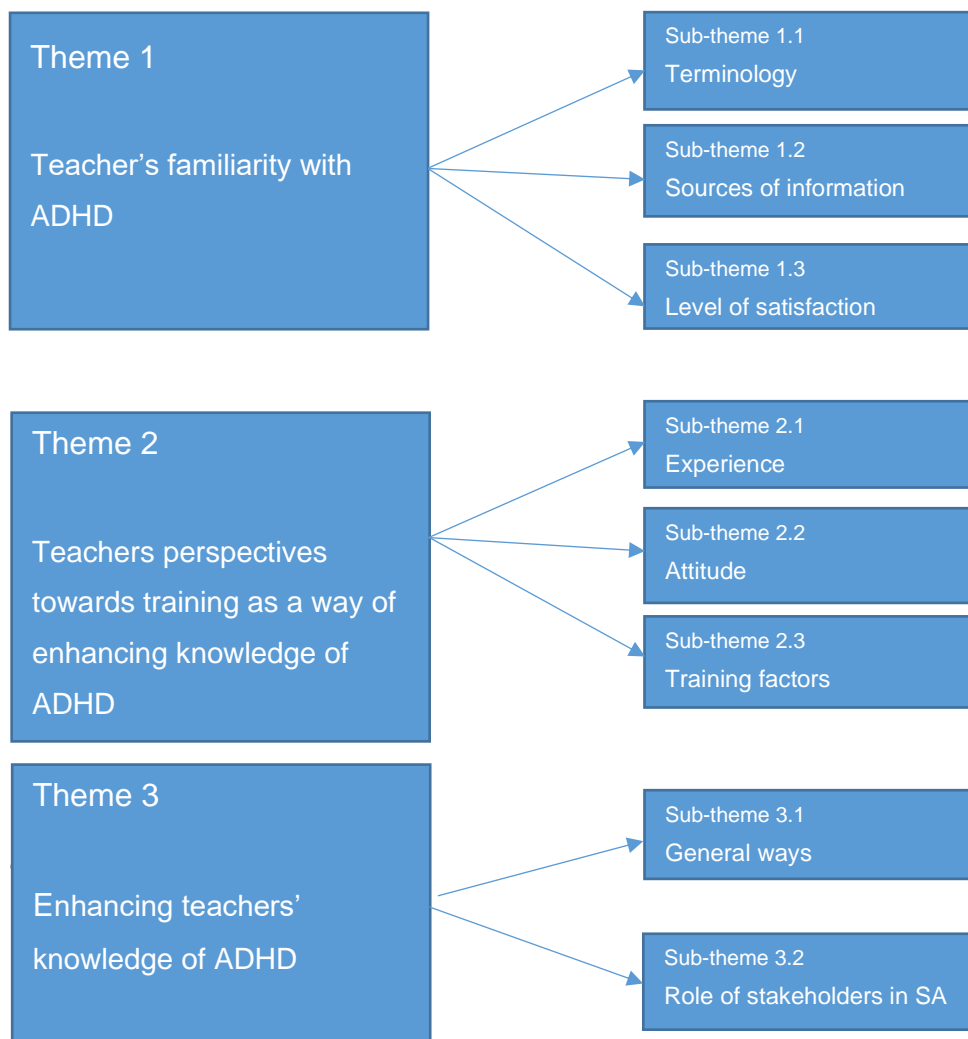
Figure 7.7: Independent-Samples Mann- Whitney U Test of overall knowledge amongst SpLD and general teachers

7.4 Section Four: Results for Research Question Two (RQ2)

RQ2 From a teacher’s perspective what can be done to overcome the lack of knowledge and misconceptions of ADHD amongst SpLD and General teachers in mainstream schools in Jeddah, KSA?

Face to face interviews were conducted to explore what SpLD and General schoolteachers think can be done to overcome the lack of ADHD knowledge. This section will present results from interviewing teachers and. from thematic analysis of qualitative data.

Following stages one to four of the guide to conducting thematic analysis according to Braun and Clarke (2006), the researcher and two independent researchers confirmed the following themes:



7.4.1 Theme 1 – Teachers’ Familiarity with ADHD

A clear theme was familiarity with ADHD, however this theme included sub-themes on teacher’s awareness of terminology (sub-theme 1.1), the sources from where they became aware of ADHD (sub-theme 1.2), and their level of satisfaction about their current awareness of ADHD (sub-theme 1.3).

Two codes were used to classify responses to sub-theme 1.1 and found 90% (eighteen) of participant teachers were familiar with ADHD as a term except for two general teachers (A7, A20) who were not familiar with the term. Of those who had heard previously of ADHD the majority knew about it through their own reading, however the depth of knowledge ranged from personal experience-A4 – *I have a son with ADHD*, training-A5 – *I heard about the term when I attended a course about*

behavioural problems amongst children, but it did not talk about ADHD in much detail) and own research-A2S – I heard about it before through my own reading and internet). From the other sources mentioned the most common was familiarity because a lecturer mentioned the term during their education degree.

Analysis of data for Sub-theme 1.2 found that the most common source by which teachers were familiar with the term ADHD was through university (A3, A6S, A11, A14S, A15S, A17S, A19S) with a typical response being *I heard about ADHD whilst studying a module at university – A6S*, printed materials (A2S, A3, A9, A12S, A13S, A18S) – *through reading books – A12S*, Family and Friends (A1S, A4, A10, A16, A17S) – *my sister has a son with ADHD – A1S* and Internet (A2S, A9, A10, A12S, A13S) – *my own reading on the internet – A3*, Specialists (A1S, A4) – *knew [about ADHD] through my son’s doctor – A4*, Courses (A5, A8) – *attending a training course for teachers on behavioural disorders – A8* and finally television (A10) – *by watching a documentary on television – A10*.

Finally, under the first theme was sub-theme 1.3 which looked at the level of satisfaction amongst teachers on their current level of awareness of ADHD. All 20 teachers felt unsatisfied with their current level of awareness of the disorder, with 50% (A2S, A3, A4, A7, A9, A11, A15S, A17S, A19S, A20) of teachers expressing that they need to know more about ADHD. Typical responses included: *I have a severe lack of knowledge and want to know more about the disorder and especially what the latest studies say so that I can help my son and my students-A4*, *I need to know more as I have poor knowledge-A20*; *I have a severe lack of knowledge and want to know about interventions for the disorder-A7*; *I feel a lack of knowledge and would like to know more-A11*; *I would like to know more as I have many General teachers come and see me to seek advice about what they should do in their class-A12S*; *Although I am an SpLD teacher and a specialist in academic difficulties there are few sources of information about ADHD, I need to know more about attention deficit since I suffer from the disorder-A19S*.

7.4.2 Theme 2 – Teachers’ perspectives towards training as a way of enhancing their knowledge of ADHD

This theme directly links to the primary research question of whether a training programme is an effective way of enhancing teachers’ knowledge of ADHD and findings from the literature review on teacher training programmes in ADHD. Sub-theme 2.1 relates to teacher’s experience of receiving training in or related to ADHD so far in their career. It was revealed by the data that no participants had previously received in-service training about ADHD. A selection of comments included: *I was so happy when I heard that you were preparing a training programme about the disorder and I registered my desire to attend such training-A3; I have never attended or received an invitation during my 16 years teaching experience-A9; Basically there is no training course for teachers about ADHD in KSA -A11; Actually I haven’t attended or been invited to attend a course about ADHD but I have attended courses about academic difficulties-A13S; such training does not exist-A14S; most of the courses that I attended are about general behavioural problems and academic difficulties-A15S; I have not heard about such training before-A17S; I only attended courses about academic difficulties not about developmental difficulties-A19S.*

Sub-theme 2.2 concerned teacher’s attitudes towards training as a way of enhancing their ADHD knowledge, all teachers believed that training would be a good way to enhance knowledge of the disorder and comments included: *the training programme is an effective way to increase knowledge and having a training programme is better than having nothing at all-A4; I believe that a training programme is an effective way to increase knowledge if it is designed and prepared well-A9; it [training] is very important and necessary-A2S; it will play a vital role in increasing knowledge about this disorder-A8.*

The final sub-theme relating to teacher’s perspectives towards training as a way to enhance their knowledge of ADHD concerned the features they regarded as fundamental to creating effective in-service training on ADHD for teachers. From the systematic literature review the researcher identified possible factors that may play a role in the effectiveness of training in ADHD and teachers were questioned on these. These were duration, interactivity and content.

When questioned about the duration of in-service training for teachers in ADHD the majority of teachers-A1S, A3, A4, A5, A6S, A8, A9, A10, A11, A12S, A13S, A15S, A16, A18S preferred the days of training to be three days or less and six teachers-A2S, A7, A14S, A17S, A19S, A20 recommended the duration of training should be more than three days. Again, the majority of participants-A5, A6S, A7, A8, A9, A14S, A15S, A16, A17S, A19S, and A20 suggested the programme should last for more than 10 hours, whilst the minority of teachers-A2S, A3, A10, A11, A12S, A13S suggested 10 hours or less. Three teachers-A1S, A4, A18S did not specify a preference for hours but commented: *length is irrelevant, the important thing is if I benefit from the period of training-A1S; for me the length is not important but what is important is the qualification of the trainer and how much he can help me to know more about ADHD-A4; time is not an issue it is more about the quality of content-A18S.*

In regards to responses about the interactivity of in-service training the most popular suggestion of activity to be included by teachers was group work-A1S, A5, A6S, A7, A8, A9, A10, A11, A12S, A13S, A14S, A15S, A16, A17S, A18S, A19S, followed by use of case studies-A1S, A2S, A3, A4, A8, A10, A11, A12S, A13S, A14S, A15S, A16, A17S, A19S. Two of the other most common suggestions from teachers related to delivery and level of engagement. Sixteen teachers suggested that the programme should be delivered through PowerPoint-A1S, A2S, A3, A5, A6S, A7, A8, A9, A10, A11, A12S, A13S, A14S, A15S, A19S, and A20 Comments included: *Using technology such as PowerPoint to attract the attention of participants-A9.* Seventeen teachers-A1S, A2S, A3, A4, A5, A8, A10, A11, A12S, A13S, A14S, A15S, A16S, A17S, A18S, A19S, A20 suggested the use of media to increase engagement to help learning, comments included: *video and audio sources that show real situations of ADHD since this will be more efficient with time and make training more interesting-A8.* Seven teachers-A2S, A5, A7, A10, A14S, A17S, A20 made suggestions relating to the trainer and their delivery of the programme: *the trainer should not speak too much-A2S; not only having one trainer so we can get different perspectives and expertise-A5; the trainer himself should be qualified and has skills that can help-A7; [the trainer should] make training interactive and not just talking at teacher-A10.* There were five other suggestions including workshops-A9, A10, A13S, A19S, open participation-A1S, A8, A16, A20, changing the training environment, for example away

from the school-A11, brainstorming-A9 and the trainer giving a gift to the best participant-A20.

The final feature of what could make for effective in-service training in ADHD under sub-theme 2.3 was content. Sixteen teachers that included a majority of General teachers-A2S, A4, A5, A6S, A7, A8, A9, A10, A11, A12S, A13S, A14S, A15S, A16, A18S, A20 wanted content related to ADHD knowledge of etiology, types and symptoms with typical comments from general teachers included: *I need to know more about ADHD widely. Definition and types are basic information that teachers must know-A8; I need information about everything linked with ADHD-A4, we need to know about the definition, types and causes of ADHD-A11.* Typical comments from SpLD teachers included: *[a need for] knowledge on how to make an accurate definition and identify types of this disorder-A6S.*

All twenty participants identified that a training programme must contain accurate information about ADHD diagnosis and comments from General teachers included: *I need to know about how to make a diagnosis in our role as a teacher-A3; the most important thing is about diagnosis-A7; I am in urgent need to know how to diagnose ADHD in children-A9; it is crucial to know more about diagnosis so that we can choose the best treatment and do it early-A11; it is urgent that I know more about diagnosis and how to play a role in that process-A16.* With regards to SpLD teachers, typical comments included: *As I have poor knowledge of diagnosis I need to know more about how to diagnose a child with ADHD-A1S; I need to know about the criteria for diagnosis so that I can recognize cases with children who have ADHD-A2S; I need to know more about diagnosis and how it is done-A12S; in terms of diagnosis it is very important to be able to recognize cases-A13S; in terms of diagnosis it is very important as I should know how to diagnose a child with developmental difficulties such as ADHD since I feel able already to diagnose a child with academic difficulties-A19S.*

Again, all twenty participants responded that the programme should provide information about ADHD treatment and educational interventions for the disorder. Responses from General teachers included: *It is important we know how to treat the child and the type of interventions available-A3; the most important thing is about how to treat the child especially in the school environment-A7; teachers must also know about treatment otherwise what is the benefit of only knowing what the disorder is*

without being able to treat it-A8; one of the main reasons for wanting to attend this training programme is knowing how to treat children with ADHD-A9; treatment is a very important part and there should be good time in the training to focus on this-A16. Whilst typical comments from SpLD teachers included: I need information about interventions and treatment so that I can deal with children and help general teachers, some General teachers refer children with suspected ADHD but I refuse to deal with them as I do not have enough experience of ADHD since my experience is in academic difficulties and not developmental difficulties which is where ADHD comes-A1S; I would like to know about possible interventions and how I can deal with children who have ADHD in the class-A2S; it is crucial to know how to use strategic interventions in the classroom-A6S; I need to know about treatment, especially non-medical treatment since the most important part of training is discussion of treatment and non-medical treatment-A13S; my most important desire is to know about intervention strategies and that 70% of the training programme should be focused on this – we need solutions not just information!-A15S; knowledge about treatment is an important part of the training especially for SpLD teachers as we have insufficient knowledge but General teachers come to us frequently to ask about this-A19S.

7.4.3 Theme 3 – Enhancing teachers’ knowledge of ADHD

This theme encompassed all responses related to ways in which teachers could know more about the disorder. As a theme it also related directly to a research question of this study as well as to the literature review. Sub-theme 3.1 looked at what can be done generally, according to teachers, to enhance their level of knowledge about ADHD. Nineteen teachers believed this could be achieved through teacher training: *compulsory training courses for teachers-A9, presenting training programme-A12S; intensive and frequent teacher training-A13S; annual compulsory training courses about ADHD-A14S; training courses can play a vital role in raising awareness amongst teachers-A19S.* Eleven teachers suggested that knowledge can be enhanced through written information on ADHD including leaflets-A1S, A2S, A3, A4, A6S, A8, A11, A16, A17S, A18S, and A19S, latest research studies on ADHD-A14S, A16, guidebooks-A4; and placing written material in staffroom-A5.

Ten participants indicated that teachers should receive support to enhance knowledge, such as: *frequent meetings between teachers and specialists to look at*

behavioural problems amongst children including ADHD and how teachers can deal with such children-A5; experienced teachers should support their peers by transferring knowledge-A18S; invite specialist experts to deliver presentations to teachers-A8; we need to enhance and support teachers to know more about this disorder especially treatment, when there is sufficient support for teachers they will want to attend training programmes-A10. Five comments-A3, A6S, A12S, A17S, and A19S suggested that media could be a way of enhancing knowledge through the internet or social media-A3, A12S, television or radio-A17, CDs or videos-A6S; A12S; and A19S. Two participants commented that the individual teacher had a responsibility to increase their knowledge of ADHD: *The teacher himself should know about the importance of the disorder and its treatment to have a will to know about ADHD-A7; they have the responsibility to increase their knowledge-A12S.*

There were other suggestions of ways to enhance knowledge such as: using modern forms of technology-A3, decision makers or government should play a role-A6S, A7, A11, A12S, A18S, contribution of social workers or school advisers-A11, commission of and dissemination of research-A11 and conferences/seminars-A14S, or hiring famous people to increase awareness-A17S. Rights and legislation should be created for people with ADHD-A18S.

In addition to what can be done in general to enhance teachers' knowledge of ADHD (sub-theme 3.1), specific ways were also explored. Sub-theme 3.2 looks at the role played by stakeholders in to enhance teachers' knowledge of ADHD and specifically Government, Schools and SpLD teachers in SA. With regards to the role that can be played by Government or Ministries in SA these further broke down to the Ministries of Education (MoE), Health (MoH) and Media (MoM). The majority (fifteen) of teachers suggested that MoE should provide training programmes in ADHD-A1S, A2S, A3, A4, A5, A6S, A7, A8, A9, A12S, A13S, A14S, A16, A17S, A18S. A typical comment was: *in my opinion, the training programme is the best way to increase knowledge and should be supported by the government-A2S.* The second most popular suggestion (ten) for the role that MoE could play is the provision of support for teachers-A1S, A6S, A7, A9, A11, A12S, A14S, A15S, A18S, A19S. Examples of responses were: *supporting SpLD teachers and Special Needs centres, such as providing teachers with scholarships to go overseas to receive training-A6S; the working hours of teachers*

should be reduced so that they can attend training-A9; ensuring teachers are free to attend training when they are at school-A14S. Seven teachers responded that the MoE should send specialists into schools-A1S, A4, A6S, A7, A11, A17S, and A19S: *a specialist should be sent to the school to help teachers-A1S; supporting ADHD societies and giving them permission to visit schools and teachers so to increase knowledge-A11.* Four participants suggested that the MoE should introduce positive legislation to support ADHD training-A7, A9, A10, and A15S with a typical comment as: *creating law that makes training compulsory-A7.* Five teachers commented that the MoE should be responsible for the dissemination of written information to help teachers increase knowledge-A2S, A5, A11, A14S, and A15S: *translating international scientific research and resources associated with ADHD to be given to teachers-A14S.* Four teachers suggested that the MoE could organize seminars and research conferences on ADHD-A6S, A9, A12s, and A15S. Seven other suggestions were made that included the MoE disseminating CDs on ADHD-A2S, A5, A12S, through a specialist section of the MoE website-A3, A19S, giving teachers the opportunity to complete relevant courses in KSA and overseas-A3, conducting research and studies on ADHD knowledge amongst teachers-A7, increasing the financial budget for training courses in ADHD-A8, making ADHD phone applications and requesting teachers to use them-A12S, identifying a day for ADHD day each year-A13S, A14S, making partnerships with the Ministries of Health and Media-A16 and finally incorporating compulsory modules on ADHD into the teaching degree in KSA-A20.

With regards to the role played by the MoH in SA to enhance teachers' knowledge of ADHD The majority of teachers (fourteen) suggested that the MoH should make partnerships with other Ministries-A1S, A2S, A3, A4, A5, A7, A9, A11, A12S, A13S, A14, A16, A19S, A20 and this was followed with eleven suggestions that the MoH send ADHD specialists into schools-A1S, A3, A4, A7, A11, A13S, A14S, A16, A17S, A19S, A20, Eight suggestions were given that the MoH should increase awareness through health centres or GP waiting rooms-A8, A9, A10, A11, A14S, A15S, A17S, A20, six teachers suggested the use of promotion campaigns by the MoH-A2S, A4, A5, A6S, A10, A15S and four suggested dissemination of written information-A2S, A4, A5, A18S. Amongst the other suggestions of what the MoH can do is allocating one day per year as ADHD day-A6S, schools having resident doctors and psychiatric specialists to help teachers and students (A8), establishing and supporting an ADHD

Society-A10, operating a telephone help line for teachers to call for advice and guidance-A13S, the creation of Learning Centres to disseminate knowledge-A16, establishment of a private centre for ADHD and requesting schoolteachers to visit from time to time so as to gain knowledge and know how to deal with children who have ADHD-A17S, arranging seminars and conferences-A19S and forming committees to give public presentations-A20.

In relation to teachers' perspectives on the role of MoM that it could play to enhance teachers' knowledge of the disorder, all twenty participants suggested the use of television or radio, and examples include: *[the MoM] should present television programmes on the disorder as many people watch television-A2S; and using both visual awareness through television channels and audio through the radio-A7*. Nine teachers suggested the use of social media-A2S, A3, A7, A8, A9, A12S, A14S, A16, A19S *they can also increase knowledge through social networks and the MoM's website-A3; social networks such as Twitter, Facebook and YouTube could be useful as they all have large followings and disseminate information quickly across society-A8*. Eight teachers suggested the use of famous people/celebrities to raise awareness of ADHD-A6, A8, A9, A11, A12s, A13S, A19S, and A20 and comments included: *hiring famous people on social media to increase interest in the matter-A6S; hiring of famous people such as sports players to create awareness of ADHD amongst society-A19S*. Ten teachers suggested that the MoM disseminate written information-A1S, A2S, A5, A9, A10, A12S, A16, A17S, A18S, A19S, comments included: *Western studies in ADHD should be translated by the MoM into Arabic to help teachers keep up to date with the disorder-A2S; the MoM can increase knowledge through paper and electronic magazines-A5*. Four teachers suggested that the MoM should host experts for programmes-A4, A17S, A18S, A20 commenting: *specialist experts should be invited to participate in programs about ADHD-A20*; and three teachers suggested other ways that the MoM could increase knowledge: a specialist channel dedicated to ADHD-A15S development of a phone application on ADHD-A16 and using school radio-A13S.

In terms of the role that can be played by school as a stakeholder, all twenty participants commented that schools should play host to experts in ADHD with examples including: *the school should host specialists in the field of ADHD to support*

teachers-A1S; hosting medical specialists in the school such as psychiatrists-A3S; collaboration with specialist centres to coordinate visits to school to increase knowledge and awareness amongst teachers-A4; hosting specialists and ADHD experts to deliver internal courses-A19S. The second most popular response was that schools could play a role in increasing knowledge of ADHD through providing teacher training-A1S, A6S, A8, A10, A11, A13S, A14S, A15S, A16, A17S, A19S, and A20. Comments that suggested training included: *arrange training programmes for teachers during the academic year to increase their knowledge on behavioural disorders including ADHD-A1S; provide internal courses about ADHD-A15S.* There were four suggestions for schools to organize meetings between teachers-A2S, A12S, A18S, A19S: *giving the chance for teachers with experience of ADHD to share their knowledge with other teachers-A12S* and to distribute leaflets on the disorder to teachers-A3, A8, A9, A10, A19S, *administration of the school should provide teachers with introductory leaflets about ADHD, how they can deal with it and how to deal with children who have it-A9.* Three suggestions were received for schools to use their internal broadcast system to make announcements about ADHD-A3, A7, A16: *the school should use morning radio to help increase the awareness of ADHD-A7,* introduce social workers and student advisers into the school-A6S, A7, A16: *grant social workers and student advisers more authorization to help teachers and not just students-A6S,* use noticeboards or display screens in school-A17S, A18S, A19S: *placing of noticeboards inside the school that contain information about ADHD useful to teachers-A17S* or provide teachers with hours necessary to increase knowledge-A8, A12S, A14S: *reducing teacher's hours to be able to attend training courses-A14S.*

Other suggestions included: to establish a centre for internal studies (A3, A6S), ADHD resource room-A3, A6S, act out ADHD scenarios-A3, A17S, form collaborations with other schools-A8, collaborate with private and governmental sector-A8, A11, provide teachers with a certificate for attending ADHD training-A8, send latest research to teachers-A11, grant teachers permission to attend training-A11, and schools should specify one day each year as ADHD day-A19S.

Finally, in relation to the role played by SpLD teachers to enhance knowledge, the most popular suggestion (seventeen) was that SpLD teachers should provide support to teachers regarding ADHD-A1S, A2S, A4, A5, A7, A8, A10, A11, A12S, A13S, A14S,

A15S, A16S, A17S, A18S, A19S, A20. Of these, seven were General teachers and made comments such as: *SpLD teachers should arrange monthly meetings for General teachers and provide them with important information about the disorder and how General teachers can deal with it-A4*; [SpLD teachers should] *arrange meetings with their peers (General teachers) to disseminate knowledge about ADHD even if it is just basic information-A8*; *they [SpLD] must transfer their experience to us-A10*. The rest of the responses (ten) were SpLD teachers who for example commented: *I think as a SpLD teacher I need to increase my knowledge of ADHD and attend training programmes so that I can help general teachers and children-A1S*; *SpLD teachers must develop themselves first to then develop others-A12S*; [SpLD teachers] *should meet with teachers at the start of each academic year to tell them not only about academic difficulties but also developmental such as ADHD-A15S*; *I am not quite sure if one of the roles of the SpLD teacher is to provide us with information but I think he can get support from the Centre of Special Education and then help us by passing this information on to general teachers of how we can deal with children who have ADHD-A18S*.

Eight teachers suggested that SpLD teachers should be responsible for the delivery of training on ADHD-A1S, A3, A7, A9, A10, A14S, A16, and A20. Five of these were General teachers that included comments such as: *SpLD teachers as an expert in academic and behavioural disorders should provide training to us on how we can deal with children who have ADHD-A3*. Three responses were made by SpLD teachers and included: *SpLD teachers should deliver internal training courses to teachers on their school-A14S*. Eight participants commented that SpLD teachers should possess appropriate knowledge and expertise of ADHD-A1S, A2S, A5, A6S, A9, A10, A11, A12S and comments included: *SpLD teachers should develop himself more and know more about ADHD as a specialist and then he can help us General teachers-A5*; *the SpLD teacher should focus on the developmental difficulties as much as academic difficulties-A6S*. Six participants commented that SpLD teachers had a responsibility to create beneficial links for himself, other teachers and school-A2S, A6S, A12S, A14S, A17S, A18S, comments included: *we can help peers if the Centre for Special Needs should provide us with training programmes in this disorder-A2S*.

Seven participants commented that it was the role of SpLD teachers to distribute leaflets about ADHD within their school-A5, A6S, A10, A13S, A14S, A15S, and A17S with comments including: *distributing educational leaflets about the disorder-A10*. One other suggestion was that SpLD teachers should provide their peers with the latest figures on the disorder-A4.

7.5 Section Five: Results for Research Question Three (RQ3)

RQ3 Can a training programme enhance the level of knowledge of and attitudes toward ADHD amongst SpLD and General teachers in KSA?

In this study the researcher sought to determine whether a training programme is a possible way to enhance the level of knowledge of ADHD amongst SpLD and General primary schoolteachers in KSA. Therefore, it was necessary to compare the results of a redistribution of KADDS to those who received training with their pre intervention KADDS scores in phase one. This meant identifying the 17 teachers who participated in the training programme and had already participated in phase one, thus the effectiveness of the training programme which was designed by the researcher is based on the pre and post KADDS scores of these teachers only. The demographic data of participants will be presented first.

7.5.1 Demographic data of participants (post intervention):

The demographic information of the 17 teachers who participated in this phase is as follows: 94.1% of teachers were aged between 31 – 40 years and 5.9% (n = 1) fell in the age range of 50 years and above. In terms of participants' qualification, the vast majority (88.2%) had a bachelor's degree, followed by a Masters (11.8%) while no participants held either a Diploma or PhD. Of the 17 participants, 9 (52.9%) were general education teachers and 8 (47.1%) were SpLD teachers. The majority of respondents (58.8%) had 16- 20 years of experience. Table 1 can be found below:

Table 7.29: The demographic characteristics of the training participants ($N = 17$).

Variable	Frequency (n)	Percentage (%)
Age:		
(20-30) yrs	0	0.0
(31-40) yrs	16	94.1**
(41-50) yrs	0	0.0
50 yrs and above	1	5.9
Qualification:		
Bachelor degree	15	88.2**
Diploma	0	0.0
Masters degree	2	11.8
PhD	0	0.0
Type of teacher:		
General	9	52.9**
SpLD	8	47.1
Years of experience:		
(1-5) yrs	0	0.0
(6- 10) yrs	0	0.0
(11- 15) yrs	5	29.4
(16- 20) yrs	10	58.8**
21 yrs and above	2	11.8

Research question three (RQ3) was addressed by analyzing the inferential statistics that used Wilcoxon Rank-Sum Test to determine whether Saudi male SpLD and General primary schoolteachers differ in their knowledge and misconceptions about ADHD before and after the intervention.

Wilcoxon Rank-Sum Test

The Wilcoxon rank-sum is a nonparametric test designed to assess the differences between two populations through data gathered from repeated measures treatment. This means the sample within a repeated measures experiment will be measured twice pre and post intervention. The null hypothesis for this test states that there is no

difference between the two interventions. In this study, since the distribution of the pre and post sample (N=17) is not normally distributed, the Wilcoxon rank-sum test was the most appropriate test to be used for this phase of study.

Null Hypothesis H0 (2) states that “ there is no difference in knowledge of ADHD amongst SpLD and General primary schoolteachers before and after the intervention”.

The null hypothesis within the three factors of ADHD knowledge and overall:

H2.1 Null hypothesis: There is no significant difference in associated features, symptoms and diagnosis knowledge of ADHD before and after the intervention.

Table 7.30: Wilcoxon W Test of associated features, symptoms and diagnosis knowledge pre and post intervention

Wilcoxon W		N	Mean Rank	Sum of Ranks		
Post-test – Pre-test	Negative Ranks	2 ^a	5.50	11.00	Z	-3.178 ^d
	Positive Ranks	15 ^b	9.47	142.00	Sig.	.001*
	Ties	0 ^c				
	Total	17				
a. Post-test < Pre-test b. Post-test > Pre-test c. Post-test = Pre-test d. based on negative ranks * significant at level 0.05						

As shown in the table 7.30 and figure 7.8, the Wilcoxon signed rank test found that there was a significant difference ($Z = - 3.178$, $p= 0.001$) between pre-test and post-test scores for associated features, symptoms and diagnosis knowledge of ADHD, this can be seen from the higher post test scores. Therefore, the null is hypothesis rejected.

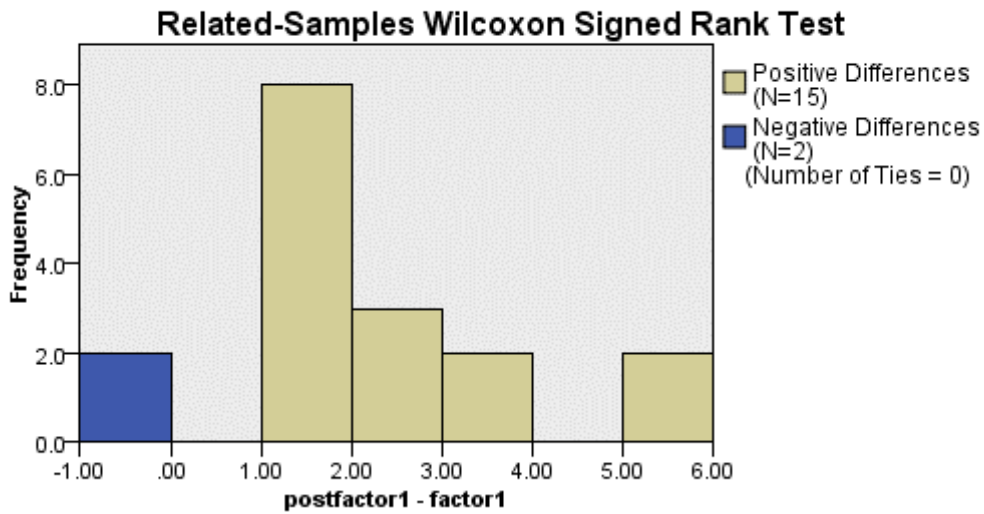


Figure 7.8: Wilcoxon W Test of associated features, symptoms and diagnosis knowledge pre and post intervention

H2.2 Null hypothesis: There is no significant difference in non-medication treatment knowledge of ADHD before and after the intervention.

Table 7.31: Wilcoxon W Test of Non-medication Treatment pre and post intervention

Wilcoxon W		N	Mean Rank	Sum of Ranks	Z	
Post-test – Pre-test	Negative Ranks	3 ^a	3.00	9.00		-2.754 ^d
	Positive Ranks	11 ^b	8.73	96.00	Sig	.006*
	Ties	3 ^c				
	Total	17				

a. Post-test < Pre-test
b. Post-test > Pre-test
c. Post-test = Pre-test
d. based on positive ranks
* significant at level 0.05

As shown in the table 7.31 and figure 7.9, the Wilcoxon signed rank test found that there was a significant difference ($Z = -2.754$, $p > 0.006$) between pre-test and post-test scores for Non-medication treatment knowledge of ADHD, since the pre intervention score differs from post intervention the null hypothesis is rejected.

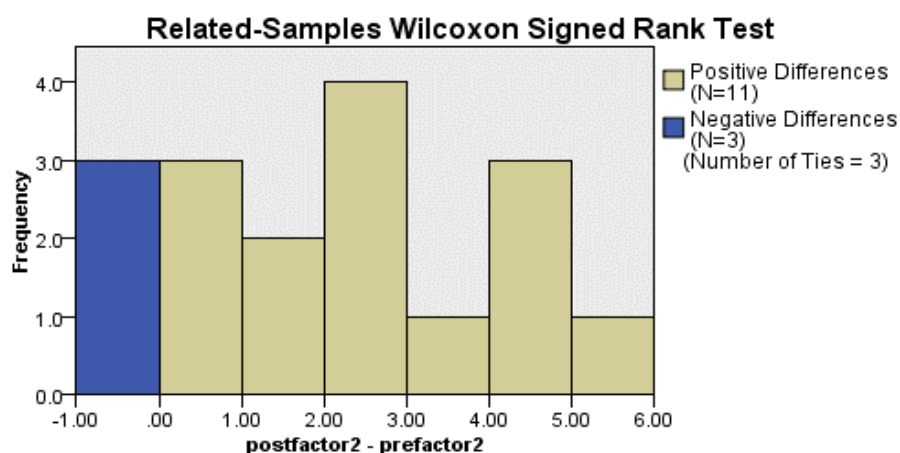


Figure 7.9: Wilcoxon W Test of Non-medication treatment pre and post intervention

H2.3 Null hypothesis: There is no significant difference in medication treatment knowledge of ADHD before and after the intervention.

Table 7.32: Wilcoxon W Test of medication treatment in pre and post intervention

Wilcoxon W		N	Mean Rank	Sum of Ranks		
Post-test - Pretest	Negative Ranks	0 ^a	.00	.00	Z	-3.649 ^d
	Positive Ranks	17 ^b	9.00	153.00	Sig.	.000*
	Ties	0 ^c				
	Total	17				
a. Post-test < Pre-test b. Post-test > Pre-test c. Post-test = Pre-test d. based on negative ranks * significant at level 0.05						

As shown in the table 7.32 and figure 7.10, the Wilcoxon signed rank test found that there was a significant difference ($Z = -3.649$, $p = 0.000$) between pre-test and post-test scores for Medication treatment of ADHD. This demonstrated that teachers showed higher scores post intervention. Therefore, the null hypothesis is rejected.

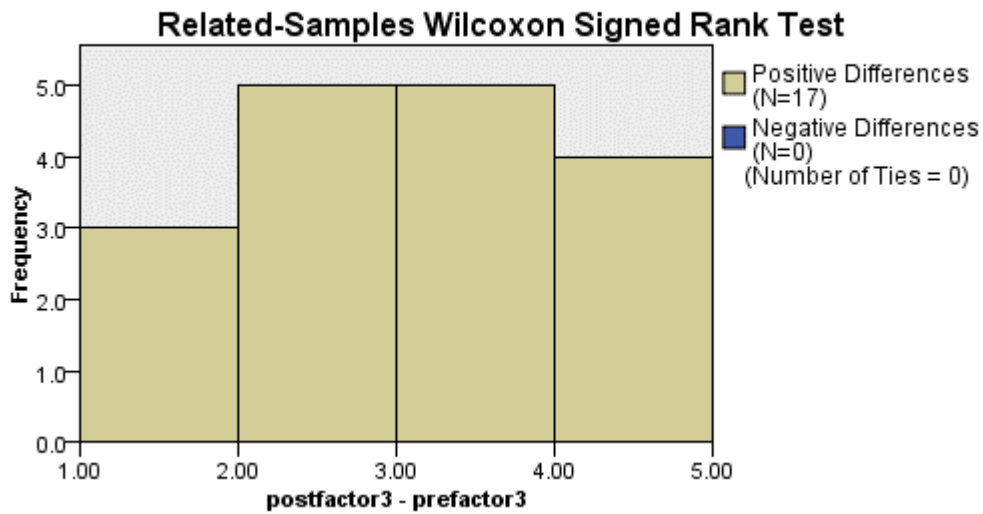


Figure 7.10: Wilcoxon W Test of Treatment in pre and post intervention

H2.4 Null hypothesis: There is no significant difference in overall knowledge of ADHD before and after the intervention.

Table 7.33: Wilcoxon W Test of overall knowledge of ADHD pre and post intervention

Wilcoxon W		N	Mean Rank	Sum of Ranks	Z	
Post-test - Pretest	Negative Ranks	0 ^a	.00	.00		-3.643
	Positive Ranks	17 ^b	9.00	153.00	Sig.	.001*
	Ties	0 ^c				
	Total	17				

a. Post-test < Pre-test
b. Post-test > Pre-test
c. Post-test = Pre-test
* significant at level 0.05

As shown in the table 7.33 and figure 7.11, applying the Wilcoxon signed rank test it was found that there was a significant difference ($Z = -3.643$, $p = 0.001$) in overall pre-test and post-test knowledge of ADHD and it can be clearly seen there are higher knowledge scores post-test. Therefore, the null hypothesis is rejected.

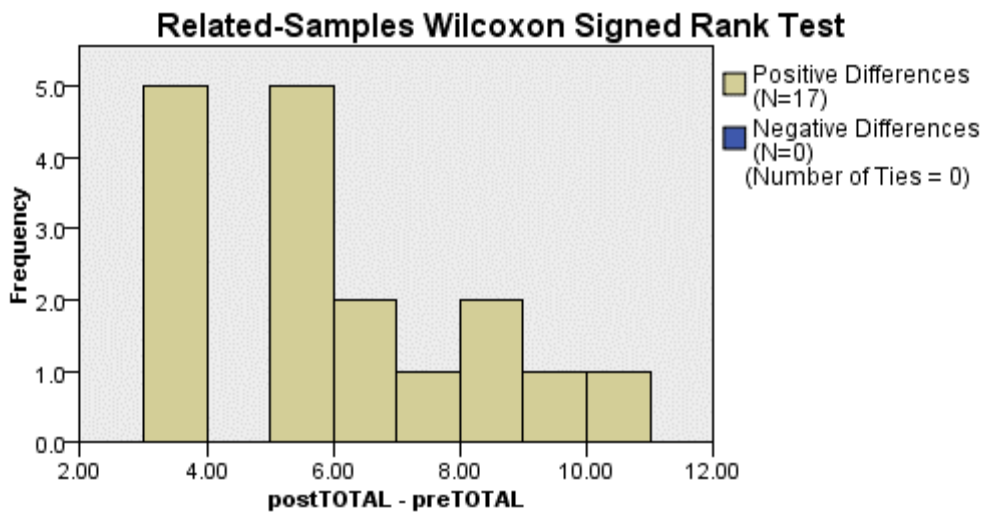


Figure 7.11: Wilcoxon W Test of overall knowledge in pre and post intervention

CHAPTER 8

Discussion

8. Introduction:

This chapter will discuss the results for research questions (RQ1), (RQ2) and (RQ3). In addition, it will discuss the theoretical framework and the impact of cultural and societal factors on the study. Finally, the researcher will discuss his own ADHD and completion of this study.

8.1 Discussion of the findings for RQ1 (Distribution of KADDS)

The first research question and linked sub questions were addressed through the distribution of KADDS to 130 primary school teachers across Jeddah, KSA. Teachers were required to complete the questionnaire and in doing so their level of knowledge about ADHD was measured. Knowledge of ADHD amongst male Saudi primary school teachers was based on three Factors: Associated features, Symptoms and diagnosis; *Non medication intervention to reduce symptoms of ADHD*; and *Medication treatment*.

Kunter et al. (2013) and Reyes et al. (2012) indicate that a lack of ADHD knowledge amongst teachers could result in a barrier at school in the educational development and success of children with ADHD or at risk of the disorder. There is a limited number of Saudi studies that have measured the level of ADHD knowledge amongst teachers in general. This research will add further insight into a potential lack of ADHD knowledge amongst Saudi teachers since the previous study was conducted a few years ago. Teacher misunderstanding or misconception of ADHD and its comorbidities could have an impact on the way that teachers interact or behave with children with ADHD in the classroom environment and inhibit learning (Jerome et al., 1994; Barbaresi and Olsen, 1998; Scuitto et al., 2000; Kos et al., 2004; Ohan et al., 2008).

It is likely that teachers will educate children with ADHD during their career and if they have inadequate knowledge of the disorder then they may find it difficult to manage such children or possess the knowledge to refer them to appropriate services. This is particularly important since teachers that show positive attitudes towards the disorder and children with ADHD often have increased knowledge of the disorder (Eagly and Chalken, 1993; Krosnick and Petty, 1995; Wood et al., 1995).

Given the vital role that Saudi primary school teachers may play in the education of children with ADHD or at risk of the disorder, it was necessary to measure the current level of ADHD knowledge amongst teachers since this could help in the design and development of any future intervention to enhance ADHD knowledge amongst Saudi primary schoolteachers. Firstly, when looking at the overall KADDS scores of these 130 teachers it could be seen that just over 47% teachers had either a lack of knowledge or misconception of ADHD. A potential consequence of this poor level of knowledge is that teachers could be cautious in their dealing with children or they might pass on misplaced advice (Scuitto et al., 2000; Kos et al., 2004).

The result that almost half male Saudi primary school teachers have a lack of ADHD knowledge is supported by the systematic review findings in this study where the majority of studies found a lack of ADHD knowledge amongst primary school teachers globally (Hepperlen et al, 2002; Kos et al, 2004; Ghanizadeh et al, 2006; Perold et al, 2010; Nur and Kavakci, 2010; Rodrigo et al, 2011; Al-Hakeem et al, 2013; Alkahtani, 2013; Muanprasart et al, 2014; Abed et al, 2014; Youssef et al, 2015; Kern et al, 2015; Al-Omari et al, 2015; Liang and Gao, 2016; Shrof et al, 2017; and Padilla et al, 2018). Overall teachers scored 15.68% incorrect answers and therefore suggests they held positive attitudes towards ADHD and this support findings from the systematic review that the majority of studies demonstrated that teachers held positive attitudes (Jerome et al, 1994; Perold et al, 2010; Rodrigo et al, 2011; Stampoltzis and Antonopoulou, 2013; Alkhtani, 2013; Ward, 2014; Liang and Gao, 2016; Lee & Witruck, 2016; Shroff et al, 2017 and Padilla et al, 2018). Such positive attitudes by teachers about this factor could prove beneficial to their role in determining the success of multidisciplinary working approaches between parents, teachers and healthcare professionals to provide support of children with or at risk of ADHD (Barkley, 1990; Snider et al., 2003; Anderson et al., 2012; Bradshaw and Kamal, 2013). Teachers feel it is important that they work collaboratively with parents and medical personnel in the diagnosis and support of children with ADHD, however such positive attitudes can become compromised when there is a breakdown of communication which could lead to a failure in multidisciplinary working (Jerome et al., 1994; Kasten, Coury & Heron 1992).

In regard to the overall negative beliefs or misconceptions found to be held by male Saudi primary schoolteachers towards children with ADHD or at risk of the disorder, these could impact upon the discipline of children in their classroom. Studies show that teachers would apply the same rules for all children (Brook et al., 2000; Ghanizadeh et al., 2006) and by doing so subject the child with ADHD to unjust action because they are unable to complete their homework or have disruptive behaviour. Such an attitude towards the punishment of children with ADHD may be counterproductive and produce negative consequences (Snider et al., 2003). As teachers' attitudes can influence the performance of ADHD students in the classroom (Bekle, 2004), the probability of negative impact on children with ADHD is almost certain where teachers view the acts of children with ADHD as deliberate and malicious (Rodrigo et al., 2011). Another possible consequence of negative beliefs regarding ADHD amongst Saudi primary school teachers could be a possible reticence in seeking support services for the child, or they could even fail to approach the parents of the child where they think the child might have ADHD, and as a consequence dissuade parents from seeking help for the child (Ohan et al., 2008).

When breaking down the results of KADDS from these 130 Saudi primary schoolteachers into three factors, the following can be seen: Teachers demonstrated the highest level of accurate knowledge for Factor 1: *Associated features, symptoms and diagnosis* with 67.69%; this score shows good knowledge and that teachers had a combined score of 32.31% for incorrect and don't know responses. The high score for this Factor comes within the range of scores found in the systematic review (Munshi, 2014; Blotnick Gallant, 2015; Soroa et al., 2016; Ward, 2014; Padilla et al., 2018; Shroff et al., 2017; Abed et al., 2014; Topkin et al., 2015) and is opposite to studies that found primary school teachers had poor knowledge in this area (Alkhtani, 2013; Perold et al, 2010; Guerra et al., 2017).

With regard to the second Factor: *Non medication treatment to reduce ADHD symptoms*, Saudi teachers achieved a combined score of 57.69% incorrect and don't know responses compared to correct knowledge of 42.31%. The third Factor: *Medication treatment*, achieved a correct score amongst teachers of 33.27% which demonstrated a lack of knowledge in this area. For this Factor Saudi primary school

teachers gave 49.23% don't know responses which suggest a severe lack of knowledge. Both Factor two and three comes within the umbrella of treatment of ADHD in general and the score is supported by the systematic review where no studies demonstrated teachers had a good level of knowledge in this area. The result in this study was directly comparable to ones conducted by Ward (2014) with 44% knowledge of treatment. Padilla et al. (2018) 45.30%, Shroff et al. (2017) 44%, Topkin and Roman (2015) 33%, Abed et al. (2014) 33%, Alkhatani (2013) 16% and Munshi (2014) found teachers only had 13.1% accurate knowledge in this area. This could be supported by the view that teachers are often not conscious of ADHD treatment and interventions (Arcia et al., 2000; Scuitto et al., 2000).

It was clear that Saudi primary school teachers had negative beliefs or misperceptions about non-medication and medication treatment for ADHD. It is known that negative attitudes held by teachers about the intervention and management of children with ADHD could result in treatment failure (Eckert and Hintze, 2000; Wilson and Jennings, 1996; Wickstrom, Jones, LaFleur et al, 1998). Studies have revealed that teachers can hold positive attitudes towards the use of medication (Jerome et al., 1994) yet also have misconceptions about the benefit of medication to treat children with ADHD (Barbaresi and Olsen, 1998; Ghanizadeh, 2006; Bradshaw and Kamal, 2013; Scuitto et al., 2016).

It can be seen that the most common accurate responses from Saudi primary schoolteachers all belong to the Associated features, Symptoms and diagnosis Factor. It was unsurprising that the highest correct answer (91.5% n = 119) amongst Saudi primary schoolteachers related to the identification that children with ADHD often fidget or squirm in their seats, this is one of the hallmark characteristics of children with the disorder. Second to parents, teachers spend a large amount of time with children and therefore there is great potential for them to witness such common characteristics of children with ADHD or at risk of the disorder in their classroom (Shaywitz & Shaywitz, 1992; Sayal et al., 2010). Several studies in the systematic review identified that primary schoolteachers possessed a very high level of knowledge of this characteristic (Topkin and Roman, 2015; Perold et al, 2010; Shroff

et al., 2017; Ward, 2014) and the high results in this study are directly comparable to the 95.6% score in the study conducted by Ward (2014).

The results show that Saudi primary school teachers have a lack of knowledge when it comes to non-medication interventions for ADHD (Factor 2) and a severe lack of knowledge regarding medication treatment for the disorder (Factor 3). Sixty percent of teachers responded don't know and almost one third incorrectly answered the item about behavioural interventions for children with inattentive ADHD demonstrate a lack of knowledge concerning non-medication interventions (Factor 2). It is also important to note that this item received the most incorrect responses from teachers overall. This is despite a number of studies in the systematic review directly suggesting that an increase in teachers' knowledge of such interventions could enable them to better implement behavioural and academic classroom management techniques to support children with ADHD or at risk of the disorder (Abed et al., 2014; Botnick-Gallant et al., 2015; and Shroff et al., 2017). Teachers scored the highest correct answer within the non-medication intervention Factor for the item that teacher/parent training when combined with medication treatment is generally effective. This is very interesting since it suggests that the majority of Saudi primary schoolteachers display positive attitudes towards the possible contribution training can make to the management of schoolchildren with ADHD or at risk of the disorder.

Regarding the severe lack of knowledge demonstrated by teachers of medication treatment of ADHD, the highest don't know responses overall belong in this Factor. The highest number of incorrect responses in this Factor relate to a lack of knowledge regarding stimulant medication for children with ADHD. Ghanizadeh (2006) found that almost 70% of teachers were unaware of Ritalin and 37.8% believed the disorder could be treated with medication. This absence of positive attitude toward the use and benefit of medication can lead teachers to inaccurate perceptions of the consequences or side effects of medication and ultimately deny the referral of affected children to specialists for the improvement of ADHD in the child (Barbaresi and Olsen, 1998; Brook et al., 2000; Rodrigo et al., 2011).

Conversely, teachers can have inaccurate perceptions of the benefits of medication such as its use may enhance the opportunity for a child with ADHD to learn (Bradshaw and Kamal, 2013).

The responses of Saudi primary school teachers demonstrate that they have a good level of knowledge in relation to associated features, symptoms and diagnosis of ADHD, however their knowledge is lacking in relation to non-medication interventions for children with ADHD or at risk of the disorder, and severely lacking in terms of medication treatment knowledge. These results support previous Saudi studies that have measured the level of ADHD knowledge amongst primary schoolteachers in KSA (Alkhatani, 2013 and Abed et al., 2014) and specifically support them in finding that Saudi teachers severely lack accurate knowledge of treatment and interventions for children with ADHD or at risk of the disorder and that Saudi teachers need to enhance their knowledge of treatment (Munshi, 2014; Alkhatani, 2013, Abed et al., 2014).

This is the first study to examine and compare the level of ADHD knowledge between Saudi SpLD and General primary schoolteachers. Only a few studies have measured the level of ADHD knowledge amongst these two types of teacher (Stampoltzis and Antonopoulou, 2013, Alkhatani, 2013; Padilla et al, 2018) but only one has made a direct comparison between the two (Stampoltzis and Antonopoulou, 2013). With regards to Factor 1 there was significant difference ($p = 0.001$) between SpLD and General Teachers in their knowledge of associated features, symptoms and diagnosis of ADHD, with SpLD teachers showing higher knowledge in this Factor. There was also a significant difference in knowledge of non-medication treatment for ADHD between SpLD and General Teachers ($p = 0.001$) again with SpLD teachers showing higher knowledge. However, when it came to knowledge of medication treatment for ADHD there was no significant difference between General and SpLD teachers ($p = 0.354$) and this was similar to the study conducted by Snider et al. (2003) that found SEN teachers and General teachers had a similar low level of knowledge when it came to stimulant medication for ADHD.

Taking the overall knowledge across these three Factors, it can be seen that there is a significant difference in the overall knowledge of Saudi SpLD teachers compared to Saudi General teachers ($p = 0.003$). This suggests that SpLD teachers possessed a

higher knowledge of ADHD compared to general teachers which supports the study by Stampoltzis and Antonopoulou (2013) that found SpLD teachers had a higher level of total ADHD knowledge compared to general teachers. A possible reason for these findings that Saudi SpLD primary schoolteachers possess higher knowledge of ADHD could be their previous university education or training in special needs as well as their experience of ADHD (Snider et al., 2003; Stampoltzis and Antonopoulou, 2013; Lee et al., 2015).

8.1.1 Summary of study one

The distribution of KADDS to 130 Saudi primary schoolteachers to measure their level of ADHD knowledge has exposed that teachers have a lack of knowledge about the disorder and supports previous studies in KSA (Alkhatani, 2013; Abed et al., 2014). On a wider scale it also supports findings in the systematic review conducted on the level of ADHD knowledge amongst primary school teachers that there is a general lack of knowledge and that this should be increased. The possible impact of a lack of knowledge amongst primary school teachers could be underpinned by negative attitudes towards, or misconceptions of ADHD which could then lead to inadequate support given to schoolchildren with the disorder or at risk of ADHD to achieve their full academic potential whilst at school (Currie and Stabile, 2004; Todd et al., 2002; Loe and Feldman, 2007). Nearly all Saudi primary school teachers correctly identified hallmark symptoms of a schoolchild with ADHD or at risk of the disorder as fidgeting and inattention, yet severely lacked knowledge about medication treatment and its effect on ADHD. Teachers also demonstrated a lack of knowledge in non-medical interventions about ADHD however showed positive attitude towards the contribution that teacher training could make to the effective management of ADHD as well as have an improving their own behaviour as a teacher in the classroom (Ajzen & Fishbein, 2002; Zint, 2002).

This study has shown that Saudi SpLD primary schoolteachers have significantly more knowledge about ADHD compared to Saudi General primary schoolteachers. It is useful to note that there was no significant difference in knowledge of medication treatment for ADHD however General primary school teachers did have a lower knowledge of non-medical interventions for ADHD compared to SpLD teachers. This

would suggest they would greatly benefit from enhanced knowledge about this type of treatment for schoolchildren with ADHD or at risk of the disorder (Kos et al., 2004; Lee et al., 2015; Shehata et al., 2016).

8.2 Discussion of the findings for RQ2 (Semi-structured interviews)

In this phase of the study and from teachers' perspectives, the researcher explored possible ways to enhance ADHD-related knowledge amongst Saudi primary school teachers in KSA, and specifically through teacher training on ADHD. Firstly, it was necessary to find out the level of familiarity with ADHD amongst participants and from where were they currently accessing information about the disorder. Themes 2 and 3 directly deal with RQ2. Discussion will focus on results from the main themes and subthemes of semi-structured interviews.

8.2.1 Theme 1 (Teacher's familiarity with ADHD):

The first theme dealt with male Saudi primary school teacher's familiarity with ADHD and is divided into three subthemes: terminology – were they aware of the term ADHD, sources of information – where had they come across ADHD information, and level of satisfaction with their current level of awareness. Regarding sub-theme 1.1, eighteen participants (90%) had heard of ADHD before compared to 52.4% who were familiar with the term in Kamal's study (2016). It is worth noting that under this theme, all participant SpLD teachers had heard of ADHD before. This was not surprising to the researcher since SpLD teachers come across ADHD and other behaviour disorders in their university education, therefore it is expected that teachers who have undergone specialist education possess higher knowledge (Snider et al., 2003; Stampoltzis and Antonopoulou, 2013; Lee et al., 2015). The most common sources of their knowledge came through reading and access to written sources and through university modules (sub-theme 1.2). These results support previous studies that found the most common resources used amongst teachers to gain ADHD knowledge were written, and suggested teachers place greater emphasis on reading as a way of gathering information (Jerome et al., 1994; Nur and Kavakci, 2010; Al-Hakeem et al., 2013; Muanprasart et al, 2014; Al-Omari et al., 2014; Liang and Gao, 2016). However, the most interesting result under sub-theme 1.2 was the least common source of ADHD knowledge was training that was not even focused on ADHD *A8 – attending a training*

course for teachers on behavioural disorders. This contrasts with the systematic review that found 17 studies in which teachers cited training as the most common source of ADHD knowledge (Jerome et al., 1994; Hepperlen et al., 2002; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al., 2006; Anderson et al., 2012; Soroa et al., 2014; Al-Omari et al., 2014; Abed et al., 2014; Kern et al., 2015; Topkin and Roman, 2015; Liang and Gao, 2016; Padilla et al., 2018). This result clearly supports the need for training amongst primary school teachers in KSA to enhance their knowledge of ADHD (Alkhatani, 2013; Abed et al., 2014).

With regard to sub-theme 1.3, it was also not surprising based on previous Saudi studies that primary school teachers lacked knowledge of ADHD (Alkahtani, 2013; Abed et al., 2014) participants were dissatisfied with their level of ADHD awareness and were keen to know more about the disorder. In an approach similar to Munshi (2014) participants were asked if they were satisfied with awareness they hold about the disorder. All participants responded that they were not happy with their current level of awareness and showed a willingness to know more.

8.2.2 Theme 2 (Teachers' perspectives toward training as a way of enhancing knowledge of ADHD):

This theme deals directly with teacher training: interviewees' experience (sub-theme 2.1) and attitude towards it (sub-theme 2.2); and their perspectives towards the design of a training programme on ADHD (sub-theme 2.3). In-service training has been identified as a positive way of increasing knowledge (James, 1973; Freeman, 1982; Owen, 1990; Thompson, 1992; Ong, 1993; Samupwa, 2008; Kazmi et al, 2011; Jahangir et al., 2012; Ekpoh et al., 2013) and improving behaviour and attitude (Ronald, 2004; Omar, 2014) amongst teachers, it was interesting to hear that no participant had received any in-service ADHD training (sub-theme 2.1). This was despite previous studies have identified that teachers' knowledge of ADHD could be raised through training (Jerome et al., 1994; Barbaresi and Olsen, 1998; Bekle, 2004; West et al., 2005; Wheeler et al., 2008; Syed and Hussein, 2010; Sarraf et al., 2011; White et al., 2011; Barnett et al., 2012; Froelich et al., 2012; Aguiar et al., 2014; Alkhatani, 2013; Munshi, 2014; Abed et al., 2014; Kamal, 2016). This result supports previous studies in KSA that show there is no widespread ADHD-related in-service

training for teachers (Alkhatani, 2013; Munshi, 2014; Abed et al., 2014; Kamal, 2016). This point was supported by responses like 'such training does not exist' (A13S).

Despite not having received any in-service training on ADHD, all teachers responded that it would be an effective way to enhance their knowledge of ADHD (Sub-theme 2.2). This demonstrates a positive attitude amongst teachers towards training as a method for enhancing knowledge of the disorder. To use the words of one teacher (A8), training can play a *vital* role in achieving this desired outcome.

Looking at participant responses in relation to Sub-theme 2.3, an important factor in relation to training was time. According to Arcia et al. (2000) and Evans et al. (2004) the demands of time to participate in training is an important consideration, and the time allocated to ADHD training of teachers in previous studies has varied widely (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al., 2011; Froelich et al., 2012; Aguir et al., 2014; Laisi et al., 2017; Shehata et al., 2016; Barnett et al., 2012; Giannopoulou et al., 2017). Therefore, giving teachers the opportunity to contribute their views on how long training should be was not only innovative but a crucial part of designing training to enhance the knowledge of ADHD amongst Saudi primary school teachers. 70% respondents said training should be three days or less and 60% wanted it to be at least ten hours long. The decision that the duration of ADHD training was three days is in line with findings from the systematic literature review (chapter 4) of non-pharmacological ADHD interventions designed to enhance the level of knowledge of the disorder amongst primary school teachers (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al., 2011; Barnett et al., 2012; Aguir et al., 2014; Shehata et al., 2016; Laisi et al., 2017; Giannopoulou et al., 2017). The duration suggested by some participants was at the higher end of the range of responses in comparison with studies mentioned above, however a common sentiment amongst interviewees that content was more important than time. For example, 'time is not an issue it is more about the quality of content' (A18S). The researcher felt that if the duration was longer than three days there was a risk that male Saudi primary school teachers could find it more challenging given the view that if training is too long in duration there is a risk those in receipt of such training will switch off (Arcia, Frank, Sanchez-LaCay et al., 2000; Evans et al., 2004).

Another factor of training identified under sub-theme 2.3 is interactivity. From the responses the majority of participants wanted a high level of interactivity and use of audio and visual media to encourage stimulation. The fact that 85% participants responded that there should be group work suggested they wanted to discuss views, opinions and information with their peers. This supports findings in the systematic literature review that most of the identified studies which measured the effectiveness of a non-pharmacological ADHD intervention to enhance knowledge of the disorder amongst teachers found teachers wanted to discuss and interact with peers whilst training (Barbaresi & Olsen, 1998; Barnett et al., 2012; Shehata et al., 2016; Lasisi et al., 2017). The use of case studies and participation from external specialists were other common suggestions from participants relating to the interactivity of training. The use of case studies is a valid point since it will help to illuminate relevance or application to a real situation, and this will help participants to apply knowledge of ADHD in order to recognize common challenges at school for children with the disorder (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Aguiar et al., 2014). It is good to see that participants view interaction with specialists as important. Giving primary school teachers opportunity to meet professionals with expertise in ADHD could mean that they better appreciate the positive effect of collaboration as a multifaceted approach to treatment of school children with ADHD. This is especially significant since Alkahtani (2013) identifies that Saudi schoolteachers held negative attitudes towards working with professionals in the treatment of children with ADHD.

Another important factor of training to enhance knowledge of ADHD amongst Saudi primary school teachers was the content. Participants unanimously responded that they wanted information that was 'accurate' and covered each of the following domains: general information and causes; symptoms and diagnosis; treatment. Knowledge of general information and causes of ADHD. Whilst there is the assumption many studies in the systematic literature review measured the level of ADHD knowledge amongst primary school teachers in this domain, a number of these studies in addition to Saudi studies (Alkhatani, 2013; Abed et al., 2014) made specific reference to poor knowledge in this area and this suggests it is important that teachers possess knowledge on general information about ADHD and causes of the disorder (Soroa et al., 2014; 2016; Shroff et al., 2017; Padilla, 2018; Perold et al, 2010). Since all participants in this phase responded that they wanted to know about how to

recognize and diagnose a child with ADHD, ensuring that this content is in training could improve knowledge amongst trainees so as to enable them to play an increased role in the identification and diagnosis of ADHD (Wheeler et al., 2008; Al-Omari et al., 2015).

Given that studies have said teachers play a vital role in the effective management of school children with ADHD, and that positive behavioural management can help a child to achieve their education potential (Ohan et al., 2008; Abu Taleb and Farheen, 2013; Bussing et al., 2012; Anderson et al., 2012; Laing and Gao, 2016; Park and Park, 2017), it is important to note this request amongst participants. The systematic review in this study found that no studies show teachers possess a good level of knowledge with regards to educational treatment of children with ADHD. This finding, along with participant responses in this phase, strongly indicates teachers need to know more about treatment. The lack of ADHD treatment knowledge amongst Saudi primary school teachers is further evidenced by Alkhatani (2013) and Abed et al. (2014).

8.2.3 Theme 3 (Enhancing teachers' knowledge of ADHD):

In the responses from participants to what can be done in general to enhance knowledge of ADHD in KSA (Sub-theme 3.1), 95% said knowledge could be enhanced through teacher training. The suggestion by many teachers was that training should be compulsory (A9) for teachers and if not frequently (A13S) then should at least be annually (A14S). This suggests participants place a value on training for their professional development. It is widely recognized that the continuing professional development of teachers through training can help enhance their educational practice (James, 1973) as well as improve their behaviour and attitude (Ronald, 2004; Omar, 2014). The suggestion training should be used to enhance knowledge on an ongoing basis could mean recipients are more likely to receive up to date information and skills (Ainscow, 1994; Garet et al., 2001).

Just over half of the participants (11) said that written sources were a way of increasing knowledge; the most common suggestion was leaflets followed by scientific reports on ADHD. From responses, it was crucial that the source of information about ADHD should be accessible to teachers. This supports the finding from international studies

that teachers placed emphasis on reading sources of information as a way of gathering information about the disorder (Brook et al., 2000; Snider et al., 2003; Bekle, 2004; Moldavsky and Sayal, 2013; Aguiar et al., 2014; Lee et al., 2015; Liang and Gao, 2016; Soroa et al., 2016). This is further supported by studies that found Saudi teachers also place emphasis on reading written sources of information about ADHD (Scuitto, 2016; Abed et al., 2014). With regards to the intended training programme designed to enhance the level of ADHD knowledge amongst Saudi primary school teachers, all participants will receive a training handout to read in their own time. The result that 50% of respondents suggested the placing of information about ADHD in staff common rooms suggests that teachers are willing to access information about the disorder whilst interacting with their peers during free school time. Over 90% of the population in Saudi Arabia use Social Media and the highest rate of growth of social media in the world (Saudi Gazette, 2019; Xanthidis and Alali, 2014).

Since technology can play a role to enhance knowledge of ADHD in KSA, this is supported by the several responses from male Saudi primary school teachers that knowledge could be enhanced through the use of media such as Internet; radio; social media; videos and television. This supports several studies in the systematic literature review that found media provided an important source of teachers' knowledge of ADHD since it can reach a large audience and provide easily accessible information (Ghanizadeh, 2006; Nur and Kavakci, 2010; Al-Omari et al., 2014; Muanprasart et al., 2014; Soroa et al., 2014).

Two responses demonstrated a positive attitude by teachers towards increasing their own knowledge about ADHD. Teachers commented that it was the responsibility of the teacher to increase his knowledge of ADHD. A suggestion made by many teachers on how their knowledge can be increased was to receive sufficient support for them to do so. This was clarified as meaning support from experienced teachers who can share their knowledge; meetings between teachers and ADHD specialists; and encouragement by decision-makers for teachers to attend training.

Within the third theme and final sub-theme of thematic analysis is the role stakeholders in KSA can play to enhance knowledge of ADHD in general from the perspective of participants. The following stakeholders were identified: School, SpLD teachers, Ministry of Education, Ministry of Media, and Ministry of Health (sub-theme 3.2).

Since it is within the school environment that teachers come into contact with children with ADHD it was important to ask interviewees what role can be played by schools to enhance knowledge of the disorder in KSA. Ninety-five per cent of participants suggested schools should host a specialist in ADHD and seventy-five per cent said that the school could increase their knowledge through the provision of in-service training. There is a clear overlap here; the function of both is the dissemination of knowledge and good practice to teachers so as to enhance their accurate knowledge of the disorder, and it is commonplace for training aimed at enhancing ADHD knowledge to include the use of specialists in the disorder (Syed and Hussein, 2010).

The suggestion by participants that schools provide leaflets about ADHD again show that teachers often increase knowledge through self-reading and that sources should be accessible. One method suggested by teachers of how schools could disseminate information was using noticeboards. The suggestion of schools facilitating meetings between teachers was interesting since all interviewees who made the suggestion were SpLD teachers. These teachers believed that they were in possession of knowledge that could be disseminated to other teachers and schools should take advantage of their willingness to help enhance knowledge in others. The suggestion for the introduction of an annual day dedicated to ADHD shows an acknowledgement by teachers that ADHD is a serious issue that people must know more about and should understand the impact it has on individuals.

When discussing the specific role that SpLD teachers can play to enhance knowledge, there was an expectation that SpLD teachers should provide support to their peers when dealing with issues of ADHD. The fact that every SpLD teacher in this phase of the study suggested they believed their role was to provide support to their peers in matters related to ADHD shows willingness to help raise the level of knowledge in others. The fact that the majority of teachers who suggested it was the role of the SpLD teacher to deliver ADHD training were general teachers, confirms the belief that since SpLD teachers deal with academic learning difficulties as part of their role (MoE, 2017), they should also provide training on the disorder since ADHD comes within special needs in KSA. General teachers assume that SpLD teachers can deal with it also. The researcher is in agreement with the idea that SpLD teachers as experts in learning difficulties should possess specialist knowledge that includes ADHD and

should be actively involved in ways of enhancing awareness of ADHD amongst their peers. This could be through providing training, advice and information about the disorder.

Since teachers in KSA work under the umbrella of the MoE which has responsibility for training and development of teachers, the researcher explored teachers' views on the role that the MoE might play in increasing knowledge of ADHD amongst teachers in KSA. When asked, three-quarters of participants believed the MoE should provide in-service training to teachers on ADHD, and half of those interviewed said that the MoE should take a supportive role in helping teachers enhance their level of knowledge. Other suggestions were: scholarships for teachers to travel overseas for training on ADHD; implementation of positive legislation to support importance of increasing knowledge on ADHD; to provide support to Special Needs Centres; granting permission to ADHD Societies to visit schools; disseminating the latest research on ADHD to teachers and translated into Arabic; incorporating ADHD-related modules into the teaching degree; and making partnerships with the MoH and MoM.

Two innovative suggestions were made by participants in relation to MoE: making an ADHD-related iPhone application for teachers; and having a day dedicated to ADHD each year in the school calendar. A phone app on ADHD could be convenient way for individuals to access information about ADHD (Powell, Parker and Harpin, 2017). Currently there is no known phone application on ADHD in Arabic, and I believe such an application would become very popular quickly by taking advantage of the growth in smart phone use in KSA. Whilst the annual ADHD Awareness Day grew to one month in the USA (add.org, 2019) there is yet to be a national day across KSA. Responses from male Saudi teachers suggest that this would be a way that the MoE could enhance knowledge of ADHD in KSA. All teachers felt that the MoE could and should do more to raise the awareness of ADHD amongst teachers and this could be done through disseminating the latest research; creating partnerships with ADHD societies in KSA and inviting them to visit schools. Suggestions like adding content about ADHD to the teaching degree in KSA may require financial support but the benefit to teachers and how they deal with children who have ADHD would outweigh any financial cost.

Since ADHD is considered a medical disorder, teachers were asked what role the MoH can play in increasing ADHD knowledge in KSA. The most common suggestion amongst teachers on how the MoH can increase knowledge was by forming partnerships with the MoE and MoM. This would facilitate suggestions from teachers such as: MoH working with MoE to send ADHD specialists into schools; and working with the MoM on promotional campaigns about the disorder. The researcher suggests that the collaboration could promote national ADHD day in KSA but from a medical perspective. The popular suggestion that the MoH should do more to ensure Health Centres and GP waiting rooms disseminate information on ADHD indicates the supportive environment these can provide. The displaying of information about ADHD is seen as endorsed by the MoH may make the disorder more valid (US Surgeon General's Report, 2001). The suggestion by some teachers that the MoH could disseminate written information to teachers is similar to responses given in other subthemes and indicated a preference amongst Saudi teachers for written sources of information on ADHD (Abed at al., 2014). A number of individual suggestions included that the MoH establish a Centre for ADHD that teachers can visit to find the latest information about the disorder. Whilst a good idea, this would be financially costly and unrealistic currently in KSA possibly due to the lack of specialists in ADHD.

Finally looking at the MoM in KSA, every single teacher suggested broadcasting information about ADHD through television and radio channels and this indicates the power and potential influence media has on our thoughts. Such a unified response should not be ignored since it can spread information more widely and quickly than any other form of dissemination. The two following connected suggestions of ways which the MoM can increase knowledge of ADHD indicate where KSA currently is as a society: firstly, through social media; and secondly using the face of celebrity. With regard to using social media, almost half of the teachers supported this. People find it engaging and it gives the individual power to not only access information but also to share it. The use of famous people to raise the profile of a campaign takes advantage of the trust and positive sentiment people have towards the celebrity and the likelihood that they will trust the decision of a beloved person to support a worthy cause. A final suggestion highlighted by the researcher is that the MoM should host experts from the MoH and MoE on specialist television or radio programmes dedicated to ADHD. Stakeholders working closely together can enhance knowledge of ADHD

(Ghaniizadeh et al., 2006; Al-Hakeem et al., 2013; Al-Omari et al., 2014; Kern et al., 2015) and having stronger relationships between the three ministries could also help to overcome the effect of a shortage of specialists in KSA since the few could disseminate knowledge to the many through media. The influence of the media on the awareness of ADHD amongst individuals has already been established (Gilmore, 2010).

8.2.4 Summary of the study two

The findings of this phase address RQ2 and provide suggestions according to the participants, about what can be done in KSA to enhance knowledge of ADHD amongst primary school teachers. Firstly, it was necessary to establish whether participants were familiar with the disorder and the most common sources of ADHD information that they were accessing. The majority of responses at least suggested they were familiar with the disorder and that the self-reading of written sources was one of the most common forms of ADHD information used by participants. This supports studies that say written sources of information about ADHD often appear to be the most commonly used amongst primary school teachers. Findings suggested almost no awareness of ADHD amongst participants was through training and all participants were unsatisfied with their current level of ADHD knowledge and were willing to know more.

When exploring participant's perspectives towards training as a way of enhancing knowledge of ADHD, it should be noted that according to the systematic literature review, training is recommended as a way of enhancing the level of knowledge of ADHD amongst primary school teachers (Jerome et al., 1994; Kos et al., 2004; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al., 2006; Nur and Kavakci, 2010; Perold et al, 2010; Rodrigo et al., 2011; Anderson et al., 2012; Al-Hakeem et al., 2013; Stampoltzis and Antonopoulou, 2013; Alkhatani, 2013; Ward, 2014; Munshi, 2014; Abed et al., 2014; Al-Omari et al., 2014; Firgerio et al., 2014; Soroa et al., 2014; Muanprasart et al, 2014; Youseef et al., 2015; Topkin and Roman, 2015; Botnicky-Gallant et al., 2015; Kern et al., 2015; Liang and Gao, 2016; Soroa et al., 2016; Lee and Witruk, 2016; Guerra et al., 2017; Shroff et al., 2017; Padilla et al., 2018) and studies have shown it to be effective (Worthington et al., 1997; Barbaresi and Olsen,

1998; Lasisi et al., 2017; Syed and Hussain, 2010, Barnett et al., 2012; Aguiar et al., 2014; Shehata et al., 2016; Giannopoulou et al., 2017).

As there is currently no in-service ADHD training for primary school teachers (Alkhatani, 2013; Munshi, 2014; Abed et al., 2014; Kamal, 2016) it is not surprising that no participants had any prior experience of attending in-service ADHD training. It was equally unsurprising that all participants showed enthusiasm that training would be a good way of enhancing their knowledge of ADHD and was pleasing for the researcher to witness such a positive response amongst participants that they believed training would be helpful. With regards to participants responses about features of training programmes that may enhance their effectiveness, duration, interactivity and content were significant factors that may play a role in making an ADHD training programme effective to enhance the level of knowledge amongst primary school teachers in KSA. Therefore, these features should be taken into consideration for designing any future in-service ADHD training programme for teachers in KSA.

The importance of training as a way of enhancing the level of knowledge amongst primary school teachers of ADHD was confirmed again as it was the most common suggestion of general ways to enhance knowledge amongst teachers in KSA by participants in this phase. However, it was also suggested by respondents that other ways such as written information and media usage could increase knowledge of ADHD in KSA as well as sharing of information about ADHD between teachers. Overall, there was the suggestion from participants that schools *could* and *should* play a role in disseminating knowledge of ADHD to teachers, for example teachers meeting specialists in the disorder or receiving in-service training about the disorder, or designating annual time in the school year specifically to ADHD. Since SpLD teachers are expected to be experts in learning difficulties and special needs, they themselves can be a source of ADHD information for General teachers. From General teacher's responses there was an expectation that they could rely upon SpLD teachers to support them in knowing more about ADHD.

Whilst teachers suggested that the MoE introduces legislation that specifically requires teachers to enhance their knowledge of ADHD, introduce scholarships for teachers to travel overseas to find out more about the disorder and incorporate more ADHD-

specific content into teaching degrees throughout KSA, the suggestion that the MoE provides in-service ADHD training to teachers in KSA was the most common response amongst participants. The novel suggestion that the MoE promotes the development of an ADHD phone application is clearly linked to KSA fast becoming one of the largest users of smart phones in the world. Whilst it may be unrealistic in the short term, the suggestion that the MoH in KSA creates centres that offer the latest advice and information on ADHD is a possible long-term goal and at least medical centres across KSA could hold the latest information on the disorder. Given that television, radio and other forms of media can reach large audiences quickly, the use of celebrities in KSA who are well known in society as well as broadcasting advice and guidance from ADHD experts, are both relatively straightforward ways of raising awareness and knowledge of the disorder. There was a clear suggestion amongst respondents that the three ministries should collaborate and work closely to increase awareness of ADHD in KSA.

8.3 Discussion of the findings for RQ3 (pre and post intervention)

The third research question was addressed through the redistribution of KADDS following the delivering of an intervention designed to enhance the level of ADHD knowledge amongst male Saudi SpLD and General primary schoolteachers in KSA. 17 teachers participated in the training intervention and their post training KADDS scores were compared with their pre intervention scores to make a direct comparison that suggests whether a training programme can enhance the level of knowledge and attitudes towards ADHD amongst Saudi SpLD and General primary schoolteachers.

In-service training can be used to strengthen teachers' knowledge to improve their practice as well as change their behaviour and attitude (James, 1973; Ronald, 2004; Omar, 2014) whilst at the same time offer the potential for career enhancement (Rashid, 1996). It has also been cited widely in studies as a way of increasing ADHD knowledge amongst teachers (Jerome et al, 1994; Kos et al, 2004; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Perold, 2010; Rodrigo et al, 2011; Anderson et al, 2012; Al-Hakeem et al, 2013; Stampoltzis and Antonopoulou, 2013; Alkhatani, 2013; Ward, 2014; Munshi, 2014; Abed et al, 2014; Al-Omari et al, 2014; Frigerio et al, 2014; Muanprasart et al, 2014; Youseef et al, 2015;

Topkin and Roman, 2015; Botnick-Gallant et al, 2015; Kern et al, 2015; :Liang and Gao, 2016; Soroa et al, 2016; Lee and Witruk, 2016; Guerra et al, 2017; Shroff et al, 2017; and Padilla et al, 2018) and is considered a useful way in which teachers can know more about the disorder as opposed to teachers accessing information through their own self reading (Jerome et al, 1994; Nur and Kavakci, 2010; Al-Hakeem et al, 2013; Muanprasart et al, 2014; Al-Omari et al, 2014; and Liang and Gao, 2016). It is accepted that training is not the only way that can enhance ADHD knowledge amongst teachers (Guerra et al., 2017) and it is the most frequently recommended way by both researchers and teachers.

Teachers can access in-service training on ADHD either online (Barnett et al., 2012) or face to face (Barbaresi & Olsen, 1998; Sarraf et al, 2011; Syed & Hussain, 2010; Aguiar et al, 2014; Shehata et al, 2016; Giannopoulou et al, 2017 and Lasisi et al, 2017). Training could be original to a research study designed by the researcher (Syed and Hussain, 2010) or be pre-existing ADHD training that is delivered by the researcher (Lasisi et al., 2017) or by professional experts. There would be an expectation that successful training has met its objectives and therefore it is important that training offers a coherence which objectives can provide (Visscher-Voerman and Gustafson, 2004). In the design and development of an intervention designed to enhance the level of ADHD knowledge amongst Saudi primary schoolteachers, the researcher selected the ADDIE model of instructional design to create the framework of the training intervention. The results from the distribution of KADDS to 130 teachers along with the systematic literature review of studies that measured the level of ADHD knowledge amongst primary schoolteachers informed the researcher on essential content that should be included in training. In combination with teacher's perspectives on what they consider important features of teacher training designed to enhance knowledge of ADHD amongst Saudi primary schoolteachers, the researcher designed a bespoke ADHD training programme.

The collaborative contribution made by Saudi teachers to the development of the intervention was unique since no other study in KSA had given teachers the opportunity to influence the design of in-service training to enhance their knowledge of ADHD. Taking the views of teachers into account when designing training can increase the likelihood of them participating and having a positive experience

(Wallace, 1991; Waters, 2006; Reagan and Osborn, 2002). The contribution from teachers directly influenced the duration of the course as 3 days (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al, 2011; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017 and Giannopoulou et al, 2017); the level of interactivity throughout training; group work (Barbaresi & Olsen, 1998; Barnett et al, 2012; Shehata et al, 2016 and Lasisi et al, 2017), ADHD specialists (Syed and Hussain, 2010) and case studies (Barbaresi and Olsen, 1998; Syed and Hussain, 2010). In terms of content, taking into account results from phase one and the systematic review, responses from interviews supported inclusion of fundamental ADHD information such as general background about the disorder with a focus on behavioural and educational ADHD interventions that teachers can use in their classroom. Day three of the training provided a brief mention of behavioural interventions but focused on educational interventions that teachers could use to support children with ADHD or at risk of the disorder. The inclusion of behavioural interventions in the training was based on: (1) teachers wanted to be able to use educational interventions as a form of treatment to provide support for schoolchildren in addition to Saudi teachers showing the most misconceptions about behavioural interventions for children with ADHD; (2) children with ADHD often manifest behavioural problems and enhancing teachers knowledge on how to deal with these problems would be beneficial for teachers (Abaoud and Almalki, 2015); (3) any training for teachers to enhance their knowledge of ADHD ought to include behavioural and academic classroom strategies (Abed et al., 2014; Botnick-Gallant et al., 2015; Shroff et al., 2017).

Following the results of the redistribution of KADDS four weeks post participation by teachers in the intervention it can be seen that there was a significant difference ($p < 0.001$) in pre and post test scores for associated features, symptoms and diagnosis knowledge of ADHD. Teachers scored higher in this Factor post participation in the training intervention. In the knowledge of non-medication treatment, teachers had significantly higher knowledge ($p > 0.006$) after participation in the intervention compared to their pre intervention KADDS scores. Finally, it was shown that the participation in the intervention by teachers had led to a significant increase in their knowledge of medication treatment of ADHD ($p < 0.000$). Therefore, when considering

the total knowledge of ADHD amongst teachers that took part in the intervention, it can be seen that taking part in training resulted in a significant increase ($p < 0.001$) in overall knowledge of ADHD amongst teachers compared to their pre intervention KADDS scores. These results directly support an affirmative answer to RQ3 that a training programme designed to enhance the level of ADHD knowledge amongst male Saudi primary school teachers is effective in achieving this. Teachers post participation in the intervention scored significantly higher on KADDS compared to their score before taking part in training. These results support those found in the systematic review that training is an effective way to enhance ADHD knowledge amongst primary schoolteachers (Worthington et al, 1997; Barbaresi and Olsen, 1998; Syed and Hussain, 2010; Barnett et al, 2012; Aguiar et al, 2014; Shehata et al, 2016; Lasisi et al, 2017; and Giannopoulou et al, 2017).

On closer comparison with other non-randomized control studies, the results in this study support those that found an increase post intervention (Syed and Hussain, 2010; Barnett et al., 2012; Aguiar et al., 2014; Shehata et al., 2016; Giannopoulou et al., 2017). Therefore the creation of an ADHD training programme seems to be a positive way on enhancing Saudi primary schoolteachers' knowledge of the disorder and the contribution by teachers to the design of the programme could have increased its positive impact (Wallace, 1991; Waters, 2006; Reagan and Osborn, 2002). Taking into account teachers' responses prior to designing the intervention, the duration of three days was both in accordance with data gathered in this study and with previous studies that had designed and delivered training to enhance the level of ADHD knowledge amongst primary schoolteachers.

The creation of a bespoke case study of a Saudi schoolchild exhibiting symptoms of ADHD that required participants to give advice to their teacher on possible ways to support them at school was very well received (Barbaresi and Olsen, 1998; Syed and Hussain, 2010). Such an activity not only piqued the interest of teachers since they identified that the child in the case study could easily be a typical child in their class, it also gave them the opportunity to reflect upon the content from the entire training programme and apply this to the case study. Inclusion of specific content that Saudi primary schoolteachers wanted included helped to ensure that the intervention met

their expectations. Having clear objectives at the start of training helped to ensure that participants were made fully aware of what the training would cover and how it was designed to enhance their level of ADHD knowledge as well as empowering them to use educational treatment strategies with children in their class.

Another significant factor that could have contributed to the success of the intervention and the enhancement of teachers' knowledge is the adoption of a methodical and systematic training framework such as ADDIE (Molenda, 2003). The training programme was designed after undergoing significant analysis of what it was trying to achieve, in this case overcoming a lack of ADHD knowledge amongst primary school teachers, and had specific goals and outcomes on how it could overcome such barriers that a lack of ADHD knowledge amongst teachers could create. As suggested by Bax (1997), the success of training is enhanced if design is not just left to the trainer but also participants are involved in this. Applying this model has helped with the quality assurance of the intervention by encouraging the use of reliable sources of ADHD information (Sanders, 1994) such as DSM 5 (APA, 2013), involving educational psychologists in the intervention (Barbaresi and Olsen, 1998; Syed and Hussain, 2010).

The success of the intervention in enhancing the level of ADHD knowledge amongst Saudi primary schoolteachers could have been influenced by the period of time between the intervention being delivered and the redistribution of KADDS. Whilst several studies that delivered interventions took a measurement of knowledge immediately after training (Syed and Hussain, 2010; Aguiar et al., 2014; Shehata et al., 2016; Lasisi et al., 2017), this study did not measure knowledge until 4 weeks after training and still found a significant enhancement in Saudi teachers' knowledge of ADHD.

Summary of study three

This RQ was addressed by the results of KADDS post delivering of a training intervention to Saudi primary schoolteachers aimed at enhancing their level of ADHD knowledge. The same teachers (17) that participated in the intervention had their KADDS results compared pre and post training. The redistribution of KADDS was

done 4 weeks after the delivery of a bespoke training programme for Saudi teachers. Based upon the significant number of studies in the systematic review that propose training is a possible way to increase ADHD knowledge amongst teachers, questionnaire results pre intervention that show a lack of ADHD knowledge amongst Saudi primary schoolteachers and Saudi teachers' views and attitudes towards the disorder, a training intervention was created using the ADDIE model of instructional design.

After delivery of a training intervention to Saudi primary school teachers there was a significant improvement in their KADDS scores relating to knowledge and attitude. Possible reasons that could support the success of training is collaboration between teachers and the researcher to design the intervention, and where possible ensure their views and opinions are reflected. It has been found that training is likely to be more effective where participants have had some contribution to its development as opposed to being completely led and created by the trainer (Bax, 1997). Despite most studies in the systematic review measuring the level of ADHD knowledge amongst primary schoolteachers immediately post intervention, it was decided that KADDS should be redistributed one month after delivery of training. Therefore, there is a chance that significance between the pre and post intervention scores amongst teachers may have been greater had measurement been taken straight after training.

Theoretical framework discussion

By utilising social constructivism as the theoretical framework to this study (Burr, 1995), with an emphasis on the interaction between individuals within society and the influence social interaction has on knowledge (Robson, 2002), it has been possible to show that beliefs and values of ADHD held amongst Saudi primary schoolteachers could make a significant contribution to the reality of children with ADHD or at risk of the disorder within the school environment. The way that Saudi teachers and children with ADHD relate to each other within this reality could help with the social and cultural construction of ADHD knowledge in KSA (Hicks, 1996). It has already been established in this research that previous Saudi studies suggest the medical model of ADHD is significantly more well known in KSA (Abed et al., 2014; Munshi, 2014; Alkahtani, 2013) and, there has been very little consideration of the social construction

of the disorder. Instead of locating the disorder within the child as the medical model does, this research instead focuses on social barriers and attitudes to ADHD and specifically the impact that Saudi primary schoolteachers may have on the reality or environment of schoolchildren with ADHD or at risk of the disorder in KSA (Davis, 2013).

The first possible environmental barrier to the educational achievement of schoolchildren with ADHD or at risk of the disorder in KSA is a lack of knowledge and misconceptions about ADHD amongst primary schoolteachers. The result of phase one showed that a lack of ADHD knowledge and misconceptions about the disorder remain amongst Saudi primary schoolteachers as found in previous studies (Alkhantani, 2013, Abed et al., 2014). This could create a social barrier for Saudi schoolchildren with ADHD or at risk of the disorder since such a lack is likely to impact upon teachers' attitudes and behaviours towards children with ADHD (Barkley, 2006). The likely impact of such a lack of knowledge is made even more profound when research suggests teachers are often the first to notice and refer children for assessment and treatment (Vereb & DiPerna, 2004). Therefore, not only could the lack of knowledge amongst teachers impact negatively upon the child's possibility to receive treatment but it could also be a barrier to supporting such children to fully meet their educational potential (Ohan et al., 2008). Looking at the results of each factor independently, Saudi teachers had a higher level of knowledge of associated features, symptoms and diagnosis for ADHD, a lack of knowledge regarding non-medication treatment and a severe lack of knowledge related to medication treatment. It has been suggested that the level of knowledge possessed by teachers about ADHD treatment could have an impact upon their support for such treatment (Ohan et al., 2008). The results in this study suggest that whilst teachers may be able to identify children with ADHD or a child at risk of the disorder, they may not know how to support such children (Webb & Myrick, 2003) and this could have an impact upon their tolerance level towards such children (Calhoun, Greenwell-Iorillo & Chung, 1997; Bekle, 2004; Moldavsky and Sayal, 2013).

After considering how a lack of ADHD knowledge amongst Saudi primary schoolteacher could create a barrier for schoolchildren with ADHD or at risk of the disorder, the results from the second phase of this study explored possible ways of

overcoming the barrier identified by a lack of knowledge. Numerous studies have recommended training as a way of enhancing ADHD knowledge amongst primary schoolteachers (Jerome et al, 1994; Kos et al, 2004; Vereb and DiPerna, 2004; Bekle, 2004; Ghanizadeh et al, 2006; Nur and Kavakci, 2010; Perold et al, 2010; Rodrigo et al, 2011; Anderson et al, 2012; Al-Hakeem et al, 2013; Stampoltzis and Antonopoulou, 2013; Alkhatani, 2013; Ward, 2014; Munshi, 2014; Abed et al, 2014; Al-Omari et al, 2014; Frigerio et al, 2014; Muanprasart et al, 2014; Youseef et al, 2015; Topkin and Roman, 2015; Botnick-Gallant et al, 2015; Kern et al, 2015; :Liang and Gao, 2016; Soroa et al, 2016; Lee and Witruk, 2016; Guerra et al, 2017; Shroff et al, 2017; and Padilla et al, 2018) since enhancement of knowledge through training leads to positive behaviours and attitudes (Ronald, 2004; Omar, 2014). It was revealing, therefore to discover there was no in-service training for teachers in KSA designed to enhance their knowledge of ADHD. This lack of training for teachers could act as an environmental barrier to children with ADHD or at risk of the disorder at school (Park and Park, 2017).

Results from interviews explored possible ways, including training, that could play a fundamental role in removing social barriers such as that found in the lack of ADHD knowledge amongst primary school teachers of schoolchildren with or suspected of having ADHD. In addition, the results showed the important role schools and SpLD teachers can play in configuring an appropriate environment for children with or suspected of having ADHD in KSA. It has shown possible ways to enhance awareness of the ADHD amongst teachers that can then have an impact on the educational performance of children with or at risk of ADHD and to provide support for such children to achieve their educational potential. Close collaboration between General and SEN teachers has been identified as a way of potentially ensuring children with ADHD receive the appropriate level of support whilst at school (Al-Zoubi and Abdel Rahman, 2016; Van Garderen et al., 2012).

The possible barrier created through a lack of collaboration or engagement by teachers with parties external to the immediate school environment may have an impact upon the level of ADHD knowledge held amongst teachers. This lack of collaboration could lead to teachers themselves feeling unsupported to enhance their knowledge of the disorder. The collaboration between teachers and other parties is

considered important when trying to increase ADHD knowledge amongst teachers (Ghanizadeh et al., 2006; Al-Hakeem et al., 2013; Al-Omari et al., 2014; Kern et al., 2015). This phase of the study placed emphasis on what could be done in KSA to raise awareness of the disorder by the Ministries of Education, Health and Media. Since collaboration between the three Ministries in KSA will help to achieve greater awareness of ADHD amongst society in KSA, it must be remembered that teachers themselves are part of society and close collaboration between the Ministries should help to create a society that is more conscious of the disorder. This will significantly increase the chance of reducing environmental obstacles that children with or at risk of ADHD face at school. Enhancing awareness of ADHD in KSA through the MoE as having ultimate responsibility for creating an appropriate environment in schools and for the development of teachers, will prove helpful for overcoming or minimizing barriers that children with ADHD and their teachers currently face in KSA.

The significant enhancement in ADHD knowledge amongst Saudi primary schoolteachers after the delivery of a training programme designed to enhance the level of knowledge of ADHD amongst teachers, seems to support the hypothesis that a training programme may overcome the barrier caused by lack of ADHD knowledge amongst teachers to the educational success of schoolchildren with ADHD or at risk of the disorder. It is already commented that the experience of a child at school can have a significant impact on their academic performance and success (What Works, 1987) and the school environment is more significant when a child has ADHD or is at risk of the disorder (Currie and Stabile, 2004; Todd et al., 2002; Loe and Feldman, 2007). The important role of primary school teachers in the experience and support of children with ADHD has been written about widely. Training teachers to enhance their level of ADHD knowledge and educational management strategies for children with ADHD could have the positive outcome of encouraging collaboration between teachers and children with ADHD to the benefit of the child and their experience whilst at school.

Utilising social constructivism enabled the interactions between the researcher and Saudi teachers to lead to shared understanding of ADHD in KSA (Lee and Gilbert, 2002), primary schoolteachers and, through training, gave teachers the opportunity to give meaning to their own experiences of working with such children in their

classrooms. The subjective experiences and opinions of Saudi teachers helped to create training intended to enhance their level of ADHD knowledge and this was particularly evident in the interviews which generated some very interesting and thought-provoking conversations as to why teachers in KSA lack ADHD knowledge and how it could be enhanced. The collaborative approach between the researcher and teachers in designing training seems to be a helpful way to make the surrounding environment, in this situation the school environment, more positive and to encourage interactions between children and teachers (Assman, 2008; Elkaim, 1990; Mo Yee & Gilbert, 2008). This current study showed that Saudi teachers' knowledge of ADHD has been enhanced through delivery of a training programme and this enhancement will support children with ADHD within the school environment. This is supported by Ohan et al., (2008) who pointed out that children taught by knowledgeable teachers who hold positive attitudes towards the disorder are more likely to receive a better level of support.

8.4 The impact of cultural and societal factors on the study

Women in KSA are subject to a number of written and unwritten codes in the context of a patriarchal society dominated by males, and this can make the status of women somewhat complex (Omair, 2008). Education and relationships play a large part of cultural life in KSA. Influenced by the religion of Islam, it has a history and tradition very different from other cultures and countries (Alkahtani, Dawson and Lock, 2013). An early definition by Tylor (1871) defines culture as including "*knowledge, belief, art, morals, laws, customs*"

Whilst conducting the study, it was noted by the researcher that in KSA there was a lack of will or incentive for teachers to participate in the study. A low response rate can particularly be seen in phase one by the 130 responses compared to the original distribution of 300 questionnaires. As a resident and teacher in KSA, with respect, from my experience culturally there is a low awareness amongst teachers of research and the possible impact that the dissemination of research finding may have on teaching practice. It is proposed this could be one of the reasons why so many teachers identified across 30 schools did not participate in this phase. It was apparent to the researcher that post completion of phase one, an influential consideration

amongst Saudi primary school teachers to consent to interviews in phase two was the time to participate in the study further. This could be due to the likelihood that Saudi workers may lack the initiative to act (Alkahtani, Dawson and Lock, 2013).

Public amenities in KSA are segregated by law which means that there is a difference in rights between men and women. Van Geel (2012) states that gender segregation in KSA is associated with public interaction between the sexes. This can be linked to the conservative society of KSA and interpretation of the Quranic principle of *ikhtilat* and the prohibition of men and women mixing unless they are close relatives, such as spouse, parent or sibling. In accordance with the interpretation of Islamic as a religion in KSA, males and females who are not related ought not to have direct contact with each other. Most women work in a completely female environment and do not interact with men, examples of such environments are girls' schools, social and medical work for female clients. Due to the constraints of interviewing female participants, it was not logistically possible to conduct interviews with female Saudi primary school teachers. Culturally, the decision was taken to only use male Saudi teachers since the researcher could conduct face-to-face interviews with them without restriction.

Al-Mahrram is the name for the male guardianship law in KSA. Regardless of age or qualification, a female must have a male guardian and is the responsibility of her father, brother or son when she reaches the age of 18. If none of these relatives apply (are available) then her uncle, grandfather or other 'Mahrram male' will be assigned to her as guardian or 'protector'. Married women are under the guardianship of their husbands (Aart, Meijer, Wagemakers et al., 2012) As a male researcher in KSA, it is very difficult for a female to participate in a research study led by a male researcher without the express permission of her male guardian. This directly limited the ability for the researcher of this study to interact with female primary school teachers. As a consequence of this only male primary school teachers were included in the study so that no restrictions were placed on participants under Al-Mahrram. With reference to these cultural constraints in KSA at the time of collecting the data for this study in 2016, there have been significant cultural modifications including a change in the law to allow females to drive, the introduction of cinemas and some greater acceptance of mixed working environments.

CHAPTER 9
Critical Evaluation

9. Introduction

This chapter will take a critical view of all stages of the study and provide a constructive commentary on the strengths and limitations of key developmental stages of the work. This will be invaluable to those who wish either to replicate the study or modify it. It will address: conception, study development, data collection, involvement of stakeholders, development of intervention, interpretation and evaluation of data; and how future researchers can learn and improve from my experience.

9.1 Conception

As a lecturer in special needs I was disappointed there seemed to be a lack of general ADHD awareness in KSA, and in my position had become increasingly aware there was a lack of knowledge about the disorder amongst many Saudi schoolteachers. In my experience, as a person with ADHD, there had been a lack of awareness of ADHD throughout my education in KSA and I had been taught by teachers who often held misconceptions about ADHD being caused by poor parenting (Sciutto et al, 2000; Ghanizadeh et al, 2006; Al-Omari et al, 2014). It is my personal experiences of going through education in KSA with undiagnosed ADHD and studying the disorder in more depth at Master's level which aligned with my intent to conduct doctoral research on this topic (Bajpai, 2015).

The topic of ADHD knowledge amongst Saudi primary schoolteachers was then narrowed to looking specifically at: (i), the level of knowledge on ADHD amongst male Saudi primary school teachers across 30 schools in Jeddah KSA; and (ii), the development of a non-pharmacological intervention that teachers could use to support children with or at risk of ADHD whilst at primary school. However, the specific research questions were not defined until at until more than a year had been spent looking at critical sources and I was satisfied these questions addressed the specific problem I sought to address (Lei, 2009).

9.2 Study development

At the time of developing the study, KSA was a less open compared to Western countries and segregated society between male and females and as a consequence it was difficult for the researcher to get access to female primary schoolteachers due to cultural and societal factors in KSA that have been explained previously in the study.

Today, segregation between males and females in KSA and rules around guardianship less strict (Anishchenkova, 2020) which means it would be easier now to conduct a similar study that included both male and female primary schoolteachers. It is accepted there could potentially be effects on the impact and ability to generalise findings of the study beyond male teachers, however I do not believe the lack of female teachers in the study automatically had a negative effect on the implementation developed in this study (Tannenbaum, Greaves and Graham, 2016).

The early process of exploring relevant literature was both time consuming and labour intense, however, conducting a comprehensive review was fundamental in discovering crucial perspectives, ideas and the significance of the problem under examination (Hart, 1998). Originally, the format of the review was chronological and only contained literature during a defined period of time. However, conducting such a review was exclusive instead of inclusive meaning that it was selective. A systematic review of literature was necessary, this taking upwards of six months to complete. Whilst such a review is considered to be more comprehensive (Greyson, Rafferty, Slater, *et al.* 2019), since it involves stages of review and quality assessment of the studies included in it, completing such a review required the contribution of reviewers in the screening stage in order to enhance the accuracy of the review (Stoll, Izadi, Fowler *et al.*, 2019; Boland *et al.*, 2017). In addition, using the PRISMA-P checklist when doing the review helped to strengthen its methodological quality and reliability (Moher, Shamseer, Clarke *et al.*, 2015; Boland *et al.*, 2017).

The systematic review in this study only included primary schoolteachers, in hindsight the neglect of pre-service, secondary and high school teachers restricted the breadth of findings. By limiting such inclusion there was likely an effect bias in the results of the review when stipulating inclusion and exclusion criteria (Gaastra *et al.*, 2016). However, these studies were included here in accordance with the strict inclusion and exclusion criteria developed in this study. Although Boland *et al.* in 2017 recommended to include poor studies in the review, however according to Richardson *et al.* 2015 including any poor study could act as a barrier in establishing effectiveness. Therefore, it is suggested when conducting such a review to exclude any study with poor methodological quality.

My own beliefs and assumptions on the existence of social barriers played a significant role when selecting what theory was most appropriate for the study. The theoretical framework serves as a roadmap to the study and helps to decide what issues will be measured and examined in the research (Grant and Osanloo, 2014). Individual theories may be more popular with a discipline and it is for the researcher to choose the most suitable theory to underpin the structure of a study (Grant and Osanloo, 2014).

The use of social constructivism as the theoretical framework for this study about ADHD was considered appropriate since it is based on what we believe exists is through social and interpersonal interaction (Burr, 1995). The culture and understanding of male Saudi primary schoolteachers of children with, or at risk of ADHD in KSA and interaction with these children was critically important to the development of an ADHD training intervention. The purpose of the intervention was to promote positive teacher interaction and foster a positive school environment for Saudi schoolchildren with, or at risk of ADHD. By removing typical barriers that such children with or at risk of ADHD might encounter at school, in this case in the classroom, Saudi primary schoolteachers can help to ensure that these children have full opportunity to learn in class.

Using social constructivism was aligned with using the social model of disability, however in hindsight this theory seems more suitable whilst observing and measuring if teachers in this study actually used and applied what they had learnt from the ADHD intervention developed. The use of one theory alone may not sufficiently answer all questions or issues raised in a study so in order to effectively address these it is acceptable to use more than one theory in a study to do so (Mayer & Sparrowe, 2013). Use of attribution theory in addition to social constructivism would also have included looking at the values, motivations and intentions of a person towards another (Weiner, 1985) and specifically in this study the behaviour and attitudes of primary school teachers towards the academic performance of primary schoolchildren (Graham, 1990; Woodcock & Vialle, 2010). The earliest known theorist on attribution theory is

Heider in 1958, however Kelley (1967) and Weiner (1985) are more well-known for attribution theory.

The development of the research questions has directly influenced other parts of the study as well as being aligned with the chosen theoretical framework. The connection between the theoretical framework and the study's research questions can enable the researcher of the study to employ social constructivism to attempt to resolve an existing problem. The design and methods should be identified and appropriate so as to address the research questions developed in the study. This study used three different designs and included three stages: (i) cross sectional: to answer the first research question and measure the level of ADHD knowledge amongst male Saudi primary schoolteachers, to determine whether any lack of knowledge acts as a social barrier that could prevent children with ADHD from reaching their full academic potential (Barkley, 2006); (ii) exploratory: to explore the social barriers on what can be done to increase the level of ADHD knowledge amongst male Saudi primary schoolteachers; and (iii) experimental design: more specifically, quasi-experimental, to examine the effectiveness of a training programme designed to improve the level of ADHD knowledge and overcome barriers caused by a lack of ADHD knowledge amongst male Saudi primary schoolteachers.

Using these three suitable designs in one study helped to address the research questions, however on reflection and even though the lack of control does not automatically mean poor results where an intervention is well developed (Vazquez et al., 2019), the use of a control group would bring greater strength and credibility to the findings from the intervention (Harris et al, 2006). In this study the use of a control group when measuring the effectiveness of the intervention was not feasible due to the length of time it would take and the practical impact it would have on the study.

The purposive sample of 130 male Saudi teachers in phase one was not representative of the target population, however this nonprobabilistic sampling sufficiently addressed the specific research question in the study (Martinez-Mesa et al., 2016). If a similar study is to be conducted in the future it is recommended to use probability sampling in order to represent the targeted population.

9.3 Data collection

In terms of using a quantitative method in this study, the data collection procedure was standardized and well described (Bennett et al., 2011). It was aligned with social constructivism through KADDS which was used to measure a lack of ADHD knowledge amongst male Saudi primary schoolteachers and was the first ever study to conduct factorial analysis of the Scale. The use of the KADDS instrument for this study was therefore appropriate and had been used already in several studies (Sciutto et al, 2000; Perold et al, 2010; Alkahtani, 2013; Muanprasart et al, 2014; Ward et al, 2014; Topkin et al, 2015; Botnick-Gallant et al, 2015; Guerra et al, 2017; Shroff et al, 2017 and Padilla et al, 2018). However, none of these studies had ever performed factorial analysis of the Scale, so therefore conducting this was original to this study.

Conducting factorial analysis of the Scale resulted in the number of KADDS items being reduced significantly from 39 to 18 items. Due to the small size of the sample used in this study and the reduction of items in KADDS through performing factor analysis that reduced items by 50 per cent, this could be a limitation of the findings. In addition, the sample strategy was stated clearly and relevant to address the first research question however the 43.3% response rate was relatively low probably due to cultural factors explained previously. The response rate was lower than normally seen as acceptable (60% - Pluye, et al., 2011) which could indicate potential bias (Lessler and Kalsbeck, 1992), however “need not necessarily lead to biased results” (Rindfuss et al, 2015 p.798).

Any similar study in the future should increase the number of distributed questionnaires. The study protocol should also provide clear emphasis of the importance of teachers' participation to potentially improve their performance as well as enhancing their professional development. Increasing the sample size beyond 130 used in this study would also allow for a greater possibility for results to be generalised and reliability of findings could be increased.

Twenty interviews were appropriate in the circumstances to generate a satisfactory set of qualitative findings. The interview questions were reviewed and held to be appropriate by the researcher's supervision team and were in accordance with general

guidelines for qualitative research interviews (Kvale, 1996). However, in order to generate a greater dataset, if using semi-structured interviews with Saudi primary schoolteachers in relation to what could be done to enhance their knowledge of ADHD, it is proposed to use a greater number of interview questions. Suggested areas could include specific questions relating to the school environment, such as the working relationships between General and SpLD teachers, types of classroom modifications and the role of the teacher within multidisciplinary decision making for schoolchildren with, or at risk of ADHD.

The researcher ensured that there was a clear schedule for conducting interviews and ethical considerations were fully observed. This was specifically important during the recording of responses and management of these. This allowed him to be more organized with taking notes and recording responses to ensure no data were lost throughout the transcription process (Bennett, Glatter & Levacic, 1994).

The findings generated from the gathered data in this stage cannot be generalised as Polit and Beck (2010) indicated that the aim of qualitative studies is to provide a deep and rich understanding of participants' experience. The fact that the sample was small does not automatically mean that findings are weak because generalization is not the aim (Hesse-Biber and Leavy, 2006) of most qualitative studies. The data gathered at this stage since they sufficiently addressed the research questions and the hypothesis in the study.

9.4 Stakeholder involvement

The main stakeholder in this research was Saudi male primary schoolteachers, and specifically General and SpLD teachers in mainstream schools in Jeddah KSA. Stakeholders can be defined as individuals, groups or organizations that can effect or are affected by an evaluation process and/or its findings (Bryson, Patton and Bowman, 2011). Within this definition other primary stakeholders that closely relate to the function of these teachers can also be identified. These include such as, the school (where these individuals teach) and specific governmental decision makers like the MoE in KSA since it makes all relevant decisions and policy relating to the duties and functions of primary school teachers. Secondary stakeholders to this study that have a link to the MoE and indirectly primary schoolteachers with regards to knowledge and

awareness of ADHD in KSA are the Ministries of Health and Media. However, this study has shown that more work must be done by both to raise awareness of ADHD in KSA.

There was a close working relationship with the MoE when conducting work in KSA and a clear example of collaboration was the delivery of the intervention in Jeddah following endorsement of the programme for potential future roll-out to Saudi primary schoolteachers in general. It is recommended that any possible future study increases the involvement of primary stakeholders by including pre-service and student teachers. This study only included in-service teachers which could be a limiting factor in the generation of findings that can be usefully applied when comparing differences between General and SpLD teachers. Communication of results from the intervention to the MoE meant a possible bridging between research and MoE policy in KSA with regards to ADHD training for Saudi primary schoolteachers, following an interaction model of engagement with this stakeholder (Slunge et al, 2017 p11). This meant the researcher become more visible through the communication of results and impact of the intervention on participants.

Besides the enhancement of ADHD knowledge found amongst participants post intervention, each participant received a certificate of attendance provided by the MoE. It can be argued that the granting of these certificates by the MoE showed positive recognition of the intervention and researcher. However, on a critical note it could also have provided an element of incentive for teachers to participate in the intervention. The potential roll out of the intervention developed in this study by the MoE could have a positive impact not only on Saudi primary school teachers but also indirectly Saudi primary schoolchildren through helping to overcome barriers in the school environment faced by children with, or at risk of ADHD.

9.5 Development of intervention

The development of the intervention closely aligned with ADDIE which is a recognised model for the development of instructional training (Molenda, 2003) and suggests that the intervention is of a high quality. In addition, the involvement of primary stakeholders in the development of the intervention was unique to this study. A particular strength of using the ADDIE process to develop the intervention is its

'ongoing process of continuous improvement' (Allen, 2006) which means the researcher was able to constantly quality assure content of the intervention and ensure that it was appropriate for participants in the study.

Whilst this study did not conduct a pilot test of the intervention due to (i) time limitations, and (ii) difficulty in finding teachers who were available to attend and securing the necessary permission from the MoE to authorize attendance, it has been shown that the absence of a pilot of an intervention on ADHD has had no detrimental impact upon findings in other studies (Worthington et al, 1997; Aguiar et al, 2014; Shehta et al, 2016; Lasisi et al, 2017; and Giannoupoulou et al, 2017), it is recommended in the future that a pilot test is conducted prior to final delivery of any intervention. This is to ensure any problems or deficiencies in the development of an intervention using the ADDIE model are identified and addressed prior to using it fully and so that evaluation of administering any intervention can take place prior to full scale delivery (Zuniga et al, 2019). Implementation fidelity was not conducted on the replication of the ADHD training intervention developed in this study due to time limitations. The term refers to what extent an intervention is delivered as intended (Carroll et al., 2006). However, it should be noted that during the data processing and ADDIE stages of development for the training programme, methodological and systematic steps were followed to ensure the high quality of the intervention. Any future researcher should include implementation fidelity in the delivery of an intervention to strengthen outcomes and conclusions (Breitensen et al., 2010).

9.6 Evaluation and interpretation of data

Using empirical data generated in this study through the use of chosen research methods and tools works well with the social constructivism theory and is linked well to the social model of disability. Data from phase one suggested there was a lack of knowledge and awareness by male primary schoolteachers in KSA, which could have a detrimental impact upon their educational practice in their dealings towards children with or at risk of ADHD in the classroom. The process of evaluating the data in phase one, in addition to using the social constructivism theory, enabled the researcher to interpret that male Saudi primary schoolteachers lacked knowledge of treatment and interventions for schoolchildren with or at risk of ADHD. Such findings and interpretation ensured content for the intervention was appropriate.

The evaluation of interview findings meant the researcher could elicit from interviewee responses other ways to enhance awareness of ADHD amongst primary schoolteachers in KSA. Data from findings were analyzed to determine intervention design and duration. Despite the small-scale nature of the study a significant amount of qualitative data was thematically analyzed and the subsequent interpretation of these findings strongly supported the need for the intervention and the positive difference that participating in an ADHD training programme would have for teachers and their professional development. Pre and post intervention data showed improvement in knowledge and that it had been enhanced in participants, however it is acknowledged that this was on a small scale (n=17), but findings did support that the intervention could be an effective way of enhancing primary schoolteachers' knowledge of ADHD and non-pharmacological treatments to be used in the classroom.

During the process of evaluation and interpretation of study data the researcher was mindful it was solely generated by male Saudi primary schoolteachers. Whilst I do not believe the exclusion of females undermined or devalued results in the study, it has limited the possibility to make generalisations of the effective ways to enhance the level of ADHD knowledge amongst all primary schoolteachers in KSA. It has been identified that gender could be an important factor in implementation research especially in the preference for the uptake of an intervention (Tannenbaum, Greaves and Graham, 2016). Arguably this is highlighted by Munshi in 2014 in a study where she only surveyed female primary schoolteachers and found they held a high level of knowledge and awareness of ADHD in addition to positive attitudes towards the disorder.

In consideration of the data generated by this study and how it has been evaluated and interpreted, any future research should include both male and female teachers so as to conduct a comparison of their responses a more generically interpretation of findings. The small-scale generation of data should also be enlarged to give a wider interpretation of findings.

Considerations for future research/ers

Findings from the study clearly suggest that an ADHD intervention is an effective way to enhance teachers' knowledge of ADHD and treatment. The critical, evaluative

points made regarding the size of sample, the inclusion of a male only sample and the use of a control group demonstrate that, whilst these could be improved upon, they do not necessarily devalue the findings. Using social constructivism as the theoretical framework helps to explain how the lack of ADHD knowledge amongst male Saudi primary schoolteachers could pose a classroom environmental barrier to the success of children with or at risk of ADHD in school.

CHAPTER 10

Contribution, Implications, Limitations, Recommendations and Conclusion

10. Introduction

This research of Saudi educators' knowledge and attitudes towards ADHD and children either with or suspected of having the disorder makes a direct contribution to SEN educational practices in Jeddah, KSA. This chapter will discuss the contribution to theoretical knowledge that this study makes; implications that it has for policy and practice amongst teachers; methodological implications for conducting research in KSA; the recommendations that arise from this study; and recommendations for future research in KSA about ADHD knowledge amongst teachers.

10.1 Contribution of the study

To my knowledge this study is the first to systematically review studies that measured the level of ADHD knowledge amongst primary schoolteachers globally and systematically review studies that delivered a training intervention to primary schoolteachers with the aim of enhancing their knowledge of ADHD. It is also the first study to conduct EFA of the KADDS scale, a widely used tool of measurement, in order to measure the level of ADHD knowledge amongst Saudi teachers.

The study focused on the level of ADHD knowledge amongst SpLD and General teachers in Jeddah, barriers that may affect knowledge about the disorder; and the impact of teacher-training on the level of that knowledge. It contributes to wider research on the level of knowledge of ADHD amongst teachers in general, and it is the only study to design and deliver training to Saudi teachers and measure the effect of that training. The research assesses the current level of knowledge amongst mainstream SpLD and General teachers in KSA and is intended to help decision-makers identify what can be done to enhance ADHD knowledge amongst teachers to ensure Saudi schoolchildren with, or suspected of having, the disorder reach their maximum educational potential whilst in the school environment.

This empirical study provides rich and valuable understanding about the knowledge and attitudes of Saudi teachers towards children with ADHD and is the first to investigate their perspectives of what can be done to enhance knowledge of the disorder. It shows that Saudi SpLD teachers generally possess higher accurate knowledge of ADHD and hold more positive attitudes towards the disorder compared to General teachers. This is likely because SpLD teachers are specifically trained to

deal with special needs and are more likely to have experience dealing with a child that has ADHD. It is hoped that these findings will show decision-makers, Governmental ministries, schools and other stakeholders in KSA that SpLD teachers can provide a valuable source of ADHD knowledge that can be disseminated to their peers.

Through eliciting the perspectives of teachers on what can be done to enhance knowledge of ADHD amongst SpLD and General teachers in KSA, this work has identified the significant social barriers perceived by male Saudi teachers that prevent them from enhancing their knowledge of ADHD and at the same time has reduced misconceptions of the disorder. The current absence of training on ADHD for teachers in KSA (Alkhantani, 2013; Munshi, 2014; bed et al., 2014) is a serious barrier identified by teachers in this study, and they firmly believe training will enhance their level of knowledge. By not working closely together, governmental decision makers like the MoE, MoM and MoH play little or no role in the daily professional, social and personal lives of teachers nor do they enhance their knowledge of ADHD to better support children with the disorder. Whilst the school environment is where teachers ought to receive support for their professional development and help to ensure that children receive every opportunity to succeed, schools in KSA play an insufficient role in enhancing knowledge of the ADHD amongst teachers.

This study establishes that SpLD teachers are not fulfilling their role as experts in behavioural problems, including ADHD. The job description for SpLD teachers clearly states that they are expected to support General teachers by advising them of how to deal with and use effective teaching strategies for children with disabilities; providing written information to general teachers to help them understand basic concepts about special needs and representing the needs of children with disabilities at internal and external school meetings (MoE, 2015). SpLD teachers are required to keep up to date with the latest information on disabilities, however if the information is not accessible to SpLD teachers then they cannot fulfill this role. This study exposes a common concern shared by Saudi SpLD teachers that they would like to enhance their knowledge of ADHD but feel unsupported to do so and as a consequence they perceive that they are prevented from enhancing the knowledge of other teachers.

This study is the first in KSA to design, develop and measure the effectiveness of an ADHD training intervention created to enhance knowledge of the disorder amongst SpLD and General teachers. The use of a structured, high quality and engaging ADHD training intervention successfully enhanced the level of knowledge amongst participants and reduced misconceptions about the disorder that were previously held by Saudi teachers. This supports previous studies in other countries that found training on ADHD delivered to teachers enhanced their level of accurate knowledge about the disorder (Barbaresi and Olsen, 1998; Syed and Hussein, 2010; Sarraf et al., 2011; White et al., 2011; Barnett et al., 2012; Aguiar et al., 2014; Lasisi et al., 2017).

Teacher training on ADHD is an effective way to enhance knowledge of the disorder provided it is based on valid, accurate and up to date information delivered through interactive and engaging means. Having exposure to this information means teachers are more effective and confident to deal with the particular needs that children with ADHD often have (Bussing et al., 2012; Anderson et al., 2012; Youssef et al., 2015; Laing and Gao, 2016). This may have the subsequent benefit of a reduction in referrals made by General teachers to SpLD teachers because they possess sufficient knowledge of ADHD and their perception of their own efficacy could increase (Perold et al., 2010; Soroa et al., 2016; Laing and Geo, 2016). The effectiveness of training is amplified if participants are able to contribute towards its design and can comment on the appropriateness of content prior to delivery. Through the incorporation of activities teachers suggested were engaging, the level of participation and interaction with training amongst recipients was maximized, and this was evidenced by the high level of satisfaction by participants.

10.2 Implications

10.2.1 Implications for SEN Policy and Teacher practice in KSA

The ADHD training programme designed in this study as well as findings in the study have practical implications for the MoE and Schools in KSA with regards to special needs education and children with ADHD. The study provides decision-makers with evidence that in-service training for teachers about ADHD seems to be a way of enhancing knowledge of the disorder and improving Saudi educators' misconceptions about ADHD. In-service training on ADHD is not only beneficial to SpLD/SEN and

general teachers but also to the child with, or suspected of having ADHD as they will be taught by a teacher who is knowledgeable about the disorder and has effective educational strategies to help support them. The development and delivery of such training to teachers makes a direct contribution to the special education field for teachers in KSA and specifically improves services for children with ADHD. Training about ADHD aimed at teachers directly contributes to the principles of inclusion and mainstreaming children who have ADHD (Avramidis and Kalyva, 2007; Avramidis and Norwich, 2002; Ellins and Porter, 2005; Kurniawati et al, 2017; Shehata et al., 2016).

According to teachers who were interviewed in this study, only a minority had received some pre-service teacher training that by chance included a brief mention of ADHD. The MoE needs to work more closely with Schools to introduce in-service teacher training which is not only ADHD-friendly to increase teachers' knowledge of the disorder but also contains guidance and advice on effective educational practices that teachers can employ with children with ADHD. The MoE and Schools in KSA should ensure that SpLD teachers undergo in-service training on ADHD since it encompasses both learning and developmental difficulties like ADHD and should allow them to take a lead role in training general teachers on ADHD. Several SpLD teachers in this study felt it was their responsibility to share knowledge about the disorder with General teacher peers, however this was dependent upon them becoming knowledgeable about ADHD first. The enthusiasm amongst teachers to receive training should be taken advantage of in KSA.

The researcher hopes that the training programme developed in this study will be rolled out across Saudi mainstream schools to both SpLD and General teachers. The commitment to improve and evaluate special education services for children with ADHD by the Saudi National Project in 2009 should include greater provision of in-service training for teachers to make them better prepared to teach and support children with ADHD. In obtaining permission for the training programme to be delivered to a sample of teachers, the researcher was able to discuss in detail the rationale and contents of the intervention. It was after this discussion that the MoE commented on how impressed they were with it and that they would like to have further discussion upon my return to KSA about the potential roll out of the training programme to Saudi teachers. The Ministry's satisfaction with the training was supported by their offer to

issue each participant and the trainer with a certificate of attendance. The difference in knowledge and misconceptions about ADHD amongst teachers pre-and post-intervention was significant, therefore it is hoped the future roll out of in-service training on ADHD will become part of special education policy in KSA. In addition, it is hoped that such training is made standard for teachers to enhance their teaching for both the benefit of themselves and their students with ADHD.

10.2.2 Methodological implications for researching in KSA

Using a mixed methodology in this social constructivist study, the researcher examined and explored possible social barriers to Saudi educator's knowledge and attitudes to children with ADHD, how these can be overcome in general and whether in-service training was an effective way of doing this. The decision to use a mixture of quantitative and qualitative methods and data is still quite new in KSA, since usually it is one or the other.

The limited number of studies looking at ADHD-related knowledge amongst teachers in KSA show that the medical model representation of the disorder is the most frequently known and understood (Alkhantani, 2013; Munshi, 2014; Abed et al., 2014). This study differs to previous ones since it places focus on the social model of ADHD and on what teachers believe can be done to enhance their ADHD-related knowledge. It is also distinctive in designing and delivering training to teachers on how to adopt behavioural, educational and effective classroom management strategies for children with or suspected of having ADHD. Inviting teachers to consider barriers to them knowing more about ADHD, and what could be done to overcome them and to enhance their knowledge takes a less narrow view compared to one that typically views the disorder in terms of the individual. This needs to be considered when debating how the level of knowledge of ADHD amongst teachers can be enhanced and awareness raised about effective classroom management and educational strategies.

As discussed in the study and due to strict adherence to Islamic doctrines in KSA, as a male researcher at the time this study was conducted, it was impossible to conduct face-to-face interviews with female teachers using the free form communication necessary to elucidate their responses to interview questions. However, the

researcher does acknowledge that the inclusion of female teachers would provide an additional layer to the results and the collection of different viewpoints on ADHD, how knowledge can be enhanced and how in-service training can be developed.

When interviewing Saudi educators about the role played by decision-makers to enhance the level of knowledge about ADHD amongst teachers, there was the risk that teachers would not feel free to give their critical views through fear of consequences. Discussion relating to the Ministries in KSA, particularly the MoE, is an example since it is a policy decision maker and has influence on schools and teachers. The researcher reassured all interviewees that responses would be anonymously coded and used only for the purposes of this study.

10.3 Limitations of the study

In addition to the issues that were discussed and critically evaluated in the previous chapter, however it is necessary to consider the following key limitations and to take them into account in any future research;

- The small sample used in the study and the data generated by it followed by subsequent interpretation of the researcher is limited, since the use of quota sampling and significant reduction in size meant that data could not be generalized. Due to the level of work involved in conducting semi-structured interviews with teachers the overall sample was reduced from 130 to 20 teachers. A limitation of conducting interviews with teachers was the time it took to translate the recording of each interview into English from Arabic before conducting thematic analysis of the data. However, whilst thematic analysis is a flexible way for processing qualitative data (Braun and Clarke, 2006), the reduction process needed to identify themes can mean that the wider context to a response given by an interviewee could be lost.
- Male primary schoolteachers were only included in this study because of the difficulty in getting access to female teachers and due to the cultural and societal factors in KSA.

- Phase three of the study did not involve the use of a control group to compare with the intervention group, as it was not feasible to do so based on the study's timeline.
- Due to the smaller sample used in phase four (n = 17) it was not possible to make generalisations from the results in this phase. Originally 20 male teachers were randomly selected for the intervention from those who consented to participate in a training programme, however three withdrew from the study. A reason for this could be the one-month period post participation in the intervention

10.4 Recommendations

Following the outcome of this study, results show that an ADHD programme designed to enhance knowledge amongst teachers of ADHD did have a significant positive effect on their level of knowledge. Based on the findings of this research study, the researcher would like to make the following recommendations:

10.4.1 Recommendations on the level of ADHD knowledge amongst teachers

There is a general lack of knowledge about ADHD amongst primary schoolteachers in KSA, and particularly regarding treatment and interventions for the disorder. It is recommended that the level of knowledge amongst teachers be enhanced in all three Factors: associated features, symptoms and diagnosis; non-medication treatment for ADHD; and medication-treatment. Knowledge about treatment of ADHD should include behavioural, educational and effective classroom management strategies. A possible result of this enhanced knowledge could be a reduction in referrals from General to SpLD teachers, often based on a lack of knowledge on how to deal with such children.

10.4.2 Recommendations on ways to enhance the level of ADHD knowledge amongst teachers generally

Knowledge of ADHD can be enhanced generally through training; making sources of information about ADHD available to teachers; and decision-makers such as schools and the MoE, MoH and MoM working more closely together. Collaboration between

these decision-makers is recommended to enhance awareness of ADHD through activities such as: hosting ADHD specialists within schools; designation of a day both in the school calendar and nationally for ADHD; disseminating the latest research on ADHD; working with ADHD society of KSA; and creating television and radio programmes dedicated to the disorder.

It is also recommended that schools support SpLD teachers to become knowledgeable about developmental difficulties and behavioural disorders including ADHD, not only specific learning difficulties. Doing this will promote the dissemination of ADHD-related knowledge by SpLD teachers to his/her peers. Two examples of the ways in which knowledge can be enhanced amongst teachers caught the researcher's attention: the first was the use of noticeboards in schools. This is a rather inexpensive way that schools can display the latest information about ADHD and update it regularly without hassle. The second is more innovative and is the development of an ADHD phone application for teachers. KSA is fast becoming a country where people widely have access to and use smartphones; it is recommended that such a phone application could take advantage of this growing use. It is anticipated such an application would be useful to teachers by providing a general repository for effective classroom management and educational strategies for children with ADHD. It would also contain links to the latest and up to date news and research about the disorder. Phone applications that can assist with diagnosis as well as provide information about ADHD do already exist but not in KSA. Research has shown that paid applications about ADHD contain higher quality information compared to free ones (Kumaragama and Dasanayake, 2015).

10.4.3 Recommendations on teacher-training as an effective way to enhance the level of ADHD knowledge amongst teachers

The MoE should immediately endorse in-service training for teachers in KSA as a possible effective way to enhance knowledge about ADHD. The training programme, like the one designed in this study, should be structured and contain the latest information which covers all Factors of the disorder (associated features, symptoms and diagnosis; non-medication treatment of ADHD; and medication treatment). Training should also include effective educational interventions that teachers can find helpful when dealing with children who have ADHD. The intended training should

contain opportunities for group work amongst participants and case studies to increase interaction. Where possible, teachers should be involved in the design of training in terms of duration and activities in addition to confirmation that content is relevant to recipients.

10.4.4 Recommendations for future research in KSA

The researcher recommends that research in the future should specifically look at the following:

- The role that teachers play in the diagnostic process of a child with ADHD, and in particular whether teachers are working effectively with doctors and parents as part of a multidisciplinary approach to diagnosis of children with ADHD.
- Whether teachers, after receiving training on effective behavioural, educational and classroom management strategies for children with or suspected of having ADHD, have actually applied these methods in their teaching practice. This study did not measure if teachers had employed any of the approaches and strategies used in the training programme within the school environment.
- The role played by SpLD/SEN teachers to enhance the level of ADHD knowledge amongst their General teacher peers through in-service training.
- Taking advantage of more liberal societal conventions in KSA so that female teachers are included in future research on the level of ADHD knowledge amongst primary schoolteachers and on the development of any intervention.
- Ensuring the sample of teachers used to measure the level of ADHD knowledge in KSA is larger and includes teachers across all grades so that generalizations are possible.

10.5 Conclusion

Following a comprehensive systematic review of literature, in addition to empirical data generated by this study, it has been shown there is a lack of knowledge of ADHD amongst Saudi primary schoolteachers and there is a need to enhance their level of knowledge. This study has provided valuable insights into the knowledge and attitudes

amongst SpLD and General teachers towards ADHD in KSA. Through comparison of the two groups of teachers in phase one it has shed new light on the imbalance of knowledge between SpLD and General teachers.

By giving Saudi educators the opportunity to suggest ways to enhance their knowledge of ADHD and to consider the social and environmental barriers they perceive as preventing them from enhancing their knowledge of the disorder, the study makes a novel contribution to the debate concerning Saudi educators' perceptions and understanding of ADHD. Previous studies have often focused on the medical model of ADHD, whereas this study pays attention to environmental factors closely associated with the social model of ADHD. Teachers expressed resolute views about what could be done within the school environment where they play a role. For example, they felt that stakeholders such as the MoE should do more to raise the awareness of ADHD in KSA, and subsequently help them to enhance their knowledge of the disorder. Both SpLD and General teachers were gravely concerned at the lack of in-service training for teachers about ADHD; the lack of up to date written information about the disorder; and the lack of support for teachers to develop themselves. All teachers in the study envisaged training as a way to overcome a lack of knowledge and misconceptions about ADHD and to support them to possibly become more effective when dealing with children with ADHD.

The work has made a contribution to existing studies that have developed and measured the effect of a training programme for teachers to enhance their ADHD knowledge. However, it is the first study in KSA to design, deliver and measure the effectiveness of the intervention on Saudi educators' knowledge and misconceptions towards ADHD. The use of a structured model of training has led to enhancement in knowledge of ADHD and beliefs amongst SpLD and General teachers towards the disorder. The researcher strongly believes that this training programme was effective because it adopted the ADDIE model to design the intervention; and it gave teachers the chance to contribute to the design and content of training. To the best of my knowledge this is the first study to give teachers the opportunity to collaborate with the researcher to design a structured training programme incorporating teachers views about duration, training activities, and content, with specific emphasis on effective behavioural, educational and classroom management strategies.

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List of appendices Checklist

Appendix A: PRISMA 2009

Section/topic	#	Checklist item	Reported on page #
TITLE			47
Title	1	Identify the report as a systematic review, meta-analysis, or both.	47
ABSTRACT			46
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	46
INTRODUCTION			48
Rationale	3	Describe the rationale for the review in the context of what is already known.	47
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	47-48
METHODS			51
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	51
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	52
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	51
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix Ac
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	53
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	53

Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	54
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	55-59
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	59-60

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Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	55-59
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			59
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	61
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Appendix C
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	54-60
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	62-75
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	62-75
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	52-55
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			75

Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	75-87
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	88
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	89
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

Appendix B: Search strategy for finding out relevant literature:

To obtain an accurate search strategy to generate a list of possibly related studies; Seven databases in health care and education were searched for this review (PsycINFO, SCOPUS, Web of Science, ERIC, British Education Index, MEDLINE and PUBMED).

The strategy included diverse keywords (Attention deficit/hyperactivity disorder; ADHD; intervention; knowledge; attitudes); free-text terms; and Boolean operators (AND; OR) were used. This review searched only published and peer-reviewed studies, and did not list unpublished dissertations and theses. In addition, this review considered reference lists from identified studies and articles.

- The search was conducted in accordance with the following inclusion and exclusion criteria;
 1. To be included in this study;
 - a. The study measured teachers' knowledge of ADHD
 - b. The study examined attitudes and beliefs held by teachers towards ADHD
 - c. Study involved primarily face to face and non-facing /non-pharmacological ADHD interventions
 - d. The intervention was delivered in educational settings
 - e. The intervention was primarily delivered to teachers only
 - f. Studies and articles that were published in English only
 - g. In-service SEN and general teachers only
 - h. Mainstream schools (primary and elementary only)
 2. To be excluded from this study;
 - a. Studies that did not include teachers
 - b. Studies that included medical practitioners and parents unless included teachers
 - c. Studies that did not investigate teaching of schoolchildren with or suspected of having ADHD
 - d. Studies that focused solely on medical treatment of ADHD/ pharmacological interventions
 - e. Studies that were not based or considered ADHD in educational settings
 - f. Studies that were not been published in English
 - g. Conference abstracts, reviews, and opinion pieces.
- For screening of citations and selection of appropriate articles to meet inclusion criteria we obtained the full manuscript of the articles and thoroughly examined

the title and abstract. Any article that did not meet the criteria above was excluded and a report of the exclusion was made. By having two reviewers conduct this review independently avoided selection bias.

- Following full inclusion assessments, forward and backwards reference searches were carried out for all included papers; checking the reference lists and citation records of each until no new eligible articles were found.

- Data extraction (selection and coding)

An initial inclusion screening was undertaken based on the title and abstract of all returned records, at least 30% of all records were verified by a second reviewer (this percentage is dependent on the number of returned records and may be larger if fewer than approximately 400 records were found). Following initial inclusion assessments, full text articles for all remaining articles were located and subjected to review by two independent reviewers. A third reviewer was available for instances of disagreement. Reasons for inclusion or exclusion were recorded on a standardised form, and entered into an electronic review record log.

Selected studies and gathered data were then extracted by one reviewer into a standardised form and were verified by a second reviewer. There was two separate stages to the standardised process in this study- teachers' knowledge of ADHD; and delivery of an interventions to teachers designed to enhance/ improve ADHD knowledge.

Extracted data included:

1. Article characteristics: author, year of publication and country.
2. Participant demographic data, including: type of teacher and years of teaching experience
3. Intervention training characteristics: mode of teacher training (group workshop, onsite interactive training, both training components), training setting (at school) teacher training process (number of sessions, length of sessions, density of training – spread out or quickly completed).
4. Outcomes related to: teacher's engagement with any activities related to ADHD in the school environment

5. study design (qualitative and quantitative studies for measuring teachers' knowledge of and attitudes towards ADHD) and for interventions and their effectiveness (Randomised controlled trials, Non-randomised controlled trials, Cohort studies, Case-control studies and Experimental case studies will be included).
6. outcome measures (efficacy of the intervention based on the following factors; enhance teachers' knowledge of ADHD, improve attitudes towards ADHD, educational interventions to support teacher in dealing with children with ADHD in classrooms).

Appendix C: study characteristics A (Knowledge and Attitudes)

	Author, Year and Country	Years of teaching	Design and Sample size	Scale of measurement	primary outcome	secondary outcomes
1	Soroa et al. 2016 Spain	Av. 17.2	1278	Specific Linguistic Scale True/False/DK 26 items 4 areas: general, symptoms/ Diagnosis, etiology, Treatment	Accurate knowledge: Treatment 83.54% Symptoms/diagnosis 72.41% Etiology 56.23% General 39.22% Most common inaccurate error in: Symptoms/diagnosis 7.49%	Teachers preferred informal sources of information as apposed formal. Actions aimed at increasing teachers 'knowledge should be promoted. Teachers should receive a variety of training and not rely only on informal sources.
2	Liang and Gao 2016 Hong Kong	Not stated	99	Questionnaire adapted from Bekle 2004 and divided into three sections: Background information for participants Kw about basic ADHD concepts Attitudes towards ADHD True/ False	Found no significant difference in knowledge between pre and in-service teachers. Significant gap found between PS and IS under theme of causation (IS higher). PS better answering questions regarding ADHD myths. No significant difference in attitudes between PS and IS. Contradictory beliefs regarding 'family influences': IS Ts (89%) understood that ADHD is not a result of 'a chaotic, dysfunctional family life'. IS Ts (63%) consider 'ADHD can be caused by poor parenting practices' as incorrect. Low scores concerning misconceptions about ADHD, less than half wrongly believed most children with ADHD outgrow their disorder & are normal as adults'. Kw & att were not sign correlated, $r = .082$, $p > .05$.	Urgent need for training on how to manage student with ADHD in the classroom needed for PS teachers' programmes. Teachers should be given more refresher courses and SPD. PS and IS teacher education should involve psychiatric professionals to provide accurate diagnosing and treatment. Training should bring together teachers, school professionals and psychiatric professionals. 34.39% IS Ts reported having read books on ADHD and 5.71% had read more than two books on ADHD. 25.71% IS Ts had received relevant training on ADHD. All interviewed teachers considered having students with ADHD in class a burden. Teachers willing to teach classes with students with ADHD expressed concerns about their ability to deal with those children. Interview data confirm that their atts were associated with their training & professional experience. The practical constraints including class size & workload affected their attitudes.
3	Lee & Witruk, 2016 Korea (K) Germany(G)	Not stated	K = 639 G = 317 T = 956	Questionnaire (Kos, 2004). 4 sections: Att. (23 items) Know. (23 items) Exp. (6 items) Personal details (7 items)	G Ts have significantly higher knowledge (77%) compared to K Ts (74.52%). Both G & K teachers showed greater knowledge about ADHD (more than 70%). G Ts have more favorable atts (68.65%) toward students with ADHD compared to K Ts (60.35%).	Limited to G and K teachers in respective countries - results would be useful in creation of country specific training. G & K teachers' kw directly affected their atts. G & K teachers' professional & personal experience significantly affect their kw which in turn affect their atts. G & K teachers' exp did not directly affect their atts. Teachers' additional training experience has the most direct effects on K & G teachers' kw.

4	Youssef et al. 2015 Caribbean	Not stated	277	Self-Report Questionnaire 3 sections: K. (26 Qs) True/False/DK T Beliefs +Atts (25 statements) 5-pnt Likert (agrd/strngly agrd. Neither agrd/nor disagrd/ strngly disagrd)	Av. Score of 36% / 4% (12) Ts had no kw of ADHD. Overall mean kw. 11.6 (45% questions right). 40% Ts had score of 10 or lower. Ts with masters scored highest/no training scored lowest. Ts that received ADHD training scored significantly higher. Gender of Ts had no relevance on kw. Overall Ts kw of ADHD was low.	Low kw of the disorder does not affect beliefs in the validity of the diagnosis. Ts with exp of teaching children with ADHD had greater kw. Need for Ts in region to become more educated about ADHD and how to deal with children. In-service education found to significantly increase Ts kw, Atts & management skills.
5	Topkin & Roman, 2015 South Africa	Av 14.5 yrs	200	KADDS (Sciutto, 2000) 36 items True/False/DK 3 subscales: General info (15 items) Symptoms/Diagnosis (9 items) Treatment (12 items) Added section: ADHD management in the classroom (13 items) based on review of literature 4 pnt Likert scale: 1=strongly disagree to 4= strongly agree	65% of Ts correctly identified general associated features of ADHD. 36% of Ts correctly identified symptoms/D of ADHD in children. 40% of Ts correctly identified treatment for ADHD in children. 82.2% of Ts had received training before. 17.9% had not KADDS accurate of 45%, 31% DK 22% inaccurate.	Barrier in SA to inclusive edu is lack of T skills & kw regarding Ts role in intervention & management of ADHD in classroom. Would be advantageous to have school psychologists work with Ts to help them implement techniques. Better T management techniques for ADHD might support children to reach their academic potential & support well-being. 97% of Ts were in support of educational interventions. 91% of Ts were in support of classroom rules. 86.9% of Ts supported Token reinforcement, 86.4% supported communication as an intervention, 85% academic/social improvement. 84.3% learning expectations, 82.8% classroom work broken down into smaller units, 82.8% repeating directions, 80.8% setting behavioral & learning expectations. Ts were least supportive of time given for tests (58.4%).
6	Blotnicky-Gallant et al., 2015 Canada	A. 15.5 yrs	113	Kw. KADDS (Sciutto, 2000) 36 items True/False/DK 3 subscales: General info (15 items) Symptoms/Diagnosis (9 items) Treatment (12 items) Beliefs - B-ADHD (Kos, 2008) 31 statements 5-point Likert scale: (strongly agree to strongly disagree)	68.2% total KADDS score for Ts. Ts scored highest on Symptoms /D subscale (80%) followed by Treatment (68.8%) and last for G Kw of ADHD (61%). Ts answered 68% of questions accurately. Knew most about symptoms and diagnostic criteria of ADHD, However less about treatment and general facts of disorder. Common misconception held amongst Ts related to diet.	No significant relationship between Kw and Atts. Likely that K amongst Ts is strong if have first-hand exp of ADHD. Possible that having higher accurate K leads to better expectations of children with ADHD. Ts with fewer negative beliefs about ADHD are more likely to seek out evidence-based information about the disorder. May be more beneficial to focus training on specific strategies as opposed to facts and etiology. Overall Ts broad K of ADHD might not be related to Ts use of classroom practices that are effective for children with ADHD.

7	Kern, A. et al, 2015 South Africa	Not stated	130 Ts F129 M1	<p>Self developed questionnaire Piloted on sample that did not include 130 Contained both open/closed questions Likert scale ranging from (strongly agree to strongly disagree) K of diagnostic criteria for ADHD was based on DSM-IV since study conducted prior to DSM-5</p>	<p>Only 15% of Ts thought ADHD was neurological. 51% Ts agreed that behaviour suggesting ADHD must occur before 7 years of age (60% Private (P) Ts/45% Public (Pc) Ts). P Ts had higher K compared to Pc Ts. Ts perceive poor diet as the primary cause of ADHD (76% P Ts and 70% Pc Ts). 52% of Ts thought Ritalin was the most effective form of treatment for children with ADHD (66% P Ts and 44% Pc Ts). Overall, study suggested that Ts understanding of ADHD is based on medical model. Ts also see systemic issues for cause of ADHD - diet and parental upbringing.</p>	<p>P Ts may be more likely to have undergone in-service ADHD training so have higher K. Supports previous' studies that Ts prefer medication as a way to control behaviors associated with ADHD. (P Ts may have easier access to ADHD specialists) 55% P Ts / 40% Pc Ts attended courses related to ADHD.</p>
8	Heppert et al, 2002 America	Not stated	103	<p>KADD - 22 error choice items 3 domains based on Antonak and Livnch (1995a) 16 truth determinable items 4 truth indeterminable factual items 2 truth indeterminable controversial items Multiple Choice answers (a,b,c,d) Items 2,6,9 and 15 from Anastopoulos (1992)</p>	<p>Because of small sample (103) researchers found that KADD was not adequately valid. Therefore, definitive conclusions about psychometric properties of assessment tool cannot be made until validity has been addressed.</p>	<p>Inclusion of more extensive direct measure of T atts. and expectations towards ADHD could better confirm or disconfirm the researchers' assumption of answering the questionnaire in a socially desirable way (pick the correct answer). Raised Ts interest (according to researchers) in ADHD and their desire for future in-service training. Training interventions could reduce Ts harmful atts and expectations towards children with ADHD. Number of students taught with ADHD over career M= 23.3. Number of formal ADHD courses taken: none=22(21.4%)/ 1=25(24.3%)/ 2-3=37(35.9%)/ 4-6=14(13.6%)/ 7 or more=4(3.9%)/ didn't report= 1(1.0%). M=2.2.</p>

9	Bekle, B. 2004 Australia	Not stated	<p>70 30 Ts 40 T students</p> <p>Practicing F23/M7</p> <p>Stdnts F32/M8</p>	<p>Self-report modified from Jerome et al. 1994 Separate measure of atts ADHD training received Amount of contact Ts had with ADHD children Participants' K of basic concepts of ADHD 20 True/false questions on ADHD K Atts section – 7-point likert from favourable to unfavourable</p> <p>Grouped into the following: Biological and nonvolitional Causation Medical and educational interventions ADHD myths</p>	<p>Significant difference in K was found between practicing and student Ts. Practicing Ts scored higher K. Researcher felt both groups had a sound K base of ADHD, however some gaps exist particularly in relation to ADHD myths. Qualitative results show both groups had similar perceptions of biological and non-volitional factors and family influences. Practicing Ts demonstrated slightly better understanding of ADHD behaviour and better informed of causes of ADHD and myths. Most significant lack of T K was in relation to diet.</p>	<p>Positive relationship between Kw and atts towards ADHD. 77% Ts did not have opportunity to benefit from extra training on ADHD. Negative atts can be changed by up to date info and effective interventions. 10% Ts received extensive training on ADHD. Significant correlation between atts towards ADHD and Kw of ADHD in both groups. 77% Ts believed they would benefit from extra training. Both groups expressed an interest in receiving more training to manage children with ADHD. Atts score improved with an increased level of training ADHD in the classroom. Practicing Ts had not received much in-service training on ADHD or as part of their university studies. Just over 50% of Ts had received brief training on ADHD. Student Ts reported that ADHD training was only covered briefly overall. Those who had not received any training (in both groups) surprisingly had the most positive atts. K and atts amongst Practicing Ts improved where they had exp of teaching ADHD children. Educating Ts about ADHD could improve student learning through more effective classroom strategies and school programmes including behaviour modification. Ts also expressed the desire for more comprehensive training.</p>
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10	Frigerio et al, 2014 Italy	Not stated	579 F565 M14	<p>Self-report Quest. - K Jerome et al (1994) / Perceptions Norvilitis and Fang (2005) (21 items) with 5-point Likert scale 1= strongly disagree to 5= strongly agree</p> <p>Instrument had previously been used with Ts in China and US suggesting sensitivity to cultural variations</p> <p>Conducted exploratory principal component analysis with a Varimax rotation</p> <p>7 factors were identified from the instrument:</p> <ol style="list-style-type: none"> 1 - Discipline 2 - Drug treatment 3 - Epidemiology 4 - Course 5 - Temperament 6 - Mental skills 7 - Social Services <p>To assess Ts Kw of ADHD the following was covered:</p> <p>Issues related to biological factors of ADHD</p> <p>Ffamily influences</p> <p>Interventions</p> <p>Myths</p> <p>True/false responses only</p>	<p>Ts showed a medium K of ADHD.</p> <p>Ts are negative towards using medication and do not rely upon discipline as an effective tool to manage ADHD.</p> <p>Ts are inclined to think ADHD is caused by biological predisposition that can affect all stages of life, however it does not directly influence mental skills.</p> <p>Ts with a greater K of ADHD are more likely to place less emphasis on the role of discipline in the onset and treatment of ADHD, to believe that ADHD is underdiagnosed, and to think ADHD has long-term effects that affect all stages on a child's life.</p> <p>Ts who received specialized info were likely to have greater K than those who did not receive it.</p> <p>Ts perceived their K was fragmented and incomplete.</p> <p>52.3 Ts had received information on ADHD previously.</p>	<p>Sig. negative correlation between years of teaching exp and K.</p> <p>Ts with more teaching exp may not have received ADHD training.</p> <p>Data indicate certain dimensions of perceptions are independent of K.</p> <p>Speculate that view of relationship between K and perceptions is controversial because perceptions are more than a matter of K and exposure to up to date info.</p>
11	Al-Omari et al 2014 Jordan	Not stated	130 F123 M7	<p>Self-report Quest. (Ghanizadeh et al., 2006) 20-items</p> <p>Used because empirically supported and agreed-upon measure of general ADHD K rather than specialised K</p> <p>parts to Quest. - demographic and Kw/atts of Ts towards ADHD</p> <p>Yes/no answer to each item</p> <p>12 items assess Kw</p> <p>8 items assess Ts atts</p> <p>Translated into Arabic and back translated with verification</p>	<p>Jordanian Ts may lack Kw about ADHD and had neg. atts. towards children.</p> <p>76.2% Ts thought ADHD could be caused by poor parenting/spoiling with ADHD.</p> <p>76.2% Ts thought ADHD was a serious problem that should be managed effectively.</p> <p>Unsatisfactory levels of ADHD Kw amongst Ts - only 5 items answered.</p> <p>75% Ts reported that ADHD is related to biological and genetic factors correctly by more than 70%.</p> <p>94.5% Ts agreed that they should be aware of ADHD and students with ADHD in their classroom.</p> <p>Another 5 correct answers only 50% of sample.</p> <p>93% Ts thought ADHD can be treated and managed using proper medication.</p> <p>Overall perception of children with ADHD amongst Ts was mostly neg.</p> <p>79% Ts agreed that educators with special training should teach children with ADHD.</p>	<p>Lack of prior education about ADHD for school Ts. (34.9%) Tv + Radio, No info (25.4%), Friends + Relatives (23.8%), scientific journal (7.9%), workshop (6.3%), reading (1.6%).</p> <p>Jordanian Ts do not receive specific training or prep. For working with ADHD children.</p> <p>No significant differences existed between T Kw and years of T experience.</p> <p>Ts with Kw cited sources such as friends/relatives and television/radio.</p> <p>Many Ts reported that they had no info. Whatsoever.</p> <p>Ts expressed a willingness to learn more about ADHD.</p> <p>No relationship between Ts Kw and their atts.</p>

12	Muanprasart, P. & Arunyanart, W. 2014 Thailand	Not stated	201 F172 M29	<p>Thai version of KADDS from (Scuitto, 2000)</p> <p>Questionnaires contain 3 sections: Demographics ADHD exposure Sources of Kw.</p>	<p>Thai Ts K of ADHD has never been assessed previously. Total T Kw 19.4%. 1st systematic evaluation of Thai Ts Kw of ADHD via KADDS.</p> <p>Ts still lacked accurate Kw with higher accurate scores in field of sign/symptoms and diagnosis compared to general info. and treatment.</p> <p>Younger Ts seemed more Kw about general info. of ADHD and sign/symptoms and diagnosis subscales and total subscale.</p> <p>Younger Ts could have higher Kw due to only recent public awareness in Thailand of DSM disorders.</p> <p>younger Ts more acquainted with ADHD.</p>	<p>Majority (83.6%) Ts had never been taught about or trained on ADHD before graduating.</p> <p>59.7% Ts had taught or been teaching students with diagnosed ADHD.</p> <p>3 most frequent sources of ADHD Kw were television, textbooks and leaflets.</p> <p>46.5% Ts were familiar with ADHD patients apart from their pupils.</p> <p>Sources of ADHD K of Ts: TV (60.4%) Books (55.2%) Leaflets (51%) Published Material (36.8%) Internet (29.4%).</p>
13	Rodrigo et al, 2011 Sri Lanka	Av. 15 yrs	202	<p>Self-administered Quest.</p> <p>12 statements covered: (diagnosis aetiology, treatment and prognosis)</p> <p>5-point Likert scale - agreed/disagreed to did not know</p> <p>Quest. Piloted on 10 Ts who volunteered to participate in pilot stage</p>	<p>Ts Kw about symptoms and presentation of ADHD was below 50%.</p> <p>Good understanding of effects of ADHD, Ts role in management and counterproductive effects of punishment.</p> <p>Ts had limited Kw about treating ADHD with medication.</p> <p>Lower T Kw of symptoms and presentation of ADHD has a sig. impact on their effectiveness as key players in initial screening and diagnosis.</p> <p>31% Ts for Q.1 and 34% Ts for Q.2 were aware that their K was poor by indicating that they did not know the answer.</p>	<p>Ts att. towards behavioural therapy was positive.</p> <p>More than 80% Ts believed that ADHD was a result of poor parental upbringing.</p> <p>56.5% Ts were of opinion that behavioural disturbances caused by ADHD children were deliberate and malicious.</p> <p>Ts who had training in child psychology: (51.5%) had significantly higher scores on Kw. and had more favourable att. Poor perceptions on effectiveness of ADHD medication may influence referring affected children to specialists or treatment.</p> <p>Majority of Ts felt behavioral therapy was beneficial although detailed Kw of behavioral treatment was not assessed.</p>

14	Ghanizadeh et al 2006 Iran	Not stated	196	<p>Self-report Quest.</p> <p>2 parts: Demographic Kw, att. and sources of ADHD info</p> <p>True/false questions</p>	<p>Ts had a lack of Kw. that did not differ between gender.</p> <p>Ts Kw at the age of 40 if the ADHD domain is low and insufficient.</p> <p>69.9% Ts were unaware of Ritalin.</p> <p>Only 37.8% Ts correctly said that ADHD can be treated with medication.</p> <p>89.3% Ts thought ADHD children needed psychological support.</p> <p>95.9% Ts believed that educators should be aware of any ADHD students in their class.</p> <p>Attention score was low. 85.7% Ts self rated their Kw of ADHD as low.</p>	<p>Att. Between gender did differ with males scoring higher. Increased awareness of Ritalin could benefit children with ADHD and decrease T stress. Most Ts agreed that parental spoiling can cause ADHD. Over 50% Ts agreed that ADHD students are at a high risk of truancy. Rate of Ts that think ADHD students' IQ is similar to non-ADHD students is lesser than that of other studies. 39.8% of teachers agree that educational achievement of ADHD students would be lower than that of non-ADHD students. Positive relationship found between Kw and att. Indication that Ts who know more about ADHD are also more tolerant. Key to raising tolerance in Ts is increasing Kw of ADHD. No correlation in study between Att. and education level of T. Special courses or lectures on ADHD students should be provided. Medical personnel should take a more active role in the education of Ts. Nearly all Ts believed that they were unaware of ADHD. Main source of info re ADHD was television/radio. Only 5.7% Ts passed special educational courses on ADHD. Medical personnel were the 6th most common source of ADHD info for Ts.</p>
15	Vereb, R.L. & DiPerna, J.C. 2004 US	Av. 13 yrs	47 F94%	<p>Knowledge of ADHD Rating Evaluation Scale (KARE)</p> <p>4 domains: Kw of ADHD (31 questions) Kw of Treatments commonly used for ADHD (12 questions) Medication acceptability (5 questions) Behavioral management acceptability (5 questions)</p> <p>Kw of ADHD - true/false with option of don't know Other domains use likert (4-point)</p> <p>20 experts reviewed content validity of KARE</p>	<p>T Kw scores ranged from 14 to 27 items correct out of possible 31. T Kw scores of treatment ranged from 3 to 10 items correct out of possible 12. T Kw scores for medication acceptability ranged from 11 to 26. T Kw of behaviour management acceptability ranged from 14 to 27. Ts Kw of ADHD was unrelated to their K of treatments. Ts Kw of ADHD was positively related to their ratings of medication acceptability but unrelated to their acceptability of behavioral interventions. Ts Kw of treatments was negatively correlated with their medication acceptability ratings but unrelated to their behaviour management acceptability ratings.</p>	<p>Ts years of experience with students with ADHD was only significantly related with ratings of medication acceptability. Ts participation in training regarding ADHD was positively correlated with their Kw of ADHD, acceptability ratings of medication, and acceptability ratings of behaviour management strategies. Participation in training was not related to Kw of treatments. Results suggest no correlation between exp of teaching students with ADHD and Kw of ADHD, Kw of treatments for ADHD, or acceptability ratings of behaviour management interventions. Ts with training in ADHD had greater Kw than those without training. 64% Ts had received previous training in ADHD.</p>

16	Nur, N. & Kavakci, O. 2010 Turkey	F82 10yr+ 17.2% M5 10yr- 82.8%	87	<p>Self-report Quest. Composed by researchers based on literature review</p> <p>2 parts: Demographic (8 items) ADHD Kw (10 items) Atts. Related to ADHD (8 items)</p> <p>Kw score range from 0-10 (0 indicating least amount of Kw)</p> <p>Atts. Score range from 0-8 and normally distributed</p> <p>Face validity of Quest. approved by a child psychologist and clinical psychologist</p>	<p>77% Ts agreed that ADHD is a serious problem. 32% Ts reported that ADHD is due to biological and genetic vulnerabilities. 65.5% Ts believed ADHD is a consequence of parental spoiling. 51.7% Ts reported that ADHD children are at a high risk of developing truancy and increased tendency for becoming alcoholics and drug addicts. 42% Ts thought that children with ADHD were at a high risk for becoming delinquent as teenagers. 36.8% Ts emphasized the necessity for treatment of children with ADHD.</p> <p>Overall T Kw is insufficient. Kw of Ritalin is low and increased awareness could benefit children.</p>	<p>93.1% Ts agreed that children with ADHD should receive a special education. 92% Ts felt children with ADHD should receive psychological support. 50.6% Ts consider that only specially trained educators should teach children with ADHD. 60.9% Ts thought that the same discipline rules used for all student should be applied to ADHD children. 80% Ts feel that all educators should be aware of any child with ADHD. Overall, Ts have moderate tolerant atts. Regarding ADHD. Ts said television was most common source of ADHD info (83.9%) then Friends (66.7%), Newspapers/magazines (44.8%), specialized literature (25.3%) and medical personnel (14.5%). No mention of relationship between Kw/Atts and experience. ADHD training is necessary, and it should be comprehensive. Relationship between Kw and Atts.</p>
17	Abed et al, 2014 Saudi Arabia	Av. 5yrs	54 F26 M28	<p>KADDQ (West, 2005) 67 rating scale items, based on KADDS Each item is phrased as a statement (T/F/DK)</p> <p>2 domains: ADHD characteristics/Causes Interventions</p> <p>Back translation, consultation and piloting</p> <p>Semi structured interviews</p>	<p>47% Ts answered questions correctly and found to have highest Kw. 68% score for Kw on characteristics subscale about general characteristics of ADHD. 37% score for Kw on causes subscale treatment. 33% score for Kw on treatment subscale. Saudi Ts have gaps and misconceptions in their Kw of causes and interventions of ADHD including impact and diet. ADHD persistence, and general myths surrounding ADHD. Ts to some extent were Kw about ADHD characteristics, but less informed about causes and treatment.</p>	<p>20% Ts reported having some previous ADHD training. 63% Ts believed they had enough info. And skills related to children with ADHD. Ts strongly disagreed with the misconception that the misbehavior of children with ADHD was due to being naughty. Ts educational levels and their professional development concerning ADHD were unconnected to their ADHD Kw. Results suggest that capability of Ts to identify likely causes of ADHD and suitable interventions does not increase with experience. Interviews - Ts said courses was the most common source of ADHD info and disseminating correct Kw, most Ts believed media (tv/radio) was a good means to provide correct Kw, then followed by brochures/newsletters. 50% Ts considered using Specialist Ts as source of disseminating info.</p>

18	Guerra et al, 2017 US	Not stated	173	<p>KADDS (Scuitto, 2000)</p> <p>39 items (T/F/DK)</p> <p>2 open ended questions</p> <p>3 demographic info</p>	<p>Courses taken related to ADHD/ Receiving administration support in working with students diagnosed with ADHD: No course = 105(60.7) 1-2 courses = 50(28.9) YES = 80 (46.2) 3-4 = 9 (5.2) NO = 90 (53.8) 5-6 = 5(2.9)</p> <p>Attended training or workshops relating to teaching students with ADHD: 7-8 = 0 (0) 9 or more = 4 (2.3) YES = 71 (41) MANOVA result: NO = 102 (59) No a statistically significant difference among teacher with different years of exp on symptoms kw and treatment. No a statistically significant relationship between predictor variables (total years of teaching exp, number of coursework taken and administrative support and training), and kw of ADHD.</p> <p>Multiple regression results on ADHD Symptoms: there was a statistically significant relationship between predictor variables and symptoms, $p < 0.01$. On treatment: No a statistically significant relationship between predictor variables and treatment $P = 0.28$.</p>	<p>Majority of Ts did not have any ADHD-related assessment in their UG or graduate training. Nearly 60% Ts reported that they did not learn about ADHD in educator training programmes. Most Ts indicated a lack of training as a hurdle to meet the needs of children with ADHD. Most Ts indicated that they rely on info. Provided by special education Ts, counsellors and school principals. There was not a statistically significant difference among Ts with different years of exp on symptoms, Kw and treatment. In the study, Ts indicated that the opportunity for ongoing professional development would help them to meet the needs of children with ADHD in the classroom. Ts have indicated their inability to provide adequate educational support to children with ADHD in the absence of administrative support. Many Ts reported that students with ADHD require a distraction-free environment which is not possible in regular education classroom with 30 students. Ts indicated that an after-school programme for such students would help make schooling experiences rewarding. Ts indicated that appropriate counselling services would also help students deal with their personal issues. More than 50% Ts did not receive administrative support in successfully implementing educational strategies for students with ADHD. Study results suggest that administrators don't understand how emotional and mental health can negatively impact on academic performance. Findings suggest that perhaps more training is NOT the only solution to help Ts and students.</p>
19	Al-Hakeem et al, 2013 Bahrain	<p>25-35=93 (60%)</p> <p>F83 36-45=49 (31.6%)</p> <p>M73 >45=13 (8.4%)</p>	158	<p>Questionnaire</p> <p>2 parts: Demographic Kw and Atts. towards ADHD</p> <p>T/F (True = 1 / False = 0)</p>	<p>29.4% Ts believed that ADHD is inherited. 13.5% Ts thought ADHD was a life-long condition. 47.1% Ts thought ADHD is due to parental punishment. 25.8% Ts knew that ADHD could be treated with medication. 51.6% believed that ADHD is the result of excess sugar. 67.1% Ts agreed that ADHD students need special education. 76.5% Ts thought that children with ADHD need a psychiatrist. 30.9% Ts believe that children with ADHD should be punished differently. Ts in Bahrain have limited Kw of ADHD 41.1% Ts believed that ADHD students need less homework than others. 34% Ts thought that ADHD students should be examined orally.</p>	<p>45.9% Ts Kw of ADHD from magazines and newspapers. 3.8% Ts got their source of ADHD info. From medical sources. 88.6% Ts had dealt with children with ADHD previously. Lack of Ts' Kw could have affected the performance and future career of ADHD students. Neither the level of education of Ts nor their years of experience affected such Kw. There is a significant relationship between Kw and Atts. of Ts which indicates that those Ts who know more about ADHD might deal in a proper manner towards students with ADHD.</p>

20	Stampoltzis, A. & Antonopoulou, K. 2013 Greece	<p>M GT(31)</p> <p>1-5= GT 17 SEN T 14 F SEN T (27)</p> <p>6-10= GT 31 SEN T 10 F GT 113 (78.5%)</p> <p>11-15= GT 28 SEN T 18 SEN T 63(70%)</p> <p>16-30 GT 48 (33.3%)</p> <p>SEN T 48 (53.3%)</p>	234	<p>ADHD Knowledge Based Questionnaire (McNicholas & Santosh, 1997)</p> <p>30 Qs phrased in the form of a statement Four statements from original omitted as not relevant to Greece</p> <p>T/F added DK</p> <p>4 specific areas for K: Epidemiology/definition (7 items) Symptomology (10 items) Etiology (5 items) Treatment (4 items)</p> <p>Positive and negative indicators of ADHD to avoid potential response bias</p>	<p>General Ts scored 61% of total Kw. Special Education Ts scored 71% of total Kw.</p> <p>56.9% G Ts and 45.6% SEN Ts incorrectly answered that ADHD does not have a hereditary basis, although ADHD has been found to run in families.</p> <p>52.1% G Ts and 48.9% SEN Ts responded incorrectly that family factors are more important than biological factors in the causation of ADHD.</p> <p>30% SEN Ts wrongly believe that dietary constituents are responsible for ADHD.</p> <p>Sig. total Kw difference - $t(232) = -5.44$, $p < .001$ - with SEN Ts appearing to be more Kw. of ADHD issues than their G T colleagues.</p> <p>SEN Ts had sig. better Kw of the definition of ADHD, the characteristics and caused of ADHD.</p> <p>SEN Ts had sig. fewer misconceptions than G Ts of the definition of ADHD, symptomology of ADHD, etiology of ADHD and treatments for ADHD.</p> <p>G and SEN Ts did not differ in lack of Kw (DK responses) related to all 4 ADHD topics: definition/ symptomology/ etiology/ treatment.</p>	<p>Demographic characteristics such as age, years of teaching did not seem to increase T's overall K of ADHD.</p> <p>Prior experience of teaching children with ADHD seems to slightly improve overall K of ADHD.</p> <p>Ts with prior experience of teaching a child with ADHD scored slightly higher in the total scale and in the symptomology subscale than Ts with no prior exposure to a child with ADHD.</p>
21	Kos et al, 2004 Australia	Not stated	120	<p>Self-report Quest. Developed by researchers</p> <p>Measured actual and perceived Kw of Ts</p> <p>Perceived Kw measured on 10cm visual scale (very little 0cm a lot 10cm)</p> <p>Actual Kw measured on 27 statements about ADHD (T/F/DK) Kw items included from Jerome (1994) Scuitto (2000) and some items based on ADHD literature</p> <p>Pilot of quest. to 9 Ts</p>	<p>In-service Ts' perception of their own Kw was moderately correlated with their actual Kw scores.</p> <p>Perceived Kw - for in-service teachers these ranged from 1 to 9.5 cm with an average score of 4.77cm or 47.7%.</p> <p>Actual Kw - on average in-service Ts were able to correctly answer 16.4 of the 27 actual Kw items, giving in-service Ts an average actual Kw of 60.7%.</p> <p>In-service Ts rated themselves sig. higher on perceived Kw about ADHD.</p> <p>In-service Ts scored sig. higher on the actual Kw quest.</p> <p>Overall, primary school Ts' Kw of ADHD was inadequate.</p>	<p>In-service older Ts were more likely than younger Ts to have had greater teaching exp in general as well as being more likely to have ever taught a student with ADHD during their career.</p> <p>Ts with greater years of teaching exp were more likely than less experienced Ts to have ever taught a child with ADHD. However, the actual number of students with ADHD taught was not significantly related to either age or years of teaching exp.</p> <p>Having ever taught a student with ADHD was sig. related to both perceived and actual Kw scores.</p> <p>Ts with more years of exp generally perceived themselves as having significantly more Kw than less experiences Ts. However, T exp was not significantly correlated with actual Kw scores.</p> <p>Age was not related to perceived or actual Kw.</p> <p>Older Ts were more likely than younger Ts to have engaged in additional ADHD training.</p> <p>Additional training also was more common in Ts with longer teaching careers and for Ts who had every taught a student with ADHD.</p> <p>Ts who had engaged in additional ADHD training perceived their ADHD Kw to be sig. higher on the actual Kw quest. than did nontrained Ts.</p> <p>The nonsignificant relationship found between years of T exp and ADHD Kw does not support the findings of Scuitto et al. (2000).</p>

22	Perold et al, 2010 South Africa	Not stated		KADDS (Scuitto, 2000) Adapted and added 2 items to make 41	<p>Substantial lack of Kw about ADHD among primary school Ts.</p> <p>75.2% Ts aware that combination of parent/teacher training and medication is an effective treatment.</p> <p>Ts overall percentage score of correct responses was 42.6% indicating Kw.</p> <p>76.3% Ts thought child with ADHD will be more distinguishable in classroom than in free play situation.</p> <p>35.4% DK responses indicating a lack of Kw.</p> <p>53.1% Ts showed lack of Kw. and 32.2% Ts had misperceptions about behaviour of child in presence of mother versus father.</p> <p>22% incorrect responses pointing to misperceptions.</p> <p>21% Ts showed lack of Kw and 19.9% had misperceptions about playing video games for a long period but not able to complete schoolwork.</p> <p>Ts were very Kw about the hallmark symptoms of ADHD, with more than 75% of Ts correctly identifying the symptoms of distractibility, fidgeting, difficulties with organisation, and primary clusters of ADHD.</p> <p>59.6% Ts showed a lack of Kw regarding epidemiology.</p> <p>41.5% of Ts had lack of Kw about long-term outcome of ADHD - 31.9% Ts believed that most children outgrow ADHD by puberty.</p> <p>31.2% Ts held misperceptions regarding epidemiology.</p> <p>65.2% Ts believed that reducing sugar, additives will affectively reduce the symptoms of ADHD in children.</p> <p>70.8% Ts showed a lack of Kw regarding causes of ADHD and 9.6% Ts held misperceptions regarding caused of ADHD</p> <p>25.2% Ts showed a lack of Kw regarding symptoms of ADHD and 62.3% Ts held misperceptions regarding symptoms of ADHD.</p>	<p>Lack of T Kw regarding epidemiology could lead to a greater number of referrals of children with ADHD.</p> <p>Better T Kw should mean they are better able to communicate with the parents of children with ADHD.</p> <p>T K is unrelated to the years of teaching exp.</p> <p>Some of the Kw of Ts was acquired through what is portrayed about ADHD in media reports - which is often incorrect and not based on scientific research.</p>
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23	Shroff et al, 2017 India Mumbai city	Not stated	106	KADDS (Scuitto et al, 2000) T/F/DK	<p>Av. Ts' Kw score on KADDS was 49% (mean value 16.92).</p> <p>Correct responses amongst Ts: General information 40% Symptoms/diagnosis 63% Treatment 44%</p> <p>Incorrect (misconceptions): total score (27%) General info 36% Symptoms/digs 23% Treatment 24%</p> <p>Dk responses: total score (24%) General info 24% Symptoms/Dias 14% Treatment 32%</p> <p>Indian Ts relative Kw about symptoms/diagnosis was sig. better (in terms of accurate responses) than their Kw about general features or treatment of ADHD. In respect of symptoms there is awareness amongst Ts of inattention, impulsivity, and fidgetiness of students.</p>	<p>Important benefit of using KADDS was the assessment of lack of Kw.</p> <p>Teachers responses indicated a lack of awareness regarding stimulant medication, use of anti depressants and efficacy of electro-convulsive therapy.</p> <p>Teachers' years of exp was not found to be correlated with kw scores. The subscales were significantly correlated with each other.</p>
24	Alkhtani, K.D.F 2013 Saudi Arabia	Not stated	429	KADDS (Scuitto et al, 2000) T/F/DK Demographic quest.	<p>Overall Ts Kw (% of correct responses) was 17.2% - poor Kw. Overall Ts incorrect responses 23% - indicate misperceptions. Overall Ts don't know responses 59.8% - lack of Kw. For first subscale Ts Kw was 16.8% accurate responses, 26.2% incorrect reponses and 57% don't know. For second subscale Ts Kw 18.1% accurate responses, 22.8 incorrect responses, 59.1% don't know. For third subscale Ts Kw 16.6% accurate responses, 20.4% incorrect, 63% don't know. Sig. lack of Kw about ADHD amongst Ts.</p>	<p>Was a strong statistical correlation between Ts Kw of ADHD and their prior training/experience with ADHD.</p> <p>Ts need to be educated and supported to know more about ADHD.</p> <p>There should be continuing professional development for Ts so that they can offer better support for children with ADHD.</p>

25	Jerome et al. 1994 US Canada	Not stated	American 439 Canadian 850	Self-report quest. 2 parts: 20 MCT for demographic 20 T/Fquestions on ADHD intended to assess Ts general Kw of diagnosis and treatment	<p>Both groups of Ts scored good Kw. Canadian Ts 15.5 correct answers out of 20 (78%). American Ts 15.4 correct answers out of 20 (77%). Both groups understood that ADHD was a disorder. 74% Canadian Ts 75% American Ts agreed that ADHD is not caused by poor parenting practices. 33% Ts did not feel that ADHD was inherited, 20% saw it as occurring equally in girls as boys. Both sets of Ts seemed well informed about the notion that "medicine alone is not the answer and that there are reasonable education interventions". 80% Canadian Ts and 78% American Ts disagreed with "if medication is prescribed, educational interventions are often unnecessary". Both sets of Ts seemed to be least Kw about: dietary management - 66% of all Ts indicated that "ADHD can often be caused by sugar or food additives". 77% of Canadian Ts and 81% American Ts disagreed that "diets are usually not helpful in treating most children with ADHD". Major lack of Kw connected with long-term prognosis - 41% Canadian Ts 50% American Ts agreed that "most ADHD children outgrow their disorder and are normal as adults". Overall, generally positive atts. towards seeing ADHD as a genuine condition are supported by the overall good results regarding basic concepts around ADHD by both groups of Ts. Results suggest there are some common myths regarding ADHD, its management and prognosis and diet.</p>	<p>Both sets of Ts had almost no opportunity to learn about ADHD during the course of their education.</p> <p>99% Canadian Ts and 89% American Ts received either no instruction at all, or only a cursory mention during the course of their education.</p> <p>97% Canadian 98% American Ts show strong interest in wanting additional training.</p> <p>83% Canadian 80% American Ts have read one or more articles on their own to increase their Kw of ADHD.</p> <p>Results showed that Ts who had had some form of training had scored better in the questionnaire.</p> <p>Training in ADHD could make a difference in T Kw.</p> <p>In-service training would need to include outside professionals, particularly prescribing physicians.</p> <p>Both samples, 86% Ts reported having no contact with an outside clinician with this group of children.</p>
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26	Donnah et al, 2012 Australia	Ranged from 1 to 37 yrs M=15.76 SD= 10.78	127	KADDQ (West et al, 2005) 67-item shortened to 33 items 3 subscales each with 11 items: (characteristics/causes/treatment) T/F/DK Attis: 4 open-ended responses measure 3 areas (beliefs and teaching, affect and behaviour). 5-point scale from very positive to very negative. Personal exp: 4 items (Yes, No & Unsure)	In-service Ts total Kw was 60.2%. In-service Ts had sig. higher total Kw of ADHD and higher perceived Kw than pre-service Ts. In-service Ts had higher total Kw for characteristics of ADHD. In-service Ts have sig. higher Kw of characteristics and treatment of ADHD compared to pre-service Ts. In-service Ts scored lowest on Kw of treatment. In-service Ts did not become sig. more negative in their beliefs of ADHD as their Kw grew. As in-service Ts exp grew so did their favourable atts. towards children with ADHD.	Both in-service and pre-service Ts had realistic perceptions of their Kw. Kw increases/develops after Ts gain classroom experience as opposed to during university education. Teachers believed that they had taught between 0 to 200 children with ADHD (M=20.23, SD=27.21). One third of Ts (33.9%) reported personal exp with ADHD. Low T Kw of treatment could be due to absence of in-service training. It is possible that as Ts gain more exp and Kw of ADHD they also gained more awareness of the problems faced by children with ADHD. Ts who had in-service training on ADHD 35.4%.
27	Padilla, A.M et al, 2018 Colombia	20-30yrs= 1 (1.61%) M1 31-40= 10 (16.13%) F61 41-50= 36 (58.06%) >50 yrs=15 (24.19%)	62	KADDS (Scuitto 2000) Spanish version 36 items T/F/DK	Overall Ts correctly answered 48.52% of questions. Incorrect responses Ts: total (23.57%). Dk responses: total score (27.91%). Most correct answers were on the symptoms/ diagnosis subscale (69.35%). General information 30.75%. Followed by treatment 33.74% Ts have little Kw about ADHD (answered fewer than 50% correctly).	Surprising result given that 83.87% of Ts reported having received some type of training on ADHD.
28	Munshi, A. 2014 Saudi Arabia Makkah	<5 = 60 5-10= 25 >10= 45	130	Interview questionnaire designed by the researcher 3 sections: Socio-demographic General Kw of ADHD Management of ADHD Answers were on a 5-point Likert scale Pilot study of 24 Ts with modifications made where necessary	60.8% of Ts had an excellent K regarding diagnosis of ADHD. 2.3% Ts had an insufficient K of diagnosis. 13.8% of Ts had insufficient Kw regarding general info. 57.7% Ts had good Kw of general info. Related to ADHD. 13.1% Ts had excellent Kw regarding treatment of ADHD. 6.2% Ts had insufficient Kw of treatment. Overall, 37.7% Ts showed excellent Kw with 0.8% Ts having insufficient Kw. 84.6% Ts believed that they must have an active role in management of ADHD. 15.4% Ts felt that the T did not have to be involved in the management of children with ADHD.	No sig. diff. in score reflecting K based on years of experience.

29	Ward, V.A. 2014 Ireland	<5= 21.6% >6=78.4% 4-10=76.7 >10= 23.3%	93	KADDS (Scuitto 2000) T/F/DK	<p>56% overall Ts gave correct answers, 21% do not know and 23% incorrect.</p> <p>Associated features - overall Ts gave 52.2% correct answers, 22.4% do not know and 25.4% incorrect.</p> <p>Symptoms/diagnosis - overall Ts showed 71.6% correct answers, 9.4% do not know and 19% incorrect.</p> <p>Treatment/outcome - overall Ts showed 49.07% correct answers, 28.37% do not know and 22.37% incorrect.</p>	<p>Higher results compared to previous studies (Scuitto 14 years) could be due to time difference.</p> <p>Attendance at special needs training/correct answer 51.9%. Not surprising that symptom/diagnosis subscale scored highest considering the role Ts play in.</p> <p>Attendance at ADHD specific training/correct answer 63.3% ADHD referrals.</p> <p>Number of ADHD children taught (41.2%).</p> <p>Ts with more T exp, higher qualifications and who have attended ADHD training have much higher K and less negative conceptions of ADHD.</p>
30	Scuitto 2000 US	average of 12.57 (SD 5 8.06)	149	KADDS	<p>Teachers' were most knowledgeable on the symptoms/diagnosis subscale and scores were significantly greater than scores on both the treatment, $F(1,148) 5 158.61, p, .001, d 5 2.07$ and general info subscales, $F(1,148) 5 194.73, p, .001, d 5 2.29$.</p> <p>Teachers' scores on the treatment and general info subscales did not differ significantly from each other.</p> <p>Misperceptions about ADHD: "don't know" responses for the general info (38.66), symptoms (27.14), and treatment (40.94). Incorrect responses for the general Kw (18.34), symptoms (9.99), and treatment (15.94).</p> <p>There were also small, but statistically significant correlations between KADDS total scores and years of teaching exp, $r (142) 5 .18, p 5 .029$.</p> <p><i>Most Common Correct Responses:</i> "Children with ADHD often fidget or squirm in their seats" (89.3%).</p> <p><i>Most Common Misperceptions:</i> "Reducing dietary intake of sugar or food additives is effective in reducing symptoms of ADHD" (42.3%).</p> <p><i>Most Common "Don't Know" Responses:</i> "Is there a family history of ADHD (i.e., first-degree relatives)? (68.5%)." (68.5%).</p>	<p>Teachers preferred informal sources of information as apposed formal.</p> <p>Actions aimed at increasing teachers 'kw should be promoted. Teachers should receive a variety of training and not rely only on informal sources.</p> <p><u><i>Most Common Correct Responses About ADHD:</i></u> Children with ADHD often fidget or squirm in their seats (89.3%). Parent-training programs are not based on the rationale that ADHD is caused by poor parenting skills (80.4). <u><i>Most Common Correct "Don't Know" Responses:</i></u> Is there a family history of ADHD (i.e., first-degree relatives)? (68.5%). <u><i>Most Common Misperceptions of Teachers About ADHD:</i></u> Reducing dietary intake of sugar or food additives is effective in reducing symptoms of ADHD (42.3%).</p>

31	Woyessa et al 2019 Western Ethiopia	42% had more than 16 years of exp	206 (F=50.5%)	Descriptive cross-sectional design Questionnaire was adopted from KADDS	76.2% had misconception about ADHD. 33.5% had lack of kw on the diagnosis. 11.2% had misbeliefs about the diagnosis. 81% had misbeliefs on treatment of ADHD.	Teachers should be educated and supported in regarding ADHD via in-service training.
32	Alajmi et al 2018 Riyadh Saudi Arabia	59% had 1-5 yrs of exp 100% of those Ts who have 6-15 yrs of exp differentiate between normal and ADHD students	51 female Ts from 3 primary schools	Descriptive cross-sectional design Self-administered quest. (Yes and No) options	High percentage of Ts had moderate level of kw about ADHD.	74.5% have heard about ADHD. 27.5% read books about ADHD. 37.3% Read brochures about ADHD. 49% read article about ADHD. 21.6% had relatives with ADHD. 84.6% had attended courses about ADHD.
33	Alfageer et al 2018 Riyadh KSA	6.5 yrs with minimum teaching exp of 3 yrs while the maximum was 32 yrs	182 Male Ts from 17schools Only 141 teachers completd and returned the quest.	Self-administered quest Adopted from KADDS Using 5-point Likert Scale	Total Knowledge score was 60% and below for labelling as having insuffivciant Kw (good Kw 61%-75%). 59% had good knowledge, 13% had very good Kw, 28% had insufficient Kw and 17% had no kw. Two third of Ts had Kw about ADHD. Ts showed positive attits. There was significant correlation between Kw and Atti $p < 0.00$. The overall Kw was good maybe because of the self-reported nature of the study might led to some exaggeration on the part of participants.	93% have heard about ADHD. Main source of Info was internet 49%, social media 34%, TV 27%, books 23%, magazine 7% and 18% through training. 82% did not attend ADHD courses. When Ts were asked "Do you have enough Info about ADHD?" YES 23% NO 36% NOT SURE 42% NO significant relationship Between yrs of exp and overall Kw and Atti toward ADHD. Its recommended that schools shloud invest in faculty development and arrange structured training and workshops on ADHD to sippoprt teachers to deal with students with ADHD.

Appendix D: Study characteristics B (Interventions)

	Author, Year and Country	Design and Sample size	Type of Intervention/ duration	Scale of measurement	Activities/ Delivery	Follow-up? & Post-test duration	primary outcome	secondary outcomes	Was teacher knowledge increased?
1	Lasisi et al, 2017 Nigeria	RCT / waitlist CG Int Grp 84 CG 75	Face to face 3 days	27-items Self-Report ADHD Questionnaire (SRAQ). Kw of symptoms, diagnosis, treatment, nature, causes and outcomes of ADHD. Derived from KADDS. T/F/DK 30-item of SRAQ to assess atts. 5-point Likert 12-item of the Kw of Behavioral Intervention Questionnaire (KBIQ) developed by second author (Ani) to assess teachers'kw of classroom strategies for ADHD.	Presentations Vignettes Role Play Small group discussion Videos Delivered by first author, Lasisi	1.5 hours (2 weeks). Immediately after delivering Int.	At baseline, the scores on kw & att. towards ADHD were not sig. diff. between the groups but IG scored sig. higher on Kw of behavioural int. Post Int. IG scored sig. higher on Kw of ADHD, Kw of behavioural ints for ADHD and sig. less negative att. towards ADHD. Int. had a statistically sig. effect on atts. towards ADHD Follow-up session helped with increase in Kw.	Follow-up session increased Kw of ADHD but no further increase in Kw of behavioural ints and no further reduction of neg. atts.	Yes, IG had statistically sig. increase in Kw of ADHD, behavioural management and improved atts. towards children.
2	Syed & Hussein 2010 Pakistan	Pilot NON-RCT 49 Ts	Face to face 5 days / 10 hrs	20-item self-report about ADHD adopted from (Jerome et al, 1994). T/F pre/post test	Videos Handouts Printed material Real-life scenarios Clinical psychologist Delivered by the authors and a clinical psychologist	No Re-administration of survey (6 months) 35 teachers completed	Improvement in Kw amongst Ts from IG with the difference remaining significant even 6 months post int.	Possible improvement in Ts recognition of children with ADHD. Not sure if increase in Kw will lead to an increase in referrals made by Ts.	Yes, difference ranged between 1.48 and 2.95.
3	Barnett & Corkum 2012 Canada	Pilot 19 female Ts NON-RCT	Online 30-60 minutes weekly 7 weeks	Kw., Atts & behaviour was measured by way of self-report pre and post Int.	PowerPoint Presentations web links Discussion boards who delivered? Not stated.	No Not stated	Teachers felt reported to be in more control and having higher competence to manage ADHD in classroom. All sessions received high satisfaction from teachers. Overall int. was very well received. Web based Ints can be effective as opposed to face to face ints. They are accessible and capable of hosting a large quantity of people.	Unavailable	Yes, teachers rated themselves as more in control.

4	Giannopoulos et al, 2017 Greece	Convenience sample NON-RCT 143 in total 68 nurseries 75 teachers	Face to face Group 1 - 5 hrs Group 2-18 hrs 2 days	Self-report ADHD-KQ. 29 items (True/False/DK). Pre and post test. Developed by the researchers.	Delivered by first two authors, Giannopoulos & Korkoliakou.	No Not stated	Increase in Kw for both groups. Sig. increase for Grp 2.	Important implications for UG curriculum for Ts to overcome Kw gaps in ADHD could lead to Ts using more appropriate strategies and better referrals.	
5	Sarrafi et al, 2010 Iran, Asfahan	RCT Pilot 67 teachers 35 -workshop 35 - non-attendance Random	Face to face 2 days wkshp (10 hrs) and Booklet non-attendance (info only)	Post int. only 33-item questionnaire (right, wrong, no idea) for Kw. 9 items relating to Atts. 5-point likert-scale. Developer NOT stated	Delivered by: An assistant prof A subspecialist of a child and adolescent psychiatry and her fellowship assistant.	Yes, day 2 Post workshop Not stated	Increase in T Kw was not sig. diff. between workshop and non-attendance group. Atts. Between groups was sig. Workshop group showed improved attention compared to non-attendance.	The less the Kw of Ts about ADHD the more destructive children may be in the classroom. Workshops give chance for Ts to discuss their exps.	
6	Barbarese & Olse 1998 US	Pilot study 44 Ts Pre- and post-int RCT	Face to face 2.5 hrs	pre-training questionnaire 27 T/F items (ADHD Kw) Developed by the researchers based on Gerome et al 1994	High interaction and discussion with Ts Q and A session at the end Case study of a child with ADHD Delivered by both authors	No 1 month after delivering Int	Ts Kw was measured 1 month after CHADD training. Sig. increase in Ts Kw post-int. Overall mean pre-test Kw score of 77% was increased to 85% post-int. CHADD Int significantly changed the specific misbeliefs noted earlier.	77% Ts had no ADHD-related training during their UG education. 27% Ts had received no ADHD training since becoming a T. 98% Ts felt that they could benefit from additional training on ADHD.	Yes - sig. increase
7	Worthington et al, 1997 US	Project 5 yrs RCT	Manual	First year survey to Ts to identify critical needs and make training objectives, content for 5 manuals then used from literature review. post survey of needs content checked as appropriate by Committee including ADHD experts. Third and fourth year for implementation/delivery. Fifth year for revision of manual content.	Not stated	Not stated	Training increased Ts general info and Kw of legal issues, assessment, and interventions.	15.1% Ts had more than 5 hrs of ADHD In-service education prior to this training.	Yes, sig. increase

8	Shehata et al, 2016 Egypt	Quisa-experiemental 60 Primary school One group pre-post test experimental NON-RCT	Face to Face 12 hrs (roughly)	1- KADDS T/F/DK (27 items). Translated into Arabic. 2- Scale developed by Ajzen and Fishbein (1980) to measure Ts general beliefs about ADHD (5-point likert). 3- Teachers' behavioural strategies scale developed by Ajzen and Fishbein (1980).	Discussion Role play feedback presentations Delivered by all researchers.	No Immediately after delivering Int	Substantial lack of Kw amongst Ts of ADHD because of a lack of in-service training and professional development. Statistically sig. changes at pre and post int regarding Ts Kw, att. and behaviour management strategies. Ts Kw and atts. and behaviours can be influenced through up to date workshops and in-service training.		Yes
9	Aguiar 2014 Brazil	convenience sample 37 Elementary NON-RCT	Face to face 6 hrs	Self-report quest. based on Jerome et al 1994, Kos et al 2004, Scuitto et al 2000. 2 parts: Demographic 20 questions about etiology, symptoms and treatment T/F/DK	Vingettes Lectures Presentations Delivered by research team	Immediately after delivering Int	T Kw score pre-int. was 15 and 17 post-int. Proven that a psyoeducational int might sig. impact T Kw on ADHD. After the int. Ts Kw increased and reduced doubts and uncertainties about ADHD show that Ints reduce the number of misconceptions teachers hold about ADHD.	Training may reduce Ts misbeliefs about ADHD	Yes

10	Latouche & Gascoigne 2017 Australia	Quisa-experiment al / waitlist control group 274 primary school Ts	A brief single-session training workshop. Face to face for 2 hrs and 15 mins	Using the KADDS 39 items scale (Sciutto et al., 2000).	PowerPoint Discussion Videos Delivered by the lead author (registered psychologist).	1 month after delivering Int	<p>A main effect of group was found, $F(1, 237) = 58.87$, $p < .001$, $\eta^2 = 0.20$, where on average, participants in the int group had higher ADHD kw as compared with waitlist control group.</p> <p>A group by time interaction, $F(1, 237) = 433.0$, $p < .001$, $\eta^2 = 0.65$, was also shown, int group teachers' average ADHD kw increased by 16.8 points from pre-int ($M = 15.7$, $SD = 7.4$) to post-int ($M = 32.5$, $SD = 3.8$) compared with teachers in the waitlist ctrl group, where average ADHD kw scores increased by 0.8 of a point from pre-int ($M = 17.3$, $SD = 7.4$) to post-int ($M = 18.1$, $SD = 7.7$).</p> <p>Average ADHD kw levels increased by 16 points from pre-int ($M = 17.4$, $SD = 7.0$) to post-int ($M = 33.4$, $SD = 3.3$), and decreased by 3.6 points from post-int to the 1-month follow-up ($M = 29.8$, $SD = 4.22$).</p> <p>Planned comparisons showed that ADHD kw at the 1-month follow-up was lower than at post-int ($p < .001$), but higher than pre-int kw levels ($p < .001$).</p>	<p>The majority of Ts in the study had received no prior ADHD training.</p> <p>Although RCTs are considered to have the greatest amount of credibility in assessing causality, randomization was not possible in the current study due to scheduling limitations.</p> <p>There may be a volunteer bias, that limits the generalizability of results to Ts who may be more inclined to participate in programmes of this kind.</p> <p>Results suggest that a brief professional development int can be utilized to greatly increase Trs' ADHD kw,</p>	<p>This is the first study to evaluate an ADHD training int that has resulted in large increases in teachers' ADHD kw, strongly supporting the efficacy of the int as hypothesized.</p> <p>Int group T'' kw went from very low to high kw levels.</p>
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Appendix E: The Services of Two English Language Specialists

<p>Kingdom of Saudi Arabia Ministry of Education Umm Al Qura University Deanship of Faculty and Staff Affairs</p>	 <p>إلى من يهمه الأمر To Whom It May Concern</p>	<p>المملكة العربية السعودية وزارة التعليم جامعة أم القرى عمادة شؤون أعضاء هيئة التدريس والموظفين</p>
<p>National ID No. 1072487166 Staff ID No. 4380085 Beginning of government service : 21-05-2017 This is to certify that abdulaziz mutlaq sebiyan almatrafi is an employee of Umm Al-Qura University. He is currently Language Teacher in the Department of English Language Center College of English Language Center. He is on the payroll of the university for the year 2017. This statement has been issued upon his request without any responsibility on the part of the university. It is valid for two months from 30-09-2017.</p>		<p>رقم الهوية 1072487166 رقم المنسوب 4380085 تاريخ بداية الخدمة: 25-08-1438 هـ تشهد جامعة أم القرى بأن عبدالعزيز مطلق صبيان المطرفي سعودي الجنسية أحد منسوبيها من التعليمية خلال العام 1439 هـ ، بكلية مركز اللغة الانجليزية قسم مركز اللغة الانجليزية ، و هو حاليا على وظيفة مدرس لغة م 6 ، وقد منحت له هذه الشهادة بناء على طلبه وهي صالحة لمدة شهرين من تاريخ منحها في 10-01-1439 وذلك لتقديمها لمن يهمه الأمر دون أدنى مسؤولية على الجامعة.</p>
 <p>الختم</p>	<p>مدير إدارة شؤون أعضاء هيئة التدريس والموظفين Director of Faculty and Staff Affairs</p>  <p>أ. نزار بن احمد عباس Mr. Nezar Ahmed Abbas</p>	<p>هذه الشهادة أصدرت إلكترونيا</p>

<p>Kingdom of Saudi Arabia Ministry of Education Umm Al Qura University Deanship of Faculty and Staff Affairs</p>	 <p>إلى من يهمه الأمر To Whom It May Concern</p>	<p>المملكة العربية السعودية وزارة التعليم جامعة أم القرى عمادة شؤون أعضاء هيئة التدريس والموظفين</p>
<p>National ID No. 1077350963 Staff ID No. 4380084 Beginning of government service : 21-05-2017 This is to certify that mohammed jareef awadh alsulami is an employee of Umm Al-Qura University. He is currently Language Teacher in the Department of English Language Center College of English Language Center. He is on the payroll of the university for the year 2017. This statement has been issued upon his request without any responsibility on the part of the university. It is valid for two months from 29-09-2017.</p>		<p>رقم الهوية 1077350963 رقم المنسوب 4380084 تاريخ بداية الخدمة: 25-08-1438 هـ تشهد جامعة أم القرى بأن محمد جريف عواض السلمي سعودي الجنسية أحد منسوبيها من التعليمية خلال العام 1439 هـ ، بكلية مركز اللغة الانجليزية قسم مركز اللغة الانجليزية ، و هو حاليا على وظيفة مدرس لغة م 6 ، وقد منحت له هذه الشهادة بناء على طلبه وهي صالحة لمدة شهرين من تاريخ منحها في 09-01-1439 وذلك لتقديمها لمن يهمه الأمر دون أدنى مسؤولية على الجامعة.</p>
 <p>الختم</p>	<p>مدير إدارة شؤون أعضاء هيئة التدريس والموظفين Director of Faculty and Staff Affairs</p>  <p>أ. نزار بن احمد عباس Mr. Nezar Ahmed Abbas</p>	<p>هذه الشهادة أصدرت إلكترونيا</p>

Appendix F: Studies used KADDS

	Study	Research aim/question	statistical test
1	Mark J. Sciuotto Mark D. Terjesen Allison S. Bender Frank 2000	Examined teachers' knowledge and misperceptions of ADHD within three specific content areas: symptoms/diagnosis, treatment, and general information (e.g., course, prevalence).	Descriptive Statistics Cronbach's Alpha Pearson correlations
2	Fred R. Guerra Jr. & Michelle S. Brown 2017	Examined the knowledge levels middle school teachers in South Texas have in relation to attention deficit hyperactivity disorder (ADHD).	Descriptive Statistics Cronbach's Alpha (ANOVA) to evaluate the differences in teacher scores among the three KADDS subscales (general knowledge, knowledge of symptoms/diagnosis, and knowledge of treatment).
3	James D. Herbert, Kia Crittenden, and Kristy L. Dalrymple 2004	Examined the knowledge that teachers, school counsellors, and school psychologists have of SAD in relation to their knowledge of a prototypical externalizing disorder, attention deficit hyperactivity disorder (ADHD).	Descriptive statistics ANOVA conducted to assess effects on overall knowledge (i.e., total questionnaire scores) revealed significant main effects for both the Discipline and Instrument factors.
4	Keetam D. F. Alkahtani 2013	Investigate teachers' knowledge and misconceptions of ADHD.	Descriptive statistics Pearson correlation analysis was computed to investigate the relationship between teachers' level of knowledge of ADHD and their prior training and experience with ADHD. Pearson correlation analysis was also carried out to examine the relationship between teachers' level of knowledge of ADHD and their level of confidence in teaching a student with ADHD.

5	Beryl Topkin and Nicolette Vanessa Roman 2015	Examine primary school teachers' knowledge of the symptoms and management of children in their classrooms who were diagnosed with ADHD.	Descriptive statistics
6	Machula, Miranda 2007	Understanding and Predicting Teachers' Knowledge of Attention Deficit/Hyperactivity Disorder.	<p>Descriptive statistics</p> <p>A multiple regression was conducted to determine if grade level taught (early childhood/elementary or middle/high school), classification (special education or general education), years of teaching experience, and education level predict KADDS scores.</p> <p>Teachers' correct responses on the three KADDS subscales were compared using a repeated-measures ANOVA.</p> <p>A second repeated-measures ANOVA was conducted to compare teachers' incorrect response on the three KADDS subscales.</p> <p>A final repeated-measures ANOVA was conducted to compare the percentage of times teachers responded "Don't Know" on the three KADDS subscales.</p>
7	Victoria Ann Ward 2014	What knowledge and conceptions do Irish primary schoolteachers hold on attention deficit hyperactivity disorder?	<p>Descriptive statistics</p> <p>Chi-square analysis to identify a significant difference based on teaching experience.</p>

8	lessandra Miranda Padilla*, Daniela Barrios Cuartas, Luisa F. Duque Henao, Edinson A. Burgos Arroyo, Jorge E. Salazar Flórez 2018	The aim of this research is to describe the knowledge of attention deficit hyperactivity disorder among primary school teachers through interviews concerning general information, symptoms/diagnosis and treatment, in addition to perceived self-efficacy.	Descriptive statistics
9	Aglaiia Stampoltzis 2013	Examines and compares general and special education teachers' knowledge and misconceptions about ADHD.	Descriptive statistics A one-way, between-group multivariate analysis of variance (MANOVA)
10	Perold et al, 2010	Measures the level of knowledge of ADHD and misperceptions about the disorder amongst primary school teachers.	Descriptive statistics A two-way analysis of variance (ANOVA) to measure teachers' knowledge on total or combined subscales. Bonferroni correlation to determine possible differences in frequency of responding don't know on the three subscales. Pearson correlations used to explore relationship between teachers' knowledge and various demographic characteristics.
11	Muanprasart et al, 2014	To identify knowledge of Thai teachers regarding ADHD	Descriptive statistics Logistic regression analysis
12	Blotnicky-Gallant et al, 2015	To examine teachers' knowledge and beliefs about ADHD	Descriptive statistics Pearson correlations / t-test
13	Shroff et al, 2017	To assess knowledge and misperceptions about ADHD Amongst schoolteachers in Mumbai	Anova was used to analyse differences on the three subscales of KADDS. Post hoc comparisons using least significant difference tests

Appendix G: Email received from the developer of KADDS

Mark Sciutto

18/07/2018

[Details](#)

MS

Dear Ahmed,

Unfortunately, we don't have any good factor analytic data on the KADDS. To my knowledge, no one has done this work with a sufficient sample size to draw valid conclusions about the factor structure. Whether you do confirmatory or exploratory depends on your goals. To decipher the potential underlying structure, exploratory would work. However, if you want to test whether the KADDS items conform to the content-based subscales (treatment, symptoms/diagnosis, associated features), then confirmatory would be appropriate. One methodological consideration would be which form of rotation to use. I would argue that an oblique rotation makes sense since I would expect that the various knowledge dimensions would be inter-related. In other words, I expect that teachers who know more about diagnosis also know more about treatment.

I hope this helps.

Best,

Mark

Appendix H: A Letter to the Saudi Cultural Bureau

Plan of Research Trip to Saudi Arabia January – April 2016

My PhD study is about the design and implementation of a training programme on ADHD for Saudi Arabian SpLD and General teachers. Therefore, I would like to conduct a research trip to Saudi Arabia. The purpose of the study is to explore what can be done to increase the gap in knowledge amongst teachers of ADHD that has already been highlighted in previous studies. This will require me to spend a period of time in Saudi Arabia distributing questionnaires, conducting interviews and delivering training to a group of teachers. During the phases of my study I will be analyzing data gathered at each stage. It is intended that questionnaires, interviews and training will take place in Western Area, Jeddah.

Location	Place	Activity	Start date	End date
Jeddah	Mainstream school as agreed by MOE	Meeting with identified schools	16 th January	23 th January
Jeddah	Mainstream school as agreed by MOE	Dissemination of questionnaires	24 th January	14 th February
Jeddah	Mainstream school as agreed by MOE	Interviews with teachers selected from respondents	15 th February	7 th March
Jeddah	Mainstream school as	Select control sample for training	8 th March	16 th March

	agreed by MOE	programme/intervention and inform individuals		
Jeddah	Mainstream school as agreed by MOE	Dissemination of pre-intervention questionnaire and Implementation of training programme/intervention	20 th March	24 th March
UK	UK	Dissemination of post training/intervention questionnaire	21 st April	

Appendix I: The Consent Form into Arabic

نموذج الموافقة الخطية

عنوان البحث:

رفع مستوى المعرفة عند المعلمين العاديين وصعوبات التعلم باضطراب تشتت الانتباه والنشاط الزائد، تطوير برنامج تدريبي لرفع الوعي.

الرجاء الاطلاع على المعلومات التالية والتي تصف طبيعة الدراسة والتي من المتوقع تجيب على تساؤلاتكم. وإذا كان لديكم أي استفسار الرجاء ارساله على عنوان البريد التالي: [REDACTED]. المشاركة في هذه الدراسة اختيارية تطوعيه وبإمكانك الانسحاب في أي وقت. وبإمكانك أيضا الامتناع عن الإجابة عن أي سؤال من الأسئلة المقدمة. عند الانتهاء من الدراسة يمكن تزويدك بنتائجها في حال طلبت ذلك.

الهدف من الدراسة:

لفحص مستوى المعرفة عند المعلمين والمواقف تجاه اضطراب تشتت الانتباه والنشاط الزائد وتصورهم عن الطرق التي من خلالها يمكن رفع مستوى الوعي، بالإضافة لتصميم برنامج تدريبي يعالج أي نقص في هذا الجانب بماذا تساهم فيه في هذه الدراسة؟

- ✓ استكمال تعبئة الاستبانة بمعرفة مدى الوعي بمعرفة اضطراب تشتت الانتباه والنشاط الزائد.
- ✓ عرض فرصة المشاركة على المعلمين لإجراء مقابلة شخصية مدتها 30 دقيقة لاكتشاف الوسائل الممكنة لرفع الوعي بالاضطراب.
- ✓ المشاركة في برنامج تدريبي مصمم خصيصا لمعلمي المدارس للتوعية باضطراب تشتت الانتباه والنشاط الزائد ومدته 20 ساعة مرفق بشهادة حضور .
- ✓ بعد تقديم البرنامج بفترة زمنية معينة (شهر) يقدم استبانته أخيرة لتعبئتها

سرية وأمان المعلومات:

كافة المعلومات التي سيتم جمعها ستحاط بسرية تامة وسوف تستخدم فقط لانجاز الهدف من الدراسة. في حال الانتهاء من الدراسة سيتم إتلافها بشكل نهائي.

الموافقة على المشاركة في تعبئة الإستبانة

لقد قرأت وفهمت كافة المعلومات وأنا أتطوع بالمشاركة في المرحلة الأولى من الدراسة الموافقة على المشاركة لإجراء مقابلة شخصية مع الباحث يتبعها حضور برنامج تدريبي قيم.

لقد قرأت وفهمت كافة المعلومات وأنا أتطوع بالمشاركة في المرحلة الثانية من الدراسة

المدرسة: الاسم:

بيانات التواصل (إيميل / رقم الجوال):

Appendix J: A Letter from Saudi Cultural Beauru to Facilitate this Study

ROYAL EMBASSY OF SAUDI ARABIA
CULTURAL BUREAU
LONDON

المملكة العربية السعودية
البحرية الثقافية
لندن

التاريخ 1436/10/07 هـ

أداة

رقم الملف TU055

تفيد الملحقة الثقافية بالمملكة المتحدة بأن المبعث/ احمد محمد على الشهري (سجل مدنى 1063829921) والمبعث من قبل جامعة الطائف لدراسة الدكتوراه في مجال Special Education بجامعة Birmingham. وقد التحق بالبعثة بتاريخ 1434/07/21 هـ ومن المتوقع ان تنتهي بعثته بتاريخ 1437/08/23 هـ الموافق. ويرغب القيام برحلة علمية الى المملكة العربية السعودية لغرض جمع بيانات تتعلق بالبحث الخاص بدراسته لمرحلة الدكتوراه، يرجى مساعدته في جمع البيانات المطلوبة وقد أعطيت له هذه الإفادة بناءً على طلبه لتقديمها الى (إدارة التعليم بجدة).

وتقبلوا فائق التحيات،،،

الملحق الثقافي
بسفارة المملكة العربية السعودية في لندن
فيصل بن محمد المهنا الخيل

لرسم التاريخ الوافق لرسالت

630 Onslow Hill Road, London W4 5R, Tel: +44 (0) 20 3245 7000 Fax: +44 (0) 20 3245 7001 E-mail: apobuk@ukc.saa.gov.sa
www.ukrcad.gov.sa

Appendix K: Permission was Granted by the MoE to Visit the Educational Centre in Jeddah

الرقم: ٣٦١٩٤٤٤٩٤
التاريخ: ١١/١١/١٤٣٦ هـ
المرفقات: ١

وزارة التربية والتعليم
Ministry of Education

الجمهورية العربية السعودية
وزارة التربية والتعليم
(٢٨٠)
الإدارة العامة للتربية والتعليم بمحافظة جدة

التخطيط والتطوير التربوي - البحوث والدراسات التربوية

إلى : سعادة الملحق الثقافي بالسفارة السعودية في لندن جدة .
من : المدير العام للتعليم بمحافظة جدة .
بشأن : الموافقة على قيام باحث بتطبيق أدوات بحثه على عينة من المعلمين .

السلام عليكم ورحمة الله وبركاته ، وبعد :

بناء على خطابكم رقم (TU055) ، وتاريخ ١٠/٧/١٤٣٦ هـ بشأن تسهيل مهمة الباحث / أحمد محمد علي الشهري ، الطالب بجامعة برمنجهام ، مرحلة الدكتوراه ، تخصص صعوبات تعلم ، لتطبيق بحثه الذي بعنوان " رفع مستوى المعرفة عند المعلمين العاديين وصعوبات التعلم باضطراب تشتت الانتباه والنشاط الزائد - تطوير برنامج تدريبي " على عينة من منسوبي تعليم محافظة جدة (معلمين عاديين ومعلمي صعوبات تعلم بالمدارس الابتدائية لمدة (٩٠ يوما) خلال الفترة من ١٨ ذوالحجة ١٤٣٦ إلى ١٦ ربيع الأول ١٤٣٧ هـ

نفيدكم أنه لا مانع لدينا تشجيعا للباحثين والبحث العلمي . وسوف نوافيكم بخطاب إنهاء مهمته بعد انتهاء الباحث من تطبيق أدوات دراسته على عينة الدراسة .

والسلام عليكم ورحمة الله وبركاته

عبد الله بن أحمد الثقفي

هاتف ٦٤٤٤٣٠٥ - فاكس ٦٤٣٤٠٤٠ - الرمز البريدي : ٢١١٥٨

Appendix L: Permission to Contact the Head Teacher of the Schools

الرقم : ٢٢/١/٤٩٥
التاريخ : ٢٥/١٠/٢٠١٦
المرفقات : ١

وزارة التربية والتعليم
Ministry of Education
(٢٨٠)

الإدارة العامة للتربية والتعليم بمحافظة جدة
التخطيط والتطوير - قسم الدراسات والبحوث

إلى : مديري المكاتب التعليمية بتعليم محافظة جدة .
إلى : مدير إدارة التربية الخاصة بتعليم محافظة جدة .
من : مدير إدارة التخطيط والتطوير .
بشأن : تسهيل مهمة الباحث / أحمد محمد علي الشهري .

السلام عليكم ورحمة الله وبركاته

بناء على خطاب الملحق الثقافي بسفارة المملكة العربية السعودية في لندن (المرفق) والمتضمن الإفادة عن الباحث / أحمد محمد علي الشهري ، المبتعث إلى جامعة (برمنجهام) ببريطانيا وذلك استكمالاً لمتطلبات بحث الدكتوراه ، وطلبه تسهيل مهمته في بحثه الذي بعنوان " رفع مستوى المعرفة عند المعلمين ومعيوبات التعلم باضطراب تشتت الانتباه والنشاط الزائد - تطوير برنامج تدريبي " ويرغب الباحث في تطبيق أداة بحثه (استبانة - مقابلة شخصية - تقديم برنامج تدريبي لمدة أسبوع) على المعلمين العاديين ومعلمي صعوبات التعلم بالمدارس الابتدائية (بنين) في تعليم محافظة جدة ، حيث تم فحص أداة البحث وتبين استيفائها لضوابط الوزارة بهذا الخصوص. نأمل منكم تسهيل مهمة الباحث بتمكينه لتطبيق أداة بحثه على عينة الدراسة التابعة لإدارتكم ؛ شاكرين ومقدرين تعاونكم واهتمامكم بالبحث العلمي .

والسلام عليكم ورحمة الله وبركاته

تسليم مستندات البحث
٢٥/١٠/٢٠١٦
لعميد القسم
وتسليم البحث
٢٥/١٠/٢٠١٦

خليل بن فراج الوافي

٢٥/١٠/٢٠١٦

٢٥/١٠/٢٠١٦

هاتف ٦٤٤٤٣٠٥ - فاكس ٦٤٣٤٠٤٠ - الرمز البريدي : ٢١١٥٨

ALSAATY
Certified translation

License 174
J.C.C. No. 124764



مكتب الساعاتي
للترجمة المعتمدة

لصاحبه د/ محمد أمين سيف الدين ساعاتي
ترخيص رقم ١٧٤
رقم العضوية ١٢٤٧٦٤

Date: / / 20

التاريخ: / / ١٤

CERTIFICATION

ALSAATY For Translation, Jeddah Saudi Arabia, licensed as an authorized translation office; by virtue of Permit No. (174), hereby certifies that, translation of the document(s) annexed hereto, which are sealed for identification purposes only, is a complete and true translation without any liability upon its contents thereof.

إشهاد

يشهد مكتب الساعاتي للترجمة بجدة - المملكة العربية السعودية، المرخص له بمزاولة مهنة الترجمة المعتمدة بموجب الترخيص رقم (١٧٤) أن ترجمة الوثيقة / الوثائق المرفقة والمختومة لأغراض تعريفها فقط هي ترجمة صحيحة وكاملة دون أدنى مسؤولية عن محتوياتها.

مدير المكتب

١/١٩
١٤٣٧

د. محمد أمين ساعاتي



جدة - حي الجامعة - أمام كلية الهندسة - بجوار قصر الساحل الغربي - جوال ٠٥٠٦٣٥٢٨٢٧ - تليفون ٦٣٣٥٧٥٣
K.S.A, Jeddah - Aljamea Dist, Tel 6335753-Mobile 0506353827 Email: omaranadani@yahoo.com

Kingdom of Saudi Arabia

Ministry of Education

(280)

General Directorate of Education, Jeddah

Planning and Development – Studies and research Dept.

No:

Date:25/10/1336H

Attachments: 6

To: Managers of the educational offices in Jeddah Province

To: Manager Special education Administration in Jeddah Province

From: Manager Planning and development Administration

**Subject: facilitating the mission of the researcher /AHMED
MOHAMMED ALSHEHRI**

Peace and mercy of Allah be upon you

Based on the letter of the Cultural attaché of the Saudi embassy in London (Attached) regarding notification about the researcher/ Ahmed Mohammed Alshehri ; the scholarship student in Birmingham University in Britain to complete the requirements of his doctorate dissertation and his desire to facilitate his mission in his research titled " Raising teachers ' level of knowledge, learning disabilities and Attention distraction, hyperactivity - Developing a training program".

The researcher would like to apply his research tools (survey –interview – Presenting a training program for one week) on regular teachers and learning disabilities teachers in primary schools (Boys) in Jeddah Governorate Education. His research tools were examined, and proved to be satisfactory in accordance with the ministry's regulations in this concern. We hope that you may facilitate his mission to apply his research tools on the study sample in your directorate.

Thanks for your cooperation and interest in scientific research.

Peace and mercy of Allah be upon you

Khalil Bin Farraj Al-Wafi



Appendix M: Consent Form: Survey and Interview Protocol

Project Title

Increasing the level of SpLD and general teachers' knowledge of and attitudes towards ADHD, developing a training programme for increasing awareness.

Please read the following information that will describe the nature of the study and it should answer any questions that you may have. If you are unsure about taking part and would like to ask questions please submit these to my email address: [REDACTED] and I will attempt to answer these fully.

Alternatively, if you have any concerns about this research project you can contact Professor Julie Allan, Head of the School of Education, University of Birmingham [REDACTED]

Taking part is completely voluntary and you can refuse to do so or to **withdraw from the project at any time**, you can also decline to answer any of the questions asked during this study. When the study is complete, you will receive a summary of results if you request this.

Aim of the study:

To examine the level of knowledge and attitudes towards attention and hyperactivity amongst SpLD and general teachers and ways they perceive can increase the level of awareness and design a training programme to address any lack of knowledge.

What does the study involve?

- ✓ Completion of a questionnaire on knowledge and attitudes towards ADHD
- ✓ Participants will then be offered the opportunity to take part a 30 minutes interview to explore how the level of knowledge could be increased
- ✓ Take part in 18 hours of training on ADHD designed specifically for mainstream schoolteachers
- ✓ After a period of time distribute a second questionnaire on knowledge and attitudes towards ADHD

Confidentiality and Security of Data

No responses will be traceable to individuals and responses will only be used to achieve the purposes of this study, information collected will be stored securely for ten years and then it will be destroyed.

Termination

You can revoke your consent to participate in the study at any time by notifying the researcher and data collected from your contribution will be destroyed.

Consent to participate in survey questionnaire

I have read and understand this consent form, and I volunteer to participate in the first stage of the research study.

Consent to participate in interview with researcher

I have read and understand this consent form, and I volunteer to participate in the second stage of the research study.

Please provide the following details:

Name:

School:

Contact email address:

Appendix N: Interview Questions into English

Name and contact details:

1. Age group

20-30		41-50	
31-40		50 +	

2. Highest level of education

Bachelor degree		Master degree	
Doctoral degree		Other (please specify	

3. Are you

SpLD teacher		General teacher (please specify your subject)	
--------------	--	---	--

4. Your teaching experiences

1-5 years		6-10 years		11-15 years	
16-20 years		21 years or more			

5. Regarding ADHD, have you heard of the term and if so, what were your resources of information about the disorder?

6. Do you feel that you have a lack of knowledge of ADHD and you need to be knowledgeable about it?

7. Have you ever received teacher training on ADHD?

8. Would a training programme be a good way to develop your knowledge of ADHD?

9. **If you consider the provision of training for teachers as an effective way of increasing knowledge of ADHD, what factors do you consider are important to ensure training is effective for teachers?**
10. **What can be done to increase the awareness in SpLD and general teachers?**
11. **What role can be played by Government represented in the Ministry of Education to increase knowledge of ADHD?**
12. **What role that can be played by schools to increase the level of knowledge of ADHD?**
13. **What role do SpLD teachers play in increasing knowledge amongst general teachers?**
14. **Do you have a perception about the role of media to increase the knowledge of ADHD, please indicate some media approaches that you believe will help?**
15. **What role can the Ministry of Health play in increasing the level of knowledge on ADHD as a recognized disorder?**

Appendix O: Interview Questions into English

أسئلة المقابلة

الاسم وتفاصيل الاتصال:

الفئة العمرية

	41-50		20-30
	50 +		31-40

أعلى مستوى تعليمي

	درجة الماجستير		درجة البكالوريوس
	غير ذلك (يرجى تحديد)		درجة الدكتوراه

هل أنت

	معلم صعوبات تعلم		معلم عام (يرجى تحديد تخصصك)
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الخبرة في مجال التدريس

	15-11 سنة		10-6 سنة		5-1 سنة
			21 سنة أو أكثر		20-16 سنة

5- هل سبق وان سمعت بمصطلح تشتت الانتباه والنشاط الزائد، لو كذلك، ماذا كانت مصادرك عن هذا الاضطراب؟

6- هل تشعر بان لديك نقص في المعرفة باضطراب تشتت الانتباه والنشاط الزائد ، وأنت بحاجة لتعرف أكثر عن هذا الاضطراب ؟

7- هل سبق وان حصلت على دورة تدريبية عن اضطراب تشتت الانتباه والنشاط الزائد ؟

8- هل البرنامج التدريبي طريقة جيدة لتطوير معرفتك باضطراب تشتت الانتباه والنشاط الزائد ؟

9- لو تعتبر أن توفير برنامج تدريبي للمعلمين طريقة فاعلة لرفع الوعي باضطراب تشتت الانتباه والنشاط الزائد، ما هي العوامل

التي تراها مهمة لضمان برنامج تدريبي فاعل للمعلمين ؟

طول ومدة البرنامج

الأنشطة التفاعلية للمعلمين (المواد والأدوات)

محتوى البرنامج

10 -ما الدور الذي يمكن أن تلعبه الحكومة ممثلة في وزارة التربية والتعليم لرفع الوعي باضطراب تشتت الانتباه والنشاط الزائد ؟

11 -مالذي يمكن عمله لرفع وعي المعلمين العاديين ومعلمي صعوبات التعلم بهذا الاضطراب؟

12 - ما الدور الذي يمكن أن تلعبه المدرسة لرفع مستوى الوعي باضطراب تشتت الانتباه والنشاط الزائد ؟

13 -ما الدور الذي يمكن أن يلعبه معلم صعوبات التعلم لرفع الوعي عند المعلمين العاديين ؟

14 - هل لديك تصور عن دور الإعلام في رفع الوعي بهذا الاضطراب ، الرجاء الإشارة إلى بعض وسائل الإعلام التي تعتقد أنها تساعد في هذا الجانب

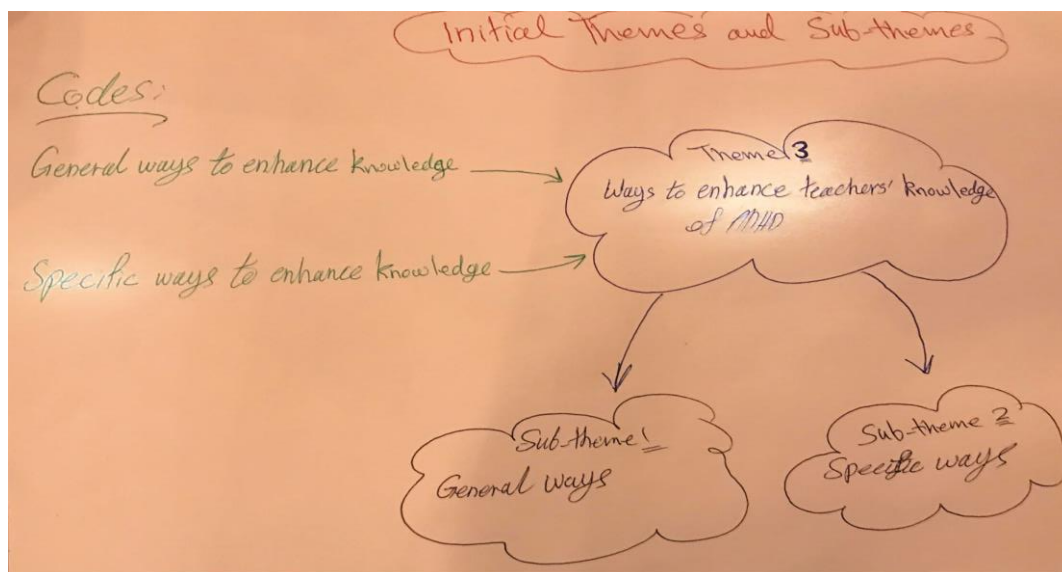
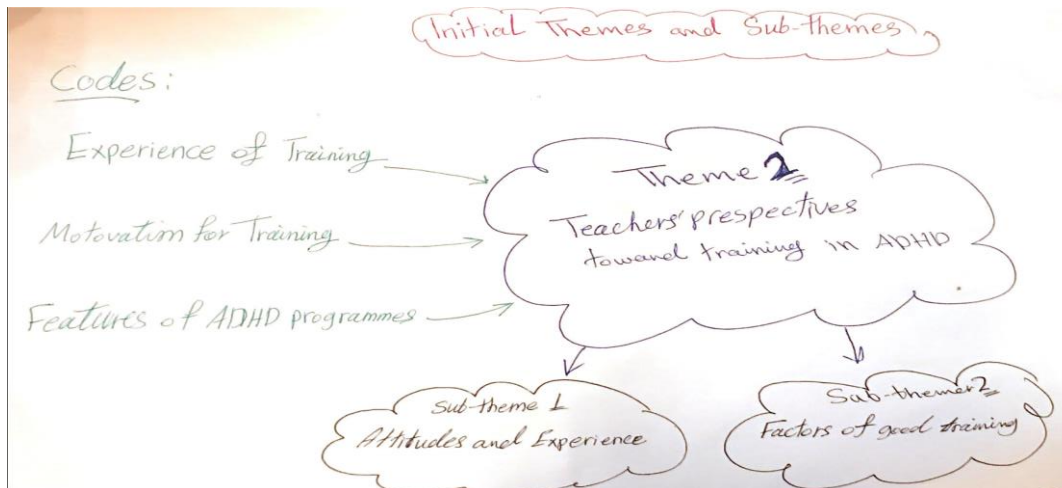
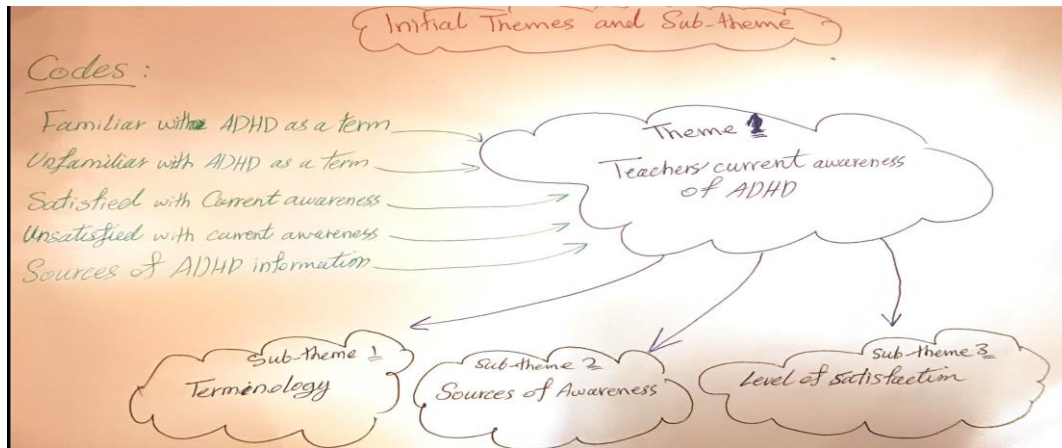
15 - ما هو الدور المناط به وزارة الصحة في رفع مستوى الوعي باضطراب تشتت الانتباه والنشاط الزائد خصوصا كونه مشكله طبية تؤثر تربويا واجتماعيا على المصاب؟

Appendix P: Thematic Analysis (Initial Codebook)

Code	Description	Example
Facilitators of ADHD knowledge	Sources cited by Teachers as providing them with information about ADHD	<p><i>“own reading and internet”</i></p> <p><i>“through study at university”</i></p> <p><i>“family/friends”</i></p>
Satisfaction with level of ADHD knowledge	Satisfaction with amount of ADHD knowledge held	<p><i>“I have a severe lack of knowledge about the disorder/</i></p> <p><i>I feel a lack of knowledge”</i></p>
Motivation to participate in ADHD training	If teachers wish to enhance their knowledge of ADHD and if they believe training in ADHD is a viable way to enhance that knowledge	<p><i>“I need to know more about this disorder/I need to know more about...”</i></p> <p><i>“I believe that a training programme is an effective way to increase knowledge if it is designed and prepared well”</i></p> <p><i>“Yes of course/Yes indeed [it is a good way]”</i></p>
Experience of receiving structured ADHD training	Has the teacher ever received structured ADHD training	<p><i>“No”</i></p> <p><i>“I have never attended or received an invitation during my 16 years teaching experience”</i></p> <p><i>“I have not heard about such training before”</i></p>
Features of good ADHD training	Factors that should be considered when designing teacher training on ADHD, focus of question based on three factors: Duration, Content, and Activities	<p><i>“length is irrelevant, the important thing is if I benefit from the period of training”</i></p> <p><i>“I think 3 days is suitable”</i></p> <p><i>“5 days as long as teachers are free from work”</i></p> <p><i>‘information about interventions and treatment so that I can deal with children’</i></p> <p><i>“information about how to make a diagnosis in our role as a teacher”</i></p> <p><i>“knowledge on how to make an accurate definition and identify types of the disorder”</i></p>

			<p><i>“have a chance to talk and discuss with the trainer”</i></p> <p><i>“there should be a variety of materials such as case studies or short stories”</i></p> <p><i>“use of PowerPoint to engage and attract the attention of participants”</i></p> <p><i>“audio-visual materials ”</i></p> <p><i>“group work”</i></p>
General	facilitators for enhancing ADHD knowledge	Teachers' opinions on what could be done to enhance their ADHD knowledge	<p><i>“this could be done through a training programme”</i></p> <p><i>“leaflets / printed materials”</i></p> <p><i>“invite specialist experts to deliver presentations to teachers”</i></p>
Specific	facilitators for enhancing ADHD knowledge	Teachers response on whether the specific stakeholders can play a part to enhance knowledge of ADHD amongst teachers: Ministries of Education, Health and Media, Schools and Special Education Teachers in Saudi Arabia	<p><i>“MOE should have intense introduction programmes [in ADHD] for teachers”</i></p> <p><i>“MOH should use campaigns to introduce information about the disorder to schools, allocating one day per year to ADHD day”</i></p> <p><i>“MOM can prepare intensive programs that can be shown on television”</i></p> <p><i>“present internal courses and hosting specialists in schools to provide more information about the disorder”</i></p> <p><i>“the SpLD teacher as an expert in academic and behavioural disorders should provide training to us [general teachers] on how we can deal with children who have ADHD”</i></p>

Appendix Q: Initial codes and themes/sub-themes of thematic analysis



Appendix R: Permission for teachers to Attend Training

الرقم: ٣٧٣٢٠٠١٤٤١
التاريخ: ٧ / ٧ / ١٤٣٧ هـ
المشروعات: ١

وزارة التعليم
Ministry of Education

المملكة العربية السعودية
وزارة التعليم
الادارة العامة للتعليم بمحافظة جدة
إدارة التربية الخاصة (بنين)

المكرم مدير مدرسة

المحترم

السلام عليكم ورحمة الله تعالى وبركاته ... وبعد :-

بناءً على خطاب المدير العام للتعليم رقم (٣٦١٩٤٢٢٩٢) في تاريخ ١١/١١/١٤٣٦ هـ بشأن تسهيل مهمة الباحث / أحمد محمد علي الشهري في تقديم برنامج تدريبي لمعلمي صعوبات التعلم والتعليم العام حول اضطراب تشتت الانتباه والنشاط الزائد عند الأطفال . عليه أمل منكم تسهيل مهمة الزميل حول تنفيذ البرنامج التدريبي المذكور لمعلمي صعوبات التعلم الواردة اسماءهم في البيان المرفق مع رغبة الزميل بمشاركة معلمي التعليم العام لأهمية ذلك في بناء الدراسة وإتمامها .

ولكم تحياتي وتقديري ” ” ”

مدير إدارة التربية الخاصة

عبد الرحمن بن علي الغامدي

١٤٣٧ / ٧ / ٧

صورة للتربية الخاصة .

نابل بن

هاتف ٨٩٠٨٩ - فاكس ٦٩٨٣٨٥٩ - البريد الإلكتروني : specialedu@jedu.gov.sa

Appendix S: A Fictional Case Study of a Saudi Child (Khalid) with ADHD

Khalid, 7, is in his second year of primary school. His father feels exhausted and has made an appointment to see his teacher Ahmed. In his meeting with Khalid's teacher, his father told teacher Ahmed that Khalid required special attention.

During the meeting Khalid's father asked teacher Ahmed for any advice he could give him on how Khalid's behaviour could be managed at home. Teacher Ahmed said that he would observe Khalid's behaviour over the next week and then invite his father back for another meeting to discuss his observations.

During that week teacher Ahmed made the following observations:

- ✓ Khalid was friendly and interested in pleasing his classmates
- ✓ He enjoyed making his teacher happy
- ✓ He can count to 50 but struggles beyond that figure
- ✓ Khalid frequently interrupts his teacher to ask questions which are unrelated to what is being taught because he feels bored
- ✓ He likes to make noises to attract the attention of his classmates
- ✓ Khalid often fidgets and sometimes leaves his seat during reading time
- ✓ He finds it difficult to remain seated when he is playing games with peers and will sometimes just get up and leave
- ✓ Khalid is easily distracted by what he sees going on outside the classroom window

Question 1

Identify Khalid's areas of strength?

Question 2

What concerns do you have about Khalid's behaviour?

Question 3

- A. What interventions do you recommend teacher Ahmed to use with Khalid at school?
- B. What other types of treatment might teacher Ahmed advise Khalid's father about?

خالد طفل عمره سبع سنوات، في الصف الثاني الابتدائي. والده يشعر بالتعب معه ويعاني منه كثيرا لذلك قرر ان يلتقي بمعلمه الأستاذ احمد. عندما التقى والد خالد بالاستاذ احمد اخبره بان خالد يحتاج اهتمام وعناية خاصة. خلال اللقاء كان يسأل والد خالد الأستاذ احمد ان يرشده الى طرق تساعد في التعامل مع خالد في المنزل. الأستاذ احمد طلب من والد خالد ان يمهلته مدة اسبوع كي يتابع حالة ابنه ويلاحظ سلوكه بشكل عام ثم بعد ذلك يدعوه للقاء مجددا لمناقشة ما تم ملاحظته.

طيلة الأسبوع لاحظ الأستاذ احمد التالي:

- ان خالد كان اجتماعي ويسعى لاسعاد أصدقائه
- يستمتع بجعل المعلم سعيدا به
- يستطيع العد حتى الرقم 50 ولكن يجد صعوبة في الأرقام التي تليه
- خالد يقاطع المعلم بشكل متكرر ليسأل عن أشياء لا تتعلق بالدرس لانه يشعر بالملل
- يحب اصدار الضوضاء لجذب انتباه زملائه في الصف
- عادة يتململ ويترك مقعده الدراسي اثناء وقت القراءة
- يجد صعوبة في البقاء في مكانه عندما يشارك أصدقائه اللعب و احيانا ينهض ويغادر بسهولة يتشتت انتباهه من خلال ما يراه عبر نافذة الصف

السؤال الأول :

حدد مواطن القوة عند خالد؟

السؤال الثاني :

ما القلق الذي ينتابك تجاه سلوك خالد؟

السؤال الثالث:

ما هو العلاج او التدخل الذي توصي المعلم احمد بان يستخدمه مع خالد في المدرسة ؟ وما الأنواع العلاجية الأخرى التي قد يوصي بها الأستاذ احمد والد خالد؟

Appendix T: A Letter from The MoE to the Head of Various Schools to Allow Teachers to Participate in the Training

الرقم : ٢ / ٢١٦
التاريخ : ١٤ / ٢ / ١٤٢٧ هـ
المرفقات : —

وزارة التعليم
Ministry of Education

وزارة التعليم
الإدارة العامة للتعليم بمحافظة جدة
مكتب التعليم بوسط جدة

بشان : تسهيل مهمة باحث

المكرم مدير المرحلة الابتدائية
وقته الله
السلام عليكم ورحمة الله وبركاته
وبعد :

بناء على خطاب إدارة التخطيط والتطوير التربوي رقم ٣١/٤٩٠ د في
١٤٣٦/١٠/٢٥هـ المبني على توجيه سعادة المدير العام بشأن تسهيل مهمة الباحث /
أحمد محمد علي الشهري بتمكينه من تطبيق أداة بحثة الذي عنوانه رفع مستوى
المعرفة عند المعلمين وصعوبات التعلم باضطراب تشتت الانتباه والنشاط الزائد -
تطوير برنامج تدريبي على المعلمين العاديين ومعلمي صعوبات التعلم بمدارسكم ،
نأمل تمكينه من ذلك ، شاكرين ومقدرين تعاونكم واهتمامكم بالبحث العلمي .
وتقبلوا خالص التحية والتقدير ، ، ، ،

مدير مكتب التعليم بوسط جدة
خالد العمري

الاعتزاز بالمدربين .. الولاد للملك .. الانتماء للوطن ..
www.wasatt.org @ 200 فاكس 012 6638095 - middle@jedu.gov.sa

King Fahd Education Center
Jeddah - Saudi Arabia

الرقم :
التاريخ : ١٤٢٧/١٠/١٧ هـ
المرفقات :



المملكة العربية السعودية
وزارة التربية والتعليم
(٢٨٠)
الإدارة العامة للتربية والتعليم بمحافظة جدة

المكرم مدير المرحلة الابتدائية وفقه الله

السلام عليكم ورحمة الله وبركاته - وبعد :

بناء على خطاب ادارة التخطيط والتطوير التربوي
رقم ٣/١/٤٩٠ د في ١٤٣٦/١٠/٢٥ هـ المبني على توجيه سعادة المدير
العام بشأن تسهيل مهمة الباحث / أحمد محمد الشهري بتمكينه تطبيق
اداة بحثة الذي عنوانه رفع مستوي المعرفة عند المعلمين وصعوبات التعلم
باططراب، تشتت الانتباه والنشاط الزائد من خلال توزيع استبانات واجراء
مقابلات شخصية وتقديم برنامج تدريبي مدة أسبوع على المعلمين العاديين
ومعلمي صعوبات التعلم بمدركم ،
نامل تمكينه من ذلك ، شاكرين ومقدرين تعاونكم واهتمامكم بالبحث
العلمي .

وتقبلو خالص التحية والتقدير ““

مدير مكتب التعليم بشرق جدة
عثمان علي السهيمي
١٤٢٧ هـ

Appendix U: Timetable of the ADHD Training Programme for Teachers (May 2016)

Day	07:00 – 07:30	07:30 – 08:30	08:30 – 09:15	09:15 – 09:30	09:30 – 10:30	10:30 – 11:30	11:30 – 11:45	11:45 – 13:30
One	Registration & Welcome	<ul style="list-style-type: none"> • Introduction to Programme • Training objectives and learning outcomes • Individual introductions 	<ul style="list-style-type: none"> • Common myths about ADHD 	Break	<ul style="list-style-type: none"> • History of ADHD • Definition and subtypes 	<ul style="list-style-type: none"> • How to identify ADHD and characteristics of the disorder 	Break	<ul style="list-style-type: none"> • Causes of ADHD • Summary of Day One
Two	Reflection on Day One	<ul style="list-style-type: none"> • Diagnosis • Importance of making a diagnosis and doing it early 	<ul style="list-style-type: none"> • Impact on quality of life of the child 	Break	<ul style="list-style-type: none"> • The academic ability and performance of children with ADHD 	<ul style="list-style-type: none"> • Multidisciplinary approach to diagnosing ADHD 	Break	<ul style="list-style-type: none"> • Rating scales for Parents and Teachers • Summary of Day Two
Three	Reflection on Day Two	<ul style="list-style-type: none"> • Treating ADHD • Early intervention 	<ul style="list-style-type: none"> • Types of treatment: medical and behavioural • Classroom management 	Break	<ul style="list-style-type: none"> • Dietary • Educational intervention • Improving academic skills in children with ADHD 	<ul style="list-style-type: none"> • Parent and teacher training • Multi-model treatment • Effective educational strategies for teachers <ul style="list-style-type: none"> • Peer Tutoring 	Break	<ul style="list-style-type: none"> • Task Modification • Token Economy • Overview of training programme and close

جدول البرنامج التدريبي للمعلمين (مايو 2016)

اليوم	07:00 – 07:30	07:30 – 08:30	08:30 – 09:15	09:15 – 09:30	09:30 – 10:30	10:30 – 11:30	11:30 – 11:45	11:45 – 13:30
الأول	التسجيل والترحيب	<ul style="list-style-type: none"> مقدمة عن البرنامج أهداف ومخرجاته البرنامج تعارف 	<ul style="list-style-type: none"> الاعتقادات الخاطئة والشائعة 	Break	<ul style="list-style-type: none"> تاريخ الاضطراب تعريف الاضطراب وانواعه 	<ul style="list-style-type: none"> سمات الاضطراب وكيفية تحديده 	Break	<ul style="list-style-type: none"> أسباب الاضطراب خلاصة اليوم الأول
الثاني	موجز اليوم الأول	<ul style="list-style-type: none"> التشخيص أهمية التشخيص والتشخيص المبكر 	<ul style="list-style-type: none"> التأثير على جودة الحياة عند الطفل 	Break	<ul style="list-style-type: none"> قدرات وأداء الطفل الأكاديمية 	<ul style="list-style-type: none"> نهج متعدد التخصصات لغرض التشخيص 	Break	<ul style="list-style-type: none"> جداول التصنيف للأباء والمعلمين خلاصة اليوم الثاني
الثالث	موجز اليوم الثاني	<ul style="list-style-type: none"> ADHD علاج التدخل المبكر 	<ul style="list-style-type: none"> انواع العلاج والتدخل الطبي والسلوكي إدارة الصف 	Break	<ul style="list-style-type: none"> النظام الغذائي التدخلات التربوية تحسين المهارات الأكاديمية عند الأطفال المصابين 	<ul style="list-style-type: none"> تدريب الآباء والمعلمين العلاج متعدد الأسلوب <ul style="list-style-type: none"> الاستراتيجيات التربوية الفعالة للمعلمين تعليم الاقران 	Break	<ul style="list-style-type: none"> تعديل المهام تعديل المهام عرض موجز للبرنامج

Appendix V: A Short Training Evaluation Questionnaire for Teacters

Scale:

Very satisfied	5
Satisfied	4
Neither satisfied or dissatisfied	3
Dissatisfied	2
Very dissatisfied	1

Objectives and outcomes for the training programme were clearly defined

1 2 3 4 5

Participation and interaction were encouraged

1 2 3 4 5

The materials were well organized and useful

1 2 3 4 5

The content of the training programme will help me with my job

1 2 3 4 5

The trainer was well prepared and delivered the programme well

1 2 3 4 5

The time given fro the training was sufficient

1 2 3 4 5

Accommodation for the training programme was adequate

1 2 3 4 5

What did you like most about this ADHD training programme for teachers?

What aspects of the training do you think could be improved?

How do you hope to change/improve/develop your teaching practise as a result of this training programme?

Many thanks for your cooperation!

Appendix W: A Certificate of Participation by the MoE For Teachers for Attending the Training Programme



Appendix X: PowerPoint Presentation

Day 1

ADHD Training Programme for Teachers
Day One
Ahmed Alshehri

Introduction

- This training programme has been designed to increase your awareness and knowledge of Attention-Deficit Hyperactivity Disorder (ADHD) in the context of schools/children.
- Training is separated into three distinct and equally important sections.
- Activities will be incorporated into the programme to give you the opportunity to reflect upon your understanding.

Training Objectives

- Enable teachers to recognize the key types of ADHD, its symptoms, characteristics and causes;
- Familiarize teachers with the process for diagnosis and identification of ADHD;
- Help teachers to identify ADHD treatment and interventions;
- Ensure inaccurate information and misperceptions about ADHD are recognized.

Training Outcomes

- Teachers will know what ADHD is and recognize the three types
- Teachers will know the possible causes of ADHD
- Teachers will understand the role that they play in the diagnosis process of ADHD
- Teachers will be aware of the criteria for a diagnosis of ADHD
- Teachers will recognize medical treatments of ADHD
- Teachers will know how to adapt behavioral, educational and effective classroom management strategies
- Teachers will demonstrate a positive attitude towards children with ADHD

Diagnostic and Statistical Manual of Mental Disorders (1994) and (2013)

- This training uses the leading manual published by the American Psychiatric Association (APA).
- APA is largest scientific and professional organization in the US for mental illness and has over 122,000 members including researchers, educators and consultants.
- The manual provides authoritative criteria for the diagnosis and classification of ADHD.
- Internationally used as a reference in clinical practice.

Activity 1: Introductions

- So that we become familiar with each other during this training programme, I would like each of you to briefly introduce yourself, tell us your teaching position and if you have had any experience of teaching ADHD children.
- I will go first. Hello my name is Ahmed Alshehri and I am a Lecturer at Taf University specializing in Special Education. Also I am a PhD candidate at the University of Birmingham, UK conducting empirical research on raising the level of knowledge amongst schoolteachers of ADHD in Saudi Arabia.
- Now you...

Common ADHD myths

- It is vital that you are able to identify and distinguish between ADHD myth and fact

There is no such thing as ADHD

- It is a valid disorder that is real and has serious consequences
- Has negative impact on daily life and functioning
- Can have lifelong consequences e.g. unemployment and depression in adulthood

The disorder only affects children

- Children diagnosed with ADHD do not outgrow the disorder
- Signs continue into adulthood leading to the possibility of further challenges
- ADHD is a lifelong disorder

ADHD is over-diagnosed

- Increased special education has provided a framework for diagnosis and treatment of ADHD
- Increase has been due to better awareness of the disorder and not simply due to over-diagnosis

ADHD is a result of poor parenting

- Poor parenting itself is not a cause of ADHD
- Evidence has shown that genetics do play a role in positive diagnosis
- Family factors may have an impact upon the effectiveness of treatment
- Misperceptions about ADHD held by parents could lead to missed opportunity for assessment and support

ADHD is a result of poor diet

- Whilst diet may cause a reaction (e.g. allergy) there is no scientific evidence to support this myth
- There is no evidence to suggest that changing the diet of someone with ADHD will cure the disorder

Sugar causes ADHD

- There is no evidence to suggest sugar is a cause of the disorder
- One study showed that giving children 10 times the usual level of sugar did not have an adverse effect on the cognitive or behavioral functioning of children with ADHD

Brief History of ADHD

- It would be useful to be aware of key dates in the timeline of ADHD as a disorder:
- 1902 – "an abnormal defect of moral control in children"
- 1952 – Diagnostic and Statistical Manual of Mental Disorders (DSM) First edition by APA BUT ADHD was not recognized
- 1980 – DSM now contained Attention Deficit Disorder (ADD) with two types: ADD with and without hyperactivity amongst children
- 1987 – name changed from ADD to ADHD
- 2000 – divided into three subtypes: inattentive, hyperactive-impulsive, and combined
- 2013 – release of DSM-5 included consideration of ADHD in both children and adults

ADHD: what is it?

- According to DSM-IV ADHD is defined as:
- "A persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable age of development".
- Either inattention or hyperactivity/impulsivity can

Subtypes of ADHD

- Inattentive
 - Shows serious attention problems
 - But does not have hyperactivity/impulsivity issues
- Hyperactive-impulsive
 - Shows serious problems with hyperactivity/impulsivity
 - But does not have inattention problems
- Combined
 - Shows both inattention and hyperactivity/impulsivity
 - The individual must show at least six symptoms that have persisted

DSM-5

- Released by the APA in 2013 and now contains ADHD in the context of children AND adults
- Gives examples of how ADHD can appear
- Subtypes now referred to as 'presentations' to better reflect the effects of ADHD on the individual at different stages of life
- Inclusion of adults puts direct emphasis on ADHD being

Identifying ADHD

- A number of characteristics must be shown by the individual before a diagnosis of ADHD is made:
- Severity
- Early onset
- Duration
- Impact

DSM-IV Criteria for ADHD

- Specific characteristics have been listed for both inattentive and hyperactivity/impulsivity presentations (subtypes) of the disorder (combined is a mix of the two):
- We will look at the characteristics of each group

Inattention

- often fails to give close attention to details or makes careless mistakes in school work, work, or other activities
- often has difficulty sustaining attention in tasks or play activities
- often does not seem to listen when spoken to directly
- often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
- often has difficulty organizing tasks and activities

Hyperactivity

- often fidgets with hands or feet or squirms in seat
- often leaves seat in classroom or in other situations in which remaining seated is expected
- often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
- often has difficulty playing or engaging in leisure activities quietly
- is often "on the go" or often as if "driven by a motor"

Activity 2

- In your group use the DSM-IV criteria handout given to you to classify each as posing challenges to social, behavioral or educational life within the school environment.
- You have 20 minutes to do this and we will then discuss and share opinions before I disclose the answer.

Socially children will...

- Often have difficulty sustaining attention in tasks or play activities
- Often do not seem to listen when spoken to directly
- Often be forgetful in daily activities
- Often have difficulty playing or engaging in leisure activities quietly

Educationally children will...

- Often fail to give close attention to details or make careless mistakes in school work
- Often do not follow through on instructions and fails to finish schoolwork
- Often have difficulty organizing tasks and activities (classroom context)
- Often avoid, dislike, or be reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)

Behaviorally children will...

- Often lose things necessary for tasks or activities (e.g. toys, school assignments, pencils, books)
- Often be easily distracted by extraneous stimuli
- Often fidget with hands or feet or squirm in seat
- Often leave seat in classroom or in other situations in which remaining seated is expected
- Often run about or climb excessively in situations in which it is inappropriate
- Often be "on the go" or as if "driven by a motor"
- Often talk excessively
- Often blur out answers before questions have been completed
- Have difficulty waiting in turn
- Often interrupt or intrude on other

Causes of ADHD

- There are a variety of potential/possible causes of the disorder:
- Brain injury
 - Some form of trauma has been suffered.
- Genetics
 - If a child has relatives with ADHD then they are more likely to develop the disorder compared with children where ADHD does not run in the family.
 - Environmental exposure and toxins
 - Factors such as exposure to alcohol, tobacco and family discord have been given but there is no scientific evidence.
- Diet
 - Nutritional deficiency does not lead to development of ADHD



Summary Day One

- Training objectives and outcomes of the programme have been discussed
- Distinguished common ADHD myths from fact
- Timeline of how ADHD has developed
- DSM-IV definition of ADHD
- Identifying subtypes: inattention, hyperactive/impulsive, and combined
- DSM-5 addition of adults
- Identifying the criteria for ADHD
- Characteristics of inattention and hyperactive/impulsive types
- Possible causes

Day 2

<p>ADHD Training Programme for Teachers</p> <p>Day Two</p> <p>Ahmed Alshehri</p>	<p>Brief Reflection on Day One</p> <ul style="list-style-type: none"> What new information did you learn about ADHD as a disorder? Key information such as characteristics and criteria link with the process for diagnosing ADHD. 	<p>Day Two</p> <ul style="list-style-type: none"> Today we will look at how a diagnosis of ADHD is made and will cover the following important issues: <ul style="list-style-type: none"> Importance of making a suitable diagnosis Consequences of failure to diagnose Impact that ADHD has on quality of life Academic ability and performance of children with ADHD Multidisciplinary approach to diagnosis Significance of teachers in making a diagnosis of ADHD 	<p>Diagnosis of ADHD</p> <ul style="list-style-type: none"> There is no single test to determine if someone has ADHD A medical diagnosis of ADHD will require the contribution of information from parents and teachers The non-diagnosis or even delay in diagnosing a child with ADHD can have a negative impact upon their academic performance <ul style="list-style-type: none"> Go without treatment Possibility of poorer long term outcomes since the individual is not able to access the services that they need The lack of early diagnosis creates consequences beyond childhood i.e. getting a good job
<p>Consequences of late or non-diagnosis</p> <ul style="list-style-type: none"> This can impact upon the child in the following ways: <ol style="list-style-type: none"> Emotional <ul style="list-style-type: none"> Self esteem Depression Wellbeing 	<p>2. Academic achievement</p> <ul style="list-style-type: none"> Often underachieve compared to children without ADHD <ul style="list-style-type: none"> Show poor academic performance Failure to diagnose will mean the child cannot access services intended to support them to achieve their full potential 3. Social interaction/family <ul style="list-style-type: none"> Disrupt home life <ul style="list-style-type: none"> Ways in which the individual forms relationships Non-diagnosis means they will go without necessary support 	<p>Discussion Point 1</p> <p>Why is it important that a valid diagnosis of ADHD is made in the child as soon as possible?</p> <p>Take 10 minutes to consider this</p>	<p>Impact: academic ability of the child with ADHD</p> <ul style="list-style-type: none"> Four specific areas have been identified as having negative impact within the context of educational achievement and performance: <ol style="list-style-type: none"> Communication Reading Writing Numeracy
<p>Dietary</p> <ul style="list-style-type: none"> Based on the premise that ADHD is a result of the child's reaction to substances in their diet (Curtis and Patel, 2008) This form of treatment requires a reduction or elimination of certain foods, commonly sweets and sugar have been associated with ADHD and junk food (Howard et al., 2011) No definitive proof that diet can cure ADHD or is a cause of the disorder but could be a contributing factor that should not be simply overlooked! 	<p>Educational Treatment</p> <ul style="list-style-type: none"> Aimed at helping children with ADHD to achieve their potential Overlaps with behaviour management as a form of treatment for schoolchildren with ADHD Focus is placed on academic skills and the role they play in the child's academic attainment The most common academic skills that require attention in children with ADHD are: <ul style="list-style-type: none"> Reading Writing Mathematics 	<p>Educational treatment: improving academic skills</p> <ul style="list-style-type: none"> The teacher uses an instructional approach to bring about the desired change in the student (Lee & Zentall, 2002; Robinson & Skinner, 2002) The academic skills of a child with ADHD can be improved following direct instruction from teachers (Evans, Pelham and Grudberg, 1995) Look at examples in training materials 	<p>Improving mathematical skills in children with ADHD</p> <p>Finer (2005) suggests a simple way to do this is to use the environment around the student</p>  <p>Telling the time is a good way of getting children to practise with numbers</p> <ol style="list-style-type: none"> Ensure that the child can recognize numbers on the face of a clock. Start simple – learn them how to tell the time on the hour, the half our, quarter hour and five by the minute Teach the various ways people can express the time
<p>Improving mathematical skills in children with ADHD</p> <p>Concept of money</p>  <p>This will help with counting and subtraction</p> <ul style="list-style-type: none"> Encourage the student to count out their money Draw opportunity for them to simulate purchasing and to make change <p>How to measure</p>  <p>Let students use a ruler to help measure items – this will help them to learn the concept of measurement</p> <ul style="list-style-type: none"> Get the student to measure. Ruler and weights Encourage following recipes that require the use of measuring ingredients 	<p>Training teachers and parents</p> <ul style="list-style-type: none"> The benefits of disseminating information to educate teachers and parents are should not be underestimated (Katsopoulos et al., 2006) Training should at least cover basic information on ADHD such as: <ul style="list-style-type: none"> Symptoms Diagnosis Treatment Techniques for improving communication between teachers and parents Training of parents can help them to understand the difficulties that their child with ADHD faces and to become better equipped to manage their child's behaviour, as well as support other intervention strategies Training can reduce parental stress and enhance parental confidence (Dai et al., 2011) 	<p>Training teachers and parents</p> <ul style="list-style-type: none"> Jacome et al. (1996) found the education of teachers about ADHD through training was necessary to provide better education for children with ADHD Teachers not only get to learn about ADHD but are exposed to useful and up to date information Teacher training provides continuing professional development that helps to fill gaps in their knowledge about the disorder and learn about useful interventions Studies show that as teachers' confidence to deal with children with ADHD is increased their knowledge of the disorder is also enhanced (Chouat et al., 2013) Activities that engage teachers should be embedded into training programmes, these include case studies, media and engaging with other participants 	<p>Benefits of teacher and parent training</p> <ul style="list-style-type: none"> These include: <ul style="list-style-type: none"> Fill any gaps in knowledge about ADHD Access up to date knowledge to stay informed and less likely to rely upon inaccurate information Understand and appreciate the challenges that child with ADHD faces Better equipped to manage the child's behavior Can play an increased role in identification and diagnosis of ADHD Potential reduction in parental/teacher stress Can implement and support intervention strategies Increase parental/teacher confidence
<p>Multi-model Treatment</p> <ul style="list-style-type: none"> Attempts to cover the home, school, medical and social dimensions of the child Therefore a combination of medical and behavioural treatment is opposed to relying just on one approach Requires a professional to take overall charge of the process and ensure that responsibility is taken by each component area Long-term commitment and therefore could pose a problem due to the amount of time required to take such an approach or where the school has financial constraints Communication between medical professionals, teachers and parents is crucial to its success (just like the multidisciplinary approach to diagnosis) 	<p>Effective Educational Strategies For Teachers</p> <p>Peer Tutoring Task Modification Token Economy</p>	<p>Peer Tutoring</p> <ul style="list-style-type: none"> What is it? <ul style="list-style-type: none"> Instructional strategy that aims to increase academic success and social development in children with ADHD How does it work? <ul style="list-style-type: none"> Instruction and feedback is given to the child with ADHD by a peer Positive Impact <ul style="list-style-type: none"> Increases overall confidence of children with ADHD Improves ability of both children to engage and perform academically Improves social skills of child with ADHD when tutored Positive effect also on the child that provides instruction Since the teacher does there is a decrease in the time they need to monitor the child's behaviour in such sessions Instructional characteristics <ul style="list-style-type: none"> Assignment done in one between tutor and tutee Part of structure is determined by the teacher Immediate and frequent feedback provided on performance (Pittman & Barkley, 1996) 	<p>Peer tutoring activity</p> <p>Have a look at the practical example of how you can design your own peer tutoring activity for use in your class.</p>  <p>Consider this intervention and think of any potential challenges the teacher or student with ADHD could experience with peer tutoring.</p>
<p>Task Modification</p> <ul style="list-style-type: none"> What is it? <ul style="list-style-type: none"> A strategy that aims to increase academic performance of children with ADHD through procedures that can help the child to complete tasks How does it work? <ul style="list-style-type: none"> The teacher breaks the curriculum or parts of it to reduce problem behaviour and increase appropriate classroom behaviours Positive Impact <ul style="list-style-type: none"> Prevention as well as preventative Reduction of class routine and expectations minimises the effects that ADHD has on performance The child is more likely to stay on task (Barkley, 2005) Characteristics <ul style="list-style-type: none"> Divided into three parts: <ol style="list-style-type: none"> Curriculum Instruction Independent work 	<ul style="list-style-type: none"> Curriculum <ul style="list-style-type: none"> Use context that the child can find engaging and personally relevant, make use of the student's background knowledge (Reid and Johnson, 2012) Make sure tools for teaching are engaging and that materials provide stimulation – get the child's attention and maintain it! Think about alternative ways of delivering content Instruction <ul style="list-style-type: none"> Make sure the way that curriculum is taught supports the child with ADHD to perform to the best of their ability If delivery is stimulating then children with ADHD are more likely to remember lesson material (Reid and Johnson, 2012) Be enthusiastic and ensure to highlight or make obvious critical parts of the lesson 	<ul style="list-style-type: none"> Independent work <ul style="list-style-type: none"> Children with ADHD are required to self-regulate themselves when teacher supervision is decreased Important factors that influence performance of independent tasks include: difficulty, duration and feedback (Reid and Johnson, 2012) The work must be pitched at the correct level so that the student can cope with the level of difficulty – avoid 'frustration' Be careful that the task is not too long or the volume of work expected is not too much as the child with ADHD will be unable to maintain attention and will not complete the task Children with ADHD perform better when they receive frequent feedback on their performance (Barkley, 2006) – the use of self-correcting materials will provide a student with immediate feedback and as a consequence help to keep them engaged 	<p>Task Modification activity</p>  <p>Have a look at the guidance of how you can modify tasks so that children with ADHD have an increased chance to complete them successfully.</p> <p>Consider this intervention and think of any potential challenges the teacher or student with ADHD could face with task modification.</p>

Day 3

<h3>ADHD Training Programme for Teachers</h3> <p>Day Three</p> <p>Ahmed Alshehri</p>	<h4>Brief reflection on Day Two</h4> <ul style="list-style-type: none"> What new information did you learn about: <ul style="list-style-type: none"> How to diagnose ADHD The impact that the disorder can have on the academic ability of the child Benefits of taking a multidisciplinary approach to diagnosis Having looked at how ADHD is diagnosed in children and the potential consequences of a lack or late diagnosis we will now consider treatment and interventions for children with ADHD 	<h4>Day Three</h4> <ul style="list-style-type: none"> Today we will look generally at the types of treatment/interventions for children with ADHD: <ul style="list-style-type: none"> Medical Behavioural Dietary Educational Parent and Teacher training We will then look at three examples of educational interventions which can offer effective ways of managing children with ADHD in your classroom and helping them to perform to the best of their academic ability! 	<h4>Treating ADHD</h4> <ul style="list-style-type: none"> Diagnosis of ADHD will be accompanied by a recommendation of treatment for the disorder The goal of any treatment to ADHD is to improve symptoms, optimize functional performance and remove behavioural obstacles (Frit et al., 2014) Research is continuously going on into new interventions for ADHD but for the purpose of this training, the main treatment options are: <ul style="list-style-type: none"> Medication Behavioural Combination of both
<h4>Early intervention</h4> <ul style="list-style-type: none"> Gives better prognosis and the child with ADHD means that they would be better equipped to deal with any difficulties in later life Likely the child will have poorer long term outcomes if they are untreated compared to a child who is receiving treatment for ADHD <ul style="list-style-type: none"> Mental health problems Antisocial behaviours Early identification and treatment means a suitable treatment plan can be put together to address issues instead of making symptoms worse because the child has reacted or responded adversely 	<h4>Early intervention</h4> <ul style="list-style-type: none"> Can be difficult to identify ADHD early on in very young children <ul style="list-style-type: none"> Difficult to differentiate between behaviour that is normal or deviant Some indicators that teachers can use as a guide with preschool children: <ul style="list-style-type: none"> Distries or avoids activities that require paying attention for more than one or two minutes Talks a lot more and makes more noise than other children of the same age Frequently aggressive with playmates; has been removed from preschool/daycare for aggression 	<h4>Types of treatment</h4> <ul style="list-style-type: none"> A number of factors can influence the choice of treatment for children with ADHD Research (Brook, Jimerson and Hansen, 2009) has shown that treatment decisions can be influenced by: <ul style="list-style-type: none"> Media portrayal Culture background Family and Friends Teachers An approach that includes medical, behavioural and educational strategies is known as a multi-modal approach, this is considered the most effective form of treatment for children with ADHD 	<h4>Medical Treatment</h4> <ul style="list-style-type: none"> Proven as an effective way of treating children with ADHD For example stimulants can increase dopamine which is a neurotransmitter linked to movement and attention A qualified medical professional will start with a low dosage that will gradually be increased until a therapeutic effect is reached In comparison non-stimulants take a longer time to have effect <ul style="list-style-type: none"> Normally between 4-6 weeks
<h4>Medical Treatment</h4> <ul style="list-style-type: none"> Has the advantage of being fast acting, proven to help with symptoms, positive effects that include increased activity and can help reduce hyperactivity and therefore increase a child's ability to concentrate However there is the possibility that the child with ADHD may suffer side effects from the use of medication: <ul style="list-style-type: none"> For example: sleeplessness, irritability and loss of appetite. It is used over a long time the individual could suffer with anxiety and regular use of medication could lead to tolerance in children, consequently the therapeutic effect will decrease (Doherty et al., 2000) 	<h4>Alternatives to Medical Treatment</h4> <ul style="list-style-type: none"> Alternatives do not have the same level of scientific evidence to support their effectiveness, however they are commonly used to help treat children with ADHD Common alternatives include: <ul style="list-style-type: none"> Behaviour Diet Training for parents and teachers Educational 	<h4>Behavioural Treatment</h4> <ul style="list-style-type: none"> As a form of treatment for children with ADHD is dates back about 25 years Purpose is for the child to display appropriate behaviours that underpin learning and interaction with others This form of treatment is particularly useful if the child suffers with severe side effects from medical treatment Used in combination with medical treatment could mean a lower dosage of medication is prescribed (Schweitzer et al., 2012) Treatment includes behavioural management and self regulation 	<h4>Behavioural Management</h4> <ul style="list-style-type: none"> Used to reduce 'problem' behaviours (such as non-compliance and disruption) and increase 'appropriate' behaviours (completion of assignments) Teachers can use behavioural management to create a suitable environment (Reid and Johnson, 2012) Functioning of the child with ADHD can be improved by using positive and negative reinforcement
<h4>Reinforcement</h4> <ul style="list-style-type: none"> Where the child demonstrates an appropriate behaviour the teacher uses a positive form of behaviour to reinforce or award the child's action <ul style="list-style-type: none"> Only use reinforcement when the child has shown the positive behaviour Negative reinforcement is when the child demonstrates a specific behaviour so as to prevent a negative behaviour (for example the child completes a task to avoid disapproval or negative comments that the task must be completed) Teachers should use positive reinforcement as a first option when dealing with children who have ADHD 	<h4>Behaviour Management: the Classroom</h4> <ul style="list-style-type: none"> The physical school environment will have an impact on the behaviour of children with ADHD (Reid, 1999) The way that teachers manage their classroom can make behaviour management more effective as a form of treatment There are specific ways in which you can manage behaviour of children when at school: <ul style="list-style-type: none"> Structuring the classroom Classroom management 	<h4>Structuring the classroom</h4> <ul style="list-style-type: none"> Avoid sitting the child near to things likely to be a distraction: <ul style="list-style-type: none"> Children with ADHD should not be placed near areas of high activity like a door or window (Bender & Mathis, 1995) Be conscious that children with ADHD might see group work as an opportunity for social interaction which could reinforce inappropriate behaviour <ul style="list-style-type: none"> A solution could be putting the child in a group away from their friends 	<h4>Classroom management</h4> <ul style="list-style-type: none"> Reid and Johnson (2012) say that for children with ADHD to succeed teachers should base classroom management on the following principles: <ul style="list-style-type: none"> Simple: Keep this simple so that the child knows what to do and when - should span the entire school day! Clear: Children should know the behaviours they should be showing and the rules they need to follow - praise should be given when children follow rules and consequences (applied quickly and reasonably) if rules are broken have been clearly displayed to children Direct: Ensure you interact with children effectively, studies have shown attention from teachers follows inappropriate behaviour as opposed to appropriate behaviour. As a result undesired behaviour is likely to increase if it is the only time a child receives interaction from their teacher!
<h4>Token Economy</h4> <ul style="list-style-type: none"> What is it? <ul style="list-style-type: none"> An intervention that aims to decrease disruptive behaviour How does it work? <ul style="list-style-type: none"> In addition to praise from the teacher, the child is offered a secondary form of reinforcement through a reward Positive Impact: <ul style="list-style-type: none"> Helps children with ADHD to remain focused and to be compliant Reinforcement can be given to the child as soon as the behaviour occurs and therefore reduces any time between the desired behaviour and reinforcement Characteristics: <ul style="list-style-type: none"> Rewards are collected by the child based on their behaviour These can be exchanged for something that the child values, for example an activity or privilege 	<h4>Token Economy Activity</h4> <p>Have a look at the practical example of how you can implement a token economy system in your classroom.</p>  <p>Consider this intervention and think of any potential challenges the teacher or student with ADHD could face with this system.</p>	<h4>Case study – Khalid</h4> <p>Khalid is in his second year of primary school. His father has influenced and has made an appointment to see his teacher Ahmed, in the morning with Khalid's teacher. His father tells teacher Ahmed that Khalid's current academic achievement.</p> <p>During the meeting teacher Ahmed and father discussed the following objectives:</p> <ol style="list-style-type: none"> Ahmed was friendly and welcoming planning for objectives He explained the token economy system He set clear and achievable targets for Khalid He explained the importance of the teacher to set objectives which are achievable in order to bring forth positive behaviour He discussed ways to reduce the attention of the classroom He discussed the importance of the teacher to set achievable goals He talked about the importance of the teacher to set achievable goals He talked about the importance of the teacher to set achievable goals <p>Question 1: Identify Khalid's areas of strength.</p> <p>Question 2: What interventions do you recommend teacher Ahmed to use with Khalid at school?</p> <p>What other types of treatment might teacher Ahmed discuss with his father about?</p>	<h4>Summary of Day Three</h4> <ul style="list-style-type: none"> There are a variety of treatments or interventions for children with ADHD, the most common are medical and behavioural Interventions for children with ADHD may also be done through the training of parents and teachers so that they can better manage each child Behavioural treatment is a foundation of educational interventions, whereby teachers can increase desired behaviour and decrease inappropriate behaviour Positive reinforcement is a way that teachers can achieve this goal with children who have ADHD How the teacher structures their classroom as well as how they manage it can have a direct impact upon the academic performance of children with ADHD The best form of treatment is one that encompasses home, school, medical and social interventions
<h4>Summary of ADHD training programme for teachers</h4> <ul style="list-style-type: none"> The objectives of this training programme were to: <ol style="list-style-type: none"> Enable teachers to recognize the key types of ADHD, its symptoms, characteristics and causes; Familiarize teachers with the process for diagnosis and identification of ADHD; Help teachers to identify ADHD treatment and interventions; Ensure inaccurate information and misperceptions about ADHD are recognized 	<h4>Summary of ADHD training programme for teachers</h4> <ul style="list-style-type: none"> On day one we looked at what is ADHD, types and possible causes of the disorder Day two looked at how the disorder is diagnosed, the consequences of either late diagnosis or the failure to diagnose and the impact this can have on the student's academic ability The types of treatment for children with ADHD were explored in day three/four, with specific emphasis on medical, behavioural and educational interventions Peer Tutoring, Task Modification and Token Economy were looked at in detail as examples of interventions that teachers could find useful in using with their students 	<p>I hope you enjoyed this training programme and that the knowledge you have developed over the past few days will be useful to your teaching of students with ADHD.</p>  <p>Many thanks! Ahmed</p>	
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Substantive content of the ADHD training programme:

ADHD Training Programme for Teachers

Definition, types, characteristics and causes of ADHD

Introduction

This section of the training handout places particular emphasis on both the (1994) and (2013) Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association and the reference to ADHD. The American Psychiatric Association works to ensure the effective care and treatment for people with mental illness. It is the largest scientific and professional organization representing psychology in the United States, with more than 122,500 researchers, educators, consultants and students as its members (www.apa.org). As an organization of psychiatrists, it aims to provide quality psychiatric diagnosis and treatment.

The Manual provides the authoritative criteria of ADHD and the 5th Edition is the latest version of this leading resource on the diagnosis and classification of mental disorders. It contains the best available diagnostic criteria giving a description of how mental disorders are expressed and recognized by trained clinicians. It has become a reference for clinical practice in the mental health field used by clinicians; it is an essential educational resource for students and psychiatry, and for those researching in the field. (DSM-5 APA, 2013).

Common myths about ADHD

There are a number of myths about the disorder and it is vital that you are able to identify these common false beliefs.

Myth	Truth
	ADHD is a valid disorder that has severe, lifelong consequences (NIH, 2000; US Surgeon General's Report, 2001). It has a negative impact on aspects of daily social, emotional, academic and work functioning

There is no such thing as ADHD

(Barkley, 1998). Studies have shown that children with ADHD have higher rates of other psychiatric disorders compared to those without the disorder (Leibson, 2001). Further consequences can include antisocial behaviour that means children are more likely to drop out of school (Barkley, Fischer, Edelbrock and Smallish, 1990) as well as experience higher rates of unemployment and depression in adulthood (Fischer, Barkley, Smallish, and Fletcher, 2002). This shows that ADHD is real and has serious consequences.

The disorder only affects children (it is a childhood disorder only)

Originally it was thought that children diagnosed with ADHD naturally outgrew the disorder (Ingram, Hechtman, and Morgenstein, 1999). However, it is a fact that children with the disorder continue to show significant signs in adolescence and adulthood and according to Barkley (1998) many individuals deal with academic failure, isolation and rejection. Studies have shown children with persistent ADHD face adverse risk factors in the future (Cuffe, McKeown, Jackson et al, 2001). It is not a disorder that only affects an individual during childhood but in fact a lifelong disorder (Teeter, 1998).

ADHD is over-diagnosed

The emphasis on new special education legislation raised the awareness of ADHD and in it was contained a framework for the legitimate diagnosis and treatment of schoolchildren with the disorder. The increase in such services for children with ADHD has meant that some have claimed the disorder is over-diagnosed. It is important to remember that the level of diagnosis may be dependent on the rating scale and criteria used to make a diagnosis of ADHD. For example, prevalence rates increased after the inattentive subtype was added to the DSM-IV (Wolraich, Hannah, Pinnock et al, 1996).

ADHD is a result of poor parenting

Whilst environmental factors which would include parenting may impact on ADHD, studies have shown it is genetic factors that have an impact upon whether a person is diagnosed with the disorder. Parental characteristics, caregiving abilities, child management or other family environmental factors are not a cause of ADHD (Barkley, 1998). There are factors such as family poverty, home environment, ineffective childhood practices that whilst do not contribute towards the development of ADHD symptoms they can impact upon the

ADHD is a result of poor diet

effectiveness of treatment (Barkley, 1998). It is a fact that the misperceptions held by parents about the disorder could result in harsh and critical parenting practices (Johnston and Patenaude, 1994).

Diet may have an affect on the behaviour of a child i.e. they might have a reaction but there is no scientific evidence to suggest that it is the cause of ADHD. Equally the belief that if the diet of an individual with ADHD is changed it will cure ADHD is inaccurate (Passmore, 2014).

Sugar causes ADHD

This common myth is wholly inaccurate and again there is no evidence that suggests sugar is a cause of the disorder. Studies have even show that children with a consumption of more than 10 times the usual level of sugar did not have adverse effect on the cognitive or behavioural functioning of children with ADHD (Passmore, 2014).

History

As understanding the disorder has developed over time so too has the name given to what we now know as ADHD. These changes can be tracked over a period of thirty years (Parker, 2005) at first the condition was named 'hyperactivity' and then 'attention-deficit disorder' (ADD). A further name change was given so as to differentiate between children who had ADD but did not exhibit hyperactivity (Wender, 2000).

Brief timeline of ADHD

1902	First mentioned as "an abnormal defect of moral control in children" by British pediatrician Sir George Still
1952	APA issued the first Diagnostic and Statistical Manual of Mental Disorders (DSM). ADHD was not recognized as a mental disorder in this edition.
1980	DSM (DSM-III) released by the APA named the disorder from hyperkinetic impulse disorder to attention deficit disorder (ADD). Two types of ADD were listed: ADD with hyperactivity and ADD without hyperactivity amongst children.

1987	APA changes name to ADHD in the revised DSM-III released that year.
1987	The name ADHD combined three symptoms: inattentiveness, impulsivity and hyperactivity.
2000	In the fourth edition of the manual (DSM-IV) the APA divided ADHD into three subtypes: combined, predominantly inattentive and predominantly hyperactive-impulsive type.
2013	APA released DSM 5 to include consideration of ADHD in both children and adults.

Definition of ADHD

According to the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders – 5th Edition (DSM-V) ADHD is defined as:

“a persistent pattern of inattention and/or hyperactivity/impulsivity that interferes with functioning or development”.

An individual may show inattention and hyperactivity/impulsivity or either have either of these predominate.

Subtypes of ADHD that have been recognized:

Inattentive	Hyperactive-impulsive	Combined
<ul style="list-style-type: none"> The individual has serious attention problems i.e. cannot pay attention for a sustained period of time. 	<ul style="list-style-type: none"> Someone who has serious problems with hyperactivity/impulsivity. 	<ul style="list-style-type: none"> The individual who exhibits both inattention and hyperactivity/impulsivity.

<ul style="list-style-type: none"> • No problem with hyperactivity/impulsivity Symptoms • Individual presents more than 6 symptoms of inattention (but less than 6 symptoms of hyperactivity/impulsivity) for a persistent period of 6 months or more 	<ul style="list-style-type: none"> • No problem with inattention • Individual presents more than 6 symptoms of hyperactivity/impulsivity (but less than 6 symptoms of inattention) for a period of at least 6 months 	<ul style="list-style-type: none"> • All presented and observed for a period of at least 6 months
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The 5th Edition of the Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association slightly changed the definition of ADHD and how it is diagnosed in children and adults.

- Easier diagnosis for adults and teens because age of when symptoms should be documented is greater
- No requirement to go back as far as childhood to check for the onset of symptoms
- Examples are given of how ADHD can appear in adults and teens
- Subtypes of ADHD changed to 'presentations' as the term better reflects the effects that the disorder has on the individual at different times in their life

The addition of ADHD in adults means that ongoing support can be given to children with the disorder through their lives.

Identifying ADHD

A clinical diagnosis of ADHD requires that a person show a number of characteristics:

Severity	The behaviour must occur more frequently in the child than other children at the same developmental stage
Early onset	Some symptoms must have been present before the age of 7 years
Duration	Symptoms must have been present for at least 6 months prior to the child being evaluated
Impact	The symptoms must have a negative impact on the child's academic and social life
Settings	Symptoms must be present in multiple settings

DSM IV Criteria for ADHD

Inattention	
(j)	often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(k)	often has difficulty sustaining attention in tasks or play activities
(l)	often does not seem to listen when spoken to directly
(m)	often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)
(n)	often has difficulty organizing tasks and activities
(o)	often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)

(p)	often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
(q)	is often easily distracted by extraneous stimuli
(r)	is often forgetful in daily activities
Hyperactivity	
(j)	often fidgets with hands or feet or squirms in seat
(k)	often leaves seat in classroom or in other situations in which remaining seated is expected
(l)	often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings or restlessness)
(m)	often has difficulty playing or engaging in leisure activities quietly
(n)	is often “on the go” or often as if “driven by a motor”
(o)	often talks excessively
(p)	often blurts out answers before questions have been completed
(q)	often has difficulty waiting turn
(r)	often interrupts or intrudes on others (e.g. butts into conversations or games)

Source: American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC, American Psychiatric Association, 1994.

Causes of ADHD

There are a number of potential causes of ADHD that have been identified. One of the first theories as a cause of the disorder was brain injury (Fisher and Beckley, 1998) and more recently genetics has been identified as a cause (Lynn, Lubke, Yang et al, 2005) that carries more prominent causal risk than environmental factors (Hawi, Segurado, Conroy et al, 2005). Research also includes diet (Boris and Mandel, 1994) and exposure to toxins as other possible causes (Bellanti, 1999; Needleman, 1982).

Brain Injury

This is where the brain has suffered some form of trauma such as a serious blow to the head, stroke or brain tumor. These can affect attention and cause problems in the regulation of motor activity. ADHD-like symptoms might also be apparent because of frontal-lobe damage.

As a cause of ADHD this contributes to 75% of cases (Acosta, Arcos-Burgos and Muenke, 2004; Volkow, Wang, Kollins et al, 2009) yet no single gene is a major contributory cause (Acosta et al., 2004).

The disorder arises from a combination of several genes (Frank-Briggs, 2011). If a child has relatives with ADHD, then they are more likely to develop the disorder compared to children where ADHD does not run in the family.

Where the disorder is passed on from parents it is called inherited risk/liability (Thapar et al, 2012). A first-degree relative who has ADHD are two to eight times more likely than relatives of unaffected individuals to also show ADHD (Faraone, Perlis, Doyle et al, 2005).

Genetics

According to Rutter (2006) environmental and genetic factors are entwined with the former (environmental causes) being influenced by the latter. Examples are exposure to alcohol and tobacco smoke during pregnancy (Braun, Kahn, Froehlich et al, 2006), conflict and family discord as well as obstetric complications (Miranda, Marco and Grau, 2007). However, a child's environment is not seen as a strong predictor of ADHD (Biederman and Faraone, 2002).

Environmental and exposure to toxins

Nutritional deficiencies have been alluded to in a number of studies as a possible aetiological factor in ADHD (Arnold and DiSilvestro, 2005; Kozielec and Starobrat-Hermelin, 1997; Spahis, Vanasse, Bélanger et al, 2008) but there has not been strong enough evidence to show causal effect of ADHD (Thapar et al., 2013). It is accepted that extreme nutritional deficiency can impact upon neurodevelopment (Sinn, 2008).

Diet

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Diagnosing ADHD

The diagnosis of ADHD is not based on a single test to determine if a child has the disorder but is based on the observance of accepted diagnostic criteria. The process requires the medical field, educational authorities and parents to work together and it is fundamental that a diagnosis is positively made where possible as failure to do so or a delay in diagnosis can have detrimental consequences for the child. For example, a child's academic performance could be adversely affected (Faraone et al., 2003; Birchwood and Daley, 2012).

Importance of making a suitable diagnosis

Without a valid diagnosis, the child with ADHD will not receive treatment and will potentially face negative psychological, academic and social problems (Wender, 2000). Untreated ADHD which is often a consequence of no diagnosis results in poorer long-term outcomes (Wender, 2000) as the undiagnosed child will not be able to access the services they need to reach their potential. Without early diagnosis, there are potential consequences beyond childhood and into adulthood which include poor occupational achievement, marital strife and money management (Barkley, Murphy and Fischer, 2008).

Possible consequences of failure to diagnose or negative impact through late diagnosis:

Emotional

How children see themselves or their self-esteem can be affected by ADHD and this may lead to depression (Sawyer et al., 2002). Children without diagnosis will not receive treatment to help support their emotional wellbeing (Hechtman et al., 1980).

Academic achievement and under performance

Studies show that children with ADHD often underachieve and show poor academic performance. By not receiving a formal diagnosis, a child will not be able to access additional services designed to help support academic achievement. Compared with children who have a formal diagnosis of ADHD the magnitude for potential impact upon

Detriment on ability to socially interact

educational attainment for those that show symptoms but have not received a diagnosis are greater (Loe and Feldman, 2007).

There can be a disruption to home life and how the individual with ADHD forms relationships with other people. This can be compounded where the individual is not diagnosed and therefore in receipt of necessary support (Cussen, Sciberras, Ukoumunne and Efron, 2011).

Impact on Quality of Life

ADHD can have an impact on a variety of aspects and such impact may vary in degree and nature. These range from individual and personal attributes such as the ability to regulate our own emotion (Barkley, 2006) and the influence this has on the child's quality of life (Wehmeier, Schach and Barkley, 2010). Additionally, the way in which the child with ADHD interacts with others can also be affected; this includes social relationships with family members and also making friends and maintaining friendships. There is a common association between academic underachievement and poor performance amongst children with ADHD.

Table 1: Impact of ADHD on quality of life

Emotional	Social	Family	Education
<ul style="list-style-type: none"> ✓ Poor self-regulation of emotion (Barkley, 2006). ✓ Greater excessive emotional expression, especially anger and aggression, greater problems coping with frustration, reduced empathy and decreased arousal and stimulation (Wehmeier et al., 2010). ✓ Children with ADHD can often be thought of as rude, thoughtless, selfish, insensitive, anxious, and immature (adhd-solutions.org, 2015). 	<ul style="list-style-type: none"> ✓ Friendships and peers – children with ADHD have problems with peer relationships (Coghill et al., 2006; Becker et al., 2006) lack friendships (Meltzer et al., 2003) and experience a limitation in the friendships that they do have (Escobar et al., 2005). This is a result of their inability to effectively participate in social exchanges and a tendency to interact in a selfish and less-cooperative manner (Barkley, 2006). ✓ Poor relationship with teachers and other adults (adhd-solutions.org, 2015). 	<ul style="list-style-type: none"> ✓ Family – life in a family unit that has a child with ADHD is more stressful than that of a family without an ADHD child (Barkley, 2006), this includes parental breakdown and financial problems for the family (Johnston and Mash, 2001). 	<ul style="list-style-type: none"> ✓ A child with ADHD is likely to not only underachieve academically but also show poor academic performance (Currie and Stabile, 2004; Todd, Sitthiraksa, Reich et al, 2002; Loe and Feldman, 2007). It is useful to differentiate between the two: academic underachievement looks at how the child applies learning and knowledge in the achievement of often-poor grades; alternatively, academic performance specifically relates to the child's completion of work activities such as classwork and homework (Loe and Feldman, 2007). ✓ Association of ADHD with poor academic achievement starts from preschool at the beginning of a child's academic journey (DuPaul et al., 2001; Rabiner and Coie, 2000). ✓ Children with ADHD will often leave tasks until the last minute (adhd-solutions.org, 2015).

Table 2: Impact upon academic ability

Communication	Reading	Writing	Numeracy
<p>Children with ADHD have often been referred to as poor communicators (Cantwell and Baker, 1991; Rabiner and Coie, 2000) as they have difficulty in using language and expression. Everyday language is used during daily interaction and requires an individual to be able to sufficiently regulate his or her own communication. Problems with communication of children with ADHD can include the failure to moderate volume of speech (Breznitz, 2003) as well as development of their vocabulary and grammar, all of which can have an impact on their classroom work (Tannock and Brown, 2000; Tirosh and Cohen, 1998).</p>	<p>Reading difficulties in children with ADHD from an early age indicate they are less likely to improve reading achievement compared to children who present only initial reading problems (Rabiner and Malone, 2004). Children with the disorder commonly struggle with long words and can exhibit slow reading (Ghelani, Sidhu, Jain and Tannock, 2004).</p>	<p>Since writing requires a number of abilities the child with ADHD is likely to experience difficulties in this task. For example, writing requires sustained attention and therefore children with the inattentive subtype of the disorder are likely to struggle with their writing (Rodriguez, González-Castro, Cerezo and Álvarez, 2012; Graham and Harris, 2005). Equally writing requires the appropriate command of motor skills (Mercer and Mercer, 2005) to ensure that it is legible, fluent and accurate (Henderson and Sugden, 1992) and therefore the child with the hyperactivity subtype of ADHD is likely to struggle.</p>	<p>Mathematical skills are essential for functioning in daily life (Gersten, Jordan and Flojo, 2005). It has been found that 26% of children with ADHD face some form of mathematical difficulties (Mayes and Calhoun, 2006). Issues with memory and attention can lead to poor mathematical problem solving (Swanson and Beebe-Frankenberger, 2004) in affected children. Simply these include differentiating between the value of two numbers, the use of immature counting skills (Gersten, Jordan and Flojo, 2005) and problems with basic addition, subtraction, division and multiplication (Swanson and Beebe-Frankenberger, 2004).</p>

A multidisciplinary approach to diagnosing the child with ADHD

To ensure that a diagnosis of ADHD is as accurate as possible it is vital that it is based on not only medical judgment in accordance with DMS 5 (APA, 2013) but also on input from both teachers and parents. The collaboration of these key influencers in the formal diagnosis of ADHD is referred to as a multidisciplinary approach whereby each contributes their own specific and crucial information to the diagnosis picture.

Parents

Early recognition of the disorder raises the significance of the role played by parents since they are in the best position to seek medical help (Zwaanswijk, et al., 2003). The beliefs that parents have about ADHD will have a direct impact upon the likelihood of them seeking medical advice and management (Hamed, et al., 2015) which can include: diet, perception of childhood behaviour as being a burden and tolerance (Bussing et al., 2003; Sayal, 2004; Sayal, Goodman and Ford, 2006). The level of trust that parents have in teachers can directly affect the early diagnosis of a child with ADHD and there must be clear communication between the two (Bussing et al., 2003). It has been found that parents who do not trust teachers or believe them can be reluctant to seek medical assessment of their child following concern raised by teachers about the child (Sayal, 2004). By collaborating with teachers, parents are able to benefit from the sharing of information about the child and their impairment that can make for an earlier identification of risk and give parents the necessary confidence to seek medical advice (Hamed et al., 2015).

Teachers

How the child behaves whilst at school will be a vital source of information to be examined in making a diagnosis of ADHD in children. Teachers will rate the behaviour of the child based on their interaction with them in the classroom environment and are in the best position to comment on the child's academic achievement and performance. Due to the large amount of time children spend

at school, teachers may be the first to identify issues with the child (Sayal et al., 2010). The attitudes of parents towards ADHD could impact on the diagnosis of a child with the disorder if their teacher lacks knowledge of ADHD and has failed to pass on accurate information to parents of children they teach who may need an evaluation and formal diagnosis of the disorder (Travell and Visser, 2006). Therefore, teachers and parents should clearly communicate with each other so that their concerns can be discussed openly (Travell and Visser, 2006; Hamed et al., 2015).

Medical Professionals

The actual diagnosis of ADHD should be made by a psychiatrist, paediatrician or other healthcare worker with expertise and training in the diagnosis of ADHD. As there is no simple test that can be performed to either prove or disprove a diagnosis it will be done based on a pattern of behaviour. Therefore, there needs to be evidence of impairment across a number of settings which will require additional information that can be provided by parents/carers, teachers and the child. There is also the possibility that clinicians may arrive at a different diagnosis even though they have used the same assessment criteria and procedures (McKenzie and Wurr, 2004). As it is the diagnosis of the clinician that is the crucial element it is also their responsibility to appropriately weigh up evidence of teachers and parents, this is often done through interviewing those concerned (Swanson et al., 1998). Obtaining family and educational history helps aid medical diagnosis of ADHD (Zhu et al., 2014). Clinicians have an important responsibility to build reassurance in parents and teachers in the clinical diagnosis process of the disorder and to do this they should work closely with the other parties when diagnosing the ADHD child (Hamed et al., 2015).

Clinical diagnosis of ADHD on DSM –IV criteria in accordance with DSM 5

- A. According to the DSM-IV, a person with Attention Deficit/Hyperactivity Disorder must have either (1) or (2):
1. Six (or more) of the symptoms stated previously of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
 2. Six (or more) of the symptoms stated previously of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent and developmental level:
- B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present from age 4 years
- C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).
- D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.
- E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

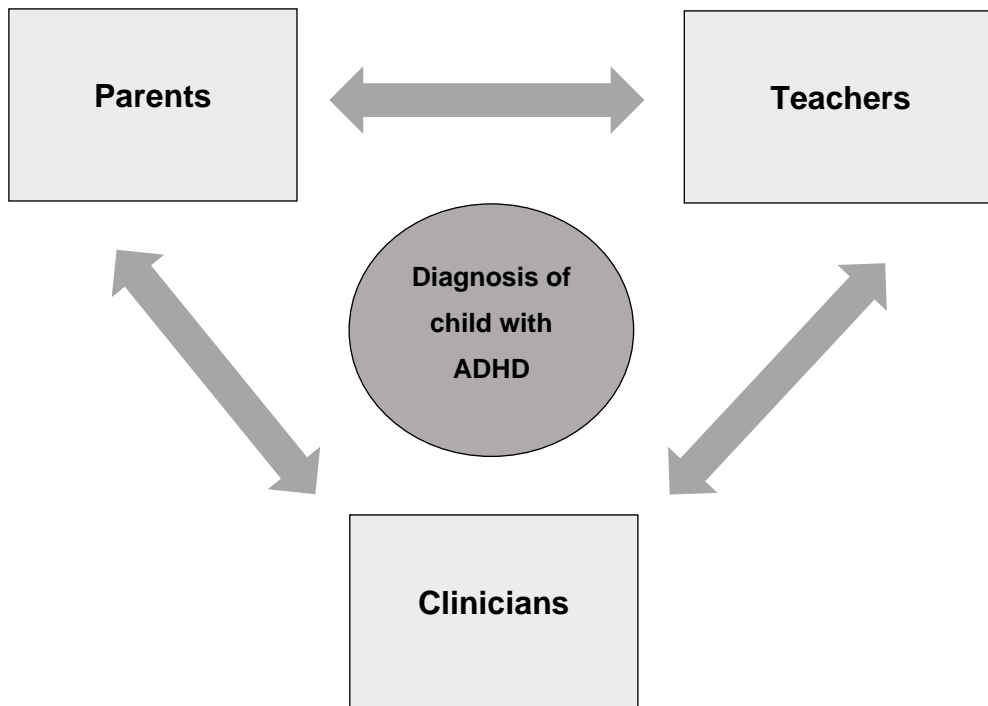


Figure 1: Diagram of multidisciplinary approach to diagnosis of ADHD

ADHD rating scales for Parents and Teachers

As mentioned above, the information provided by parents/carers and teachers is fundamental to making a final clinical diagnosis of ADHD. The way in which such evidence can be gathered is through the completion of a rating scale specifically designed to evaluate impairments associated with the disorder. It is then down to the clinician using the evidence that cannot be observed in a clinic, and their own findings to either provide an affirmative diagnosis (where medical diagnosis agrees with a diagnosis of ADHD by teachers and parents) or differential diagnosis if appropriate (where medical diagnosis is not in agreement with evidence provided by teachers and parents i.e. does not consider the child to have ADHD). There are a number of rating scales in use, which include the Vanderbilt Scale, Conner's Parents Scale, ADHD-IV to name just three.

For the purposes of this training we will adopt the Vanderbilt scale for Parents and Teachers. You will notice that they are different and each contain questions which are more appropriate for the environment in which the child is being observed.

Vanderbilt ADHD rating scale for Parents

Circle the number on the scale that corresponds to how you would rate your child's behaviour

0=never 1=Occasionally 2=Often 3=Very Often

1	Does not pay attention to details or makes careless mistakes, for example homework	0	1	2	3
2	Has difficulty attending to what needs to be done				
3	Does not seem to listen when spoken to directly				
4	Does not follow through when given directions and fails to finish things				
5	Has difficulty organizing tasks and activities				
6	Avoids, dislikes, or does not want to start tasks that require ongoing mental effort				
7	Loses things needed for tasks or activities (assignments, pencils, books)				
8	Is easily distracted by noises or other things				
9	Is forgetful in daily activities				
10	Fidgets with hands or feet or squirms in seat				
11	Leaves seat when he is supposed to stay in his seat				
12	Runs about or climbs too much when he is supposed to stay seated				
13	Has difficulty playing or starting quiet games				
14	Is "on the go" or often acts as if "driven by a motor"				
15	Talks too much				

16	Blurts out answers before questions have been completed				
17	Has difficulty waiting his/her turn				
18	Interrupts or bothers others when they are talking or playing games				
19	Argues with adults				
20	Loses temper				
21	Actively disobeys or refuses to follow an adults' requests or rules				
22	Bothers people on purpose				
23	Blames others for his or her mistakes or misbehaviors				
24	Is touchy or easily annoyed by others				
25	Is angry or bitter				
26	Is hateful and wants to get even				
27	Bullies, threatens, or scares others				
28	Starts physical fights				
29	Lies to get out of trouble or to avoid jobs (i.e., "cons" others)				
30	Skips school without permission				
31	Is physically unkind to people				
32	Has stolen things that have value				
33	Destroys others' property on purpose				
34	Has used a weapon that can cause serious harm (bat, knife, brick, gun)				
35	Is physically mean to animals				
36	Has set fires on purpose to cause damage				
37	Has broken into someone else's home, business or car				
38	Has stayed out at night without permission				
39	Has run away from home overnight				
40	Has forced someone into sexual activity				
41	Is fearful, nervous, or worried				

42	Is afraid to try new things for fear of making mistakes				
43	Feels useless or inferior				
44	Blames self for problems, feels at fault				
45	Feels lonely, unwanted, or unloved; complains that "no one love him/her"				
46	Is sad or unhappy				
47	Feels different and easily embarrassed				

How is your child doing?		Problem		Average	Above Average	
		1	2	3	4	5
1	Rate how your child is doing in school overall					
a	How is your child doing in reading?					
b	How is your child doing in writing?					
c	How is your child doing in math?					
2	How does your child get along with you?					
3	How does your child get along with brothers and sisters?					
4	How does your child get along with others his/her own age?					
5	How does your child do in activities such as games or team play?					

Vanderbilt ADHD rating scale for Teachers

Each rating should be considered in the context of what is appropriate for the age of children you are rating

0=never 1=Occasionally 2=Often 3=Very Often

		0	1	2	3
1	Fails to give attention to details or makes careless mistakes in schoolwork				
2	Has difficulty sustaining attention to tasks or activities				
3	Does not seem to listen when spoken to directly				
4	Does not follow through on instruction and fails to finish schoolwork (not due to oppositional behavior or failure to understand)				
5	Has difficulty organizing tasks and activities				
6	Avoids, dislikes, or does not want to start tasks that require ongoing mental effort				
7	Loses things needed for tasks or activities (assignments, pencils, books)				
8	Is easily distracted by extraneous stimuli				
9	Is forgetful in daily activities				
10	Fidgets with hands or feet or squirms in seat				
11	Leaves seat in classroom or in other situations in which remaining seated is expected				
12	Runs about or climbs excessively in situations in which remaining seated is expected				
13	Has difficulty playing or engaging in leisure activities quietly				
14	Is "on the go" or often acts as if "driven by a motor"				
15	Talks excessively				
16	Blurts out answers before questions have been completed				
17	Has difficulty waiting in line				
18	Interrupts or intrudes on others (e.g., butts into conversations or games)				
19	Loses temper				
20	Actively defies or refused to comply with adults' requests or rules				
21	Is angry or resentful				
22	Is spiteful and vindictive				

23	Bullies, threatens, or intimidates others				
24	Initiates physical fights				
25	Lies to obtain goods for favors or to avoid obligations (i.e., "cons" others)				
26	Is physically cruel to people				
27	Has stolen items of nontrivial value				
28	Deliberately destroys others' property				
29	Is fearful, anxious, or worried				
30	Is self-conscious or easily embarrassed				
31	Is afraid to try new things for fear of making mistakes				
32	Feels worthless or inferior				
33	Blames self for problems, feels guilty				
34	Feels lonely, unwanted, or unloved; complains that "no one loves him/her"				
35	Is sad, unhappy, or depressed				

Performance		Problematic		Average	Above Average	
		1	2	3	4	5
Academic Performance						
1	Reading					
2	Mathematics					
3	Written expression					
Classroom Behavioral Performance						
1	Relationship with peers					
2	Following directions/rules					
3	Disrupting class					
4	Assignment completion					
5	Organizational skills					

ADHD Treatment

The treatment of ADHD is considered as a matter of ongoing research and debate and even now the research for new interventions continues. Diagnosis of ADHD will be accompanied by a recommendation of the type of first line treatment the child should receive. There are a number of treatment options for ADHD, but the main ones are medication, behavioural therapy or a combination of both. Therefore, the goal of treatment for ADHD is to improve symptoms, optimize functional performance and remove behavioural obstacles (Felt et al., 2014).

Importance of treatment and early intervention

Treatment of the disorder is highly recommended because early and effective treatment of ADHD can result in a better prognosis for the individual and they could face fewer problems later on in life (Childress and Berry, 2012). Without treatment, the child can suffer from psychological, educational and social problems and will have poorer long-term outcomes compared to a child with ADHD who is receiving treatment, for example for mental health problems. A child with ADHD who does not receive any treatment may have impaired social and occupational functioning and have an increased likelihood of developing comorbid disorders such as depression and antisocial behaviours (Hamed et al., 2015).

Identification and treatment at an early age allows an appropriate treatment plan to be put in place meaning that problems can be responded to as opposed to making the child's symptoms worse through adverse reaction or response. Early intervention for ADHD may be problematic because of the difficulty in differentiating between normal and deviant behaviour in very young children. As a guide some of the signs of impulsivity, hyperactivity and inattention in preschool children include:

- Dislikes or avoids activities that require paying attention for more than one or two minutes

- Loses interest and starts doing something else after engaging in an activity for a few moments
- Talks a lot more and makes more noise than other children of the same age
- Climbs on things when instructed not to do so
- Cannot hop on one foot by age 4
- Nearly always restless -- wants to constantly kick or jiggle feet or twist around in his/her seat. Insists that he/she "must" get up after being seated for more than a few minutes
- Gets into dangerous situations because of fearlessness
- Warms up too quickly to strangers
- Frequently aggressive with playmates; has been removed from preschool/daycare for aggression
- Has been injured (e.g., received stitches) because of moving too fast or running when instructed not to do so

Studies have found that the more intensive or earlier the identification the greater the improvement in parents' ratings of children's symptoms of ADHD (Brandau and Pretis, 2004).

Types of Treatment:

Deciding on the type of treatment can be complicated by a number of factors including media portrayal, cultural background, family and friends as well as teachers (Brock, Jimerson and Hansen, 2009). A multi-modal approach to treatment that includes medical, behavioural and educational strategies is the most effective.

Medical Treatment

Pharmacological treatment is effective at reducing ADHD symptoms and increasing the effectiveness of other forms of intervention. Stimulants are prescribed as a treatment for ADHD as they increase dopamine levels in the brain. Dopamine is a neurotransmitter linked to pleasure, movement and attention. The beneficial effect of stimulants is that they slowly increase dopamine in a similar way to how it is naturally produced in the brain. Prescribing stimulants for the treatment of ADHD must be done by a qualified medical professional and will start with a low dosage that will be gradually increased until the stimulant has therapeutic effect. Preferred stimulants for ADHD include methylphenidate (MPH) and dexamphetamine.

Alternatively, non-stimulant medication takes longer to have effect compared to stimulant medication; typically, this can be between 4-6 weeks.

Common medication for ADHD

Short-acting	Methylphenidate (Ritalin, Methylin) Dexmethylphenidate (Focalin) Dextroamphetamine (Adderall)
Intermediate-acting	Methylphenidate (Ritalin, Metadate ER) Dextroamphetamine (Dexedrine)
Long-acting	Lisdexamfetamine (Vyvanse)

Felt, B.T., Biermann, B. Christner, J.G., Kochhar, P., Van Harrison, R.,
Diagnosis and Management of ADHD in Children. (2014) *American Family Physician* Volume 90, No 7

Advantages/Disadvantages of medical treatment for ADHD

Advantages

Disadvantages

- ❖ Can be fast affecting i.e. stimulants
- ❖ Scientifically proven to help treat the symptoms of ADHD (Dulcan, 2007).
- ❖ Positive effects include increased activity and therefore the ability to complete tasks i.e homework (Ryan et al., 2008)
- ❖ Can help reduce hyperactivity and consequently increase a child's ability to concentrate (Ryan et al., 2008)
- ❖ Possibility of side effects such as sleeplessness, irritability and loss of appetite and lack of sleep (Fitzpatrick et al., 1992; Walker-Noack et al., 2013)
- ❖ Long-term use of medication could cause anxiety in the individual (Greenhill et al., 2002)
- ❖ Regular use of medication could lead to a development of tolerance in children and therefore decrease therapeutic effect (Doherty et al., 2000)

Non-medical treatment for ADHD:

There are alternative forms of treatment for ADHD which may not have the same degree of scientific data to support their effectiveness as treatment options for children with ADHD. These commonly include behaviour, diet, training for parents and teachers and educational and psychoeducational treatment.

Behavioural treatment

Behavioural treatment or intervention for children with ADHD has been studied for around 25 years (Schweitzer, Fassbender., Lit, Reeves and Powell, 2012). The aim of such treatment is to assist students in displaying appropriate behaviours to underpin learning and interaction with others. It has been found that such treatment provides additional benefits to solely using drug therapy and evidence to support this has been the level of satisfaction from both parents and teachers and children from a lower socioeconomic status (Wolraich et al., 2011; Jensen et al., 2001; Jensen et al., 2007). Behavioural treatment is necessary for children who may experience significant side effects from pharmacological treatment and combining it with such could permit a lower

dosage of medication (Schweitzer et al., 2012). As the child's behaviour changes over time the behavioural treatment will also need to be modified (Schweitzer et al., 2012).

Behavioural treatment can include:

Behavioural management

- Structuring the classroom
- Classroom management

Self-regulation

- Monitoring
- Management
- Goal setting
- Reinforcement

Behavioural management

This can effectively reduce problem behaviours i.e. noncompliance and disruption and increase appropriate behaviours like assignment completion and time management (Pelham and Fabiano, 2008). Therefore, through this type of management teachers can create a suitable environment for children with ADHD to function better (Reid and Johnson, 2012) by using reinforcement and/or negative reinforcement (Reid and Johnson, 2012; Maag, 2004).

Reinforcement (Pfiffner et al., 2006; Reid and Johnson, 2012)

Positive reinforcement

Negative reinforcement

<p>A consequence will follow the desired behaviour with the result that the particular type of behaviour increases. The teacher will use a positive form of behaviour to reinforce/award the behaviour. Teachers should only use reinforcement when the positive behavior has been exhibited.</p>	<p>The specific behaviour either removes or prevents a subsequent event. For example, completing a task so as to avoid the disapproval or negative reminders that the task must be completed. This means that the negative stimulus goes away when the behaviour occurs.</p>
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- ✓ As a first option teachers should use positive reinforcement when dealing with children with ADHD
- ✓ Negative reinforcement should only be used after positive reinforcement has been tried (Reid and Johnson, 2012)

An example of how teachers can manage the behaviour of students with ADHD is to specifically assist them to deal with the school environment and physical set up of the classroom (Reid, 1999). These both have a direct impact on behaviour so management of the student's physical school environment can result in them being more effective. Specific ways in which teachers can manage the behaviour of their students (Reid and Johnson, 2012; Rief, 2005; DuPaul et al., 2011) include structuring and classroom management.

Structuring the Classroom

- ✓ The teacher is aware of how the physical setup can impact upon behaviour (Reid, 1999)
- ✓ Manage the physical environment to manage children with ADHD easier in the classroom (Rief, 2003)
- ✓ Removing potential distractions i.e. a confined classroom is less likely to distract children compared with an open one where they can see what is happening elsewhere as well as hear noise (Pfiffner et al, 2006). Equally overcrowding a classroom can lead to distractions.
- ✓ Seating and desk arrangements appropriate for children with ADHD to work either sitting or standing
- ✓ According to Bender and Mathes, 1995) children with ADHD should not be located near areas of high activity such as the doorway or window
- ✓ Placing children with ADHD in groups with friends may distract them since they perceive such as an opportunity for social interaction that could then reinforce inappropriate behaviour (Bender and Mathes, 1995; Pfiffner et al., 2006; Lewis and Sugai, 1996; Northup, Broussard, Jones et al, 1995). A solution could be to put the child in a group that does not include his or her friends (Umbreit, 1995)

Classroom Management

- ✓ Aim is to increase appropriate behaviour so that inappropriate behaviour automatically decreases
- ✓ According to Reid and Johnson (2012) for children with ADHD to succeed teachers need to base their classroom management on the following principles:
 - ✓ Creation of **routine**
 - Helps the child to know what to do and when
 - Must to be stable, predictable and simple
 - For example, creating and displaying a schedule of daily activities which should be maintained and taught to (Bender and Mathes, 1995; DuPaul and Stoner, 2003)
 - Teachers need to give precise expectations of children right from the beginning of the day and throughout until the end (Rief, 2005)
 - ✓ Have effective **rules**
 - Children should clearly know the behaviours they should be showing and the rules that they need to follow (DuPaul and Stoner, 2003)
 - Teachers can use prompts to help remind children of the rules
 - Children with ADHD must be praised by teachers for complying with the rules (Brophy, 1981)
 - Consequences for breaking rules should be clearly displayed, applied quickly and consistently and be reasonable (Pfiffner et al., 2006)
 - ✓ **Interact** effectively
 - Studies show increased teacher attention will often follow inappropriate behavior than appropriate behaviour (Moore Partin, Robertson, Maggin et al, 2010) and therefore the undesired behaviour is likely to increase
 - Reid (1999) identifies two types of interaction between teachers and children with ADHD: giving effective directions; and giving effective reprimands.

Dietary

Nutritional interventions are based on the premise that ADHD may be caused by adverse reaction to substances in the diet (Curtis and Patel, 2008). Typically, these will involve reducing or eliminating additives or certain foods from the child's diet, two of the most common foods believed to be associated with ADHD symptoms are sweets and sugar (Azadbakht and Esmailzadeh, 2012; Johnson et al., 2011). Western dietary patterns (Wiles et al., 2009) and junk food (Howard et al., 2011) have also been associated with the disorder.

However, there is no definitive proof that diet will cure or indeed is a cause of ADHD (Ghanizadeh and Haddad, 2015), however it could be one of a number of contributing or aggravating factors and should not be necessarily ruled out (Wolraich et al., 1995; Schnoll et al., 2003).

Educational treatment

Educational intervention can help children with ADHD focus and therefore support them to achieve their potential (The Association for Youth, Children and Natural Psychology, 2012). There is a significant degree of overlap between behaviour management and educational intervention as a form of ADHD treatment and this can be seen clearly in the classroom management strategies highlighted above. An educational intervention as a form of treatment for ADHD places a focus on academic skills and how these are lacking in students with ADHD (Lamoreaux, 2001; Zentall, 2006) and their significance to academic attainment. As Lamoreaux (2001) points out, the most common academic skills that require specific attention are reading, writing and mathematics.

According to Lee and Zentall (2002) and Robinson and Skinner (2002) the purpose of educational intervention is modification where the teacher seeks to use an instructional approach to bring about this change in students. For example, Evans et al. (1995) showed that students with ADHD showed improved note-taking and test performance following direct instruction in taking

notes during teacher instruction.

Example 1: Improving reading skills in students with ADHD

Teachers can try the following instructional practices to address poor reading skills of students with ADHD:

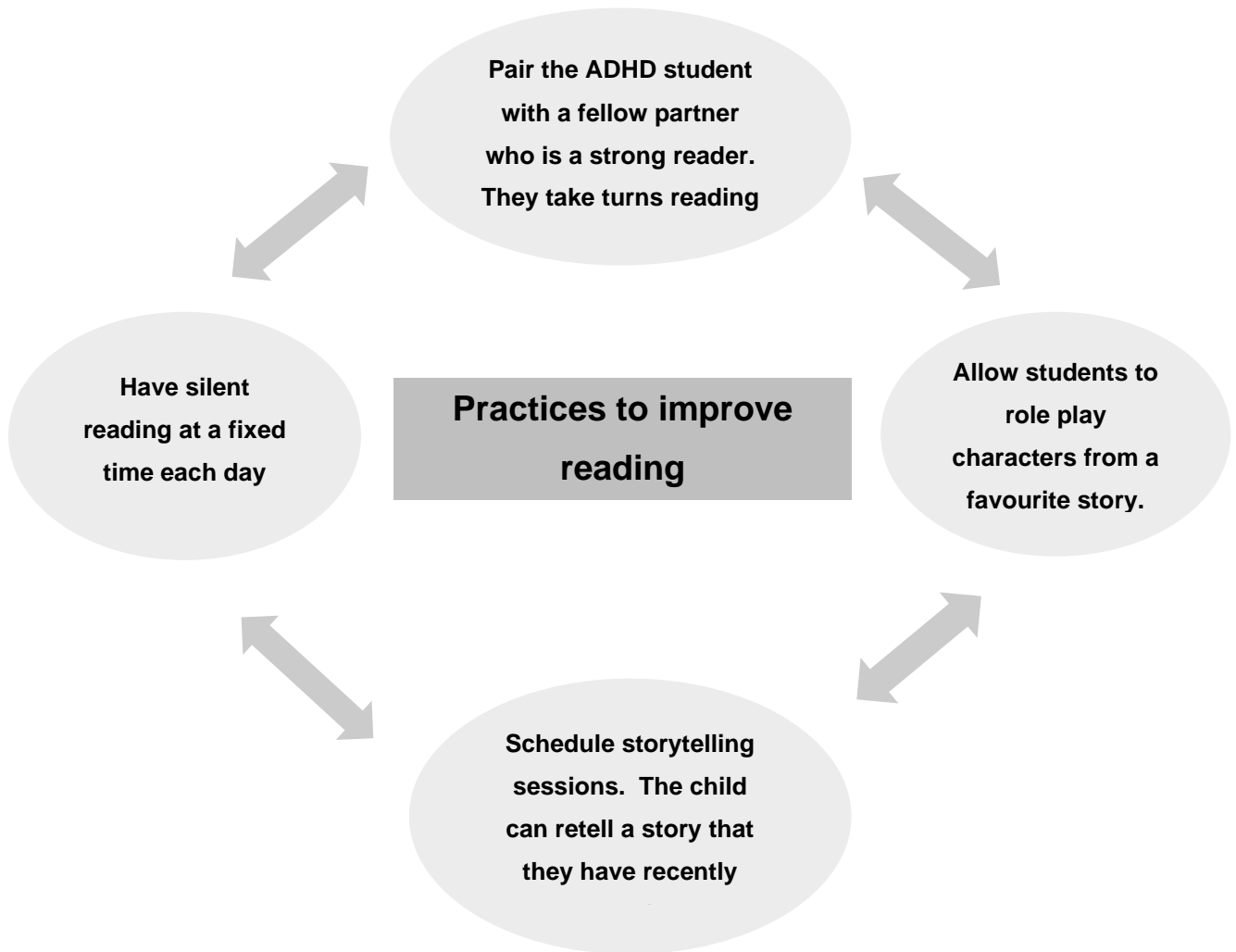


Figure O.2: Improving reading skills in students with ADHD

U.S. Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs, *Teaching*

Children with Attention Deficit Hyperactivity Disorder: Instructional Strategies and Practices. Washington, D.C., 2008.

Example 2: Improving handwriting in students with ADHD

The following instructional practices for teachers can be used to help improve the handwriting of students with ADHD:

Individual chalkboards	Ask the child to practise copying and erasing the target words on a small, individual chalkboard. Two children can be paired to practise their target words together.
Quiet places for handwriting	Provide the child with a special “quiet place” (e.g., a table outside the classroom) to complete his or her handwriting assignments.
Spacing words on a page	Teach the child to use his or her finger to measure how much space to leave between each word in a written assignment.
Special writing paper	Ask the child to use special paper with vertical lines to learn to space letters and words on a page.

U.S. Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs, *Teaching Children with Attention Deficit Hyperactivity Disorder: Instructional Strategies and Practices.* Washington, D.C., 2008

Example 3: Improving mathematical skills in students with ADHD

A way that teachers can help with improving mathematical skills is by encouraging students to use and experience their environment to solve problems involving mathematical concepts (Parker, 2005).

The Following practices can be used to increase mathematical skills:

<p>Telling the time</p>	<p>Ensure that the child can recognize numbers on the face of a clock or watch.</p> <p>Start simple by teaching them how to tell the time on the hour, the half hour, quarter hour then by the minute</p> <p>Teach the various ways people can express the time, for example, 8:30 can be described as “eight-thirty,” “half-past eight” or “thirty minutes to the hour”</p>
<p>Reinforce concepts associated with money</p>	<p>This will help with counting and subtraction.</p> <p>Using play money, encourage the student to count out loud</p> <p>Provide the opportunity for them to simulate purchases and to make change</p>
<p>Understand how to measure something</p>	<p>Letting students use a ruler to measure items will help them to learn the concept of measurement.</p> <p>Help the student to measure liquids or solids</p>

Provide a sample problem with a explanation of how it can be solved

Following recipes that require the use of measurements should be encouraged

Always give an example of a problem along with a clear explanation of how to solve it. Do this before setting the student the mathematical task.

Use signal words

These help to inform the student of the process to be used to solve the problem:

“plus” or “together” indicate “addition”
“times” or “doubled” indicate “multiply”

“average” or “share” indicate “division”

Adapted from Parker, H.C., (2005) the ADHD Handbook for Schools: Effective Strategies for Identifying and Teaching Students with Attention-Deficit/Hyperactivity Disorder (Specialty Press)

Training Teachers and Parents as an Intervention

The importance of teachers’ role in the multidisciplinary approach to treatment of ADHD and the working relationship between healthcare professionals, teachers and parents was discussed previously. Here we focus on training teachers and parents as a form of intervention itself.

The dissemination of information is a powerful tool in educating teachers and parents alike (Anastopoulos et al., 2006). The aim of any training is to positively affect performance whether that of the teacher or parent (Abed, 2014). Training in general should include key components such as: basic information on ADHD

such as symptoms, diagnosis and common treatments; effective behaviour management for children with ADHD; and techniques for improving the communication between teacher or parent and child.

It has been said that training of parents about ADHD can help them to understand the difficulties that children with the disorder face such as decision-making, time management and organisation (Association for Youth, Children and Natural Psychology, 2012). Where parental training is successful parents can become better equipped to manage their child's behaviour and can help to support other intervention strategies such as clinical management (Anastopoulos et al., 1993). Parental training in the context of increased awareness and understanding of children with ADHD may help to reduce parental stress and enhance parental confidence (Zwi et al., 2011).

Training for parents of children with ADHD are either aimed at reducing behavioural problems associated with the disorder or the improvement of social skills of children with ADHD (Kohut and Andrews, 2004).

Jerome et al. (1994) found that educating teachers through training on ADHD was necessary to provide better education of such children. These programmes allow teachers to learn about the disorder and be exposed to current and up to date knowledge so that they can remain informed (Brook et al., 2000; Snider et al., 2003). Teacher training can also act as a form of continuing professional development that can help fill gaps in their knowledge about the disorder as well as useful interventions (West et al., 2005; Bradshaw and Kamal, 2013; Al-Omari et al., 2014). Like previously discussed regarding increased confidence in parents through parental training, studies have shown that teacher confidence in dealing with children with ADHD can also increase as their knowledge of the disorder is enhanced (Youssef et al., 2015).

The level of interactivity between participant teachers on such programmes can vary and this is dependent upon the activities embedded into training. Common examples of activities that stimulate engagement include: case

studies, media and online resources. These can all create the opportunity for participants to discuss such activities and engage with each other and the trainer in a group-format.

Shared Benefits of Teacher and Parent training

- Increase knowledge of ADHD as a disorder
- Fill any gaps in knowledge about ADHD
- Access up to date knowledge to stay informed and less likely to rely upon inaccurate information
- Understand and appreciate the challenges that child with ADHD faces
- A gain in knowledge that has a positive impact on effectiveness to deal with children with ADHD
- Better equipped to manage the child's behaviour
- Can play an increased role in identification and diagnosis of ADHD
- More knowledge means a potential reduction in parental/teacher stress
- Can implement and support intervention strategies
- Increase parental/teacher confidence
- Form of continuing development

Multimodal approach to treatment

Treatment of ADHD cuts across the home, school, medical, and social settings (Reid and Johnson, 2012) so it is important that the treatment plan for a child with ADHD provides a combination of medical management and behavioural approaches as opposed to one approach alone (Abed, 2014). As an approach, multimodal treatment of children with ADHD requires the individual who is in charge of the child's treatment plan to manage the multimodal treatment overall and the component areas on which it is based. Therefore, the individual will need to think about how responsibility is divided across the different areas, identify training needs and also allocate resources (Reid and Johnson, 2012). As discussed previously, the success of a multimodal approach to treatment is similar to the multidisciplinary approach to diagnosis of children with ADHD so therefore having effective communication between all parties involved is essential.

Having discussed medical treatment, behavioural therapies such as classroom management strategies, along with educational and social interventions like parent and teacher training it is obvious that a multimodel approach to treatment is a long-term commitment. This itself may pose an obstacle to teachers because of school constraints such as resources and the time needed for this approach.

Effective Educational Strategies for Teachers:

Peer Tutoring

Peer tutoring is a well-researched evidence-based strategy that can increase academic success as well as social development that has been recognised as a beneficial intervention for students with ADHD (Bowman-Perrott, 2009; Stenhoff and Lignugaris/Kraft, 2007).

This is an instructional strategy whereby students can work together on an activity provided by the teacher. This strategy is significant because it is a *peer* of the child with ADHD that provides instruction, and feedback (Greenwood et al., 2002; Pfiffner and Barkley, 1998). Peer tutoring has positive impact on children with ADHD that increases their sustained attention (DuPaul and Stoner, 2003 and 2014) and studies using peer tutoring with children with ADHD have shown an increased ability by such children to engage and positively improve their academic performance (DuPaul et al., 1998).

Peer tutoring can be used to not only address the academic skills of children with ADHD but also their social skills, for example to be a companion at school, to manage behaviour or by allowing the child with ADHD to have another student to whom they can express feelings (Parker, 2005). It is important for teachers to understand that peer tutoring not only offers benefit to the child with ADHD but also the child who provides instruction. As Parker (2005) points out, bright students should not only be given an opportunity to become peer teachers but also those who would benefit from increasing self-esteem or who need to improve their performance. According to Reid and Johnson (2012) this

strategy can have a positive impact on teachers since there is a decrease in the time needed for them to monitor behaviour during such sessions. Time is created that could be spent on other activities such small group instruction with other students.

It has been accepted that all models of peer tutoring share the following instructional characteristics: one-to-one arrangement between tutor and tutee; pace of instruction determined by the learner; prompting of academic response; immediate and frequent feedback on performance (Pfiffner and Barley, 1998).

Example of how to implement Peer Tutoring

1

Define the content for instruction

the for

Decide the content area(s) and the materials to be used. Peer tutoring is most effective if it correlates with class content. It should focus on the skills the student needs to succeed in the classroom. **For example:**

- ✓ reading,
- ✓ spelling
- ✓ writing practice
- ✓ mathematics

2

Identify or create the materials needed for the tutor to perform instruction

Prompts such as flashcards or lists of correct responses

3

Creation of lesson format

of It is important that the peer tutor knows exactly what to do and how to do it for all parts of the lesson!

To facilitate this the teacher must develop a step-by-step lesson guide so that the tutor can:

- ✓ deliver correct instruction
- ✓ allow the tutor to function independently of the teacher

4

- Establish a schedule**
- Decide when peer tutoring will take place and the duration of sessions. There are no set rules for this but as a useful guide:
- ✓ 3-5 sessions per week
 - ✓ each session should be between 15-30 minutes

5

- Identify and recruit tutors**
- These are students who would make good peer tutors. As a guide to do this:**
- ✓ Select students who have a good understanding of the content material.
 - ✓ Remember the tutor is required to direct the lesson and needs to do this well.
 - ✓ Ideally the student should possess good interpersonal skills – they need to work well with other people!
 - ✓ Ensure to positively reinforce student tutors that they are assisting you and their peers with an important job!

6

- Train the tutors**
- Tutors need training to ensure:
- ✓ They perform instructional tasks correctly
 - ✓ Fully know the lesson format of the peer tutoring activity – make sure this is the same as the one to be used in the actual session you have developed!
 - ✓ Play the tutor role with the peer tutor to enable them to practice

- ✓ Assess the competence of the peer tutor before allowing them to begin a real session

Teach them how to:

- ✓ Give clear directions,
- ✓ Encourage and praise learners
- ✓ Confirm correct responses
- ✓ Correct errors positively
- ✓ To not overprompt

Discuss with them:

- ✓ The purpose of being a peer tutor
- ✓ Responsibilities of the role
- ✓ Commitment involved such as commitment to do it, punctuality and maintaining a positive relationship with the learner

7

Measuring progress

Decide how progress of the tutee will be recorded.

For example, the creation of a student record form if this is age appropriate.

8

Go!!!

You need to closely monitor sessions at first and deliver additional training where needed. This will allow:

- ✓ Opportunity for improvement or refinement of tutoring procedure
- ✓ Give valuable feedback to the tutor and tutee – reinforce students whose performance exceed your expectations
- ✓ Be actively involved in peer tutoring and support it as it is crucial that students see your enthusiasm, as this will send the right message!

Challenges!!

- Maintaining the peer tutoring activity
- Keeping tutors motivated

Steps on how to implement peer tutoring has been adapted from Reid, R. Johnson, J. (2012) *Teacher's Guide to ADHD*. The Guildford Press. New York. Based on Miller, M.A. (2005). Using peer tutoring in the classroom: Applications for students with emotional/behavioural disorders. *Beyond Behaviour*, 15(1) 25-30.

Task Modification

This intervention seeks to improve the academic performance of children with ADHD through the implementation of procedures that can help the child to complete tasks (Raggi and Chronis, 2006). According to DuPaul and Stoner (2003) this type of intervention requires the teacher to revise the curriculum or parts of it to reduce problem behaviour and increase appropriate classroom behaviours. Changes are made prior to the curriculum being presented to the student and therefore are a proactive as well as preventative strategy (DuPaul, 2007). Like other interventions, task modification requires the teacher to adapt classroom routine and expectations in order to minimize the impact of ADHD on the child's performance (Eiraldi, Mautone and Power, 2012) and to stay on task (Parker, 2005). According to Reid and Johnson (2012) task management can be divided into three main areas: curriculum, instruction, and independent work (the child's ability to do this).

Curriculum

Whilst teachers have little control over what is taught since the school determines this, they can exercise some authority over the curriculum by delivering it using contexts the student can find personally relevant. According to Glasser (1992) when a teacher delivers content which students identify as valuable and relevant then they are more likely to engage. One way of doing this is to teach curriculum content that takes advantage of a student's background knowledge (Reid and Johnson, 2012).

The tools that teachers use to deliver the curriculum, the extent to which they are effective in engaging students and the degree to which curricular materials provide stimulation should be considered. For students to be engaged it is essential to grab attention and then maintain it!

Tips

- ✓ Adapt content to what interests the child
- ✓ Make use of the child's background knowledge to stimulate their interest
- ✓ Consider alternative ways of how the work can be done, for example audio or visual
- ✓ Modify curriculum materials to make the lesson fun!
- ✓ Ensure that the task given to the student requires a motor response as opposed to a passive one

Instruction

This relates to how the curriculum is taught and whether it supports the child's ability to perform. To do this successfully then teachers need to think about the way in which they present their delivery of the curriculum and that it is in a way which takes into account the challenges faced by children with ADHD and therefore minimize hindrance to their learning. Just as it is important to engage students in the content they are being taught, the way in which instruction is given to children with ADHD must also encourage their engagement. As Reid and Johnson (2012) point out, if instruction by the teacher stimulates the engagement of children with ADHD then the child's likelihood of remembering lesson material will be increased whilst at the same time decreasing the likelihood of problematic behaviour occurring during the lesson.

Tips

- ✓ Make sure students can follow the lesson so ensure that it is 'pitched' at the right level
- ✓ Remember, if students with ADHD do not have the necessary background knowledge or skills they will struggle!
- ✓ Unless specific vocabulary is to be used in the session (which should be taught to students before the lesson takes place) make sure to use appropriate vocabulary that can be understood
- ✓ A good way to engage students in your instruction is to be enthusiastic, use action and tone to reinforce interesting and important material
- ✓ Emphasise critical parts of the lesson by highlight or underlining important information

- ✓ Alternate both group and seatwork
- ✓ Don't let students sit passively, consider the high-participation format to give them frequent opportunities to respond to your instruction (Zentall and Meyer, 1987)
- ✓ Make sure activities involve all students and that no one is left out
- ✓ So as to concentrate on the instruction and not taking notes (this may prove distracting) provide a handout of the session or copy of the instruction

Independent work

As there is less teacher supervision when students are doing tasks independently, children with ADHD need to self-regulate their behaviour so that they can maintain their focus on task completion. Factors that influence the ability of children with ADHD to complete tasks independently are difficulty, duration and feedback on performance (Reid and Johnson, 2012).

When assigning independent work to the student it is important for the teacher to assess the performance of the student to ensure that they are able to cope with the level of difficulty of the task, or to put it another way that the task is of an appropriate level of difficulty. If the task is too difficult for the child or pitched too high then this could result in frustration, which is likely to cause behaviour problems (Cooper, Wacker, Thursby et al, 1992). Another potential issue for children with ADHD is that they can become "stuck" so therefore it is essential that such students can access appropriate information to assist them as it is unlikely that teacher assistance will be immediate

because of the independent nature of the work which the student is performing.

The length of the task whether it is duration in time or amount of work assigned can impact upon behaviour. One negative consequence of work being excessive is the child with ADHD being unable to maintain attention and is unable to complete it.

Children with ADHD perform better when they receive frequent feedback on their performance (Barkely, 2006). As the teacher is not on hand to give immediate feedback then answer materials should be used, since they can prove beneficial by providing ongoing feedback to children as they work independently through the task (Cohen and de Bettencourt, 1988).

Tips

- ✓ Ensure the level of difficulty for a task is appropriate, look at prior student performance to help you judge this,
- ✓ Make sure students know the process of how they can seek assistance if and when they need help, an example could be some form of sign or notice that students could use to let the teacher know the student requires help
- ✓ Putting children in pairs to do a task means they can give assistance to each other when needed
- ✓ Make assignments shorter, or break them up into sections
- ✓ Ensure that appropriate breaks are given throughout the duration of a task (where appropriate to do so)
- ✓ Provide a break after the student has done something i.e. completed part of the task
- ✓ Use self-correcting materials to provide students with immediate feedback on their performance during independent work and feedback on task engagement

Token economy

This is another intervention that aims to decrease disruptive behaviour (Tiano, Fortson, McNeil and Humphreys, 2005) and in addition to praise from the teacher it offers a secondary form of reinforcement that is immediate and required for children diagnosed with ADHD (DuPaul and Stoner, 2003). Put simply it is a method of behavioural contracting that uses tokens as immediate reward for certain behaviour or task performance (Parker, 2005). The tokens have little or no intrinsic value but their worth is apparent if exchanged for something the child values such as an activity or privilege.

The token economy system has proven effective for children with ADHD in the classroom (DuPaul and Weyandt, 2006) and can help children with ADHD remain focused on their task or be compliant over an agreed period of time (Alban-Metcalfe and Alban-Metcalfe, 2001). The system is useful for teachers of children with ADHD because they allow the teacher to provide reinforcement as soon as the behaviour occurs and therefore it reduces a lapse of time between the desired behaviour or achievement and the child receiving reinforcement behaving in a desired way or completing the required task (Reid and Johnson, 2012).

STEP BY STEP Guide for Implementing a Token Economy System in the Classroom

STEP	ACTION
1	Explain to the child how the token economy system works and make it clear that they will WIN tokens for positive behaviour or task completion but will LOSE tokens if they behave negatively or fail to complete a task
2	Select a token to use, for example stickers such as stars
3	Identify the appropriate behaviour or goal that is important for the child to demonstrate to win the token. Alternatively identify the

undesirable behaviour that you want the child not to demonstrate (and lose a token)

- 4** Display the targeted behaviours on a daily or weekly chart which can be easily seen by the students
- 5** Allocate token value for the identified behaviours, for example 1 star for displaying a desired behaviour OR 2 stars for completion of an academic task and an extra star for completing it correctly!
- 6** Decide the rewards that the child can earn in exchange for tokens, these should be activities that the student likes
- 7** Choose the point when you will give tokens for the desired behaviour or the point at which students can perform an exchange of their tokens. This may be influenced by your decision to use daily and weekly rewards.
- 8** Record individual performance on a chart that is clearly visible to all students
- 9** Discuss in a positive way the student's performance with them daily and remember to use the chart as a visual example on how well the student is demonstrating the targeted behaviours

Appendix Y: Teachers' responses to the Short Training Evaluation Questionnaire

“What did you like most about this ADHD training programme for teachers?”

“The way the trainer delivered the programme and the opportunity for discussion “
“The method that the trainer used to present the information was helpful and easy to understand “
“The way that the trainer conveyed the ideas and information was perfect “
“A clear presentation “
“The trainer’s preparation and scientific evidence presented to support points made “
“the trainer was knowledgeable and very competent on the topic of ADHD “
“The way in which the trainer simplified the information and made it easy to understand “
“Clear training objectives were made of the programme “

“Learning how to deal with children with ADHD”
“Learning very important information about ADHD, such as misperceptions about the disorder “
“Gaining knowledge of how to deal with children with ADHD “

“What aspects of the training programme do you think could be improved?”

“There could be more material, more examples and an increase in the programme duration”
“Duration of the programme and the training methods used “
“More time dedicated to group discussion “

“How do you hope to change/improve/develop your teaching practice as a result of this training programme?”

“I will be changed for the better and am excited to work closely with children who have ADHD”

"I will change the way I deal with children who have ADHD and use the knowledge I have learnt and apply it "

"I will deal kindly with students who have ADHD in the classroom "

"90% I will change myself by trying hard "

"I will be more understanding and tolerant when I deal with and support children who have ADHD "

"To better my own teaching practice after I now know about children with ADHD "

"I will make a significant change in my teaching practice "

"I will deal with children who have ADHD in a positive way "

"I will make a positive improvement in how I teach"

"I will use every effort to support children with ADHD and know their problems and challenges so I can address them properly "

Appendix Z: The Ethical Clearance

FW: Ahmed Ashehri: additional information required ERN_15-1046
Julie Allan
Sent: 19 November 2015 05:24 PM
To: Ahmed Alshehri

From: Gemma Williams (Research Support Group)
Sent: 19 November 2015 14:47
To: Julie Allan
Subject: RE: Ahmed Ashehri: additional information required ERN_15-1046

Dear Dr Allan

Re: "Increasing the level of knowledge of ADHD amongst SpLD and general teacher in mainstream schools in western area of Saudi Arabia; developing a training programme for teachers"

Application for Ethical Review ERN_15-1046

Thank you for your application for ethical review for the above project, which was reviewed by the Humanities and Social Sciences Ethical Review Committee.

On behalf of the Committee, I can confirm the conditions of approval for the study have been met and this study now has full ethical approval. Please note that this approval has been granted on the basis that participants are provided with a specific deadline/timescale for when withdrawal from the study can be up to, as opposed to stating it can be 'at any time'. The Committee consider it to be best practice to provide a specific deadline/timescale (e.g. x amount of weeks, or by x date), as not all participants will know when data has been analysed or published, and withdrawal from the study is no longer possible.

I would like to remind you that any substantive changes to the nature of the study as described in the Application for Ethical Review, and/or any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

Please also ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at <https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx>) are adhered to and referred to in any future applications for ethical review. It is now a requirement on the revised application form (<https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx>) to confirm that this guidance has been consulted and is understood, and that it has been taken into account when completing your application for ethical review.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at healthandsafety@contacts.bham.ac.uk <<mailto:healthandsafety@contacts.bham.ac.uk>>.

Thank you,

Gemma Williams
Deputy Research Ethics Officer
Research Support Group
The Dome (C block)
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Email: g.c.williams@bham.ac.uk
Web: www.birmingham.ac.uk/researchsupportgroup

Appendix Aa: Permission Granted By Sciotto To Use KADDS Scale



Dear Ahmed,

Thank you for your interest in the KADDS. I have attached a brief test manual, which contains information on the scale. It is not quite up to date, but it should give you some idea of the properties of the scale. Several recent studies have used the KADDS and we are currently finishing a cross-cultural study of teacher knowledge in 9 countries, but we haven't had a chance to incorporate those data yet. If you would like to use the KADDS, I only ask that you send me a brief description of your study and forward a copy of the results when available. I also ask that you do not reproduce the scale in its entirety in any published document (e.g., your thesis).

Best regards,

Mark

Mark J. Sciotto, Ph.D.
Department of Psychology
Muhlenberg College
Allentown, PA 18104
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sciutto@muhlenberg.edu

Appendix Ab: Two examples of interview transcripts

Interview Transcript (1):

___ MHG/A12S ___

1. **Regarding ADHD, have you heard of the term and if so, what were your resources of information about the disorder?**

Yes, I heard ADHD as a term before.

What was your resource?

It was through reading some books and briefly browsing the internet.

2. **Do you feel that you have a lack of knowledge of ADHD and you need to be knowledgeable about it?**

Yes of course I feel a lack and I would like to know more as I have many General teachers come and see me to seek advice about what they should do in their class for children with ADHD

3. **Have you ever received teacher training on ADHD?**

Not at all, never

4. **Would a training programme be a good way to develop your knowledge of ADHD?**

Could you repeat your question again please?

Yes of course, I meant do you believe that a training programme is a good tool to enhance your awareness of the disorder?

Yes, indeed, but I think there are other ways which could be as effective such as: going or visiting the ADHD societies or centres and seeing real cases to see how the specialist deals with them

Ok that is an interesting point, we will come to that point later in the interview

That is important and would play a vital role in increasing knowledge about this disorder especially when it is practical. I can remember when I was in university one of our lecturers was taking us to schools to have practical sessions about deaf,

visual and motor impairments so it would be good if it was practical rather than theoretical.

So, you prefer practical sessions?

Yes of course, showing me practical training and how to apply it in reality is better than just theoretical talk

5. If you consider the provision of training for teachers as an effective way of increasing knowledge of ADHD, what factors do you consider are important to ensure training is effective for teachers

First of all the duration of the training is essential, in my opinion the number of days is not an issue for me but if we say 3 days is about reasonable

So how many hours per day you would suggest?

Well, as teachers we often work through the day so I do not think it should exceed 2-3 hours per day

Great, so what other factors do you think are important?

In addition to showing case studies, documentary videos, modern technology such as PowerPoint, internet, laptops and Ipads, working within groups, and avoiding delivery through the traditional way.

What do you mean by traditional way?

I mean the person who delivers the training should not talk all the time

Excellent, what else?

We can employ WhatsApp technology as well.

Yes indeed but we will talk about it when we come to the other ways can help to raise awareness of ADHD

What about the content and Information for the training?

Although I have some information about the disorder and its symptoms, I need to know more about it and its types and causes...I need to know more about diagnosis and how it is done, the importance of interventions and that they are early. I have my own ways to deal with children with ADHD, but they are very limited...

Could you tell me about these ways please?

I mean I have no idea about treatment other than prevention and reinforcement.

So you believe that the training should include these ways in addition to other effective strategies?

Yes of course

6. What can be done to increase the awareness in SpLD and general teachers?

Presenting training programmes, preparing or making introductory videos and sending useful links of information to teachers and parents.

Could you tell me more about making videos and how links can be sent to teachers?

Yes I mean making video clips about the disorder in interesting and modern way that can send I clear message and that can be through for example WhatsApp application as I mentioned previously to be sent to teachers' groups

What other ways can be used do you think?

Printing leaflets although this could be boring to read, decision makers should play a vital role to increase the knowledge amongst teachers – the teachers work with the MoE and therefore they have a responsibility to enhance knowledge

7. What role can be played by Government represented in the Ministry of Education to increase knowledge of ADHD?

We have no training about ADHD at all so it is important to conduct or deliver courses outside of school hours, coordinating seminars and conferences, distributing CDs amongst teachers, making applications about ADHD through APPs and tell teachers about them and download them, providing schools and teachers with possible interventions for this disorder.

8. What role that can be played by schools to increase the level of knowledge of ADHD?

Actually the school can play a good role in helping us teachers know more about the disorder. They could give those teachers who have experience of teaching ADHD children opportunity to share their experience with other teachers. The school can also host specialists and doctors as well as reducing teacher's hours so they have time to attend courses on ADHD

9. What role do SpLD teachers play in increasing knowledge amongst general teachers?

SpLD teachers must develop themselves first to then develop others, he should attend ADHD courses.

What do you mean by developing themselves first?

I mean we as SpLD should be aware of behavioural issues since we work in resource rooms closely with students with learning difficulties and their difficulties sometimes

are related to behavioural problems however, there is not enough support to get updated information and no facilities available for us.

Can you give example of these facilities please?

Yes, for example getting access to important resources to keep up to date about students' issues including ADHD.

Do you have any other suggestions?

The Centre of Special Needs should support SpLD teachers to gain sufficient knowledge so that they can then help general teachers and children at the same time

10. Do you have a perception about the role of media to increase the knowledge of ADHD, please indicate some media approaches that you believe will help?

MoM can increase the knowledge amongst society and teachers through electronic websites, electronic and hard copy magazines, use television channels and audio through radio. using social media is important.

If you belief social media is important can you tell me in which way it can help please?

It can help by for example hiring famous people I social media to raise awareness about ADHD especially Snapchat application.

11. What role can the Ministry of Health play in increasing the level of knowledge on ADHD as a recognized disorder?

Well, the role played by the MoH is very important and MoH can partner and collaborate with MoM and MoE to raise this matter. In addition, MoH should arrange visits to schools.

How can visiting schools be useful way for teachers?

Yes within their visits they can send specialists in the area of ADHD to raise awareness amongst teachers and to provide them with treatment solutions.

Do you have anything else you would like to add?

No thanks.

Interview Transcript (2):

Researcher: Regarding ADHD, have you heard of the term and if so, what were your resources of information about the disorder?

SA: *As a term, I have not heard about it, however in the class I can notice there is hyperactivity and inattention amongst some children*

Researcher: Do you feel that you have a lack of knowledge of ADHD and you need to be knowledgeable about it?

SA: *Yes, of course I need to know more about this disorder*

Researcher: Have you ever received teacher training on ADHD?

SA: *No*

Researcher: Would a training programme be a good way to develop your knowledge of ADHD?

SA: *Yes definitely*

Researcher: If you consider the provision of training for teachers as an effective way of increasing knowledge of ADHD, what factors do you consider are important to ensure training is effective for teachers?

SA: *I think time is important factor and the training should be at least three days as I think it's enough time for someone to get beneficial knowledge*

Researcher: *Oh great, so for how many hours within these three days you suggest?*

SA: *I think for example 15 hours is ok such as 5 hours per day.*

Researcher: *Ok what activities for teachers and provision of training materials are effective and can be included in any future training do you think?*

SA: If I am to attend such training about ADHD then I prefer programmes that use open discussion that give a chance for trainees to talk, sharing experiences and swap questions between trainer and attendees. I do not like where the presenter just talks so I suggest if the trainer gives a gift for the best discussion or participant. I prefer using technology such as computer and projector, using video clips. It is important to take into considerations providing the attendees with refreshments, drink, juice and water...

Researcher: *Oh yes, it is very important to provide these...!
So, what about the content and Information that you think should be included in the training?*

SA: The trainer should focus on the definition of the disorder.

Researcher: *Do you think definition and background of the disorder is enough or we need to include other elements?*

SA: Yes of course identifications of the disorder and interventions should be included.

Researcher: *Ok treatment, so do you think including treatment is good thing?*

SA: Yes, this is the main reason why we attend training programmes and to find solutions and possible interventions and treatments that can help us in the school and classroom.

Researcher: **What can be done to increase the awareness in SpLD and general teachers?**

SA: To be honest with you courses and training programmes are playing vital role in the first place.

Researcher: *Ok if training programme is important and play an vital role from your perspective can you tell me what is the nature of these programmes?*

SA: I think these courses should be compulsory and related to behavioural disorders including ADHD, even if once per year

Researcher: *Is there anything else can help to enhance the awareness in SpLD and general teachers?*

SA: I think regular meeting between the headteacher with teachers and other staff members is important to raise this matter and discuss how they can reduce symptoms amongst children and what can be done to help them.

Researcher: **What role can be played by Government represented in the of Education to increase knowledge of ADHD?**

SA: For example, they can provide teachers with awareness programmes or spread a brief and useful leaflet that can help teachers.

Researcher: *Do you suggest anything else?*

SA: They can also provide them with short courses. Working on a comprehensive programme for all schools. Have compulsory modules in the teachers' degree so that trainee teachers are taught about behavioural disorders as part of their qualification.

Researcher: **What role that can be played by schools to increase the level of knowledge of ADHD?**

SA: The school should arrange regular meeting between teachers and focus and raise this disorder. The school also can support and reward teachers who search about behaviour problems including ADHD and share their knowledge with their colleges.

Researcher: *What do you mean by rewarding teachers?*

SA: I mean providing them with gifts and appraise their efforts.

Researcher: *Ok I got it thanks for your explanation. So, what else can schools do?*

SA: Schools can arrange regular courses and inviting experts to give presentations to teachers

Researcher: What role do SpLD teachers play in increasing knowledge amongst general teachers?

SA: They should present training courses to general teachers on a regular basis, to discuss children's problems including ADHD

Researcher: Do you have a perception about the role of media to increase the knowledge of ADHD, please indicate some media approaches that you believe will help?

SA: Nowadays social media is so important so it can be used to raise awareness.

Researcher: *Could you tell me in which way it can be used?*

SA: By launching introductory and educational websites about the disorder. The media should highlight ADHD by audio and visual ways such as television and radio. Specialist experts should be invited to take part in these programs, they should be on a weekly basis. Use famous people to help reach society to educate them about this disorder.

Researcher: *Oh, using famous people. it sounds a great idea to awareness about ADHD.*

Researcher: What role can the Ministry of Health play in increasing the level of knowledge on ADHD as a recognized disorder?

SA: It plays a vital role in raising awareness by Health centres and distributing leaflets and journals about ADHD and through collaborating with TV channels. Forming committees and experts to give public presentations. In addition to cooperating between Ministry of Health and Education.

Researcher: *Is there anything else would you like to add it?*

SA: I think these points are the most important suggestions from my perspectives and I hope they come true one day soon.

Researcher: *Yes of course the results of this study will be beneficial to the decision makers for any futures developments and what you suggest can be taken into their future considerations.*

Appendix Ac: The number of studies for each database

ERIC, British Education Index & Medline database

The screenshot shows the EBSCOhost search interface. At the top, the search bar contains the text "Searching: British Education Index, ERIC, MEDLINE". Below the search bar are three input fields, each with an "AND" label and a "Select a Field (optional)" dropdown menu. A green "Search" button is located to the right of the first input field. The University of Birmingham logo is visible in the top right corner.

Search Options

Search Modes and Expanders

Search modes

- Boolean/Phrases
- Find all my search terms
- Find any of my search terms
- SmartText Searching [Help](#)

Apply related words

Apply equivalent subjects

Limit your results

Full Text

Publication Date

Month: Year: — Month: Year:

Scholarly (Peer Reviewed) Journals

Journal Name

The screenshot shows the "Special limiters for British Education Index" section of the EBSCOhost search interface. It contains several filter categories with dropdown menus:

- Publication**:
- Document Type**: (Options: Periodicals, Monographs, Followup Studies, Glossaries, Graduate Surveys, Guides)
- Language**: (Options: French, German, English, Italian, Spanish)
- Age Level**: (Options: Young Adults, Adults, Middle-Aged Persons, Older People)
- Publication Type**: (Options: All, Academic Journal, Book, Newspaper)
- Cover Story**:
- ISSN**:
- Educational Level**: (Options: All, Adult Education, Basic Education, Continuing Education)

Special limiters for **ERIC**

IES Funded

Journal or Document
 All
 Document (ED)
 Journal Article (EJ)

Publication Type
 All
 Book/Product Reviews
 Books
 Collected Works (All)

What Works Clearinghouse (WWC) Reviewed
 All
 Meets Evidence Standards without Reservations
 Meets Evidence Standards with Reservations
 Does Not Meet Evidence Standards

Location Identifiers

Assessment and Survey Identifiers

ERIC Number

Education Level
 All
 Adult Basic Education
 Adult Education
 Early Childhood Education

Intended Audience
 Practitioners
 Researchers
 Students
 Teachers

Language
 Danish
 Dutch, Flemish
 English
 Finnish

Law, Policy & Program Identifiers

Special limiters for **MEDLINE**

Author

EBM Reviews

Human

Sex
 All
 Female
 Male

Clinical Queries
 All
 Therapy - High Sensitivity
 Therapy - High Specificity
 Therapy - Best Balance

Journal & Citation Subset
 All
 AIDS
 Bioethics
 Core Clinical (AJM)

Language
 Dutch/Flemish
 English
 Finnish
 French
 Germanian

Abstract Available

English Language

Review Articles

Animals

Age Related
 All
 Infant, Newborn: birth-1 month
 Infant: 1-23 months
 All Infant: birth-23 months

Subject Subset
 All
 AIDS
 Bioethics
 Cancer

Publication Type
 All
 Adaptive Clinical Trial
 Address
 Autobiography

Animals
 All
 Cats
 Cattle
 Chick Embryo

Search

web.b.ebscohost.com.ezproxye.bham.ac.uk/ehost/resultsadvanced?vid=13&sid=b0772e28-8416-4352-889a-921e65feabf6%40pdc-v-sssmgr03&bquery=TI+(+teachers+o

Select / deselect all Search with AND Search with OR Delete Searches Refresh Search Results

Search ID#	Search Terms	Search Options	Actions
<input type="checkbox"/> S7	S5 AND S6	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	View Results (60) View Details Edit
<input type="checkbox"/> S6	TI (teachers or educators) OR AB (teachers or educators)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	View Results (554,905) View Details Edit
<input type="checkbox"/> S5	S3 AND S4	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	View Results (889) View Details Edit
<input type="checkbox"/> S4	TI (intervention or program* or training or course or support or practic* or strateg* or guidance or modification) OR AB (intervention or program* or training or course or support or practic* or strateg* or guidance or modification)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	View Results (6,098,952) View Details Edit
<input type="checkbox"/> S3	S1 AND S2	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	View Results (1,687) View Details Edit
<input type="checkbox"/> S2	TI (attention deficit hyperactivity disorder or adhd or attention deficit disorder or add or inattention or impulsivity or hyperactivity or hyperkinesis or hyperkinetic disorder) OR AB (attention deficit hyperactivity disorder or adhd or attention deficit disorder or add or inattention or impulsivity or hyperactivity or hyperkinesis or hyperkinetic disorder)	Limiters - Document Type: Journal Article; Language: English; Journal or Document: Journal Article (EJ); Intended Audience: Teachers; Language: English; English Language; Review Articles; Human; Language: English Search modes - Boolean/Phrase	View Results (16,576) View Details Edit
<input type="checkbox"/> S1	TI (knowledge or education or understanding or awareness) OR AB (knowledge or education or understanding or awareness) AND TI (attitud* or belie* or perceptio* or perspectiv* or view*) OR AB (attitud* or belie* or perceptio* or perspectiv* or view*)	Limiters - Document Type: Journal Article; Language: English; Journal or Document: Journal Article (EJ); Intended Audience: Teachers; Language: English; English Language; Review Articles; Human; Language: English Search modes - Boolean/Phrase	View Results (128,703) View Details Edit

web.b.ebscohost.com.ezproxye.bham.ac.uk/ehost/folder?vid=19&sid=b0772e28-8416-4352-889a-921e65feabf6%40pdc-v-sssmgr03

My Folder: Persistent Links to Searches

1-1 of 1
Page: 1

Select / deselect all Delete Items Copy To Move To

1. S5 AND S6

[http://search.ebscohost.com.ezproxye.bham.ac.uk/login.aspx?direct=true&db=bri&db=eric&db=cmedm&bquery=\(\(\(\(TI+\(knowledge+OR+education+OR+understanding+OR+awareness\)\)+OR+\(AB+\(knowledge+OR+education+OR+understanding+OR+awareness\)\)+AND+\(TI+\(attitud*+OR+belie*+OR+perception*+OR+perspectiv*+OR+view*\)\)+AND+\(AB+\(attitud*+OR+belie*+OR+perception*+OR+perspectiv*+OR+view*\)\)\)\)\)+AND+\(TI+\(attention+deficit+hyperactivity+disorder+OR+ADHD+OR+attention+deficit+disorder+OR+ADD\)\)\)+OR+\(AB+\(attention+deficit+hyperactivity+disorder+OR+ADHD+OR+attention+deficit+disorder+OR+ADD\)\)\)+AND+\(TI+\(intervention+OR+program*+OR+training+OR+course+OR+support+OR+practic*+OR+strateg*+OR+guidance+OR+modification\)\)+OR+\(AB+\(intervention+OR+program*+OR+training+OR+course+OR+support+OR+practic*+OR+strateg*+OR+guidance+OR+modification\)\)\)+AND+\(TI+\(teachers+OR+educators\)\)+OR+\(AB+\(teachers+OR+educators\)\)\)&type=1&site=ehost-live](http://search.ebscohost.com.ezproxye.bham.ac.uk/login.aspx?direct=true&db=bri&db=eric&db=cmedm&bquery=((((TI+(knowledge+OR+education+OR+understanding+OR+awareness))+OR+(AB+(knowledge+OR+education+OR+understanding+OR+awareness))+AND+(TI+(attitud*+OR+belie*+OR+perception*+OR+perspectiv*+OR+view*))+AND+(AB+(attitud*+OR+belie*+OR+perception*+OR+perspectiv*+OR+view*)))))+AND+(TI+(attention+deficit+hyperactivity+disorder+OR+ADHD+OR+attention+deficit+disorder+OR+ADD)))+OR+(AB+(attention+deficit+hyperactivity+disorder+OR+ADHD+OR+attention+deficit+disorder+OR+ADD)))+AND+(TI+(intervention+OR+program*+OR+training+OR+course+OR+support+OR+practic*+OR+strateg*+OR+guidance+OR+modification))+OR+(AB+(intervention+OR+program*+OR+training+OR+course+OR+support+OR+practic*+OR+strateg*+OR+guidance+OR+modification)))+AND+(TI+(teachers+OR+educators))+OR+(AB+(teachers+OR+educators)))&type=1&site=ehost-live)

Database	Limiters Applied
British Education Index	
ERIC	
MEDLINE	

1-1 of 1
Page: 1

PsycINFO Database

Select Resource(s) to search:

- Books@Ovid June 11, 2018
- PsycARTICLES Full Text
- Journals@Ovid Full Text June 18, 2018
- Embase 1974 to 2018 June 15
- Ovid MEDLINE(R) 2014 to June Week 2 2018
- CAB Abstracts 1973 to 2018 Week 23
- Embase Classic 1947 to 1973
- HMGIC Health Management Information Consortium 1979 to May 2018
- Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present
- Ovid MEDLINE(R) 1946 to June Week 2 2018
- Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations June 15, 2018
- PsycINFO 1987 to June Week 2 2018
- PsycINFO 1806 to 1966
- Social Policy and Practice 201804

Buttons: OK, Add Group, Delete Group

Browser address bar: <https://ovidsp.dc1.ovid.com/sp-4.05.0b/ovidweb.cgi>

Page header: Ovid, My Account, Admin Tools, Support & Training, UNIVERSITY OF BIRMINGHAM, Help, Feedback, Logged in as ahmed alshetri at the university of birmingham, Logoff

Navigation: Search, Journals, Books, Multimedia, My Workspace

▼ Search History (67) View Saved

#	Searches	Results	Type	Actions	Annotations
1	knowledge.mp	293797	Advanced	Display Results More	Contract
2	limit 1 to (all journals and english language)	194711	Advanced	Display Results More	
3	know*.mp	516049	Advanced	Display Results More	
4	limit 3 to (all journals and english language)	398708	Advanced	Display Results More	
5	exp Awareness/	87809	Advanced	Display Results More	
6	limit 5 to (all journals and english language)	68476	Advanced	Display Results More	
7	understand*.mp	505154	Advanced	Display Results More	
8	limit 7 to (all journals and english language)	312910	Advanced	Display Results More	
9	appreciation.mp	13276	Advanced	Display Results More	
10	limit 9 to all journals	9276	Advanced	Display Results More	
11	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	996375	Advanced	Display Results More	
12	attitud*.mp	443365	Advanced	Display Results More	
13	limit 12 to (all journals and english language)	319874	Advanced	Display Results More	
14	belie*.mp	133533	Advanced	Display Results More	
15	limit 14 to (all journals and english language)	86198	Advanced	Display Results More	
16	belie*.mp	202953	Advanced	Display Results More	
17	limit 16 to (all journals and english language)	132123	Advanced	Display Results More	
18	exp Perception/	401091	Advanced	Display Results More	

Item ID	Search Query	Count	Advanced	Display Results	More	Icon
18	exp Perception/	401091	Advanced	Display Results	More	Icon
19	limit 18 to (all journals and english language)	308061	Advanced	Display Results	More	Icon
20	perspective*.mp	281436	Advanced	Display Results	More	Icon
21	limit 20 to (all journals and english language)	167769	Advanced	Display Results	More	Icon
22	view*.mp	284516	Advanced	Display Results	More	Icon
23	limit 22 to (all journals and english language)	191893	Advanced	Display Results	More	Icon
24	12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	1299694	Advanced	Display Results	More	Icon
25	11 and 24	389222	Advanced	Display Results	More	Icon
26	exp Attention Deficit Disorder with Hyperactivity/ or exp Hyperkinesis/ or "attention deficit hyperactivity disorder".mp	34909	Advanced	Display Results	More	Icon
27	limit 26 to (all journals and english language)	25885	Advanced	Display Results	More	Icon
28	"ADHD".mp. or exp Attention Deficit Disorder with Hyperactivity/	31153	Advanced	Display Results	More	Icon
29	limit 28 to (all journals and english language)	22890	Advanced	Display Results	More	Icon
30	exp Attention Deficit Disorder/ or "ADD".mp.	51895	Advanced	Display Results	More	Icon
31	limit 30 to (all journals and english language)	37531	Advanced	Display Results	More	Icon
32	exp Impulsiveness/ or Inattention.mp	14145	Advanced	Display Results	More	Icon
33	limit 32 to (all journals and english language)	11008	Advanced	Display Results	More	Icon
34	impulsivity.mp	16450	Advanced	Display Results	More	Icon
35	limit 34 to (all journals and english language)	12645	Advanced	Display Results	More	Icon
36	hyperactivity.mp.	41652	Advanced	Display Results	More	Icon
37	limit 36 to (all journals and english language)	31880	Advanced	Display Results	More	Icon
38	hyperkinetic disorder.mp.	217	Advanced	Display Results	More	Icon
39	limit 38 to (all journals and english language)	152	Advanced	Display Results	More	Icon
40	26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39	88718	Advanced	Display Results	More	Icon
41	25 and 40	6918	Advanced	Display Results	More	Icon

41	25 and 40	6918	Advanced	Display Results	More	Icon
42	exp Intervention/	103798	Advanced	Display Results	More	Icon
43	limit 42 to (all journals and english language)	73252	Advanced	Display Results	More	Icon
44	program*.mp	413032	Advanced	Display Results	More	Icon
45	limit 44 to (all journals and english language)	276919	Advanced	Display Results	More	Icon
46	exp Training/	72388	Advanced	Display Results	More	Icon
47	limit 46 to (all journals and english language)	49032	Advanced	Display Results	More	Icon
48	course.mp.	154419	Advanced	Display Results	More	Icon
49	limit 48 to (all journals and english language)	103642	Advanced	Display Results	More	Icon
50	support.mp.	473617	Advanced	Display Results	More	Icon
51	limit 50 to (all journals and english language)	343568	Advanced	Display Results	More	Icon
52	practic*.mp	570766	Advanced	Display Results	More	Icon
53	limit 52 to (all journals and english language)	381056	Advanced	Display Results	More	Icon
54	strateg*.mp.	344571	Advanced	Display Results	More	Icon
55	limit 54 to (all journals and english language)	234205	Advanced	Display Results	More	Icon
56	guidance.mp.	41893	Advanced	Display Results	More	Icon
57	limit 56 to (all journals and english language)	26939	Advanced	Display Results	More	Icon
58	modification.mp.	37926	Advanced	Display Results	More	Icon
59	limit 58 to (all journals and english language)	26984	Advanced	Display Results	More	Icon
60	42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59	1630892	Advanced	Display Results	More	Icon
61	41 and 60	3367	Advanced	Display Results	More	Icon
62	teacher*.mp.	192471	Advanced	Display Results	More	Icon
63	limit 62 to (all journals and english language)	107332	Advanced	Display Results	More	Icon
64	educator*.mp	51787	Advanced	Display Results	More	Icon

64	educator*.mp	51787	Advanced	Display Results	More	Icon
65	limit 64 to (all journals and english language)	27105	Advanced	Display Results	More	Icon
66	62 or 63 or 64 or 65	224741	Advanced	Display Results	More	Icon
67	61 and 66	595	Advanced	Display Results	More	Icon

PubMed Database

Use the builder below to create your search

Edit Clear

Builder

All Fields Show index list

AND All Fields Show index list

or [Add to history](#)

History [Download history](#) [Clear history](#)

Search	Add to builder	Query	Items found	Time
#6	Add	Search (((((((knowledge) OR know*) OR awareness) OR understand*) OR appreciation)) AND (((attitud*) OR belie*) OR belie*) OR perception) OR perspective*) OR view*)) AND (((((((attention deficit hyperactivity disorder) OR "attention deficit hyperactivity disorder") OR "attention-deficit/hyperactivity disorder") OR "ADHD") OR "ADD") OR inattention) OR impulsivity) OR hyperactivity) OR hyperkinesia) OR hyperkinetic disorder)) AND (((((((intervention) OR program*) OR training) OR course) OR support) OR practic*) OR strateg*) OR guidance) OR modification*)) AND ((teacher*) OR educator*)	200	21:57:39
#5	Add	Search (teacher*) OR educator*	77238	21:55:24
#4	Add	Search (((((((intervention) OR program*) OR training) OR course) OR support) OR practic*) OR strateg*) OR guidance) OR modification*	16732633	21:54:41
#3	Add	Search (((((((attention deficit hyperactivity disorder) OR "attention deficit hyperactivity disorder") OR "attention-deficit/hyperactivity disorder") OR "ADHD") OR "ADD") OR inattention) OR impulsivity) OR hyperactivity) OR hyperkinesia) OR hyperkinetic disorder	152196	21:51:40
#2	Add	Search (((attitud*) OR belie*) OR belie*) OR perception) OR perspective*) OR view*	1800150	21:47:02
#1	Add	Search (((knowledge) OR know*) OR awareness) OR understand*) OR appreciation	3158041	21:44:15

Scopus Database

The screenshot shows the Scopus search results interface. At the top, the Scopus logo is on the left, and navigation links for Search, Sources, Lists, and SciVal are on the right. A blue banner displays '491 document results'. Below this, a detailed search query is shown, involving various terms like 'knowledge', 'attitud*', 'belief*', 'perception', 'perspective*', 'view*', 'attention deficit hyperactivity disorder', 'ADHD', 'ADD', 'inattention', 'impulsivity', 'hyperactivity', 'hyperkinesis', 'hyperkinetic disorder', 'intervention*', 'program*', 'training', 'course', 'support', 'practice', and 'strateg*'. Below the query are links for Edit, Save, Set alert, and Set feed.

Search within results... [Search icon]

Documents Secondary documents Patents

Analyze search results Show all abstracts Sort on: Date (newest)

[All] [RIS export] [Download] [View citation overview] [View cited by] [Save to list] [Print] [Email] [Share]

	Document title	Authors	Year	Source	Cited by
1	Integrating STEM with AgLIT (Agricultural Literacy Through Innovative Technology): The Efficacy of a Project-Based Curriculum for Upper-Primary Students	Vallera, F.L., Bodzin, A.M.	2020	International Journal of Science and Mathematics Education 18(3), pp. 419-439	0

Refine results: Limit to [] Exclude []

Access type: [] Open Access (71) [] Other (420)

Year []

Web of Science Database

The screenshot shows the Web of Science search interface. At the top, there is a navigation bar with links for 'Web of Science', 'InCites', 'Journal Citation Reports', 'Essential Science Indicators', 'EndNote', 'Publons', 'Kopernio', and 'Master Journal List'. On the right, there are dropdown menus for 'AHMED', 'Help', and 'English'. Below the navigation bar is the 'Web of Science' logo and the 'Clarivate Analytics' logo. A 'Tools' dropdown menu is visible, containing 'Searches and alerts', 'Search History', and 'Marked List'. A 'Select a database' dropdown menu is set to 'All Databases'. Below this, there are three search tabs: 'Basic Search', 'Cited Reference Search', and 'Advanced Search'. The 'Advanced Search' tab is selected. A text box contains the search query: 'TS=(nanotub* AND carbon) NOT AU=Smalley RE #1 NOT #2 more examples | view the tutorial'. A 'Search' button is located below the text box. To the right of the search box, there is a 'Booleans: AND, OR, NOT, SAME, NEAR' section and a 'Field Tags' section with a list of search fields: TS- Topic, TI- Title, AU- Author [Index], AI- Author Identifiers, GP- Group Author [Index], ED- Editor, SO- Publication Name (Index), DOI- DOI, PY- Year Published, AD- Address, SU- Research Area, and IS- ISSN/ISBN. Below the search box, there is a 'Timespan' dropdown menu set to 'All years (1900 - 2020)'. A 'More settings' link is visible. Below that, there is a 'Select Databases' section with a checked box for 'Web of Science Core Collection' and an 'Auto-suggest publication names' dropdown menu set to 'On'.

Set	Results		Combine Sets	Delete Sets
		Save History / Create Alert	AND OR	Select All
		Open Saved History	Combine	Delete
# 9	1,135	#8 AND #7 Databases= WOS, BCI, BIOSIS, DRCI, DIIDW, KJD, RSCI, SCIELO, ZOOREC Timespan=All years Search language=English	<input type="checkbox"/>	<input type="checkbox"/>
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Appendix Ad: ADHD and My Pursuit of a PhD (A reflective account).

This account will purposely be divided into two sections: early years; and pursuit of doctoral studies. The first section will cover my experience my childhood and education in KSA as an undiagnosed person with ADHD, whilst the second part will look at my pursuit of a PhD and an adult international student at the University of Birmingham (UoB) and the formal late diagnosis of ADHD in the third year of my doctoral studies.

As a child I was viewed by my mother and relatives as a naughty and cheeky who liked to get the attention of others. It is now that I can see when looking back that often when trying to get my mum or perhaps siblings to smile, they were often laughing at me due to the extent I would often go to so as to get their attention. Coming from a large family, this was a way that I could feel noticed. My desire to be noticed seemed to be significantly motivated through often feeling bored and often not wanting to keep focused on things that I found boring. In primary school this resulted in the teacher moving me around the class as a way, they hoped, of maintaining my concentration on them or the lesson. However, moving me to a different desk or location had the opposite effect since I felt like I become inquisitive about any new area and this would often seem more important to me than paying attention to the teacher. Sadly, for me this often resulted in getting punished by the teacher, I recall that in as well as being hit (this was a time when it was permitted to physically punish pupils) I was also prevented from participating in classroom activities with my peers. I had gone from being a child that could easily make myself and other people laugh and smile through my actions, to now being a child at school who was being punished for actions that were caused by my boredom.

Being at Middle school (in KSA 12 - 15) gave me the chance to meet more new classmates, however I was often late to class each day due to being distracted by things I saw on my way walking to school. A positive memory of secondary school for me was playing football, I think I placed too much focus on it instead

of getting to school on time and participating in classroom activities. I felt when playing football, I could be free and unrestricted since there were no rules that I found boring. So far, anything that I had found boring I also found a turn off and was reluctant to put my time and energy into such things. Even though I found being indoors in class less enjoyable in comparison to activities like football, my academic achievement did not obviously suffer. In fact, my test scores for writing and reading were considered high and myself a high achieving student in these areas, however my scores for mathematics and expression did need improvement. However, I continued to struggle concentrating in class. Now in secondary school, it was common for teachers to ask us to respond to a question or topic, however I was often so keen to give an answer that I responded before the teacher had finished making their point and such enthusiasm did not go down very well with the teacher and even more so if I got the answer wrong.

Secondary school (15 – 18) meant an increased number of compulsory subjects had to be studied which I found very challenging. Since Middle School I had also lost my father and this now meant that I lacked a parent who could support me with my studies, unfortunately my mother was unable to provide the same academic support since she was unable to discuss my studies due to her lack of education. The loss of my father was significant on a personal and academic level. The gap left by being unable to discuss academic studies with an adult at home was partially filled by the support offered through private tuition, however due to my problems with focus and concentration the tutor was paid by the hour which meant I did not complete or deal with all matters during the time I had. My attitude towards class attendance became careless since I would often play truant with my friends, I would do this because I believed being away from school less boring and restrictive.

I recall finding it particularly difficult to concentrate in subjects such as chemistry as I found the equations very boring, and my poor attitude was being noticed by teachers. Teachers almost expected me now to be chatty and disruptive in

class and because of this I felt they did not pay as much attention to me as I think I needed. It was at this stage my forgetfulness was becoming an issue, not only was I forgetting to prepare for in class assessments but I was also forgetting to bring requisite study materials to class. On these days the teacher would make an example of me and I was usually prevented from taking part in class activities like my peers. Looking back now, I can see that teachers would often segregate me from other peers. My overall school results when I was 18 years-old were good enough to qualify in taking the entry examinations for the pilot profession in KSA, this opportunity made me very happy. Unfortunately, I was unable to focus and concentrate during the timed examination and as a result did not get into aviation school because of this. This failure left me very frustrated and unhappy.

It was expected that I would go to university to study a bachelor's degree and had received an offer from King AbdulAziz University in the School of Education. So far, I had not received any diagnosis about the characteristics I had displayed regarding the inability to focus for any period of time, my attitude towards things I found boring and my tendency to want to fidget or not stay still during lectures. The first year of my bachelor's degree in special needs education was the inaugural year of the programme at King AbdulAziz University, consequently there were no services department for students and none of the teaching staff tried meeting with me individually to discuss my behaviour and offer any appropriate support. Studying this degree gave me the first opportunity to cross reference the characteristics that I was showing with recognised different learning difficulties, it was at this stage in my life that I realised there was a classification or name for my characteristics. The realisation that I had a legitimate disorder was an unwelcome surprise.

I first came to the UK to study English language in 2008 prior to starting the MA Education in 2010. This presented a new range of difficulties and challenges. As an international student I now had to deal with embarking upon a postgraduate degree in a second language, moving to a new country with my

wife and becoming a new father months before starting the MA. My academic difficulties were noticed quite quickly by academic staff on my course, however I was informed that because English language was my second language it would be difficult to make any firm diagnosis regarding a learning difficulty. I was advised that a full diagnosis would be costly, and as a student as well as being responsible for a growing family I could not afford this option and had not been offered any financial assistance by the university. Despite these challenges, I did successfully complete the Masters degree with the support and guidance of academic staff.

After the completion of my MA I worked as a lecturer in Special Needs at Taif University, KSA. I can now see that this appointment was almost entirely motivated by my personal experience growing up with special needs, and that I had not received any support with my own needs during my academic studies in KSA. In fact, my academic experience had been tainted by the displays of negative attitudes from teachers towards me during school. This directly led me to wanting to support primary school teachers in knowing more about learning difficulties in their pupils, this position meant I could teach them about academic and developmental difficulties as part of their course to graduate as SpLD teachers in KSA. As an adult displaying the characteristics of ADHD but without a formal diagnosis, I was keen to pursue doctoral studies whereby my research could have an impact by increasing awareness of the disorder amongst teachers in KSA so that children exhibiting these symptoms could be better supported in the classroom. I did not have the benefit of being taught by a teacher in primary school who understood my difficulties or at least was able to identify my symptoms. I decided to apply to UoB since it was recognised by the MoE in KSA and had a special needs department with a high reputation.

I found the way that the first year was structured on a modular basis, very manageable to study. Having frequent deadlines whether through coursework, group interaction with peers on tasks and regular seminars helped me to focus my mind to maintain attention. Since English is not my first language, I had to

use more effort to communicate both orally and in writing using academic English. The volume of preparatory reading of literature required for modules during the first year posed additional challenges to me over my peers since I had to expend more effort and concentration to complete the reading. During the first year my problems with attention again came to light as I struggled to sustain the level of concentration needed for reading and analysis of the literature. Reading the level of literature was boring to me and I would often find excuses to move onto other tasks or sources of literature before finishing reviewing an article.

One specific example I recall involved conducting research on the philosophy of education research, there was a complexity of the terminology used as well as cultural differences from what I was used to as well as differing perspectives amongst researchers on the topic. The level of focus needed to fully comprehend these perspectives, particularly literature on research paradigms and research design was very high, I had to demonstrate criticality and sustained concentration. One way of support in achieving what was required in the first year was to maintain regular contact with academic tutors for each module as well as my supervision team. Knowing that I had to meet with academic staff gave me additional motivation to complete necessary tasks in preparation for these meetings. I found breaking down the large volume of literature into smaller parts more manageable to read since I was less likely to become bored or distracted. It would then be possible to piece together my critical thoughts and comments on a piece of literature when looking back at it as a whole. To do this I did need to go back to a number of articles and reread them in order to refamiliarize myself with why it was important and critical to the work I was producing.

As a result of the need to concentrate on my studies I found myself becoming segregated from my wife and two children due to the length of time I was spending at the university library. Me being at home was too much of a

distraction where I would struggle to concentrate on my studies unless I was in complete silence. This was near impossible at home.

At the end of the first year I had identified a gap in knowledge amongst Saudi male primary schoolteachers of ADHD and non-pharmacological forms of treatment such as educational interventions. I look back on my second year as the point when I started to work more autonomously by setting my own research aims and schedule of work. In fact becoming an independent researcher was expected of me, and I could see that the modules I had successfully completed in year one had created a foundation for me upon which to work. However, now in addition to my issues with maintain focus and attention I was supposed to self-manage my studies.

Drafting my literature review required me to read a large volume of academic material, in fact I sometimes had to repeat my reading of many articles a number of times in order to fully understand and appreciate the importance of it and the point it was making. I recall finding it a struggle to read large volumes of information about research paradigms, I did break down the reading into smaller tasks but doing this was taking at least twice as long. To hasten the process I would often write notes summarizing points in Arabic that I could then translate into English. I found doing this particularly helpful whilst also mindful of any dangers of losing details in the translation process. During the drafting process of the literature review I met with my first supervisor on a monthly basis to discuss my thoughts and findings on the literature I had reviewed. I valued these meetings greatly, my supervision team often gave me a quick email response and this helped me to feel like I was still on track and that my own emails were relevant. In these meetings my supervision team would often recommend me to review literature that I had not read so far, these recommendations further helped me to manage the level of reading and ensure that I remained focused on reviewing appropriate literature to my study.

However, the task of conducting research and the reading of literature was very time consuming and would put me at the risk of becoming easily distracted by completely unrelated ideas that would cause me to go off on a tangent and away from the original idea. This was a problem as I often wanted to read literature that was unrelated to the review of my specific topic of study. I realised that the environment around me could have a positive impact on the level of concentration that I could maintain when reading. The first year had taught me that I did the best when studying in silence and being in a quiet environment. Therefore studying in the library at the university meant that I could read the necessary volume of literature needed for this part of the study. However, the downside of this meant spending time away from my family.

The second part of the year was dedicated to drafting the methodology for my study. It had been agreed with my late supervisor that it would use action research. It was in the months after this when reviewing literature specifically about action research as a method that I received the very sad news that my supervisor had unexpectedly died. As well as feeling a profound sense of grief and loss, my original supervisor was very sympathetic towards me, I was worried that another supervisor would not be as supportive. There was some comfort that my second supervisor was providing a consistent level of guidance and support, however my new lead supervisor was confirmed as the Head of the School and an internationally renowned professor of disability, inclusion and special needs studies. Soon after taking on the study my new supervisor suggested a change in my methodology was more appropriate for my study to use experimental design as opposed to action research. I had not anticipated that there would be a change, and the necessary reading to understand this design was not foreseen and caused me to slightly panic. However, I stuck to the method of reviewing that had worked for me so far in face this challenge. In the second year I had started to develop the confidence to attend national ADHD conferences, events on Special Needs and education research in general. Attending these helped me to get feedback on my research.

During the third year I found designing the interview questions was very time consuming, whilst they were based on the reading, I had done for the literature review I still wanted feedback from my supervisor as to the appropriateness of the questions. Doing this, whilst repetitive gave me reassurance that the questions were relevant and appropriate for the topic. This repetition also meant going over things a number of times – a process that I was comfortable with. The sustained and in-depth work needed to develop the ADHD training programme for Saudi teachers was challenging. The design framework selected (ADDIE) helped me to maintain my focus since it was systematic and based on stages – it was not possible to move onto the next stage until the preceding stage had been fully completed. Throughout this process I received both face-to-face (through monthly meetings) and email support from my supervision team. I found this very helpful since it helped me to ensure my grasp of the model was accurate and how I applied it to the instructional ADHD training programme was appropriate. Out of the stages (5), I found the development stage the most time consuming and complex, the reason being that I wanted to ensure training provided teachers with all the important information about ADHD. However, this was too ambitious, it was not possible for me to give a summary on everything to do with the disorder, this would not only be too much information for me to manage but also for the training participants.

Using a clear schedule for the empirical research that I would undertake whilst in KSA helped me to keep my attention and focus on the task to be achieved. I had a number of tasks to achieve whilst in KSA so it was vital that I did these in order, for example without going first to get a permission letter from the MoE I would not be able to visit the schools in my sample to seek permission and access to Saudi teachers. I felt a little somewhat anxious since I also required the permission of the headteacher at these schools to allow teachers to attend training. Whilst in KSA I also had to ensure that the facilities offered by the MoE for the training were acceptable, since there were a number of weblinks in the training I was hesitant that internet would be available. I was responsible for

managing several tasks all at once, whilst this perhaps might have been too much to deal with had I not been adequately prepared, my schedule helped me to keep focus. Before the moment I started delivering the training programme to teachers, I felt both proud and strange at the same time as I was talking to teachers about a disorder that I had experienced symptoms of since I was at primary school.

The fourth year was pivotal to my study as I had to analyse my empirical data in order to write up my findings and collate the entire thesis together. The enormity of the task made me depressed and to seek medical help, unfortunately I was diagnosed with clinical depression. This additional barrier slowed down the progress of my analysis and it also made me go and see a clinical psychologist about my symptoms of attention deficit subtype, lack of focus and ability to become easily distracted. Being medically diagnosed with ADHD as an adult has had a lot of highs and lows. I was prescribed Ritalin, a famous drug for the treatment of ADHD, when it was working well it helped me to significantly increase my productivity but at the same time led to loss of appetite, mood swings and periods of sleep deprivation, all of which have had a negative impact upon my family life.

Due to the serious health and mental wellbeing difficulties in this year, sadly I was unable to meet the thesis submission deadline. I found this devastating and my mood worsened even more since I was now taking medication for depression, ADHD and an underlying thyroid problem. I applied for an extension and provided the necessary evidence to support my application and it was granted.

In the fifth year I submitted my thesis for viva examination. Prior to the real viva I prepared for a mock examination with my supervision team. I was worried that my ADHD could prevent me from performing well and I started to obsess on whether I had the capability to defend my work. During this period of low self-esteem I often wanted to be alone and I spent most of my time preparing

for it on my own. During this time not only was my own mental health suffering but also my relationship with my family. I did not find the viva experience positive, whilst I anticipated it to be a rigorous discussion of my work I did not expect that the outcome would require resubmission of my thesis and re-viva.

My mental health in the following months suffered greatly. I did not want to get out of bed, could not sleep and when I did I had nightmares about the viva, all of this then caused me to question what had been the point of the previous five years of hard work. To be told that I had six major corrections that would take 18 months left me devastated. However, I was determined that this would not beat me since I had come this far and I was determined to produce a PhD degree that looked specifically at the development of an ADHD training programme for Saudi male primary school teachers.

The first step was to meet with my supportive supervision team, this first meeting after the unsuccessful viva was very hard as I was upset and they were concerned at seeing me upset. During this meeting we went through the official report of the conditions that had to be met. Together we made a plan to work through these consecutively which was better for me since I found a systematic approach of working more manageable. The most significant condition was the production of a systematic literature review instead of the original review that had taken me a long time to produce. This process required me to undertake a lot of reading on the process of conducting systematic reviews, I found this reading boring but was encouraged that I would not only receive regular feedback from my supervision team but also that the literature found was checked by independent reviewers at each stage which made me more confident. When revisiting the way that interview responses were analysed, the use of independent reviewers that verified my findings gave me more confidence that these were valid. Performing factor analysis on the KADDS scale and using additional statistical tests was hard but I was supported by statistical experts in the School of Education.

In the final year after re-submitting the thesis, I began to fear the worst possible outcome despite now feeling more confident that my knowledge of research and analysis was stronger and more valid. I knew that my resubmission was more valid and fully addressed all conditions following the first viva, however I was extremely nervous. The second viva experience was draining however I was pleased to be awarded a pass on condition that issues in the work were addressed. It was commented during the viva that I had improved significantly on my first attempt. My self-esteem was very high after receiving the news that I had successfully defended by thesis with conditions since I was able to share this news with my family but felt guilty as the same time of how I had neglected them.

Overall my experience as a person with ADHD having faced difficulties with my academic performance since primary school has had many ups and lots of downs. As an adult, the motivation to continue studying even though I faced difficulties at school was that I had an interest in ADHD, and specifically the role played by school environment on the educational performance of children with ADHD. I was not taught by teachers or in a school environment that was open to embracing ADHD, my teachers knew nothing about the disorder and there were no support services for children that reacted like me during classes. This interest really motivated in to pursue postgraduate and doctoral studies.

It was vital for me to have open and honest communication with my supervision team at the start of my PhD. It was important that I told them how I could struggle with maintaining attention and focus, especially where there was a number of different tasks going on at the same time. In order to maintain focus and should I become distracted when meeting with my supervisor, I took the initiative to use an agenda for each meeting to ensure I covered relevant issues. This helped enormously, and to be honest I do not think I could have managed without using agendas.

Finally, being a teacher, lecturer and now with a PhD means that ADHD does not define me or stopped me achieving these goals, yes it has made it more difficult and my academic journey has been longer but nonetheless I did get there.