Maternal mental health in the perinatal period

Volume 1: Literature review, empirical paper and public domain paper

By

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To my mum and gran

Overview

This thesis is submitted to fulfil the academic requirements for the degree of Doctor of Clinical Psychology (Clin.Psy.D.) at the School of Psychology, University of Birmingham. The thesis is submitted in two volumes, comprised of both the clinical work and research required by the course.

Volume 1: Research component

There are three papers contained in this volume, all concerned with maternal mental health problems in the perinatal period. The first is a review that examines the existing literature on eating disorders in the perinatal period. It examines prevalence, symptomatology levels across the perinatal period and factors associated with development and remission from eating disorders in the perinatal period. The second paper is a report of research, carried out by the author, investigating obsessive compulsive disorder, bonding and meta-cognitions in new mothers. It specifically examines whether bonding is impaired in new mothers with OCD when compared with mothers who have no symptoms of OCD, a subject that has not been investigated in previous research. Both papers have been prepared for submission to Archives of Women's Mental Health. The final paper is a public domain paper describing the literature review and empirical papers and has been used to disseminate the findings of the research amongst participants, mother and baby organisations and mental health professionals. The appendices contain information regarding ethical approval, measures used and instructions to authors from the Archives of Women's Mental Health.

Volume 2: Clinical component

This volume contains five clinical practice reports (CPR) submitted during the doctorate course. These reports reflect the training of the course and the work completed over the three years of the course. CPR 1 and 2 were conducted during a child and adolescent placement. CPR 1 describes a doctor phobia in a five year old girl, formulated

from a behavioural and a systemic perspective. CPR 2 reports a single case experimental design study on a narrative intervention for sleep difficulties in a nine year old boy. CPR 3 describes a qualitative service evaluation of a waiting list initiative and changes to the referral system to a Psychological Therapies Service within an adult mental health service. CPR 4 is a case study of a CBT intervention for a client with OCD in a specialist adult service. The abstract of CPR 5, a presentation on a CBT and narrative intervention for anger in a woman with a learning disability in an inpatient setting. The names and identifying details have been changed or removed from these reports to protect anonymity.

Volume 1: Research volume

	Page No.
Literature Review	
Title: A narrative review of prevalence, symptomatology levels and psychosocial factors associated with eating disorders in the perinatal period	1
Abstract	2
Introduction	3
Review criteria	4
Prevalence of eating disorders in the perinatal period	5
Anorexia Nervosa	5
Bulimia Nervosa	7
Eating Disorders Not Otherwise Specified (EDNOS)	9
Symptomatology levels across the perinatal period	14
Diagnostic criteria in the perinatal period	14
Symptomatology levels in the perinatal period	15
Case studies of eating disorders in the perinatal period	18
Psychosocial factors associated with eating disorders in the perinatal period	20
Methodological limitations	24
Methodological strengths	24
Future research	25
Clinical implications	26
Conclusion	26
Reference section	28

Page No.

Empirical Paper

Title: Obsessive compulsive disorder, bonding and meta-cognitions in new mothers 37

Abstract 38

Introduction 39

- Obsessive compulsive disorder 39
- Obsessive compulsive disorder in the perinatal period 40
- Cognitive processes in OCD 41
- Mother-to-infant bonding 43

Materials and method 47

- Participants and recruitment 47
- Measures 49
- Study design and data analysis 52

Results 52

- Data Checks 52
- Descriptive statistics 53
- Hypothesis testing 58

Discussion 60

Conclusion and clinical implications 63

Reference section 65

Public Domain Paper 74

Appendix Section		Page
Appendix 1:	Clinical participant information sheet	79
Appendix 2:	Non-clinical participant information sheet	82
Appendix 3:	Clinical consent form	85
Appendix 4:	Non-clinical consent form	86
Appendix 5:	Clinical debrief sheet	87
Appendix 6:	Non-clinical debrief sheet	88
Appendix 7:	Demographics	89
Appendix 8:	OCI-R	90
Appendix 9:	PI-WSUR	91
Appendix 10:	HADS	94
Appendix 11:	MPAS	97
Appendix 12:	MCQ-30	102
Appendix 13:	OCI-R scoring	104
Appendix 14:	PI-WSUR scoring	105
Appendix 15:	HADS scoring	106
Appendix 16:	MPAS scoring	107
Appendix 17:	MCQ-30 scoring	108
Appendix 18:	Data checks for outliers, non-normal distribution and unequal variance	109
Appendix 19:	Correlations with MPAS quality of attachment subscale	146
Appendix 20:	Letter of ethical approval	147
Appendix 21:	Letter of R&D approval	151
Appendix 22:	Archives of Women's Mental Health – Instructions for authors	152

Volume 2: Clinical Volume (Clinical Practice Reports)

	Page No.
CPR 1: Psychological models	
Title: Formulation of a doctor phobia in five year old E and her family from behavioural and systemic perspectives	2
Abstract	3
Referral details	4
Initial contact	4
Assessment	4
Presenting problem	4
Assessment measures	6
Developmental history	7
Family background	8
Behavioural formulation	10
Systemic formulation	17
Conclusion and reflections	21
Reference section	23
CPR 2: Single case experimental design	
Title: Single case experimental design study of a nine year old boy with sleep difficulties	26
Abstract	27
Referral details	28
Assessment	28
Problem history	28
Presenting problems	29
Developmental history	29
Family background	30
Presentation	32
Sleep and premature children	32
Initial formulation	32
Intervention	35
Design	37
Assessment measures	37

Procedure 38
Results 39
Discussion and reflections 45
Reference section 48

CPR 3: Small scale service related evaluation 50
Title: A qualitative analysis of a waiting list initiative and changes to the referral system to a Psychological Therapies Service
Abstract 51
Introduction 52
Methodology 57
Analysis 58
Results 59
Discussion 63
Limitations 65
Reflections 66
Conclusions 66
Recommendations 67
Reference section 68

CPR 4: Case study 71
Title: Leah: A case study of a 41 year old woman with OCD
Abstract 72
Referral 73
Assessment 73
Personal history 73
Presenting problem 74
Problem history 74
Formulation 77
Intervention 82
Evaluation 86
Reflections 88
Conclusion 89
Reference section 90

CPR 5: Case study presentation 92
Title: Sally: CBT and narrative intervention for anger
Abstract 93

Appendices
CPR 1
Appendix 1 – Strengths and Difficulties Questionnaire 94
Appendix 2 – Strengths and Difficulties Questionnaire results 96
Appendix 3 – Anxiety faces scale for session 1 97
Appendix 4 – Anxiety faces scale for session 2 98

CPR 2
Appendix 5 – Example story 99
Appendix 6 – Example drawing 100
Appendix 7 – Sleep and confidence rating scales 101
Appendix 8 – Pre Strengths and Difficulties Questionnaire results 102
Appendix 9 – Post Strengths and Difficulties Questionnaires results 103

CPR 3
Appendix 10 – Interview questions 104
Appendix 11 – Information sheet 105
Appendix 12 – Consent form 106

Literature review paper prepared for submission to Archives of Women's Mental Health

A narrative review of prevalence, symptomatology levels and psychosocial factors associated with eating disorders in the perinatal period

Abstract

Summary

Research examining eating disorders in the perinatal period is limited and has mainly focused on medical complications and management. A thorough understanding of eating disorders in the perinatal period is beneficial to mental health, primary care and obstetric services. This narrative review had three aims:

1. To investigate prevalence of anorexia nervosa, bulimia nervosa and eating disorders not otherwise specified (EDNOS) in community samples of pregnant and postnatal women.

2. To examine eating disorder symptomatology levels across the perinatal period.

3. To document the psychosocial factors associated with eating disorders in the perinatal period and examine whether these are similar to eating disorders generally.

Due to the limited number of studies and small sample sizes, robust prevalence estimates for community samples of women in the perinatal period were not possible. However, the evidence suggested that a number of women continue to meet diagnostic criteria for anorexia nervosa, bulimia nervosa and EDNOS during the perinatal period. Studies which followed women longitudinally through the perinatal period tended to show a reduction in symptomatology levels with each trimester. However, relapse was common in the postnatal period, and symptoms were often worse than pre-pregnancy. Risk factors for eating disorders generally, which were also associated with eating disorders in the perinatal period, included history of sexual and/or physical abuse, low mood, low self esteem, maladaptive cognitions about shape and weight and multiple life stressors. Perinatal specific factors included unwanted pregnancy, gestational diabetes, BMI at conception and during pregnancy and mother-to-infant bonding difficulties.

The small number of studies and methodological limitations, including differences in assessment methods, small sample sizes and retrospective studies, combined with the potential risk of underreporting due to guilt and shame, limit the robustness of the conclusions of this review. However, this review highlights that the perinatal period is a potentially vulnerable time for women with symptoms of eating psychopathology and there is a need for further research in this area. In addition, it recommends training for obstetric staff to aid identification and to support women with eating psychopathology in the perinatal period.

A narrative review of prevalence, symptomatology levels and psychosocial factors associated with eating disorders in the perinatal period

Introduction

There is a well documented research and evidence base investigating perinatal affective disorders, particularly in relation to postnatal depression (Gavin et al., 2005; Poobalan et al., 2007; Wylie, Martin, Marland, Martin & Rankin, 2011). However, research examining eating disorders in the perinatal period is limited, with a focus on medical complications and management, and it has not been as extensively investigated despite eating disorders being predominately diagnosed in women and being present during their childbearing years (Astrachan-Fletcher, Veldhuis, Lively, Fowler & Marcks, 2008; Bansil et al., 2008). A thorough understanding of eating disorders in this population is important not only to specialist perinatal mental health or eating disorder services but also to primary care and obstetric services. Eating disorders in the perinatal period have been associated with an increased risk of miscarriage, birth complications, low birth weight infants, premature labour, postnatal depression and difficulties with feeding the infant (Abraham, 1998; Bansil et al., 2008; Franko et al., 2001; Koubaa, Hallstrom & Hirschberg, 2008; Mitchell, Seim, Glotter, Soll & Pyle, 1991; Morgan, Lacey & Chung, 2006; Stein, Murray, Copper & Fairburn, 1996; Stein, Woolley, Cooper & Fairburn, 1994). Also, previous research has found that women are reluctant to disclose their eating disorder to their obstetrician (Cantrell, Kelley & McDermott, 2009; Franko & Spurrell, 2000) and staff in obstetrics and gynaecology services have poor knowledge and understanding of eating disorders and, as a result, frequently do not identify symptoms (Franko & Spurrell, 2000; Morgan, 1999).

This narrative review aims to critically evaluate existing research on eating disorders in the perinatal period. Medical complications and management are outside of the scope of this review. Instead it will focus on:

- The prevalence of anorexia nervosa (AN), bulimia nervosa (BN) and eating disorders not otherwise specified (EDNOS) in community samples of pregnant and postnatal women.
- Examining eating disordered symptomatology levels across the perinatal period.

- Establishing which psychosocial factors are associated with eating disorders in the perinatal period and whether these are similar to eating disorders generally.

Review criteria

A search of the available literature was conducted using the following key terms: 'eating disorder' and 'perinatal' (including pregnancy, postnatal, postpartum). Initially, studies were identified using Ovid (Medline, Embase and PsycINFO), EBSCO, PubMed, and Google Scholar. Table 1 shows the search results for each database.

Table 1: Literature search results

Database	Number of results
Ovid	90
EBSCO	17
PubMed	931
Google Scholar	8090 (limited to first 250)

A number of limitations and exclusions were then applied to the search results:

1. Articles not in English (due to a lack of resources for translation)
2. Studies related exclusively to medical complications
3. Studies related to the impact of own birth experiences leading to the development of an eating disorder
4. Existing reviews

The reference sections of the resulting studies were examined to ensure no relevant papers had been missed. A total of 35 papers were identified.

Prevalence of eating disorders in the perinatal period

Studies that reported prevalence rates of eating disorders in the perinatal period were reviewed. The results will be discussed separately for anorexia nervosa, bulimia nervosa and eating disorders not otherwise specified (EDNOS). It was common for papers to look at more than one diagnostic category. As a result, these papers may be presented in each section.

Anorexia Nervosa

Anorexia nervosa (AN) is characterised by restricted eating; the refusal to maintain normal body weight, usually less than 85% of what is expected; an intense fear of weight gain; body shape or weight having a significantly negative impact on self-evaluation; and, in post-menarcheal females, the presence of amenorrhea (i.e. the absence of at least three consecutive menstrual cycles) (Palmer, 2000). Prevalence of AN in the general population is low with estimates ranging from 0.1% to 1% (Astrachan-Fletcher et al., 2008; Palmer, 2000).

Five studies reported prevalence rates for AN during the perinatal period, four of these reported prevalence during pregnancy (Bulik et al., 2009; Fairburn, Stein & Jones, 1992; Micali, Treasure & Simonoff, 2007; Rocco et al., 2005), with the remaining paper reporting prevalence at delivery (Bansil et al., 2008). No postnatal prevalence studies were identified. Table 2 shows the prevalence rates for the four pregnancy studies.

Bulik and colleagues are part of a research team based in Norway. Their sample was recruited through the Norwegian Mother and Child Cohort Study (MoBa) which is linked to Norwegian health registers, including the Medical Birth Registry of Norway (MBRN). All pregnant women are registered on the MBRN at 16 weeks gestation. This resulted in a total sample size of 35,929. Thirty-five women (0.1%) reported broadly defined AN in the six months before or during pregnancy which is consistent with general population prevalence rates. However, it is impossible to establish whether this prevalence rate was stable or changed when comparing pre and post conception. Therefore, it may not be an accurate representation of prevalence during pregnancy. A similar population based study was conducted by Micali and colleagues (2007) in the UK, who used the Avon Longitudinal Study of Parents and Children (ALSPAC) to obtain their sample. From a total sample of 12,252 pregnant women, 6 (0.05%) reported a recent episode of AN. However, the authors failed to

Table 2: Prevalence rates for AN during pregnancy

Study	Time period	Diagnosis method	Country	Sample size	Prevalence N (%)
Bulik et al. (2009)	Six months before and during pregnancy	Questionnaire	Norway	35,929	35 (0.1%)
Fairburn et al. (1992)	15 weeks	Clinical interview	UK	100	0 (0%)
	32 weeks	Clinical interview			0 (0%)
Micali et al. (2007)	Recent episode	Self report	UK	12,254	6 (0.05%)
Rocco et al. (2005)	12 weeks	Clinical interview	Italy	97	5 (5.2%)

report their criteria for determining a recent episode of AN; or how this differed from a history of AN, which was reported by 167 (1.4%) women. As a result, it is impossible to state whether the recent episode of AN was during pregnancy or if this episode was prior to conception. This raises doubts about whether this is a pregnancy prevalence rate.

In contrast to the population studies, two smaller studies were identified that recruited through local maternity units. A UK sample of 100 first-time mothers referred to the maternity department in Oxford found no women met DSM-III-R criteria for AN when interviewed in their second and third trimesters (Fairburn et al., 1992). However, clinical interviews with 97 pregnant women recruited at their first ultrasound appointment in Italy found 5 (5.2%) women meeting the diagnostic criteria, according to DSM-IVR, for AN purging and binging type (Rocco et al., 2005). Prevalence rates for eating disorders differ across cultures (Palmer, 2000). However, Italy has similar prevalence rates to other European countries (Preti et al., 2009; Ruggiero, Prandin & Mantero, 2001) implying that the difference in prevalence may not be cultural. A comparison of DSM-III-R and DSM-IV with individuals with an eating disorder found a difference in prevalence of AN binge/purge type (14 using DSM-IV compared with 6 using III-R) (Sunday et al., 2001). The difference in prevalence rates found in the two studies may be due to the use of different versions of DSM.

In comparison, Bansil and colleagues (2008) used hospital discharge data from the National Inpatient Sample (NIS) in the United States to report prevalence rates at delivery. The NIS is a stratified sample of about 20% of all U.S. community hospitals. Diagnosis was identified by the presence of ICD-9 code for AN in the medical notes from maternity services. The authors did not report sample sizes although they reported a prevalence of 0.16/10,000 deliveries for AN. They also reported methodological limitations with the use of medical notes, as diagnosis would only be recorded in delivery medical notes if the mother disclosed her eating disorder; if medical complications arose from the eating disorder that needed documented; or if staff identified eating disorder symptomology. As previously stated women generally do not disclose their eating disorders to maternity staff and staff have limited knowledge to identify symptomatology. In addition to this, the length of stay in a maternity unit is short and gives limited opportunities for staff to fully assess or observe eating psychopathology. It is possible that the use of medical delivery notes alone produces an underestimate of prevalence at the time of delivery. This is the only study which used ICD codes rather than DSM criteria. Previous research found that there are differences between the ICD and DSM criteria and prevalence changed according to the system used (First, 2009; Peters, Slade & Andrews, 1999). Again, this suggests measurement issues may have an impact on reported prevalence rates.

In summary, it is not possible to confidently state prevalence rates for AN in the perinatal period due to measurement issues, with studies using different versions of DSM and one using ICD criteria. Also, no consistent assessment method was used to diagnose AN with the studies using self report, clinical interviews and questionnaires. In addition, the time period investigated in some of the studies included pre-conception and pregnancy making it difficult to state whether the prevalence would be the same if pre-conception and pregnancy had been investigated separately.

Bulimia Nervosa

The main features of Bulimia Nervosa (BN) are the presence of episodes of binge eating and compensatory behaviours to prevent weight gain. Binge eating is classified as eating an amount of food that is larger than most people would eat under similar circumstances and in a similar time period and a sense of lack of control of eating during this episode. The main compensatory behaviour is self-induced vomiting. However, laxatives, diuretics or slimming pills misuse, fasting or excessive exercise can also be used (Palmer,

2000). Prevalence rates for BN are slightly higher than AN and are estimated to range from 1 to 4% (Astrachan-Fletcher et al., 2008; Micali & Treasure, 2009).

Eight papers were identified that included prevalence rates for BN, seven during pregnancy (Berg et al., 2008; Bulik et al., 2007, 2009; Fairburn et al., 1992; Kelly, Zatzick & Anders, 2001; Micali et al., 2007; Rocco et al., 2005), one at the time of delivery (Bansil et al., 2008) and none in the postnatal period. Table 3 shows the prevalence rates for BN during pregnancy.

Table 3: Prevalence rates for BN during pregnancy

Study	Time period	Diagnosis method	Country	Sample size	Prevalence N (%)
Berg et al. (2008)	First trimester	Questionnaire	Norway	41,157	96 (0.2%)
Bulik et al. (2007)	First trimester	Questionnaire	Norway	41,157	96 (0.2%)
Bulik et al. (2009)	Six months before and during pregnancy	Questionnaire	Norway	35,929	304 (0.8%)
Fairburn et al. (1992)	15 weeks	Clinical interview	UK	100	0 (0%)
	32 weeks	Clinical interview			0 (0%)
Kelly et al. (2001)	26 weeks	Self report, medical records and questionnaire	USA	186	3 (2%)
Micali et al. (2007)	Recent episode	Self report	UK	12,254	51 (0.4%)
Rocco et al. (2005)	12 weeks	Clinical interview	Italy	97	6 (6.2%)

Two of the papers reported prevalence in the same sample (Berg et al., 2008 and Bulik et al., 2007). In addition, the Bulik et al. (2009) paper cannot be considered to be

independent from these papers as the data was collected as part of the MoBa studies. However, comparing the pregnancy only with the before and during pregnancy prevalence suggests that prevalence rates are lower during pregnancy. Low rates of BN were found in all studies. However, Rocco and colleagues (2005), again, reported higher prevalence rates than the other studies. Kelly et al. (2001) found prevalence rates of BN in pregnancy that were within the estimated prevalence for BN but are higher than the majority of the studies on pregnant populations. They investigated the prevalence of psychiatric disorders and substance use among pregnant women using multiple assessment methods. It is possible that the use of a range of screening methods, which included self report, accessing all medical records and the use of a psychometric questionnaire, increased the likelihood of detecting BN. Bansil and colleagues (2008) reported prevalence at delivery for BN as 0.25/10,000 deliveries.

Similar methodological limitations apply to the BN prevalence as were reported in the AN section. It is difficult to compare the studies due to the different methods (questionnaires, self report and clinical interviews) used to assess BN. Similar differences were present in diagnostic criteria as one study used ICD criteria (Bansil et al., 2008), one used DSM-III-R (Fairburn et al., 1992) and the remaining five papers used DSM-IV criteria. The results indicate that BN is present in the perinatal period and its prevalence may be lower than the general population. However, it is likely this figure is an underestimate of prevalence.

Eating Disorders Not Otherwise Specified (EDNOS)

EDNOS is the most commonly diagnosed eating disorder and is estimated to make up 60% of all clinical cases (Fairburn & Bohn, 2005). It is used to classify eating-disordered behaviours that do not meet formal diagnosis for AN or BN but are clinically significant. As a result, it covers a wide range of presentations, including binge eating disorder (BED), the presence of episodes of binge eating in the absence of compensatory behaviours, subsyndromal presentation of AN or BN, or mixed presentations. Due to the lack of diagnostic criteria for EDNOS prevalence rates are not clear. Micali and Treasure (2009) suggested prevalence rates of 5 to 7% for partial eating disorder syndromes. However, EDNOS prevalence rates as low as 2% (Machado, Machado, Goncalves & Hoek, 2007) and as high as 12.5% have been reported (Keel, Gravener, Joiner & Haedt, 2010).

Ten papers were identified that reported prevalence rates either for EDNOS or for scores that indicated clinically significant eating-disordered behaviours in the perinatal period. Eight of the papers reported prevalence rates for pregnancy only (Berg et al., 2011; Bulik et al., 2007, 2009; Fairburn et al, 1992; Kelly et al., 2001; Lai, Tang & Tse, 2005; Soares et al., 2009; Turton, Hughes, Bolton & Sedgwick, 1999), one paper reported pregnancy and postnatal prevalence (Lai, Tang & Tse, 2006) and one reported prevalence rates for any time period up to 7 months postnatal (Larsson & Andersson-Ellstron, 2003). Table 4 details the prevalence rates for each study.

Prevalence rates varied from <0.1% to 19.8%, however, this is not surprising given the lack of diagnostic clarity. Prevalence of EDNOS during pregnancy was reported by one study to be 3% during early pregnancy and 4% in late pregnancy, while the prevalence of EDNOS-P, a subtype of EDNOS with purging in the absence of bingeing, was reported in two studies with <0.1% during pregnancy and 0.1% in the six months prior to pregnancy and during pregnancy. Prevalence rates for BED of 4%, 4.1% and 4.8% were reported during pregnancy and a rate of 5% when including pregnancy and the six months prior to conception, implying fairly stable findings. However, the prevalence was variable for women reporting clinically significant disordered eating using questionnaire assessment. Rates during pregnancy ranged from 0.6% to 9.8% and increased to 19.08% in the postnatal period.

Three of the studies are part of the MoBa group and, again, cannot be considered independent samples (Berg et al., 2011; Bulik et al., 2007, 2009). Similar to the BN prevalence, these results suggest that the prevalence for EDNOS-P decrease after conception. However, prevalence rates did not follow this pattern for women with BED. There is also an overlap between the samples in the Lai et al. papers (2005,2006) as the 2006 paper is a postnatal follow up from the first paper. Their findings suggest lower prevalence rates in pregnancy when compared with the postnatal period. Larsson and Andersson- Ellstrom (2003) reported prevalence in a sample of postnatal women attending child health checks at their local clinic in Sweden. Although they state that 11.5% of women reported a previous or ongoing eating disorder, there is no attempt to identify prevalence in the perinatal period alone. As the MoBa studies and Lai and colleagues results suggest that prevalence varies between before, during and after pregnancy, the result of 11.5% cannot be confidently stated as perinatal prevalence. However, taking the results of all ten papers into account it suggests that, similar to the prevalence in clinical eating disorders services, EDNOS is more prevalent than AN and BN in the perinatal period.

Table 4: Prevalence rates for EDNOS in the perinatal period

Study	Time period	Diagnosis method	Country	Sample size	Prevalence N (%)	Comments
Berg et al. (2011)	First trimester	Questionnaire	Norway	45,644	1887 (4.1%)	BED
Bulik et al. (2007)	First trimester	Questionnaire	Norway	41,157	1856 (4.8%)	BED
					12 (<0.1%)	EDNOS-P[1]
Bulik et al. (2009)	Six months before and during pregnancy	Questionnaire	Norway	35,929	1812 (5%)	BED
					36 (0.1%)	EDNOS-P
Fairburn et al. (1992)	15 weeks	Clinical interview	UK	100	3 (3%)	EDNOS
	32 weeks	Clinical interview			4 (4%)	EDNOS
Kelly et al. (2001)	26 weeks	Self report, medical records and questionnaire	USA	186	7 (4%)	BED
Lai et al. (2005)	Pregnancy	Questionnaire	Hong Kong	359	33 (9.8%)	Reported frequent disordered eating on the EDI-2[2]
Lai et al. (2006)	Pregnancy	Questionnaire	Hong Kong	131	11 (8.4%)	Reported frequent disordered eating on the EDI-2
	6 months postnatal	Questionnaire			25 (19.08%)	
Larsson & Andersson-Ellstrom (2003)	Previous or ongoing up to 7 months postnatal	Questionnaire	Sweden	454	52 (11.5%)	No details provided of diagnosis
Soares et al. (2009)	Pregnancy	Questionnaire	Brazil	712	4 (0.6%)	Reported probable eating disorder on EDE-Q[3]
Turton et al. (1999)	Pregnancy	Questionnaire	UK	370	20 (4.9%)	Scored above the threshold on EAT[4]

[1] The authors define EDNOS-P as self-induced purging in the absence of binge eating
[2] The Eating Disorders Inventory-2
[3] Eating Disorders Examination Questionnaire
[4] Eating Attitudes Test

In conclusion, there are a small number of studies carried out on prevalence of eating disorders in the perinatal period, and several of the papers were produced by the same research team, the MoBa group in Norway. Their research is ongoing and there is a large overlap in the sample populations in each paper. Although their samples cannot be considered independent, each publication reports similar prevalence rates suggesting that the findings are fairly stable. The MoBa research also allowed for comparison rates for participants reporting an eating disorder six months before and during the first trimester of pregnancy with those reporting during the first trimester only. The data suggested the prevalence of BN and EDNOS-P decreased in their samples after conception. BED did not follow this pattern and the data were not available for AN. Additionally, only two papers (Lai et al., 2006; Larsson & Andersson-Ellstrom, 2003) included the postnatal period and Lai and colleagues reported an increase in prevalence rates in the postnatal period. Larsson and Andersson-Ellstrom (2003) asked about current or previous history of eating disorders and included these women as an 'eating disorders' group which they compared with women reporting never having an eating disorder. As a result, it is impossible to state how many women had recovered from their eating disorder prior to becoming pregnant, and therefore, firm conclusions cannot be made about the prevalence during pregnancy or in the postnatal period.

A major limitation is the small sample sizes in most of the studies. Smaller samples are more likely to result from convenience sampling, therefore they may not be representative of the population and are more vulnerable to selection bias (Deville et al., 2002). In addition, as smaller samples are less representative the observations reported in different small samples are more variable than comparisons of larger samples (Field & Hole, 2003). This may explain the lack of consistency in the prevalence estimates across the studies. Bulik et al. (2009) report that the general prevalence estimates for eating disorders may be higher than prevalence in the perinatal period. They suggest that by investigating the perinatal period there is a bias towards individuals with less severe eating disorder psychopathology who are physically well enough to become pregnant. In addition, the selection of the perinatal period excludes males with an eating disorder and females outside of their childbearing years or those who opt not to have children. As prevalence rates for eating disorders, particularly AN, are low, Bulik and colleagues (2009) recommend sample sizes of several thousand individuals when investigating eating disorders in the perinatal period. Only the MoBa studies and Micali et al. (2007) were able to recruit to these numbers and the prevalence estimates were similar for AN and BN.

In addition to small sample sizes, of the 14 papers reporting prevalence rates, 12 also reported response rates. Response rates ranged from 42% to 99%, however removal of the MoBa group results in response rates from 73% to 99%. The MoBa group state that a response rate of 42% is typical for large epidemiologic studies. However, the question of response bias must be considered.

Other than the MoBa group, no studies compared their samples with eating disordered populations. MoBa participants completed multiple questionnaires and medical tests during their pregnancy and the authors suggest that this could bias their sample to women who are well or at the healthier end of the eating disorders spectrum (Bulik et al., 2009). Most of the papers report that the sample is representative of the general perinatal population e.g. Micali et al. (2007) reported the sample is representative of the British population. However, few report comparison rates or information on the general population. The MoBa participants tended to be more educated than the general Norwegian population and there is a suggestion of a 'social gradient' as the MoBa participants have lower rates of preterm labour and low birth weight infants (Bulik et al., 2009). Lai and colleagues (2005; 2006) reported that they were unsure how representative their sample was due to the exclusion of single mothers and due to interviewing during the day they felt they underrepresented working women. They did report that the education levels of the sample were representative of the Hong Kong general population and there was a reasonable spread in relation to socioeconomic status (SES). Bansil and colleagues (2008) report they lacked information on race and SES and make no statements about representativeness. While Kelly et al. (2001) and Soares et al. (2009) state that their samples were targeted towards low income, low SES and minority ethnic groups. As a result, both conclude that their results may not be generalisable to other groups of pregnant women. There is either a lack of information on representativeness in relation to the general perinatal population and/or to eating disorder populations or issues regarding the representativeness of the samples used in all of the studies which raises concerns about the prevalence estimates.

High levels of shame are reported in individuals with an eating disorder and non-disclosure of their eating disorder and difficulties is commonly reported (Burney & Irwin, 2000; Swan & Andrews, 2003). It is suggested that shame and guilt will be higher during pregnancy as women are responsible for the health of the foetus (Franko & Spurrell, 2000). As a result, socially desirable responding needs to be considered with the implication that prevalence rates may be higher than reported.

Furthermore, four of the papers reported probable diagnosis by scores on eating disorder assessment questionnaires rather than self report or diagnostic interview (Lai et al., 2005, 2006; Larsson & Andersson-Ellstrom, 2003; Turton et al., 1999). This raises issues about the validity of the results as research suggests risks (e.g. lack of rigour and social desirability in reporting) and benefits (e.g. anonymity allows women to respond more honestly and reduces the shame and guilt related to disclosing eating disorder symptomology) (Lai et al., 2005; Turton et al., 1999). However, these results need to be interpreted with caution as clinical interviews with high scorers on questionnaire measures do not always meet diagnostic criteria for an eating disorder (Turton et al., 1999; Wilfley, Schwatrz, Spurrell & Fairburn, 1997).

In conclusion, while the available evidence suggests that eating disorders are present in the perinatal period, the small number of studies and a number of methodological limitations, particularly the small sample sizes and the issue of representativeness of the samples, makes it impossible to confidently state prevalence rates of eating disorders in the perinatal period.

Symptomatology levels across the perinatal period

It is commonly stated that women with eating disorders report improvement in their symptoms during pregnancy and then relapse in the postnatal period, often at a more severe level than at conception (Astrachan-Flectcher et al., 2008; Cantrell et al., 2009; Micali & Treasure, 2009). This section reviews papers that investigated diagnostic categories or symptomatology levels across the perinatal period. It also will review case studies.

Diagnostic criteria in the perinatal period

Four papers were found that reported onset and remission in relation to diagnostic criteria across the perinatal period (Berg et al., 2008; Bulik et al., 2007; Lai et al, 2006; Turton et al., 1999). Two of the papers used the same sample (Berg et al., 2008; Bulik et al., 2007) and the results will be considered together. They reported that 290 women met DSM-IV criteria for broadly defined BN in the six months prior to pregnancy, of whom 77 (26.6%) were in remission and 73 (25.2%) were in partial remission (defined as continuing to binge eat but in the absence of compensatory behaviours) in the first trimester of pregnancy. In

addition 1405 women met the criteria for BED prior to pregnancy, of which 548 (39%) were in remission in the first trimester of pregnancy. New cases of BN in pregnancy were rare, only 26 were identified unlike BED where 711 new cases were identified. A UK sample of 370 pregnant women who were assessed using the EAT, a questionnaire which measures clinically significant eating disordered behaviours, showed a similar trend to the MoBa BN group (Turton et al., 1999). Participants completed the questionnaire twice, once in relation to current symptoms in pregnancy and then for the two years prior to conception. While 25 (6.8%) women changed from above the recommended threshold prior to conception to below the threshold during pregnancy, only 5 (1.4%) went from below the threshold prior to pregnancy to above during pregnancy (Turton et al., 1999). The authors report that the difference in changing classification between the two groups was statistically significant. The paper by Lai and colleagues (2006) was the only one to compare pregnancy with the postnatal period. Their sample consisted of 131 Chinese women in Hong Kong who were followed from pregnancy to 6 months postnatal. They report that 16 women (12%) had symptoms of disordered eating in the postnatal period that were not present in pregnancy while four (3.05%) women had symptoms of disordered eating in pregnancy that were not present in the postnatal period.

In summary, the papers suggest that the number of women meeting diagnostic criteria changed across the perinatal period, with lower numbers meeting diagnostic criteria during pregnancy than pre-conception and the postnatal period. An exception was BED: a greater number of women developed BED in pregnancy when compared with the number who were in remission. However, comparison of these papers is difficult. Only one paper investigated the postnatal period. In addition, this paper used a Chinese population which may not be easily compared with the mainly White European samples used in the other three papers. Also the studies comparing pre-conception with pregnancy used different pre-conception time periods (i.e. six months versus two years).

Symptomology levels in the perinatal period

Fairburn (2008) questioned the usefulness of diagnostic criteria in eating disorders and suggested that there is overlap in eating disordered behaviours between the diagnostic categories and a shared cognitive psychopathology in relation to over-evaluation of shape and weight. As a result, Fairburn suggested a transdiagnostic view of eating disorders with a

focus on behavioural symptoms and cognitions. This section reviews behavioural symptoms, in line with the transdiagnostic model, rather than individuals meeting diagnostic criteria.

Eleven papers were reviewed that reported symptomatology levels across the perinatal period in both general perinatal populations and in clinical populations (Abraham, King & Llewllyn-Jones, 1994; Blais et al., 2000; Crow, Agras, Crosby, Halmi & Mitchell, 2008; Crow, Keel, Thuras & Mitchell, 2004; Fairburn et al., 1992; Lacey & Smith, 1987; Lemberg & Phillips, 1989; Morgan, Lacey & Sedgwick, 1999; Rocco et al., 2005; Soares et al., 2009; Willis & Rand, 1988).

Four studies compared preconception with pregnancy only, three of which used non-clinical populations (Abraham et al., 1994; Fairburn et al., 1992; Soares et al., 2009), with the remaining paper using a sample of women with BN (Crow et al., 2004). The most commonly assessed symptom was bingeing. In the clinical sample, 59.6% of 42 women with BN reported a decrease in frequency of bingeing in pregnancy (Crow et al., 2004). A Brazilian community study reported that 26.5% of women binged before pregnancy compared with 17.3% during pregnancy (Soares et al., 2009). While seven percent binged before pregnancy, three percent in early pregnancy and five percent in late pregnancy in a UK sample of 100 pregnant women (Fairburn et al., 1992). The difference in the number of women bingeing may be due to the different samples studied. While the mean ages of participants were similar, 24.7 years in Brazil and 25.9 in the UK, 25.4% of the Brazilian sample were aged between 13 and 19 years and 13.8% had four or less years of education.

In contrast, an increase in the number of women engaging in bingeing or the frequency of bingeing has also been found. In a sample of 100 women in an Australian maternity unit in the three days after giving birth, 37% reported binge eating before pregnancy and this increased to 44% during pregnancy and 22% of participants reported that their binge eating was worse during pregnancy (Abraham et al., 1994). Similarly seven percent of a clinical sample of women with BN reported an increased frequency of bingeing (Crow et al., 2004).

Three studies reported on purging and generally reported a decrease where six percent of non-clinical pregnant Brazilian women reported using self-induced vomiting before pregnancy compared with one percent during (Soares et al., 2009). A reduction in self-induced vomiting (SIV) was also reported in the UK sample of non-clinical pregnant women where three percent of women used SIV pre-pregnancy compared with three percent in early pregnancy and one percent in late pregnancy (Fairburn et al., 1992). Additionally, 64.9% of

pregnant women with BN reported a decrease in the frequency of purging (Crow et al., 2004). However, eight percent of that clinical sample reported an increase in frequency of purging (Crow et al., 2004). An improvement was found for laxative and diuretic misuse (Soares et al., 2009) and the use of slimming pills and excessive exercise (Abraham et al., 1994) when comparing pre-pregnancy with pregnancy levels.

The seven remaining papers assessed eating-disordered behaviours from conception to the postnatal period using clinical populations. The earliest paper was a retrospective study of 20 women attending an eating disorders clinic with BN who had given birth within two years of their initial assessment appointment. They reported a reduction in bingeing and purging in each trimester with a return of BN symptoms in the postnatal period. By the third trimester 75% of the sample were in full remission. However, 45% experienced BN symptoms in the postnatal period at a greater level than at conception (Lacey & Smith, 1987). Morgan, Lacey and Sedgwick (1999) expanded this initial study with a retrospective study of a sample of 94 women with a diagnosis of BN who were presenting for treatment. There was an average time of 4.7 years (range of 2 to 10 years) between pregnancy and participation in this study. They found similar results of an improvement in behavioural symptoms of bingeing and laxative and slimming pill misuse in each trimester with a return of symptoms in the postnatal period. They classified 34% as 'cured' in the postnatal period and 58% were worse. A small retrospective study of four women with BN found all four women reported decreased levels of bingeing and purging in pregnancy but three of the women resumed their pre-pregnancy levels of bingeing and purging in the postnatal period (Willis & Rand, 1988). They also reported that women who were misusing laxatives stopped completely during pregnancy but restarted this in the postnatal period. Lemberg and Phillips (1989) retrospectively investigated the impact of pregnancy on eating disordered behaviours in 43 women with AN, BN or mixed symptoms with 56% stating they were in remission during pregnancy, although only 23% remained in remission in the first year postnatal.

In comparison to the retrospective studies a number of prospective studies have been conducted recently. As part of a longitudinal eating disorder study of 385 clinical participants with mixed diagnosis of full or subthreshold AN, BN and BED, the symptomology levels of a subsample of the 42 women who became pregnant during the course of the study were reported by Crow and colleagues (2008). The authors report similar results to the retrospective studies with the frequency of bingeing and purging significantly decreasing from pre-pregnancy to pregnancy but returning to pre-pregnancy levels in the postnatal period (Crow et al., 2008). A similar pattern of gradual reduction across pregnancy with a return to

conception levels was also found in an Italian sample of pregnant women reporting current AN or BN (Rocco et al., 2005). Furthermore, another prospective longitudinal study of treatment-seeking women with AN or BN found the same pattern in women with AN. However, in women with BN they found that the decrease in symptomology levels in pregnancy was maintained up to nine months postnatally (Blais et al., 2000).

In conclusion, the evidence in relation to symptomatology suggests that symptoms decrease with each trimester but return to pre-conception levels in the postnatal period. While there are limitations using retrospective studies, similar findings are reported in longitudinal studies and in clinical and non-clinical populations.

Case studies of eating disorders in the perinatal period

The thirteen case studies that described eating disorders in the perinatal period are presented in Table 5 (Benton-Hardy & Lock, 1998; Bonne, Rubinoff & Berry, 1996; Conrad, Schablewski, Schilling & Liedtke, 2003; Foster & Jenkins, 1987; Hollifield & Hobdy, 1990; Madsen, Horder & Stoving, 2009; Lewis & le Grange, 1994; Manzato, Zanetti & Gualandi, 2009; Mazer-Poline & Fornari, 2009; Milner & O'Leary, 1988; Namir, Melman & Yager, 1986; Ramchandani & Whedon, 1988; Rand, Willis & Kuldau, 1987).

The case studies generally report that women maintain eating disordered behaviours during pregnancy and frequently relapse in the postnatal period. However, selection bias must be considered when evaluating the generalisability of case study evidence. Cases are generally selected as they are interesting or unusual cases. All the case studies are from researchers within psychiatry or specialist eating disorders services, who are more likely to have contact with women at the more severe end of the eating disorders spectrum compared with studies who recruited women accessing routine antenatal services. This may explain the high number of case studies that reported psychiatric interventions and hospitalisation during pregnancy or in the postnatal period.

In conclusion, the evidence presented from the above studies supports the commonly made statement that women with eating disorders improve over the course of pregnancy. Similarly, although it is claimed that pregnancy can be 'curative' (Morgan et al, 1999), only a minority of women continue to remain symptom free in the postnatal period and the majority of women experience symptoms at a level similar to or worse than they experienced prior to

Table 5: Case studies of eating disorders in the perinatal period

Study	N	Diagnosis	Comments
Benton-Hardy & Lock (1998)	1	AN	Postnatal onset of AN which need hospitalisation – pregnancy reported as possible cause
Bonne et al. (1996)	2	AN	1) Maintained AN in pregnancy 2) Improved during pregnancy and maintained this in the postnatal period
Conrad et al. (2003)	1	BN	Got worse during pregnancy and needed to be hospitalised
Foster & Jenkins (1987)	1	AN	Improved during pregnancy and relapsed in the postnatal period
Hollifield & Hobdy (1990)	3	BN	All maintained BN throughout pregnancy. Postnatal information available for one – who relapsed while in maternity unit
Lewis & le Grange (1994)	6	BN	All maintained their BN during pregnancy with 5 reporting worse symptomology in the postnatal period
Madsen et al. (2009)	5	AN, BN, EDNOS (3)	All reduced eating disordered symptomology during pregnancy with only one relapsing in the postnatal period
Milner & O'Leary (1988)	1	AN	Got worse during pregnancy and needed to be hospitalised
Namir et al. (1986)	6	AN	All improved during pregnancy but relapsed in the postnatal period but not at the same level as pre-pregnancy
Ramchandani & Whedon (1988)	2	BN	Maintained BN during pregnancy
Rand et al. (1987)	2	AN	Improved during pregnancy then relapsed in the postnatal period

becoming pregnant. Several methodological limitations may impact on the robustness of this finding. Due to the low prevalence of eating disorders in the perinatal period, the sample size in several of the studies is small. The majority of the studies were retrospective; either they were conducted several years after pregnancy or women were recruited in the perinatal period and asked retrospectively about pre-pregnancy levels. Due to long time intervals and potential memory issues, these results may not present an accurate representation of the number of women engaging in eating disordered behaviours or the frequency of these

behaviours. However, the recent longitudinal studies conducted reported similar findings adding support to the theory of improvement during pregnancy and relapse in the postnatal period. Socially desirable responding may have less of an impact on these results as the women generally reported a reduction in eating disordered behaviours across the course of pregnancy. However, if the women were responding in a socially desirable way then similar results would be expected for each trimester.

Psychosocial factors associated with eating disorders in the perinatal period

Eleven papers reported an association between psychosocial and demographic factors and the development or improvement of eating disorders in the perinatal period (Berg et al., 2008, 2011; Bulik et al., 2007; Crow et al., 2004; Lacey & Smith, 1987; Lai et al., 2005, 2006; Lemberg & Phillips, 1989; Morgan et al., 1999; Soares et al., 2009; Turton et al., 1999). The main findings are presented in Table 6.

Women are more likely to develop BN during pregnancy if they are anxious or depressed during pregnancy and report low life satisfaction and low self-esteem, while high reported life satisfaction and self-esteem were associated with remission in pregnancy (Berg et al., 2008). Relapse of BN in the postnatal period was associated with previous AN, high symptomatology levels at conception and continuing to binge into pregnancy, postnatal low mood, reporting an unwanted pregnancy and experiencing gestational diabetes (Morgan et al., 1999).

A number of factors were associated with the development of BED during pregnancy including social and economical difficulties (Berg et al., 2011; Bulik et al., 2007), lifetime abuse experience (Berg et al., 2001), lifetime or pregnancy mental health difficulties (Berg et al., 2001; Soares et al., 2009), previously being pregnant (Bulik et al., 2007) and weight concerns and lower BMI before pregnancy (Berg et al., 2011; Soares et al., 2009). Remission from BED during pregnancy was associated with high BMI before and during pregnancy and women with lower eating-disordered cognitions (Berg et al., 2011; Bulik et al., 2007).

Previous eating disorders and reporting eating-disordered cognitions during pregnancy were also associated with pregnancy onset of eating-disordered behaviours

Table 6: Variables associated with the development or improvement of an eating disorder in the perinatal period

Study	Sample (N)/ Population	Diagnostic category	Pregnancy/ Postnatal	Major findings
Berg at al. (2008)	41,157 non-clinical	BN	Pregnancy	Incidence associated with high anxiety and depression scores, low life satisfaction and self esteem scores Remission associated with high life satisfaction and self esteem scores
Lacey & Smith (1987)	20 BN	BN	Postnatal	Self reported factors for continuing/resuming bingeing included feeling overwhelmed by becoming a parent, stresses of pregnancy and looking after a baby and relationship difficulties with partner Self reported factors for reducing/stopping bingeing included wanting to be a good mum, not wanting baby to observe or copy them and insufficient time to binge due to caring for baby
Morgan et al. (1999)	94 BN	BN	Postnatal	Relapse predicted by previous history of AN, high frequency (>30) of bingeing per week at conception, continuing to binge into the second trimester of pregnancy, gestational diabetes, postnatal depression and an unplanned pregnancy
Berg et al. (2011)	45,644 non-clinical	BED	Pregnancy	Incidence associated with lifetime sexual and physical abuse, lifetime history of major depression, current symptoms of anxiety and depression, low life satisfaction and self esteem scores, previous smoking or smoking during pregnancy, alcohol use before pregnancy, low partner relationship satisfaction, lack of social support, thoughts of being overweight before pregnant, worrying about pregnancy-related weight gain and over evaluation of weight. Remission positively associated with thoughts of being overweight before pregnant and negatively associated with over evaluation of weight
Bulik et al. (2007)	41,157 non-clinical	BED	Pregnancy	Incidence associated with higher BMI during pregnancy only, lower maternal education, smoking, previous pregnancy, abortion and live birth, lower minimum combined income and native language not Norwegian Remission associated with higher BMI before and during pregnancy

Study	Sample (N)/ Population	Diagnostic category	Pregnancy/ Postnatal	Major findings
Soares et al. (2009)	712 non-clinical	BED	Pregnancy	Associated with binge eating before pregnancy, anxiety symptoms during pregnancy and low BMI before pregnancy
Lemberg & Phillips (1989)	43 clinical	AN, BN and mixed AN/BN	Postnatal	Relapse was self reported by 80% to be related to feeling fat and wanting to lose weight Remaining symptom free reported to be due to the meaning of their life changing since having a child and wanting to remain healthy to care for the baby
Crow et al. (2004)	129 BN	Disordered eating	Postnatal	Disordered eating higher in women whose body image worsened during pregnancy and those scoring higher on the drive for thinness subscale of the EDI
Lai et al. (2005)	359 non-clinical	Disordered eating	Pregnancy	Positively correlated with drive for thinness, body image dissatisfaction and traditional gender role attitude scores
Lai et al. (2006)	131 non-clinical	Disordered eating	Postnatal	Negatively correlated with mother-infant relationship, postnatal depression symptoms, maternal-foetal attachment in pregnancy, levels of spousal support and positively correlated with disordered eating in pregnancy
Turton et al. (1999)	370 non-clinical	Disordered eating	Pregnancy	Associated with younger age, previous eating disorder symptoms, lower educational attainment, unsatisfactory housing, poorer employment status, partner's poorer employment status and previous miscarriage

(Crow et al., 2004; Lai et al., 2005; Turton et al., 1999). However, bonding difficulties during pregnancy or postnatal, postnatal depression and poor spousal support were associated with postnatal onset of eating-disordered behaviours.

Subjectively, women who reported not engaging in eating disordered behaviours in the postnatal period stated they wanted to be healthy for the baby, had a fear of being observed or copied by the baby and lacked the time necessary to binge and purge; while they associated postnatal relapse with the stress of pregnancy or being a new mother, relationship difficulties with their partner and feeling fat and wanting to lose weight (Lacey & Smith, 1987; Lemberg & Phillips, 1999). Additionally, women commonly reported that purging is similar to morning sickness, and therefore they justified that this made it 'safe' and not damaging to the foetus (Hollified & Hobdy, 1990).

A comparison of the eleven studies is difficult as they measure different aspects of eating disorder psychopathology and investigated different variables and factors. The presence or absence of an eating disorder was also measured differently. These measures included the MoBa questionnaire (which was designed in accordance to DSM-IV criteria for AN, BN and EDNOS), the EDE-Q, the EDI-2, the EAT, self report and clinical diagnosis from eating disorders services for the clinical samples. The EDI-2 is not designed to be used as a diagnostic tool, rather it measures psychological and behavioural traits linked to eating disorders (Lai et al., 2005). Similarly, additional assessment of high scoring individuals on the EAT has found that they do not meet diagnostic criteria for an eating disorder (Turton et al., 1999). This raises doubts about the validity of claiming the variables are associated with eating disorders. Only one study was longitudinal and assessed women in pregnancy and again in the postnatal period (Lai et al., 2006). All the other papers were retrospective, with six assessing women in pregnancy while simultaneously and retrospectively assessing pre-pregnancy levels (Berg et al., 2008, 2011; Bulik et al., 2007; Lai et al., 2005; Soares et al., 2009; Turton et al., 1999) which may have potential memory effects on responses. However, the remaining four papers assessed women between two and ten years after their pregnancy with serious questions about the credibility of recall over such a long time period (Crow et al., 2004; Lacey & Smith, 1987; Lemberg & Phillips, 1989; Morgan et al., 1999).

In summary, these findings support Fairburn's transdiagnostic model, with cognitions in relation to weight and over evaluation of weight being associated with onset of eating disorders during the perinatal period. The findings also support previous research on risk factors for the development of eating disorders not in the perinatal period, with increased

rates of previous physical and/or sexual abuse (Fischer, Stojek & Hartzell, 2010; Romans, Gendall, Martin & Mullen, 2001; Steiger et al., 2010; Welch & Fairburn, 1996), low mood (Fontenelle et al., 2003; Rasmus, Mauri, Riittakerttu & Kaj, 2010; Yanovski, Nelson, Dubbert & Spitzer, 1993) and low self-esteem (Ghaderi & Scott, 2001;Griffiths et al., 1999; Nicholls & Viner, 2009). This suggests that some similar mechanisms are associated with eating disorders in general and in the perinatal period.

Methodological limitations

The lack of consistency in the methods used by the studies in this field has made drawing conclusions in this review difficult. In addition a number of methodological limitations must be considered. The studies reviewed used a mix of medical records, self report, clinical interview and questionnaires, all of which have varying levels of reliability and validity. Some studies attempted to differentiate between pregnancy-related eating disturbances, e.g. pregnancy-related nausea and vomiting and food restrictions, such as avoiding unpasteurised cheese, by adapting the measures. However, these adaptations have not been fully researched and the authors could not confidently state that they were as valid a measure as the original scale. In addition, the authors rarely stated whether the scales used were valid to use in a perinatal population. The studies all report that women with eating disorders experience high levels of shame and guilt, which is expected to be greater in the perinatal period when they are responsible for the health and care of the foetus and baby. As a result, all of the studies suggest that the results are an underrepresentation of the prevalence and impact of eating disorders in the perinatal period. As these studies focused on the perinatal period, there is a suggestion that the participants were relatively 'well' as they could physically become pregnant and the majority reported that they were married or in a relationship and were highly educated.

Methodological strengths

Despite these limitations a number of the studies had used a more robust methodology. In terms of prevalence, the MoBa studies and Micali et al. (2007) were large scale population studies. Due to the large sample sizes the prevalence estimates are more likely to be reliable and less likely to be effected by sampling errors and biases. In addition, Kelly and colleagues (2001) used a number of sources to gain prevalence information

including medical notes, self report and psychometrics and this may increase reliability in the results by reducing biases in reporting, socially desirable responding and lack of awareness in obstetric staff.

In the symptomatology section, four studies used a prospective and longitudinal design (Blais et al., 2000; Crow et al., 2008; Lai et al., 2006; Rocco et al., 2005). Using this methodological design reduces the effect of memory bias on responses. In addition, Blais and colleagues (2000) and Crow and colleagues (2008) used clinical samples with individuals with a formal diagnosis recruited through eating disorder services. As there were issues with the measurement of diagnosis of an eating disorder, the use of clinical participants with a confirmed diagnosis increases the confidence in the results produced and the generalisability to women with an eating disorder in the perinatal period.

In the psychosocial factors section the MoBa studies and Soares and colleagues (2009) showed methodological strengths in comparing the sample with an eating disorder with the non-eating disordered group and using valid measures for the psychosocial variables (Berg et al., 2008; 2011; Bulik et al., 2007; Soares et al., 2009). This leads to greater confidence in the robustness of the conclusions that BN incidence in pregnancy is associated with high anxiety and depression scores, low life satisfaction and self esteem scores while remission of BN in pregnancy was associated with high life satisfaction and self esteem scores (Berg et al., 2008). BED in pregnancy was associated with a number of variables including multiple life stressors, sexual/physical abuse, anxiety, depression, low self esteem, binge eating before pregnancy, over evaluation of weight and BMI before and during pregnancy while remission in pregnancy was associated with thoughts of being overweight before pregnancy and higher BMI before and during pregnancy (Berg et al., 2011; Bulik et al., 2007; Soares et al., 2009).

Future research

A number of suggestions can be made for future research in each of the three sections. In terms of prevalence, studies need to include the postnatal period, conduct more large scale population studies, increase sample sizes and consider using multiple methods of assessment such as clinical interviews, reviewing medical notes and questionnaires. For symptomatology, research again needs to include the postnatal period and use larger sample sizes. In addition, it should consider the use of longitudinal or prospective

methodologies and the use of clinical samples to increase confidence that the results are generalisable to individuals with an eating disorder. For psychosocial variables, in addition to sample size and the postnatal period, research could consider qualitative methodologies to examine the perspective of the women in the perinatal period. It could also consider comparing women with eating disorders in the perinatal period to the general eating disorders population to examine areas of similarity and difference.

Clinical implications

The findings of the studies investigating eating disorders in the perinatal period are of interest to primary care, maternity and mental health services. Previous research states that women are reluctant to disclose that they have an eating disorder to their obstetric staff and that maternity staff lack the skills and knowledge to assess and identify eating disorders in this population (Cantrell, Kelley & McDermott, 2009; Franko & Spurrell, 2000; Morgan, 1999).

While this review could not make firm conclusions about the prevalence of eating disorders in the perinatal period, the findings do show that a significant number of women continue to meet diagnostic criteria and show eating disordered symptomology in the perinatal period. Training for maternity staff could increase their awareness of eating disorders in the perinatal period which may in turn lead to increased identification and support for women. This training needs to cover education about eating disorders and symptoms but, in addition, needs to address the stigma attached to eating disorders and challenge the attitudes of staff. The findings also suggest that women with eating disorders frequently relapse in the postnatal period. Mental health services should explain the likelihood of relapse to women with an eating disorder and suggest that they continue to get support from services during the perinatal period.

Conclusion

This review aimed to investigate the prevalence of eating disorders in the perinatal period, what happens to eating disorders when tracked across the perinatal period and which factors are associated with onset or recovery from an eating disorder in the perinatal period.

The small number of studies and small sample sizes combined with the fact that a number of the papers come from the same research team, MoBa, and use the same sample

at different time points, makes it impossible to confidently state prevalence rates in the perinatal period. In addition, the majority of the research considered pregnancy only. However, the findings from the symptomatology section suggest that the number of women engaging in eating disordered behaviours decreases from pre-pregnancy to pregnancy and increases in the postnatal period. This suggests that prevalence rates may not be stable across the perinatal period and prevalence will depend on the time period assessed.

Fairly consistent findings were reported in the symptomatology section despite the small number of studies, small sample sizes, few prospective studies and a selection bias in the results. While pregnancy seems to result in an improvement in symptomatology levels, a number of women continue to engage in eating disordered behaviours that are harmful to themselves and the foetus. Women in the postnatal period are particularly vulnerable to relapse, usually at a similar or worse degree than pre-pregnancy.

Various factors were associated with the development or remission of eating disorders in the perinatal period. Again, the research is almost exclusively conducted in pregnancy rather than the postnatal period. Social factors, such as employment, housing and financial difficulties; cognitions about weight and shape; mood; self esteem and abuse experiences were all found to be associated with eating disorders in the perinatal period. Similar risk factors findings are reported for individuals with eating disorders generally and this suggests that some of the mechanisms involved in the development of eating disorders are the same.

Future research should focus on developing a better understanding of eating disorders in the postnatal period as the research was limited in this area. The existing research suggests this is a vulnerable period and a high risk time for relapse. The use of prospective rather than retrospective methodologies may increase the credibility of the results and reduce the possible effects of memory.

Conflict of Interests

The authors declare that they have no conflict of interest.

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Obsessive compulsive disorder (OCD), bonding and meta-cognitions in new mothers

Abstract

Summary

Purpose: There is a lack of research investigating OCD in the postnatal period, especially in relation to mother-to-infant bonding. Maternal bonding has been found to be impaired in new mothers with mental health problems, particularly depression. In addition, differences in self reported bonding were found when comparing new mothers with postnatal depression and those with postnatal psychosis. This highlights the need for investigating bonding in each postnatal mental health condition separately. This study aimed to investigate whether bonding was impaired in new mothers with OCD when compared with non-clinical new mothers.

Method: A cross sectional study design was used. Impaired bonding was assessed using Mann-Whitney tests and ANCOVA.

Results: Self reported total bonding and quality of attachment scores were significantly lower in new mothers with OCD. This difference in quality of attachment scores was not significant once controlling for the effects of location of completing the questionnaire, labour experience, low mood and meta-cognitions. Location of completing the questionnaire, low mood and meta-cognitions were found to have a significant effect on quality of attachment.

Conclusions: Self reported bonding was impaired in new mothers with OCD. Low mood and maladaptive meta-cognitions have a greater effect on bonding than OCD symptomatology.

Obsessive compulsive disorder (OCD), bonding and meta-cognitions in new mothers

Introduction

There is a large evidence base in relation to the understanding and treatment of postnatal depression and its impact on maternal bonding (Dennis, 2005; Hornstein et al., 2006; Miller & LaRusso, 2011; Moehler, Brunner, Wiebel, Reck & Resch, 2006; Williams, 2009). However, the evidence base for postnatal OCD is limited and no studies have investigated OCD and bonding in the postnatal period. Therefore, it is not possible to state whether OCD has an adverse effect on maternal bonding. As a result, this is a preliminary study into the effect of OCD on self perceived bonding in new mothers.

Obsessive Compulsive Disorder

Obsessive compulsive disorder (OCD) is classified as an anxiety disorder and it is defined by the presence of obsessions, thoughts, images or impulses that are distressing; and compulsions, repetitive behaviours or mental acts that are aimed at preventing or reducing distress or preventing an unwanted event or situation and that are time consuming and excessive (DSM-IV-TR; American Psychiatric Association, 2000). Obsessions are involuntary, recurrent and persistent (De Silva & Rachman, 2004). They are ego-dystonic; meaning they are inconsistent with the individual's sense of self, including their morals and values (Clark, 2004). Intrusive thoughts that are personally unacceptable, or contradict valued aspects of the self, cause greater levels of distress (Rowa & Purdon, 2003; Salkovskis & Kirk, 1989). As a result the content of obsessions varies between individuals. However, general themes of obsessions concern contamination, harm or injury occurring to self or others, pathologic doubt, symmetry/exactness and unacceptable sexual or religious thoughts or images (Clark, 2004). Research has found that the content of intrusive thoughts, images or impulses is similar between clinical and non-clinical populations suggesting that it is not necessarily the content but the evaluation and interpretation of them that results in distress (Clark & O'Connor, 2005). Compulsions can be overt, such as hand washing, checking, ordering or aligning objects; or covert, such as praying, counting or repeating words, numbers or phrases (Wells, 1997).

Obsessive Compulsive Disorder in the Perinatal Period

Previous research reports that between 65% and 100% of new parents experience intrusive harm-related thoughts about their infant (Abramowitz et al., 2006; Abramowitz, Schwartz & Moore, 2003; Fairbrother & Woody, 2008; Larsen et al., 2006). The content of these intrusive thoughts has been qualitatively analysed into seven categories (1) thoughts of suffocation or sudden infant death syndrome (SIDS); (2) thoughts of accidents; (3) unwanted ideas or urges of intentional harm; (4) thoughts of losing the infant; (5) illness; (6) unacceptable sexual thoughts and (7) contamination. It was reported to be similar in content to obsessional intrusive thoughts experienced by individuals with OCD (Abramowitz et al., 2003). Furthermore, no difference has been found between the content of intrusive thoughts in males and females in the perinatal period (Abramowitz et al., 2003).

The reported frequency of these intrusive thoughts can vary depending on length of time after giving birth and the content of the intrusive thought. Fairbrother and Woody (2006) reported that 100% of new mothers experienced thoughts of accidental harm occurring to the infant and 49.5% had thoughts of non-accidental harm at four weeks postnatal; but this dropped to 95.2% and 19.1% respectively at 12 weeks postnatal. Similarly, the number of new parents reporting intrusive thoughts varied between 9.4% for unwanted sexual thoughts to 80% for accidents (Abramowitz et al., 2006). While a significant number of new parents experience intrusive thoughts, they are not perceived to be highly distressing and are reported to be infrequent and of short duration (Abramowitz et al., 2003, 2006; Fairbrother & Woody, 2008).

In addition, new parents spend large amounts of time thinking solely about their infant, an average of 14 hours per day in mothers and 7 hours for fathers at two weeks postnatal (Leckman, Mayes, Feldman, Evans, King & Cohen, 1999). Leckman and colleagues hypothesise that this 'normal' behaviour is similar to the symptoms of OCD and view this preoccupation as adaptive and acceptable within society. It appears to be relatively common for new parents to experience senseless and distressing intrusive thoughts of harm and spend large periods of time preoccupied by thoughts of the infant. It is important, however, to gain a clear understanding of when this normal process becomes maladaptive, leading to new parents developing OCD.

Previous research has suggested that OCD can develop or become exacerbated in the perinatal period (Abramowitz & Fairbrother, 2008; Abramowitz, Schwartz, Moore & Luenzmann, 2003; Brandes, Soares & Cohen, 2004). In addition, research suggests a

distinct symptom presentation in perinatal OCD: during pregnancy, obsessional content concerns contamination with washing and cleaning compulsions, while during the postnatal period obsessional thoughts of harm occurring to the newborn and checking compulsions are more common (Abramowitz & Fairbrother, 2008; Abramowitz et al., 2003; Chaudron & Nirodi, 2010). Strategies used to manage these intrusive thoughts of harm include thought suppression, reassurance seeking, distraction and avoidance of triggers (including the infant) (Abramowitz & Fairbrother, 2008; Abramowitz, Khandker, Nelson, Deacon & Rygwall, 2006; Fairbrother & Woody, 2008; Larsen et al., 2006). It has been suggested that postpartum OCD could be considered a subtype of OCD (Abramowitz & Fairbrother, 2008). However, a recent review of the literature stated that the available evidence does not robustly support this claim and reports conflicting results for prevalence of OCD in the postnatal period (McGuinness, Blissett & Jones, 2011). In this review, the authors report that there was evidence to support the presence of obsessional thoughts of harm to the baby and less heterogeneity in symptom presentation than OCD in general (McGuinness et al., 2011).

Cognitive processes in OCD

A number of models highlight the importance of cognitive processes in the development and maintenance of OCD, with common themes including the role of dysfunctional appraisals of intrusive thoughts and beliefs about the importance of thoughts (Janeck, Calamari, Riemann & Heffelfinger, 2003). Parkinson and Rachman's model stated that intrusive thoughts are commonly experienced and it is through appraisal or evaluation that they develop into clinical obsessions (Clark, 2004). Salkovskis developed the inflated responsibility model of OCD. Again this model emphasises the importance of the appraisal or interpretation of the intrusive thought rather than the content (Clark, 2004). Salkovskis suggests that individuals with OCD interpret the presence of intrusive thoughts as an indication that they are responsible for harm and responsible for the protection of others (Wells, 1997). Wells (1997, 2000) developed the meta-cognitive model of OCD. Meta-cognitions are the beliefs and knowledge we have about our own thoughts and the strategies used to regulate and control thought processes (Flavell, 1979). The model states that a trigger, which could be an intrusive thought or a doubt, activates beliefs about the meaning of the trigger. Triggers that are appraised as meaningful, significant or dangerous then lead to beliefs about rituals and responses to the trigger. This in turn leads to the selection and implementation of a ritual or response, such as washing, checking, thought suppression or

avoidance (Wells, 1997, 2000). Meta-cognitions and processes that are hypothesised to be central to OCD include:

- Thought-Action Fusion, the belief that having a thought about an action is equal to carrying out that action
- Thought-Event Fusion, the belief that having a thought about an action increases the likelihood of that action occurring or the belief that having a thought is evidence that the event has happened
- Beliefs about the positive and negative effects of rituals
- Positive beliefs about the need to neutralise, a mainly covert and cognitive strategy to reduce anxiety and 'undo' the obsession

(Clark, 2004; Fisher and Wells, 2005; Wells, 1997)

The model proposes that individuals with OCD have maladaptive meta-cognitive beliefs about the importance of intrusive thoughts and believe that complete mental control over these thoughts is possible and desirable. This leads to excessive monitoring for ego-dystonic thoughts and the selection of maladaptive coping strategies such as thought suppression and avoidance (Clark, 2004). The excessive monitoring and maladaptive strategies then maintain and exacerbate OCD (Wells, 1997).

A growing body of evidence supports the role of meta-cognitions in OCD. Irak and Tosun (2008) found meta-cognitions, measured with the meta-cognitions questionnaire (MCQ-30), correlated with obsessive-compulsive symptoms. In addition, they also found that symptoms could be predicted by increased scores on the MCQ-30 subscales which measured positive beliefs about worries, cognitive self-consciousness, negative beliefs about uncontrollability and danger of worry and the need to control thoughts. Thought-fusion beliefs have consistently been found to be higher in individuals with OCD (Janeck et al., 2003; Solem et al., 2010) and thought-action fusion has been shown to predict the frequency of obsessive thoughts (Belloch, Morillo & Garcia-Soriano, 2007). In addition, individuals with OCD have been found to have higher scores on the meta-cognitive constructs of thought-fusion beliefs and beliefs about rituals (Solem, Myers, Fisher, Vogel & Wells, 2010). Cognitive self-consciousness, the tendency to monitor and reflect upon thought processes, has also been found to be elevated in individuals with OCD (Janeck et al., 2003) and has been found to be a predictor of obsessional thoughts (de Bruin, Muris & Rassin, 2007). The

addition of a meta-cognition element to an exposure response prevention (ERP) intervention was found to lead to reductions in anxiety, thought-fusion beliefs and the urge to neutralise in individuals with a diagnosis of OCD when compared to ERP alone (Fisher & Wells, 2005). Similarly, reductions in meta-cognitions predicted better outcomes in ERP interventions in outpatients with OCD (Solem, Haland, Vogel, Hansen & Wells, 2009).

Mother-to-infant bonding

Mother-to-infant bonding has been defined in several ways, including emotional involvement (Figueiredo & Costa, 2009); the surge of affection for the infant after delivery (Edhborg, Matthiesen, Lundh & Widstrom, 2005); the mother's perception of her emotional relationship with the infant (Hornstein et al., 2006); the mother's emotional response to the infant (Brockington, 2004; Condon & Corkindale, 1998); maternal affection and responsiveness (Sluckin, 1998); and a desire to protect the infant (Walsh, 2010). These terms are often used interchangeably. Despite the lack of definitional clarity, there is a common theme that maternal bonding concerns the mother's perception of the relationship between her and her baby and her emotional response. In addition, mother-to-infant bonding or mother-to-infant attachment is considered to be different to infant attachment, the reciprocal relationship between the mother and the infant (Walsh, 2010). However, the terms maternal attachment and maternal bonding are also used interchangeably (Condon & Corkindale, 1998; Muller, 1996; Williams et al., 1987).

The lack of clarity in defining maternal or mother-to-infant bonding has made measurement problematic. Two methods of assessment are regularly used, observation and self report using questionnaires and interviews. Observational studies measure maternal responsiveness and sensitivity through observation of mother-infant interactions and report an objective measure of maternal bonding (Hornstein et al., 2006; Noorlander, Bergink & van den Berg, 2008). A number of limitations with observational studies have been identified including that they are labour-intensive, need trained staff, and as a result, have small sample sizes. Also the presence of an observer can alter behaviour and they often cannot identify the cause and effect of the behaviour under observation (Condon & Corkindale, 1998; Field & Hole, 2003). Condon and Corkindale (1998) propose that maternal attachment (or bonding) is a subjective experience involving thoughts and feelings which can only be measured by asking the mother. While this method allows for an understanding of the mother's subjective experience, there are concerns about social desirability in responses as

many women report feeling guilty and ashamed at their bonding difficulties (Kumar, 1997; Sluckin, 1998).

Brockington (2004) states that bonding is the most important psychological process that occurs after childbirth. It was suggested in the 1970s that there was a critical period just after birth for bonding to occur (Sluckin, 1998) and interfering or postponing contact between mother and infant could lead to bonding difficulties and impair the mother-infant relationship (Crouch & Manderson, 1995). This led to a number of improvements in maternity services and increased contact between mothers and their infants. However, the concept of a critical period has led to mothers becoming concerned about bonding if they are separated from their infant and it has been suggested that this could lead to a self-fulfilling prophecy and potentially create bonding difficulties (Crouch & Manderson, 1995).

Bonding is now considered to be a process rather than an instant occurrence (Crouch & Manderson, 1995; Sluckin, 1998), and this is supported by research findings on positive bonding and mother/infant relationships when infants have been in special care units or when children are adopted (Bennett, 2003; Brisch et al., 2005; Feldman, Weller, Leckman, Kuint & Eidelman, 1999; Kumar, 1997; Sluckin, 1998). Similarly, research has also found that the bonding process starts during pregnancy and self-reported bonding scores increase through the course of pregnancy (Condon & Corkindale, 1997; Figueiredo & Costa, 2009; Laxton-Kane & Slade, 2002). Increased antenatal bonding has been linked to ultrasound scans where parents get the opportunity to see their baby (Fletcher & Evans, 1983; Ji et al., 2005; Sedgmen, McMahon, Cairns, Benzie & Woodfield, 2006).

Between 15% and 40% of new mothers report a delay in the onset of affection for their newborn infant (Edhborg et al., 2005) and disorders of the mother-infant relationship are present in 10% to 25% of women referred to mental health services in the postnatal period (Brockington, 2004). Women with bonding difficulties commonly state they experience a lack of positive emotions, and report alienation, indifference, detachment and a lack of love, with some reporting negative emotions such as resentment, hate and hostility towards the infant (Brockington, 2004; Brockington et al., 2001; Kumar, 1997).

While the evidence no longer supports the existence of a critical period for maternal bonding, two factors are consistently found to be related to impaired bonding - namely, labour experience and maternal mental health. Women who report traumatic and painful labour or delivery frequently report bonding difficulties with their infant (Ayers, Wright &

Wells, 2007; Davies, Slade, Wright & Stewart, 2008; Kumar, 1997; Nicholls & Ayres, 2007; Parfitt & Ayres, 2009; Sluckin, 1998).

Research on bonding difficulties in women with mental health problems has mainly focused on depression, with a limited number of studies considering postpartum psychosis. Edhborg and colleagues (2005) reported that the presence of lifetime depression and/or postnatal depression was found to predict lower self reported bonding scores at two months postnatal. Similarly, postnatal depression symptoms between two weeks and four months postnatal were strongly associated with lower self reported quality of bonding to the infant from 2 weeks until 14 months postnatal (Moehler, Brunner, Wiebel, Reck & Resch, 2006). Furthermore, mothers with postnatal depression report poorer bonding than women with postpartum psychosis (Hornstein et al., 2006; Noorlander et al., 2008). However, this is thought to be related to the negative cognitions associated with depression and poorer insight associated with psychosis as no objective differences in interactions with the infant were observed between mothers in each diagnostic group (Hornstein et al., 2006; Noorlander et al., 2008). A review by Murray, Cooper and Hipwell (2003) concluded that children of mothers who experienced acute postpartum psychosis had better attachment at 1 year than children whose mothers had longer and more chronic psychosis and related this to limited exposure to the illness.

The research suggests a complex relationship between maternal mental health, particularly depression, and mother and infant bonding rather than, simply, mental health difficulties causing impaired bonding. Poorer self reported bonding and emotional attachment to the foetus during pregnancy was found to predict maternal postnatal rates of depression and anxiety, while anxiety and depression in pregnancy did not predict postnatal mood (Figueiredo & Costa, 2009). However, the authors report that antenatal depression was associated with poorer emotional attachment to the foetus (Figueiredo & Costa, 2009). Similarly, women with postnatal depression and bonding difficulties experience depression for a longer duration than women with postnatal depression only (Sluckin, 1998).

No studies were indentified that investigated bonding in new mothers with OCD. Theoretically OCD could have an effect on bonding in several ways. The presence of obsessions and compulsions could make a mother less physically and mentally available for her infant. For example, a mother who experiences intrusive thoughts about harming her infant may focus her attention on the obsessive thoughts and strategies for managing these obsessions. This may result in her being less responsive to the infant. The strategies used

to manage the obsessions may also have an impact on bonding, e.g. the mother avoids the infant or spends time undertaking rituals. Several other mechanisms for OCD to impact on maternal bonding are possible. There are high levels of comorbidity in OCD, particularly with depression, which has been found to have an impact on bonding. Impaired bonding in new mothers with OCD may be due to the comorbid depression rather than OCD symptoms or there may be a cumulative effect of both depression and OCD. Similarly, cognitive processes are implicated in the development and maintenance of OCD; therefore, bonding could potentially be affected by the cognitive processes associated with OCD, such as thought fusion beliefs or beliefs about intrusions, rather than OCD symptomology. New mothers with OCD may have beliefs about the nature of intrusive thoughts, particularly if they involve the infant, such as I am a bad mother for having thoughts about harming my baby or these thoughts are important and indicate an underlying wish to hurt my baby. They may also have beliefs about their rituals and responses to the intrusion thoughts, which could be positive, (e.g. by staying away from the baby, I will not act on that thought and I'm keeping my baby safe), or negative, (e.g. my checking rituals take hours and they keep me away from my baby).

In summary, there is a lack of research investigating OCD in the postnatal period, and, therefore, a lack of evidence based practice guidance for clinicians working with this client group. Research has found a difference in self reported bonding when comparing new mothers with postnatal depression and with those with postnatal psychosis. This difference was attributed to lack of insight in postnatal psychosis and negative cognitions in postnatal depression. This research highlights the importance of investigating bonding for each postnatal mental health condition separately rather than generalising across conditions. As there is a distinct symptomatology profile of obsessive thoughts and compulsive behaviours in OCD, it would be useful to investigate the impact of OCD in the postnatal period on mother-to-infant bonding. This symptomatology profile may affect bonding as research states that it is common for new mothers with OCD to experience intrusive obsessive thoughts about harm occurring to the newborn, to spend long periods of time engaged in rituals and that avoidance of the infant is common.

In conclusion, several mechanisms are possible for OCD to affect mother-to-infant bonding. Some of these mechanisms are OCD specific, such as the presence of intrusive thoughts about harming the infant, disruptions to the developing bond due to preoccupation with obsessive thoughts and engaging in compulsive behaviours and rituals and the various meta-cognitive beliefs and processes associated with OCD. However, some of the

mechanisms may be more general, such as labour experience and co-morbid levels of depression.

The aim of this research was to investigate self reported bonding in new mothers. Initially it will compare whether levels of self reported bonding are lower in new mothers with OCD when compared with new mothers who do not have symptoms of OCD. Factors such as mood and labour experience have been found to affect bonding; therefore, the research will then investigate whether these factors have a greater effect on bonding than OCD symptomatology levels. This will be achieved by further analysis by controlling for the effect of significant variables such as demographics, labour experience, mood and meta-cognitions.

Materials and method

Participants and recruitment

To guide sample size a power calculation was conducted using GPower 3.1. A total sample size of 72 (36 in each group) was required for an ANCOVA analysis where effect size = 0.53 (based on previous DClinPsy research), $\alpha = 0.05$, power = 0.95, groups = 2 and using 6 covariates. Inclusion criteria included being female, over 18 years of age and having a child that was 12 months or younger at the time of participating and for the clinical sample a formal diagnosis of OCD. Exclusion criteria were being under 18 years of age, inability to read and understand English, presence of postnatal psychosis, and no child under the age of 12 months. In addition, non-clinical participants were excluded from the study if their scores on both OCD measures were above the recommended clinical cut off scores. Participants completed the questionnaire packs on one occasion. This study gained approval from a local NHS ethics committee and the NHS Trust research and development department.

Clinical participants were recruited through a local NHS mental health service. All psychologists working in Improving Access to Psychological Therapies (IAPT), primary care, community mental health teams (CMHT) and specialist adult services were contacted and provided with information about the study and the exclusion and inclusion criteria. Clinicians then identified potential participants from their caseloads and provided them with information about the study. Potential participants were also informed that the decision to participate would have no impact on their current treatment. Women who were interested in participating completed a questionnaire pack at their next appointment. These were

completed during the session. Recruitment involved a number of individual clinicians in several teams; therefore data about the number of participants who were approached but refused to participate or who did not complete the questionnaire pack is not available.

Non-clinical participants were recruited through local mother and baby groups and through Sure Start centres. The person organising the mother and baby group or the early years co-ordinator or centre manager for the Sure Start centres was contacted, provided with information about the study and permission sought to approach potential participants. Group members were informed that a researcher would be attending the group the following week and participation was optional. The following week the researcher attended and provided potential participants with the questionnaire pack. Questionnaires were either completed at the group or completed at home and returned with a pre-paid envelope. As some groups ran several times per week additional questionnaire packs were taken by group organisers or Sure Start centres. As a result, it is not possible to report accurate figures about the number of women who refused to participate or who did not complete or return the questionnaire packs.

Participants were recruited between September 2010 and March 2011. A review of recruitment numbers in January 2011 indicated that recruitment targets based on the power calculation were unlikely to be met for the clinical sample. Three strategies were implemented for recruitment. All local clinicians were contacted and reminded about the study and the exclusion and inclusion criteria. Secondly, seven participants had been excluded from the non-clinical sample due to scoring in the clinical ranges on both OCD measures. Independent samples t-tests were conducted to compare these seven participants with the clinical sample to see if they could be transferred into the clinical sample. The t-tests found no significant differences in the OCD or bonding measures, however, the anxiety and depression scale and the meta-cognitions measure showed statistically significant differences on the total score and subscales indicating that there were differences between these seven excluded participants and the clinical sample. As a result the seven excluded participants could not be confidently included within the clinical sample and were excluded from the final analysis. The final recruitment strategy implemented was to over-recruit in the non-clinical sample. Using this strategy would allow for the option of dropping the clinical sample and analysing the results from a non-clinical community sample of new mothers.

The total number of participants in this study was 61. The non-clinical sample comprised of 50 women and the clinical sample contained 11 women. Initially the non-clinical sample contained 57 women but seven were excluded due to high scores on the OCD measures. The age and gender distribution of the infants can be seen in Table 1.

Table 1: Gender and age of infants

Variable	Clinical (n = 11)	Non-clinical (n = 50)	Total (n = 61)
Gender (%)			
Male	54.5	52	52.5
Female	45.5	48	47.5
Mean age in months (sd)	5.36 (3.53)	6.1 (2.78)	5.97 (2.91)

Measures

Following informed consent all participants completed with following battery of assessments. Permission was obtained in advance from the authors and/or publishers to use the questionnaires. The questionnaire packs were presented in the following order. The questionnaire packs and scoring criteria for each measure can be found in the appendix section.

1. Obsessive Compulsive Inventory Revised (OCI-R) (Foa, Huppert, Leiberg, Langner, Kichic, Hajcak & Salkovskis, 2002)

The OCI-R is a self report measure of obsessive and compulsive symptoms. The revised version of the Obsessive Compulsive Inventory consists of 18 items. In addition to the total score, the OCI-R includes six subscales: (1) washing e.g. “I wash my hands more often and longer than necessary”; (2) obsessing e.g. “I find it difficult to control my own thoughts”; (3) hoarding e.g. “I collect things I don’t need”; (4) ordering e.g. “I get upset if objects are not arranged properly”; (5) checking e.g. “I check things more often than necessary” and (6) neutralising e.g. “I feel compelled to count while I am doing things”. Items on each subscale are rated on a 5-point Likert scale according to the degree of distress experienced in the previous month from 0 (not at all) to 4 (extremely). Previous research found that the scale has high internal consistency (clinical $\alpha = .81$; non-clinical $\alpha = .89$) and

test-retest reliability (clinical r = .82; non-clinical r = .84) (Foa et al., 2002). The OCI-R is a valid measure of OCD and can discriminate between OCD and other anxiety disorders (Abramowitz & Deacon, 2006; Foa et al., 2002). The OCI-R has previously been used with a perinatal population (Abramowitz et al., 2006; Alison, Wenzel, Kleiman & Sarwer, 2011; Chaudron & Nirodi, 2010). A good level of internal consistency was found for this data set (clinical α = .89; non-clinical α = .75).

2. Padua Inventory Washington State University Revision (PI-WSUR) (Burns, Keortge, Formea & Sternberger, 1996)

The PI-WSUR is a self report measure of obsessive and compulsive symptoms. The revised version of the Padua Inventory consists of 39 items that assess the frequency and severity of obsessive and compulsive symptoms. In addition to the total score, the PI-WSUR includes five subscales: (1) obsessional thoughts of harm to self or others e.g. "I think or worry at length about having hurt someone without knowing it"; (2) obsessional impulses to harm self or others e.g. "I sometimes have an impulse to hurt defenceless children or animals"; (3) contamination obsessions and washing compulsions e.g. "I find it difficult to touch an object when I know it has been touched by strangers or certain people"; (4) checking compulsions e.g. "I have to do things several times before I think they are done properly" and (5) dressing and grooming compulsions e.g. "I feel obliged to follow a particular order in dressing, undressing and washing myself". Items on each subscale are rated on a five-point Likert scale according to the degree of disturbance caused by the thought or behaviour from 0 (not at all) to 4 (very much). The scale has been shown to have high internal consistency (α = .92) and test-retest stability (r = .76) (Burns et al., 1996). Previous research has recommended the use of more than one OCD measure due to the heterogenous and complex presentation of the disorder (Anholt et al., 2009). The internal consistency for this sample was high (clinical α = .83; non-clinical α = .87).

3. Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983)

The HADS is a 14-item self report measure designed to assess depressive and anxious symptoms. The scale provides a total score and two subscales: anxiety e.g. "Worrying thoughts go through my mind" and depression e.g. "I look forward with enjoyment to things". Items are rated on a four-point Likert scale with higher scores indicating greater

symptom severity in the previous week. A literature review of studies using the HADS on somatic, psychiatric and primary care patients found a mean reliability of α = .83 (range from .68 to .93) for the anxiety subscale and a mean of .82 (range from .67 to .90) for the depression subscale (Bjelland, Dahl, Haug & Neckelmann, 2002). Bjelland and colleagues (2002) also found good to very good levels of concurrent validity. High levels of internal consistency were found in this study (clinical α = .91; non-clinical α = .89).

4. Maternal Postnatal Attachment Scale (MPAS) (Condon & Corkindale, 1998)

This is a self report measure of mothers' emotional and cognitive responses to their infant. The scale consists of 19 items and provides a total score and three subscales: (1) pleasure in interaction e.g. "I try to involve myself as much as I possibly can playing with the baby"; (2) absence of hostility e.g. "When I am caring for the baby, I get feelings of annoyance or irritation" and (3) quality of attachment e.g. "When I am with the baby and other people are present, I feel proud of the baby". Items are rated on a Likert scale wtih higher scores indicating greater levels of attachment. Condon and Corkindale (1998) report good levels of internal consistency (α = .78) and test-retest stability (r = .7). Internal consistency levels for this data set were good (clinical α = .75; non-clinical α = .85).

5. Meta Cognitions Questionnaire – 30 (MCQ-30) (Wells & Cartwright-Hatton, 2004)

This is a 30-item self report measure of beliefs people have about their thinking. It produces a total score and had five subscales: (1) positive beliefs about worry e.g. "Worrying helps me to avoid problems in the future"; (2) negative beliefs about uncontrollability and danger of worry e.g. "My worrying is dangerous for me"; (3) cognitive confidence e.g. "I have little confidence in my memory for words and names"; (4) need for control e.g. "If I did not control a worrying thought, and then it happened, it would be my fault" and (5) cognitive self-consciousness e.g. "I think a lot about my thoughts". Items are rated on a four-point Likert scale according to agreement with each statement from 1 (do not agree) to 4 (agree very much). The authors state that the scale has high internal consistency (α = .93) and good test-retest stability (r = .75) (Wells & Cartwright-Hatton, 2004). The MCQ-30 has been used with clinical and non-clinical populations (Draper, Rees & Nathan, 2008; McEvoy, Mahoney, Perini & Kingsep, 2009; Roussis & Wells, 2006; Spada & Wells, 2005), including OCD

(Myers & Wells, 2005; Solem et al., 2009). Good to very good levels of internal consistency were found in this study (clinical α = .77; non-clinical α = .9).

In addition to completing these questionnaires, the participants also completed a demographic sheet. Participants were asked about their age, ethnicity, marital status, educational achievements, age and gender of child, number of other children, delivery experience and previous pregnancy difficulties (miscarriage, abortions and still born baby). All clinical participants completed the questionnaire pack with their treating clinician present. For the non-clinical sample, 29 (58%) completed the questionnaire pack at home and 21 (42%) completed the questionnaire pack at their mother and baby group with the researcher present. As the data was not normally distributed, Mann-Whitney tests were used to compare the non-clinical sample in relation to location of completing the questionnaire packs. No significant differences were found for the total scores or subscales of the HADS and MCQ-30. However, statistically significant differences were found on the OCI-R checking subscale, PI-WSUR impulses of harm subscale and the MPAS quality of attachment, pleasure in interaction subscales and total score on the MPAS where participants completing at home scored higher on the OCD measures and lower on the bonding measures than those women who completed at the mother and baby groups.

Study design and data analysis

This is a cross sectional study and the data were collected on a single occasion. The data were analysed using SPSS version 17.

Results

Data checks

The data was checked for outliers, non-normal distribution and unequal variance. The results can be found in appendix 18. The majority of the data was not normally distributed. In addition, there were outliers and the variance was not equal on the majority of the data. As a result, non-parametric tests were used in the analysis unless a non-parametric alternative was not available.

Descriptive statistics

Demographics

Table 2 shows the continuous demographic variables for the clinical and non-clinical groups in relation to age of mother, age of child and number of other children. Mann-Whitney tests found no significant differences between the two groups on these factors. However, the data suggests a trend towards the clinical group having more other children. The mean scores are also presented in the following tables. While the median scores are used for the analysis, the mean scores have been retained and presented to facilitate comparison with previous research papers which used mean scores.

Table 2: Demographic characteristics of the groups – continuous variables

Demographic variable	Clinical Median	Clinical Mean (sd)	Non-clinical Median	Non-clinical Mean (sd)	Mann-Whitney U	Z	Significance
Age of mother (years)	29.0	29.55 (5.36)	31.5	32.08 (5.26)	202	-1.37	0.17
Age of child (months)	5.0	5.36 (3.53)	6.0	6.1 (2.78)	226.5	-0.92	0.36
Number of other children	1.0	0.91 (0.7)	0.0	0.52 (0.68)	187	0.36	0.07

Table 3 shows the categorical demographic variables including marital status, ethnicity, educational qualifications, gender of child, labour experience and previous pregnancy experiences. Using Pearson Chi-Squared test (two-sided), there were no significant differences between the two groups on all factors except for labour experience where non-clinical participants were more likely to have an unplanned caesarean section than were clinical participants.

Table 3: Demographic characteristics of the groups – categorical variables

Demographic variable		Clinical (n = 11)	Non-clinical (n = 50)	Chi Squared Value	df	Significance
Marital status	Single	2	4	1.33	3	0.72
	Married	7	37			
	Co-habiting	2	8			
	Widowed	0	1			
Ethnicity	White	8	45	2.36	1	0.12
	Other	3	5			
Educational qualifications	None	1	3	1.18	3	0.76
	School	1	2			
	College/ Undergraduate	6	24			
	Postgraduate/ Professional	3	21			
Gender of child	Male	6	26	0.02	1	0.88
	Female	5	24			
Labour experience	Vaginal delivery	7	38	11.99	2	<0.01
	Planned caesarean section	4	2			
	Unplanned caesarean section	0	10			
Previous miscarriages	Yes	3	14	<0.01	1	0.96
	No	8	36			
Previous termination of pregnancy	Yes	3	6	1.67	1	0.2
	No	8	44			
Previous still born baby	Yes	0	0	N/A	N/A	N/A
	No	11	50			

Symptomatic status

OCD symptoms

As expected there was a significant difference between the clinical and non-clinical groups in the subscales and total scores on both OCD scales using Mann-Whitney tests. Table 4 shows the mean and median scores for the subscales and total scores on the OCI-R and the PI-WSUR. Furthermore, the clinical and non-clinical mean total scores were compared with the recommended cut-off scores for both measures. The non-clinical total scores were within the non-clinical range (<21 for the OCI-R and mean total score of 21.78 for the PI-WSUR). The clinical group total mean scores were within the clinical range (≥21 for the OCI-R and mean total score of 54.93 for the PI-WSUR).

Depression and anxiety symptoms

There was a significant difference between the groups in terms of symptomatic status using Mann-Whitney tests. Table 5 shows the mean and median scores and standard deviations for the subscales and total scores for both groups on the HADS. For the non-clinical group, all mean scores (anxiety, depression and total) were within the non-clinical range (scores less than eight for the subscales and less than 15 for the total score). The clinical group's mean scores were all within the clinical range.

Meta-cognitions

Using Mann-Whitney tests, there were significant differences between the clinical and non-clinical groups on the total score and all of the subscales except for the positive beliefs about worry subscale of the MCQ-30. This indicated greater levels of problematic meta-cognitive beliefs or processes in the clinical sample. The mean and median scores can be seen in Table 6.

Table 4: OCI-R and PI-WSUR subscales and total mean and median scores

Measure		Clinical Median	Clinical Mean (sd)	Non-clinical Median	Non-clinical Mean (sd)	Mann-Whitney U	Z	Significance
OCI-R	Washing	3.0	4.55 (4.39)	0.0	0.36 (0.75)	93.0	-4.16	<0.01
	Obsessions	10.0	9.0 (2.76)	0.0	1.02 (1.65)	7.5	-5.33	<0.01
	Hoarding	5.0	4.82 (4.33)	1.0	1.68 (1.7)	170.5	-2.0	0.04
	Ordering	11.0	7.18 (5.44)	2.0	2.46 (2.06)	156.0	-2.26	0.02
	Checking	6.0	5.91 (4.35)	1.0	1.98 (2.49)	137.0	-2.64	0.01
	Neutralising	1.0	3.27 (4.29)	0.0	0.5 (1.0)	171.5	-2.41	0.02
	Total	32.0	34.73 (16.72)	7.0	8.0 (5.61)	28.0	-4.64	<0.01
PI-WSUR	Contamination/ Washing	21.0	20.55 (11.47)	1.0	2.44 (3.05)	32.5	-4.65	<0.01
	Dressing/ Grooming	8.0	7.0 (4.07)	0.0	0.66 (1.38)	68.0	-4.41	<0.01
	Checking	13.0	16.09 (10.78)	3.0	4.22 (4.03)	75.5	-3.76	<0.01
	Thoughts of harm	8.0	12.36 (8.71)	1.0	1.33 (1.95)	19.0	-4.92	<0.01
	Impulses of harm	2.0	3.0 (2.97)	0.0	0.48 (1.05)	114.0	-3.47	<0.01
	Total	60.0	59.0 (20.99)	6.0	9.21 (8.44)	2.0	-5.11	<0.01

Table 5: HADS subscales and total mean and median scores

Measure	Clinical Median	Clinical Mean (sd)	Non-clinical Median	Non-clinical Mean (sd)	Mann-Whitney U	Z	Significance
Anxiety	16.0	15.27 (4.15)	5.0	5.6 (3.57)	25.0	-4.71	<0.01
Depression	12.0	10.73 (5.88)	2.0	3.78 (3.43)	78.0	-3.72	<0.01
Total	28.0	26.0 (9.54)	7.0	9.38 (6.5)	40.0	-4.42	<0.01

Table 6: MCQ-30 subscales and total mean and median scores

Measure	Clinical Median	Clinical Mean (sd)	Non-clinical Median	Non-clinical Mean (sd)	Mann-Whitney U	Z	Significance
Positive beliefs about worry	13.0	12.64 (5.97)	8.5	9.12 (3.26)	180.0	-1.81	0.07
Negative beliefs about uncontrollability and danger of worry	20.0	20.36 (1.8)	8.0	9.08 (3.71)	4.0	-5.15	<0.01
Cognitive confidence	14.0	15.45 (5.34)	8.0	8.88 (2.65)	75.0	-3.79	<0.01
Need for control	17.0	18.64 (3.04)	8.0	8.4 (2.41)	4.0	-5.14	<0.01
Cognitive self-consciousness	22.0	20.36 (3.47)	9.5	10.78 (3.93)	29.0	-4.64	<0.01
Total	91.0	87.45 (10.41)	44.5	46.26 (11.17)	5.5	-5.06	<0.01

Bonding

Hypothesis testing

To test hypothesis 1, that new mothers with OCD would have significantly lower scores on measures of self reported bonding than the non-clinical new mothers, Mann-Whitney tests were used to compare the clinical and non-clinical groups on each of the subscales and the total score of the MPAS. The results can be seen in Table 7.

Table 7: MPAS subscales and total mean and median scores

Measure	Clinical Median	Clinical Mean (sd)	Non-clinical Median	Non-clinical Mean (sd)	Mann-Whitney U	Z	Significance
Quality of attachment	36.8	34.47 (5.05)	42.2	41.26 (3.54)	60.0	-4.06	<0.01
Absence of hostility	19.6	19.83 (3.75)	20.2	19.7 (3.46)	267.0	-0.15	0.88
Pleasure in interaction	22.0	20.64 (4.13)	22.0	21.77 (2.93)	235.5	-0.56	0.58
Total	74.6	74.94 (9.43)	84.95	82.96 (8.47)	118.5	-2.83	<0.01

The hypothesis that the clinical group would have significantly lower bonding scores on the subscales and total score of the MPAS was partially upheld. Significant differences were found in the quality of attachment subscale and total score. No significant differences were found between the groups on the absence of hostility subscale and the pleasure in interaction subscale.

Hypothesis two investigated whether the difference in self reported bonding scores was present once controlling for the effect of demographic factors, mood and meta-cognitions using ANCOVA. The use of ANCOVA depends on the data meeting a number of assumptions including normal distribution, homogeneity of variance, linearity between the dependent variable and the covariates, reliability of covariates and homogeneity of regression (Field, 2009; Field & Hole, 2003; Howell, 2010; Pallant, 2007;Tabachnick & Fidel,

2001). The data were not ideal for use within ANCOVA as they did not meet the assumptions of normal distribution or equal variance as Levene's test of equality of error variances was significant (p = 0.03). However, linear relationships were found between all covariates and the dependent variable. In addition, the covariates can be assumed to be reliable as the internal consistency checks on each scale were above the recommended level of 0.7 (Pallant, 2007). Finally, homogeneity of regression was met for half of the covariates. As the data met the majority of the assumptions, there is a lack of non-parametric alternatives and a need to control for the effect of low mood and birth experience according to previous research, ANCOVA analysis was felt to be the most appropriate form of analysis.

Given that the clinical and non-clinical groups' bonding differed only on the subscale of quality of attachment and the total bonding score, the quality of attachment subscale was chosen as the dependent variable in this analysis. This was because, given that the total bonding score is the sum of the subscales, the differences between the groups in the total bonding score could be affected by the non-significant differences between the groups in the non-significant subscales (i.e. absence of hostility and pleasure in interaction). Initially, Spearman's correlations were calculated between, on the one hand, all demographic factors and the HADS and MCQ-30 subscales and, on the other, total scores from the MPAS quality of attachment subscale to identify which variables needed to be included as covariates in the ANCOVA analysis. Appendix 19 shows the results of this analysis. Apart from location of completing the questionnaire, there were no significant correlations between any of the demographic factors and the quality of attachment subscale. As a result, location of completing the questionnaire was used as a covariate in the ANCOVA analysis. In addition, as the groups differed on labour experience and previous research has found this to have an effect on bonding, it was also used as a covariate. Significant correlations were also found between the quality of attachment subscale and total scores and subscales on the HADS and MCQ-30. OCD is an anxiety disorder and the anxiety subscale of the HADS significantly correlated with the OCD measures. Additionally, previous research has found that depression has an effect on bonding. As a result, HADS depression subscale and the MCQ-30 total score were also used as covariates.

The results from the ANCOVA analysis can be found in Table 8. The ANCOVA revealed effects of HADS depression subscale ($F(1,57) = 20.85$, $p = <0.01$), MCQ-30 total score ($F(1,57) = 5.13$, $p = 0.03$) and location of completing the questionnaire ($F(1,57) = 4.1$, p

= 0.048) on MPAS quality of attachment. The ANCOVA revealed no main effect of the group with the covariates included in the model ($F(1, 51) = 1.58$, $p = 0.21$).

Table 8: MPAS quality of attachment subscale ANCOVA analysis results

Source	df	F	Significance
HADS depression	1	20.85	<0.01
MCQ-30 total	1	5.13	0.03
Location	1	4.1	0.048
Labour experience	1	1.69	0.2
Group	1	1.58	0.21

Discussion

Due to the lack of existing research the primary aim of this study was to gain a better understanding of maternal bonding in new mothers with OCD. The study initially aimed to investigate whether self reported bonding is lower in new mothers with OCD when compared with new mothers who do not have symptoms of OCD. Previous research has found bonding difficulties are associated with maternal mental health and traumatic birth experiences. In addition meta-cognitions have been demonstrated to play an important role in the development and maintenance of OCD. Therefore a secondary aim of the study was to investigate whether the difference in self reported bonding was present once controlling for the effects of these factors.

The results showed high levels of symptomatic and cognitive distress in the clinical sample. They reported scores on the OCI-R, PI-WSUR and HADS that indicated clinical levels of OCD, depression and anxiety symptomatology and significantly higher levels of problematic meta-cognitive beliefs or processes when compared with mothers without OCD symptoms.

Compared with non-clinical new mothers, new mothers with OCD had lower self reported total bonding scores on the MPAS and also reported poorer quality of attachment. However, this difference in quality of attachment was no longer significant once controlling for the effects of location of completing the questionnaire, labour experience, low mood and

meta-cognitions The analysis also found that the location of completing the questionnaire, HADS depression score and MCQ-30 total score had a significant effect on quality of attachment.

These results suggest that the metacognitive beliefs and processes associated with OCD have an effect on maternal bonding while the behavioural symptoms of OCD (such as checking, washing and hoarding) are less influential. This provides support for Wells' meta-cognitive model of OCD where dysfunctional and maladaptive meta-cognitions are essential for the development and maintenance of OCD (Clark, 2004; Fisher & Wells, 2005). Wells proposes that the core dysfunctions in OCD are the excessive monitoring for intrusive thoughts and the activation of meta-cognitive beliefs about controlling the intrusion via coping strategies such as suppression, avoidance and rumination (Clark, 2005). The excessive monitoring, coping strategies and rituals associated with OCD could have an effect on the bond and developing relationship between the mother and infant. Condon and Corkindale (1998) state that there are four indicators of maternal attachment (mother-to-infant bonding) (1) pleasure in proximity; (2) tolerance; (3) need-gratification and protection and (4) knowledge acquisition. These indicators mediate the relationship between maternal bond and maternal behaviours such as proximity seeking, protecting and pleasuring (van Bussel, Spitz & Demyttenaere, 2010). Mother's with OCD will be cognitively and behaviourally preoccupied, making them less sensitive or attuned to the infant and, as a result, this will impair their ability to engage with the infant and participate in bonding behaviours.

In addition, the presence of maternal depression had a significant effect on perceived maternal bonding. These results are supported by previous research on bonding which consistently finds impaired bonding in mothers with postnatal depression (Edhborg et al., 2005; Hornstein et al., 2006; Moehler et al., 2006; Noorlander et al., 2008). Additionally, mothers with postnatal depression have negative cognitions about their bond with the infant and report poorer bonding than women with postnatal psychosis (Hornstein et al., 2006; Noorlander et al., 2008). Co-morbidity of depression is high in individuals with OCD (Clark, 2004). The results suggest that women with OCD with problematic meta-cognitions and co-morbid depression are at greater risk for bonding difficulties.

There are a number of limitations which may impact on the robustness of the results of this study. The clinical sample was small (n = 11). The majority of the data was not normally distributed. However, the data did meet the majority of the assumptions for

ANCOVA analysis, including linearity, reliability of covariates and homogeneity of regression suggesting we can have some confidence in the results produced.

Participants completed the questionnaire packs in different locations. The non-clinical sample were either at home or at their mother and baby group with the researcher present. For the clinical sample, the 11 service users completed the questionnaire pack with their treating clinician present. Due to this difference it was difficult to compare all three groups. However, initial analysis found a significant difference in self reported bonding scores where highest scores were found in non-clinical mothers who completed at the mother and baby group, then the non-clinical mothers completing at home, with the lowest bonding scores in the clinical sample. There are several possible explanations for this result. Non-clinical participants with concerns about their bond with their infant may not have felt comfortable completing the questionnaires in public. Similarly, participants who thought their responses may be observed by the researcher may have wanted to present themselves as 'good' mothers who were functioning well. This effect is not of major concern as location of completing the questionnaire was controlled for in the ANCOVA analysis. However, it does raise issues for future research in relation to recruitment and data collection. Similarly, differences in results due to location may make comparisons with previous research difficult. From a clinical perspective it may be important to compare clinical participants to see if a similar trend is apparent in their reporting. This may have clinical implications for treatment and measurement of outcomes.

Most of the measures have been widely used in clinical and non-clinical groups and have been used previously in perinatal populations. However, no studies were found that had used the MCQ-30 in the perinatal population. This raises issues about the suitability of this measure for this sample. Many women subjectively perceive a cognitive decline during the perinatal period, commonly referred to as 'baby brain' (Crawley, 2002; Crawley, Dennison & Carter, 2003). However, research into cognitive difficulties in the perinatal period has produced mixed results (Christensen, Leach & Mackinnon, 2010; de Groot, Vuurman, Hornstra & Jolles, 2006; Rendell & Henry, 2008). The MCQ-30 specifically asks about confidence in memory and awareness of thinking processes. As women expect to have memory difficulties in pregnancy, their awareness of their cognitive processes may be heightened in this period. As a result, scores on the MCQ-30 may be higher in the perinatal period.

Furthermore, this study relied solely on self report measures. Therefore, there were no measures of time spent engaging in rituals and neutralising. It is possible that new mothers with OCD spend long periods of time engaged in rituals rather than spending time with the infant which would also have an effect on bonding. Furthermore, social desirability was not measured. This may be important as previous research has found that women report feeling guilty and ashamed about their bonding difficulties (Kumar, 1997; Sluckin, 1998). In addition, there were no objective measures of bonding or interactions between the mothers and their infants, However, Condon and Corkindale (1998) state there are substantial limitations with behavioural observation including that the high-cost and labour-intensive nature results in small sample sizes and limited time periods of observation; the mother's behaviour may be influenced by her awareness of being observed; infant state (e.g. tiredness or sickness) may affect the behaviours observed and the lack of consensus in defining maternal bonding means there is a lack of agreement in which behaviours should be observed. As the bonding results varied in the non-clinical group depending on location completed, it could be argued that women who have concerns about their bond or want to present themselves as good mothers could alter their behaviour while being observed and the observations would not be an accurate measure of the mother-to-infant bond.

Conclusion and clinical implications

The results of this study found that self reported bonding was not significantly impaired in new mothers with OCD after controlling for the effects of location of completing the questionnaire, labour experience, low mood and meta-cognitive processes. Location, low mood and problematic meta-cognitive processes were found to have a significant effect on quality of attachment. Impaired bonding was more likely in new mothers with OCD who were low in mood and using problematic meta-cognitive processes. An assessment of maternal bonding would be beneficial in new mothers presenting with OCD with co-morbid depression. In addition the results suggest that behavioural symptoms of OCD have less of an effect on bonding than problematic meta-cognitive processes and beliefs. Meta-cognitions are generally not assessed in OCD measures, which focus on behavioural symptoms, and this makes their identification and assessment difficult in clinical settings. Clinicians may want to consider the use of a meta-cognitions measure in addition to OCD measures and targeting meta-cognitions as part of treatment. However, due to the methodological limitations, including unequal sample sizes, the appropriateness of using

ANCOVA analysis on this dataset, concerns around the measurement of maternal bonding and the use of the MCQ-30 in the perinatal period, the results of this study should be interpreted with caution.

Conflict of Interests

The authors declare that they have no conflict of interest.

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Public Domain Paper

Maternal mental health in the perinatal period

Lynda Russell
University of Birmingham, October 2011

The aim of this thesis was to gain a better understanding of obsessive compulsive disorder (OCD) and eating disorders in the perinatal period. There is a lack of research of the impact of both of these mental health conditions in pregnant women and new mothers.

Literature Review

Research into the effect of eating disorders in the perinatal period has mainly focused on medical complications and management. Eating disorders in the perinatal period increases the risk of miscarriage, birth complications, low birth weight infants, premature labour, postnatal depression and difficulties when feeding the infant (Abraham, 1998; Bansil et al., 2008; Franko et al., 2001; Koubaa, Hallstrom & Hirschberg, 2008; Mitchell, Seim, Glotter, Soll & Pyle, 1991; Morgan, Lacey & Chung, 2006; Stein, Murray, Copper & Fairburn, 1996; Stein, Woolley, Cooper & Fairburn, 1994). Also, previous research has found that women are reluctant to disclose their eating disorder to their obstetrician (Cantrell, Kelley & McDermott, 2009; Franko & Spurrell, 2000) and staff in obstetrics and gynaecology services have poor knowledge and understanding of eating disorders and, as a result, frequently do not identify symptoms (Franko & Spurrell, 2000; Morgan, 1999).

This review investigated the prevalence of eating disorders in the perinatal period, symptomatology levels across the perinatal period and factors associated with the development and relapse from an eating disorder in the perinatal period. The evidence suggests that a small number of women have an eating disorder during pregnancy and the postnatal period. In addition, the number of women bingeing and purging and the frequency of these behaviours decreases with each trimester. However, most women relapse after giving birth at a worse level than before pregnancy. A number of risk factors were identified for the development of an eating disorder in the perinatal period, including social factors such as employment, housing and financial difficulties, beliefs about weight and body shape, mood, self esteem and abuse experiences. While remission was associated with life satisfaction, high self esteem and wanting to be healthy and be a good mum.

A number of limitations were found, including sample sizes were often small, different assessment methods were used (clinical interviews, questionnaires and reviewing medical notes) and many of the studies were retrospective, sometimes several years after pregnancy, raising doubts about the accuracy of the women's memories for frequency of eating disorder symptoms. This made comparing the studies difficult and limits how confident the conclusions can be.

Empirical Paper

Background: The primary aim of this study was to gain a clearer understanding of maternal bonding in new mothers with OCD as there is no existing research in this area. It is common for new mothers to experience intrusive thoughts of accidental and non-accidental harm involving the newborn (Abramowitz, Khandker, Nelson, Deacon & Rygwall, 2006; Abramowitz, Schwartz & Moore, 2003; Fairbrother & Woody, 2008; Larsen et al., 2006). The content of these intrusive thoughts is similar to the obsessions experienced by individuals with OCD but they are not perceived to be as distressing or as frequent as obssesions (Abramowitz et al., 2003). It is suggested that experiencing OCD in the postnatal period could have an impact on the maternal bond as the mother may not be as physically or mentally available to the baby.

Method: To investigate whether bonding was impaired in new mothers with OCD, 11 mothers with OCD were compared with 50 mothers with no symptoms of OCD. All participants completed the Obsessive Compulsive Inventory – Revised (Foa et al., 2002), the Padua Inventory Washington State University Revision (Burns, Keortge, Formea & Sternberger, 1996), the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983), the Maternal Postnatal Attachment Scale (Condon & Corkindale, 1998) and the Meta Cognitions Questionnaire – 30 (Wells & Cartwright-Hatton, 2004). They also provided background demographic information about themselves and their infant. The mothers were recruited through local Mental Health services, mother and baby groups and Sure Start centres.

Results: Mothers with OCD rated their bond with their infant lower than the mothers with no OCD symptoms. This analysis was expanded to control for the effects of location of completing the questionnaires, labour experience, OCD symptoms, low mood and the use of maladaptive meta-cognitive beliefs, beliefs about thoughts and processes used to manage thoughts. No significant difference was found once controlling for these factors. Further

analysis found that the location of completing the questionnaire, low mood and problematic meta-cognitive processed had a significant effect on quality of maternal attachment.

Conclusion: Bonding is impaired in new mothers with OCD when compared with new mothers who do not have OCD. Low mood and maladaptive meta-cognitive beliefs and processes had a greater effect on bonding than OCD symptoms. Due to the small sample size, the results should be interpreted with caution and replication with a larger sample is recommended.

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Appendix 1: Clinical participant information sheet

Participant Information Sheet

Title of Project: Thoughts, feelings and the relationship with the newborn

My name is Lynda Russell and I am a psychologist in clinical training on the Doctorate course of Clinical Psychology at the University of Birmingham. I am the chief investigator of this research project, which is supervised by Dr, Senior Lecturer, at the University of Birmingham and Dr, Consultant Clinical Psychologist.

Invitation

You are being invited to take part in this research study. Before you decide it is important that you understand why the research is being done and what it would involve for you. Please take your time to read this information carefully before making a decision about participation. You have no obligation to take part in this study. Should you wish to discuss any aspect of this study or would like some further information before making your decision please feel free to contact us.

What is the purpose of this research?

Negative or troubling thoughts seem to be surprisingly common in new mothers. The purpose of this study is to help us to understand the relationship between these thoughts and the way new mothers feel about their baby. Research in this area may help to improve psychological therapies for new mothers who experience mental health difficulties. Also, it is hoped that this research will help our understanding of the experiences of new mothers in general. That is why we are comparing the results of new mothers from the community with new mothers who are under the care of an NHS Mental Health Service.

Why have I been invited?

You have been invited as you are a female service user within a NHS Mental Health Service, have a diagnosis of OCD and have a child that is less than 12 months old.

Do I have to take part?

It is up to you to decide to join this study. This information sheet will describe this study and what you will be asked to do. If you agree to take part, you will be asked to sign a consent form. You are free to withdraw from the study at any time, without giving a reason. This will not affect the standard of care you receive from your NHS Mental Health service.

What will happen to me if I take part?

If you agree to take part you will be asked to

(1) Complete a consent form
(2) Complete a demographic information questionnaire – to give us some information about you and your baby
(3) Complete 5 questionnaires looking at your thoughts and feelings.

This may take about 30 minutes. You will only need to complete these forms once.

What are the potential benefits and disadvantages of taking part in this study?

We cannot promise that this study will help you but the information we get from this study will help improve the treatment of new mothers with mental health difficulties.

Sometimes people feel inconvenienced by spending time completing questionnaires. Some people may get distressed when answering questions about their thoughts or their relationship with their baby. Everyone who takes part will be provided with a list of potential sources of help or support. You can also contact your GP or mental health worker within your NHS Mental Health service.

Will my taking part in the study be kept confidential?

All information which is collected about you during the course of this study will be kept strictly confidential. This research follows the Code of Conduct, Ethical Principals and Guidelines published by the British Psychological Society. All participants will be given an ID code. Consent forms will be kept separately from the questionnaires. All data will be kept in a secure location with assess only permitted to members of the research team. Information will be kept for the duration of the research only and then will be destroyed. No names or identifying information will be released in any publications.

For each participant recruited from the NHS Mental Health service, we will inform their GP that they have taken part in this study. We will fill out a form and send it to your GP. This is

routine procedure for research within the Mental Health service and an ethical requirement. No other details will be sent to your GP and your GP will not have access to the completed forms.

What will happen if I don't want to carry on with the study?

You can refuse to take part in this study. You can also refuse to finish the questionnaires at any point during the study. Your treatment will not be affected if you decide not to take part or withdraw at any point. If you decide to withdraw from the study after completing the questionnaires please contact us and we will use your ID code to identify and remove your results. We will not keep a record of your results or any personally identifiable information.

What if there is a problem?

Should you have cause to complain you can contact the Course Director of the Clinical Psychology Doctorate Course at the University of Birmingham –

Dr Jan Oyebode
University of Birmingham
School of Psychology
Edgbaston
Birmingham
B15 2TT
Tel: [redacted]

Additionally, you can access the National Health Service complaints Service through PALS –

What will happen to the results of this study?

It is hoped that the results of this study will be published in a research journal. It will not be possible to identify individual participants from the results.

Please contact me if you would like to request a questionnaire pack or if you would like some further information about this study –

Please keep this information sheet for future reference

Appendix 2: Non-clinical participant information sheet

Participant Information Sheet

Title of Project: Thoughts, feelings and the relationship with the newborn

My name is Lynda Russell and I am a psychologist in clinical training on the Doctorate course of Clinical Psychology at the University of Birmingham. I am the chief investigator of this research project, which is supervised by Dr, Senior Lecturer, at the University of Birmingham and Dr, Consultant Clinical Psychologist.

Invitation

You are being invited to take part in this research study. Before you decide it is important that you understand why the research is being done and what it would involve for you. Please take your time to read this information carefully before making a decision about participation. You have no obligation to take part in this study. Should you wish to discuss any aspect of this study or would like some further information before making your decision please feel free to contact us.

What is the purpose of this research?

Negative or troubling thoughts seem to be surprisingly common in new mothers. The purpose of this study is to help us to understand the relationship between these thoughts and the way new mothers feel about their baby. Research in this area may help to improve psychological therapies for new mothers who experience mental health difficulties. Also, it is hoped that this research will help our understanding of the experiences of new mothers in general. That is why we are comparing the results of new mothers from the community with new mothers who are under the care of NHS Mental Health Services.

Why have I been invited?

You have been invited as you are a new mother with a child that is less than 12 months old.

Do I have to take part?

It is up to you to decide to join this study. This information sheet will describe this study and what you will be asked to do. If you agree to take part, you will be asked to sign a consent form. You are free to withdraw from the study at any time, without giving a reason.

What will happen to me if I take part?

If you agree to take part you will be asked to

(1) Complete a consent form

(2) Complete a demographic information questionnaire – to give us some information about you and your baby

(3) Complete 5 questionnaires looking at your thoughts and feelings.

This may take about 30 minutes. You will only need to complete these forms once.

What are the potential benefits and disadvantages of taking part in this study?

We cannot promise that this study will help you but the information we get from this study will help improve the treatment of new mothers with mental health difficulties.

Sometimes people feel inconvenienced by spending time completing questionnaires. Some people may get distressed when answering questions about their thoughts or their relationship with their baby. Everyone who takes part will be provided with a list of potential sources of help or support. You can also contact your GP or health visitor.

Will my taking part in the study be kept confidential?

All information which is collected about you during the course of this study will be kept strictly confidential. This research follows the Code of Conduct, Ethical Principals and Guidelines published by the British Psychological Society. All participants will be given an ID code. Consent forms will be kept separately from the questionnaires. All data will be kept in a secure location with assess only permitted to members of the research team. Information will be kept for the duration of the research only and then will be destroyed. No names or identifying information will be released in any publications.

What will happen if I don't want to carry on with the study?

You can refuse to take part in this study. You can also refuse to finish the questionnaires at any point during the study. If you decide to withdraw from the study after completing the questionnaires please contact us and we will use your ID code to identify and remove your results. We will not keep a record of your results or any personally identifiable information.

What if there is a problem?

Should you have cause to complain you can contact the Course Director of the Clinical Psychology Doctorate Course at the University of Birmingham –

Dr Jan Oyebode
University of Birmingham
School of Psychology
Edgbaston
Birmingham
B15 2TT
Tel: [redacted]

Additionally, you can access the National Health Service complaints Service through PALS –

What will happen to the results of this study?

It is hoped that the results of this study will be published in a research journal. It will not be possible to identify individual participants from the results.

Please contact me if you would like to request a questionnaire pack or if you would like some further information about this study –

Please keep this information sheet for future reference

Appendix 3: Clinical consent form

Consent Form

Title of Project: Thoughts, feelings and the relationship with the newborn

Name of Researcher: Lynda Russell

Patient Identification Number for this study:

Please initial box

1. I confirm that I have read and understand the information sheet dated 31/08/2010 (Version 7) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that relevant sections of any of my medical notes and data collected during the study may be looked at by the chief investigator, responsible individuals from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records. ☐

4. I agree to my GP being informed of my participation in the study. ☐

5. I agree to take part in the above study. ☐

_____	_____	_____
Name	Date	Signature
_____	_____	_____
Name of researcher	Date	Signature

Appendix 4: Non-clinical consent form

Consent Form

Title of Project: Thoughts, feelings and the relationship with the newborn

Name of Researcher: Lynda Russell

Patient Identification Number for this study:

Please initial box

1. I confirm that I have read and understand the information sheet dated 31/08/2010 (Version 7) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study. ☐

_____ _____ _____

Name Date Signature

_____ _____ _____

Name of researcher Date Signature

Appendix 5: Clinical debrief sheet

Thank you for taking part in this study.

The aim of this study is to investigate the relationship between Obsessive Compulsive Disorder (OCD) and the way new mothers feel about their baby. OCD is a mental health condition where people experience obsessions (thoughts or images that cause distress) and compulsions (behaviours that are aimed at reducing the distress). People often think of excessive hand washing and checking doors and locks when they think about OCD.

The results of this study will provide us with information about OCD in new mothers. We are interested in the thoughts and feelings new mothers with OCD have about their babies. We hope this information will allow health professionals to have a better understanding of how to work with and help new mothers with OCD.

You may have found answering some of the questions difficult or the questions may have raised some issues that you would like to explore. Here are the contact details for sources of information and support.

NHS

Your GP
Your health visitor
Your mental health worker
NHS Direct 0845 4647

Charities and voluntary organisations

OCD Action	0845 390 6232	www.ocdaction.org.uk
Offers support and information on OCD		
Parentline Plus	0808 800 2222	www.parentlineplus.org.uk
Provides support and advice to parents		
Cry-Sis	08451 228 669	www.cry-sis.org.uk
Support for families with excessively crying, sleepless and demanding babies		
Mind	0845 766 0163	www.mind.org.uk
Provides information on mental health conditions		
Samaritans	08457 90 90 90	www.samaritans.org
Provides confidential emotional support for people experiencing distress		

Please keep this sheet for future information

Appendix 6: Non-clinical debrief sheet

Thank you for taking part in this study.

The aim of this study is to investigate the relationship between Obsessive Compulsive Disorder (OCD) and the way new mothers feel about their baby. OCD is a mental health condition where people experience obsessions (thoughts or images that cause distress) and compulsions (behaviours that are aimed at reducing the distress). People often think of excessive hand washing and checking doors and locks when they think about OCD.

The results of this study will provide us with information about OCD in new mothers. We are interested in the thoughts and feelings new mothers with OCD have about their babies. We hope this information will allow health professionals to have a better understanding of how to work with and help new mothers with OCD.

You may have found answering some of the questions difficult or the questions may have raised some issues that you would like to explore. Here are the contact details for sources of information and support.

NHS

Your GP

Your health visitor

NHS Direct 0845 4647

Charities and voluntary organisations

OCD Action	0845 390 6232	www.ocdaction.org.uk
Offers support and information on OCD		
Parentline Plus	0808 800 2222	www.parentlineplus.org.uk
Provides support and advice to parents		
Cry-Sis	08451 228 669	www.cry-sis.org.uk
Support for families with excessively crying, sleepless and demanding babies		
Mind	0845 766 0163	www.mind.org.uk
Provides information on mental health conditions		
Samaritans	08457 90 90 90	www.samaritans.org
Provides confidential emotional support for people experiencing distress		

Please keep this sheet for future information

Appendix 7: Demographic sheet

Demographics

Your age: _____

Are you:

- □ Single
- □ Married
- □ Co-habiting
- □ Civil partnership
- □ Widowed

What educational qualifications do you have (Tick all that apply):

- □ None
- □ GCSE
- □ A level
- □ NVQ/College course
- □ Undergraduate degree
- □ Masters degree
- □ PhD/Doctorate
- □ Professional qualification
  Please state: _____

How would you describe your ethnicity:

- □ White
- □ Indian
- □ Black/Caribbean
- □ Pakistani
- □ Black/African
- □ Bangladeshi
- □ Black/Other
- □ Chinese
  Please state: _____
- □ Other
  Please state: _____

The month and year of birth of your most recent child: _____

Gender of your most recent child: □ Male □ Female

How many other children do you have: _____

Have you ever had any miscarriages: □ Yes □ No

Have you ever had any abortions or terminations: □ Yes □ No

Have you ever had a still born baby: □ Yes □ No

How was your most recent baby delivered:

- □ Vaginal delivery – uncomplicated
- □ Vaginal delivery – complicated
- □ Planned caesarian section – local anaesthetic
- □ Planned caesarian section – general anaesthetic
- □ Unplanned caesarian section – local anaesthetic
- □ Unplanned caesarian section – general anaesthetic

Appendix 18: Data checks for outliers, non-normal distribution and unequal variance

OCI – R

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Group	Statistic	df	Sig.	Statistic	df	Sig.
OCI-R Washing Subscale	Clinical	.186	11	.200*	.858	11	.055
	Non-clinical	.465	50	.000	.542	50	.000
OCI-R Obsessions Subscale	Clinical	.187	11	.200*	.901	11	.192
	Non-clinical	.312	50	.000	.668	50	.000
OCI-R Hoarding Subscale	Clinical	.197	11	.200*	.910	11	.242
	Non-clinical	.236	50	.000	.836	50	.000
OCI-R Ordering Subscale	Clinical	.304	11	.005	.766	11	.003
	Non-clinical	.157	50	.004	.900	50	.000
OCI-R Checking Subscale	Clinical	.144	11	.200*	.915	11	.281
	Non-clinical	.257	50	.000	.750	50	.000
OCI-R Neutralising Subscale	Clinical	.253	11	.048	.787	11	.006
	Non-clinical	.452	50	.000	.569	50	.000
OCI-R Total	Clinical	.128	11	.200*	.931	11	.418
	Non-clinical	.123	50	.055	.938	50	.011

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Tests of Normality

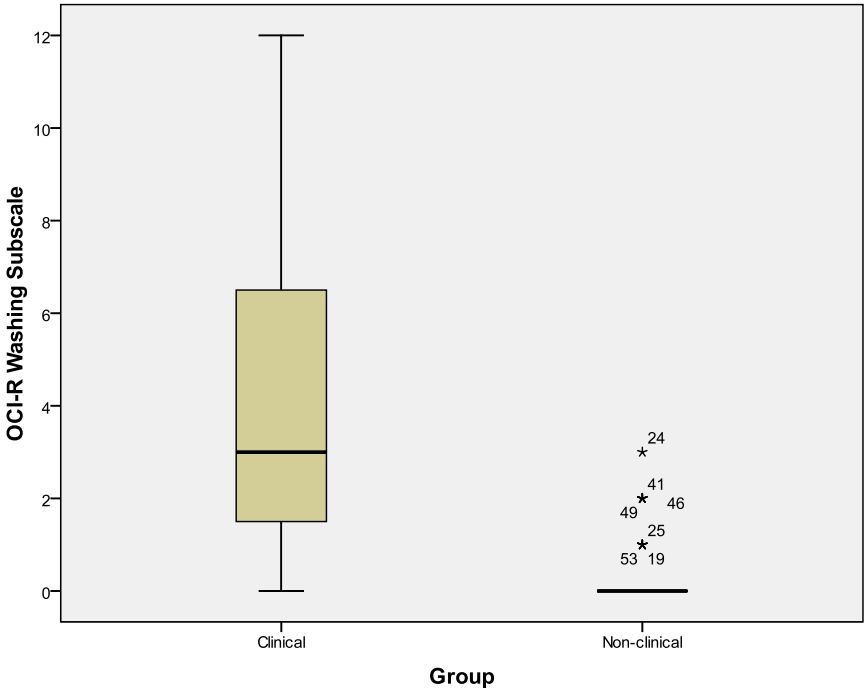
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
OCI-R Washing Subscale	.360	61	.000	.506	61	.000
OCI-R Obsessions Subscale	.272	61	.000	.708	61	.000
OCI-R Hoarding Subscale	.226	61	.000	.783	61	.000
OCI-R Ordering Subscale	.225	61	.000	.810	61	.000
OCI-R Checking Subscale	.256	61	.000	.783	61	.000
OCI-R Neutralising Subscale	.377	61	.000	.515	61	.000
OCI-R Total	.206	61	.000	.759	61	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
OCI-R Washing Subscale	Based on Mean	57.472	1	59	.000
	Based on Median	31.341	1	59	.000
	Based on Median and with adjusted df	31.341	1	15.560	.000
	Based on trimmed mean	53.026	1	59	.000
OCI-R Obsessions Subscale	Based on Mean	6.106	1	59	.016
	Based on Median	3.549	1	59	.065
	Based on Median and with adjusted df	3.549	1	57.675	.065
	Based on trimmed mean	5.846	1	59	.019
OCI-R Hoarding Subscale	Based on Mean	30.420	1	59	.000
	Based on Median	23.469	1	59	.000
	Based on Median and with adjusted df	23.469	1	51.174	.000
	Based on trimmed mean	30.137	1	59	.000
OCI-R Ordering Subscale	Based on Mean	51.084	1	59	.000
	Based on Median	14.487	1	59	.000
	Based on Median and with adjusted df	14.487	1	19.264	.001
	Based on trimmed mean	49.173	1	59	.000
OCI-R Checking Subscale	Based on Mean	6.809	1	59	.011
	Based on Median	5.688	1	59	.020
	Based on Median and with adjusted df	5.688	1	57.645	.020
	Based on trimmed mean	6.705	1	59	.012
OCI-R Neutralising Subscale	Based on Mean	72.918	1	59	.000
	Based on Median	21.478	1	59	.000
	Based on Median and with adjusted df	21.478	1	18.358	.000
	Based on trimmed mean	58.965	1	59	.000

OCI-R Total	Based on Mean	43.109	1	59	.000
	Based on Median	34.065	1	59	.000
	Based on Median and with adjusted df	34.065	1	27.141	.000
	Based on trimmed mean	42.956	1	59	.000


OCI-R Washing Subscale
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10
8
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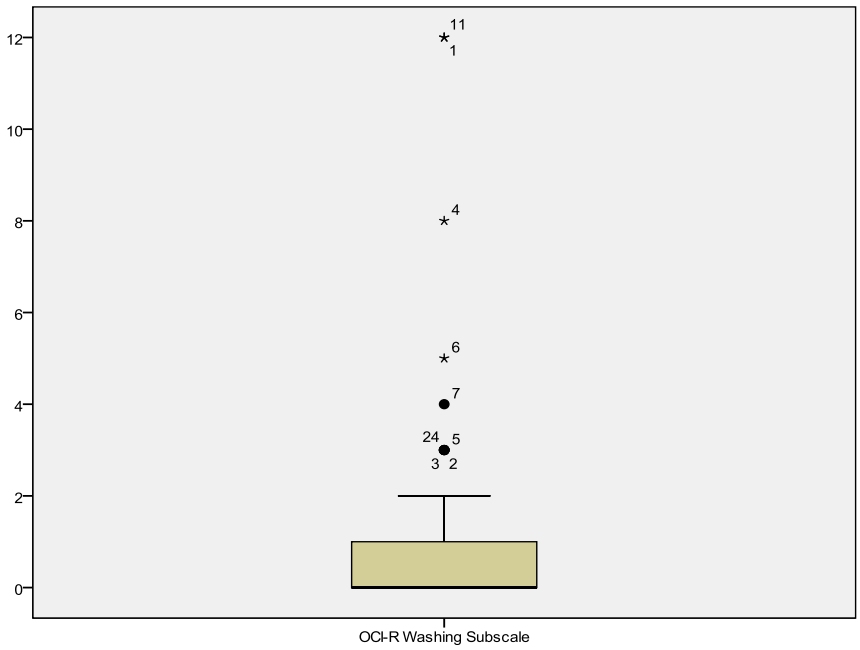
19
Clinical
Non-clinical
Group


12
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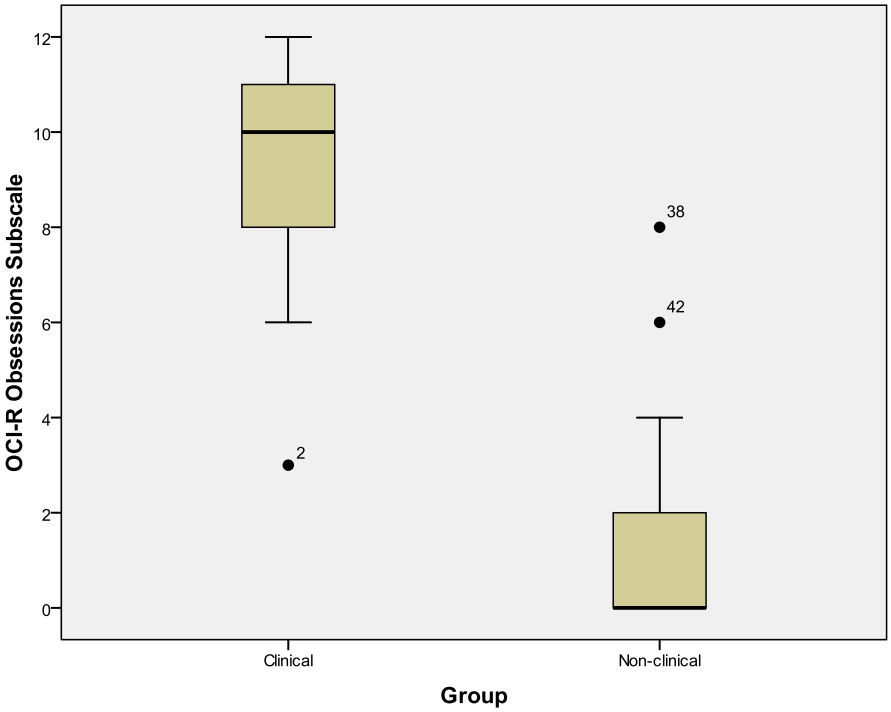
OCI-R Washing Subscale


OCI-R Obsessions Subscale
12
10
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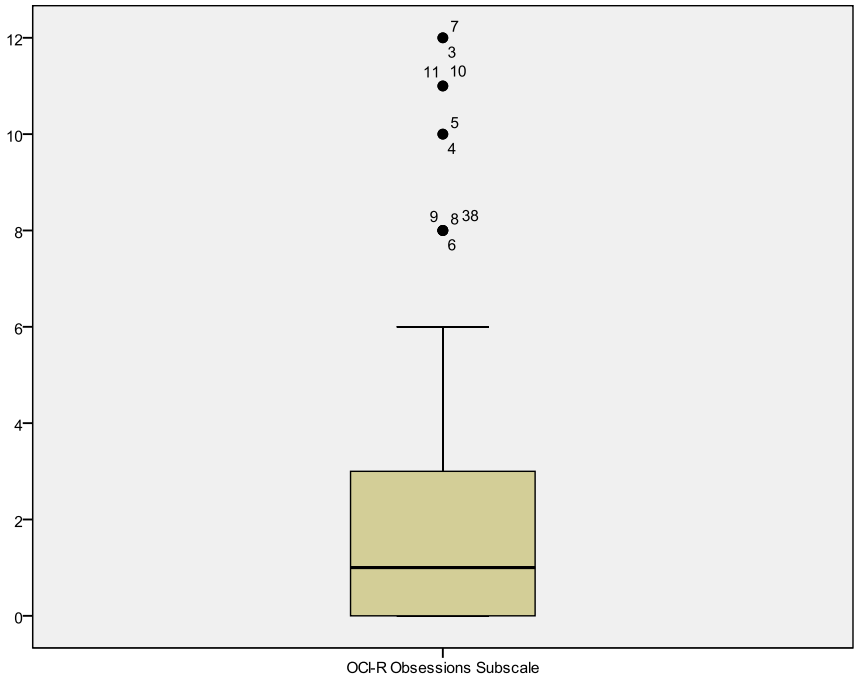
38
42
2
Clinical
Non-clinical
Group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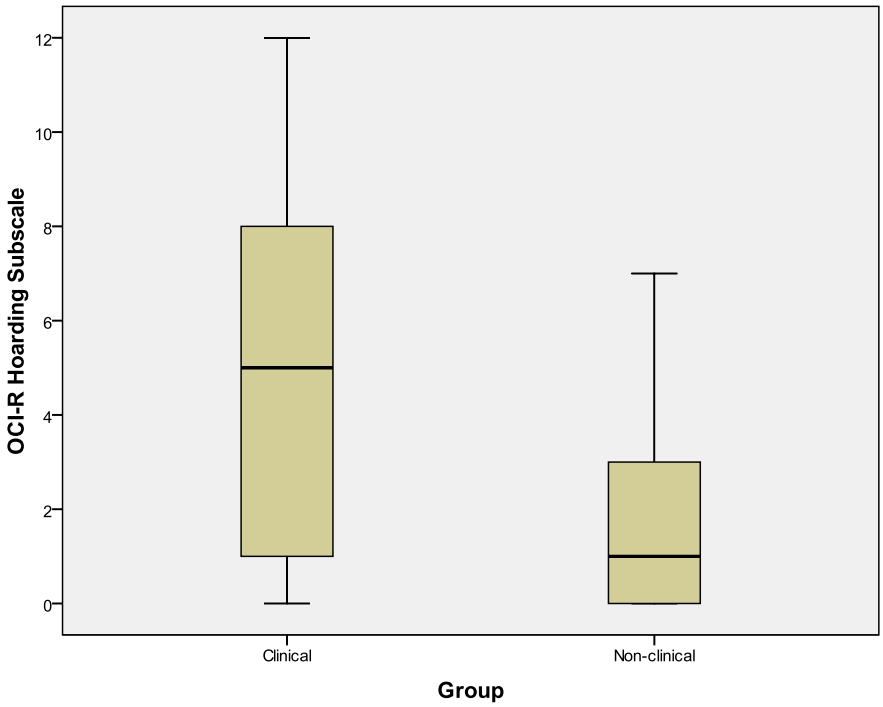
OCI-R Obsessions Subscale


OCI-R Hoarding Subscale
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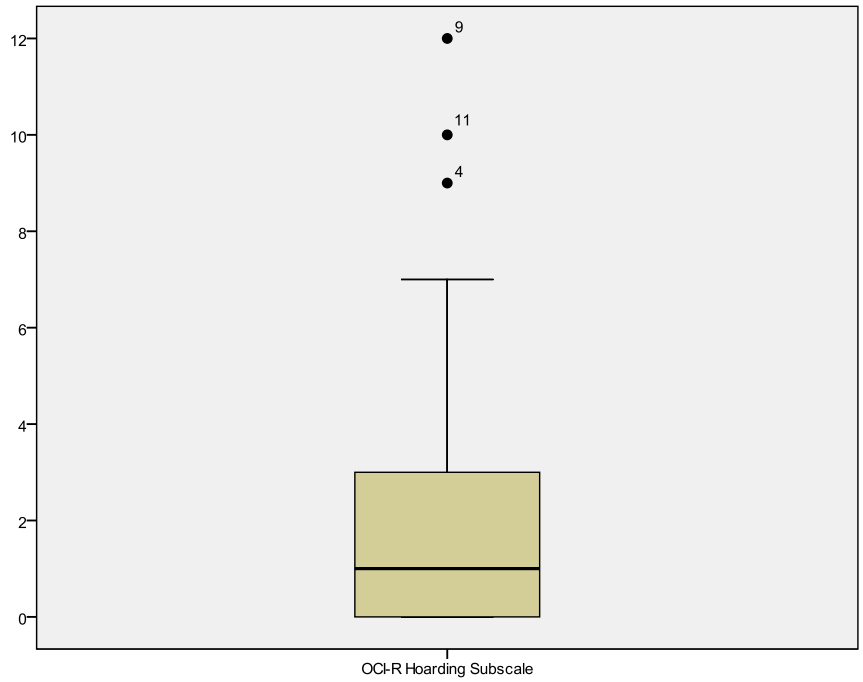
Clinical
Non-clinical
Group


12
10
8
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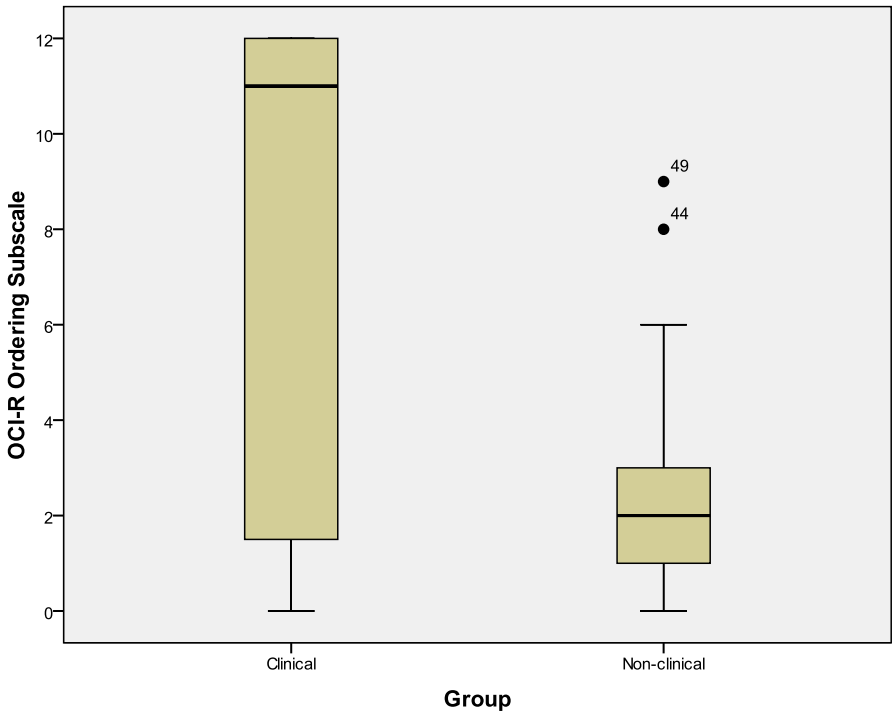
OCI-R Hoarding Subscale


OCI-R Ordering Subscale
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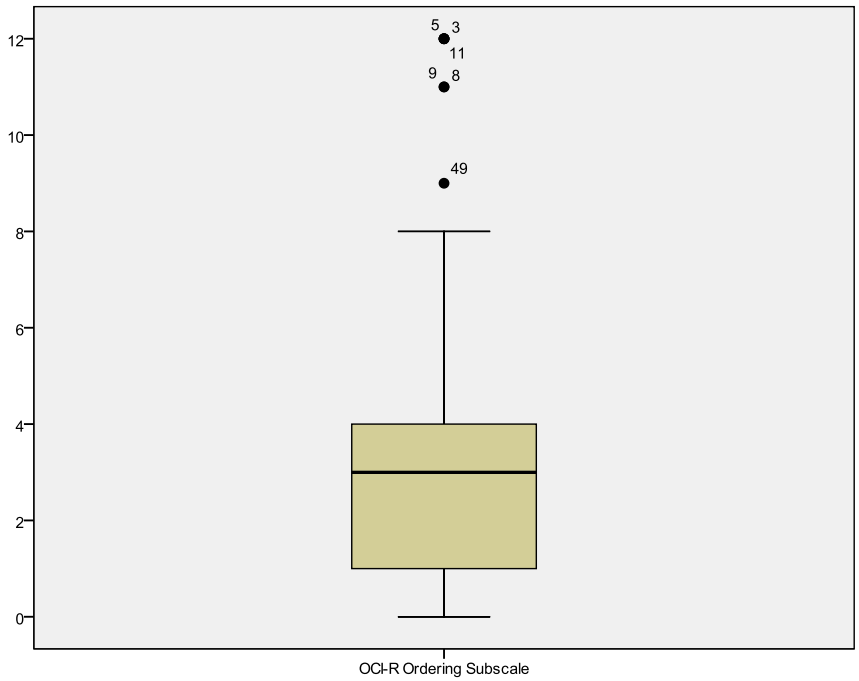
49
44
Clinical
Non-clinical
Group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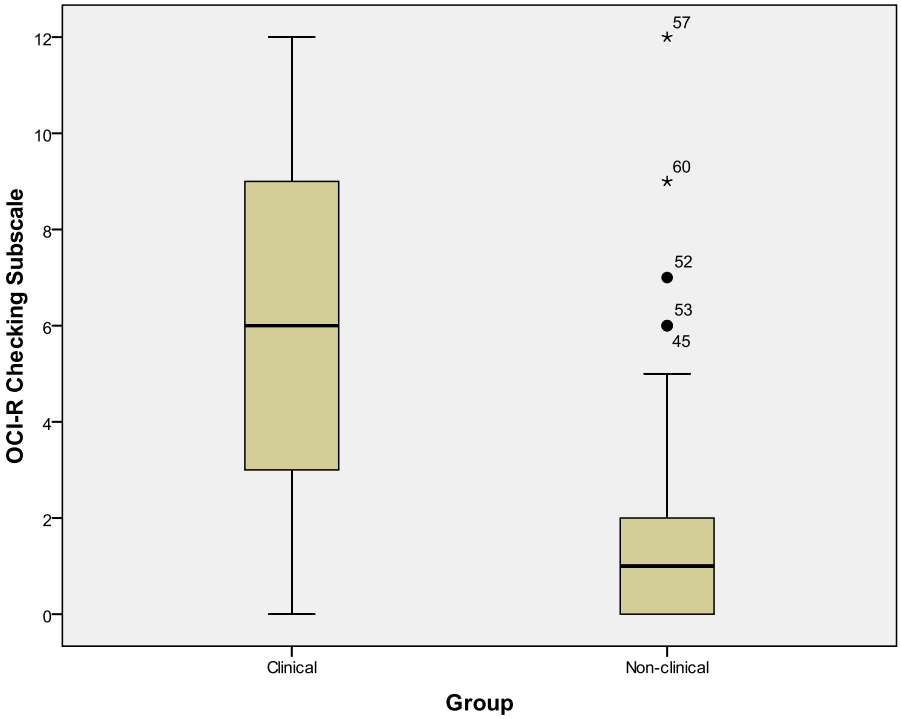
OCI-R Ordering Subscale


OCI-R Checking Subscale
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57
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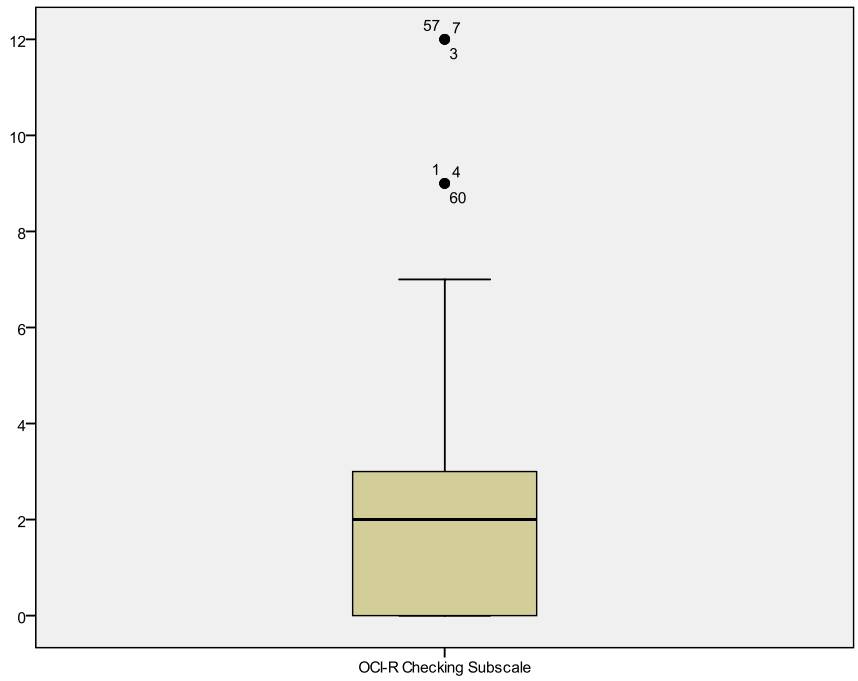
52
53
45
Clinical
Non-clinical
Group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2
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57
7
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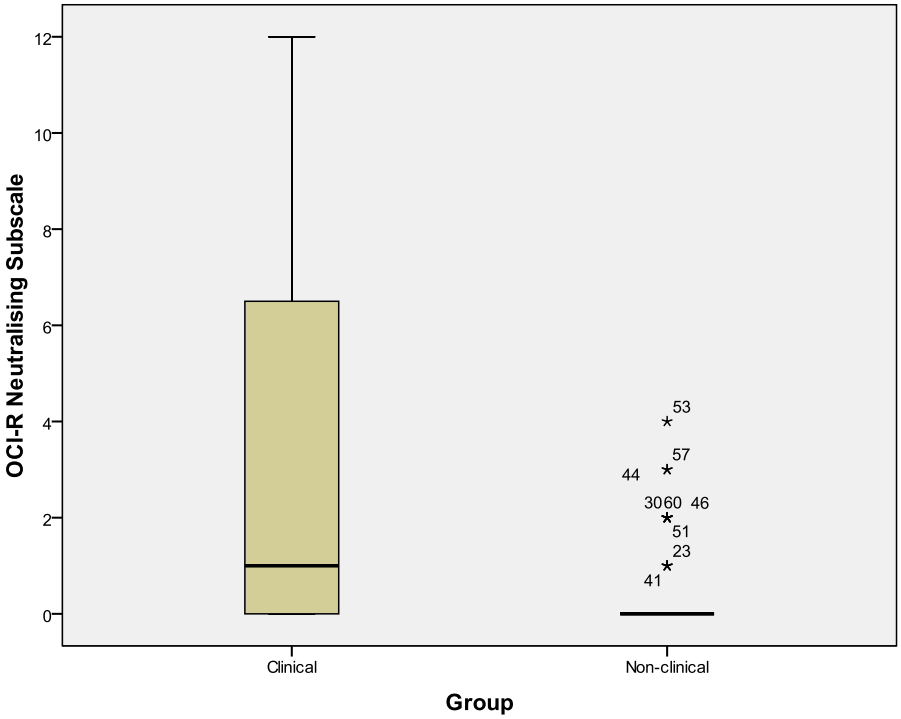
1
4
60
OCI-R Checking Subscale


OCI-R Neutralising Subscale
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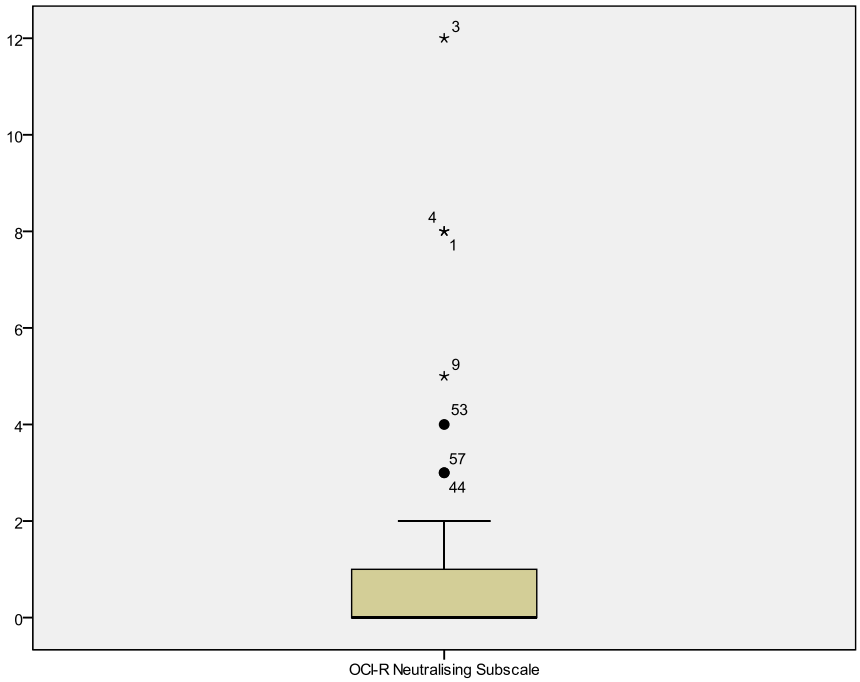
30 60 46
51
23
41
Clinical
Non-clinical
Group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3
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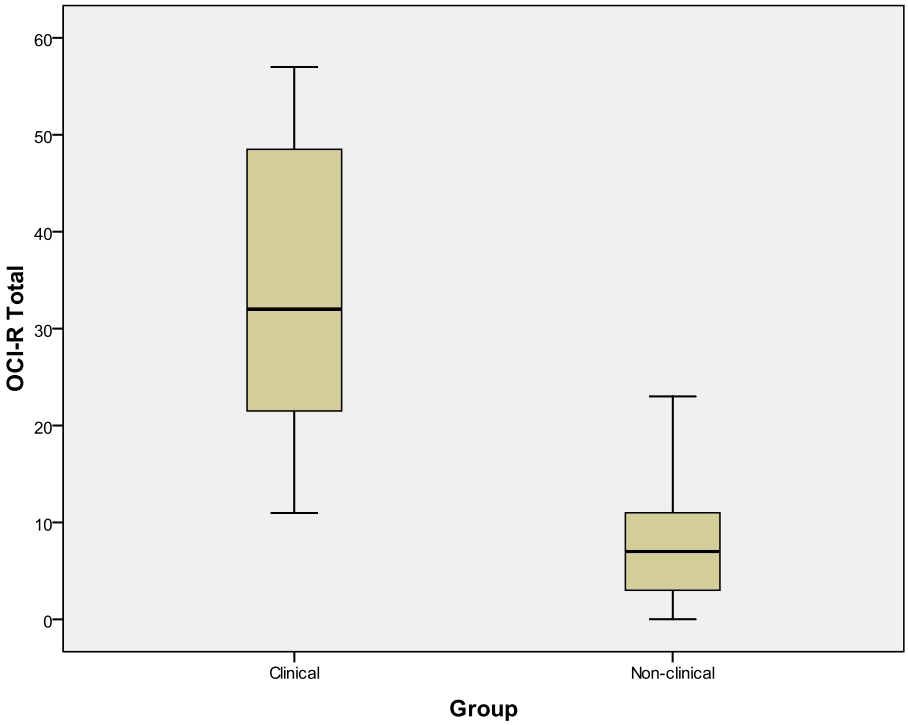
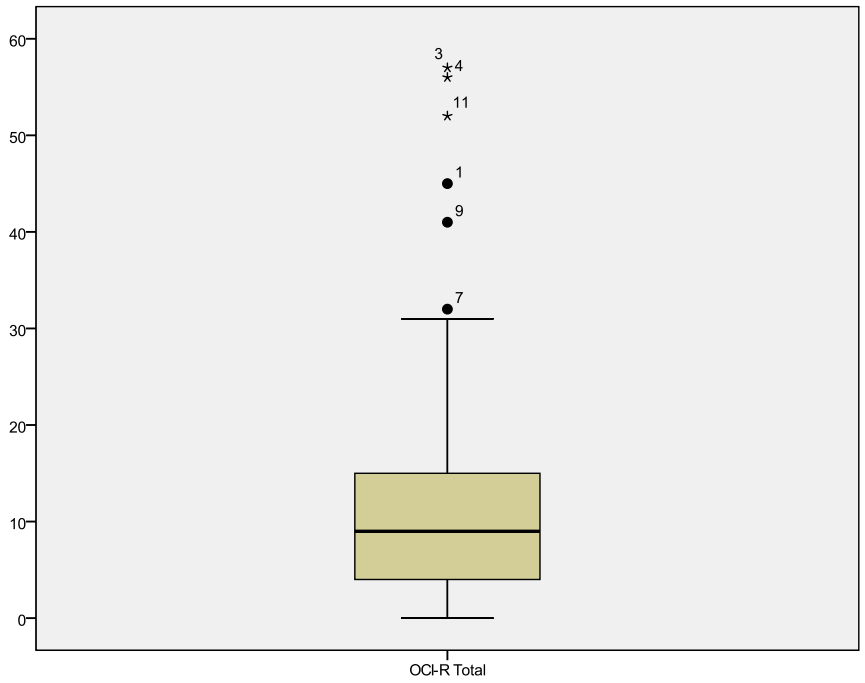
9
53
57
44
OCI-R Neutralising Subscale


OCI-R Total
60
50
40
30
20
10
0
Clinical
Non-clinical
Group


60
50
40
30
20
10
0
3
4
11
1
9
7
OCI-R Total

PI-WSUR

Tests of Normality

	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
PADUA Contamination/Washing Subscale	Clinical	.167	11	.200*	.948	11	.617
	Non-clinical	.288	48	.000	.733	48	.000
PADUA Dressing/Grooming Subscale	Clinical	.227	11	.117	.889	11	.136
	Non-clinical	.376	48	.000	.564	48	.000
PADUA Checking Subscale	Clinical	.158	11	.200*	.952	11	.670
	Non-clinical	.222	48	.000	.857	48	.000
PADUA Thoughts of harm Subscale	Clinical	.243	11	.068	.858	11	.054
	Non-clinical	.255	48	.000	.706	48	.000
PADUA Impulses of harm Subscale	Clinical	.204	11	.200*	.879	11	.102
	Non-clinical	.426	48	.000	.515	48	.000
PADUA Total	Clinical	.171	11	.200*	.945	11	.579
	Non-clinical	.182	48	.000	.873	48	.000

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

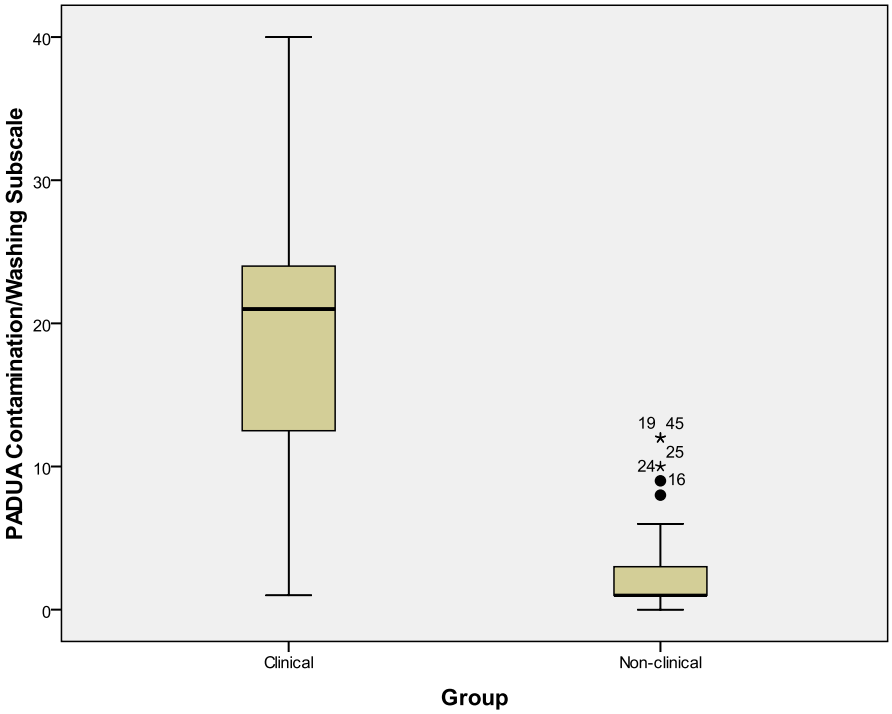
Tests of Normality

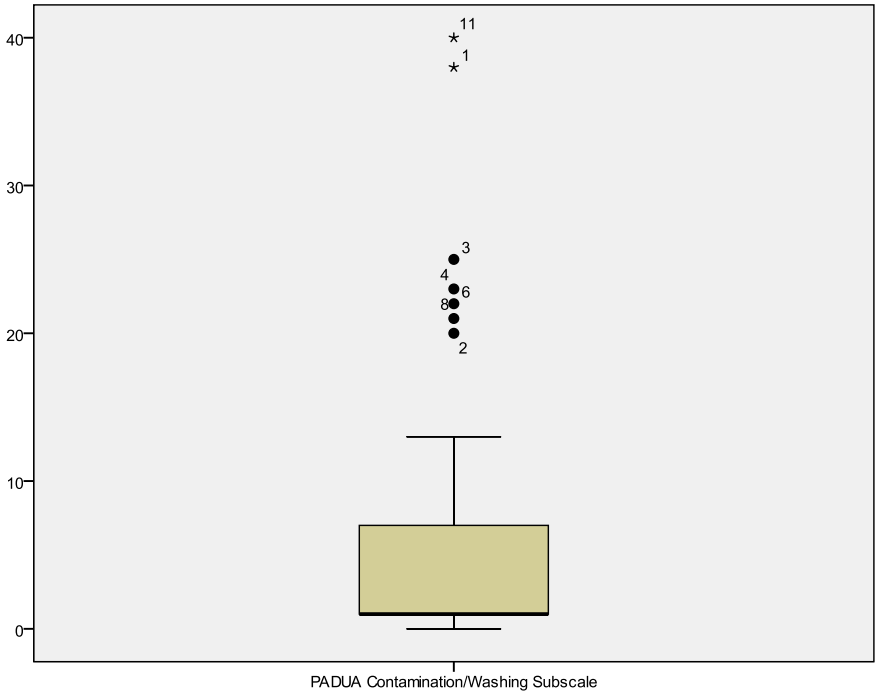
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PADUA Contamination/Washing Subscale	.276	59	.000	.664	59	.000
PADUA Dressing/Grooming Subscale	.317	59	.000	.637	59	.000
PADUA Checking Subscale	.197	59	.000	.773	59	.000
PADUA Thoughts of harm Subscale	.289	59	.000	.604	59	.000
PADUA Impulses of harm Subscale	.358	59	.000	.587	59	.000
PADUA Total	.239	59	.000	.750	59	.000

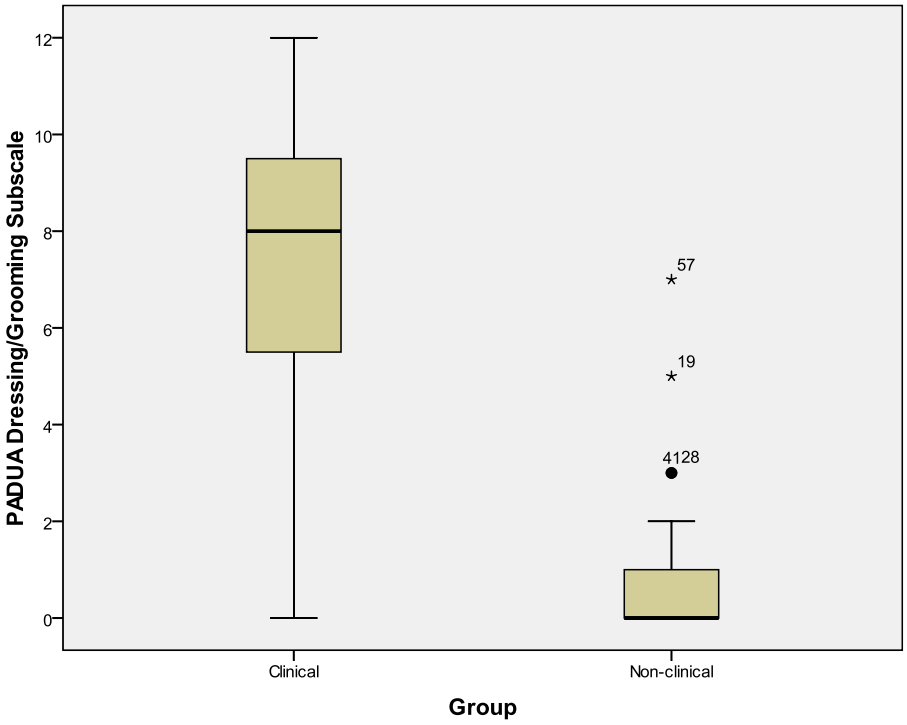
a. Lilliefors Significance Correction

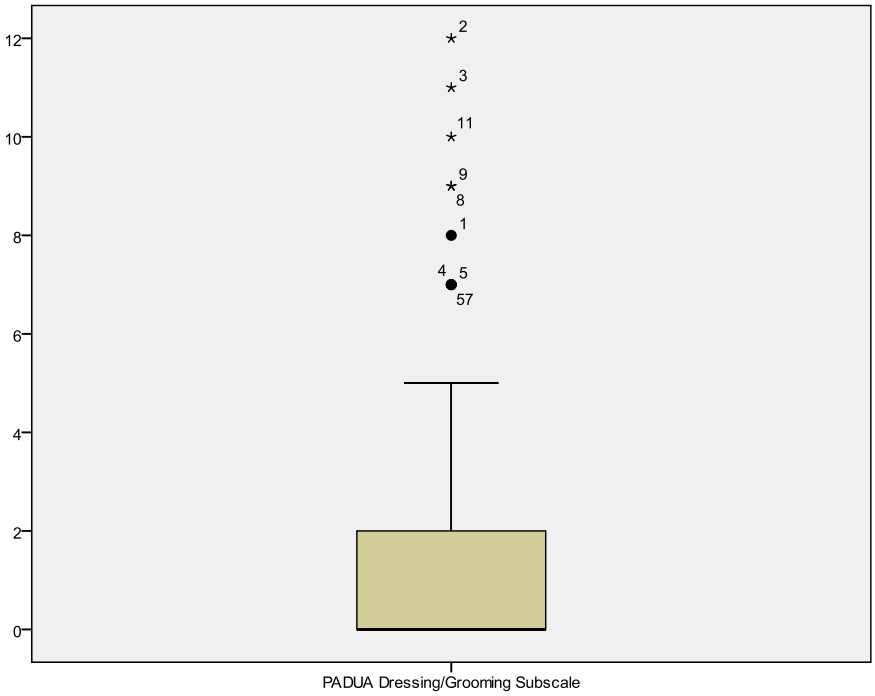
Test of Homogeneity of Variance

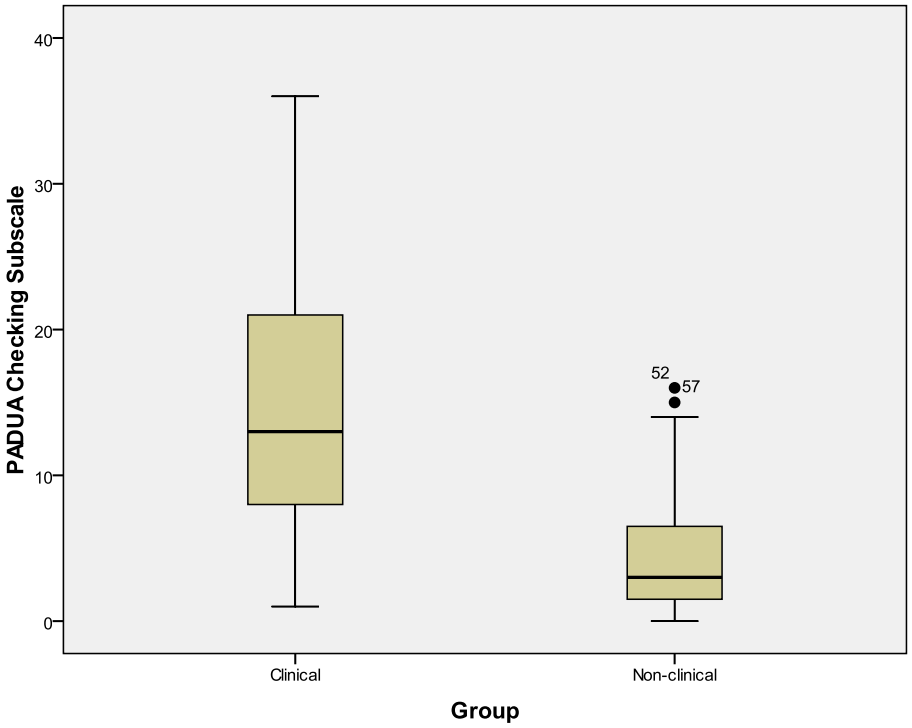
		Levene Statistic	df1	df2	Sig.
PADUA Contamination/Washing Subscale	Based on Mean	24.687	1	57	.000
	Based on Median	21.958	1	57	.000
	Based on Median and with adjusted df	21.958	1	25.562	.000
	Based on trimmed mean	24.633	1	57	.000
PADUA Dressing/Grooming Subscale	Based on Mean	21.285	1	57	.000
	Based on Median	16.017	1	57	.000
	Based on Median and with adjusted df	16.017	1	36.730	.000
	Based on trimmed mean	20.784	1	57	.000
PADUA Checking Subscale	Based on Mean	23.638	1	57	.000
	Based on Median	15.741	1	57	.000
	Based on Median and with adjusted df	15.741	1	30.446	.000
	Based on trimmed mean	22.751	1	57	.000
PADUA Thoughts of harm Subscale	Based on Mean	88.997	1	57	.000
	Based on Median	26.422	1	57	.000
	Based on Median and with adjusted df	26.422	1	15.002	.000
	Based on trimmed mean	79.952	1	57	.000
PADUA Impulses of harm Subscale	Based on Mean	38.765	1	57	.000
	Based on Median	23.499	1	57	.000
	Based on Median and with adjusted df	23.499	1	43.593	.000
	Based on trimmed mean	35.820	1	57	.000
PADUA Total	Based on Mean	26.531	1	57	.000
	Based on Median	20.570	1	57	.000
	Based on Median and with adjusted df	20.570	1	45.745	.000
	Based on trimmed mean	26.130	1	57	.000

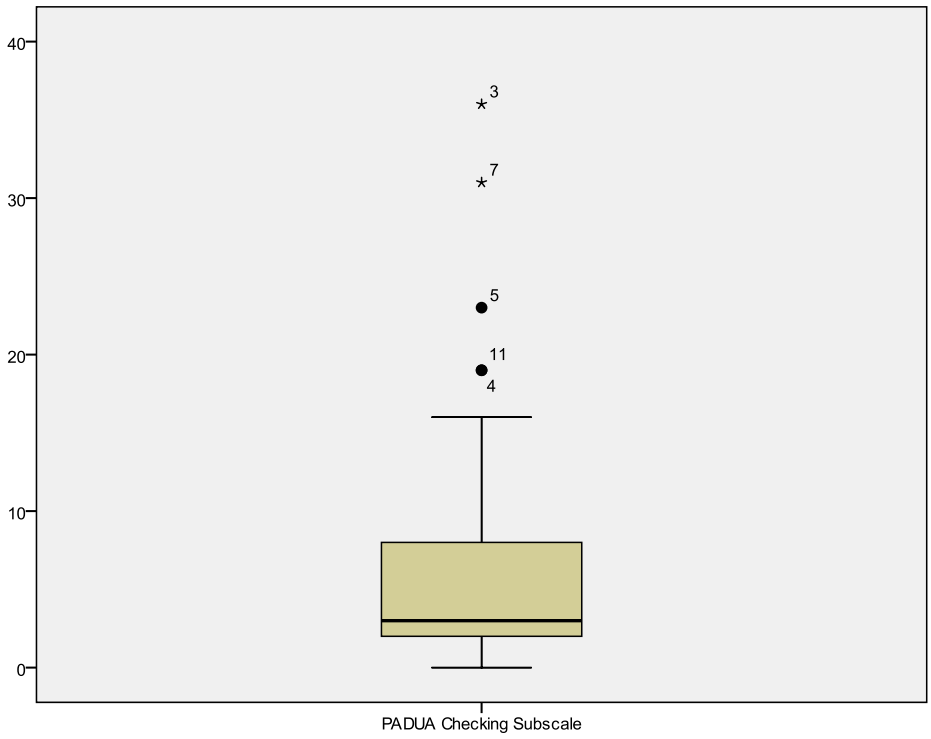

PADUA Contamination/Washing Subscale
40
30
20
10
0
19
45
25
24
16
Clinical
Non-clinical
Group

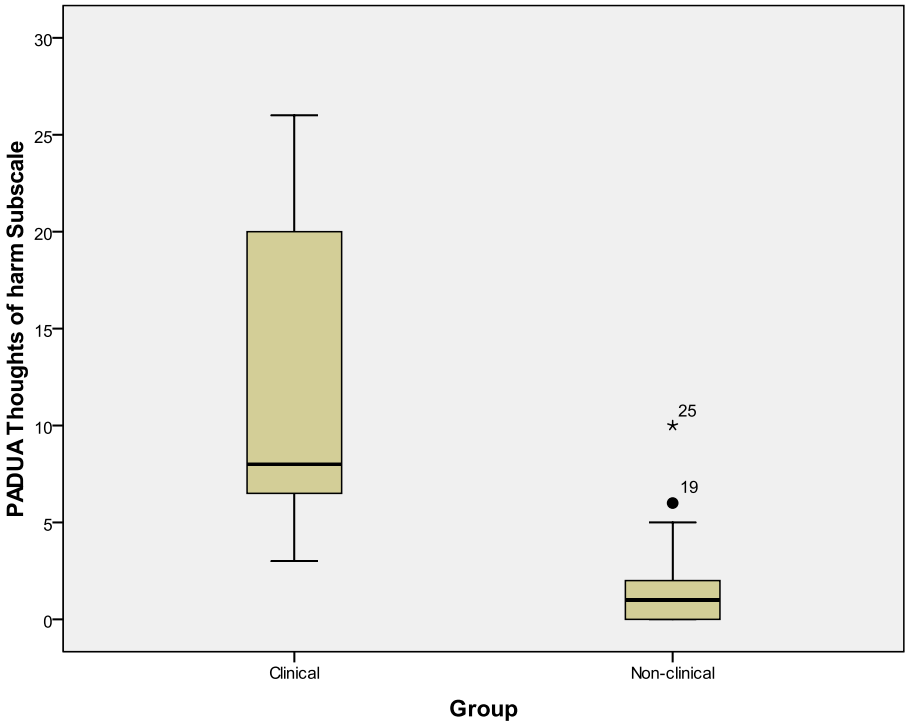

40
30
20
10
0
11
1
3
4
6
8
2
PADUA Contamination/Washing Subscale

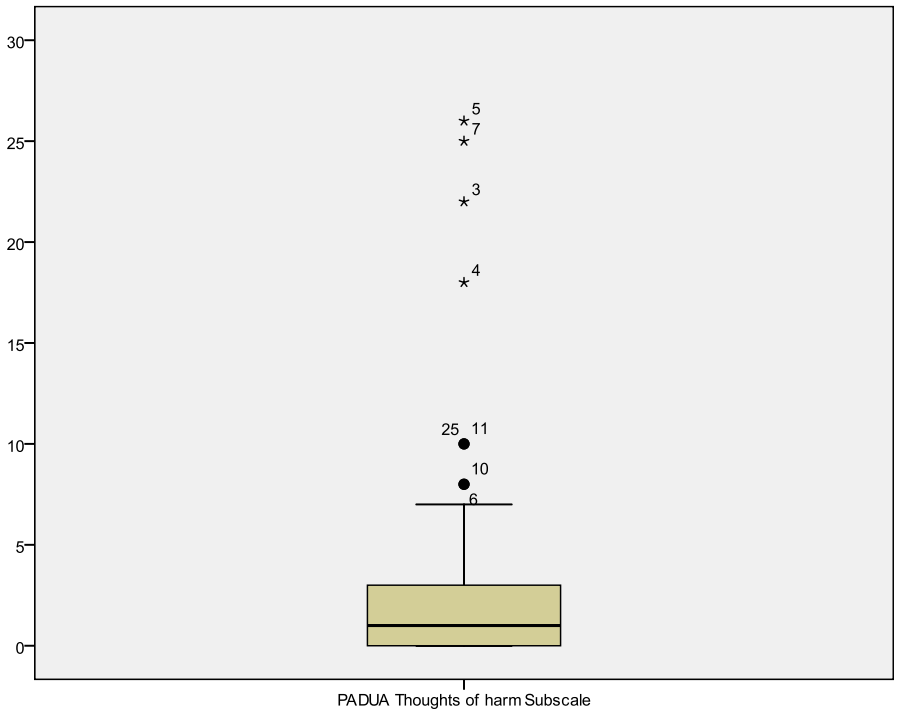

PADUA Dressing/Grooming Subscale
12
10
8
6
4
2
0
57
19
4128
Clinical
Non-clinical
Group

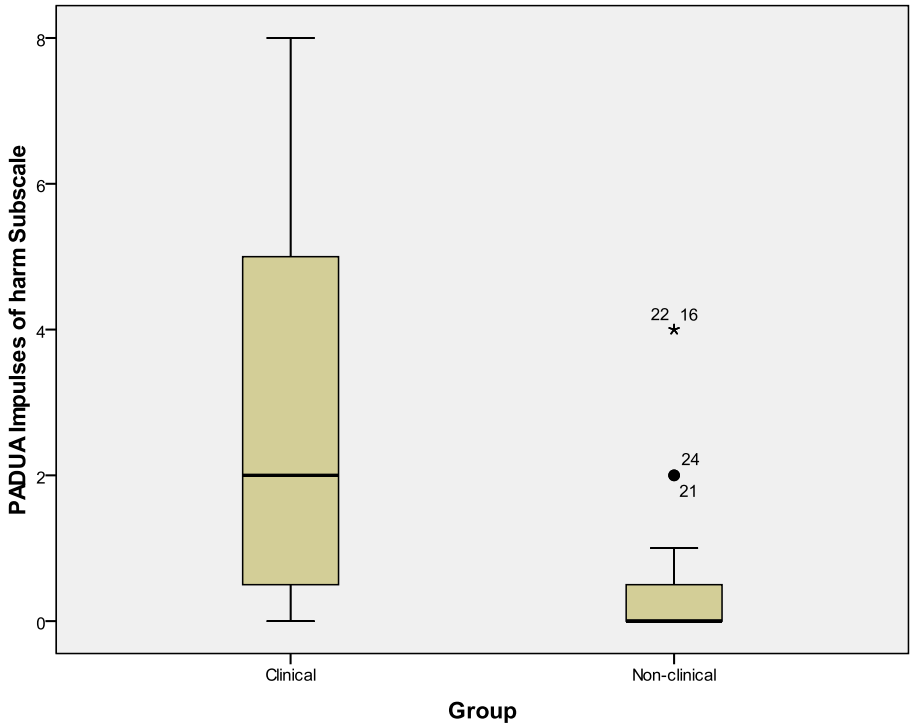

12
10
8
6
4
2
0
2
3
11
9
8
1
4
5
57
PADUA Dressing/Grooming Subscale

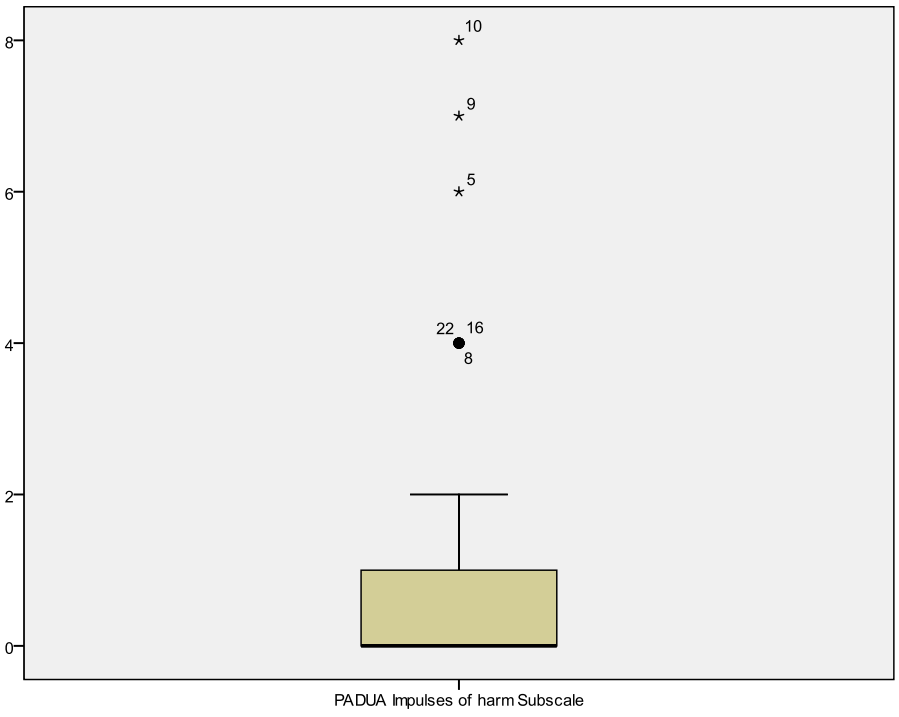

PADUA Checking Subscale
40
30
20
10
0
52
57
Clinical
Non-clinical
Group

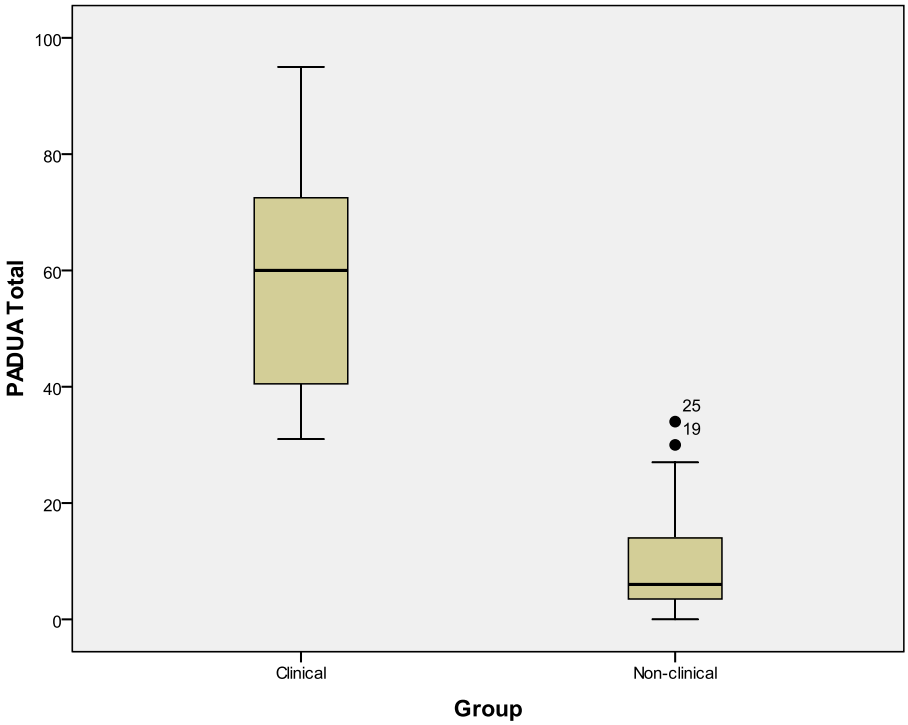

40
30
20
10
0
3
7
5
11
4
PADUA Checking Subscale

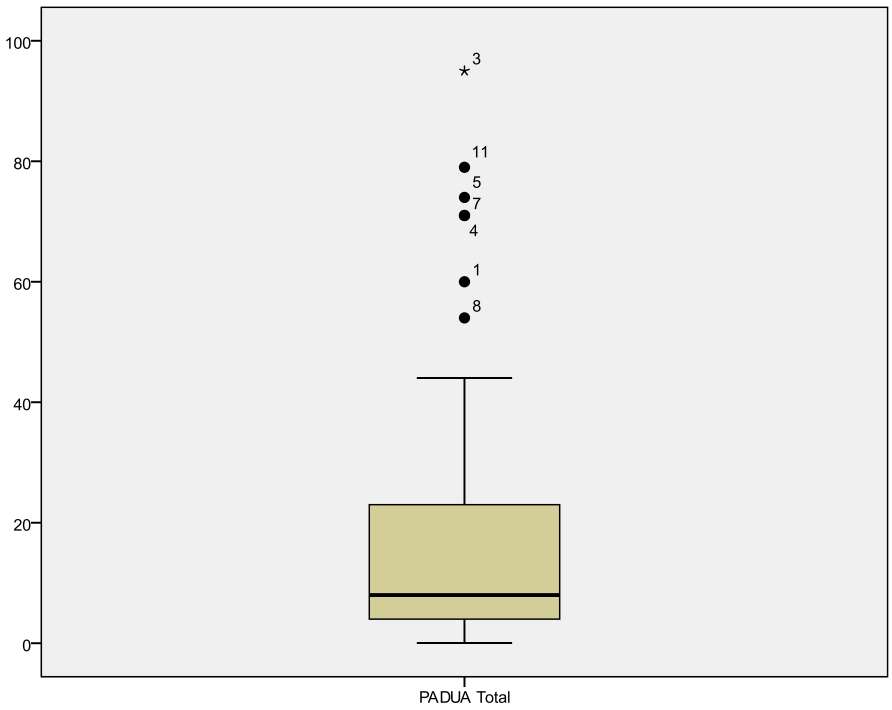

PADUA Thoughts of harm Subscale
30
25
20
15
10
5
0
25
19
Clinical
Non-clinical
Group


30
25
20
15
10
5
0
5
7
3
4
25
11
10
6
PADUA Thoughts of harm Subscale


PADUA Impulses of harm Subscale
8
6
4
2
0
22 16
24
21
Clinical
Non-clinical
Group


8
6
4
2
0
10
9
5
22 16
8
PADUA Impulses of harm Subscale


PADUA Total
100
80
60
40
20
0
25
19
Clinical
Non-clinical
Group


100
80
60
40
20
0
3
11
5
7
4
1
8
PADUA Total

HADS

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Group	Statistic	df	Sig.	Statistic	df	Sig.
HADS Anxiety Subscale	Clinical	.116	11	.200*	.965	11	.832
	Non-clinical	.153	50	.005	.927	50	.004
HADS Depression Subscale	Clinical	.153	11	.200*	.920	11	.317
	Non-clinical	.218	50	.000	.866	50	.000
HADS Total	Clinical	.163	11	.200*	.920	11	.320
	Non-clinical	.163	50	.002	.913	50	.001

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

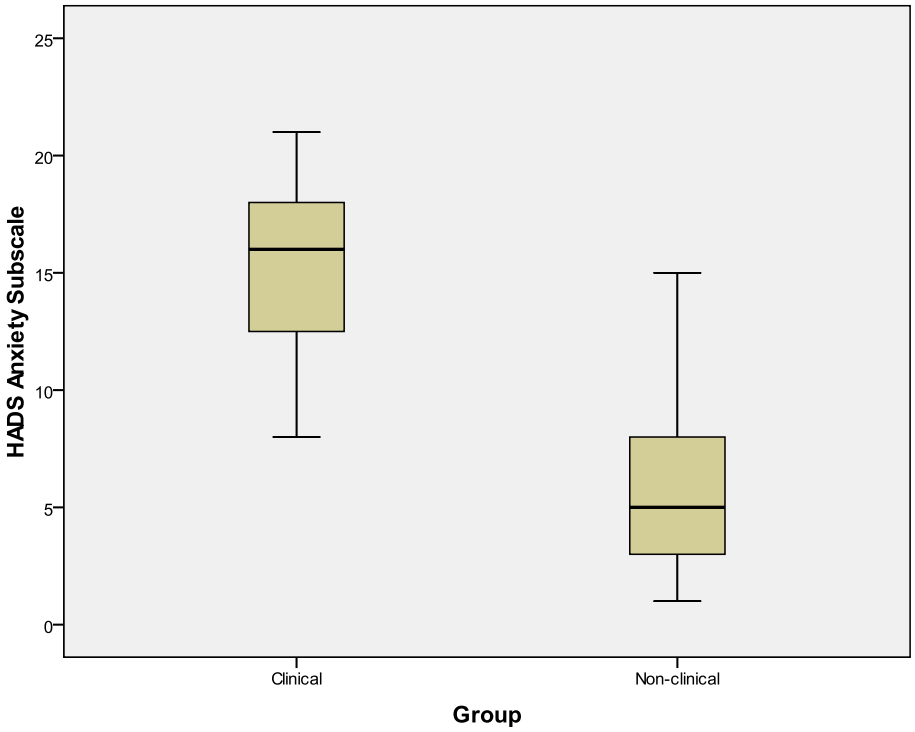
Tests of Normality

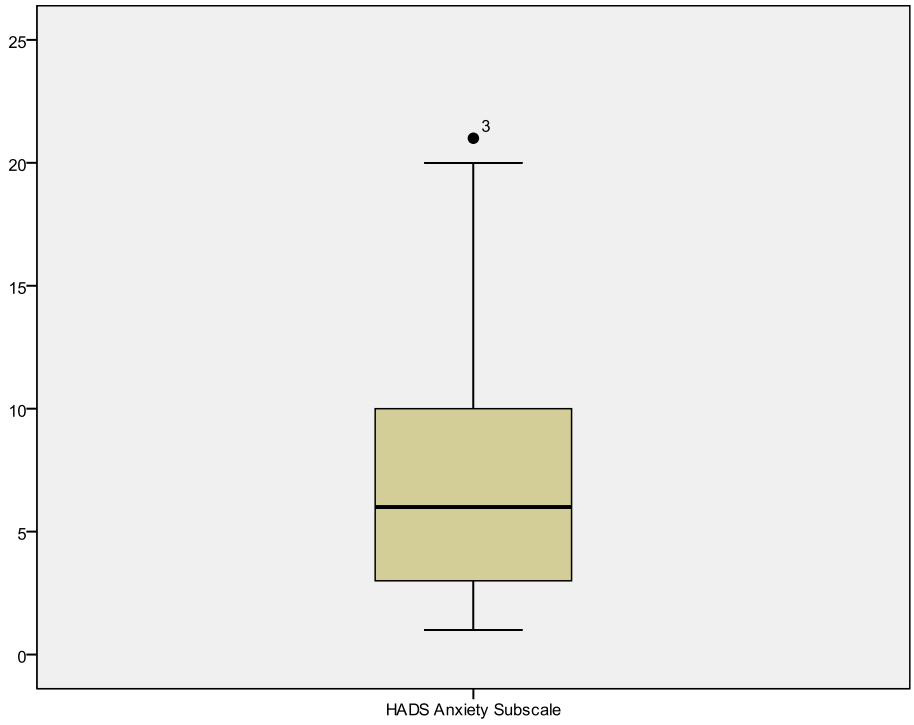
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HADS Anxiety Subscale	.148	61	.002	.911	61	.000
HADS Depression Subscale	.174	61	.000	.851	61	.000
HADS Total	.140	61	.005	.891	61	.000

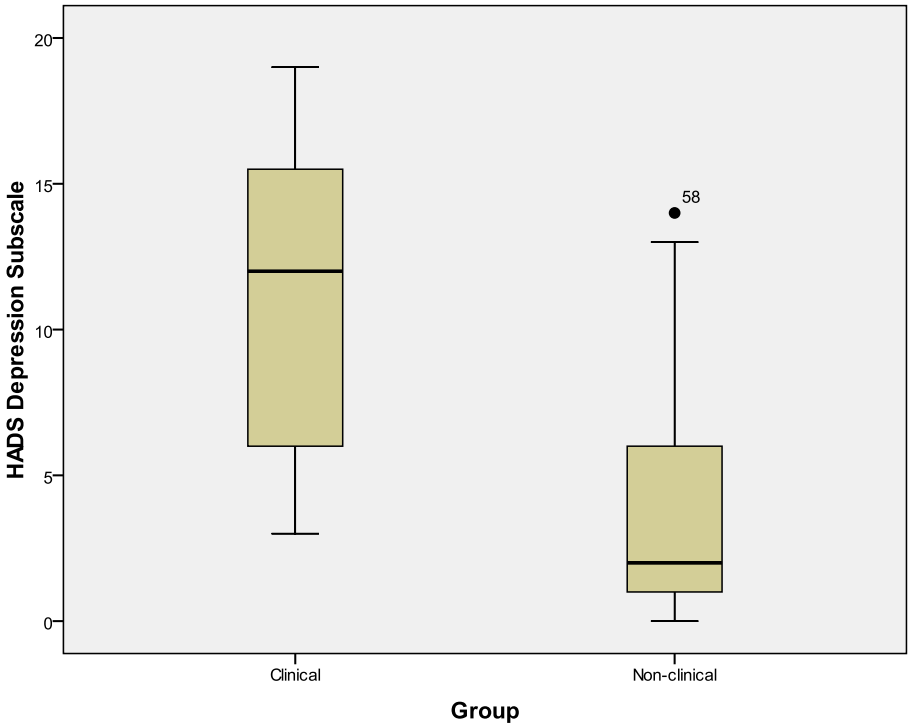
a. Lilliefors Significance Correction

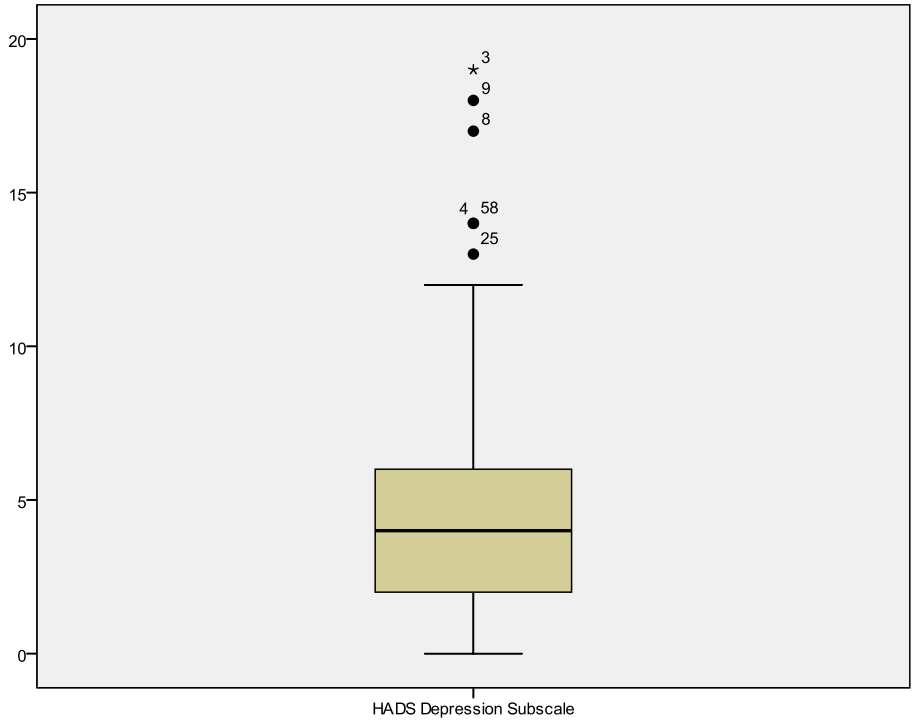
Test of Homogeneity of Variance

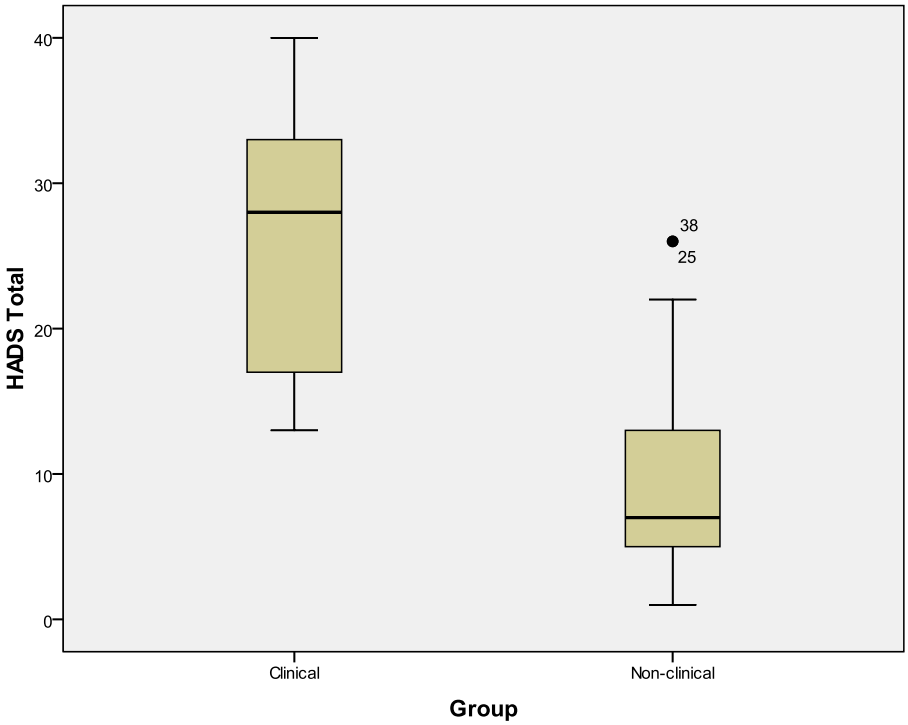
		Levene Statistic	df1	df2	Sig.
HADS Anxiety Subscale	Based on Mean	.301	1	59	.585
	Based on Median	.283	1	59	.596
	Based on Median and with adjusted df	.283	1	58.388	.596
	Based on trimmed mean	.323	1	59	.572
HADS Depression Subscale	Based on Mean	10.264	1	59	.002
	Based on Median	5.759	1	59	.020
	Based on Median and with adjusted df	5.759	1	58.676	.020
	Based on trimmed mean	10.101	1	59	.002
HADS Total	Based on Mean	6.182	1	59	.016
	Based on Median	3.972	1	59	.051
	Based on Median and with adjusted df	3.972	1	58.999	.051
	Based on trimmed mean	6.135	1	59	.016

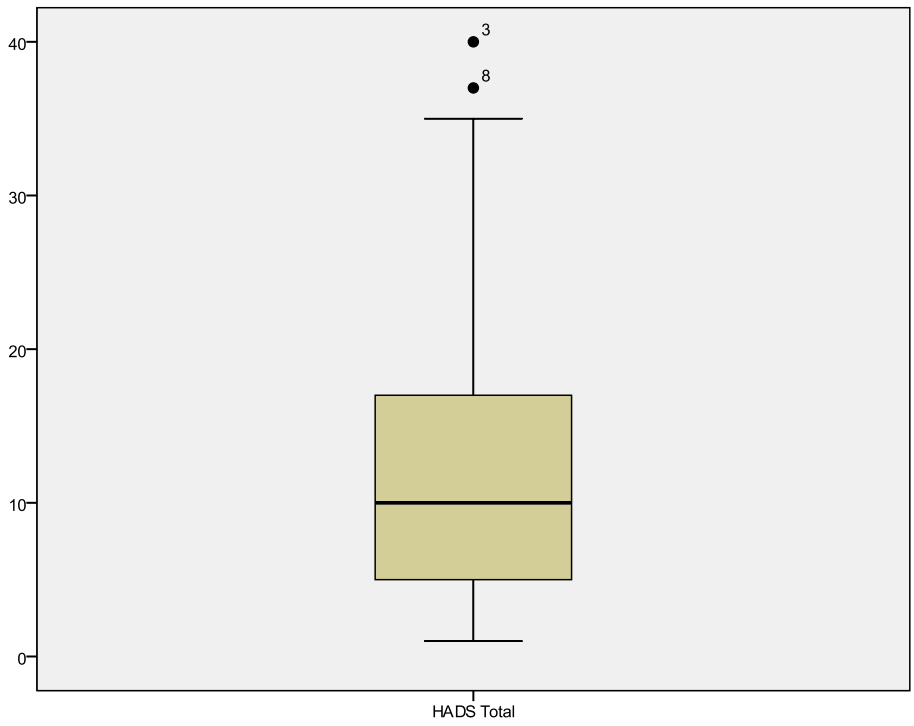

HADS Anxiety Subscale
25
20
15
10
5
0
Clinical
Non-clinical
Group


25
20
15
10
5
0
3
HADS Anxiety Subscale


HADS Depression Subscale
20
15
10
5
0
58
Clinical
Non-clinical
Group


20
15
10
5
0
3
9
8
4
58
25
HADS Depression Subscale


HADS Total
40
30
20
10
0
38
25
Clinical
Non-clinical
Group


40
30
20
10
0
3
8
HADS Total

MPAS

Tests of Normality

	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
MPAS Quality of attachment subscale	Clinical	.223	11	.133	.849	11	.041
	Non-clinical	.182	48	.000	.870	48	.000
MPAS Absense of hostility subscale	Clinical	.134	11	.200*	.964	11	.818
	Non-clinical	.115	48	.145	.951	48	.045
MPAS Pleasure in interaction subscale	Clinical	.175	11	.200*	.897	11	.171
	Non-clinical	.167	48	.002	.794	48	.000
MPAS Total	Clinical	.192	11	.200*	.880	11	.104
	Non-clinical	.114	48	.148	.881	48	.000

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Tests of Normality

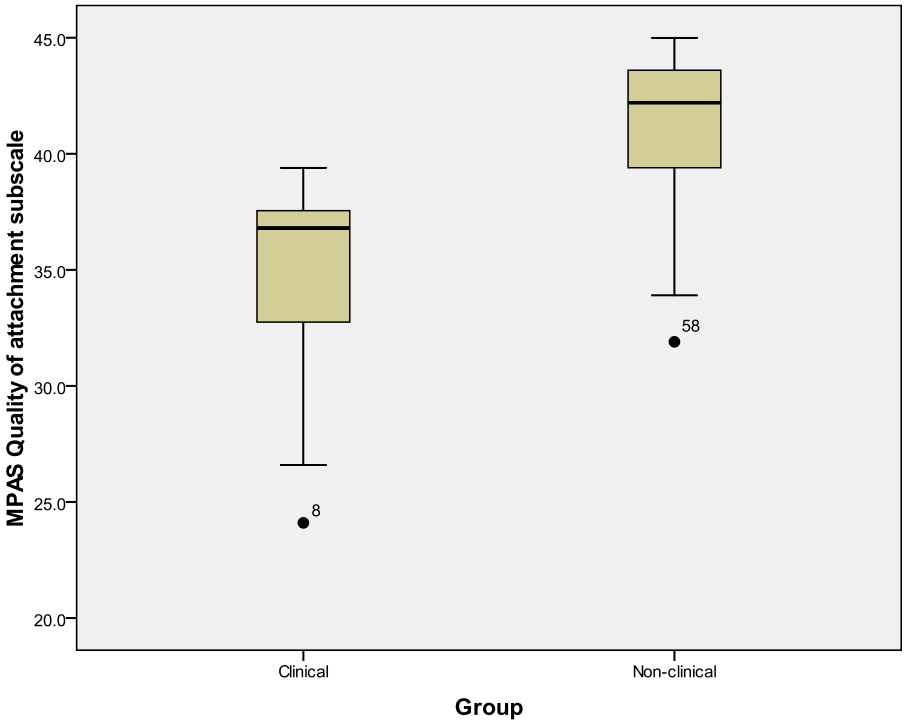
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MPAS Quality of attachment subscale	.152	59	.002	.882	59	.000
MPAS Absense of hostility subscale	.089	59	.200*	.957	59	.036
MPAS Pleasure in interaction subscale	.176	59	.000	.832	59	.000
MPAS Total	.117	59	.043	.899	59	.000

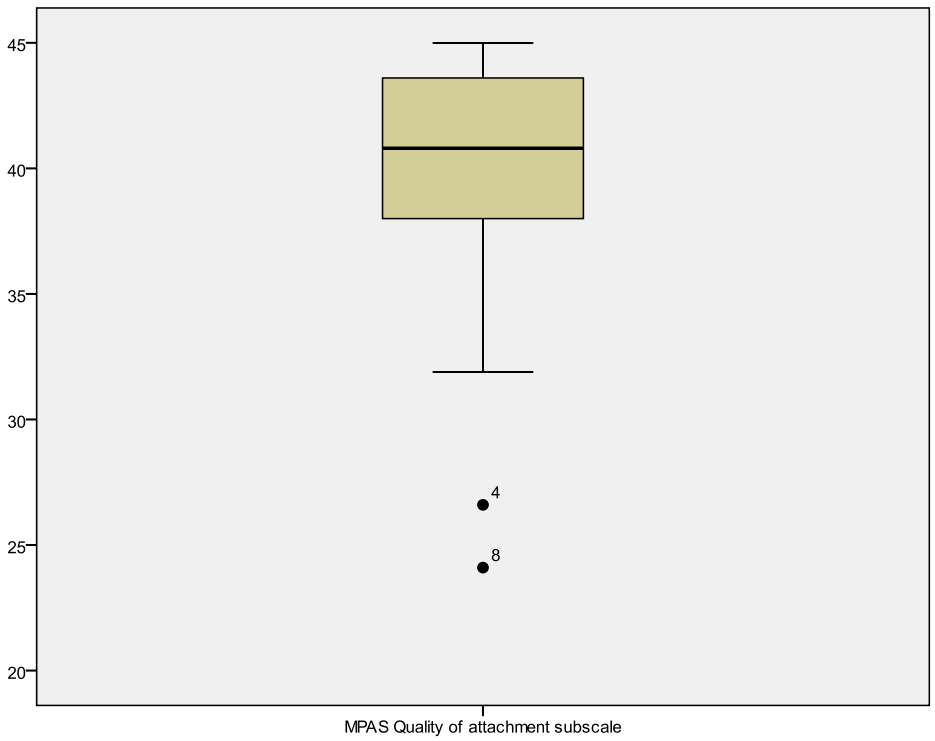
a. Lilliefors Significance Correction

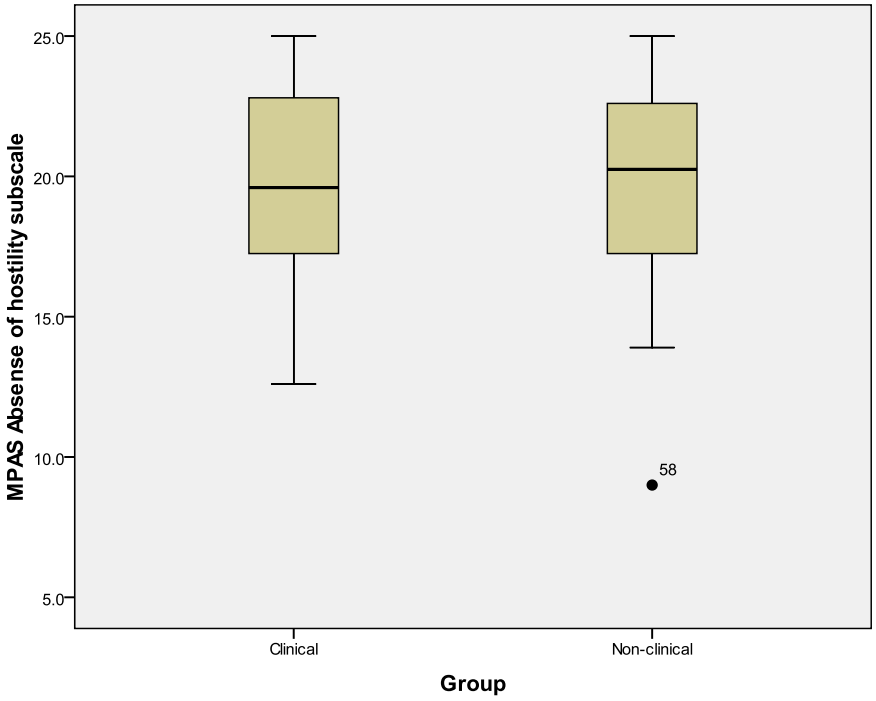
*. This is a lower bound of the true significance.

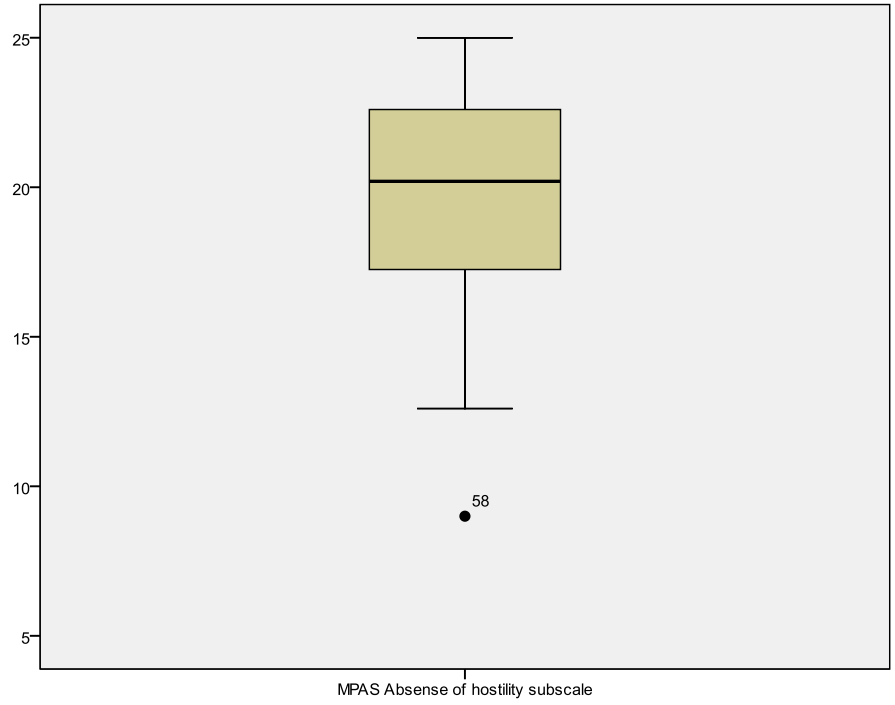
Test of Homogeneity of Variance

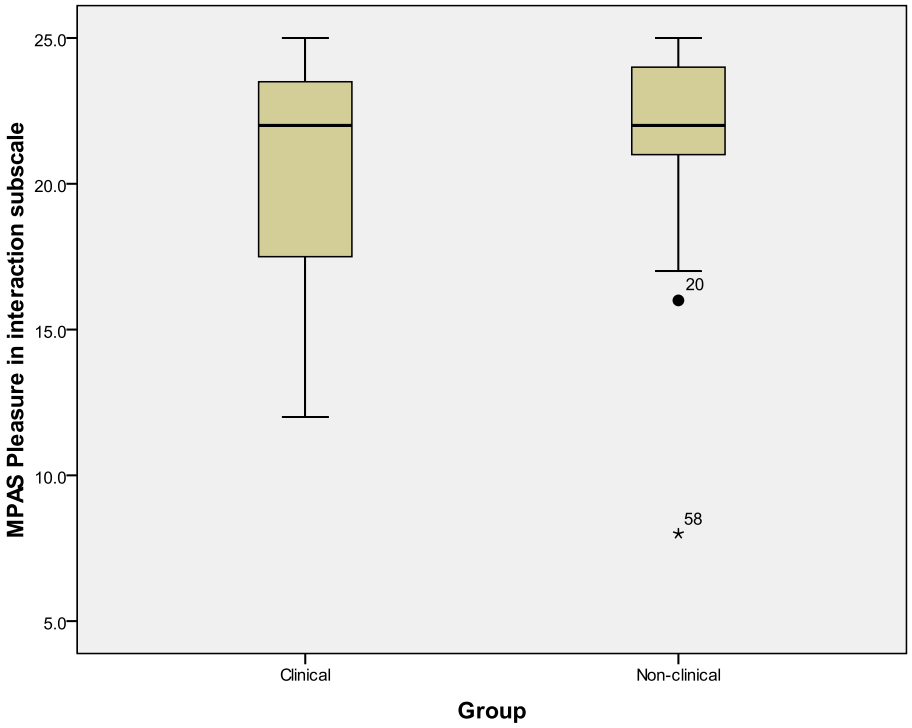
		Levene Statistic	df1	df2	Sig.
MPAS Quality of attachment subscale	Based on Mean	1.838	1	57	.181
	Based on Median	.648	1	57	.424
	Based on Median and with adjusted df	.648	1	43.348	.425
	Based on trimmed mean	1.566	1	57	.216
MPAS Absense of hostility subscale	Based on Mean	.213	1	57	.646
	Based on Median	.221	1	57	.640
	Based on Median and with adjusted df	.221	1	56.980	.640
	Based on trimmed mean	.250	1	57	.619
MPAS Pleasure in interaction subscale	Based on Mean	3.676	1	57	.060
	Based on Median	2.471	1	57	.122
	Based on Median and with adjusted df	2.471	1	53.898	.122
	Based on trimmed mean	3.276	1	57	.076
MPAS Total	Based on Mean	.001	1	57	.970
	Based on Median	.005	1	57	.943
	Based on Median and with adjusted df	.005	1	56.613	.943
	Based on trimmed mean	.033	1	57	.857

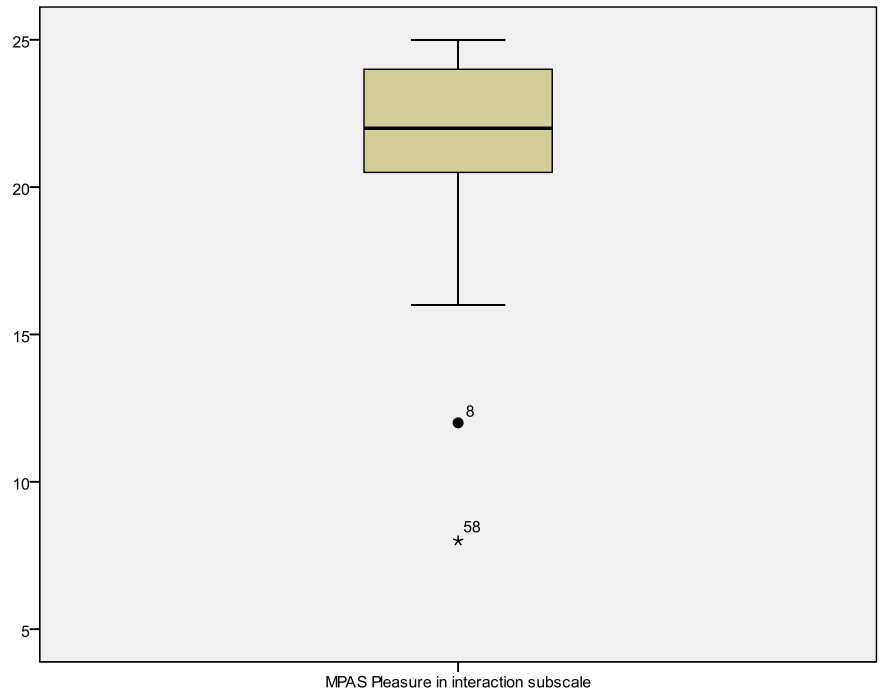

MPAS Quality of attachment subscale
45.0
40.0
35.0
30.0
25.0
20.0
58
8
Clinical
Non-clinical
Group

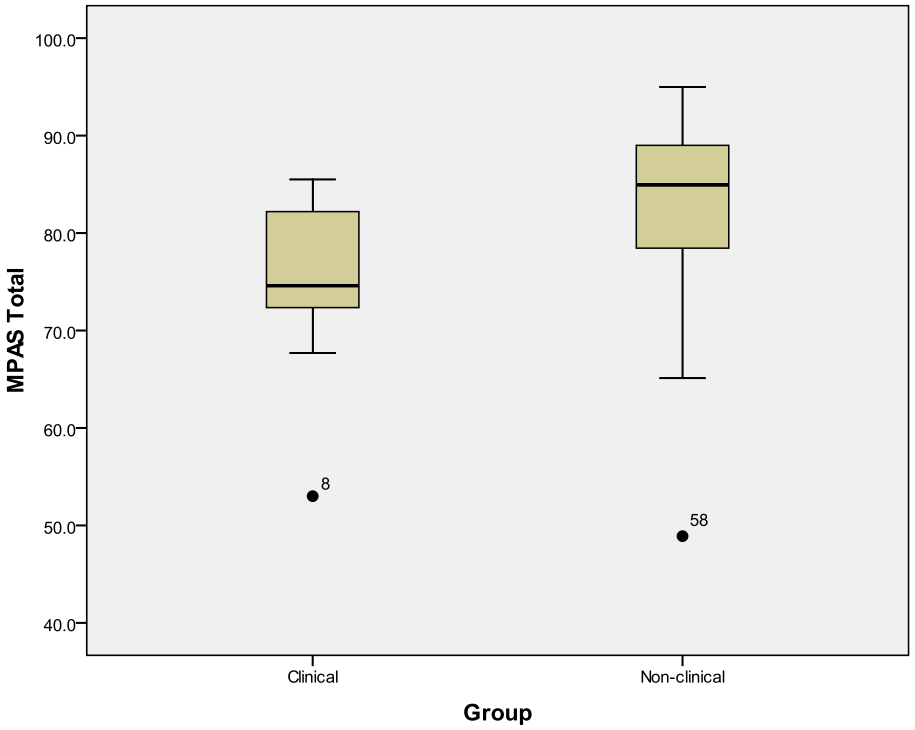

45
40
35
30
25
20
4
8
MPAS Quality of attachment subscale

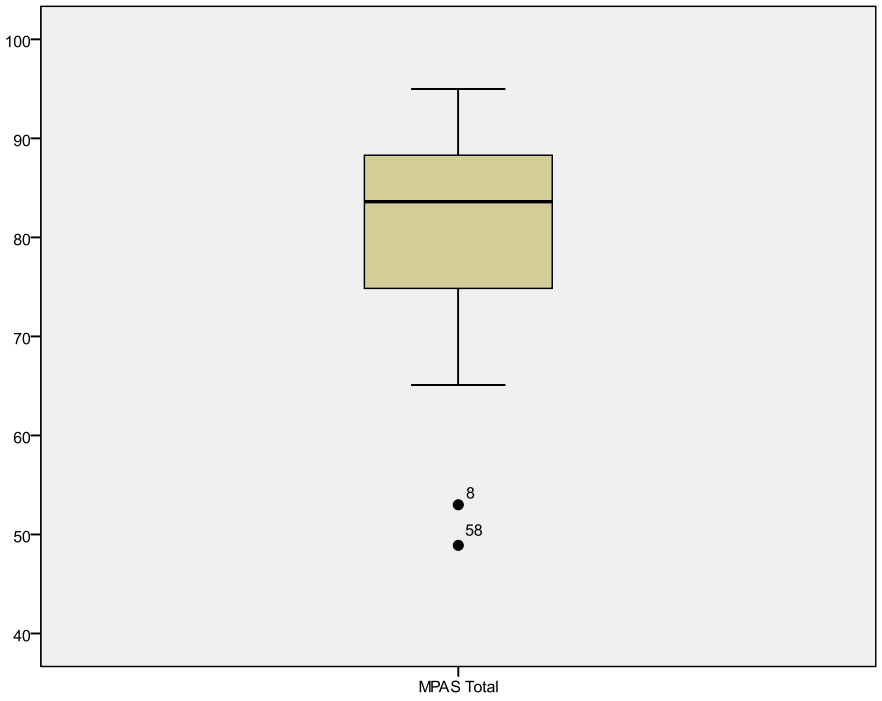

MPAS Absense of hostility subscale
25.0
20.0
15.0
10.0
5.0
58
Clinical
Non-clinical
Group


25
20
15
10
5
58
MPAS Absense of hostility subscale


MPAS Pleasure in interaction subscale
25.0
20.0
15.0
10.0
5.0
20
58
Clinical
Non-clinical
Group


25
20
15
10
5
8
58
MPAS Pleasure in interaction subscale


100.0
90.0
80.0
70.0
60.0
50.0
40.0
MPAS Total
8
58
Clinical
Non-clinical
Group


100
90
80
70
60
50
40
8
58
MPAS Total

MCQ-30

Tests of Normality

	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
MCQ-30 Positive beliefs about worry subscale	Clinical	.191	11	.200*	.896	11	.163
	Non-clinical	.182	50	.000	.866	50	.000
MCQ-30 Negative beliefs about worry subscale	Clinical	.139	11	.200*	.927	11	.379
	Non-clinical	.215	50	.000	.792	50	.000
MCQ-30 Cognitive confidence subscale	Clinical	.244	11	.067	.922	11	.337
	Non-clinical	.150	50	.007	.899	50	.000
MCQ-30 Need for control subscale	Clinical	.250	11	.053	.848	11	.040
	Non-clinical	.200	50	.000	.860	50	.000
MCQ-30 Cognitive self-consciousness subscale	Clinical	.227	11	.119	.875	11	.091
	Non-clinical	.178	50	.000	.893	50	.000
MCQ-30 Total	Clinical	.233	11	.097	.895	11	.159
	Non-clinical	.143	50	.012	.888	50	.000

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

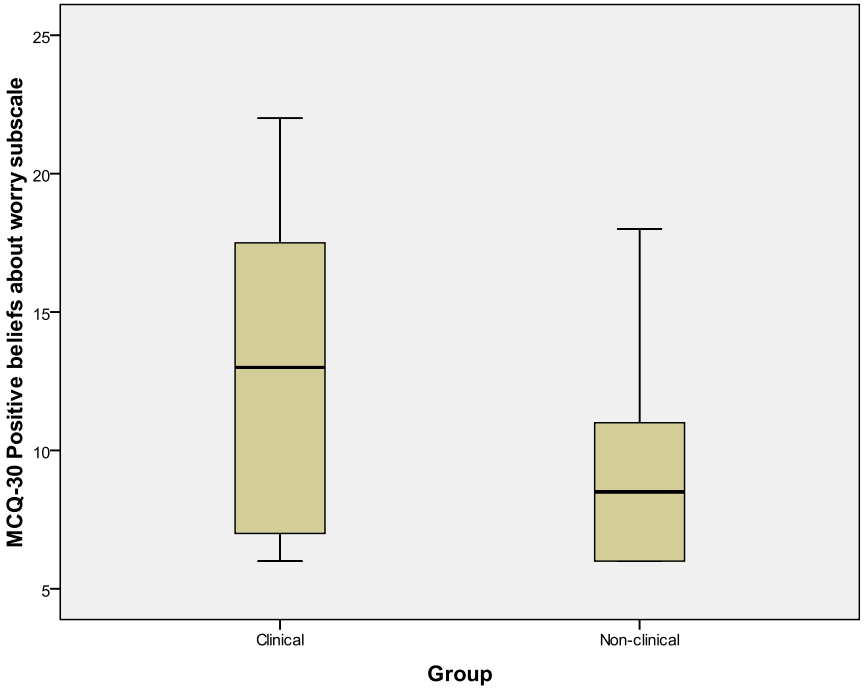
Tests of Normality

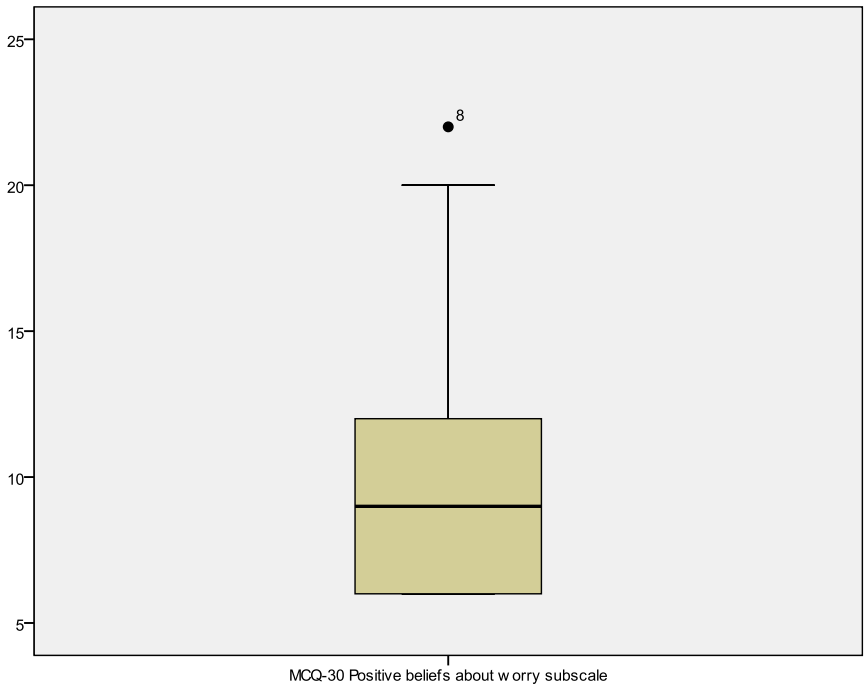
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MCQ-30 Positive beliefs about worry subscale	.178	61	.000	.856	61	.000
MCQ-30 Negative beliefs about worry subscale	.222	61	.000	.823	61	.000
MCQ-30 Cognitive confidence subscale	.162	61	.000	.851	61	.000
MCQ-30 Need for control subscale	.228	61	.000	.812	61	.000
MCQ-30 Cognitive self-consciousness subscale	.185	61	.000	.894	61	.000
MCQ-30 Total	.202	61	.000	.848	61	.000

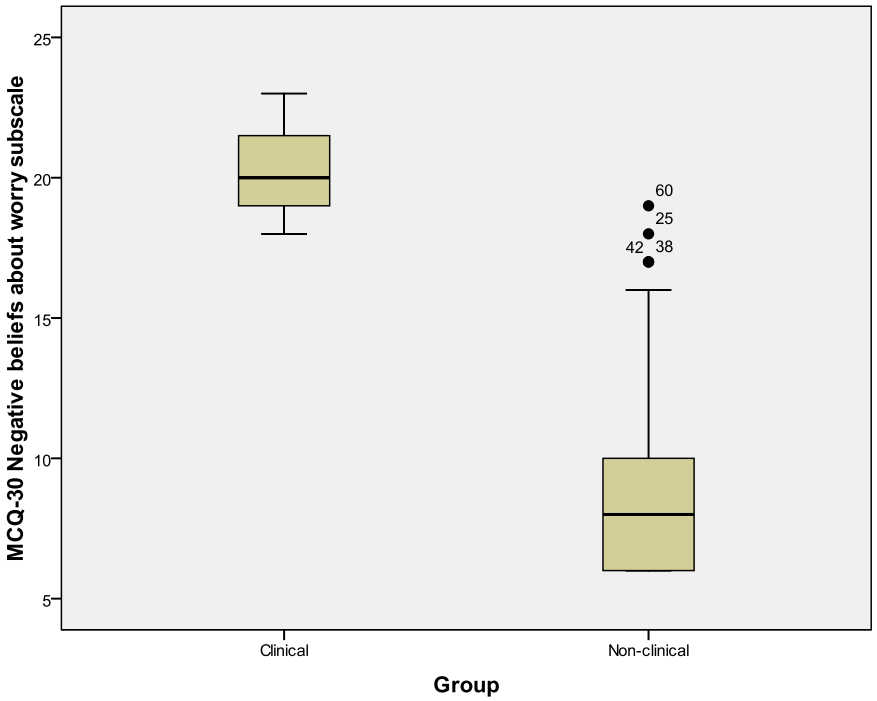
a. Lilliefors Significance Correction

Test of Homogeneity of Variance

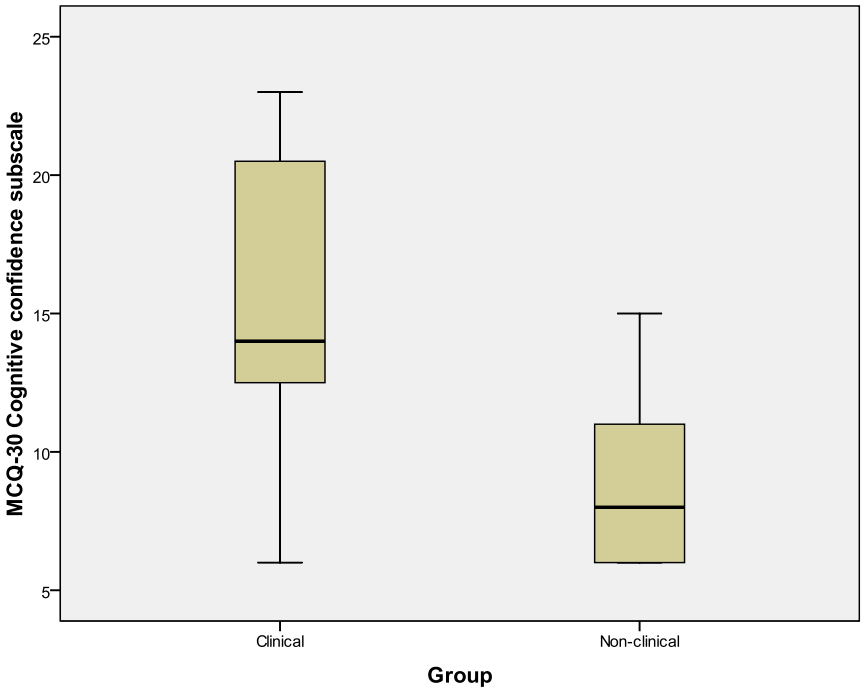
		Levene Statistic	df1	df2	Sig.
MCQ-30 Positive beliefs about worry subscale	Based on Mean	13.943	1	59	.000
	Based on Median	12.160	1	59	.001
	Based on Median and with adjusted df	12.160	1	53.752	.001
	Based on trimmed mean	13.862	1	59	.000
MCQ-30 Negative beliefs about worry subscale	Based on Mean	3.423	1	59	.069
	Based on Median	1.725	1	59	.194
	Based on Median and with adjusted df	1.725	1	51.517	.195
	Based on trimmed mean	2.738	1	59	.103
MCQ-30 Cognitive confidence subscale	Based on Mean	14.782	1	59	.000
	Based on Median	6.416	1	59	.014
	Based on Median and with adjusted df	6.416	1	35.921	.016
	Based on trimmed mean	15.245	1	59	.000
MCQ-30 Need for control subscale	Based on Mean	2.878	1	59	.095
	Based on Median	1.526	1	59	.222
	Based on Median and with adjusted df	1.526	1	53.276	.222
	Based on trimmed mean	2.965	1	59	.090
MCQ-30 Cognitive self-consciousness subscale	Based on Mean	.001	1	59	.974
	Based on Median	.015	1	59	.903
	Based on Median and with adjusted df	.015	1	58.338	.903
	Based on trimmed mean	.001	1	59	.982
MCQ-30 Total	Based on Mean	.001	1	59	.976
	Based on Median	.061	1	59	.806
	Based on Median and with adjusted df	.061	1	59.000	.806
	Based on trimmed mean	.000	1	59	.989

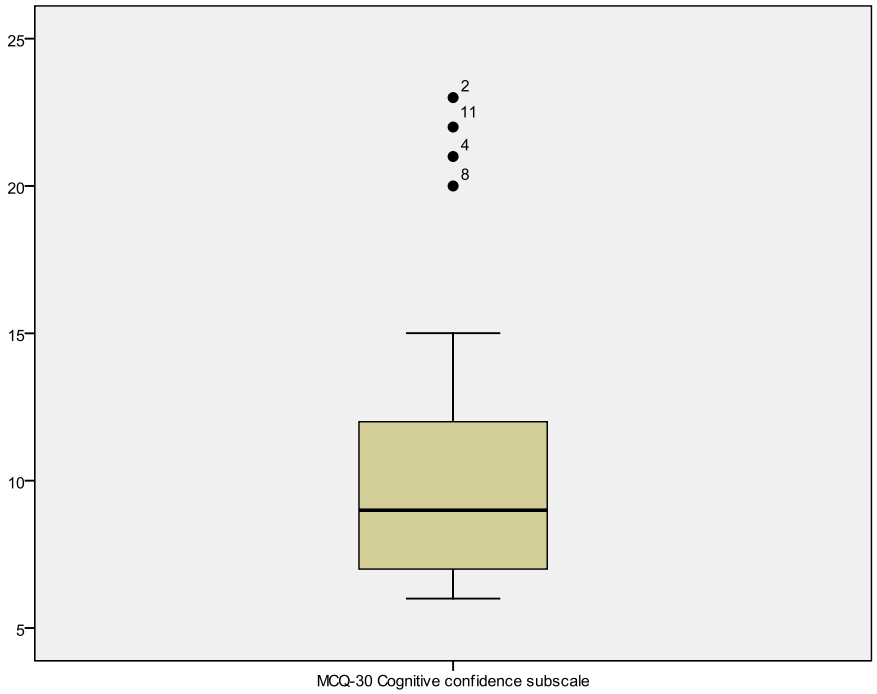

MCQ-30 Positive beliefs about worry subscale
25
20
15
10
5
Clinical
Non-clinical
Group

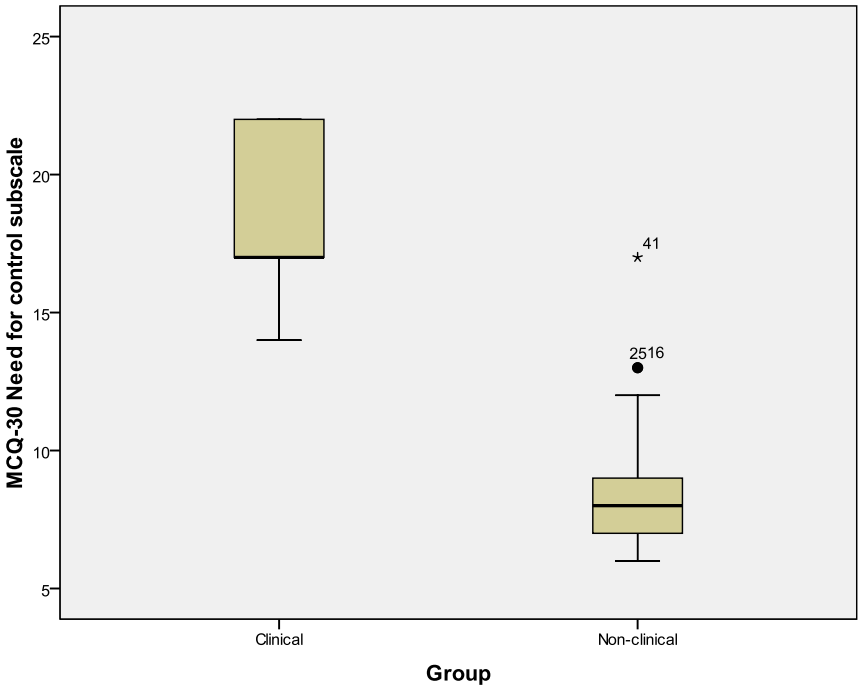

25
20
15
10
5
8
MCQ-30 Positive beliefs about w orry subscale

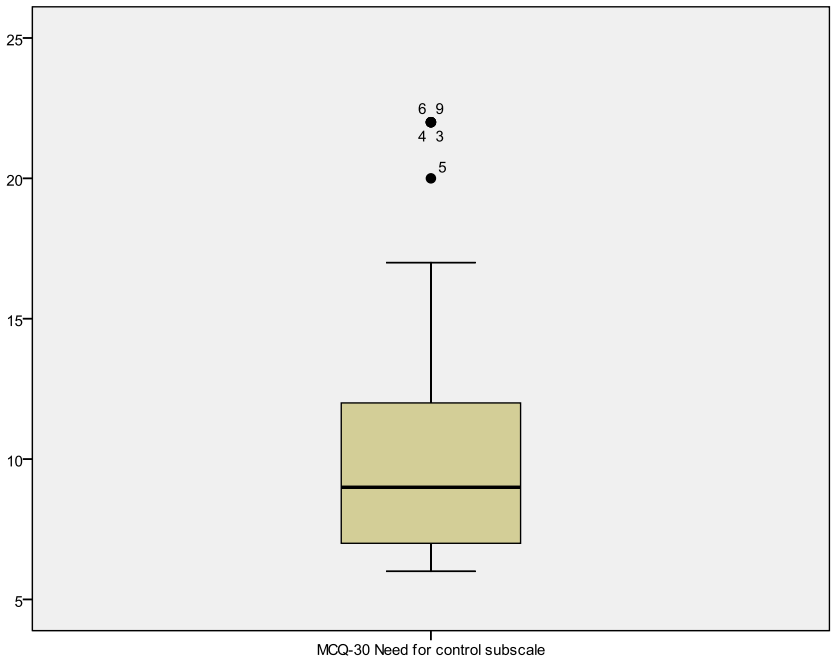

MCQ-30 Negative beliefs about worry subscale
25
20
15
10
5
60
25
42
38
Clinical
Non-clinical
Group

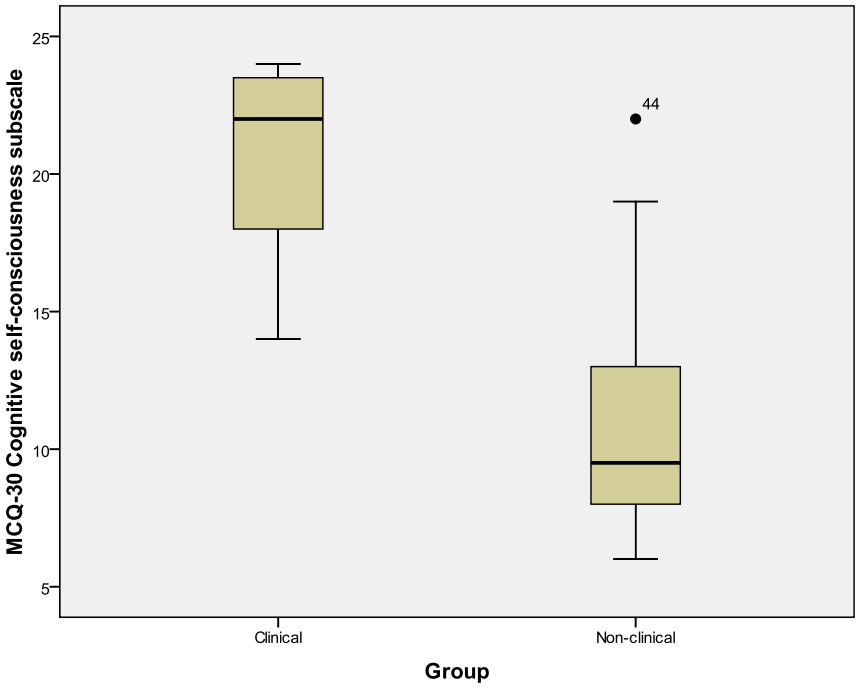

25
20
15
10
5
MCQ-30 Negative beliefs about w orry subscale

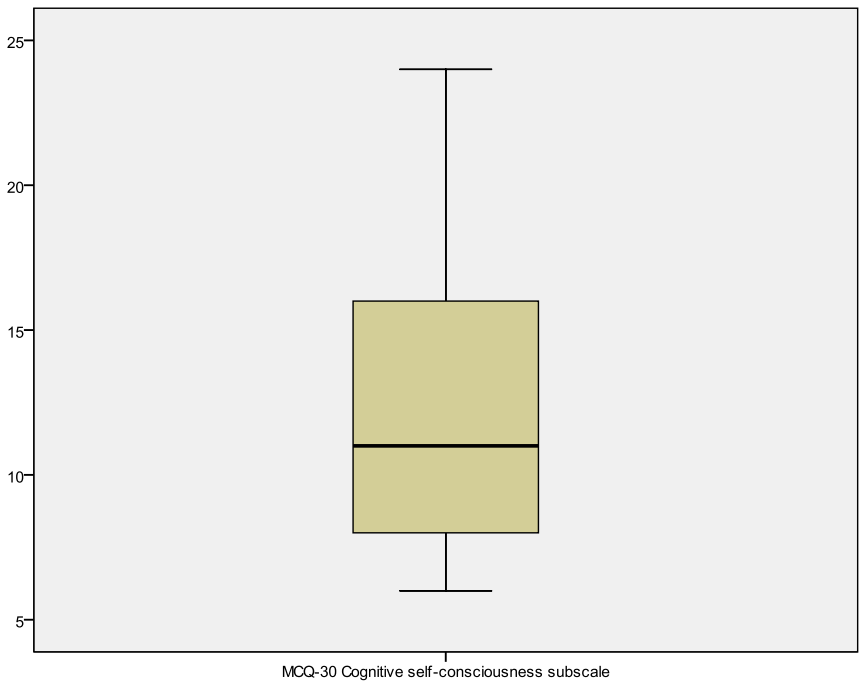

MCQ-30 Cognitive confidence subscale
25
20
15
10
5
Clinical
Non-clinical
Group

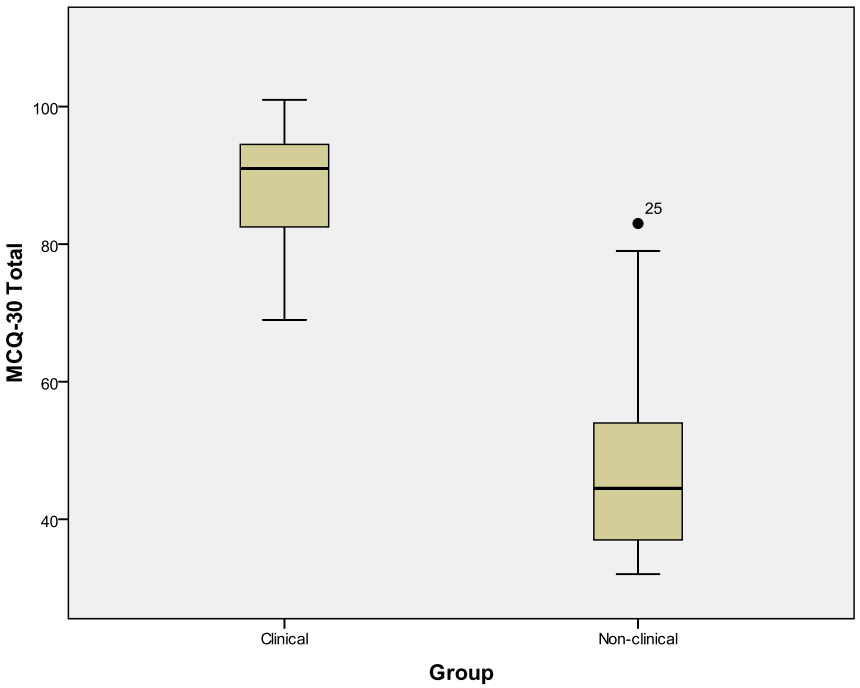

25
20
15
10
5
2
11
4
8
MCQ-30 Cognitive confidence subscale

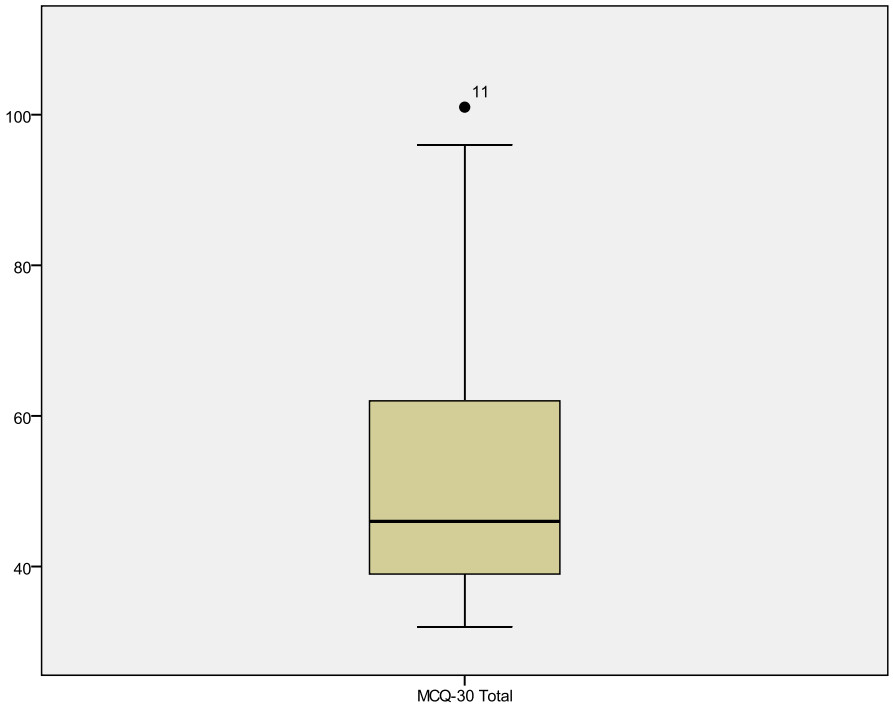

MCQ-30 Need for control subscale
25
20
15
10
5
41
2516
Clinical
Non-clinical
Group


25
20
15
10
5
6 9
4 3
5
MCQ-30 Need for control subscale


MCQ-30 Cognitive self-consciousness subscale
25
20
15
10
5
44
Clinical
Non-clinical
Group


25
20
15
10
5
MCQ-30 Cognitive self-consciousness subscale


MCQ-30 Total
100
80
60
40
25
Clinical
Non-clinical
Group


100
80
60
40
11
MCQ-30 Total

Appendix 19: Correlations with MPAS quality of attachment subscale

Variable	Spearman's rho correlation coefficient	Significance (2 tailed)	N
Maternal age	0.08	0.56	61
Marital status	0.07	0.58	61
Educational qualifications	-0.04	0.76	61
Ethnicity	-0.04	0.79	61
Age of child	0.22	0.09	61
Gender of child	-0.12	0.35	61
No. of other children	-0.01	0.95	61
Previous miscarriages	-0.11	0.4	61
Previous termination of pregnancy	0.07	0.59	61
Previous still born baby	N/A	N/A	61
Labour experience	0.14	0.29	61
Location of completing questionnaire	-0.57	<0.01	61
HADS Anxiety	-0.56	< 0.01	61
HADS Depression	-0.6	< 0.01	61
HADS Total	-0.61	< 0.01	61
MCQ-30 Positive	-0.41	< 0.01	61
MCQ-30 Negative	-0.55	< 0.01	61
MCQ-30 Cognitive confidence	-0.47	< 0.01	61
MCQ-30 Need for control	-0.56	< 0.01	61
MCQ-30 Cognitive self-consciousness	-0.4	< 0.01	61
MCQ-30 Total	-0.6	< 0.01	61