

**A qualitative study investigating the attitudes of primary health  
care professionals and patients towards the use of a 'polypill' to  
prevent cardiovascular disease**

by

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## **ABSTRACT**

### **Background**

A 'polypill' containing blood pressure and cholesterol lowering drugs given to all people over a specific age could prevent up to 80% of cardiovascular events (primary prevention). It could also be given to those with cardiovascular disease who are already taking separate drugs (secondary prevention). Minimal monitoring would be required. Little is known about attitudes of primary health care professionals and patients to such a strategy: hence the aim of this study.

### **Methods**

Semi-structured interviews were conducted with 16 primary health care professionals and 17 patients across Birmingham. The principles of grounded theory were used to guide sampling and analysis.

### **Results**

Health care professionals and patients expressed low acceptance of the polypill for primary prevention because of concerns about medicalisation, adverse effects, evidence, titration, impact on health related behaviours and confidence in preventive health. There was greater acceptance regarding its use for secondary prevention due to its practicality. Minimal monitoring received much scepticism as it was believed side-effects, efficacy and compliance would go undetected and because most medications are monitored.

## **Conclusions**

Implementing a polypill for primary prevention would require health care professionals and patients to be convinced of the potential benefits. However, regular monitoring may need to continue.

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## **ABBREVIATIONS**

CVD	Cardiovascular Disease
DoH	Department of Health
GP	General Practitioner
HCP	Health Care Professional
ICHGCP	International Conference of Harmonisation Good Clinical Practice
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
PN	Practice Nurse
RGF	Research Governance Framework

## **CHAPTER 1: INTRODUCTION**

The focus of this study is what is known as the 'polypill strategy'. This chapter begins by explaining the background to this approach, followed by a review of the current literature surrounding the strategy. The chapter concludes with the research question which this study aims to address.

### **1.1 Background**

#### **1.1.1 Defining cardiovascular disease**

Cardiovascular disease (CVD) is a group of disorders affecting the heart and/or blood vessels.

Disease may be caused by atherosclerosis whereby the walls of the arteries become hardened by fat and cholesterol. CVD caused by atherosclerosis includes:

- Coronary heart disease: narrowing of the arteries supplying the heart which may lead to myocardial infarction, angina or congestive heart failure.
- Cerebrovascular disease: disease of the blood vessels that supply the brain that can result in a stroke or transient ischemic attack (a 'mini-stroke').
- Peripheral arterial disease: disease of the blood vessels supplying the arms and legs and can cause claudication, gangrene or an aneurysm.

(British Heart Foundation, 2008)

### **1.1.2 Significance of cardiovascular disease**

According to the World Health Organisation (2009), CVD is the leading cause of death worldwide. Despite better understanding of the aetiology and pathophysiology of CVD and having more effective tools to prevent the disease, the burden of CVD is likely to increase over the next 20 years. Total deaths from CVD are expected to have almost doubled globally from 13.1 million in 1990 to 24.8 million in 2020 (Mathers, et al., 2009).

The explanation for this increase is that most of the world is in the process of developing and as populations develop their exposure to modifiable risk factors for CVD increases. For example, people get older, they smoke more, exercise less, drink more alcohol, their body weight increases, and intake of saturated fat and salt increases while potassium intake decreases (as they consume less fresh fruit and vegetables) (Poulter, 2003). Also, since deaths from communicable diseases in developing countries are falling and therefore people are living longer, deaths from long term conditions such as CVD are increasing.

In the UK, mortality rates from CVD are among the highest in the world (Mathers, et al., 2009). One in four male deaths and one in six female deaths are caused by CVD. The cost of CVD to the National Health Service (NHS) is huge: costing around £9 billion each year, 64 per cent of which is for hospital care and 23 per cent is the cost of medication (British Heart Foundation Health Promotion Research Group, 2012).

### 1.1.3 Risk factors for cardiovascular disease

There are several major modifiable and non-modifiable risk factors for CVD. The literature cites over 300 CVD risk factors. Table 1 lists those generally considered to be the most important (Poulter, 2003).

Modifiable risk factors	Non-modifiable risk factors
High low density lipoprotein (LDL) cholesterol	Age
High blood pressure	Sex
Smoking	Family history
Low high density lipoprotein (HDL) cholesterol	Genetic
Lack of exercise	Birth weight
Diabetes and glucose intolerance	
Left ventricular hypertrophy	
Central obesity	
Homocysteine	
Clotting factors	
Oral contraceptives	

Table 1: Risk factors for cardiovascular disease

(Poulter, 2003)

Large meta-analyses and cohort studies have consistently shown substantial reductions in CVD deaths from decreases in each of the major modifiable risk factors in individuals: mainly blood pressure and cholesterol (Vartiainen, et al., 1994; Goldman, et al., 2001; Prospective Studies Collaboration, 2002).

#### **1.1.4 Current strategy to reduce the burden of cardiovascular disease**

In 1999, the UK Government endorsed CVD as a top priority in England in their National Service Framework for Coronary Heart Disease (Department of Health, 2000). Several strategies have been implemented aimed to cut deaths from CVD by reducing risk factors in individuals. The current National Institute for Health and Clinical Excellence (NICE) (2011) guidelines recommend blood pressure lowering medication (i.e. antihypertensives) in individuals whose blood pressure exceeds 140/90mmHg and who have a 20% or greater risk of developing CVD over the next 10 years. It is also suggested that cholesterol lowering drugs (i.e. statins) are offered to adults who have a 20% or greater 10 year CVD risk (NICE, 2008). Risk should be estimated using an appropriate risk calculator (such as the Framingham risk scoring calculator) which takes into account several modifiable and non-modifiable risk factors including age, sex, blood pressure, cholesterol, smoking status and weight (Rodondi, et al., 2012).

Clinical trials have shown that treatment with statins reduces the probability of developing CVD by approximately 30% of the pre-treatment probability (Thavendiranathan, et al., 2006; Prospective Studies Collaboration, 2007). A reduction in blood pressure of 10mmHg reduces probability by a similar amount (Law, et al., 2009). This relative risk reduction (the relative likelihood of an event occurring in the absence of treatment) of a third equates to an absolute benefit of about 10% over 10 years or 5% over 5 years (Pyorala, et al., 1994).

The guidelines also recommend a secondary prevention approach for those with evidence of CVD. It is advised that these patients are placed on a regimen of antihypertensive and statin therapy (NICE, 2008; NICE, 2011).

### **1.1.5 An alternative strategy to reduce the burden of cardiovascular disease**

NICEs' primary prevention approach is a 'high risk' strategy as it works by treating a small number of patients defined as susceptible. The epidemiologist, Geoffrey Rose (1981), believed such strategies may be appropriate for those individuals identified as high risk as well as being an efficient use of resources; but its capacity to reduce the burden of disease in the whole community tends to be disappointingly small due to its inability to accurately identify risk. Rose based his beliefs on his Whitehall Study where medical data on 20,000 middle-aged male civil servants in London was collected. It was found that whilst most deaths from strokes and coronary heart disease occurred in patients with high blood pressure, a large proportion also occurred in those with only slightly raised blood pressure (Reid, et al., 1976).

Hence Rose proposed a 'population' strategy in the prevention of CVD, whereby the entire population is treated so that everybody receives a small benefit. This is an effort to control the incidence of a disease in the population, to lower the mean level of risk factors involved and shift the whole distribution of exposure in a favourable direction. It involves mass environmental control methods in terms of attempting to alter some of society's norms of behaviour. Rose believed that lowering the risk of the entire population to be a more productive intervention than high risk approaches.

The advantages of the population strategy to disease prevention are thought to be powerful. Firstly, removing the underlying causes that make a disease common offers huge potential for the population as a whole. Rose calculated that a reduction of 10mmHg of the blood pressure in the population would correspond to about a 30% reduction in the total

attributable mortality. Secondly, the strategy is behaviourally appropriate. If adopting a healthy lifestyle eventually becomes 'normal', then continuing to persuade individuals would become less necessary. Once a social norm of behaviour has become accepted and supply industries have adapted themselves to the new pattern, then the maintenance of that situation no longer requires effort from individuals (Rose, 2001).

The population approach however has some weighty drawbacks. It leads to what Rose (1981) described as the 'prevention paradox' whereby a preventive measure brings much benefit to the population but offers little benefit to each participating individual, particularly in the short-term. Thus there is poor motivation on the part of the individual, as most people act for substantial and immediate rewards. There is poor motivation on the part of the physician too, as they tend to expect higher rates of success for each individual. There is the additional difficulty for health care providers to see health as a population issue and not merely as a problem for individuals (Rose, 2001). Furthermore, it is argued that population based approaches do not need doctors to treat individual patients: instead it treats populations. Such strategies forget the essence of the doctor's job. Ramos (2003) believes that medicine is and should remain a patient based practice. Moreover, Taylor and Konings (2003) raise the question of ethics and morality. If the risk of CVD is reduced, what then for humanity? Will everyone be that much happier, healthier and more productive? They argue that clinicians must remember that humans are still mortal and a balance needs to be achieved between quality and quantity.



### **1.1.6 The polypill strategy**

Recently there has been a renewed interest in population based approaches to prevention as opposed to high-risk strategies (Starfield, et al., 2008). Wald and Law (2003) propose such an approach in their 'polypill strategy'. They suggest offering preventive treatment for CVD to all people over a particular age, irrespective of their blood pressure and cholesterol level since whilst these risk factors are responsible for most cases of the diseases they cause, they are weak predictors of those who will and those who will not become affected by these diseases. This calls into question the accuracy of risk calculators in estimating the risk of developing CVD. Instead, Wald and Law suggest that the most discriminatory factor is age. Since 96% of deaths from coronary heart disease and stroke occur in people aged 55 years and over, age 55 has been proposed as the entry point for preventive treatment.

Treatment would be in the form of a daily 'polypill' containing both blood pressure and cholesterol lowering agents at a fixed dose, as opposed to titrating treatment to individual target levels, because interventions have been shown to be effective whatever the initial levels of the risk factors. There would be no monitoring of patients taking the polypill because complications from the proposed ingredients are rare, but also the tests lack specificity (Law & Wald, 2002).

Based on their meta-analysis of existing trials and cohort studies on antihypertensives and statins, Wald and Law estimate that adopting a polypill strategy could prevent 80% of strokes and 88% of coronary heart disease events, with a low risk of adverse events. They believe the polypill may also have a role in people with known CVD (i.e. secondary prevention), since combined pills have been shown to lead to better patient adherence

(Bangalore, et al., 2007; Gupta, et al., 2010). Wald and Law conclude that the polypill could have a huge impact in the prevention of disease in the western world.

Since Wald and Law's novel idea, a few trials have been conducted to test the efficacy and tolerability of the polypill. One randomised controlled trial conducted in India found that the polypill led to a reduction in blood pressure and cholesterol and no evidence of increasing intolerability with increasing number of active components in one pill. However, the effectiveness of the polypill seemed to be lower than projected by Wald and Law: the benefit was found to be closer to 60% (Yusuf, et al., 2009). A more recent randomised controlled trial carried out across several countries including the UK, found the reduction in CVD from the polypill to be 25-30% smaller than predicted by Wald and Law and the observed side effects to be considerably higher (Pill Collaborative Group, 2011). The reasons for the difference between the actual and predicted effectiveness of the polypill is unclear, although it may be due to baseline differences, non-adherence or drug interactions (Yusuf, et al., 2009; Pill Collaborative Group, 2011).

### **1.1.7 Controversy and criticism of the polypill strategy**

Wald and Law's concept has generated much controversy and criticism. The polypill proposal is argued as being a theoretical construct as it is based on the extrapolation of data from many disparate studies. Definitive answers can only really be provided by actual trials of the polypill (Powlson, 2003). It is also suggested that the absolute reduction in risk for patients would only be 7% over 10 years if started at age 55 years. According to a study by Trewby et al (2002), this level of benefit would only be acceptable to one in 10 healthy

people. This means if only one in 10 ten people took the polypill the effect on the population would be negligible (Trewby & Trewby, 2003).

The interpretation of the trial data on which Wald and Law have based their proposal is thought to be optimistic. The expected 61% reduction in ischemic heart disease events from statins is about twice that seen in any trial. Similarly, blood pressure lowering trials reduced the risk of ischaemic heart disease by about 20% not 46% (Assmann, et al., 2003). Wald and Law also estimated a low rate of adverse effects and a high rate of adherence on the basis of data from short-term trials. This estimation is again optimistic, because the reality is that longer-term treatment may result in higher rates of adverse effects and poorer adherence (Lonn, et al., 2010).

Another problem with the polypill approach is the risk of adverse events when a new drug is used without medical supervision by large sections of the general population. Recognition of low-frequency events may not be apparent for many years, by which time many persons may have been harmed (Kernan, et al., 2010). There are also concerns that a “magic bullet” for primary prevention may lead people to abandon a healthy lifestyle, hence having an adverse impact (Lonn, et al., 2010). Furthermore, it is argued that a polypill given to large populations is not the solution to prevention. Healthy lifestyle choices should form a critical component of the strategy. In fact, lifestyle interventions may be more efficacious than drug based approaches to clinical events (Kernan, et al., 2010). For example, a prospective cohort study found that individuals with a low risk lifestyle (defined as not smoking, exercising daily, modest alcohol intake, consuming a healthy diet and having a healthy weight during midlife),

had a 80% lower risk of stroke in 20 years of follow-up than individuals without a low risk lifestyle (Chiuve, et al., 2008).

Despite its controversy, it is likely that a polypill will be implemented in the near future as the government increasingly moves towards preventive healthcare. Hence prescribing the polypill to all those over a particular age may become a NICE recommendation. However, whether HCPs (general practitioners (GPs) and practice nurses (PNs)) would be willing to offer the medication to individuals and whether patients would be agreeable to taking the drug is another matter entirely; one that may determine the success of the polypill (Sleight, et al., 2006).

## **1.2 Literature review**

### **1.2.1 Purpose of the review**

A review of the literature on HCP and patient opinions on a polypill in the prevention of CVD was undertaken in order to formulate a research question and help inform the design of the study.

### **1.2.2 Integrative review method**

An integrative review method was used to examine the literature as this approach allows the inclusion of experimental and non-experimental research in order to more fully understand a phenomenon (Whittemore & Knaf, 2005; Cronin, et al., 2008). The integrative review method is often accused of lacking rigour, being inaccurate and containing bias due to the complexity inherent in combining diverse methodologies (Beck, 1999; O'Mathuna, 2000).

Therefore, explicit and systematic methods were used to attempt to enhance the rigour of the review process.

### **1.2.3 Literature search**

The PubMed database was searched allowing the simultaneous searching of articles from PubMed, PubMed Central and MEDLINE. PubMed was selected as it contains more than 22 million citations for biomedical literature from thousands of journals and it was felt that many of the relevant articles could be identified here. The Cochrane database, an internationally recognised database of systematic reviews of primary research in human health care and health policy, was also searched to identify any publications that may have been missed by PubMed.

Initially, a number of search terms were chosen (such as 'polypill AND attitudes AND physicians OR polypill AND attitudes AND patients'), aimed to capture the attitude of HCPs and patients towards the polypill. However, this was generating few papers (as little as 3), probably because the polypill is still a relatively new area of research. Therefore a broad search term was used (i.e. 'polypill AND cardiovascular') in an attempt to find all the available sources and thus funnelling from a wide perspective to a narrow focus on relevant studies.

Certain inclusion criteria were applied during the searches (table 2). Only articles written in English were included as we did not have the resources to have papers translated. Only publications from 2000 were searched as it was felt that those prior to this date may not be relevant since preventive healthcare is a relatively new and emerging concept. The searches

were carried out in April 2012, so papers published after this date were also not included.

Only studies involving humans were sought as this is the population on which our study was based. All types of articles were included, even those that had not been peer-reviewed, as very few studies on the polypill have been carried out. An attempt was made to keep the search terms and inclusion criteria across the two databases as similar as possible, although this was difficult as the databases are set up in slightly different ways. The Cochrane database seemed to offer less flexibility in terms of inclusion criteria.

Database	Search terms	Inclusion criteria
PubMed	Polypill AND Cardiovascular	English From 01/01/00 – 31/04/12 Humans
Cochrane	Polypill AND Cardiovascular	From 2000 - 2012

Table 2: Search terms and inclusion criteria

Any papers that were duplicated from the searches were removed. The titles of the remaining records were screened and those that were irrelevant to the topic area were excluded. Of the remaining records, the full-text of the articles were obtained and assessed for eligibility. Irrelevant papers were again removed. The reference lists of all relevant studies were examined to ensure that any significant papers had not been overlooked. The remaining studies were used to provide a review of the findings (section 1.2.4).

The number of records searched through each stage of the process described above is shown diagrammatically in figure 1.

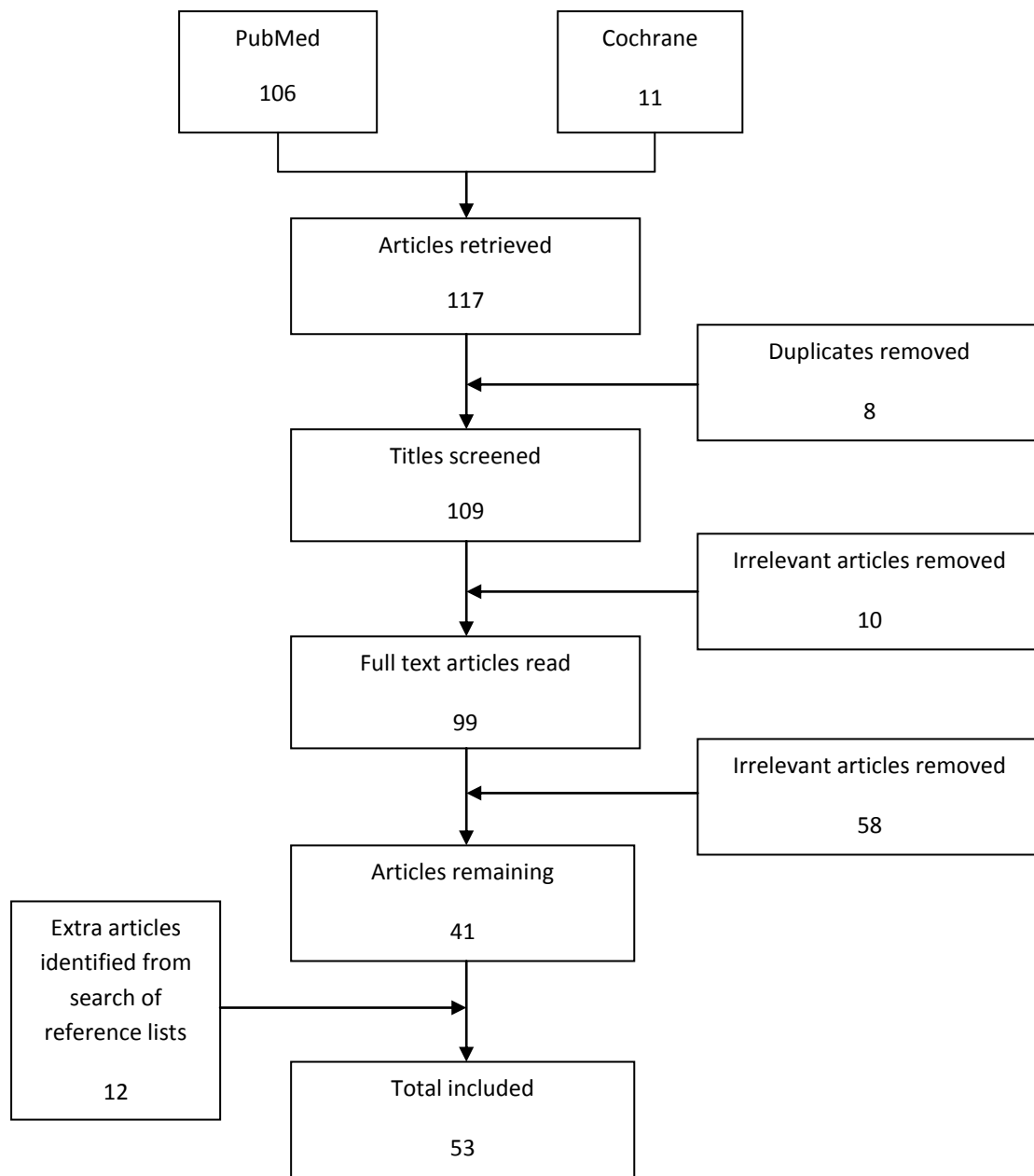


Figure 1: Flow diagram of records searched

#### **1.2.4 A review of the findings**

##### ***1.2.4.1 Patient understanding of blood pressure, cholesterol and cardiovascular risk***

Studies have shown that patient knowledge of cholesterol is somewhat poor. Although most patients with high cholesterol are aware that this condition can adversely affect health, there is much confusion about what cholesterol actually is. There is a lack of understanding of its association with CVD risk (Durack-Brown, et al., 2003; Goldman, et al., 2006; Hobbs, et al., 2008). However, more educated patients seem to demonstrate a greater understanding of the relationship, while older patients and non-English speakers are less likely to know of the associated risk (Goldman, et al., 2006; Kaplan, et al., 2006). In terms of cholesterol medication, most patients do not know how they work believing they are only required short-term. In fact, many do not fully understand why they are on them (Consoli, et al., 2002; Gialamas, et al., 2011). Few patients know their cholesterol value and most do not know what the ideal value is, although this appears to be associated with educational level (Nash, et al., 2003; Goldman, et al., 2006; Kaplan, et al., 2006). Physicians appear to be the main source of information (Erhardt & Hobbs, 2002; Nash, et al., 2003; Gialamas, et al., 2011).

According to the research, knowledge regarding some aspects of blood pressure amongst patients is good. For example, most patients with high blood pressure are aware what it means, that it is treatable and that it is a risk factor for CVD (Alexander, et al., 2003; Oliveria, et al., 2005; Ragot, et al., 2005). However, patients are less knowledgeable regarding other aspects of blood pressure. Most patients are unaware of the appropriate blood pressure to aim for and many cannot recall their last blood pressure reading and whether it is within



normal range (Alexander, et al., 2003; Oliveria, et al., 2005). This appears to be associated with educational level, race and family medical history (Oliveria, et al., 2005; Ragot, et al., 2005; Viera, et al., 2008). Furthermore, several patients inaccurately believe that medication can cure high blood pressure (Viera, et al., 2008).

When it comes to estimating their risk of developing a disease, patients generally underestimate their personal vulnerability to health and life threatening problems, particularly when events are perceived as more controllable (Webster & Heeley, 2010). For example, a European study found that most patients who had two or more CVD risk factors, putting them at high risk, perceived their risk of developing CVD as low (Erhardt, 2005). Part of the reason patients underestimate their risk is because they generally have insufficient knowledge about CVD and CVD risk factors (Goldman, et al., 2006; van der Weijden, et al., 2007). Studies have shown patients perceive stress, smoking and family history as being the most important risk factors for CVD as opposed to blood pressure and cholesterol (Hunt, et al., 2000; Carroll, et al., 2003). Another reason for their underestimation of risk is related to poor health literacy; the ability to perform basic reading and numerical tasks required to function in a health environment (Webster & Heeley, 2010). Poor health literacy is widespread but often not recognised. The proportion of patients with limited health literacy has been shown to be between 34% and 59% (Eichler, et al., 2009). The reason poor health literacy impacts patients' understanding of CVD is that it has been shown that historically educational material related to CVD is written at an inappropriate reading level (Safeer, et al., 2006).

#### **1.2.4.2 Attitudes towards the polypill**

In terms of HCP attitudes, only three quantitative surveys in this area have been conducted worldwide: none of which have been in the UK (Holt, 2009; Soliman, et al., 2011; Viera, et al., 2011). The findings of these surveys have been consistent. All three found physicians to have fairly modest knowledge regarding the polypill. The acceptability of the polypill for primary prevention appeared relatively high, particularly for those with high CVD risk. In one of the surveys, the acceptability was even higher for secondary prevention (Soliman, et al., 2011). In terms of the factors affecting their decision to prescribe the polypill, cost, degree of CVD event risk reduction and side-effects were rated as important (Soliman, et al., 2011; Viera, et al., 2011). The lack of flexibility of the ingredients and doses within the drug was a concern, with physicians preferring some ability to modify these (Holt, 2009; Viera, et al., 2011). There was also a great deal of scepticism regarding forgoing of monitoring patients taking the polypill (Soliman, et al., 2011; Viera, et al., 2011).

The research on patient attitudes towards the polypill has been very limited: to date there has been only one quantitative survey conducted abroad. This survey found approximately 90% of patients would either “definitely” or “probably” take the polypill for primary prevention if it was shown to be effective in reducing CVD risk (Soliman, et al., 2011). Although this is only one study, the high degree of acceptability of the polypill amongst patients appears to be consistent with that found amongst physicians.

#### **1.2.4.3 Patient adherence and opinions on combined pills**

The majority of hypertensive patients often require two or even three medications to achieve blood pressure targets (ALLHAT, 2002; Julius, et al., 2004; Dahlof, et al., 2005).

Many of these patients also have comorbidities such as diabetes which means daily drug regimens can be large and complex (Lewanczuk & Tobe, 2007). Unfortunately, studies have demonstrated that as drug numbers and procedural complexity increases so does non-adherence, potentially threatening clinical outcomes (Haynes, 1976; Pullar, et al., 1988).

There is evidence to suggest that combining separate drugs into a single tablet improves adherence, which can translate into better clinical outcomes (Bangalore, et al., 2007). How and why this occurs is unproven, although it is thought that simpler regimens are easier to understand, harder to forget, and impact less on daily activities (Finn & Alcorn, 1986; Townsend, et al., 2003).

Research on patients' attitudes to changing to combined tablets is limited. However, one study found that most patients who were taking a combination of antihypertensives and statins saw little clinical benefit in changing from an established, effective and tolerable regimen to one that was less flexible and might not mirror their current dosages.

Nevertheless, some patients could appreciate the potential convenience of a combined pill.

Despite mixed attitudes, some patients indicated they would probably agree to try a combined pill if it was recommended by their physician (Williams, et al., 2005).

#### ***1.2.4.4 Patient adherence and beliefs about antihypertensives and statins***

There is substantial evidence demonstrating that antihypertensive and statin therapy significantly lowers blood pressure and cholesterol respectively in a very high proportion of patients, thereby decreasing both CVD morbidity and mortality (Law, et al., 2003; Psaty, et al., 2003). Yet poor adherence and persistence with prescribed medication continues to be one of the main causes of unsatisfactory control of blood pressure and cholesterol and hence adverse outcomes (Krousel-Wood, et al., 2004; Ho, et al., 2008). It is estimated that 30-55% of patients fail to adhere to their prescribed hypertensive regimen (WHO, 2003). Furthermore it is estimated that only 50% of patients persist on treatment one year later (Vrijens, et al., 2008). Adherence rates to statin therapy is similarly poor: it is estimated that up to 50% of patients do not take their statins as prescribed and 12-45% of patients discontinue treatment after one year (Insull, 1997).

The reasons for poor adherence to antihypertensives and statins are multilevel and complex (Miller, et al., 1997; Vermeire, et al., 2001). Some are related to patient factors in terms of age, gender, ethnicity, comorbidities and knowledge of the disease and its treatment (Monane, et al., 1996; Avorn, et al., 1998; Yilmaz, et al., 2005; Aggarwal & Mosca, 2010). Several are associated with provider variables such as access to health care, patient-physician communication and faith in the physician (Svensson, et al., 2000; Tolmie, et al., 2003). Others are connected to drug characteristics including drug regimen and side-effects (Insull, 1997; Bodenheimer, et al., 2002; Bramley, et al., 2006). However, the findings are inconsistent and do not provide a full explanation of patients' decision not to take their antihypertensive and statin therapy as prescribed (Brewer, et al., 2002; Inkster, et al., 2006).

Research has increasingly focussed on the role of patients' health beliefs as this is thought to be more powerful predictors of adherence (Horne & Weinman, 1999). The 'medicines belief model' proposes that patients weigh up health related behaviours (such as adherence) by considering their perceived susceptibility of the illness and the benefits of the action (Becker, 1974). Similarly, Horne and Weinman (1999) suggest that whilst most patients believe that their medicines are necessary, they also have serious concerns about taking them and therefore hold the two beliefs in tension which in turn affects their level of adherence depending on which belief is stronger. In fact, they found patients' health beliefs were more important predictors of adherence than clinical and sociodemographic factors, accounting for 19% of the variance in adherence.

The role of health beliefs in adherence to antihypertensives has been demonstrated in several studies which have found that patients have concerns about the medication in terms of their continued necessity, the possible side-effects and a preference for an alternative to drugs. Patients weigh their reservations against reasons for taking them, such as positive experiences with doctors, perceived benefits and pragmatic considerations (Benson & Britten, 2002; Bane, et al., 2007; Shiri, et al., 2007). Similarly, studies have found adherence to statins to be affected by patients' beliefs about adverse effects, uncertainty over potential benefits and their perceived risk of CVD (Mann, et al., 2007; Fung, et al., 2010).

#### ***1.2.4.5 Factors affecting the decision to initiate medication to prevent cardiovascular disease***

Whilst the NICE guidelines (2008, 2011) recommend antihypertensive and statin therapy for the primary prevention of CVD in adults with a 20% or greater 10 year CVD risk, it is also

stated that the decision to initiate therapy should be made after an informed discussion between the physician and individual about the risks and benefits of treatment and taking into account additional factors such as comorbidities and life expectancy. Concordance (a partnership approach to medicine prescribing and taking) and seeking consent for treatment is considered an ethical duty by the General Medical Council (McAlister, et al., 2000). However, the decision to initiate medication to prevent CVD is not straightforward: both HCP and patient factors play a role.

Although HCPs use risk assessments tools and guidelines to make decisions about preventive treatment for CVD, studies have shown their actual behaviour is influenced by more subjective factors (Lewis & Barton, 2003; Lewis, et al., 2003; Bryan, et al., 2005; Greenfield, et al., 2005; Gale, et al., 2011). Hence they seem to vary widely in the threshold at which they believe treatment should be initiated: specialists prefer treatment at lower risk levels than generalists, and doctors prefer treatment at lower risk thresholds than nurses (Steel, 2000; Lewis, et al., 2003; Bryan, et al., 2005). However, studies have shown most HCPs have difficulty making decisions about risk thresholds and often experience problems in understanding risk data (Lewis, et al., 2003; Bryan, et al., 2005; Greenfield, et al., 2005).

When making the actual decision to start treatment, most HCPs believe patients should be provided with information regarding the risks and benefits of medication but the ultimate decision should be that of the patient (Lewis, et al., 2003; Greenfield, et al., 2005). When making treatment decisions, studies have demonstrated HCPs take into account several patient characteristics such as: existing medical condition; age; gender; likely adherence; family history; current lifestyle; other medications; and ethnicity (Kedward & Dakin, 2003;

Lewis, et al., 2003; Abuful, et al., 2005; Greenfield, et al., 2005). They also consider the potential harm to the patient in terms of the possible side-effects, unnecessary drug taking (and thereby medicalisation) and financial cost, against the potential benefits (Lewis & Barton, 2003; Greenfield, et al., 2005; Gale, et al., 2011). When considering initiating drug treatment, HCPs prefer patients to make lifestyle changes instead (Lewis, et al., 2003; Gale, et al., 2011). Furthermore, the decision to prescribe treatment appears to be influenced by the financial cost of treatment to both the practice and NHS (Greenfield, et al., 2005). The findings appear to suggest that the guidance given to patients by HCPs is arbitrary. Hence patients at similar risk may receive very different advice depending on the HCP they consult (Bryan, et al., 2005; Greenfield, et al., 2005).

Studies have shown patients' decision to commence preventive treatment for CVD is also influenced by several factors (Lewis, et al., 2003; Marshall, et al., 2006; Gale, et al., 2011). Many patients demonstrate problems in comprehension of risk information and tend to be influenced by the way in which information is presented to them (Trewby, et al., 2002; Lewis, et al., 2003). For example, they are more persuaded to accept treatment when the effects of treatment are framed in terms of reduced potential losses (fewer adverse events or deaths) as opposed to potential gains (higher chance of healthy survival) (Edwards, et al., 2002). Nonetheless, most patients prefer to take medication at a higher risk threshold than the threshold recommended by HCPs and clinical guidelines. In other words, they are less likely to prefer treatment (McAlister, et al., 1997; Steel, 2000; Trewby, et al., 2002; Lewis & Barton, 2003). However, there is wide variation amongst patients with social class being the overriding factor: those from lower socio-economic groups are willing to accept treatment at much lower risk thresholds (Marshall, et al., 2006).

When making the decision to initiate preventive treatment for CVD, patients prefer to decide for themselves based on the information provided by HCPs (Lewis, et al., 2003). However, other studies have found that although patients welcome the information provided, most trust their physicians' judgement and recommendation to start medication due to their greater knowledge about health and disease (Gale, et al., 2011). Most are cautious about taking preventive medication for CVD due to concerns around side-effects and unnecessary drug taking, preferring to make lifestyle changes instead (Lewis, et al., 2003; Gale, et al., 2011).

#### ***1.2.4.6 Factors influencing the prescribing of new drugs***

The rate of uptake of new medicines by GPs in the UK is slower than in many other developed countries (Pharmaceutical Industry Competitiveness Task Force, 2005). In fact, most GPs describe themselves as 'conservative' or 'cautious' prescribers (Jacoby, et al., 2003). The reasons for the slow uptake of new drugs is complex and involves multiple factors (Jones, et al., 2001; Jacoby, et al., 2003; Prosser, et al., 2003; Mason, 2008).

Several studies have shown that the information provided by the pharmaceutical industry is often the only source of information for GPs. A long-standing and trusted relationship with a representative often leads to an acceptance of drug information, reduced perceived risk and thereby a greater willingness to prescribe (Jones, et al., 2001; Prosser, et al., 2003; Prosser & Walley, 2005). Scientific research and evidence-based sources are not often consulted. In fact, one study found peer-reviewed journals to be influential for only 17% of GPs (Prosser, et al., 2003). This does not suggest a critical appraisal process to prescribing (Jones, et al., 2001).



Seeing respected hospital consultants adopt a new drug is important for many GPs as it gives the drug acceptability (Jones, et al., 2001; Prosser, et al., 2003). Patient factors are also influential. Where patients request a new drug and it is more convenient and acceptable to them, GPs are more willing to prescribe the medication (Prosser, et al., 2003). Biomedical and drug factors play a role too. Where current therapy has failed and there is a lack of available and effective alternatives, GPs are more likely to adopt new medication (Jones, et al., 2001; Prosser, et al., 2003). The perceived effectiveness of the new drug, its side-effect profile, interactions with other drugs and the dose is also taken into account (Jones, et al., 2001). Practice characteristics are thought to have an influence: GPs based in larger and busier practices are more likely to utilise new drugs (Tambyln, et al., 2003).

The uptake of new drugs by GPs is influenced by their attitudes towards risk. High prescribers are more likely to experiment with new drugs (Mason, 2008). Cautious prescribers however are not prepared to try them until there is clear evidence. They tend to adopt a 'wait and see approach' (Jacoby, et al., 2003). Although cost may inform prescribing, it does not represent a significant barrier to the uptake of new medicines. It is often considered secondary to other factors (Jones, et al., 2001; Jacoby, et al., 2003; Mason, 2008). Increasingly, pressures from central government and local health authorities are a factor in adopting new drugs (Harrison, et al., 2003). However, the NICE guidelines (2008, 2011) in isolation have little impact on uptake, unless supported by other sources of information (Mason, 2008).

#### **1.2.4.7 Attitudes towards monitoring of drugs**

Medicine has always put patients at risk: its power to do good is accompanied by the potential for harm (Wilson, et al., 2001). Medication errors and drug-related adverse events have important implications for patients in terms of increased hospitalisation and costs, undue discomfort, disability and even increased mortality (Montesi & Lechi, 2009). Although primary care is relatively safe compared to hospital care, patient safety incidents occur in general practice too (Wetzels, et al., 2008). It is estimated that such incidents occur between 5 and 80 times per 100,000 consultations in general practice (Sanders & Esmail, 2003).

The National Prescribing Centre (2011) provided by NICE, have devised 10 strategies for GPs to make the prescribing of drugs in primary care safer for patients. One of their strategies is to monitor patients for the effects of medications and any side-effects, particularly for high risk drugs in high risk patients. However, inadequacies in patient monitoring account for about 25% of preventable medication-related hospital admissions (Howard, et al., 2007). Effective monitoring can help to identify problems before they result in serious patient harm.

Although the guidelines recommend monitoring patients taking medication in the interests of safety, very little is known about HCPs beliefs regarding this aspect of their practice. However, a study conducted in the Netherlands discovered most GPs and PNs considered monitoring of medication as one of the most important aspects of patient safety (Gaal, et al., 2010). Little is also known about patient views on being monitored. Nevertheless, a study on patients' perspectives on taking warfarin (an anticoagulant to reduce the risk of having a

stroke) found that many reported the regular visits to the clinic for monitoring as being an inconvenience (Dantas, et al., 2004).

#### ***1.2.4.8 Preventive medicine in the UK***

There is an increasing move towards preventive medicine in the UK. This can be seen in the various screening, immunisation/vaccination, health promotion and patient education programmes endorsed by the Department of Health (DoH) in almost every area of patient healthcare. However, research has shown that a number of factors hinder the wide delivery of preventive medicine, in particular the lack of physician time or heavy workload and inadequate reimbursement (Brotons, et al., 2005). Some studies have suggested that certain characteristics of physicians such as their age, gender, attitudes and own health status may also be predictors of the extent to which they address preventive health issues (Lurie, et al., 1993; Frank & Kunovich-Frieze, 1995). Despite the difficulty in delivering preventive services in the UK, a recent survey demonstrated that most GPs thought that preventive medicine was very important and claimed to spend 10-30% of each consultation on this area (Gowin, et al., 2010).

However, not everyone believes in preventive medicine. One particular critic is David Sackett (2002), who accuses preventive medicine as being “aggressively assertive” pursuing symptomless individuals telling them what they must do to remain healthy, and occasionally invoking the force of law as in the case of immunisations for example. He also believes preventive medicine is “presumptuous” as it is confident that the interventions it prescribes will do more good than harm to those who accept and adhere to them. Finally, Sackett

blames preventive medicine for being “overbearing”: attacking those who question the value of its recommendations.

Others are critical of preventive medicine in the elderly, believing it simply changes the cause of death rather than prolonging life. For example, one study revealed that the preventive use of statins showed no overall benefit in elderly people in terms of cardiovascular mortality and morbidity as these were replaced by cancer (Shepherd, et al., 2002). By providing treatments designed to prevent particular diseases, another cause of death is being selected unknowingly and certainly without the patient’s consent. This is considered fundamentally unethical and undermines the principle of respect for autonomy (Mangin, et al., 2007).

### **1.3 Research question**

Research question:

What is the attitude of HCPs and patients towards the use of a polypill for primary and secondary CVD prevention?

Research aim:

To determine the attitude of HCPs and patients towards the use of a polypill for primary and secondary CVD prevention.

Research objectives:

- To critically investigate HCP's attitudes towards the use of a polypill for primary and secondary CVD prevention.
- To critically investigate patient's attitudes towards the use of a polypill for primary and secondary CVD prevention.

Although this study was carried out as part of the Stroke Prevention Programme at the University of Birmingham, I had full agreement from the team to undertake all aspects of the study for the purpose of the Masters in Health Research. I was also given rights to access the data.

## **CHAPTER 2: METHODOLOGY**

This chapter begins by outlining the ethical approvals that were required to carry out this study, followed by a discussion of the research design employed, the procedures involved in sampling and recruiting participants, the process of interviewing respondents and the how the data was analysed.

### **2.1 Ethical approval**

Any study involving humans must meet specific ethical requirements. The International Conference on Harmonisation Good Clinical Practice (ICHGCP) guidelines (2002), devised by the European Medicines Agency, provides comprehensive ethical and scientific quality standards in the design and conduct of trials involving human participants. In addition to this, the DoH's Research Governance Framework (RGF) for Health and Social Care (2005) sets out broad principles of good research governance. Both sets of guidelines state that any study protocol must be reviewed independently to ensure it meets ethical standards. Hence, the study protocol was submitted to the local Birmingham, East, North and Solihull Research Ethics Committee for a favourable opinion, which was received on 23<sup>rd</sup> June 2008 (Appendix 1). The protocol was also submitted to the Birmingham and Black Country Comprehensive Local Research Network (responsible for research and development for the local Primary Care Trust) in order to gain permission to undertake the study within local general practices in the Birmingham area: this was received on 18<sup>th</sup> February 2009 (Appendix 2).

## **2.2 Research design**

### **2.2.1 Choice of methodology**

In order to address the research questions, it was decided that a qualitative approach would be taken. Earlier studies on the acceptability of the polypill amongst HCPs and patients all used quantitative surveys (discussed in section 1.2.2). Although these surveys have been useful in gauging opinions, they are of limited value as they do not explore in any detail the reasons for their responses. The meanings people attach to their responses tend to be personal and subjective which quantitative measures cannot always measure. Qualitative methods are better suited to exploring this area as it is the most appropriate way to understand why individuals act in a particular manner, as well as exploring new areas and addressing sensitive issue (Silverman, 2000). This understanding will be essential when planning strategies to implement the polypill.

Having established that a qualitative approach would be used, it was decided that individual semi-structured interviews would be the most appropriate data collection tool. Focus groups were considered as an alternate method as it meant: fewer focus group interviews could be conducted; discussion of some subjects could potentially be stimulated by the group environment; and it would be possible to include the views of more people by carrying out a few focus groups than it would by choosing to use individual interviews (Ritchie & Lewis, 2003).

Individual semi-structured interviews were chosen instead for several reasons. They allow the interviewer to delve deeply into social and personal matters. Although a focus group allows interviewers to get to a wider range of experience, the public nature of the process

prevents delving as deeply into the individuals' experiences (Chilban, 1996; Johnson, 2002; Rubin & Rubin, 2005). Semi-structured interviews can offer greater validity since respondents can ask the interviewer to explain questions they do not understand and the interviewer can identify when there is a problem of comprehension and rephrase questions: there may be less opportunity for this in a group setting (Bryman, 2004). Semi-structured interviews also allow participants to discuss potentially sensitive topics which can be difficult in a group setting as people may be less willing to discuss their experiences or opinions (Ritchie & Lewis, 2003). Another reason for selecting semi-structured interviews was because one of the populations in question (i.e. HCPs) are difficult to access for research due to workload commitments (McDonald, 1993; Templeton, et al., 1997). They may be more likely to participate if their involvement could be carried out at a time and location suitable for them rather than a stipulated date and venue.

However, semi-structured interviews have their shortcomings: in particular bias. There is evidence that the characteristics of the interviewer, such as ethnicity, gender, professional background and socio-economic status, can have an impact on respondents' replies (Bryman, 2004). For example, an interview study on heart disease found that when respondents were interviewed by a sociologist they were more open regarding their unfavourable views about medical professionals: this was not evident when they were interviewed by a GP (Richards & Emslie, 2000). There is also the problem of bias arising from the researchers' questioning style, encouraging respondents to give responses other than the true ones. In this current study, the researcher attempted to compensate for these potential biases: these are discussed in section 2.4.2.



### **2.2.2 Theoretical approach**

The theoretical approach taken by this study was 'grounded theory'. The theory was first developed by Glaser and Strauss (1967) and has undergone much modification, most notably by Strauss and Corbin (1990) and later by Charmaz (2000). It is now diverse and somewhat fractured. In its most recent incarnation, grounded theory has been described as 'theory that was derived from data, systematically gathered and analysed through the research process...data collection, analysis and eventual theory stand in close relationship to one another' (Strauss & Corbin, 1998). The uniqueness of grounded theory appears to lie in two central features: the development of theory is based upon patterns in empirical data, rather than from inferences or the association of ideas from existing literature; and the approach is iterative, or recursive, meaning that data collection and analysis proceed in tandem, repeatedly referring back to each other (Bryman, 2004).

There has been some discussion about the characteristics a grounded theory study must have to be legitimately referred to as 'grounded theory' (Morse, et al., 2009). Sbaraini et al (2011) provide a list of the fundamental components of a grounded theory study (table 3).

Many argue that grounded theory needs to be understood as a package of research methods, primarily those shown in table 3 (Bryman, 2004; Elliott & Lazenbatt, 2005).

<b>Component</b>	<b>Stage</b>	<b>Description</b>
Openness	Throughout the study	Inductive analysis is used whereby analytic thinking moves from the particular to the general: it develops new theories from many observations. Hence grounded theory studies take a very open approach to the process being studied.
Analysing immediately	Analysis and data collection	Analysis commences as soon as possible and continues in parallel with data collection to allow theoretical sampling (see below).
Coding and comparing	Analysis	Data analysis relies on coding: a process of breaking down data into much smaller components and labelling those components. It also relies on comparing: comparing data with data, case with case, and code with code in order to understand and explain variation in the data. Codes are eventually combined and related to one another and are referred to as categories or concepts.
Memo-writing	Analysis	Memos are written throughout the study. They can be about events, cases, categories or relationships between categories. Memos are used to stimulate and record the researcher's developing thinking, including the comparisons made (see above).
Theoretical sampling	Sampling and data collection	A theoretical sample is informed by coding, comparison and memo-writing. By carefully selecting participants and by modifying the questions asked during interviews, the researcher is able to fill gaps, clarify uncertainties, test their interpretations and build their emerging theory.
Theoretical saturation	Sampling, data collection and analysis	This is the point where researchers are hearing nothing new from participants and interviewing ceases.
Production of a theory	Analysis and interpretation	The results of the study are expressed as a theory: as a set of concepts that are related to one another in a cohesive whole.

Table 3: Components of a grounded theory study

(Sbaraini, et al., 2011)

Grounded theory has much to offer. It provides a framework for carrying out the research as well as for the analysis of data in a systematic and rigorous manner. Its recursive and iterative process is one that fits well with systemic practice, in which feedback informs and shapes further enquiry. It also generates rich data from the experiences of individuals. Furthermore, grounded theory aids researchers in formulating theories about processes and developing conceptual analyses of social worlds (Burck, 2005).

However, grounded theory is not without its critics. It is argued that conceptualisations do not just emerge from the data: their source is within the researcher. The researcher cannot be expected to enter the field, ignorant of any theory or associated literature related to the phenomenon, and wait for the theory to emerge purely from the data. No researcher can possibly erase from their mind all the theory they know before they begin their research. Grounded theory is also accused of being impractical at times. For example, the principles of theoretical saturation and interpretation of the data can make it difficult to anticipate accurate time scales for conducting research (Goulding, 2005). Furthermore, it is doubtful whether grounded theory actually results in theory as such. It provides a rigorous approach to the generation of concepts but it is often difficult to see what theory is being offered. Despite its limitations, grounded theory is probably the most influential general strategy for conducting qualitative research, although the extent to which the approach is followed varies between studies (Bryman, 2004). The present study used some of the components of grounded theory and these are discussed where the principles have been utilised.

## **2.3 Sampling and recruitment**

### **2.3.1 Sampling strategy**

In order to answer the research questions, two samples were required: each from two different populations. One sample was needed from a population of HCPs based in primary care as they would be prescribing the polypill if implemented. PNs were included in this population as currently there are 24,151 independent nurse prescribers in the UK (Nursing and Midwifery Council, 2011). The other sample required was from the over 55 age group patient population also from primary care, as they could potentially be taking the polypill if it becomes available.

Purposive sampling was used to identify the HCP and patient samples. Pope and Mays (1995) describe this type of sampling as a deliberate choice of respondents representing theoretically important groups of subjects. This approach was used to gain a diverse range of perspectives, as opposed to a statistically significant sample that is representative of the population. It is argued that the aim of qualitative research is not to provide generalisations but to investigate the extent of variation within a population (Polit & Beck, 2010).

There were several diverse criteria on which HCPs were purposively sampled (table 4). The aim was to attempt to ensure equal representation across each of the criteria. Profession was selected as there is currently no literature on PN attitudes towards the polypill, but also because research has shown that nurses tend to prefer preventive CVD treatment at higher risk thresholds (Steel, 2000; Lewis, et al., 2003; Bryan, et al., 2005). Gender and year of qualification (as a proxy for age) were chosen as criteria because some studies have found that these characteristics of physicians may be predictors of the extent to which they

address preventive health with patients (Lurie, et al., 1993; Frank & Kunovich-Frieze, 1995). Ethnicity (based on the Office for National Statistics general census ethnic categories 2001) was a further characteristic as studies have demonstrated that the ethnicity of physicians influences decision-making and communication during the consultation with patients (Cooper-Patrick, et al., 1999).

HCPs were also sampled on their general beliefs about medicines, as it has been shown that most HCPs tend to prefer patients to make lifestyle changes as opposed initiating medication treatment, indicating a possible dislike of drug taking (Lewis, et al., 2003; Gale, et al., 2011). Their beliefs regarding medicines were determined by their responses to the 'Beliefs about Medicines Questionnaire (BMQ)-General' (Horne, et al., 1999). This questionnaire consists of two scales: a 'General-Harm' scale assessing beliefs about the harmfulness of medicines, and a 'General-Overuse' scale measuring opinions on the extent to which medicines are overused by doctors. Respondents are scored on the two scales and the total can range between 8 and 40, with higher scores indicating a greater belief that medicines are both harmful and overused. Since it was important to include a range of views, in other words respondents with extreme views as well as those with moderate beliefs and there appeared to be different ways in which to interpret scores, scores were divided into tertiles so that those between 8-15 were categorised as low, 16-22 as medium and 23-40 as high (Horne & Weinman, 1999; Kumar, et al., 2008; Mardby, et al., 2009).

A further characteristic included in the HCP sample was the level of socio-economic deprivation of the practice area as physicians are known to be influenced by a patient's characteristics when making CVD treatment decisions. Some of these patient characteristics

have been found to include: existing medical conditions; age; likelihood of drug compliance; family history; known lifestyle habits such as smoking; and ethnic group (Kedward & Dakin, 2003; Lewis, et al., 2003; Abuful, et al., 2005; Greenfield, et al., 2005). Socio-economic deprivation was reflected in the Indices of Multiple Deprivation (IMD) score of the practice area. The IMD score is a single deprivation score combining a number of indicators covering a range of economic, social and housing issues (Noble, et al., 2004). Scores were divided into quartiles with one representing the least deprived areas and four the most.

Practice size was also taken into account when sampling as practice characteristics have been shown to have an influence on the uptake of new drugs (Tambyln, et al., 2003). The size of the practice was determined by the number of full-time equivalent GPs, which meant practices with between 1-2 GPs were categorised as small, 3-4 as medium, and 5 or more as large.

<b>GP sampling criteria</b>	<b>Range</b>
Profession	General practitioner
	Practice nurse
Gender	Male
	Female
Year of qualification	1960-1969
	1970-1979
	1980-1989
	1990-1999
	2000-2009
Ethnicity	White British
	White (other)
	Indian
	Pakistani
	White Irish
	Mixed race
	Black Caribbean
	Black African
	Bangladeshi
	Other Asian (non-Chinese)
	Chinese
	Other
Black	
Beliefs about Medicines Questionnaire-General score	Low (8-15)
	Medium (16-22)
	High (23-40)
Indices of Multiple Deprivation score of practice location	1
	2
	3
	4
Practice size	Small (1-2 GPs)
	Medium (3-4 GPs)
	Large (5≥ GPs)

Table 4: Health care professional sampling criteria

Patients were also purposively sampled on a range of criteria (table 5). The aim was to attempt to recruit equally across each of the criteria. Age, ethnicity and IMD score of practice location (as a proxy for socio-economic status and educational level) were selected as these variables have been shown to be associated with patient understanding of blood

pressure and cholesterol and estimation of CVD risk (Nash, et al., 2003; Oliveria, et al., 2005; Ragot, et al., 2005; Goldman, et al., 2006; Kaplan, et al., 2006; Viera, et al., 2008).

Furthermore, socio-economic status is believed to be a strong predictor of the decision to initiate CVD medication (Marshall, et al., 2006). Gender and the number of current prescribed medications (as an indication of comorbidities) were also chosen because studies have demonstrated these (as well as ethnicity) play a role in adherence to medication (Monane, et al., 1996). A further characteristic used to sample participants was their BMQ-General score, as health beliefs are thought to be strong predictors of adherence to medication (Horne & Weinman, 1999).

Cardiovascular risk status and associated treatment were also taken into account when sampling. This was whether patients had: existing CVD for which they were on secondary preventive treatment i.e. antihypertensives and/or statins; or a high CVD risk score – defined as being a 20% or greater risk of developing CVD over the next 10 years based on the Framingham risk calculator – and were on primary preventive treatment; or a high CVD risk score and not on primary preventive treatment (Rodondi, et al., 2012). Patients were sampled on this criterion in order to investigate whether their risk status and associated treatment would have any impact on their opinions towards preventive treatment.

Another sampling criterion was practice size. This was selected as practice characteristics are known to effect patient satisfaction: with patients preferring smaller practices (Wensing, et al., 2001). Practice size is also known to influence patient uptake of preventive screening tests (Majeed, et al., 1994).



<b>Patient sampling criteria</b>	<b>Range</b>
Gender	Male
	Female
Age	50-59 years
	60-69 years
	69-70 years
	80≥ years
Ethnicity (based on the 2001 Census)	White British
	White (other)
	Indian
	Pakistani
	White Irish
	Mixed race
	Black Caribbean
	Black African
	Bangladeshi
	Other Asian (non-Chinese)
	Chinese
	Other
Number of current prescribed medications	0
	1-4
	5≥
Cardiovascular risk and treatment status	Existing CVD and on treatment (antihypertensives and/or statins)
	High risk (20%≥) and on treatment (antihypertensives and/or statins)
	High risk (20%≥) and not on treatment (antihypertensives and/or statins)
Beliefs about Medicines Questionnaire-General score	Low (8-15)
	Medium (16-22)
	High (23-40)
Indices of Multiple Deprivation score of practice location	1
	2
	3
	4
Practice size	Small (1-2 GPs)
	Medium (3-4 GPs)
	Large (5≥ GPs)

Table 5: Patient sampling criteria

### **2.3.2 Participant selection and recruitment**

In order to generate the samples of HCPs and patients, practices were selected to reflect a range of IMD scores of their location and size: this data had been gathered from the West Midlands Strategic Health Authority. Practices that were sampled were sent an invitation letter (with a reply slip attached) to attend a training day to explain both the interview study and a cardiovascular screening study in detail (Appendix 3). The latter study was a linked study designed to estimate the percentage of the population in primary care with existing CVD and high CVD risk scores. This was done using the Framingham CVD risk score calculator to calculate risk scores for all patients within participating practices, either based on patient data held on the practice database or by inviting patients to be screened (Rodondi, et al., 2012). Practices were also sent a brief information sheet of the two studies (Appendix 4).

Practices that did not respond to the initial invitation were sent a reminder letter with another information sheet two weeks later (Appendix 4 and 5). Any practice that either failed to respond a second time or indicated on their reply slip that they were not interested in either of the studies were replaced by another practice with similar characteristics.

At the training day, the two studies were explained in more detail and issues such as logistics, payment and data protection were discussed. Practices were asked to confirm with the research study team within the following 7 days whether they wished to participate.

Once practices had agreed to take part, all HCPs at these practices were sent: a postal questionnaire requesting data on their profession, gender, year of qualification and ethnicity; a BMQ-General; and a letter explaining the questionnaires (Appendix 6, 7 and 8).

Any HCPs that failed to respond within two weeks were sent the questionnaires again with an accompanying reminder letter (Appendix 7, 8 and 9). Once all characteristic data on HCPs had been gathered, it was possible to select a sample of HCPs reflecting the range of criteria shown in table 4 above. Sampled participants were sent a letter (with a reply slip) inviting them to take part in the interview study and an information sheet explaining the study in more detail (Appendix 10 and 11). Those who did not respond to the initial invitation letter were sent a reminder letter two weeks later accompanied with another information sheet (Appendix 11 and 12). Participants who failed to respond a second time or declared on their reply slip that they did not want to take part in the study, were replaced by another participant with similar characteristics.

The patient sample was drawn from the practices taking part in the two studies in a similar manner. All patients with: existing CVD and on appropriate treatment; high CVD risk and on treatment; and high CVD risk and not on treatment, were posted a BMQ-General and a letter explaining the questionnaire using general practice stationary in order to achieve a high response rate (Appendix 7 and 13). Risk score data was available from the cardiovascular screening study. Patients who failed to return a completed questionnaire were sent the questionnaire again with a reminder letter two weeks later (Appendix 7 and 14). Data regarding gender, age, ethnicity and number of current prescribed medications was collected from the patient records held on the practice database. Once all sampling data on patients had been gathered, a selection of patients could be drawn to reflect the range of criteria shown in table 5 above. Practices were required to check through the list of patients selected from their surgery in order to exclude those with mental capacity issues or who were terminally ill. Sampled patients were sent a letter (with a reply slip) requesting their

participation, again using general practice stationary to maximise the response rate, and an information sheet (Appendix 15 and 16). Non-responders were sent a reminder letter and another information letter two weeks later (Appendix 16 and 17). Patients failing to respond a second time or who stated that they did not want to participate were replaced by another patient of similar characteristics.

Since data analysis and data collection occurred concurrently, participant selection and recruitment continued until theoretical saturation was achieved (see section 2.5).

## **2.4 The semi-structured interview**

### **2.4.1 Interview guide**

A separate interview guide was developed for both HCPs and patients. Its purpose was to ensure that all important topics were covered: it served mainly as a reminder to the interviewer rather than a rigid format to be followed. The development of the guide was based upon information in the exiting literature with the aim of answering the research questions. The questions in the guide were worded to include the general topics thought to be important, but also to allow respondents to express what was particularly important to them. The guide used during the HCP interviews began with their attitude towards the polypill, followed by their views on prescribing and opinions on monitoring (Appendix 18). The guide employed for the patient interviews covered areas including: understanding of blood pressure and cholesterol; their current health status; and their attitude towards the polypill (Appendix 19).

#### **2.4.2 Conducting the interviews**

All respondents expressing an interest to take part in the study were telephoned by the researcher to arrange a suitable date, time and venue for the interview to be conducted. They were offered the option of coming to the University where the researcher was based, or they could choose to have the interviewer visit them at the practice, their home or an alternative location suitable for them. Participants were sent a confirmation letter of the date and time of the interview together with a copy of the interview study information sheet (Appendix 11, 16 and 20).

At the beginning of the interview, the researcher reiterated the purpose of the study and gave reassurances about confidentiality and anonymity and how their data would be used. Participants were asked whether they had any questions which the researcher attempted to answer appropriately. In order to reduce the potential bias arising from the interviewer's characteristics (discussed in section 2.2.1), the researcher disclosed their non-medical professional background as it is argued that any relevant limitations or advantages should be opened discussed (Steier, 1991).

The respondent and the researcher completed two identical copies of the consent form together: one for the participant to keep and the other retained for the research file (Appendix 21). The ICHGCP (2002) guidelines and the RGF for Health and Social Care (2005) both state that consent from participants to take part in a study must be: informed using understandable language; freely given without coercion; and with ample time to decide. Hence, the researcher ensured that participants had been sent the information sheet about the study in language that was simple and free from jargon well in advance of their

participation. The researcher was also mindful about coercing or influencing participants into taking part.

The interviews were audio recorded. The interview guide (described in section 2.4.1) was used as an aid to ensure all topics were covered, although respondents were given the opportunity to discuss any issues important to them. There was an attempt to minimise any potential bias arising from the researchers' questioning style (discussed in section 2.2.1) by: avoiding cues that could have led to participants giving what they interpreted as socially desirable responses; phrasing questions in language that was as neutral as possible; avoiding leading questions; using simple jargon-free language; remaining non-judgemental about responses; and demonstrating a lack of commitment to any answers (Ritchie & Lewis, 2003; Bryman, 2004).

During interviews with patients, the researcher was acutely aware that discussing their health status may raise anxiety, particularly since some had already suffered a stroke or myocardial infarction in the past making them a vulnerable group of participants to study. The ICHGCP (2002) guidelines and the RGF for Health and Social Care (2005) both state that the dignity, rights, safety and well-being of participants must be the primary consideration of any research study. Therefore in order to protect this group of participants, the researcher remained particularly alert to any signs of discomfort and was willing to stop the interview if respondents became upset. The researcher also had a list of relevant organisations and services that could be offered to distressed patients, and was aware of advising them to contact their GP to discuss their concerns.

At the end of the interview, the researcher thanked the participant for taking part and gave further reassurances about confidentiality and anonymity and how their data would be used. Any questions raised by the participant were answered appropriately. After the interview, relevant field notes were made regarding: impressions of the participant; whether anyone else was present and their contribution to the interview; and anything of significance that occurred during the interview.

The recordings were transcribed very soon after the interviews either by the researcher or an administrator, as data analysis and data collection were being carried out concurrently (see section 2.5).

### **2.4.3 Respondent validation**

Respondent validation is a method of external validation which seeks to confirm that the researcher's findings and impressions are congruent with the views of those being researched. However, there are limitations to its use as a test of validation. Some participants may be reluctant to be critical of the findings. It is also doubtful whether participants are in a position to validate findings as this entails inferences being made (Bryman, 2004). It is questioned whether respondent validation is needed at all if using a grounded theory approach, as the process of theoretical sampling and constant comparative analysis means that the researcher moves on to involve other participants who have different experiences to see if the findings hold as new data is collected (Elliott & Lazenbatt, 2005).

Despite criticisms, the process of respondent validation was carried out in this study as only some of the components of grounded theory were used. Also the study regarded respondent validation as a process of error reduction as opposed to a check on validity (Steier, 1991). Each participant was sent: a copy of their interview transcript; a short summary of the text; and a response sheet asking them to confirm whether or not the summary was a correct interpretation of their opinions (Appendix 22).

#### **2.4.4 Protection of participant data**

According to the ICHGCP (2002) guidelines and the RGF for Health and Social Care (2005), participant data that allows identification must be protected. This meant each participant record (allowing identification) was given a unique identification code held electronically on a secure database with limited access. All recordings, transcripts and consent forms were labelled with identification codes and stored separately. The code key allowing data to be identified was held elsewhere with restricted access. The confidentiality of participants was maintained by removing any potential identifiers such as the name of the practice or individuals from transcripts, and avoiding the inclusion of any comments in reports or publications allowing identification of respondents.

## **2.5 Data Analysis**

Grounded theory was used to analyse the interview data. The analysis of the HCP and patient data were conducted separately.



### **2.5.1 Coding and constant comparison**

The coding of the data occurred in stages. After the first few interviews, the interview transcripts were reviewed and initial codes were assigned to each part of the text. These codes were initial impressions of the data. The researcher remained open-minded and generated as many codes as necessary to encapsulate the data. According to Charmaz (2006) initial coding 'fractures data into separate pieces and distinct codes'. A comparison was made: comparing data with data, case with case, event with event and code with code in order to understand and clarify the variation in the data. During this process of constant comparison, some codes were combined, others were modified and a few became redundant. Codes that were closely related to one another were grouped together to represent categories or themes. In doing so, it was possible to see the relationships between them and begin to develop a theory. A coding framework was developed in order to code subsequent transcripts and test the integrity of the codes, themes and the emerging theory (Appendix 23 and 24).

### **2.5.2 Alteration of interview guide**

The initial analysis highlighted where there were gaps or uncertainties in the data and where it was necessary to test the integrity and credibility of the emerging theory. The questions on the interview guide were therefore modified so that this could be addressed in subsequent interviews.

### **2.5.3 Data collection and theoretical saturation**

Data collection and data analysis occurred concurrently. This meant after sampling and interviewing a few more participants with the revised guide, their transcripts were analysed in order to assess if the coding framework was still appropriate or whether some modification was required. If additional clarification on a theme was required or new areas of interest were emerging, the guide was again altered and further participants were sampled for interview. Participant recruitment continued until theoretical saturation occurred, that is where nothing new was being heard during the interviews.

### **2.5.4 Mapping themes and developing a theory**

The themes were mapped out in order to view the relationships between them, helping to build the emerging theory. Where the theory was unable to explain any account, the theory was developed further to explain all of the data. The theory regarding the way in which HCPs and patients perceived the polypill was expressed as a set of themes that related to one another in a cohesive way, accounting for all the data collected.

## **CHAPTER 3: RESULTS**

In this chapter, a brief overview of the interviews conducted with HCPs and patients is provided, followed by a presentation of the results.

### **3.1 Interview overview**

All HCP and patient interviews were carried out between March 2009 and July 2010. HCP interviews were conducted at the practice and patient interviews within the home.

Interviews were audio recorded and transcribed verbatim by the researcher. They lasted between 30 and 60 minutes and the topic guide was used throughout. All respondents were sent a copy of their transcript and a summary of the interview; only one additional comment was made by a HCP and this was included in the analysis.

### **3.2 Health care professional results**

#### **3.2.1 Health care professional characteristics**

Nine practices agreed to participate in the CVD screening and interview studies of the 14 initially sampled and approached. From these 9 practices, 50 HCPs were selected and invited to be interviewed. A total of 16 participants agreed across the 9 surgeries.

The characteristics of the HCP sample are shown in table 6. There were almost twice as many GPs (11) than PNs (5). There was at least one HCP and at the most 3 from each practice. There were similar numbers of male and female participants (9 and 7 respectively);

although most GPs (9) were men and all PNs (5) were women. Just under half of respondents (7) were from a minority ethnic group; 3 Indian, 1 White Irish, 1 Chinese and 2 other. Most HCPs (13) had gained their professional qualification between 1970 and 1989, which meant the majority had been qualified for approximately between 20 and 40 years and were aged between 45 and 65 years on average. Half of all HCPs (8) had a medium BMQ score, and the remaining half (8) had either a high or low score. Most HCPs (13) were from either small or medium sized practices. The majority of participants (12) were based in practices located in relatively deprived areas (i.e. those with an IMD score of 3 or 4).

Profession (GP /PN)	Practice number	Gender		Ethnicity		Year of professional qualification					BMQ-General score			Practice size			Indices of Multiple Deprivation (Quartiles)			
		Male	Female	White British	Other	1960 - 1969	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	Low (8-15)	Medium (16-22)	High (23-40)	Small (1-2 full- time equivalent GP)	Medium (3-4 full- time equivalent GP)	Large (5≥ full- time equivalent GP)	1	2	3	4
GP 1	1	✓		✓			✓					✓		✓					✓	
GP 2	2		✓	✓				✓				✓			✓		✓			
GP 3	2	✓		✓				✓				✓			✓		✓			
GP 4	4	✓			✓		✓					✓			✓				✓	
GP 5	5	✓			✓					✓			✓						✓	
GP 6	7	✓			✓					✓			✓						✓	
GP 7	7		✓		✓	✓							✓		✓				✓	
GP 8	8	✓		✓				✓					✓			✓				✓
GP 9	8	✓			✓			✓					✓		✓					✓
GP 10	9	✓			✓		✓						✓		✓					✓
GP 11	3	✓			✓			✓								✓		✓		
PN 1	1		✓	✓			✓						✓	✓					✓	
PN 2	3		✓	✓			✓				✓					✓		✓		
PN 3	6		✓	✓			✓				✓					✓				✓
PN 4	7		✓	✓				✓			✓			✓					✓	
PN 5	8		✓	✓			✓				✓				✓					✓

Table 6: Health care professional characteristics

### 3.2.2 Interview themes

From an analysis of the HCP interview data, three key themes emerged each with subthemes (table 7).

Theme	Subtheme
Attitude towards the polypill	Knowledge and understanding
	Primary prevention
	Secondary prevention
Factors influencing prescribing the polypill	Personal factors
	Drug factors
	External factors
	Patient factors
Monitoring the polypill	Regular monitoring
	Minimal monitoring

Table 7: Themes and subthemes from health care professional Interviews

Each of these themes and their subthemes are discussed below. In order to facilitate a comparison of comments and contextualise the findings, the number of respondents discussing each subtheme is reported (denominator 16 participants) and interview extracts quotes representative of each subtheme are given (Stevenson, et al., 2000). A comparison of cases and subthemes did not appear to demonstrate a relationship between HCPs' characteristics and their views on the use of the polypill in managing primary and secondary cardiovascular risk.

### **3.2.2.1 Attitude towards the polypill**

HCPs discussed their attitude towards the polypill in terms of what they already knew and understood about the drug, and their thoughts about using the medication for primary and secondary prevention.

#### ***Knowledge and understanding***

The majority of HCPs (11) understood that the polypill would be used for CVD prevention, whether this was for primary or secondary prevention or indeed both, and that it would contain multiple ingredients.

*“[The polypill is]...hoping to reduce heart attacks and heart disease and stroke and things like that really...regardless of whether or not they have hypertension or ischemic heart disease at the time.” (GP4)*

*“Its a pill that contains several different things – medicines that are proven to be of benefit to people with cardiovascular disease...” (GP2)*

Beyond this however, their knowledge appeared limited. Most (10) were uncertain about various aspects in terms of the specific population to whom the polypill would be given, and the ingredients and dosages it would contain.

*“...you’re only going to put these people on primary prevention if they’re at risk, aren’t you? It’s not for everybody is it?” (GP10)*

*“...I don’t know if the polypill is supposed to be one dose or different dosages...” (GP6)*

Some participants (3) mentioned that their knowledge was based on what they had read in journals or seen in the media.

*“...I don’t know the thinking behind the use of it other than what I’ve read in the national press.” (GP8)*

### **Primary prevention**

All HCPs (16) expressed concern about using the polypill for primary prevention for all people over a specific age. Most of these concerns were regarding potential side-effects; the difficulty in identifying the ingredient(s) causing the side-effects; and the built-in inability to titrate the ingredients and dosage.

*“...one would intellectually feel that if you put five pills in a pill, or four pills in a pill, more people are gonna react to it than if you’ve got one pill.” (GP3)*

*“If people have side-effects to it, how do you tease out which component it is?” (GP3)*

*“I think you need titration, individual titration of different medications for individual people...so I can’t imagine that one pill will work for everybody.” (PN3)*

*“You cannot with the polypill take out any ingredient that you might not want to give.” (GP1)*

Other concerns raised were: unnecessary medicalisation of healthy people; the current lack of evidence demonstrating effectiveness; and the possible negative impact on health related behaviour, in that it might lead to complacency about leading a healthy lifestyle.

*“...its [the polypill] just another medication that you’d be committing the person to really...I just think it’s unnecessary. I think we should be teaching people, well people,*



*how to keep themselves well without offering them preventive things, in the way of medication that is.” (PN1)*

*“I don’t believe in taking medication unless there’s a good reason for it...As soon as you start administering medication you’ve got 50 year olds who become patients who didn’t need to become patients.” (GP1)*

*“...if you’ve got evidence that it works, then that would be easy for me to support. No, the evidence doesn’t exist.” (GP8)*

*“...it may give people a false sense of security...they’ll continue to eat and drink too much, and smoke too much and take the polypill...it may make no difference whatsoever to them.” (GP4)*

Despite such apprehension, half of respondents (8) recognised the possible advantages of administering a polypill to all people over a specific age: mainly the potential to reduce the risk of developing CVD at a population level. Hence a number (5) were receptive towards a population approach.

*“...the possibilities are that it [the polypill] might reduce people, populations’ risk of heart disease and stroke.” (GP11)*

*“You would reach a population that you wouldn’t otherwise reach, then you’re broadening the service you’re providing and reducing cardiovascular risk.” (GP8)*

However, the majority of HCPs (10) thought that the polypill should only be given to those with risk factors for CVD.

*“It [the polypill] should only be for those at risk of a cardiovascular attack...especially if there’s any history of cardiovascular disease in the family.” (PN2)*

### **Secondary prevention**

Of those HCPs (8) who discussed using the polypill for secondary prevention, most (6) appeared positive. They believed it would be more practical for patients to take thereby improving compliance.

*“...it just saves taking lots of tablets often: I think compliance probably would be better.” (PN5)*

However, a minority (2) questioned whether the polypill would be of any value for secondary prevention as the medication would simply be a combined replacement of current CVD medication.

*“...secondary prevention: I’m not so sure about because we are supposed to be treating these patients anyway...so there is a question really about...well the purpose really.” (GP11)*

#### **3.2.2.2 Prescribing the polypill**

Although all HCPs (16) would consider prescribing the polypill, there appeared to be several factors influencing their willingness. These could be divided into four groups relating to: their personal values; features of the drug; external issues; and patient factors.

### **Personal factors**

For many HCPs (10), personal beliefs regarding unnecessary medicalisation meant that they would not prescribe the polypill without an indication in addition to age alone.

*“...it’s not my ethos to medicate well people to prevent the normal ageing process...”*

(GP8)

*“I just don’t believe that there’s a pill for every ill...later in life you are probably going to develop some problems with your blood pressure and maybe your cholesterol levels won’t stay the same...I think you really have to live with them, you can’t expect to be taking a tablet for every little change that’s happening in your body.”* (PN1)

### **Drug factors**

There were three important factors about the polypill that were deemed to have an influence on whether or not HCPs would prescribe the drug: cost; monitoring; and titration.

According to just under half (7) if the polypill was cost-effective for both patients and the NHS, they would be more likely to prescribe.

*“...if its researched based, it’s shown to have fantastic results, its cost effective...yes I would prescribe it.”* (PN2)

Whereas others (5) stated that cost would have no bearing on their decision if the outcome was beneficial.

*“My primary concern is the patient: is it beneficial to the patient? Not how much it costs.”* (PN4)

Some respondents (6) claimed they would be more willing to prescribe the polypill if they could monitor patients.

*“...I would be happy prescribing it if I could watch people carefully for a while and see how they feel about it.” (PN3)*

Quite a few (6) had concerns over the inability to titrate the polypill which meant they were reluctant about prescribing.

*“...unless there are different doses of combinations of polypills, just giving one to somebody might not necessarily be the right one for that person.” (GP10)*

### ***External factors***

Two external factors, evidence and guidance from the DoH, seemed to have an impact on HCPs' decision to prescribe the polypill.

Most (13) claimed the evidence demonstrating the polypill to be safe, effective and beneficial would be a major determinant in their judgement.

*“...I would be happy [to prescribe the polypill], provided I've got enough data to go on...I think everything hinges on that actually.” (GP7)*

*“...if you're not going to be treating to target but just giving everyone a polypill, that would be quite a major jump and one would have to sort of be convinced that that was an appropriate thing to be doing...” (GP3)*

Two participants said if the DoH recommended prescribing the polypill, they would be more likely to prescribe the drug.

*“If our Primary Care Trust and the Department of Health feel it’s a good thing, then yes I would prescribe it.” (PN2)*

### **Patient factors**

There were several patient factors (risk level, patient choice, previous side-effects, existing cardiovascular disease, compliance, other medical conditions/medications) and one socio-demographic factor (age) that influenced respondents’ views regarding potential prescription of the polypill.

Most (10) claimed they would be more willing to prescribe the medication as a preventive measure for people with risk factors.

*“...patients would have to be selected on the basis of their family history...if the family history contains ischemic heart disease then they’re the ones we should be picking first.” (GP4)*

Many (9) also believed that their willingness to prescribe the polypill would be influenced by the patient’s choice to take the medication.

*“I think we should give patients options. I don’t think we should be saying “oh that is the one. It’s very much a personal choice for the patient.” (GP5)*

A number of HCPs (7) mentioned that they would not prescribe the polypill to patients who had experienced previous side-effects from the individual ingredients.

*“Where somebody’s had an adverse reaction to any of those things that are in it [the polypill], then I wouldn’t prescribe it.” (GP2)*

Several (6) believed they would prescribe the polypill for patients on treatment for existing CVD merely as a replacement as it would be more practical for them to take.

*“Secondary prevention patients – if we’re going to combine some of the medications that they’re already on into a polypill so they’re taking fewer tablets...they might be interested.” (GP1)*

Whereas others (4) thought they would avoid giving these patients the new medication since they require titrated dosages.

*“...the ones who have already got established cardiovascular problems...I would treat them as their condition demands...for example if they need 40 or 80 milligrams of Simvastatin, what am I doing giving them a small dose with the polypill?” (GP7)*

Where patients had problems complying with multiple medications (due to not wanting to take lots of tablets, not having time to adhere to a complex regime, or forgetting to take their pills) some respondents (4) said they would be more likely to prescribe the polypill.

*“...it very much depends on the type of patient...some people will probably be happier to take one pill rather than a couple...people who have a problem with compliance...it would be the right one for them...” (GP5)*

A few (4) also suggested they would be less keen to prescribe the polypill for patients who had complex medical conditions or were on certain medications due to possible contra-indications.

*“...I don’t know if it is contraindicated with people with certain conditions or people who are on certain medications like warfarin for instance...that could be a barrier.”*

(PN2)

In terms of age, the majority (10) of HCPs did not believe in prescribing the polypill to all people over 50 years for primary prevention unless there were risk factors.

*“If they haven’t got any risk factors for cardiovascular disease, I don’t think everybody over the age of 50 should be taking it. I don’t think I’ll agree to that.”* (GP5)

However, there were a number (5) who claimed they would be willing to offer the medication to this population regardless of their level of risk, as long as the evidence demonstrated it to be safe, effective and beneficial.

*“...[the polypill] couldn’t just be handed out to everybody over the age of 50, unless the studies and research suggested that there were no adverse effects and anyone could take the drug...even if they didn’t have hypertension or anything like that.”*

(PN4)

In fact, one participant thought the age limit should be lower, particularly for men.

*“I think the age limit could be lower...maybe 40 for men and 50 for women, because men have higher cardiovascular risks...”* (GP11)

Some (4) claimed they would be more willing to prescribe the polypill for the elderly as it would be more practical for them to take.

*“...very elderly people...they would be happy that some of their treatment for hypertension and cholesterol were combined into one pill so it’s less for them to take.” (PN1)*

Whereas others (2) said they would avoid it for this group due to possible contra-indications with existing drugs.

*“...I would keep it well away from the elderly...because they’re already on polypharmacy.” (GP1)*

### **3.2.2.3 Monitoring the polypill**

HCPs reflected upon both regular and minimal monitoring of patients taking the polypill.

#### ***Regular monitoring***

Almost all HCPs (15) felt it was essential to regularly monitor patients taking the polypill, whether this was quarterly, biannually or annually. The main reasons were: to check that the medication was both safe and effective, especially as it is a new drug; to screen for and encourage patient compliance; and because of the perception that most prescribed medications (including the individual ingredients proposed for the polypill) require some degree of monitoring.

*“...how will you know it’s actually being effective in terms of reducing blood pressure if it’s not monitored?” (PN3)*

*“...you need to see the side-effects...by monitoring. You need to see whether they are developing anything else as well.” (GP7)*



*“...just to reassure [patients] that yes it is working, because I think some people might stop taking it and then not bother coming back, and then you’ve got problems with non-compliance again.” (PN5)*

*“...if someone’s on a drug then historically they are monitored...[not to monitor] would be quite a difficult thing to do...” (PN4)*

*“...we monitor patients who have medication...so it would be a complete change of culture not to do that.” (PN5)*

Only one HCP subscribed to the view that regular monitoring was not necessary as the polypill would become unfeasible otherwise, although he did highlight that the dose would have to be considered safe enough not to be monitored.

*“I think the polypill is only feasible if there is no monitoring associated with it...it’s probably only feasible if the dose is considered safe enough not to be monitored.”*

(GP11)

### ***Minimal monitoring***

The idea of minimal monitoring of patients taking the polypill caused major unease amongst most HCPs (11), with two claiming such a strategy to be negligent.

*“That as a GP does not sit comfortably...if you’re prescribing medication you have an ethical and a moral obligation to monitor this person.” (GP10)*

*“...you don’t give people medicines without seeing what it’s going to do: that’s pure negligent...” (GP1)*

Several (7) claimed they would need to see the evidence regarding why minimal monitoring was deemed appropriate before they could be convinced to adopt this practice.

*“So if the evidence was you don’t have to monitor a polypill then I would say fine...but you’ve got to give me the evidence that that’s an okay way to behave before I would consider that...”* (GP8)

However, others (4) argued they would monitor patients regularly even if the advice was that it was unnecessary.

*“...if the advice was saying not to monitor I’d still want to...for the patients sake and my sake.”* (GP6)

### **3.3 Patient results**

#### **3.3.1 Patient characteristics**

Across the 9 practices that had agreed to take part in the CVD screening and interview studies, 59 patients were sampled and invited to be interviewed. 17 respondents agreed from 7 of the 9 practices.

The characteristics of the patient group are shown in table 8. There was a minimum of one patient and a maximum of 4 from each practice. There were almost twice as many males (11) as females (6). Most participants (15) were White British and only two were from a minority ethnic group (1 Bangladeshi and 1 White Irish). Almost all respondents (16) were aged between 50 and 79 years and most (11) were taking between 1 and 4 medications daily. Over half of patients (10) had a high cardiovascular risk score for which most (8) were

on treatment. There were generally equal numbers of participants (between 5 and 6) with low, medium or high BMQ scores. Most patients (10) belonged to a small practice size and the majority (14) came from practices located in areas of relatively high deprivation (i.e. those with an IMD score of 3 or 4).

Patient	Practice number	Gender		Ethnicity		Age (years)				Number of medications			Cardiovascular risk and treatment status			BMQ-General score			Practice size			Indices of Multiple Deprivation (Quartiles)				
		Male	Female	White British	Other	50-59	60-69	70-79	80≥	0	1-4	5≥	Existing cardiovascular disease and on treatment (anti-hypertensives and/or statins)	High risk (20%≥) and on treatment (anti-hypertensives and/or statins)	High risk (20%≥) and not on treatment (anti-hypertensives and/or statins)	Low (8-15)	Medium (16-22)	High (23-40)	Small (1-2 full-time equivalent GPs)	Medium (3-4 full-time equivalent GPs)	Large (5≥ full-time equivalent GPs)	1	2	3	4	
1	1	✓		✓				✓			✓		✓				✓		✓			✓				
2	2	✓		✓		✓					✓		✓				✓	✓								✓
3	3		✓	✓					✓			✓	✓				✓	✓							✓	
4	4	✓		✓			✓				✓	✓				✓		✓							✓	
5	3	✓		✓			✓				✓		✓		✓			✓							✓	
6	4	✓			✓		✓				✓	✓					✓	✓							✓	
7	4	✓		✓		✓						✓	✓			✓		✓							✓	
8	4	✓		✓		✓					✓		✓				✓	✓							✓	
9	4	✓		✓		✓					✓		✓			✓		✓							✓	
10	1		✓	✓				✓			✓		✓			✓			✓				✓			
11	3	✓		✓				✓				✓	✓				✓	✓							✓	
12	3	✓		✓			✓			✓							✓	✓							✓	
13	1	✓		✓			✓				✓	✓					✓		✓				✓			
14	5		✓	✓				✓				✓					✓	✓							✓	
15	6		✓		✓			✓				✓	✓				✓	✓							✓	
16	6		✓	✓				✓			✓		✓				✓	✓							✓	
17	7		✓	✓		✓					✓	✓				✓			✓						✓	

Table 8: Patient characteristics

### 3.3.2 Interview themes

An analysis of the patient interview transcripts also revealed three key themes, each with subthemes (table 9).

Theme	Subtheme
Understanding of blood pressure and cholesterol	Defining blood pressure and cholesterol
	Dangers of high blood pressure and cholesterol
	Causes of high blood pressure and cholesterol
	Treatment for high blood pressure and cholesterol
Attitude towards current treatment	Perceived risk of developing health problems
	Feelings regarding taking statins and antihypertensives
	Feelings about current monitoring
Attitude towards the polypill	Primary prevention
	Secondary prevention
	Minimal monitoring

Table 9: Themes and subthemes from patient interviews

Again, the number of participants discussing each subtheme is reported (denominator 17 participants) and interview extracts representative of each theme and subtheme are provided. As with the HCP results, the patient data did not reveal a relationship between participant characteristics and opinions on the polypill in managing primary and secondary cardiovascular risk.

### **3.3.2.1 Understanding of blood pressure and cholesterol**

#### ***Defining blood pressure and cholesterol***

Most patients (11) were either unable to describe blood pressure or were inaccurate in their descriptions.

*“I don’t think I really know what it [blood pressure] is to be honest with you.” (P3)*

*“I don’t know...no-one’s ever explained it to me what blood pressure is.” (P13)*

Some (6) however, provided fairly accurate accounts believing it to be the pressure of the blood in the arteries when the heart is beating and resting.

*“[Blood pressure is] the amount of pressure created on the blood when the heart beats or when the heart rests...” (P11)*

Patient understanding of cholesterol was somewhat better. Most (12) were aware that it is related to levels of fat in the blood stream which clogs up the arteries.

*“There’s good and bad fat...but if you’ve got the bad stuff it means there are a lot of loose fatty substances running around in your bloodstream.” (P1)*

However, several (5) confessed to being unable to define cholesterol.

*“I don’t know, I honestly don’t know what it [cholesterol] is...” (P13)*

#### ***Dangers of high blood pressure and cholesterol***

Despite their average understanding of blood pressure and cholesterol, the majority of patients (16) were aware of the possible dangers of when these measures become too high; recognising that it could lead to a stroke, heart disease and even premature death.

*“...if your arteries clog up and reduce the blood supply then obviously you’ve got the chance of having a stroke, heart failure and so on and so forth.” (P7)*

*“I would think if you continued with the high blood pressure, you stand a wonderful chance of dying before your time...” (P13)*

### ***Causes of high blood pressure and cholesterol***

In terms of the leading causes of high blood pressure and high cholesterol, almost all (16) possessed sufficient knowledge. They believed stress and lifestyle factors (such as poor diet, high alcohol intake, smoking, lack of exercise and being overweight) were the main contributors towards high blood pressure

*“I think stress accounts for 60% of high blood pressure cases...” (P2)*

*“Loads of things cause high blood pressure. I mean smoking, too much alcohol, lack of exercise, poor diet, particularly high salt intake.” (P17)*

A high fat diet was considered as the major cause of high cholesterol.

*“...eating certain products cannot be good for your cholesterol – cream, milk and cheese...” (P13)*

### ***Treatment for high blood pressure and cholesterol***

All patients (17) recognised that medication and changes in lifestyle (in terms of regular exercise, a healthy diet, avoiding smoking, reducing alcohol intake and losing weight) could help to reduce high blood pressure and high cholesterol.

*“...the cholesterol tablets help break down that cholesterol, you know keep that under control...” (P8)*

*“Healthy eating, exercise, no smoking, no drinking – same story all the time isn’t it? Just healthy living.” (P9)*

Most (9) believed controlling stress levels could also have a positive impact on blood pressure.

*“...certainly to get yourself out of a stressful situation: if it’s a financial problem that’s creating your blood pressure then try and get your finances into some order.” (P2)*

### **3.3.2.2 Attitude towards current treatment**

#### ***Perceived risk of developing health problems***

Even though all patients in the interview study either had a high cardiovascular risk score or existing CVD, most (11) did not perceive themselves to be at significant risk of developing problems associated with being in these risk groups. The reason was because they believed their blood pressure and cholesterol were being well controlled through medication and lifestyle.

*“...my blood pressure has never been that high so no, I don’t feel I’m at risk any more than obviously everybody could be.” (P17)*

*“I don’t think I’m at risk because I think the doctor keeps my blood pressure and cholesterol fairly well under control...” (P10)*



Some patients (6) however, did not express the same degree of confidence and consequently considered themselves to be at greater risk of complications.

*“I certainly do believe I’m at risk, especially as I’ve been diagnosed with Type II diabetes and suffering with blood pressure...I think I’m an ideal candidate for an early exit.” (P8)*

### ***Feeling regarding taking statins and antihypertensives***

Just over half of all patients (9) who had experience of taking statins and antihypertensives were happy to be taking them as they felt it was controlling their condition and preventing the onset of disease.

*“Relieved to be on medication to be honest, because I’ve always had a bit of a problem with my blood pressure...the tablets are doing a good job, so yeah it’s good.” (P9)*

*“I’m alright with taking them...it keeps me active, keeps me healthy and I don’t have problems as such.” (P15)*

Others (8) however were not so positive, particularly regarding statins: they resented having to be on long term medication; were sceptical of their effectiveness; and had concerns regarding side-effects. Consequently, two patients stopped taking their medication without consulting their GP.

*“I don’t think this medication they’re pumping into you really does work all the time.” (P3)*

*“I’m very sceptical about statins...and my arms and joints were aching...I wouldn’t be sceptical at all if I didn’t feel side-effects.” (P4)*

### **Feelings about current monitoring**

For most patients (13), having their blood pressure and cholesterol monitored by their GP or PN provided them with reassurance that their medication was working and their lifestyle was sufficient.

*“When you’ve been monitored and know you’re okay, it’s like a pat on the back, reassurance...it gives you an indication of your health and longevity of life which we all want...” (P13)*

*“I am reassured because then I know that I’m eating properly...and I don’t have to increase the tablets.” (P15)*

However, there was a minority (4) who did not share this feeling: they claimed to be sceptical of the accuracy of the readings. Upon further exploration this minority appeared disillusioned with their practice believing them to be disinterested in their patients. Whereas those who reported feeling reassured, expressed greater confidence and trust in their GP and PN. It appears patients’ relationship with their care provider was central to their feelings of reassurance.

*“I’m a bit of a non-believer I suppose about how good these doctors are. They just give you a number you want to hear or it depends on how interested they are.” (P3)*

*“I’m not really reassured...blood pressure is taken poorly in most cases...it depends on who your doctor is, on the equipment used...on how far you’ve had to walk to get to the surgery...” (P7)*

### **3.3.2.3 Attitude towards the Polypill**

Patients discussed their thoughts on using the polypill for primary and secondary prevention and their opinions on minimal monitoring.

#### ***Primary prevention***

The majority of patients (14) had serious reservations about the use of the polypill for primary prevention. They considered it as being the unnecessary medicalisation of people whose blood pressure and cholesterol are within normal range.

*“Well you don’t treat something that doesn’t exist do you? If you’ve got somebody whose blood pressure is normal and you’re giving them something which is going to reduce it, it’s dangerous.” (P1)*

*“...putting people not at high risk on treatment would be medicalising them.” (P17)*

They also thought the polypill could cause potential problems in terms of: side-effects; hypotension (i.e. lowering blood pressure too much); and encouraging some people to become complacent about leading a healthy lifestyle believing the medication will protect them from developing CVD.

*“They’re all foreign bodies that you’re taking...they can create other problems...it can cause side-effects.” (P3)*

*“If somebody doesn’t already have high blood pressure, it might make your blood pressure drop too low, and you can feel just as bad.” (P10)*

*“If people think that a tablet saves them having fruit or taking exercise or changing their drinking habits, it can create more problems than it’s worth.” (P2)*

Furthermore, they expressed a general lack of confidence in preventive medicine, often referring to the frequent changes in guidance on taking aspirin.

*“...some time ago the idea that you took aspirin on a regular basis would prevent heart disease is now discovered to cause serious problems. So I would be a bit uneasy about a blanket approach to the polypill.” (P5)*

Consequently, most participants (10) thought the polypill should only be given to those at high risk of CVD.

*“Anybody that has high blood pressure or high cholesterol then yes I think it’s a good idea, but not for everybody over a certain age.” (P10)*

*“It would be ridiculous to put people who weren’t at high risk on a tablet...” (P17)*

However, a minority (3) were positive about administering the polypill for primary prevention to the general population regardless of level of risk, as they believed it could prevent CVD thereby saving the NHS money.

*“I think anything that prevents a disease rather than waiting for people to develop it is superb. It reduces heart attacks and perhaps frees up money to be spent on other things.” (P13)*

*“It’s a very good idea as prevention is better than cure.” (P6)*

### **Secondary prevention**

All patients (17) were optimistic about the use of the polypill for secondary prevention. This centred around the actual pill itself in terms of: the polypill being more convenient and practical to take (as it would reduce the number of tablets); patients being less likely to forget to take their medication; and less packaging.

*“I think the polypill would be superb - anything that can cut down on the vast amount of tablets that people have to take would be superb to be honest.” (P2)*

*“I suppose for elderly people especially, they would find it [the polypill] convenient.” (P4)*

*“People are less likely to forget to take it [the polypill] if its only one tablet.” (P5)*

*“Any way of reducing packaging and the number of pills you have has got to be good.” (P7)*

Several (9) also highlighted the potential cost savings of the polypill for both patients and the NHS.

*“I should imagine it would be more cost effective for the NHS.” (P8)*

*“In the long run it would be cheaper, not just for me but for the NHS.” (P10)*

This optimism led most patients (13) to declare that they would consider taking it for secondary prevention.

*“I would be glad to take it [the polypill] because instead of two, one tablet can cover all my ailments.” (P6)*

*“I would rather take one than several tablets. And remembering to take them – If it’s only one, it would be better.” (P14)*

Despite their confidence in the polypill, many (14) also expressed concerns. The majority of these were again to do with the actual medication itself in terms of: it’s inflexibility (i.e. lack of titration) since the ingredients and doses cannot be adjusted; the possible side-effects; the potential size of the pill; and forgetting to take the polypill in which case patients would be lacking all their CVD medication for that day.

*“The trouble is that you can’t do anything about any ingredient that is causing you side-effects because it’s combined in the pill. At least separately you can make a judgement about whether to stop taking it.” (P4)*

*“A lot of people have got high blood pressure and they are all on different tablets on different doses...so I don’t see how you can have one tablet to cure all...I just don’t think it will work for everyone.” (P9)*

*“If there’s two or more ingredients put into one pill, they may interact with each other and cause side-effects.” (P2)*

*“With all the ingredients there would be a long list of side-effects. The information leaflet would make slightly ridiculous reading.” (P17)*

*“If the tablet becomes too big that some people can’t swallow it, it could lead to another problem where people stop taking the tablet.” (P2)*

*“...if they forget to take the polypill it means they’ve forgotten to take all of their tablets. Whereas now if you forget to take a tablet, it’s far less dangerous than if you forget to take all your tablets.” (P11)*

One patient had reservations about the lack of UK evidence on the effectiveness of the polypill.

*“So there are a few countries abroad that show the polypill reduces the risk? I’m not convinced. The polypill would have to be researched properly in this country.” (P4)*

As a result of their concerns, some respondents (4) stated they would refuse to take the drug for secondary prevention.

*“...when it [the polypill] is in free flow, when it’s regularly used, I might change my mind, but right now I wouldn’t take it.” (P4)*

### **Minimal monitoring**

Most patients (11) were sceptical about the idea of minimal monitoring of the polypill for several reasons. They believed it would fail to give them an indication of whether the medication was being effective or causing any side-effects.

*“How do you know it [the polypill] is of benefit if it’s not monitored? What if it’s detrimental to my health? (P4)*

*“You need to be monitored to see if the polypill is working. You shouldn’t be allowed to go on and on without being monitored.” (P8)*

They also recognised that blood pressure and cholesterol values tend to change with age which can only be detected through regular monitoring.

*“I think that’s dangerous...because people vary through time...so it would need to be checked in time.” (P11)*

It was highlighted that most medications (including the ingredients proposed for the polypill) are monitored and patients therefore questioned why it should be any different for the polypill.

*“I can’t see how putting three medications in one jacket actually alters the monitoring regime. Individually, they are normally monitored.” (P1)*

*“If the polypill is a combination of items which I am currently monitored for, then why wouldn’t I be monitored for a polypill? It doesn’t make sense.” (P4)*

Some respondents (4) were receptive towards minimal monitoring as long as the research evidence and their GP suggested it was appropriate. In fact, they welcomed fewer visits to their practice for monitoring purposes.

*“Minimal monitoring wouldn’t bother me. It’s the perception of what we expect. If it wasn’t needed, I would accept that.” (P7)*

*“Minimal monitoring sounds good...I put my faith in what doctors say, and if they said well you don’t need to be monitored just take this and you’ll be okay...then I’d be quite happy to do that...” (P12)*

Others (2) however were mixed in their opinions on minimal monitoring: although sceptical, they claimed they could be convinced by the research evidence and their GP’s advice.



*“I wouldn’t like no monitoring, but then again if that’s what my doctor said was right, I’m inclined to go with whatever she says anyway.” (P10)*

## CHAPTER 4: DISCUSSION

In this final chapter, the key findings of the study are discussed as well as their potential implications. The chapter ends by providing some conclusions to the study.

### 4.1 Discussion of key findings

This section reviews the key findings of the study in terms of the use of the polypill, prescribing and monitoring, and compares these with existing research.

#### 4.1.1 Use of the polypill

##### 4.1.1.1 *Use of the polypill for primary prevention*

The results of our study found a low degree of acceptability of the polypill for primary prevention amongst HCPs and several concerns regarding: adverse effects; determining the cause of side-effects; titration; medicalisation of patients; lack of evidence; and the negative impact on health related behaviour. Although earlier surveys found HCPs expressed similar concerns, the degree of acceptability appeared to be far higher than found in our study (Holt, 2009; Soliman, et al., 2011; Viera, et al., 2011). There are various possible explanations for this. Firstly, it may be related to level of HCP knowledge. Viera et al (2011) found greater knowledge of the polypill to be associated with greater acceptance. In our study however, HCPs demonstrated insufficient knowledge which may have contributed to their low acceptance of the polypill. Secondly, the inconsistent findings may be related to the characteristics of our sample. The majority of physicians in Viera et al's (2011) study had

been in practice for less than 20 years. However, most of the HCPs in our sample had been qualified for approximately between 20 and 40 years and were aged between 45 and 65 years on average. Since they had been qualified longer and were generally older, they may have been more sceptical of new drug based approaches to primary prevention. Finally, the discrepancy in results may be related to differences in prescribing culture between the US (where Viera et al's (2011) study was conducted) and the UK, since studies have shown the uptake of medicines by UK GPs tends to be slower than in many other developed countries (Pharmaceutical Industry Competitiveness Task Force, 2005).

HCPs scepticism of the polypill may be understood within the context of existing research. For example, studies have shown when HCPs consider initiating preventive treatment for CVD, they prefer patients to make lifestyle changes instead (Lewis, et al., 2003; Gale, et al., 2011). Also, GPs are known to be 'conservative' or 'cautious' in their prescribing behaviour, adopting a 'wait and see approach' (Jacoby et al 2003). Furthermore, when considering medication for patients HCPs take into account the potential harm in terms of side-effects and medicalisation (Lewis & Barton, 2003; Greenfield, et al., 2005; Gale, et al., 2011). In fact, these were of particular concern for HCPs in our study and were found to contribute to their pessimism towards the polypill.

In terms of patient acceptability of the polypill for primary prevention, this too was found to be low and they shared similar concerns as HCPs including: medicalisation; adverse effects; hypotension; the negative impact on health related behaviour; and the poor confidence in preventive medicine. However, an earlier study on patient attitudes towards the polypill demonstrated a high degree of acceptability of the drug (Soliman, et al., 2011). This

discrepancy in results may have been because participants in Soliman et al's (2011) study were already taking the polypill as part of a trial and had experienced a low level of adverse events. Their positive experiences of taking the drug meant they were more likely to be optimistic in their opinions of the polypill than if it had been presented to them as scenario as in our study.

Previous studies may help to identify the reasons for the distrust of the polypill amongst patients in the current study. Research has shown patients tend to underestimate their personal vulnerability to health and life threatening problems: a finding confirmed by our study (Webster & Heeley, 2010). This underestimation of CVD risk may explain why patients saw little potential benefit from taking the polypill as a preventive measure. Research has also demonstrated that patients are cautious about taking preventive CVD medication due to concerns about adverse effects and medicalisation: this too was found in our study (Lewis, et al., 2003; Gale, et al., 2011). There is evidence to suggest patients are wary of antihypertensives and statins (both of which would be included in the polypill) and often fail to adhere to their prescribed regimen, as our study also discovered (Insull, 1997; Bodenheimer, et al., 2002; Bramley, et al., 2006). In fact, according to the 'medicines belief model' patients balance their concerns about medication against potential benefits (Horne & Weinman, 1999). In the case of the polypill, their reservations seemed to outweigh any possible gains.

#### ***4.1.1.2 Use of the polypill for secondary prevention***

The polypill for secondary prevention seemed to achieve a high level of acceptability amongst HCPs and was associated with being more practical. This is consistent with Soliman

et al's (2011) findings where almost all physicians claimed they would support its use. The greater acceptance of the polypill for secondary prevention as opposed to primary prevention may be related to several factors. Firstly, for patients with existing CVD there may be a greater perceived need for the medication as opposed to those who do not have the disease. Secondly, the polypill would simply be a replacement of current therapy rather than a new treatment strategy. Finally, adherence to antihypertensives and statins amongst patients is known to be low (Insull, 1997; WHO, 2003). Combining ingredients into a single form making the medication more practical to take improves adherence (Bangalore, et al., 2007).

Patient acceptance of the polypill for secondary prevention was also high. Despite concerns over titration, side-effects, pill size and the impact of missing a dose, the polypill was perceived as being practical, easier to remember, requiring less packaging, and cost-effective. There has been no research on patient attitudes towards the polypill for secondary prevention and therefore our results cannot be compared. However, previous research can help to confirm and explain some of our findings. For example, in terms of the health belief model, patients in our study expressed reservations about the polypill, but these were outweighed by the potential benefits and therefore many were agreeable to taking the drug (Horne & Weinman, 1999). Similarly, research on combined pills has shown that while patients have concerns regarding titration, they appreciate its practicality and some would be willing to try it if recommended by their physician (Williams, et al., 2005).

#### **4.1.2 Prescribing the polypill**

The findings of our study suggest that HCPs willingness to prescribe the polypill is affected by several factors, although three key features appear to be of key importance: evidence demonstrating the polypill to be safe and effective; patient risk factors; and personal beliefs regarding medicalisation of individuals. Previous surveys on the polypill also found several factors to influence the prescribing decision; however evidence and medicalisation were not identified as playing a role (Holt, 2009; Viera, et al., 2011). This may be due to several reasons. It may be a reflection of healthcare systems. In the UK, there is a strong emphasis on evidence based practice. The reliance on evidence may be less widespread in New Zealand and the US where Holt (2009) and Viera et al's (2011) studies (respectively) were carried out. It may also be because drug based prevention strategies, which have been accused of medicalising people, is still an emerging concept in the UK and has not yet been accepted. Finally, the fact that evidence and medicalisation of people were not identified in either Holt (2009) or Viera et al's (2011) studies may be due to the research method used. They both used quantitative surveys where HCPs were asked to select from a predetermined list, factors most likely to influence their decision to prescribe the polypill. Whereas the qualitative nature of our study allowed participants to generate their own responses.

It is clear from our findings that HCPs decision to prescribe the polypill is complex and affected by both patient and personal factors as well as external and drug characteristics. This is consistent with the literature on prescribing behaviour in relation to preventive medication for CVD and new drugs (Jones, et al., 2001; Jacoby, et al., 2003; Lewis & Barton, 2003; Lewis, et al., 2003; Prosser, et al., 2003; Bryan, et al., 2005; Greenfield, et al., 2005;

Mason, 2008; Gale, et al., 2011). Decisions about medications appear to be entirely subjective with much variation between HCPs. Hence the likelihood of a patient being prescribed a polypill may be determined as much by their own attitude as those of their health care provider.

#### **4.1.3 Monitoring the polypill**

Our study findings revealed considerable scepticism from both HCPs and patients towards the concept of minimal monitoring. They shared similar reasons for regular monitoring: to check for side-effects, effectiveness, compliance and because most medications are traditionally monitored. Previous surveys on the polypill demonstrate similar feelings of scepticism towards minimal monitoring (Soliman, et al., 2011; Viera, et al., 2011).

Research on HCP and patient attitudes towards monitoring medication is limited so we can only speculate on the reasons for our findings. HCPs unease regarding minimal monitoring may largely be a reflection of current practice where patients taking any type of medication are monitored regularly. In fact, monitoring patients for the effects of medication is one of NICE's National Prescribing Centre (2011) strategies. Minimal monitoring of any medication would be a complete change of practice.

For patients, their scepticism may be associated with needing to feel reassured that their medication is both safe and effective in controlling their disease. In fact, most patients in our study claimed they felt reassured when they had their blood pressure and cholesterol monitored at their practice, although this was related to their trust and confidence in their HCP. Requiring reassurance may be part of the reason why an increasing number of patients

are monitoring their own blood pressure at home (Verberk, et al., 2005). However, patient cynicism towards minimal monitoring may also be a reflection of their characteristics: most were either retired or unemployed which meant for many, attending their practice to be monitored did not pose a major inconvenience.

## **4.2 Strengths and Limitations**

### **4.2.1 Strengths**

One of the strengths of the study is that this is the first qualitative study investigating the attitudes of HCPs and patients towards the use of the polypill for CVD prevention. The three previous studies in this area had all been quantitative surveys thereby offering limited insight into the meanings participants attached to their responses (Holt, 2009; Soliman, et al., 2011; Viera, et al., 2011). The present study has allowed an in-depth exploration of what is considered acceptable to HCPs and patients which will be imperative when implementing a polypill strategy.

This is also the first study on HCP and patient attitudes towards the polypill conducted in the UK. The reason this is important is because data from studies conducted abroad cannot necessarily be applied to the UK due to differences in healthcare systems, population demographics and culture. For example, physician prescribing behaviour between countries tends to vary (Pharmaceutical Industry Competitiveness Task Force, 2005). Hence, data from this country will be essential for policymakers considering introducing the polypill in the UK.



The fact that the opinions of PNs were included is a further merit of the study, particularly since previous studies have failed to involve them (Holt, 2009; Soliman, et al., 2011; Viera, et al., 2011). It is important to include their views as the numbers of nurse prescribers in the UK is increasing (Nursing and Midwifery Council, 2011).

A further strength of the study is that all interviews were conducted by a single researcher. Thus any potential bias arising from the researcher's background and characteristics will have been consistent across all interviews.

The grounded theory approach adopted in this study ensured that both the research and data analysis were conducted in a systematic and rigorous manner. It also allowed rich data from the experiences of participants to be generated.

Although the aim of qualitative research is not to be generalisable, both samples of HCPs and patients were representative across several criteria, in particular general attitudes towards medicines: this is important when exploring attitudes towards a potentially new drug (Polit & Beck, 2010). Furthermore, the sample size was sufficient to achieve saturation since there is research to show that this tends to occur by the twelfth interview (Guest, et al., 2006).

#### **4.2.2 Limitations**

One of limitations of the study is that the patient sample only included participants aged 50 years and above. Therefore the cynicism of patients towards the polypill for primary prevention and minimal monitoring may be a reflection of age. It could be that patients under the age of 50 years place greater value on preventive healthcare as well as appreciate

not having to visit their GP practice for regular monitoring due to work commitments.

However, it was felt interviewing should be confined to the older population as it is this group for whom the polypill is being proposed.

Unfortunately the sample of HCPs in our study did not include any newly qualified GPs and PNs. It could be that younger respondents would display more positive attitudes towards prescribing the polypill and forgoing regular monitoring. However, the practices from which the sample was drawn had very few newly qualified HCPs, who when approached to participate in the interview study either refused or did not respond. It may have been useful to enquire further regarding the non-participation of this group.

Our sample also did not represent the opinions of non-English speaking patients. Their views may have been potentially very different. However, these participants were not included due to the additional challenges of translation and interpretation and the associated cost and workload.

A further drawback of the study is that the views of individuals who chose not participate in the study could not be represented. It may be that these participants would be even less tolerant of preventive healthcare and hence their reason for failing to respond to the study invitation, in which case the study findings potentially underestimate the level of acceptance. However, it is impossible to include the opinions of those who are not interested in becoming involved in research, even though their attitudes may be substantially different and therefore valuable.

The study only included the views of patients who were either at high risk of CVD or had existing CVD. Since the polypill is to be offered at a population level, which would include

those with low or moderate CVD risk, it would be important to take their opinions into account too. It may be that this group of patients would be even less tolerant of taking the polypill for primary prevention than those with high or existing CVD risk. The failure to include low and moderate risk patients in our sample is an important design flaw.

The use of the IMD score of the practice area as an indicator of patient's socio-economic status in our sampling strategy may have lacked validity. Each practice location can have pockets of people with differing socio-economic status. A more appropriate measure may have been to use patient's occupation and level within that occupation which many studies often use. However, obtaining this type of patient data as part of the sampling frame could have been problematic.

According to a grounded theory approach, the researcher is expected to be ignorant of any theory or associated literature to the phenomenon being researched. However, the researcher in this study had a good understanding of CVD which may have influenced the process of generating concepts. At the same time, it would have been unfeasible for the researcher to have conducted the research without any prior knowledge as it was a requirement of the role to design and conduct the study.

A further limitation is related to the background and characteristics of the researcher. Participants may have perceived the researcher as being affiliated with the polypill so may have failed to provide a true opinion, thereby potentially biasing the results. In fact, some respondents asked the researcher whether the University was working in collaboration with a pharmaceutical company manufacturing the polypill. Although the researcher clarified such questions when raised, it would have been worthwhile for the researcher to provide

this information from the outset so that participants could offer their genuine opinions. Furthermore, responses from participants may have been different if the interviewer had been a clinician, particularly since research has shown this characteristic tends to have an effect (Richards & Emslie, 2000). However, the professional background of the researcher may not have had a potentially adverse impact on responses since it is likely that participants may have been more open with a non-clinician regarding their unfavourable views of the polypill. A final drawback is that we cannot comment on how prevalent the views expressed in this study are amongst the wider population of HCPs and patients. However, this is the nature of qualitative research: the aim is not to be generalisable but to provide a diverse range of views (Polit & Beck, 2010).

### **4.3 Implications**

In this section, the implications of the study findings in terms of clinical practice and future research are discussed. The ethical implications of introducing a polypill strategy are also considered.

#### **4.3.1 Implications for clinical practice**

If the polypill strategy is to be successfully implemented, there are numerous challenges for clinical practice that would need to be overcome. Based on the study findings, getting HCPs to prescribe the polypill to CVD patients for secondary prevention would not pose a major difficulty as the drug received a high degree of acceptability for this purpose. However, gaining HCP acceptance of the polypill for primary prevention and convincing them to

prescribe it for this purpose would be a huge obstacle to conquer. An even greater challenge would be gaining their approval of minimal monitoring. Several strategies would need to be employed to overcome this resistance and encourage the use of the polypill for primary prevention and forgo regular monitoring of patients. HCPs would need to be provided with UK evidence from clinical trials demonstrating the effectiveness of the polypill, the low risk of adverse events, and the efficacy of minimal monitoring since lack of trial data was a common concern for respondents in our study. HCPs would also need to be informed about the polypill because knowledge regarding the drug was found to be poor and this appears to be related to their level of acceptance. Furthermore, they may need to be educated about population based approaches to primary prevention and the idea that if a stroke or heart attack can be prevented from occurring in the first place, then secondary prevention would not be needed. The aim would be to alter the belief held by HCPs that preventive drugs lead to unnecessary drug taking and medicalisation and that they should only be prescribed for those with established disease. The principle is that a change in attitude should lead to a change in prescribing behaviour. This educational approach may also help to address the current gap in HCP understanding of risk data which is important when making decisions about initiating preventive treatment (Lewis, et al., 2003; Bryan, et al., 2005; Greenfield, et al., 2005).

Given the degree of resistance from HCPs towards minimal monitoring from our findings and those of previous studies, these strategies may not be effective in gaining acceptance for this type of monitoring (Holt, 2009; Soliman, et al., 2011; Viera, et al., 2011). Hence it may be necessary to allow regular monitoring until the polypill becomes well established and there

is substantial long term evidence to support the efficacy of minimal monitoring. Despite this, minimal monitoring will still remain a challenge to implement.

Regardless of the type of monitoring, even if HCPs are accepting and willing to prescribe the polypill for primary prevention, lack of time, heavy workload or inadequate reimbursement may mean many HCPs fail to do so since previous research has shown this to be a barrier in the delivery of preventive medicine (Brotons, et al., 2005). Therefore it may be necessary to delegate the task of prescribing and monitoring to specialised clinics or even pharmacists. However, this approach may not offer continuity of care for patients which may affect compliance with medication. Also, given that two thirds of the population visit their GP once or twice each year, primary care is in an ideal position to deliver preventive healthcare (Brotons, et al., 2005).

If the polypill strategy is to be successful, it is not just HCPs that would need to be convinced. Persuading patients presents another challenge. Encouraging them to take the polypill for secondary prevention would be relatively straightforward since our findings demonstrated a high degree of acceptability. However, the challenge would be convincing patients to take the medication for primary prevention and accept minimal monitoring. Again, various strategies would be required. Patients would need to be educated about the polypill and minimal monitoring as well as the benefits of preventive healthcare. As part of this they would need to be presented with UK based evidence of the drug's efficacy. The idea would be to provide them with enough information of the potential benefits so that these outweigh their concerns such as medicalisation and adverse effects to name just a few. This educational approach could be done as part of a national health programme whereby

patients would be invited for a discussion with their HCP regarding the polypill. Similar health initiatives have been successfully implemented such as the national cardiovascular screening programme for the 40-74 age group population (Department of Health, 2008; UK National Screening Committee, 2008). In addition, media health campaigns could be used to promote the polypill, as smoking cessation programmes have done. However, relying on patients to respond to a national health programme would depend to a large extent on their trust in their health care provider, which as our findings revealed was sometimes lacking. Therefore building trust with patients is essential if patients are to be encouraged to adopt and comply with the polypill. Despite such strategies, acceptance of minimal monitoring is likely to remain problematic. Again, it may be necessary to allow regular monitoring for a while at least.

#### **4.3.2 Implications for future research**

There are potential implications for future research based on the findings of our study. There is certainly a need for a large UK randomised controlled trial in order to test the efficacy of the polypill. This would provide the evidence required by HCPs and patients to help them decide whether the polypill is acceptable. It would also be useful to carry out another qualitative study to investigate the opinions of low and moderate risk CVD individuals since the polypill would be prescribed to all risk groups over a specific age. Considering the views of younger age group populations in this study would be helpful as there are findings, including those of our study, to show that some HCPs believe the threshold at which the polypill is offered to patients should be as low as 40 years (Holt, 2009).

### **4.3.3 Ethical implications**

There are various ethical implications to consider if the polypill is to be implemented. Firstly, it is important to take into account the personal views of HCPs as not everyone believes in preventive medicine (Sackett, 2002). Hence, policy makers need to be aware of the ethics of asking HCPs to encourage patients to take a drug which they themselves have little faith in. Secondly, it is necessary to consider the ethics of encouraging patients to take a drug that may potentially change the cause of death rather than prolong life (Mangin, et al., 2007). This would be considered as both unethical and undermining patient autonomy. Finally, it is necessary to be mindful of the fact that the polypill strategy may be a reflection of a “nanny state” whereby the Government introduces policies that interfere with personal choice.

## **4.4 Conclusions**

Based on our study findings, several conclusions regarding the attitudes of HCPs and patients towards the use of the polypill in the prevention of CVD can be drawn which answer our research questions (section 1.3).

HCPs displayed limited knowledge of the polypill which was largely based on journal articles and the media. Both HCPs and patients exhibited low levels of acceptance of the polypill for primary prevention because of concerns regarding unnecessary medicalisation, potential adverse effects, evidence, titration, impact on health related behaviours and confidence in preventive health. It was believed that if the polypill was to be used for primary prevention, then it should only be for those with risk factors for CVD. Despite this, there was a minority



who recognised the possible benefits of a drug based population approach to primary prevention. In terms of their willingness to prescribe the polypill, HCPs were influenced by several subjective factors although evidence, CVD risk factors and medicalisation played a key role. While HCPs and patients expressed concerns about using the polypill for secondary prevention, these were outweighed by the perceived benefits: largely its practicality and therefore potential to improve compliance. Hence for secondary prevention, the polypill was deemed highly acceptable. Minimal monitoring was received with much scepticism from both HCPs and patients as it was thought that side-effects, efficacy and compliance would go undetected and also because most medications are traditionally monitored. However, there was a minority who could be convinced to adopt minimal monitoring based on the evidence.

The findings would suggest that implementing the polypill for secondary prevention may be relatively successful. Its introduction may also be successful as a primary preventive strategy for those at high risk of developing CVD. However, in terms of a population based approach to primary prevention whereby all those over a specific age are given the polypill, HCPs and patients would need to be convinced of the potential benefits. This would require considerable engagement; providing trial data and education to address key concerns such as lack of evidence, side-effects, titration, and unnecessary medicalisation. Even if HCPs and patients could be persuaded to adopt the polypill for primary prevention on a population level, it is likely that scepticism regarding minimal monitoring would remain. Hence, regular monitoring would need to continue if HCP prescribing and patient compliance is to be optimised.

**Appendices 1, 2 and 7 have been removed from the electronic copy of this thesis as they contain confidential information/are subject to copyright restrictions.**

**Appendix 3: Invitation letter to practices regarding interview and screening study training day**

[GP name]  
[GP address]

[Date]

Dear [GP name]

**Re: Opportunity to participate in a cross sectional and interview study to inform the design of a 'polypill' trial**

We are writing to invite you to take part in a study which will gather data about the prevalence of cardiovascular (CV) risk factors in your patients. The data will be used to aid the design of a pilot randomised controlled trial (RCT) that will test the effectiveness and cost-effectiveness of treatment to target levels of cholesterol and blood pressure, as compared to using fixed doses of statins and blood pressure lowering agents ('polypill' strategy). This project is funded jointly by the National Institute of Health Research and the National School for Primary Care.

Potential benefits to your practice of taking part include:

- Support for your QOF performance in relation to CV indicators.
- Identifying previously unknown patients in a high CV risk group.
- Having a significant proportion of your practice population screened for cardiovascular risk in advance of the introduction of the Government 'MOTs'.

Further information about the study and what it would involve for your practice are enclosed. Training sessions will be held at The University of Birmingham and will last for approximately 2 hours. Patient recruitment expected to begin in September/October 2008.

Please let us know whether or not you are interest in taking part by returning the reply slip enclosed. Places on the training course are likely to be offered on a first come first served basis. If you have any questions, please contact us on [REDACTED].

Yours sincerely,

Professor Jonathan Mant  
Professor of Primary Care Stroke Research

[GP name]  
[GP address]

Please indicate whether you would be willing to participate in the “Cross sectional study and interview study to inform the design of a polypill trial” by ticking one of the options given below.

I would like to take part in the Polypill trial

• I would like to attend the training session on :   
12<sup>th</sup> September 2008, 11.30am – 2.00pm

• I would like to attend the training session on:   
18<sup>th</sup> September 2008, 11.30am – 2.00pm

I am interested in taking part in the Polypill trail, but would like to have more information about the study before deciding whether to take part.

I do not want to take part in the Polypill trial and do not wish to be approached again about this study.

Thank you for taking the time to complete this slip.

Please return to:

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## **Appendix 4: Interview and screening study information sheet for Practices**

### **Overview of the Cross sectional study and interview study to inform the design of a polypill trial**

#### Aim/Rationale

The aim is to gather data from patients in primary care aged 50 and over, in a series of projects that will aid the design of a pilot randomised controlled trial (RCT) that will test the effectiveness and cost-effectiveness of treatment to target levels of cholesterol and blood pressure (BP), as compared to using fixed doses of statins and BP lowering agents (polypill strategy).

These linked projects will be used to identify the most appropriate group of patients to target in an RCT, and will test the feasibility and acceptability of the 'polypill'. Specifically, they will determine the prevalence of people with high cardiovascular risk in a primary care population and ascertain GP and patient attitudes to using a 'polypill'

#### Design

20 practices will run a computer search with support from the research team. The report will collect anonymised data on risk factors used to calculate CV risk for all patients aged 50 or over. 10 practices will then go on to take part in the screening study, where all patients who fall into the unknown CV risk group will be invited to the practice for an appointment with a research nurse. It is estimated that approximately 2500 patients will be screened. At this appointment patients will have their blood pressure and cholesterol levels tested, and a CV risk score will be calculated. Any patient found to be in the high risk group at this appointment will be referred to their usual GP to discuss treatment options. To determine Health Care Professional and patient views on the polypill approach, a number of GPs, nurses and patients will be invited to attend for an interview.

#### Practice workload implications

- Practices will be responsible for running initial reports, with the support of researchers if required.
- Practices will be responsible for sending out invitation letters to patients, with a further follow up letter being sent to non-responders after two weeks. Replies will be sent back to The University of Birmingham. Research staff are also available to assist with this process, where required.
- GPs will be asked to see patients who are deemed to be at high CV risk as a result of the screening, in order to discuss their care. This can be carried out during a routine consultation.
- Researchers will carry out all screening appointments and interviews, although you will be required to provide a room in the practice for the researchers to use during screening.
- Clinical staff at the practice who will be taking part in this study will need to attend a training session to be held at the University of Birmingham. This will last approximately 2 hours and is likely to be over a lunch time period.

## **Appendix 5: Reminder letter to practices regarding interview and screening study training day**

[GP name]  
[GP address]

[Date]

Dear [GP name]

### **Re: Opportunity to participate in a cross sectional and interview study to inform the design of a 'polypill' trial**

You may recall that we recently wrote to you about taking part in a study designed to gather data about the prevalence of cardiovascular (CV) risk factors in your patients, but unfortunately we did not receive a response. The data will be used to aid the design of a pilot randomised controlled trial (RCT) that will test the effectiveness and cost-effectiveness of treatment to target levels of cholesterol and blood pressure, as compared to using fixed doses of statins and blood pressure lowering agents ('polypill' strategy). This project is funded jointly by the National Institute of Health Research and the National School for Primary Care.

Potential benefits to your practice of taking part include:

- Support for your QOF performance in relation to CV indicators.
- Identifying previously unknown patients in a high CV risk group.
- Having a significant proportion of your practice population screened for cardiovascular risk in advance of the introduction of the Government 'MOTs'.

Further information about the study and what it would involve for your practice are enclosed. Training sessions will be held at The University of Birmingham and will last for approximately 2 hours. Patient recruitment expected to begin in September/October 2008.

Please let us know whether or not you are interest in taking part by returning the reply slip enclosed. Places on the training course are likely to be offered on a first come first served basis. If you have any questions, please contact us on [REDACTED].

Yours sincerely,

Professor Jonathan Mant  
Professor of Primary Care Stroke Research

[GP name]

[GP address]

Please indicate whether you would be willing to participate in the “Cross sectional study and interview study to inform the design of a polypill trial” by ticking one of the options given below.

I would like to take part in the Polypill trial

• I would like to attend the training session on :   
12<sup>th</sup> September 2008, 11.30am – 2.00pm

• I would like to attend the training session on:   
18<sup>th</sup> September 2008, 11.30am – 2.00pm

I am interested in taking part in the Polypill trail, but would like to   
have more information about the study before deciding whether  
to take part.

I do not want to take part in the Polypill trial and do not wish to   
be approached again about this study.

Thank you for taking the time to complete this slip.

Please return to:

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**Appendix 6: Letter to health care professionals regarding Beliefs about Medicine-General Questionnaire and personal data questionnaire**

[University headed paper]

[HCP name]

[Practice address]

[Date]

Dear [HCP name]

Your practice has decided to take part in a research study called "Treatment choices for reducing risk of cardiovascular disease". The study is being run by the Department of Primary Care and General Practice at the University of Birmingham

As part of the study we are asking people to complete a questionnaire telling us their views on medications. Please read the attached information, complete the enclosed questionnaires and return in the pre-paid envelope to the University. If you do not wish to complete it, please return the blank questionnaires and you will not be contacted again.

If you have any questions please contact [REDACTED].

Yours sincerely,

Professor Jonathan Mant  
Professor of Primary Care Stroke Research



**Appendix 8: Questionnaire requesting personal data from health care professionals**

**Personal Details**

Participant ID:

**Gender**

Male

Female

**Date of professional qualification** .....

**Ethnic group**

*Please tick the box which you feel best describes your ethnic background*

White British

White Irish

Other White

Mixed

Indian

Pakistani

Bangladeshi

Other Asian

Black Caribbean

Black African

Other Black

Chinese

Other (*please state*) .....

**All information provided will remain confidential to the Research Study Team**

**Appendix 9: Reminder letter to health care professionals regarding Beliefs about Medicine Questionnaire-General and personal data questionnaire**

[University headed paper]

[HCP name]

[Practice address]

[Date]

Dear [HCP name]

You may recall that we recently wrote to you to ask you to complete a questionnaire telling us about your views on medication, as part of a research study called “Treatment choices for reducing risk of cardiovascular disease” that your practice has decided to take part in. The study is being run by the Department of Primary Care and General Practice at the University of Birmingham.

We do not appear to have received any completed questionnaires from you, and it would be very useful if you could spend a few minutes filling them in and returning them to us in the enclosed pre-paid envelope. If you have recently returned the questionnaires to us, please accept our apologies for this reminder. If you do not wish to complete them, please return the blank questionnaires and you will not be contacted again.

If you have any questions please contact [REDACTED].

Yours sincerely,

Professor Jonathan Mant  
Professor of Primary Care Stroke Research

**Appendix 10: Invitation letter to health care professionals regarding interview study**

[University headed paper]

[HCP name]

[Practice address]

[Date]

Dear [HCP name]

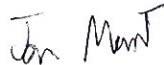
Your practice has decided to take part in a research study called "Treatment choices for reducing risk of cardiovascular disease". The study is being run by the Department of Primary Care and General Practice at the University of Birmingham.

As part of this study we would like to invite you to an interview with a researcher from The University of Birmingham to talk about your experience and views of medications. Please read the attached information sheet, complete the reply slip below, and return to the University in the enclosed pre-paid envelope. Even if you do not wish to be interviewed it would be useful if you could return the reply slip. You will not be contacted any further.

Please note that the interview is expected to last between 30 and 45 minutes. Your practice will be financially reimbursed for your time.

If you have any questions please contact [REDACTED]

Yours sincerely,



Professor Jonathan Mant  
Professor of Primary Care Research

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**TREATMENT CHOICES FOR REDUCING RISK OF CARDIOVASCULAR DISEASE**

I would like / not like to be interviewed.

Name .....

Address .....

Daytime  
phone number .....

Evening  
phone number .....

Reason for not wishing to take part (*you do not have to give a reason if you do not wish to do so*):

## **Appendix 11: Interview study information sheet for health care professionals**

[University headed paper]

### **TREATMENT CHOICES FOR REDUCING RISK OF CARDIOVASCULAR DISEASE**

#### **INTERVIEW STUDY**

We would like to invite you to take part in an interview as part of a research study looking at different ways of reducing risk of cardiovascular disease. Before you decide whether or not you wish to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Do contact us if there is anything that is not clear or if you would like more information.

#### **What is the purpose of this study?**

The purpose of this interview study is to find out about Health Care Professionals' attitudes to using a polypill to manage cardiovascular risk, as opposed to treatment to individual targets for blood pressure and cholesterol.

#### **Why have I been chosen?**

We hope to interview about 30 health professionals (15 General Practitioners and 15 Practice Nurses) for the purposes of this study. You have been approached because your practice has taken part in helping to identify relevant patients for other parts of the research programme.

#### **Do I have to take part?**

It is up to you whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form indicating that you understand what the study involves. If you decide to take part you are still free to withdraw at anytime.

#### **What will happen to me if I take part?**

We are asking you to be interviewed once by a researcher from the University of Birmingham in your practice or in another place convenient for you. We expect each interview to last approximately 30-45 minutes. The interview will be tape recorded.

#### **Will I be reimbursed for taking part?**

Once you have been interviewed, the interviewer will arrange for your practice to be reimbursed for your time during the interview.

#### **What will happen to the results of the interviews?**

The results of the interviews will be written up and published in health professional journals and may be presented at conferences in the UK and abroad. If you wish to know the results of the study then we will send you a copy once they are available. We will not present the results in any way that could allow the identification of individual people who have taken part.

**Appendix 12: Reminder letter to health care professionals regarding interview study**

[University headed paper]

[HCP name]

[Practice address]

[Date]

Dear [HCP name]

We recently wrote to you to invite you to take part in an interview study as part of a research project that your practice has decided to take part in. The study is being run by the Department of Primary Care and General Practice at the University of Birmingham.

We do not appear to have received a response from you about whether you would like to participate in an interview with a researcher from The University of Birmingham to talk about your experience and views on medications. If you are interested in taking part in the study, please read the attached information sheet, complete the reply slip below, and return to the University in the enclosed pre-paid envelope. Even if you do not wish to be interviewed it would be useful if you could return the reply slip. You will not be contacted any further.

Please note that the interview is expected to last between 30 and 45 minutes. Your practice will be financially reimbursed for your time.

If you have any questions please contact [REDACTED].

Yours sincerely,

Professor Jonathan Mant  
Professor of Primary Care Research

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TREATMENT CHOICES FOR REDUCING RISK OF CARDIOVASCULAR DISEASE

I would like / not like to be interviewed.

Name .....

Address .....

Daytime  
phone number .....

Evening  
phone number .....

Reason for not wishing to take part (*you do not have to give a reason if you do not wish to do so*):

### **Appendix 13: Letter to patients regarding Beliefs about Medicine Questionnaire-General**

[Practice headed paper]

[Patient name]

[Patient address]

[Date]

Dear [Patient name]

Our practice has decided to take part in a research study looking at treatment choices for reducing blood pressure or cholesterol levels. The study is being run by the Department of Primary Care and General Practice at the University of Birmingham and has our support.

As part of the study we are asking patients to complete a Beliefs about Medicines Questionnaire. This questionnaire is about what you think about taking medicines. You do not need to be taking any medicines to fill in the questionnaire, we would still like you know what you think. Please read the attached information, complete the questionnaire and return it in the pre-paid envelope to the University. If you decide to complete the questionnaire, you may be invited to take part in an interview study. If you do not wish to complete the questionnaire, please return it blank and you will not be contacted again. Your care will not be affected in any way.

If you have any questions please contact [REDACTED].

Yours sincerely,

[General Practitioner name]

**Appendix 14: Reminder letter to patients regarding Beliefs about Medicines  
Questionnaire-General**

[Practice headed paper]

[Patient name]

[Patient address]

[Date]

Dear [Patient name]

You may recall that we recently wrote to you to ask you to complete a questionnaire telling us about your views on medication, as part of a research study looking at treatment choices for reducing blood pressure or cholesterol levels. The study is being run by the Department of Primary Care and General Practice at the University of Birmingham.

We do not appear to have received a completed questionnaire from you, and it would be very useful if you could spend a few minutes filling one in and returning it to the University in the enclosed pre-paid envelope. If you have recently returned a questionnaire, please accept our apologies for this reminder. If you do not wish to complete it, please return the blank questionnaire and you will not be contacted again.

If you have any questions please contact [REDACTED].

Yours sincerely,

[General Practitioner name and signature]

**Appendix 15: Invitation letter to patients regarding interview study**

[Practice headed paper]

[Patient name]

[Patient address]

[Date]

Dear [Patient name]

Our practice has decided to take part in a research study looking at treatment choices for reducing blood pressure or cholesterol levels. The study is being run by the Department of Primary Care and General Practice at the University of Birmingham and has our support.

As part of this study we would like to invite you to an interview with a researcher from The University of Birmingham to talk about your experience and views on medications. Please read the attached information sheet, complete the reply slip below, and return to the University in the enclosed pre-paid envelope. Even if you do not wish to be interviewed it would be useful if you could return the reply slip. You will not be contacted any further and your care will not be affected in any way.

If you have any questions please contact [REDACTED].

Yours sincerely,

[General Practitioner name and signature]

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**TREATMENT CHOICES FOR LOWERING BLOOD PRESSURE OR CHOLESTEROL LEVELS**

I would like / not like to take part in an interview (please circle)

Name .....

Daytime telephone number .....

Evening telephone number .....

I would prefer to be contacted in the daytime / evening (please delete as appropriate)

Reason for not wishing to take part (*you do not have to give a reason if you do not wish to do so*):



## **Appendix 16: Interview study information sheet for patients**

[University headed paper]

### **TREATMENT CHOICES FOR REDUCING BLOOD PRESSURE OR CHOLESTEROL LEVELS** **INTERVIEW STUDY**

We would like to invite you to take part in an interview as part of a research study looking at different ways of taking medicine to lower blood pressure or cholesterol levels. Before you decide whether or not you are willing to be interviewed, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Do contact us if there is anything that is not clear or if you would like more information.

#### **What is the purpose of this study?**

The purpose of the interview is to find out about your views on different ways of taking medicine to lower your blood pressure or cholesterol level. For example, would you prefer to have a combination of medicines in one tablet and fewer trips to your GP to monitor your progress, or would you rather have separate pills for your medicines and more regular visits to your doctor.

#### **Why have I been chosen?**

You have been chosen because you recently filled in a questionnaire telling us about your views on medicines. We are hoping to interview about 20 people who returned a completed questionnaire to us, to find out more about what you think about taking medicine.

#### **What will happen to me if I take part?**

We are asking you to be interviewed once by a researcher from the University of Birmingham in your home or in another place convenient for you. We expect each interview to last approximately 1 – 1 ½ hours. The interviews will be tape recorded.

#### **Do I have to take part?**

It is up to you to decide whether or not to take part. If you do take part, you will be given this information sheet to keep and be asked to sign a consent form to say that you understand what the study involves. If you decide to take part you are still free to withdraw at any time without giving a reason. A decision to withdraw at any time, or a decision not to take part will not affect the standard of care that you receive.

#### **What are the possible benefits of taking part?**

The information we get from this study may help us to manage blood pressure or cholesterol lowering medicine better for people in the future.

#### **Will my taking part in this study be kept confidential?**

We will remove your name from the interview transcripts to keep your identity confidential. Nothing that you say will be fed back to the doctors and nurses involved in your care as

coming from you. Anything you say during the interview will only be used for the purposes of the study. Recordings will be kept in a locked filing cabinet in the Department of Primary Care and General Practice at The University of Birmingham.

### **What will happen to the results of the interviews?**

The results of the interviews will be written up and published in health professional journals and may be presented at conferences in the UK and abroad. If you wish to know the results of the study then we will send you a copy once they are available. We will not present the results in any way that could allow the identification of individual people who have taken part.

### **Who is organising and funding this study?**

The University of Birmingham, Department of Primary Care and General Practice are running this study. The study is funded by the National Institute for Health Research, part of the Department of Health.

### **Who has reviewed this study?**

Before deciding whether to fund the study, the National Institute for Health Research asked the opinion of two independent experts. The study has also been reviewed and approved by the Birmingham East North & Solihull Research Ethics Committee.

### **What if something goes wrong?**

If you wish to complain or have any concerns about any aspect of the way you have been approached or are treated during this study, you can contact the lead researcher, Professor Jonathan Mant.

### **What happens now?**

We would be grateful if you could complete the reply slip on the attached letter to let us know whether or not you are interested in taking part in an interview. If you tell us that you would like to come for an interview, a researcher will contact you to arrange a suitable time.

## **Thank you for taking time to consider participating in this study**

**If you have any concerns or questions about the study, please contact:**

[Redacted contact information]

[Redacted contact information]

Version 3, April 2009)

**Appendix 17: Reminder letter to patients regarding interview study**

[Practice headed paper]

[Patient name]

[Patient address]

[Date]

Dear [Patient name]

We recently wrote to you to invite you to take part in an interview study as part of a research project looking at treatment choices for reducing blood pressure or cholesterol levels, and as yet, we do not seem to have had a reply from you. The study is being run by the Department of Primary Care and General Practice at the University of Birmingham and has our support.

As part of this study we would like to invite you to an interview with a researcher from The University of Birmingham to talk about your experience and views on medications. If you are interested in taking part in the study please read the attached information sheet, complete the reply slip below, and return to the University in the enclosed pre-paid envelope. Even if you do not wish to be interviewed it would be useful if you could return the reply slip. You will not be contacted any further and your care will not be affected in any way.

If you have any questions please contact [REDACTED]

Yours sincerely,

[General Practitioner name]

---

**TREATMENT CHOICES FOR LOWERING BLOOD PRESSURE OR CHOLESTEROL LEVELS**

I would like / not like to take part in an interview (please circle)

Name .....

Daytime telephone number .....

Evening telephone number .....

I would prefer to be contacted in the daytime / evening (please delete as appropriate)

Reason for not wishing to take part (*you do not have to give a reason if you do not wish to do so*):

## Appendix 18: Health care professional interview guide

### Understanding and attitude towards a polypill

- What is your understanding of the polypill?  
*Provide an explanation of the polypill: In terms of primary prevention, the polypill would contain 4 ingredients: statin, thiazide, ace inhibitor and calcium channel blocker. For secondary prevention, the polypill would contain a beta-blocker instead of a calcium channel blocker. Where patients have existing cardiovascular disease, aspirin would be prescribed in addition to the polypill.*
- What do you think about using a polypill for primary prevention? In other words, giving the polypill to all people over a specific age a polypill as a preventive measure.
- What do you think about using a polypill for secondary prevention?
- Can you see any benefits of the polypill? Explore benefits.
- Can you see any drawbacks of the polypill? Explore drawbacks.

### Monitoring

- Do you think the polypill should involve regular monitoring? Explore reasons.
- What do you think of the idea of minimal monitoring of patients taking the polypill?
- Would you still monitor patients regularly even if you were advised not to? Explore reasons.

### Prescribing

- How would you feel about prescribing the polypill?
- Are there any factors that would affect your decision to prescribe the polypill? E.g. minimal monitoring, risk factors, cost, etc.
- Which groups of patients would you be most likely to prescribe the polypill to? Explore reasons.
- Which groups of patients would you be least likely to prescribe the polypill to? Explore reasons.

## **Appendix 19: Patient interview guide**

### **Patient understanding of blood pressure**

- What do you understand by blood pressure?
- What causes high blood pressure?
- If someone has high blood pressure, why do you think it needs to be treated/why does it matter?
- What treatment can a doctor give someone with high BP?
- Are there any other ways in which people can help to lower their BP (e.g. diet, weight, exercise)?

### **Patient understanding of cholesterol levels**

- What do you understand by cholesterol?
- What causes high cholesterol?
- If someone has high cholesterol, why do you think it needs to be treated/why does it matter?
- What treatment can a doctor give someone with high cholesterol?
- Are there any other ways in which people who have high cholesterol can help to lower it (e.g. diet, weight, exercise)?

### **Patient attitudes toward current medication and monitoring**

- Do you think you are personally at risk of developing any of the problems associated with high blood pressure?
- Do you think you are personally at risk of developing any of the problems associated with high cholesterol?
- Are you currently taking any medication that your doctor has prescribed for your high blood pressure and/or high cholesterol?  
*If yes: how do you feel about taking them?*  
*If been prescribed but not taking them: why are you not taking them?*
- Are you currently having your blood pressure and cholesterol monitored by your GP or practice nurse?  
*If yes: how do you feel about being monitored?*

### **Patient attitudes towards polypill**

(Explain polypill strategy)

- What do you think about the idea of giving a polypill to all people over a certain age to prevent cardiovascular disease even if they do not have high blood pressure or high cholesterol?
- What do you think about offering a polypill to those already taking medication for high blood pressure and high cholesterol as a replacement?
- What do you think about the concept of monitoring patients who were taking the polypill less frequently?

## **Appendix 20: Confirmation letter to participants regarding interview**

[University headed paper]

[Participant name]

[Participant address]

[Date]

Dear [participant name]

### **RE: Polypill – Interview Study**

Thank you for agreeing to be interviewed for the study on [Date] at [time]. Your views on blood pressure and cholesterol are very important for the study. If you have any questions about the interview please contact either myself (Satnam Virdee) on [REDACTED]  
[REDACTED]

I look forward to talking to you.

Yours sincerely

Ms Satnam Virdee  
Researcher

**Appendix 21: Participant consent form for interview study**

[University headed paper]

**PARTICIPANT CONSENT FORM**

**TREATMENT CHOICES FOR REDUCING RISK OF CARDIOVASCULAR DISEASE**  
**INTERVIEW STUDY**

Participant ID \_\_\_\_\_

Please initial box

1. I confirm that I have read and understood the information sheet dated April 2009 (version 3) for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I understand that the interview will be tape recorded but that I can refuse to answer a question if I wish and stop the interview at any time without having to give an explanation
4. I understand that the interview will be typed up and that the conversations in that interview may be used when the research team write about the study. However, any quotes will be anonymised and that no information will be used in any presentations or reports that could lead to my identification.
5. I agree to take part in the above study

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of person taking  
consent

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

**Appendix 22: Letter to participants regarding respondent validation**

[University headed paper]

[Participant name]

[Participant address]

[Date]

Dear [participant name]

**RE: Polypill Interview**

Thank you for talking to me recently regarding your views and beliefs on the use of a Polypill for the treatment of high blood pressure and cholesterol.


I have enclosed a short summary of our discussion, and I would be very grateful if you could spend a few minutes to read it and indicate on the reply slip below whether or not you agree with my interpretation. If there is anything that you do not agree with, it would be useful if you could provide some comments about what it is you disagree with. Once you have done this, please return the reply slip in the enclosed pre-paid envelope, or by fax marked for my attention on [REDACTED].

I have also enclosed, for your information, a copy of the interview transcript. Should you wish to make any comments on the transcript, please feel free to do so and forward them to me.

Once again, thank you for your co-operation and I look forward to receiving your reply slip.

Yours sincerely,

Ms Satnam Virdee  
Researcher

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Yes, I have read the attached summary and:

I do agree with your interpretation

I do not agree with your interpretation

*(please tick appropriate box)*

Comments *(please continue overleaf)*

Signature: \_\_\_\_\_

Date: \_\_\_\_\_ HCP ID: \_\_\_\_\_



## Appendix 23: Coding framework for health care professional transcripts

<b>1</b>	<b>Knowledge and understanding of polypill</b>
1.1	How the polypill may be used/Populations to whom it may be given
1.2	Ingredients/dosages the polypill may contain
1.3	Knowledge of polypill based on journals/media
<b>2</b>	<b>Use of the polypill for primary prevention</b>
2.1	Possibility of side-effects
2.2	Difficulty in establishing ingredient causing side-effects
2.3	Inability to titrate ingredients and dosages
2.4	Lack of evidence of its effectiveness
2.5	Unnecessary medicalisation of people
2.6	Negative impact on health related behaviours
2.7	Could potentially reduce risk of cardiovascular disease at population level
2.8	Should be used as a primary preventive approach
2.9	Should only be given to people with risk factors
<b>3</b>	<b>Use of the polypill for secondary prevention</b>
3.1	Practical for patients/Would improve compliance
3.2	Lack of purpose as would be a combined replacement of current treatment
<b>4</b>	<b>Monitoring the polypill</b>
4.1	Regular monitoring is essential (to check for side-effects and effectiveness/compliance/most drugs require monitoring)
4.2	Regular monitoring is unnecessary (polypill would become unfeasible otherwise)
4.3	Minimal monitoring is a major concern
4.4	Need to see the evidence for minimal monitoring before could be convinced to adopt the practice
4.5	Would still monitor patients despite advice that it is unnecessary
<b>5</b>	<b>Factors influencing prescribing the polypill</b>
	Unnecessary medicalisation of people
	Cost
	Monitoring
	Titration
	Evidence
	Guidance from Department of Health
	Patient risk level
	Patient choice
	Previous side-effects from individual ingredients
	Existing cardiovascular disease
	Patient compliance
	Other medical conditions/medications
	Patient age

## Appendix 24: Coding framework for patient transcripts

<b>1</b>	<b>Understanding of blood pressure</b>
1.1	Defining blood pressure
1.2	Dangers of high blood pressure
1.3	Causes of high blood pressure
1.4	Treatment for high blood pressure
<b>2</b>	<b>Understanding of cholesterol</b>
2.1	Defining cholesterol
2.2	Dangers of high cholesterol
2.3	Causes of high cholesterol
2.4	Treatment for high cholesterol
<b>3</b>	<b>Attitude towards current treatment</b>
3.1	Perceived risk of developing health problems associated with high cardiovascular risk level/existing cardiovascular disease
3.2	Feelings regarding taking statins
3.3	Feeling regarding taking antihypertensives
3.4	Feeling about current monitoring of blood pressure and cholesterol by practice
<b>4</b>	<b>Attitude towards use of the polypill for primary prevention</b>
4.1	Unnecessary in those with normal blood pressure/cholesterol
4.2	Could cause side-effects
4.3	May lower blood pressure too much
4.4	May encourage people to become complacent about leading a healthy lifestyle
4.5	Lack of confidence in preventive medicine in general
4.6	Should only be prescribed to those at high risk of cardiovascular disease
<b>5</b>	<b>Attitude towards use of the polypill for secondary prevention</b>
5.1	Would be convenient and practical for patients
5.2	Patients would be less likely to forget to take medication
5.3	Less packaging
5.4	Cost effective for patients and National Health Service
5.5	Would consider taking the polypill for secondary prevention
5.6	Lack of titration
5.7	Possible side-effects
5.8	Size of pill may be too large
5.9	If forget medication would be lacking all cardiovascular medication for that day
5.10	Lack of evidence demonstrating its effectiveness
5.11	Would refuse to take the polypill for secondary prevention
<b>6</b>	<b>Minimal monitoring</b>
6.1	Sceptical (would not know if polypill was safe and effective/values change with age/most medications require monitoring)
6.2	Receptive towards minimal monitoring as long as supported by evidence/GP
6.3	Mixed opinions but could be convinced

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