Type D Personality and cardiovascular disease: an exploratory study

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work, and that I have not previously in its entirety or in part submitted it at any university for a degree.

_____   Date: _____

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ABSTRACT

Worldwide there is concern about the increase in the level of deaths due to coronary heart disease. In accordance with this global picture, coronary heart disease in South Africa signifies a key health problem. *Type D Personality* (or distressed personality) was developed as an emerging psychological risk factor in coronary heart disease. It is associated with an adverse prognosis, impaired health status, and a wide range of emotional distress symptoms, such as depression. Type D is defined as the tendency to experience increased negative distress such as anxiety, paired with the inhibition of these emotions in social interactions. Hence this exploratory pilot study aimed to determine the relationship between Type D Personality and coronary heart disease. In addition, this research aimed to observe prevalence rates of Type D Personality and coronary heart disease in a group of patients at the Steve Biko Academic Hospital diabetic clinic.

A non-probability convenience sample of 104 Caucasian and Black, Afrikaans and English speaking diabetic patients were approached to be participants. Their ages ranged from 55 to 87 and their socio-economic status ranged from low to high. The Type D Scale–14 and a demographic questionnaire were used to assess for Type D Personality and coronary heart disease, respectively.

Due to under reporting of coronary heart disease patients and the added possible confounding variable of a diagnosis of diabetes, the findings from this research indicate that no statistically significant results were found. However, 41.4% of participants could be classified as Type D. Interestingly, although 41.4% of participants were classified as Type D, 68.9% were classified as positive for Negative Affectivity. Of the total sample of 104 respondents, 35.6% tested positive for coronary heart disease and 92.3% for hypertension. Only 18.3% of the 104 respondents tested positive for both coronary heart disease and Type D. A total of 38.5% of the participants tested positive for hypertension and Type D.

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CHAPTER 1

INTRODUCTION

In this section the importance of the planned research will be contextualised both internationally as well as nationally and then the research problem will be explained. Thereafter, the definition of key constructs as well as the justification, aims and objectives of the study will be given to better the understanding of current research.

1.1   Background and context of study

According to the World Health Organisation (WHO) (World Health Organisation, 2009a) cardiovascular disease (defined later in this chapter) is the main cause of death worldwide claiming 29% of all deaths globally. The WHO furthers states that in 2004, an estimated 17.1 million lives were lost due to cardiovascular disease and of these fatalities 7.2 million were due to coronary heart disease and 5.7 million were due to strokes (World Health Organisation, 2009a; World Health Organisation, 2009b). It is estimated that by the year 2030, there will be 23.6 million fatalities worldwide, mainly due to cardiovascular disease (World Health Organisation, 2009a). Of even more concern is the fact that approximately 82% of the total number of cardiovascular deaths that occur globally, occur in developing countries (World Health Organisation, 2009a; World Health Organisation, 2009b).

In South Africa, a developing country, coronary heart disease signifies a key health problem (World Health Organisation, 2002). This is very similar to what is seen globally. An estimated 28% of all South African deaths in 2002 were accounted for by chronic diseases of which 13% were cardiovascular diseases (World Health Organisation, 2002). The WHO (2009a) states that people in developing countries are more exposed to risk factors that may lead to and exacerbate the development of cardiovascular diseases, in particular coronary heart disease, than

people in developed countries. These risk factors for populations in developing countries include less effective health care services and less exposure to preventative measures. Less effective health care may lead to dire financial difficulties for poor households due to loss of income of the ill person and an increased burden of care on the healthy family members. This may result in family members dying prematurely - a loss that may have been prevented had correct information been distributed to these communities (World Health Organisation, 2009a; World Health Organisation, 2009b). These factors (less effective health care and less exposure to preventative measures) in turn could have an impact on the country's gross domestic profit (World Health Organisation, 2009a). In low- and middle-income countries, it is estimated that there is a reduction of between 1 and 5% in the gross domestic profit due to the impact of chronic diseases such as coronary heart disease and diabetes (World Health Organisation, 2009a). Thus coronary heart disease may be viewed as a severe problem currently influencing the physical, mental and financial well-being of South African society.

Chronic coronary heart disease may have many and complex causes (Kupper & Denollet, 2007). Biologically it is associated with increased blood pressure, increased inflammation, increased sympathetic cardiac drive, high cholesterol, diabetes and vital exhaustion (Brook & Julius, 2000; von Kanel et al., 2009; Williams et al., 2008). In addition, an array of psychological and psychosocial risk factors associated with the incidence and progression of heart disease have been identified. These include depression (Denollet et al., 1996; Pedersen, Ong, et al., 2006), anxiety (Yu, Zhang & Liu, 2008), low social support (Williams et al., 2008), a sedentary lifestyle (Borkoles, Polman & Levy, 2010; von Kanel et al., 2009) and personality (Denollet et al., 1996; Denollet & Van Heck, 2001; Denollet, Vrints & Conraads, 2008). These factors, in particular the psychological factors, often cluster together in heart disease patients thus raising the risk of adverse effects and poor recovery for patients struggling with coronary heart disease (Kupper & Denollet, 2007).

In recent years, research has increasingly focused on psychological prognostic factors in coronary heart disease patients in particular (Denollet, Sys, & Brutsaert, 1995; Denollet, Sys, Stroobant, Rombouts, Gillebert & Brusaert, 1996; Scheier & Bridges, 1995). This is noteworthy as the contentious debate that shadows the Type A, B and C Behaviour Patterns made it undesirable to include personality factors in coronary heart disease research. Pertinent to this debate is the break through construct of *Type D Personality* (or *distressed personality*) that was developed by Denollet et al. (1995, 1996). Type D Personality is defined as the tendency to experience increased negative distress such as anxiety, paired with the inhibition of these emotions in social interactions (Denollet, 2005). The distressed or Type D Personality, appears to be a psychological risk factor in coronary heart disease that has been associated with adverse prognosis, impaired health status, and a wide range of emotional distress, such as depression (Spindler, Kruse, Zwisler & Pedersen., 2009). Type D is based on two broad and stable personality traits that occur in the coronary heart disease patient population namely, negative affectivity (NA) and social inhibition (SI) (Denollet, 2000; Denollet, 2005). The impact of Type D Personality on patients suffering from coronary heart disease has very seldom been investigated in non-Western countries, including in the South African context (Pedersen & Denollet, 2004; Yu et al., 2008). After consulting a range of electronic academic search databases, including EbscoHost, ScienceDirect and SA ePublications, this researcher has concluded that, to the best of her knowledge, most research done in the area of Type D Personality's links to coronary heart disease has been done extensively in Western countries (Pedersen, Ong, et al., 2006) and more recently in Asian settings (Yu et al., 2008). Given the extent of the problem of coronary heart disease internationally and nationally, it is vital that more research about the Type D construct should be done in South Africa. Thus, the current exploratory pilot study intends to investigate Type D Personality and its possible link to coronary heart disease in a group of patients at the Steve Biko Academic Hospital diabetic clinic, in an effort to produce some literature on research on the topic conducted in South Africa.

1.2 Research problem

This study aims to observe prevalence rates of Type D Personality and coronary heart disease in a group of patients at the Steve Biko Academic Hospital diabetic clinic. Further, this research aims to determine the association between Type D Personality and coronary heart disease.

1.3 Definition of constructs

The following definitions are important to develop a better understanding of the proposed research:

Cardiovascular disease: Cardiovascular disease is a generic term that includes a number of specific diseases of the heart and blood vessels such as coronary heart disease. Cardiovascular disease is defined by the World Health Organisation (2009a) as a disease of the blood vessels supplying blood and oxygen to the heart muscle. Other diseases that fall into the category of cardiovascular disease are cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism. For the purpose of this study, the focus will be on coronary heart disease, although mention is made of cardiovascular disease.

Coronary heart disease: Coronary heart disease refers to any disease of the heart and blood vessels. The most common being diseases of the heart muscle, strokes, heart attacks, heart failure and heart disease caused by high blood pressure (hypertension) (Steyn, 2007).

Type D Personality: Type D Personality (Type D) or 'distressed' personality refers to a discrete personality configuration describing coronary heart patients that have a proclivity to experience emotional and interpersonal difficulties (Denollet, 2000; Denollet, Sys & Brutsaert,

1995). This may include high levels of anxiety, anger and chronic tension as well as feelings of insecurity at social gatherings and poor quality of social interactions due to a lack of self-expression (Denollet, 2000; Denollet et al., 1995). Type D consists of two stable personality constructs namely, negative affectivity (NA) and social inhibition (SI). NA denotes the tendency to experience negative emotions over time and in diverse situations. This NA trait has also been conceptualised as being close to the concept of neuroticism which includes feelings of depressiveness, irritability and anger (Denollet, 1997; Denollet, 2000; Denollet, 2005). It is suggested that the level of distress experienced by a coronary heart patient is not linked to the severity of the prognosis, but rather to the individual differences in NA experienced by patients (Denollet, 1997). SI is defined as the basic personality trait that inhibits the expression of emotions and behaviours in social interactions (Denollet, 2005). Individuals who have a high social inhibition score view the outside world as threatening in the sense that they anticipate disapproval from others in social settings. This may lead to them to actively avoid interactions by using coping strategies such as withdrawal (Denollet, 1997). Social inhibition is closely related to the concept of introversion which leads to the conclusion that Type D individuals may actively decrease the availability of social support and may suffer from a lack of assertiveness (Denollet, 1997).

It is important to note that it is the interaction between NA and SI that proves to clarify some of the risk associated with the development of coronary heart disease (Denollet, 1997, Denollet, 2005). Coronary patients that tend to experience negative emotions, but are able to express themselves to others are less likely to become depressed (Denollet, 1997). Conversely, coronary patients who tend to be reserved in social interactions but who are less likely to experience negative emotions are expected to lead a more stable emotional life (Denollet, 1997). Thus, the SI trait moderates the NA trait in individuals who score high on both personality traits (Denollet, 2005).

DS14: Type D Scale-14 is a standardised 14 question measurement tool used in this research to determine whether a patient has Type D Personality or not (Denollet, 2005). (See Appendix C)

1.4   Justification, aim and objectives of study

This pilot study will investigate the prevalence of Type D Personality in a group of patients at the Steve Biko Academic Hospital diabetic clinic. To the knowledge of this researcher, no research about Type D Personality has thus far been done in South Africa. Given the severity of the prevalence of coronary heart disease, it is important to attempt to generate research about Type D in South Africa in order to compare it to studies done abroad. This may help to ascertain whether current findings hold true for cardiac patients in the Steve Biko Academic Hospital diabetic clinic. Furthermore, the development of a psychologically orientated approach to the early identification of patients who may be at risk for coronary heart disease would be of immeasurable value to individuals, communities, and the country as a whole (Pedersen, Ong, et al., 2006; World Health Organisation, 2009a; World Health Organisation, 2009b).

Thus, the aim of this exploratory study was to determine the prevalence of Type D Personality in a group of adult patients frequenting the Steve Biko Academic Hospital diabetic clinic. The three objectives would be to determine the prevalence of Type D Personality in the total sample as a percentage; to determine the prevalence of coronary heart disease in the total sample; and to determine the association between Type D Personality and coronary heart disease.

1.5   Outline of dissertation

In Chapter Two a literature review regarding the factors associated with the onset and progression of coronary heart disease is presented. It explains how Type D Personality as a construct serves as a possible determinant of psychological distress. Possible critique against Type D Personality construct is discussed. Finally, potential ways of how the link between Type D Personality and coronary heart disease is mediated in the body is also debated.

In Chapter Three the biological, psychiatric and psychological theories of the onset of coronary heart disease are discussed in an effort to give a wider view of the possible factors that may come into play in the prospective early diagnoses of coronary heart disease. Various psychological theories are presented, including the Type A, B and C Behaviour Patterns and the Type D Personality model.

Chapter Four covers the aims and research design of the study, a description of the sample and of the measuring instruments used. Furthermore, it explains the research process and the ethical considerations that had to be taken into account for this research. Finally, the methods used for the data analysis are described.

In Chapter Five the results of the frequency procedure exploring the prevalence of Type D Personality and coronary heart disease within the study group are presented. Furthermore, Type D Personality and coronary heart disease compared on the basis of the four demographic variables of gender, age, race and smoking, are presented in tabular form. This is followed by a Pearson chi-square test exploring the nature of the association between Type D Personality and coronary heart disease; and finally, a brief summary of the results is given. The hypotheses are ordered according to the hypotheses in Chapter Four.

Chapter Six reports the findings of the various statistical analyses of the data and compares it to similar research results. In addition, possible clarifying hypothesises are put

forward regarding inconsistencies between the findings of the present study and the literature. The possible limitations of the present study are discussed as well as recommendations for improvement in future studies.

CHAPTER 2

LITERATURE REVIEW

This section commences with a brief discussion of behavioural, psychosocial and psychological risk factors associated with coronary heart disease. This is followed by a discussion of Type D as a determining factor of psychological stress, the prevalence of Type D across cardiac populations and various critique brought against Type D. Thereafter possible mediating processes are elaborated upon including the discussion of the role of cortisol, heart rate, and immune functioning. This may aid in explaining the physiology of how Type D may be linked to an increased risk for being diagnosed with coronary heart disease.

2. 1   Risk factors associated with the incidence and progression of coronary heart disease

   2.1.1   Behavioural risk factors.

The association of behavioural risk factors with coronary heart disease has been well documented (Stamler, Neaton, Garside & Daviglus, 2005; Williams et al., 2008). The most important behavioural risk factors for coronary heart disease are an unhealthy diet, a sedentary lifestyle and tobacco use (Borkoles et al., 2010; World Health Organisation, 2009a). Literature has shown a strong, significant and continuous positive relationship between a high *body mass index* (overweight or obese) and coronary heart disease (Stamler et al., 2005). Interestingly, there is a remarkable difference between diet and coronary heart disease mortalities worldwide (Stamler et al., 2005). Dietary patterns associated with lower coronary heart disease are exceedingly plant-based and are low in saturated fat (Stamler et al., 2005). Research has also shown that the decline in careers that involve *physical activity*, the popularity of sedentary leisure activities for example watching television and the use of transport such as motor vehicles are important risk factors to consider as part of the growing epidemic of coronary heart disease

(Stamler et al., 2005). Inadequate aerobic exercise may lead to a decline in cardiorespiratory fitness and the onset of coronary heart disease, especially in later adulthood. Finally, many studies have shown that there is a high significant positive relationship between daily cigarette *smoking* and the risk of dying from coronary heart disease (Stamler et al., 2005). The health risk lessens considerably for those individuals who have never smoked or who have stopped smoking.

It is important to note that behavioural risk factors are accountable for an estimated 80% of coronary heart disease (World Health Organisation, 2009a). The effects of an unhealthy diet and physical inactivity may lead to raised blood pressure (hypertension), raised blood glucose (diabetes) and raised blood lipids (cholesterol) (Stamler et al., 2005; World Health Organisation, 2009a). The WHO (2009a) regards being overweight or obese as intermediate risk factors, meaning that overweight individuals could be a higher than average risk for any number of cardiovascular complications.

2.1.2   Psychosocial risk factors.

Over the last three decades research exploring the possible link between psychosocial factors and coronary heart disease has gained momentum (Kuper, Marmot, & Hemingway, 2005). In particular the literature seems to focus on factors that relate to *work-stress* and lack of *social support*, partly because these factors seem to mediate the association between social class and health (Denollet et al., 1996; Kuper et al., 2005; Williams et al., 2008). Psychosocial risk factors are known to cluster together within certain individuals and to interact with established biomedical coronary vascular disease risk factors in generating unfavourable clinical outcomes (Pedersen, Ong, et al., 2006).

The acceptance that *work-stressors* could lead to harmful effects on health is a commonly held belief by the general public (Kuper et al., 2005). However, due to the lack of uniformity in measuring work-stressors in research studies, it was difficult to compare results. This led to a vague association between work-stressors and the diagnosis of coronary heart disease (Kuper et al., 2005). Karasek and Theorell (1990) developed a model that defined stress at work to aid in homogenising the way work-stressors are defined in research studies. This model proposed that the need to work quickly and intensely accompanied with minimal control over one's job load, may produce stress. This could result in workers being unable to normalise work pressures by organising their time, making new decisions or learning new skills. Hence, high work demands may add to an increased experience of anxiety and stress that may have long term detrimental effects on health (Karasek, 2004).

An individual's *social support* relates to the number and quality of the social contacts that a person has, as well as describing to what extent an individual experiences emotional support (Kuper et al., 2005; Williams et al., 2008). Furthermore, social relationships may improve health behaviours such as going for regular medical check-ups. This improvement in health related behaviours may be brought about by friends and family encouraging health seeking behaviours similar to keeping up healthy eating and exercise habits (Kuper et al., 2005). Hence, social isolation might negate these healthy behaviours and may induce an unfavourable mental state putting the individual at risk for developing a poor health status (Kuper et al., 2005; Yu, Thompson, Yu, Pedersen & Denollet, 2010). The revelation of an inverse relationship between social support and mortality demonstrates that people with a higher level of social support have better health outcomes (Williams et al., 2008).

2.1.3   Psychological risk factors.

One of the earliest psychological risk factors to gain risk factor status was the Type A Behaviour Pattern (TABP), identified by time urgency, hostility, competitiveness and impatience (Dimsdale, 1988). Due to lack of consistent replication of a significant positive correlation between TABP and coronary heart disease in the literature, psychosomatic research began to turn its attention towards mood and affective disorders instead of TABP; especially to hostility, depression, anxiety and distress (Denollet, 1997; Denollet, 2005; Denollet & Van Heck, 2001; Kuper et al., 2005; Spindler et al., 2009).

Research studies and meta-analytic studies executed to gage the association between *anger*, *hostility* and *coronary heart disease* have presented varying and opposing results (Denollet & Pedersen, 2009; Chida & Steptoe, 2009; Kuper et al., 2005). In a systematic review Kuper et al. (2005) could only identify one small study that showed a positive association between hostility and coronary heart disease, and one study that showed an increase in the rate of sudden death of patients with hostility traits after a myocardial infarction. Kuper et al. (2005) came to the conclusion that there was little support for the hypothesis that hostility alone can predict coronary heart disease. However, in a meta-analysis performed by Chida and Steptoe (2009) anger and hostility were associated with a 20% increase in risk for coronary heart disease events occurring in a healthy population. Poor prognosis was also related to anger and hostility in patients with existing coronary heart disease. Numerous reasons are given for these conflicting outcomes, including the hypotheses that the divergent definitions of hostility and anger, the varying sample populations and the lack of adequate reviews of study designs negatively influence the findings of numerous studies pertaining to hostility and coronary heart disease (Chida & Steptoe, 2009; Kuper et al., 2005).

Major depression is regarded as the most pathogenic risk factor for the development of sickness (morbidity) and mortality in patients with established cardiovascular diseases (Denollet & Van Heck, 2001; Pedersen, Ong, et al., 2006). Psychosomatic depressive symptoms are reported to be prevalent in approximately 20% to 30% of cardiac patients. It has been shown that depressive symptoms present a two-fold increase in the risk of a poor clinical outcome namely multiple cardiac events or death, with the necessary adjustment for established risk factors. This was confirmed in a recent meta-analysis on depression as a risk factor for mortality in coronary heart disease patients (Barth, Schumacher, & Hermann-Lingen, 2004). Depression is significantly different to the psychological risk factor of anger and hostility as it is a defined psychiatric disorder and may be modifiable by drug intervention (Kuper et al., 2005). However, there are some central questions that appear to go unanswered regarding depression, such as whether the risk is restricted to individuals with major depression or whether it also extends to patients with less severe depression (Pedersen, Ong, et al., 2006). Denollet and Pedersen (2009) are of the opinion that researchers investigating the role that depression might play in the onset of coronary heart disease are slowly coming to the conclusion that depression in cardiac patients could possibly be qualitatively different from depression in psychiatric patients. It may be that somatic symptoms of depression such as fatigue, appetite problems and sleeping difficulties are more associated with an increased rate of coronary heart events than cognitive and affective symptoms namely, depressed mood, feelings of worthlessness and suicidal ideation (Hoen et al., 2010). Various predictive factors have been related to the prediction of depressive symptoms in coronary heart disease patients; including lack of social support, hostility, younger age, smoking and social factors (Pedersen, Ong, et al., 2006). Yet there is a paucity of research focused on the influence of personality factors and personality structure (for example ego structure) on the progress of depressive symptoms in cardiac patients (Pedersen, Ong, et al., 2006).

Anxiety is a psychiatric disorder and can be treated by psychopharmacological means and/or by counselling (Kuper et al., 2005). In recent studies Denollet (2000) and Kop (1999) have linked psychological stress to an increased risk of coronary heart disease. Personality is believed to clarify much of the different individual ways that people present psychological distress; hence a personality approach to discern the possible risk of developing coronary heart disease may have advantages over a mood state approach (Pedersen, Ong, et al., 2006). Personality traits exert stable effects on behaviour, whereas mood states, for example depression, are transitory and may vary over time (Pedersen, Ong, et al., 2006; Spindler et al., 2009). Thus, to disregard any association between personality traits and coronary heart disease would be premature. During the past 15 years, there has been a revival of interest in personality traits in the context of cardiovascular disease (Denollet, 2000; Kupper & Denollet, 2007; Spindler et al., 2009). Specifically, Type D or *distressed* personality is an emerging psychological risk factor that has been associated with increased psychological distress, symptoms of exhaustion, adverse health status, and adverse clinical outcome despite appropriate medical treatment (Pedersen, Ong, et al., 2006). In fact, Type D Personality has been stated to be a risk factor on par with established biomedical risk factors with Type D patients having a more than four-fold increased risk of adverse clinical outcome (Pedersen, Ong, et al., 2006). The concept of personality and more specifically Type D Personality as a potential risk factor is an important concept in this study and merits a more detailed discussion in the following section.

2.2   Type D Personality defined

2.2.1   Personality as a determinant of psychological distress.

During the past decade many new diagnostic and treatment strategies including coronary angiography, bypass surgery and angioplasty have been developed for people with cardiovascular disease (Denollet, 1997). As a result of these new developments a marked

improvement has been seen in the short-term prognosis of patients with coronary heart disease. However, there still seem to be some lesser known factors that appear to play a role in the variance of the development and progression of coronary heart disease (Denollet, 1997). Psychological distress may prove to be one such factor and Type D Personality may, to a large extent, account for the relation between psychological distress and coronary heart disease (Denollet, 1991; Denollet, 2000; Denollet, 2005).

Personality traits are replicable across measuring tools and observations thus reflecting an individual's general approach to life and may summarise the behavioural tendencies of coronary heart patients (Denollet, 1997). Therefore, the global traits of negative affectivity (NA) and social inhibition (SI), as identified by cluster analysis (Emons, Meijer & Denollet, 2007), are relevant because they aid in clarifying an individual's emotional and behavioural tendencies (Denollet, 1997). As defined in Chapter 1, NA is a basic personality trait that describes the tendency to experience negative emotions such as dysphoria, anxiety and irritability (Denollet, 2000; Denollet, 2005; Williams et al., 2008). It would seem that in coronary heart disease patients the experience of psychological stress is not related to the severity of their diagnosis, but may reflect individual differences in NA (Denollet, 1991). Similarly, SI is a personality trait denoting the tendency to suppress the expression of emotions in social interaction and is closely related to introversion (Denollet, 1997). The suppression of emotions relates to individual differences in personality and is associated with a reduced inclination to seek social support and with poor quality social interactions (Kuper et al., 2005; Williams et al., 2008). Thus, it appears that the personality traits of NA and SI are pertinent to the topic of personality risk factors in the development and progression of coronary heart disease.

It is estimated that 50% of new coronary heart disease cases cannot be identified on the basis of standard risk factors such as hypertension and smoking (Denollet, 1997). Hence, the

interaction between the traits of NA and SI has the potential to clarify a portion of the variance that exists in the incidence of coronary heart disease (Denollet, 1997; Denollet, 2005). This interaction suggests that SI influences the way that NA is dealt with in coronary heart disease patients and represent a synthesis of the NA and SI traits (Denollet, 1997; Denollet, 2000; Denollet, 2005). Not only is the experience of NA being considered, but also how it is dealt with (Kupper & Denollet, 2007; Pedersen, Ong, et al., 2006). Coronary heart disease patients who score high on both the NA and SI traits have a *distressed personality* (Type D) (Denollet, 1997; Denollet, 2000; Denollet, 2005). Type D Personality has been regarded as an excellent example of a psychological risk factor that includes personality traits (Denollet, 2000; Denollet, 2005; Kupper & Denollet, 2007; Pedersen, Ong, et al., 2006). Type D patients are perceived to be more vulnerable to becoming victims of chronic emotional distress and may put themselves at risk for adverse health outcomes, eventually culminating in actual medical interventions (Denollet, 1997; Denollet, 2005). For example, Type D has been connected with an increased risk of fatal and nonfatal cardiac events in patients with documented coronary heart disease (Denollet, 2000; Pedersen, Holkamp, et al., 2006). How Type D compares as a risk factor across cardiovascular disease patient groups will be discussed in the next section.

2.2.2   Relevance of Type D Personality across cardiovascular disease patients.

In order for Type D to be considered a risk factor it has to fulfil the minimum requirement of being a significant risk factor across cardiovascular patient groups (Pedersen & Denollet, 2006). Hence, the following section will elaborate on the significance of the influence that Type D has on patients with chronic heart failure, coronary heart disease, hypertension, ischemic heart disease and vital exhaustion. In addition, long-term follow up studies of patients with coronary heart disease will be presented as further evidence of the significant role that Type D may play in the progression of coronary heart disease. This will be followed by a short

exposition of the prevalence of Type D internationally, in countries other than Holland, where Type D was initially standardised (Denollet, 2005).

In addition to being a cardiac condition, *chronic heart failure* is seen as a multi-faceted and systemic disease that carries a grim prognosis which affects a patient's quality of life (Denollet et al., 2008). A pro-inflammatory environment adds to the pathogenesis and progression of chronic heart failure (Denollet et al., 2008). Pro-inflammatory cytokines (a protein) are independent indicators of mortality in chronic heart failure as well as being associated with the development of atherosclerotic disease (Denollet et al., 2008). A presumed causal relationship with age is considered, as an age-related rise in pro-inflammatory cytokines has been demonstrated in chronic heart failure patients. Denollet et al. (2008) found in their study that even adjusting for age, Type D was independently linked with significant immune activation and an increase in pro-inflammatory cytokines were observed that paralleled that of immune activation in ageing. This suggests that Type D patients may be more prone to chronic immune inflammatory deregulation and that Type D may accelerate the rate of normal age-related immune dysfunction in patients with established chronic heart failure (Denollet et al., 2008).

Similarly, Pedersen, Ong, et al., (2006) investigated predictors of the onset of depressive symptoms in patients 12 months post-percutaneous coronary intervention who, six months after the percutaneous coronary intervention, had not been depressed. Percutaneous coronary intervention, also known as angioplasty, is a medical procedure used to treat the narrowed arteries of the heart found in *coronary heart disease* (WHO, 2010). It was established that patients who were depressed at 12 months after receiving angioplasty were more likely to have a Type D Personality and to be diagnosed with diabetes than the non-depressed group.

Consequently it was found that Type D could be a significant predictor of the onset of depressive symptoms in coronary heart disease patients.

Likewise, Denollet (2005) validated the DS14 by comparing the prevalence rates of Type D Personality in patients with a diagnosis of *hypertension* and *ischemic heart disease* (reduced blood supply to the heart due to coronary heart disease) with those in a healthy control group. Unpredictably, Type D was significantly more prevalent in hypertensive patients than in ischemic heart disease patients and in the healthy control group. The prevalence of Type D in ischemic heart disease patients compared well with rates found in previous studies (Denollet, 2005). However, the prevalence of Type D found in hypertensive patients was unusually high, thus indicating a possible significant, positive relationship between Type D and hypertension.

In the same vein, the relationship between Type D Personality and *vital exhaustion* in patients with documented coronary heart disease was investigated by Pederson and Middel (2001). Vital exhaustion denotes a mental state distinguished by the experience of fatigue, demoralisation and irritability (Pederson & Middel, 2001). In the Pederson and Middel (2001) study it was shown that patients classified as having Type D Personality had a significantly increased risk of suffering from vital exhaustion. Hence, Type D was a significant predictor of vital exhaustion. This study was deemed as important in establishing Type D as a potential risk factor which could account for individual risk in coronary patients, because it investigated acute (vital exhaustion) and chronic (Type D) forms of negative emotions. This addressed the argument in psychosomatic research that research on acute as well as chronic negative emotions should be investigated (Denollet & Van Heck, 2001). Hence, Type D could be seen as a significant predictor of vital exhaustion in coronary heart disease patients that may account for individual differences in the coping style of patients.

Finally, Type D Personality has previously been identified as an important explanatory risk factor of individual differences in emotional distress and clinical outcome in patients with established coronary vascular disease (Pedersen, Holkamp, et al., 2006). In fact, a number of longitudinal studies during the past decade conducted by Denollet (1991, 1997, 2000, 2005) amongst others, has shown that Type D may be predictive of adverse clinical and psychological outcomes in cardiac patients (Williams et al., 2008). For example, in a 6 to10 year follow-up study, coronary heart disease patients initially identified as having Type D personalities had a fourfold mortality risk compared with non-Type D patients (Williams et al., 2008). Furthermore, a 7 year follow-up study showed that Type D patients who had heart transplantations were associated with a 3 to 6 fold increased risk of impaired health-related quality of life compared to non-Type D personalities (Pedersen, Holkamp, et al., 2006). In addition, Pedersen, Ong, et al. (2006) state that Type D Personality may be on a par with established medical risk factors, as patients with Type D Personality are regarded as being four times more likely to experience increased risk of adverse clinical outcomes. Thus, in short, the literature has shown that Type D is a measure of an individual's psychological distress and that there is an association between Type D Personality and an increased risk of cardiac morbidity.

2.2.2.1 Type D Personality internationally.

Type D Personality had been standardised and extensively researched in the Dutch and Dutch-speaking Belgian populations and found to be highly prevalent in these populations with a prevalence rate of 27% to 31% (Denollet, 2005). However, not only was Type D found to be prevalent in Dutch speaking populations, but also in the Danish population where a prevalence of 16% was found in a mixed group of cardiac patients (Spindler et al., 2009). Type D personality was also determined to be prevalent in the Italian (28%) and German (25%) populations (Grande et al., 2004; Gremigni & Semmaruga, 2005). The combined prevalence for

the United Kingdom and Ireland was found to be 38.5% (Williams et al., 2008). A study to validate the DS14 in the Chinese culture carried out by Yu et al. (2010) found that the prevalence of Type D was 31% in Chinese patients with coronary heart disease and a mean age of 67.3 years. Interestingly, comorbidity in patients was found to be common, with hypertension being the most prevalent comorbid factor. This study showed that the Chinese sample confirmed the validity and reliability of the Type D Personality construct (Yu et al., 2010).

Looking at the body of research (Denollet et al., 2008; Grande et al., 2004; Gremigni & Semmaruga, 2005; Pedersen, Holkamp, et al., 2006; Yu et al., 2010), the value of the Type D construct becomes more and more evident. It may be seen to cut across a variety of cardiovascular patient groups such as chronic heart failure, coronary heart disease, hypertension and vital exhaustion patients as well as a number of countries such as Italy, Germany, the United Kingdom and China (Pedersen & Denollet, 2006). These studies indicate that Type D Personality is perhaps not only an indicator for adverse clinical diagnoses but also for increased psychological distress and impaired physical health (Pedersen & Denollet, 2006; Williams et al., 2008).

2.2.3   Critique of Type D Personality.

It is significant to note that the Type D construct has been criticized by some researchers who argue that Type D is simply another measure of neuroticism which tells us nothing new about the psychological risk factors associated with coronary heart disease patients (Williams et al., 2008). In response, Denollet and Van Heck (2001) argue that a high negative affectivity and social inhibition score is what constitutes Type D and sets it apart. This interaction between high negative affectivity *and* high social inhibition is what places cardiac patients with Type D Personality at risk for adverse health outcomes (Denollet & Van Heck, 2001).

However, numerous other misunderstandings exist about Type D that may impede an optional integration of this personality construct into psychosomatic research (Lesperance & Frasure-Smith, 1996). The first misunderstanding deals with the belief that Type D claims to be the most significant psychological risk factor for coronary heart disease, thereby implying that Type D would deny the importance of specific mood states such as depression or vital exhaustion (Carney, 1998). This statement was made in an editorial comment on a Type D article (Carney, 1998). In fact, the intention is that the Type D construct could be used as a risk factor in the early identification of patients who are at increased risk of experiencing one of these acute or chronic forms of disease-promoting stress (Denollet & Van Heck, 2001). In addition, Type D could not possibly account for all the complexity associated with the pathogenesis of coronary heart disease. The picture provided if one only takes the Type D construct into account is incomplete (Denollet & Van Heck, 2001). The Type D construct neither specifies mechanisms that mediate the personality-disease relationship (Rozanski, Blumenthal, & Kaplan, 1999) nor does it take into account the numerous environmental influences that may moderate this relationship (Denollet & Van Heck, 2001).

The second misunderstanding deals with the mistaken assumption that because Type D is composed of the personality traits of NA and SI, and is seen as a personality sub-type, it is unalterable (Denollet & Van Heck, 2001). This assumption suggests that Type D may promote a static view of the role of psychological stress in heart disease. In answer to this criticism, Denollet and Van Heck (2001) emphasize the point that because Type D patients may have a characteristic way of dealing with stress, it does not automatically mean that the level of emotional stress in these patients cannot be altered (Denollet & Van Heck, 2001). Moderating anger levels, easing depressive symptoms and positively developing social relations has been proposed as aims for behavioural and pharmacological interventions in coronary patients and

would clearly benefit a patient classified as Type D (Pedersen & Denollet, 2004; Pedersen, Ong, et al., 2006; Spindler et al., 2009).

The idea that the Type D construct represents an old idea merely presented in a new form implies that it fails to tell us something new about personality factors in health and disease (Denollet & Van Heck, 2001). Type D is often mistaken for measurement of depression by other researchers because of the wide range of negative emotions characteristic of Type D. However, depression and Type D differ from each other quite noticeably. Firstly, depression refers to depressed affect in particular, whereas Type D refers to negative affect in general including worry and irritability (Pedersen & Denollet, 2006). Secondly, depression does not specify a trait like SI, while Type D includes high scores of inhibition of emotion. Thirdly, depression is episodic ranging from two years or less, while Type D signifies a chronic experience of distress lasting for two years or longer (Pedersen & Denollet, 2006).

The final misconception relates to the Type A Behaviour Pattern frequently being cited as an example of the failure of global traits to predict adverse outcomes in cardiac patients, yet the Type A Behaviour Pattern was purposefully designed to avoid links with global personality traits (Dimsdale, 1988). As a result, Type A reflects a dissimilar assortment of behavioural symptoms and signs. By comparison, the Type C Behaviour Pattern, suggested as being linked to the causality of cancer, reflects a very heterogeneous mixture of cognitions, emotions, verbal and non verbal behavioural patterns, as well as coping strategies (Temoshok & Dreher, 1993). As Scheier and Bridges (1995) advise, behaviour or personality measurements that are too wide or poorly defined should rather be avoided.

Many differences exist between Type A Behaviour Pattern, Type C Behaviour Pattern and Type D Personality. Firstly, Type C mainly focuses on inhibited self-expression whereas Type D places more significance on the propensity to experience negative emotions. Secondly,

Type C has been proposed as being the opposite to the Type A Behaviour Pattern (Temoshok & Dreher, 1993), whereas Type D is fundamentally unrelated to the Type A behaviour pattern (Denollet & Van Heck, 2001). Thirdly, Type D is sometimes confused with particular emotional coping styles such as repression. Repression, however, refers to low negative affect due to an unconscious defensive process whereby negative emotions are excluded from awareness (Denollet, 2000; Denollet & Van Heck, 2001). In contrast, Type D refers to high levels of negative affect and the conscious suppression of these negative emotions as a purposeful strategy to avoid disapproval by others (Denollet & Van Heck, 2001). These foremost conceptual dissimilarities point toward the value of construct validation and model building in research on personality, health and disease (Denollet & Van Heck, 2001).

To conclude, The Type D construct was purposely designed to refer to a homogeneous sub-group that is defined by the combination of two broad and stable personality traits that have a clear conceptual basis in psychological theory (Denollet, 2005; Denollet & Van Heck, 2001; Emons et al., 2007).

2.3 Possible mediating physiological processes between Type D Personality and coronary heart disease

Given that a poor clinical outcome in coronary heart disease patients is perpetuated by multiple factors and their interactions, it is unlikely that only one physiological process can explain the link between Type D Personality and poor cardiac prognosis (Carney, 1998). In light of this complexity and in an attempt to elucidate the possible interaction between psychological factors and actual poor cardiac prognosis, the role of cortisol as well as certain possible physiological processes, namely, heart rate and the immune function will be elaborated upon.

Cortisol is a vital steroid hormone in the regulation of normal physiology (Kupper & Denollet, 2007). It plays a vital role in the body's stress response and as a result continued or

frequent exposure to chronically excreted cortisol may cause potentially harmful effects including hypertension and cardiovascular disease (Kupper & Denollet, 2007). It has been reported that the negative affectivity personality trait is related to higher levels of cortisol during the day, implying that individuals who may experience negative affectivity could possibly be more prone to hypertension and cardiovascular diseases (Kupper & Denollet, 2007; Miller, Cohen, Rabin, Skoner, & Doyle, 1999). In other words, stress hormones, like cortisol, may be so badly regulated in Type D patients that their blood pressure rises, blood vessels clench not allowing enough oxygen rich blood through to the heart, and extra blood sugar is released (Miller, 2005).However, in a recent study on healthy men, no significant associations between negative affectivity and cortisol could be found (Von Kanel et al., 2009).

Heart rate and heart rate variability have equally been shown to be significant predictors of cardiovascular morbidity and mortality (Kupper & Denollet, 2007). Thus, in theory, these physiological processes in the body may mediate the relationship between Type D and adverse health outcomes in heart diseases. Most of the studies done on behaviourally inhibited individuals have shown that they had increased sympathetic nervous system activity due to increased heart rate (Horsten et al., 1999). However, no significant results have been found linking Type D classification with heart rate variability. The core personality traits of NA and SI have been associated with heart rate variability and blood pressure reactivity respectively, a sample of healthy men (Pedersen & Denollet, 2006). Additional studies are needed to investigate this possible physiological interactive pathway between Type D and heart rate (Kupper & Denollet, 2007).

Finally, the possible relationship between personality and immune functioning has received relatively little attention in the literature (Kupper & Denollet, 2007). However, this may be another suggested physiological pathway between Type D and its influence on the body. Type D coronary heart patients may have more active immune systems, and therefore more

inflammation, which could result in damage to blood vessels and the break-up of atherosclerotic plaques (Miller, 2005). These platelets may get stickier, and so they are more likely to form clots in coronary arteries (Miller, 2005). However, Miller et al. (1999) could not find a significant association between neuroticism and circulating leukocyte levels which play a vital role in immune modulation. It is relevant to note that the study of potential pathways linking psychological risk factors, in particularly Type D, to adverse prognosis is still relatively under researched and many more studies are needed to broaden our understanding of this possible link (Pedersen & Denollet, 2006).

This literature review explored the risk factors associated with coronary heart disease. In addition, it elaborated upon Type D as a determinant of psychological distress, the prevalence of Type D across cardiac populations and also debated some of the critique levelled against the Type D construct. Finally, Type D was briefly discussed in relation to possible physiological mediating mechanisms.

CHAPTER 3

THEORETICAL OVERVIEW

This section briefly elaborates on the theoretical viewpoints of coronary heart disease from a range of paradigms including the medical/biological viewpoint, the psychiatric viewpoint and lastly from the psychological viewpoint which will include a discussion regarding the Type A, B and C Behaviour Patterns as well as Type D Personality.

3.1   Biological theory of coronary heart disease

The hypothalamic-pituitary-adrenal (HPA) axis and the stress hormone cortisol provide key links between emotions and the heart (Kupper & Denollet, 2007; Pedersen & Denollet, 2006; "Type D personality," 2005). The HPA axis varies body functions by releasing hormones into the bloodstream (Kupper & Denollet, 2007; Pedersen & Denollet, 2006; "Type D personality," 2005). The system, with the stress hormone cortisol as its agent, performs the vital function of preparing the body to respond to a threat ("Type D personality," 2005). Depending on the threat level, the HPA axis regulates the amount of cortisol circulating in the bloodstream (Kupper & Denollet, 2007; Pedersen & Denollet, 2006; "Type D personality," 2005). This state of readiness, the "fight-or-flight" response, has assorted cardiovascular effects, including a faster heartbeat, higher blood pressure, constricted blood vessels and a release of blood sugar ("Type D personality," 2005). In a very real way, the HPA axis connects emotions to the heart (Kupper & Denollet, 2007; Pedersen & Denollet, 2006; "Type D personality," 2005).

In times of true danger, this heightened cardiovascular state is necessary (Pedersen & Denollet, 2006). But continued exposure to cortisol could have potentially harmful effects as the resulting high cortisol levels place a strain on the heart and on the entire circulatory system and may lead to hypertension and cardiovascular diseases (Kupper & Denollet, 2007; Pedersen &

Denollet, 2006; "Type D personality," 2005). Research has shown that NA may be related to higher levels of cortisol during the day (Miller et al., 1999).

People with Type D personalities may be in double jeopardy ("Type D personality," 2005). Trapped in negative emotions, their stress levels are high and their SI prevents them from getting the help they need to relieve that stress (Kupper & Denollet, 2007; Pedersen, Ong, et al., 2006; "Type D personality," 2005).

3.2   Psychiatric theory of coronary heart disease

Psychiatric disorders frequently occur as complications or as co-morbid conditions in persons with coronary heart disease (Kaplan, Sadock & Sadock, 2003; Spindler et al., 2009). Depression, anxiety, delirium and cognitive disorders are especially prevalent. It is believed that the autonomic cardiac modulation is profoundly sensitive to acute emotional stress such as intense anger, fear, or sadness. Hence it is not surprising that acute emotions, especially anxiety, affect the heart (Kaplan et al., 2003; Pedersen, Ong, et al., 2006; Spindler et al., 2009). Instances of sudden cardiac death related to sudden emotional distress have been noted throughout history in all cultures. High levels of anxiety are associated with a tripling of the risk of sudden cardiac death (Kaplan et al., 2003). A high level of anxiety also raises the risk of future coronary events in patients with myocardial infarction by two to five times that of non anxious patients who have had heart attacks (Kaplan et al., 2003).

3.3   Psychological theories of coronary heart disease

In the following section the psychological theories related to the development of coronary heart disease will be elaborated upon. Firstly, the theories of Type A, B and C

Behaviour Patterns will briefly be discussed and will be followed by an exposition of the Type D Personality theory.

3.3.1   Type A, B and C Behaviour Patterns.

During the 1970s to 1980s, many research studies theorised that the Type A behaviour pattern (TABP) was composed of a pattern of competitive, hard driving behaviour and a pre-disposition to interact with others in a hostile manner (Kupper & Denollet, 2007). It was hypothesised that this cluster of behaviours put people at risk for developing heart diseases after Friedman and Rosenman (1974), during the 1950s, identified a cluster of similar symptoms and behaviours in patients with heart diseases. These behaviours included patients speaking quickly and appearing agitated. Ultimately only hostility remained as one of the core, research proven characteristics of the TABP (Kupper & Denollet, 2007). Type A Behaviour Pattern was seen to represent an amalgamation of different and unrelated behaviours and signs that avoided global personality traits and thus could not be proven to be a significant risk factor for heart diseases. The psychological opposite of TABP was seen as the Type B behaviour pattern (Friedman & Rosenman, 1974). Type B was used to describe patient, even-tempered people that were not seen to be at increased risk for coronary heart disease. Another behaviour pattern, the Type C Behaviour Pattern, developed by Temoshok and Dreher (1993) was selected as the possible psychological blueprint that could cause people to develop cancer. They defined this behaviour pattern as one exhibited by individuals who could not cope with life-stress in a healthy way, but instead suppressed their feelings. These people never expressed anger, fear or sadness. It was extremely important to them to maintain an outward appearance of pleasantness, even under dire circumstances and to strive excessively to please family, friends and even strangers (Temoshok & Dreher, 1993). Like the TABP, this Type C behaviour pattern also consists of a cluster of behaviours and symptoms that seem related to one another. In contrast to the behaviour patterns

mentioned above, the Type D Personality signifies a unified group of behaviours and emotions that are defined by two broad and stable personality traits, negative affectivity (NA) and social inhibition (SI) (Denollet & Van Heck, 2001; Pedersen & Denollet, 2006).

3.3.2   Type D Personality.

The following discussion will start by theorising about the intrapsychic picture of someone with a Type D Personality. Thereafter, the interpersonal difficulties in the social arena will be elaborated upon and finally it will end with a brief account of how Type D Personality may influence an individual's health related behaviours.

In the psychological picture of Type D, mention is made of an individual's intrapsychic level and interpersonal level (Denollet, 2000). On an intrapsychic level, Type D patients tend to experience difficulties in the area of emotional well-being. Individuals exhibiting high scores in NA are more likely to experience emotional problems and behaviours over time and in different situations (Denollet, 2000; Denollet, 2005; Pedersen, Ong, et al., 2006; Williams et al., 2008). From a cognitive point of view, Type D patients are inclined to worry a lot and to take a gloomy view of things. From an affective point of view, symptoms of depressed mood are often accompanied by other negative emotions such as anxiety and anger (Denollet, 2000; Pedersen, Ong, et al., 2006; Spindler et al., 2009; Williams et al., 2008). Type D patients are more likely to feel unhappy and to be tense or easily irritated and less likely to experience positive mood states (Denollet, 1997; Denollet, 2000; Spindler et al., 2009; Williams et al., 2008). They sometimes live under a considerable amount of pressure and may be unable to cope effectively with stressful events. However, given their inhibited behaviour and low self-disclosure, these intrapsychic phenomena may not be readily acknowledged by others (Denollet, 2000; Denollet et al., 2008). Overall, Type D individuals may be lacking in self-esteem, dissatisfied with life in general and may communicate low subjective levels of well-being (Denollet, 1997).

On an interpersonal level, Type D patients tend to experience difficulties in the area of social interaction (Denollet, 2000; Spindler et al., 2009; Williams et al., 2008). That is, individuals high in SI are more likely to perceive the social world as "threatening" in the sense that they anticipate negative reactions, such as disapproval, from others. To avoid these reactions, Type D patients adopt self-protective strategies such as inhibition of self-expression and withdrawal (Denollet, 2000; Denollet et al., 2008). Type D patients are less likely to disclose their negative emotions and tend to inhibit the expression of their true thoughts and feelings (Denollet, 2000; Denollet, 2005). Type D patients often feel uncomfortable with strangers and may be unable to display assertive behaviours (Denollet, 2000; Williams et al., 2008). They may have only a few personal ties with people and tend to keep others at a distance (Denollet, 2000; Denollet, 2005; Williams et al., 2008), thus significantly lowering their exposure to social ties such as friends and family who may encourage health seeking behaviours. However, it is important to note that this psychological picture of the Type D model is incomplete as it does not specify all health-related personality dimensions nor does it take into account dynamic interaction between the person and environmental situations (Denollet, 2000).

This psychological picture that Type D presents may translate to Type D patients being more inclined to let a diagnosis of coronary heart disease get them down, possibly intensifying their gloomy outlook on life and low self-esteem (Williams et al, 2008). This may lead to them engaging in disease promoting behaviours such as smoking, spending less time outdoors, having less healthy eating patterns, not cooperating with rehabilitation programmes and not going for regular medical checkups (Pedersen & Denollet, 2006; Williams et al., 2008). Furthermore, social inhibition may also impede communication between patient and physician, which might lead to the smaller likelihood of patients undergoing invasive procedures, hence increasing the possibility of recurrent cardiac events in these individuals.

To summarise what was discussed in this chapter; psychological theories help us to understand, explain and predict human behaviour. Hence, the biological, psychiatric and psychological theories were briefly discussed to facilitate our understanding of the interaction between Type D and coronary heart disease. In particular, the central assumptions of the Type D Personality theory were discussed in more detail and formed the central theoretical conceptualisation utilised for this study.

CHAPTER 4

METHODOLOGY

This chapter describes the methodology that was employed in the present study. Firstly it presents the aims of the study and sets out the research questions. Secondly the research design and the measuring instruments used, as well as the descriptive statistics of the sample, are presented. Thirdly, the procedure used to execute the research is presented, closely followed by the ethical considerations that had to be taken into account in carrying out this study. The description of the data analysis methods used to examine the data concludes this section.

4.1   Aim of study

The major aim of this study was to explore the prevalence of Type D Personality in a group of adult patients frequenting the Steve Biko Academic Hospital diabetic clinic.

Thus, the research attempted to investigate the following hypothesis:

- The prevalence of Type D Personality as measured by the Type D Scale-14 in a group of patients at the Steve Biko Academic Hospital diabetic clinic will be higher than other populations.

- The prevalence percentage of coronary heart disease as reported by a group of patients at the Steve Biko Academic Hospital diabetic clinic will be higher than other populations.

- The prevalence of Type D Personality will be higher in patients with coronary heart disease in this sample.

4.2   Research design

The study incorporates a cross-sectional design as this allows the researcher to compare a static image of the participants' self-reported functioning in terms of Type D Personality and their diagnosis of coronary heart disease. This design does not usually allow for the establishment of temporal association, but that does not hinder the testing of hypotheses since a mutually predictive relationship is being tested rather than causality (Dooley, 1995). Furthermore, Denollet (2005) notes that the time point for assessment of the construct is of less importance since Type D Personality is perceived as a stable personality construct. Thus, a cross-sectional design was followed for this quantitative study in order to determine the prevalence percentage of Type D Personality as well as the prevalence of coronary heart disease in patients frequenting the Steve Biko Academic Hospital diabetic clinic. Currently no such statistics exist.

Possible limitations of the study may be seen as the inability to control the confounding variables such as unhealthy behaviours (for example excess consumption of alcohol and overeating) that contribute to cardiovascular morbidity (Denollet, 2005). Furthermore, the absence of data regarding the discriminant validity of the DS14 and its relationship to psychopathology and personality disorders may further limit any conclusions drawn from this study. However, a possible strength may be that the sample consists of participants, as they were approached in the order that they report at the clinic. Hence, the patients represent those seen in daily clinical practice at the Steve Biko Academic Hospital diabetic clinic (Pedersen, Ong, et al., 2006).

4.3   Sample

The participants taking part in this study all frequented the Steve Biko Academic Hospital Diabetic Clinic as patients at that facility. Their average age was 66 years and the gender of the sample was fairly evenly split between males and females. This sample was also evenly split in terms of race. Most of the patients could communicate in English and understand the questionnaire fairly well, although it was not their first language. This was determined in an informal way by asking the participants whether they could understand what was asked of them. In some instances the researcher had to explain isolated terms in the questionnaire to the participants. The proposed sample size was 100 patients of 55 years or older that could be conveniently sampled. Research shows that for older patients (55=>) it is not an unexpected major event to be diagnosed with coronary heart disease, thus an age of 55 years or older was selected as an inclusion criterion (Denollet et al., 2008). The fact that older patients are more frequently diagnosed with coronary heart disease may be because this population group has a more aggressive development of heart failure as a result of having to cope with a host of psychosocial issues such as the death of friends and loved ones, as well as concerns about their own health (Denollet et al., 2008).

The final sample size that was used for this study was 104 patients in total, with ages ranging from 55 to 87. A decision to make use of the non-probability sampling method of convenience sampling was taken because of time constraints related to the research and because this was an exploratory pilot study (Coolican, 2004). Nevertheless it did allow the researcher to gain access to basic data and trends (Coolican, 2004; Graziano & Raulin, 2004). However, the drawback to this sampling method is the possibility of selection bias which is described as the difference in results between the sample and the theoretical results from the entire population of coronary heart patients as reported in the literature (Coolican, 2004). This may result in limited

generalisation of this sample to the population and low external validity. In this study a sample of a group of diabetic patients was used without prior knowledge of the status of their cardiac diagnosis. This would make the current sample qualitatively different from samples used in the literature, where larger case-control studies were used with patients that had prior diagnoses of coronary heart disease (Denollet, 2000; Denollet, 2005). As is shown in the results chapter, the number of participants with coronary heart disease was significantly under reported. Furthermore, the added variable of a diabetes diagnosis was significantly over reported and may have had unknown effects on the results.

4.4   Measuring instruments

Two measurements were used in this research, namely a demographic questionnaire and the Type D Scale–14 (Denollet, 2005). These measures were both compiled in English and are self report measures. Research has shown that self report measures can aid in gathering unique information about the internal affective and cognitive world of research participants (Chan, 2009; Fink, 1995). Indeed, in matters of confidentiality, self report measures may offer the participant reliable privacy and anonymity (Baldry & Winkle, 2004). However, respondents may answer the questions in what they perceive to be a socially desirable way so as to present themselves as more attractive and in a way that they would find more acceptable (Chan, 2009). Although this criticism may hold partially true, it cannot be said that participants would be inaccurate all the time, for example about their gender. Furthermore, the validity of the Type D Personality Scale – 14 has been analysed and confirmed for different populations on numerous occasions (Borkoles et al., 2010; Denollet, 2005; Emons, et al., 2007; Spindler et al., 2009; Yu et al., 2008). Thus it has obtained the reputation of being a well-established, valid and reliable self report measure. Hereafter follows a discussion about the measuring instruments used in the research.

4.4.1 Demographic questionnaire.

The Demographic questionnaire provided information about the participants' medical diagnosis as well as demographic information such as gender, age, educational and marital status. In particular, information about the presence of diabetic type, cardiovascular disease in a broader sense and a diagnosis of coronary heart disease was gathered with this questionnaire. A health behaviour related question to ascertain participant's smoking practices was also included. Thus, the information gained may be seen not only as a measurement of demographic information but also as an assessment of other co-variate variables, such as age, gender and a diagnosis of diabetes, hypertension, cardiovascular heart disease or coronary heart disease, that may distort the relationship between Type D and coronary heart disease. (See Appendix B)

4.4.2 Type D Scale-14.

The Type D Scale-14 (DS14) was specifically developed by Denollet (2005) to assess negative affectivity (NA), social inhibition (SI) and Type D in a reliable and standardised way (Denollet, 2005; Kupper & Denollet, 2007). This measurement tool was used as the primary exposure assessment of whether a participant was positive for Type D or not. (see Appendix C.) Some of the items of the DS14 originated from its predecessor, the DS16, but the DS14 also contains some new items that were developed to enhance the assessment of NA and SI (Denollet, 2000; 2005). The DS14 consists of 14 questions which delineate two subscales, namely negative affectivity (NA) and social inhibition (SI). NA denotes the stable tendency to experience negative emotions such as dysphoria, anxiety and irritability over time and regardless of the situation (Denollet, 2000; Denollet, 2005; Emons et al., 2007). Social inhibition (SI) refers to the stable tendency to inhibit the expression of emotions and behaviours in social interaction, lack of self-assurance and the tendency to avoid confrontation in social interaction leading to non-expression of negative emotions (Denollet, 2005; Emons et al., 2007).

A brief measure was devised so as to burden patients as little as possible (Denollet, 2005; Emons et al., 2007). Seven items were selected to cover the domains of NA and SI, respectively. The inclusion of items in the DS14 was based on conceptual and psychometric grounds as the NA items had to cover the tendency to experience feelings of dysphoria, anxious apprehension and irritability (Denollet, 2005; Emons et al., 2007; Yu et al., 2008). The SI items had to cover the domains of social conflict, reticence and lack of social poise. Psychometrically, items with the highest item-total correlations were selected (Denollet, 2005; Emons et al., 2007).

Each item is scored on a 5-point Likert-scale where 0 represents 'false' and 4 represents 'true' (Denollet, 2005; Emons et al., 2007). To assess these personality traits the NA and SI subscales can be scored as continuous variables with a range of 0-28. A cut-off of 10 on both subscales is used to classify subjects as Type D, thus NA and SI subscales are positive if they are equal to or greater than 10 on both scales (Denollet, 2005; Denollet et al., 1996; Emons et al., 2007; Kupper & Denollet, 2007). In the current study the Type D Scale-14 questionnaire defines whether a participant has Type D Personality.

In the study done by Denollet (2005), the questionnaire was standardised on a sample of Belgian, Caucasian participants, with an age range of between 16 and 101 years and a mean age of 45.6 years (Denollet, 2005; Kupper & Denollet, 2007). The internal consistency of the scale seems to be good, as it scored 0.88 and 0.86 on Cronbach's alpha for the respective subscales (Denollet, 2005; Emons et al., 2007; Kupper & Denollet, 2007). A more recent control design study done by Yu et al. (2008) included 187 Chinese coronary heart disease patients and 376 healthy controls. They found the reliability of the DS - 14 to be excellent for the coronary heart disease patients as the Cronbach's alpha for the respective subscales were 0.90 and 0.85 for the NA and SI subscales respectively. Further, in Denollet (2005), factor analysis of the 7 NA and 7 SI items showed that the NA subscale covered dysphoria (items 4, 7, 13); worry (items 2, 12)

and irritability (items 5, 9) and the SI subscale covered discomfort in social interactions (items 6, 8, 14); reticence (10, 11) and social self-assurance (items 1, 3) (Denollet, 2005; Emons et al., 2007; Kupper & Denollet, 2007; Yu et al., 2008).

4.5 Data collection procedure

Approval to conduct the research was granted by the Faculty of Health Sciences Research Ethics Committee (see Appendix D) and the Faculty of Humanities Research Ethics Committee (see Appendix E). After permission was granted from the relevant authorities, the researcher approached the clinic for permission to conduct the research. Once this was granted, all the practical arrangements were made and a liaison with the nursing staff and doctors, who were informed about the research, was established. The research was conducted over a period of eight weeks at the Steve Biko Academic Hospital Diabetic Clinic.

The patient turnover at the Steve Biko Academic Hospital Diabetic Clinic is very high, thus different patients are seen on a daily basis. The researcher introduced herself to patients on a daily basis for eight weeks and explained the research being undertaken and attended to the due process of informed consent (see Appendix A). Ample time was given for the participants to raise any queries or questions that they had. If patients did not wish to take part, they were thanked for the time they took to listen to the researcher. Informed consent forms were given to the participants who wished to take part in the study and, if they so desired, the researcher filled in their answers on the questionnaire. The participant then gave the questionnaire to the doctor they were scheduled to see and he/she completed the profile of the patient by filling in the health status from the patient's file. The doctor then placed the questionnaire into a closed box that belonged to the researcher. The researcher collected this box on a daily basis. At no time was the researcher allowed access to any confidential information from a patient file regarding a patient.

Usually a period of 10 to 20 minutes was sufficient for participants to complete the questionnaire. After the participants had completed the questionnaires, the researcher thanked them. Time was allowed for debriefing which included an offer to schedule a debriefing session after filling in the questionnaire. This provided a satisfactory conclusion to the research. The researcher conducted all the research herself to ensure uniformity of the research process.

4.6   Ethical considerations

The researcher undertook to conduct the research in an ethically sound manner. The participants had to sign a consent form to be able to participate in the study. Participants were assured of anonymity and confidentiality as no name was required on anything except the consent form. Thus their answers were confidential and it would not be possible to trace them back to a specific individual.

Furthermore, the researcher made it very clear that at no time were patients expected to take part in the research. Participation was done on a voluntary basis by verbally requesting the patient's informed consent. Lastly, at no time was the researcher privy to any confidential information in the participants' patient files as only the doctors were allowed to view the confidential patient files.

4.7   Data analysis

Data analysis for this study was generated using Statistical Analysis Software (SAS). Descriptive statistics were employed to calculate the prevalence rate of both Type D Personality as well as coronary heart disease in the sample. The association between gender, age, smoking and other continuous and categorical data with Type D Personality was determined by utilising frequency procedures and cross tabulations. Because this study was exploratory in nature 100

subjects were deemed to be sufficient for possible regression purposes, however, on analysis

of the data, it was decided that no regression would be performed as no significant results were

found. The results of these computations are presented in the next chapter.

CHAPTER 5

RESULTS

This chapter presents the results of the statistical analyses of the data gathered. First, the descriptive data analyses provide a descriptive picture of the sample and questionnaire. The main data analyses follow and an attempt is made to answer the research questions and subsequent hypotheses outlined in Chapter 4. The main results are presented in an order corresponding to the order of the research questions.

5.1   Descriptive data analysis

A quantitative description of the sample used in the current research, followed by a discussion of the reliability of the Type D Scale–14 measurement is presented below.

5.1.1   Descriptive statistics describing current sample.

Table 1

Demographic profile of the sample (N=104)

Variable	Categories	n	Percentage (%)
Gender	Male	50	48.1
	Female	54	51.9
Age	55 – 65 years (middle adulthood)	56	53.9
	66 + years (late adulthood)	48	46.1
Race	Black [1]	55	52.9
	White	49	47.1
Educational	None	10	9.6
level obtained	Primary school	14	13.5
	Secondary school	61	58.7
	Higher education	19	18.3

[1] In this study, "Black" comprises of Black, Coloured, and Asian participants

Table 1 (continued).

Variable	Categories	n	Percentage (%)
Marital status	Never married	6	5.8
	Live with a partner/Married	62	59.6
	No partner[2]	36	34.6
Smoking status	Positive	12	11.7
	Negative (includes non- and ex-smokers)	91	88.3
	Missing data	1	0.9
Duration of diabetes mellitus	1 - 10 years	27	26.0
	11 - 20 years	48	46.1
	21 years +	29	27.9
Type of Diabetes	Type 1	16	15.4
	Type 2	88	84.6
Insulin used	Yes	90	86.5
	No	14	13.5

The participants who were used in this sample came from very diverse backgrounds and socio-economic groups as illustrated by Table 1. This sample consisted mainly of black participants (52.9%); female participants (51.9%); and participants who are middle aged. At least the majority of the sample (61%) seemed to have obtained some high school education or even to have completed high school. However, 23.1% of the sample was either illiterate or had only obtained some primary school education. More than half of the participants (59.6%) indicated that they are either married or living with a partner. Participants who indicated that they do not have a partner (34.6%), either live alone or live with family members. 88.9% of participants have either never smoked or are ex-smokers. The majority of participants have lived

[2] In this study, "no partner" can be understood to mean an individual who is a widow/widower, separated or divorced

with diabetes for more than 10 years (74%). A total of 88% suffer from Type 2 diabetes and 90% use insulin daily.

5.1.2 Reliability analysis of Type D Scale-14 in current sample.

Cronbach alphas were used to determine the internal consistency of the measurement used in this sample. Table 2 illustrates the reliability of the Type D Scale–14.

Table 2

Measures of internal consistency for the Type D Scale-14 and its subscales

Scale	Cronbachs Alpha
Negative Affectivity	0.72
Social Inhibition	0.42

For this present study an acceptable Cronbach alpha was yielded for the Negative Affectivity subscale (0.72). This compares favourably with the Cronbach alpha of 0.88 found by Denollet (2005) in a standardisation study in Belgium as well as the Cronbach alpha of 0.90 in a study by Yu et al. (2008) done in China. The Cronbach alpha yielded for the Social Inhibition subscale (0.42) is, however, deemed to be unacceptable. George and Mallory (1999) state that a Cronbach alpha equal to or exceeding 7.0 is deemed to be acceptable for psychological research. Possible reasons for the low alpha may be that the participants did not fully understand the questions. It may also be that participants rushed to complete the questionnaire in order to finish quickly before having to go to consult the medical practitioner.

5.2 Main analysis

5.2.1 Research question 1.

This question investigated what the prevalence percentage of Type D Personality might be as estimated by the Type D Scale–14 in a group of patients frequenting the Steve Biko Academic Hospital Diabetic Clinic. A frequency procedure was employed to test for the prevalence of Type D Personality in this sample. Table 3 presents these findings.

Table 3

Prevalence fraction of Type D Personality and the subscales of Negative Affectivity and Social Inhibition

Type D Scale–14	Positive	Percentage (%)	Negative	Percentage (%)
Type D Personality	43	41.4	61	58.7
Negative Affectivity	71	68.9	32	31.1
Social Inhibition	53	51	51	49

As seen in Table 3, 41.4% of participants in this sample tested positive for Type D Personality compared with 58.7% who tested negative. It is interesting to note that although more than half the sample (68.9%) was positively classified under the subscale, Negative Affectivity, only 41.4% was positively classified as Type D Personality.

Table 4 presents the data from the chi-square test that was performed to investigate the possible association between Type D Personality and gender, age, race and smoking.

Table 4

Pearson chi-square tests of gender, age, race and smoking against the Type D Scale–14

Demographic factors	Type D Personality		df	x^2 - Value	p
	Positive score (%)	Negative score (%)			
Gender					
Male	17 (16.4)	33 (31.7)	1	2.14	0.14*
Female	26 (25.0)	28 (26.9)			

Table 4 (continued).

Demographic factors	Type D Personality		df	x^2 - Value	P
	Positive score (%)	Negative score (%)			
Age					
55-65 years	23 (22.1)	33 (31.7)	2	0.88	0.64*
66-75 years	15 (14.4)	24 (23.1)			
76 years and above	5 (4.8)	4 (3.9)			
Race					
Black	25 (24.0)	30 (28.9)	1	0.81	0.37*
White	18 (17.3)	31 (29.8)			
Smoking					
Never smoked	25 (24.3)	36 (35)	2	0.39	0.82*
Former smoker	12 (11.7)	18 (17.5)			
Current smoker	6 (5.8)	6 (5.8)			

* p = non-significant

As Table 4 illustrates, no significant association between Type D Personality with regard to gender, age, race or smoking was found for this sample. However, it does seem that more females (26) were classified as Type D than males (17).

5.2.2 Research question 2.

The second research question explored the prevalence percentage of coronary heart disease in this sample. A frequency procedure was employed attempting to answer the research question and the results are reflected in Table 5 below.

Table 5

Prevalence fraction of Coronary heart disease, Cardiovascular disease and Hypertension

Diseases	Positive	Percentage (%)	Negative	Percentage (%)
Coronary heart disease	37	35.6	67	64.4
Cardiovascular disease	14	13.5	90	86.5
Hypertension	96	92.3	8	7.7

As Table 5 illustrates, 35.6% of the participants in the total sample were classified as having a coronary heart disease. The majority of participants were seen to be suffering from hypertension (92.3%) while the minority were seen to be suffering from a cardiovascular disease (13.5%).

Table 6, 7 and 8 present the chi-square tests that were performed to investigate the possible association between coronary heart disease, cardiovascular disease and hypertension and certain demographic factors.

Table 6

Pearson chi-square tests of gender, age, race and smoking against coronary heart disease

Demographic factors	Coronary heart disease		df	x^2 - Value	p
	Positive score (%)	Negative score (%)			
Gender					
Male	16 (15.4)	34 (32.7)	1	0.54	0.46*
Female	21 (20.2)	33 (31.7)			
Age					
55-65 years	19 (18.3)	37 (35.6)	2	1.72	0.42*
66-75 years	13 (12.5)	26 (25.0)			
76 years and above	5 (4.8)	4 (3.9)			
Race					
Black	17 (16.4)	38 (36.5)	1	1.11	0.29*
White	20 (19.2)	29 (27.9)			
Smoking					
Never smoked	22 (21.4)	39 (37.9)	2	0.04	0.98*
Former smoker	11 (10.7)	19 (18.5)			
Current smoker	4 (3.9)	8 (7.8)			

* p = non-significant

As Table 6 illustrates, no significant association between coronary heart disease and gender, age, race or smoking was found for this sample.

Table 7

Pearson chi-square tests of gender, age, race and smoking against cardiovascular disease

| Demographic factors | Cardiovascular disease | | df | x^2 - Value | p |
	Positive score (%)	Negative score (%)			
Gender					
Male	7 (6.7)	43 (41.4)	1	0.02	0.88*
Female	7 (6.7)	47 (45.2)			
Age					
55-65 years	6 (5.8)	50 (48.1)	2	3.43	0.18*
66-75 years	8 (7.7)	31 (29.8)			
76 years and above	0 (0.0)	9 (8.7)			
Race					
Black	4 (3.9)	51 (49.0)	1	3.84	0.05*
White	10 (9.6)	39 (37.5)			
Smoking					
Never smoked	7 (6.8)	54 (52.4)	2	0.57	0.75*
Former smoker	5 (4.9)	25 (24.3)			
Current smoker	2 (1.9)	10 (9.7)			

* p = non-significant

As Table 7 illustrates, no significant association between cardiovascular disease and gender, age, race or smoking was found for this sample. However, it does seem as though more white respondents (10) tested positive for cardiovascular disease than did black respondents (4).

Table 8

Pearson chi-square tests of gender, age, race and smoking against hypertension

Demographic factors	Hypertension		df	x^2 - Value	p
	Positive score (%)	Negative score (%)			
Gender					
Male	46 (44.2)	4 (3.9)	1	0.01	0.91*
Female	50 (48.1)	4 (3.9)			
Age					
55-65 years	52 (49.0)	5 (4.8)	2	4.24	0.12*
66-75 years	38 (36.5)	1 (1.0)			
76 years and above	7 (6.7)	2 (1.9)			
Race					
Black	51 (49.0)	4 (3.9)	1	0.03	0.86*
White	45 (43.3)	4 (3.9)			
Smoking					
Never smoked	56 (54.4)	5 (4.9)	2	0.07	0.96*
Former smoker	28 (27.2)	2 (1.9)			
Current smoker	11 (10.7)	1 (1.0)			

* p = non-significant

As Table 8 illustrates, no significant association between hypertension and gender, age, race or smoking was found for this sample.

5.2.3 Research question 3.

The third research question probed what the association between Type D Personality and coronary heart disease (CHD) in this sample would be. It also explored the association between Type D Personality and other relevant diseases such as cardiovascular disease (CVD) and

hypertension (HYPT) (Denollet, 2005). Table 9 below contains the results from the chi-square procedure testing for significant relationships.

Table 9

Pearson chi-square tests of patients with and without CHD, CVD and HYPT against the Type D Scale-14

Diseases	Type D Personality		df	x^2 - Value	p
	Positive score (%)	Negative score (%)			
Coronary heart disease					
Positive CHD	19 (18.3)	24 (23.1)	1	2.37	0.12*
Negative CHD	18 (17.3)	43 (41.4)			
Cardiovascular disease					
Positive CVD	5 (4.8)	38 (36.5)	1	0.21	0.65*
Negative CVD	9 (8.7)	52 (50)			
Hypertension					
Positive HYPT	40 (38.5)	56 (53.9)	1	0.05	0.82*
Negative HYPT	3 (2.9)	5 (4.8)			

* p = non-significant

Table 9 indicates that no statistically significant association was found in this sample between Type D Personality and coronary heart disease, cardiovascular disease or hypertension, as indicated by the p-value of the chi-square tests.

In summary, no statistically significant results were found in any of the data from the analyses that were pursued. However, 41.4% of participants could be classified as Type D. Interestingly, although 41.4% of participants were classified as Type D, 68.9% were classified as positive for Negative Affectivity. 35.6% (37 of 104) of the total sample was classified as having

a coronary heart disease. The majority of participants were categorised as hypertension patients (92.3%; 96 of 104) while a minority of participants were seen to be suffering from a cardiovascular disease (13.5%; 14 of 104). Only 19 respondents of the 104 tested positive for both coronary heart disease and Type D. A total of 40 participants of the entire sample tested positive for hypertension and Type D. The following chapter will provide an integrated discussion of the results.

CHAPTER 6

DISCUSSION, LIMITATIONS AND RECOMMENDATIONS

The present study endeavoured to determine what the prevalence rate of Type D would be as well as establishing whether there was an association between Type D Personality and coronary heart disease in this sample. These research questions were tested using a variety of statistical methods the results of which were presented in the preceding chapter. This chapter discusses these results further by comparing them, where possible, with other existing research and suggesting reasons for the results concurring with or contradicting the existent body of literature. This chapter ends with the limitations of the study and recommendations for future studies. The discussion will follow the order of the main hypotheses in the results chapter.

6.1 Discussion

6.1.1 Research question 1.

This question investigated what the prevalence percentage of Type D Personality might be as estimated by the Type D Scale–14 in a group of patients frequenting the Steve Biko Academic Hospital Diabetic Clinic. A frequency procedure was employed to test for the prevalence of Type D Personality in this sample. It was found that 41.4% (43 of 104) of participants were classified as positive for Type D Personality versus 58.7% (61 of 104) who tested negative. It is interesting to note that although more than half the sample (68.9%; 71 of 104) was positively classified under the subscale, Negative Affectivity, only 41.4% (43 of 104) was positively classified as Type D Personality. When further cross-tabulations were performed to pursue possible association between Type D Personality and gender, age, race and smoking, no significant relationship could be found in this sample.

Pedersen, Ong, et al.(2006) reported a prevalence rate for Type D individuals between 24% and 30% of the sample to be on par with the findings of most other research studies. Consequently, the prevalence of 41.4% (43 of 104) for this South African seems higher than usual when compared to the Dutch and Belgium sample in Denollet (2005) where 28 % (1027 of 3678) of the patients in his sample were classified as Type D Personality. Similarly, the prevalence of Type D reported in Holland (21%); in Germany (25%) and in Italy (28%) were well below the prevalence found in the South African sample (Grande, 2004; Gremigni & Semmaruga, 2005; Williams et al., 2008). Contrastingly, the United Kingdom and Ireland showed 38.5% (390 of 1012) of their sample be positive for Type D which seems to be on par with the South African sample (Williams et al., 2008). This could suggest that there is a higher prevalence rate of Type D in this South African sample than in other countries, although many follow-up studies would be necessary to confirm this. However, reasons for the usually high rate of Type D in this may be related to the sample choice and will be discussed in the limitation section.

Interestingly, more than half the South African sample met the requirements (68.9%; 71 of 104) for the Negative Affectivity Scale. Similar results were shown in Pedersen, Ong, et al. (2006), where they reported that depressed patients were more likely to have a Type D Personality and diabetes than non-depressed patients. This finding may relate to the current sample as most patients in this sample were diagnosed with diabetes mellitus, which could have led to the elevated level of depressive symptoms, thus influencing the scores on the NA scale (Pedersen, Ong, et al., 2006). This sample is also dissimilar to the majority of previous research on Type D which was carried out on older, male respondents suffering from cardiovascular disease, in that, in this sample, there was an almost equal spread of male and female participants. As the literature reports, females are seen to be more vulnerable to depressive symptoms, this may also have had an undue influence on the elevated NA scale scores (William et al., 2008).

6.1.2 Research question 2.

The second research question explored what the prevalence percentage of coronary heart disease might be as reported by this sample. A frequency procedure was employed attempting to answer this research question. It was shown that 35.6% (37 of 104) of the participants in the total sample were classified as having a coronary heart disease. The majority of participants were seen to be suffering from hypertension (92.3%; 96 of 104) while the minority were seen to be suffering from a cardiovascular disease (13.5%; 14 of 104). Furthermore, cross-tabulations were performed to pursue possible associations between coronary heart disease, cardiovascular disease, hypertension and certain demographic factors, namely, gender, age, race and smoking. None of these associations were found to be significant in this study.

The prevalence of 35.6% (37 of 104) of patients with coronary heart disease in this South African sample seems high. In contrast, Yu et al. (2010) found a prevalence of 3.7% (12 of 326) of patients with ischemic heart disease, which is much lower than the prevalence found in this study. This contrasting result may be due to dietary influences, as the diet of the South African sample may vary considerably from their Chinese counterparts (Stamler et al., 2005). Similarly, the high prevalence of hypertension in the current sample is reflected in Yu et al. (2010) with 55.5% (181 of 326) of the participants in the Chinese sample being hypertensive. This could be a result of a sedentary lifestyle and unhealthy eating habits (Borkoles et al., 2010). Furthermore, given the high NA scale scores, participants in this study may be more vulnerable to hypertension as hypertension may be influenced by unfavourable social and dietary factors (Kuper et al., 2005; Stamler et al., 2005; Yu et al., 2010). However, comparisons are difficult between these two studies as the Yu et al. (2010) study was a case controlled study, as the participants were pre-selected and therefore their coronary health status was already known. It is interesting to note Reddy's (2005) comments that estimations and projections about the

prevalence of coronary heart disease in sub-Saharan Africa are at best professional guesses as data is inadequate and there is a lot of uncertainty about data quality.

6.1.3   Research question 3.

The third research question probed the association between Type D Personality and coronary heart disease in this sample. It also explored the association between Type D Personality and other relevant diseases such as cardiovascular disease and hypertension (Denollet, 2005). In addition, cross-tabulations were performed to pursue possible associations linking coronary heart disease, cardiovascular disease and hypertension with Type D Personality. Of the total sample, 18.3% (19 of 104) of the participants were found to be positive for both coronary heart disease as well as Type D, and 38.5% (40 of 104) were found to be positive for both hypertension and Type D. However none of these associations were found to be significant in this sample.

The reported result of the present study that 18.3% of respondents were positive for Type D and coronary heart disease is in contrast to the result found by Denollet (2005) where he stated that 29% of cardiac patients in his sample were positive for Type D Personality. Similarly, in a non-Western context, Yu et al. (2010) reported a prevalence of 31% of Type D patients with coronary heart disease. The reason for this dissimilar result may be that the number of respondents in this sample with coronary heart disease is too small to yield any significant results. Given that all the respondents were diabetic, it is possible that more individuals had coronary heart disease that had not yet been diagnosed.

However, similar results for Type D hypertensive patients in the current study were found in Denollet (2005) as he reported that a substantial number of patients with hypertension were classified as Type D (53%), as opposed to the 29% of coronary heart disease patients. This

result was simulated in the current study as 38.5% (40 of 104) of hypertensives were classified as Type D compared to 18.3% (19 of 104) of coronary heart disease patients.

6.2   Limitations of the study and recommendations

Several changes in the research process could be made to improve the accuracy of the data.

Firstly, while the self-reporting measure of Type D Scale–14 (DS14) was found to be a reliable means of classifying participants as Type D or non-Type D (Denollet, 2005), it was limited by the participants' understanding and interpretation of some words such as the word "gloomy" (item 7) and "inhibited" (item 6) in the items on the measuring instrument (Baldry &, Winkel, 2004). These are not words that are used extensively in South African colloquial English. This calls into question the quality of the data that was gathered. It is advisable to try and translate the DS14 into Afrikaans and Sotho; then to conduct a focus group to be able to observe how respondents perceive the items on the questionnaires. This was not possible in the present study, because of the time limitation. It is recommended that the items in the NA and SI scales be further refined in the participants home language before use in future studies. Some of the meaning may be lost in translation, however it is important to make the measuring tool as relevant as possible whilst still keeping its standardized properties. The perceptions of the respondents were a significant factor in the classification of Type D; thus it was important for this study to ascertain their perceptions using the self-reporting measure of Type D Scale-14.

Secondly, this study would have been enhanced by the inclusion of other measuring scales related to the concept of Type D Personality in an effort to describe the possible moderating effects between Type D Personality and coronary heart disease better. This study was not able to show any association between Type D and coronary heart disease. However, the Type D Scale-14 questionnaire has been shown to be a highly reliable and valid measuring tool

in other studies in Western and non-Westernised countries (Denollet, 2005; Pedersen, Ong, et al., 2006; Yu et al., 2010). Further studies in the South African context should be done to confirm or reject the results of the present study and to attempt to throw light on the possible mediating effect with which the association between Type D and coronary heart disease is realised.

Thirdly, the sample used in this study was heterogeneous as the researcher wanted to use a convenient sampling framework. However, the drawback to this sample was that it was not large enough to yield any significant results; hence, the findings can not be generalised to the broad South African public. Thus, the use of larger, heterogeneous samples could, in future studies, contribute to the findings being generalised to the broad South African population.

Fourthly, a further possible drawback to this study was that the sample consisted of patients with diabetes and diabetes mellitus may be seen as a possible confounding variable, as diabetes is regarded as a risk factor for developing depressive symptoms in cardiovascular patients (Pedersen, Ong, et al., 2006). Thus, in future studies, a selected case-control sampling design might yield more significant results.

As can be seen, this study has many limitations and thus any possible findings should be interpreted with caution. However, the current research does have some strengths. Firstly, its respondents consisted of unselected patients, thus no patients were excluded due to clinical or medical criteria. The patients used here may be seen to represent those daily frequenting a medical practice (Pedersen, Ong, et al., 2006). Secondly, this research attempted to provide new data for the Type D construct in a non-Westernised sample, thus trying to broaden the understanding of this concept in a South African setting. Nevertheless, more clinical research is needed in South Africa to ascertain the possible impact of Type D Personality on the quality of life and health outcomes of cardiac patients and their prognosis.

6.3 Conclusion

Given the prevalence of coronary heart disease in this country it is important, for the welfare of South Africans, that additional research in cross cultural validity of Type D Personality (that poses minimal burden to patients) is undertaken in order to validate the personality scale (DS14). Furthermore, given the paucity of research on this construct in South Africa it would be of immeasurable value to replicate (in this country) the myriad of research that has been done on the Type D construct. Finally, the possible heuristic value of this study could lead to the potential incorporation of a trouble-free personality scale that could easily be incorporated into standard hospital enquiry procedures. It could be of huge value in identifying patients that may be at higher than normal risk for complications during their recovery of coronary heart disease, due to their personality profile (Denollet, 2000; Denollet, 2005).

REFERENCES

Baldry, A.C., & Winkel, F.W. (2004). Mental and physical health of Italian youngsters directly and indirectly victimised at school and at home. *International Journal of Forensic Mental Health, 3*, 77-91.

Barth, J., Schumacher, M., & Hermann-Lingen, C. (2004). Depression as a risk factor for mortality in patients with coronary heart disease: A meta-analysis. *Psychosomatic Medicine, 66*(6), 802-813.

Borkoles, E., Polman, R., & Levy, A. (2010). Type D Personality and body image in men: The role of exercise status. *Body Image, 7,* 39-45.

Brook, R. D., & Julius, S. (2000) Autonomic imbalance, hypertension and, cardiovascular risk. *American Journal of Hypertension, 13*, 112S-122S.

Carney, R. M. (1998). Psychological risk factors for cardiac events: Could there be just one? *Circulation, 97*, 128-129.

Chan, D. (2009). So why ask me? Are self report data really that bad? In C. E. Lance, & R. J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp.309-335). New York: Routledge.

Chida, Y., & Steptoe, A. (2009). The association of anger and hostility with future coronary heart disease: A meta-analytic review of prospective evidence. *Journal of the American College of Cardiology, 53*(11), 936-946.

Coolican, H. (2004). *Research methods and statistics in psychology* (4th ed.). London: Hodder & Stoughton.

Denollet, J. (1991). Negative affectivity and repressive coping: Pervasive influence on self-reported mood, health, and coronary prone behaviour. *Psychosomatic medicine, 53*, 538-556.

Denollet, J. (1997). Personality, emotional distress and coronary heart disease. *European Journal of Personality, 11*, 343-357.

Denollet, J. (2000). Type D Personality: A potential risk factor refined. *Journal of Psychosomatic Research, 49*, 255-266.

Denollet, J. (2005). DS14: Standard assessment of negative affectivity, social inhibition and Type D Personality. *Psychosomatic Medicine, 67,* 89-97.

Denollet, J., & Pedersen, S. S., (2009). Anger, depression and anxiety in cardiac patients: The complexities of individual differences in psychological risk. *Journal of the American College of Cardiology, 53*(11), 947-949.

Denollet, J., & Van Heck, G. L. (2001). Psychological risk factors in heart disease: What Type D Personality is (not) about. *Journal of Psychosomatic Research, 51*, 465-468.

Denollet, J., Sys, S. U., & Brutsaert, D. L. (1995). Personality and mortality after myocardial infarction. *Psychosomatic Medicine, 57*, 582-591.

Denollet, J., Sys, S. U., Stroobant, N., Rombouts, H., Gillebert, T. C., & Brutsaert, D. L. (1996). Personality as independent predictor of long-term mortality in patients with coronary heart disease. *The Lancet, 347*, 417-421.

Denollet, J., Vrints, C. J., & Conraads, V. M. (2008). Comparing Type D Personality and older age as correlates of tumour necrosis factor-α dysregulation in chronic heart failure. *Brain, Behavior and Immunity, 22*, 736-743.

Dimsdale, J. E. (1988). A perspective on type A behaviour and coronary disease. *New England Journal of Medicine, 318*, 110-112.

Dooley, D. (1995). *Social Research Methods* (3rd ed.). New Jersey: Prentice-Hall.

Emons, W. H. M., Meijer, R. R., & Denollet, J. (2007). Negative affectivity and social inhibition in cardiovascular disease: Evaluating type-D personality and its assessment using item response theory. *Journal of Psychosomatic Research, 63*, 27-39.

Fink, A. (1995). *Evaluation for education and psychology.* Thousand Oak,CA:Sage

Friedman, M., & Rosenman, R. H. (1974). *Type A behavior and your heart*. New York: Fawcett Books.

George, D., & Mallory, P. (1999). *SPSS for Windows step-by-step guide: A simple guide and reference.* Massachusetts: Allyn and Bacon

Grande, G., Jordan, J., Kummel, M., Struwe, C., Schubmann, R., Schulze, F., Unterberg, C., von Kanel, R., Kudielka, B. M., Fischer, J., Herrmann-Lingen, C. (2004). Evaluation of the German Type D Scale (DS14) and prevalence of the Type D personality pattern in cardiological and psychosmatic patients and healthy subjects. *Psychotherapie, Psychosomatik, Medizinische, Psychologie, 54*, 413–22.

Graziano, A. M., & Raulin, M. L. (2004). *Research methods: A process of inquiry* (5th ed). Boston: Pearson Education Group.

Gremigni, P., & Semmaruga, M. (2005). Type D personality, a relevant construct in cardiology: Preliminary validation study of the Italian questionnaire. *Psicoterapia Cognitiva e Comportamentale, 11*(1), 7-18.

Hoen, P. W., Whooley, M. A., Martens, E. J., Na, B., Van Melle, J. P., De Jonge, P. (2010). Differential associations between specific depressive symptoms and cardiovascular prognosis in patients with stable coronary heart disease. *Journal of the American College of Cardiology, 56*(11), 838-844.

Horsten, M., Ericson, M., Perski, A., Wamala, S. P., Schenck-Gustafsson, K., & Orth-Gomer, K. (1999). Psychosocial factors and heart rate variability in health women. *Psychosomatic Medicine, 61*, 49-57.

Kaplan, H. I., Sadock, B. J, & Sadock, V. A. (2003). *Synopsis of Psychiatry: Behavioural Sciences / Clinical Psychiatry* (9th ed). Philadelphia: Lippincott, Williams & Wilkins.

Karasek, R. A. (2004). An analysis of 19 international case studies of stress prevention through work reorganization using the demand/control model. *Bulletin of Science, Technology & Society, 24*, 446-456.

Karasek, R. A., & Theorell, T. (1990). *Healthy work: stress productivity and reconstruction of working life.* New York: Basic Books.

Kop, W. J. (1999). Chronic and acute psychological risk factors for clinical manifestations of coronary heart disease. *Psychosomatic Medicine, 61,* 476-487.

Kuper, H., Marmot, M., & Hemingway, H. (2005). Systematic review of prospective cohort studies of psychosocial factors in the aetiology and prognosis of coronary heart disease. In M. Marmot, & P. Elliot (Eds.), *Coronary Heart Disease Epidemiology: From aetiology to public health* (2nd ed.) (pp. 363-413). New York: Oxford University Press.

Kupper, N., & Denollet, J. (2007). Type D Personality as a prognostic factor in heart disease: Assessment and mediating mechanisms. *Journal of Personality Assessment, 89*(3), 265-276.

Lesperance, F., & Frasure-Smith, N. (1996). Negative emotions and coronary heart disease: Getting to the heart of the matter. *Lancet, 347,* 414-415.

Miller, G. E., Cohen, S., Rabin, B. S., Skoner, D. P., & Doyle, W. J. (1999). Personality and tonic cardiovascular, neuroendocrine and immune parameters. *Brain, Behavior and Immunity, 13,* 109-123.

Miller, M. C. (2005, November). Questions & answers: What is type D personality? *Harvard Health Letter, 22*(5), 8. Retrieved from http://www.health.harvard.edu

Pedersen, S. S., & Denollet, J. (2004). Validity of the Type D Personality construct in Danish post-MI patients and healthy controls. *Journal of Psychosomatic Research, 57,* 265-272.

Pedersen, S. S., & Denollet, J. (2006). Is Type D Personality here to stay? Emerging evidence across cardiovascular disease patient groups. *Current Cardiology Reviews, 2,* 205-213.

Pedersen, S. S., & Middel, B. (2001). Increased vital exhaustion among Type D patients with ischemic heart disease. *Journal of Psychosomatic Research, 51,* 443-449.

Pedersen, S. S., Holkamp, P. G., Caliskan, K., van Domburg, R. T., Erdman, R. A. M., & Balk, A. H. M. M. (2006). Type D Personality is associated with impaired health-related

quality of life 7 years following heart transplantations. *Journal of Psychosomatic Research, 61*, 791-795.

Pedersen, S. S., Ong, A. T. L., Sonnenschein, K., Serruys, P. W., Erdman, R. A. M., & van Domburg, R. T. (2006). Type D Personality and diabetes predict the onset of depressive symptoms in patients after percutaneous coronary intervention. *American Heart Journal, 151*(2), 367.e1-367.e6.

Reddy, K. S. (2005). Developing countries. In M. Marmot, & P. Elliot (Eds.), *Coronary Heart Disease Epidemiology: From aetiology to public health* (2nd ed.) (pp. 363-413). New York: Oxford University Press.

Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation, 99*, 2192-2217.

Scheier, M. F., & Bridges, M. W. (1995). Person variables and health: personality predispositions and acute psychological states as shared determinants for disease. *Psychosomatic medicine, 57*, 255-268.

Spindler, H., Kruse, C., Zwisler, A., & Pedersen, S. S. (2009). Increased anxiety and depression in Danish cardiac patients with a Type D Personality: Cross-validation of the Type D Scale (DS14). *International Journal of Behavioral Medicine, 16*, 98-107.

Stamler, J., Neaton, J. D., Garside, D. B., & Daviglus, M. L. (2005). Current status: Six established major risk factors – and low risk. In M. Marmot, & P. Elliot (Eds.), *Coronary Heart Disease Epidemiology: From aetiology to public health* (2nd ed.) (pp. 32-70). New York: Oxford University Press.

Steyn, K. (2007). *Heart disease in South Africa: Media document*. Retrieved from http://www.heartfoundation.co.za/docs/heartmonth/HeartDiseaseinSA.pdf

Temoshok, L., & Dreher, H. (1993). *The Type C connection: The mind-body link to cancer and your health*. New York: Plume.

Type D personality and cardiovascular risk: Recent research suggests that, for heart health, it's better to be a gregarious Pooh Bear than a gloomy, isolated Eeyore. (2005, August). *Harvard Health Letter, 30*(10), 3. Retrieved from http://www.health.harvard.edu

Von Kanel, R., Barth, J., Kohls, S., Saner, H., Znoj, H., Saner, G., & Schmid, J. (2009). Heart rate recovery after exercise in chronic heart failure: Role of vital exhaustion and Type D Personality. *Journal of Cardiology, 53*, 248-256.

Williams, L., O' Conner, R. C., Howard, S., Hughes, B. M., Johnston, D. W., Hay, J. L., O' Conner, D. B., Lewis, C. A., Ferguson, E., Sheehy, N., Grealy, M. A., & O' Carrol, R. E. (2008). Type D Personality mechanisms of effect: The role of health-related behavior and social support. *Journal of Psychosomatic research, 64*, 63-69.

World Health Organisation. (2002). *The impact of chronic disease in South Africa.* Retrieved from http://www.who.int/chp/chronic_disease_report/southafrica.pdf

World Health Organisation. (2009a). *Cardiovascular diseases: Fact sheet 317.* Retrieved from http://www.who.int/mediacentre/factsheets/fs317/en/index.html

World Health Organisation. (2009b). *World Health Organisation Country Organisation Strategy2008-2013: South Africa.* Retrieved from http://www.who.int/countryfocus/cooperation_strategy/ccs_zaf_2008_2013_en.pdf

World Health Organisation. (2010). *Heart disease.* Retrieved from http://www.who.int/tobacco/research/heart_disease/en/index.html

Yu, D. S. F., Thompson, D. R., Yu, C. M., Pedersen, S. S., & Denollet, J. (2010). Validating the Type D Personality construct in Chinese patients with coronary heart disease. *Journal of Psychosomatic Research, 69*, 111-118.

Yu, X., Zhang, J., & Liu, X. (2008). Application of the Type D Scale (DS14) in Chinese coronary heart disease patients and healthy controls. *Journal of Psychosomatic Research, 65*, 595-601.

APPENDIX A

PARTICIPANT'S INFORMATION LEAFLET & INFORMED CONSENT FOR ANONYMOUS QUESTIONNAIRES

Researcher's name: Michéle Willemse   **Student Number: 29460035**
Department of : Psychology   **University of Pretoria**

Dear Participant

Title
TYPE D PERSONALITY AND CARDIOVASCULAR DISEASE: AN EXPLORATORY STUDY
I am a Master's student in Clinical Psychology in the Department of Psychology, University of Pretoria. You are invited to volunteer to participate in our research project on Type D Personality and cardiovascular disease: an exploratory study.

Information
This letter gives information to help you to decide if you want to take part in this study. Before you agree you should fully understand what is involved. If you do not understand the information or have any other questions, do not hesitate to ask us. You should not agree to take part unless you are completely happy about what we expect of you.

Purpose
The purpose of the study is aimed at determining if patients with Type D Personality are more prone to develop heart diseases. Type D Personality is described as people who show a tendency to experience many negative emotions, but at the same time people with Type D personalities do not usually show or talk about these negative emotions. This makes it more difficult for them to receive help and support. We would like you to complete a questionnaire. This may take about 10-15 minutes. We will collect the questionnaire from you before you leave the clinic.

Confidentiality
The questionnaires will be kept in a safe place for a period of 15 years in the Psychology Department at the University of Pretoria to ensure confidentiality. Please do not write your name on the questionnaire. I will be available to help you with any queries you might have about the questionnaire or to fill in your answers on your behalf.

Ethics
The Research Ethics Committee of the University of Pretoria, Faculty of Health Sciences and the Research Ethics Committee, Faculty of Humanities granted written approval for this study.

Voluntary participation
Your participation in this study is voluntary. You can refuse to participate or stop at any time without giving any reason. As you do not write your name on the questionnaire, you give us the information anonymously. Once you have given the questionnaire back to us, you cannot recall your consent. We will not be able to trace your information. Therefore, you will also not be identified as a participant in any publication that comes from this study.

We sincerely appreciate your help.

Yours truly,
Michéle Willemse

APPENDIX B

Demographic information

INSTRUCTIONS:
1. This questionnaire is anonymous and confidential.
2. Please answer ALL of the questions.

Thank you for your co-operation.

Please answer the following with an 'X':

1. Sex:

Male (1)		Female(2)	

2. Age:

3. Race:

Black African	(1)	
Coloured	(2)	
Asian / Indian	(3)	
White	(4)	
Other (specify) :	(5)	

4. Obtained educational level:

No schooling	(1)	
Some Primary school	(2)	
Complete Primary school	(3)	
Some Secondary school	(4)	
Grade 12 / Std 10	(5)	
Higher education	(6)	

5. Marital status:

Never married	(1)	
Married	(2)	
Living together with partner	(3)	
Widower / Widow	(4)	
Separated	(5)	
Divorced	(6)	

5. **Do you smoke? :**

*Ex-smoker (1)		No (2)		Yes(3)	

6. **Clinical condition:**

Clinical history:	
Duration of diabetes mellitus in years (1)	
Type of diabetes mellitus (one or two) (2)	
Does current therapy include insulin? (3)	
Hypertension (4)	
Non-traumatic amputation (5)	
Stroke (6)	

* Stopped more than one year ago.

APPENDIX C

Type D Scale-14 (DS14)
Instructions:
- Indicate with an 'X' the likelihood of the following behaviour being applicable to you.
- Please answer ALL the questions.
- Choose only ONE answer per question.
- There is no right or wrong answer.

QUESTIONS	False	Rather false	Neutral	Rather true	True
1. I make contact easily when I meet people*	0	1	2	3	4
2. I often make a fuss about unimportant things.	0	1	2	3	4
3. I often talk to strangers *	0	1	2	3	4
4. I often feel unhappy.	0	1	2	3	4
5. I am often irritated.	0	1	2	3	4
6. I often feel inhibited in social interactions.	0	1	2	3	4
7. I take a gloomy view of things.	0	1	2	3	4
8. I find it hard to start a conversation.	0	1	2	3	4
9. I am often in a bad mood.	0	1	2	3	4
10. I am a closed kind of person.	0	1	2	3	4
11. I would rather keep other people at a distance.	0	1	2	3	4
12. I often find myself worrying about something.	0	1	2	3	4
13. I am often down in the dumps.	0	1	2	3	4
14. When socialising, I don't find the right things to talk about.	0	1	2	3	4

*For researcher: Reverse keyed

APPENDIX D

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Health Sciences Research Ethics Committee
Fakulteit Gesondheidswetenskappe Navorsingsetiekkomitee

DATE: 5/07/2010

PROTOCOL NO.	**62/2010**
PROTOCOL TITLE	Type D Personality and coronary heart disease: An exploratory study
INVESTIGATOR	**Principal Investigator:** Ms Michéle Willemse
SUBINVESTIGATOR	Prof. P. Rheeder
SUPERVISOR	Dr. M. Aronstam
DEPARTMENT	**Dept:** Psychology **Phone:** 021 420 2329 **Mobile:** 0727 442 663
	E-Mail: michelewillemse@yahoo.com
STUDY DEGREE	MA Clinical Psychology
SPONSOR	Not Applicable
MEETING DATE	21/04/2010

The Protocol and Informed Consent for anonymous Questionnaire Document were approved on 30/06/2010 by a properly constituted meeting of the Ethics Committee subject to the following conditions:

1. The approval is valid for 1 year period, and
2. The approval is conditional on the receipt of 6 monthly written Progress Reports, and
3. The approval is conditional on the research being conducted as stipulated by the details of the documents submitted to and approved by the Committee. In the event that a need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.

Members of the Research Ethics Committee:

Prof M J Bester	(female)BSc (Chemistry and Biochemistry); BSc (Hons)(Biochemistry); MSc(Biochemistry); PhD (Medical Biochemistry)
Prof R Delport	(female)BAet Scien, B Curationis (Hons) (Intensive care Nursing), M Sc (Physiology), PhD (Medicine), M Ed Computer Assisted Education
Prof VOL Karusseit	MBChB; MFGP(SA); MMed(Chir); FCS(SA) - Surgeon
Prof JA Ker	MBChB; MMed(Int); MD – Vice-Dean (ex officio)
Dr NK Likibi	MBBCh – Representing Gauteng Department of Health)
Prof TS Marcus	(female) BSc(LSE), PhD (University of Lodz, Poland) – Social scientist
Dr MP Mathebula	(female)Deputy CEO: Steve Biko Academic Hospital
Prof A Nienaber	(female) BA(Hons)(Wits); LLB; LLM(UP); PhD; Dipl.Datametrics(UNISA) – Legal advisor
Mrs MC Nzeku	(female) BSc(NUL); MSc(Biochem)(UCL, UK) – Community representative
Prof L M Ntlhe	MBChB(Natal); FCS(SA)
Snr Sr J Phatoli	(female) BCur(Eet.A); BTec(Oncology Nursing Science) – Nursing representative
Dr R Reynders	MBChB (Prêt), FCPaed (CMSA) MRCPCH (Lon) Cert Med. Onc (CMSA)
Dr T Rossouw	(female) M.B,.Ch.B. (cum laude); M.Phil (Applied Ethics) (cum laude), MPH (Biostatistics and pidemiology (cum laude), D.Phil

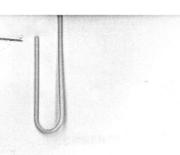| Dr L Schoeman | (female) B.Pharm, BA(Hons)(Psych), PhD – Chairperson: Subcommittee for students' research |
Mr Y Sikweyiya	MPH; SARETI Fellowship in Research Ethics; SARETI ERCTP; BSc(Health Promotion) Postgraduate Dip (Health Promotion) – Community representative
Dr R Sommers	(female) MBChB; MMed(Int); MPharmMed – **Deputy Chairperson**
Prof TJP Swart	BChD, MSc (Odont), MChD (Oral Path), PGCHE – School of Dentistry representative
Prof C W van Staden	MBChB; MMed (Psych); MD; FCPsych; FTCL; UPLM - **Chairperson**

DR R SOMMERS; MBChB; MMed(Int); MPharmMed.
Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

APPENDIX E

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Office of the Deputy Dean

12 August 2010

Dear Prof Marchetti-Mercer

Project:	**Type D personality and coronary heart disease: an exploratory study**
Researcher:	**M Willemse**
Supervisor:	**Dr M Aronstam**
Department:	**Psychology**
Reference Number:	**29460035**

Thank you for the application that was submitted for review.

The application was **approved (with comment)** by the **Postgraduate Committee** on 20 July 2010. The **Research Ethics Committee** *conditionally* **approved** the application on 5 August 2010 due to the following:

- The hospital should not give patients' contact details to the researcher. Instead, the hospital can consult with the patients and advise them of the intended research and give the researcher's contact details to the patients;
- Debriefing must be provided when necessary;
- It is recommended that non-caucasian be specified in the sample;
- The hospital must give written consent for the research to be conducted there.

To facilitate the administrative process, please respond directly to Ms Tracey Andrew, Room 7-25 Humanities Building, at your earliest possible convenience.

Sincerely

Prof John Sharp
Chair: Research Ethics Committee
Faculty of Humanities
UNIVERSITY OF PRETORIA
e-mail: john.sharp@up.ac.za