Psychological factors that impact on non-compliant medication use amongst patients diagnosed with hypertension

by

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DECLARATION

I, Sonja Nicolene Mostert, hereby declare that this dissertation, to be submitted to the University of Pretoria for the degree of Master in Research Psychology, is my own work and has not been submitted to this University or any other tertiary institution for any degree.

Signed _____Sonja Mostert_____

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This __4__ day of _May__2012.

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***Abstract*:**

Hypertension is defined as an asymptomatic disease which means that the disease is not related to the experience of physical symptoms. This illness is mainly managed by means of oral drug therapies, but research shows that many patients fail to take their medication as they should. Non-compliance is the main problem associated with drug-related treatments, specifically amongst patients diagnosed with chronic conditions, such as hypertension. Past research has focused on many different factors accounting for the high occurrence of non-compliance. Psychological factors relate to patients' beliefs about their diagnosed illness and their prescribed treatment regimen. These beliefs are conceptualized in terms of the self-regulation model as constituting 5 main dimensions: identity or symptoms of their illness, the consequences of their illness, timeline or specifically referring to the course of the illness (chronic or acute), causes of the illness and controllability.

Compliance is vital in the treatment and management of hypertension and research attempting to understand the relation between compliance and patients' illness cognitions are thus important. The already high prevalence of this condition coupled with an increase in the number of people reporting low compliance suggests the need for intervention. The research question informing the present study was based on the role that psychological factors play in impacting patients' medication-taking patterns. The medication adherence model describes medication compliance in terms of purposeful action, patterned behaviour and feedback. Purposeful action concerns patients' intentional decisions to take their medication while patterned behaviour relates to the medication-taking patterns that patients develop. The feedback dimension guides the medication-taking patterns, providing feedback about blood pressure for example.

The theory informing the present study involved social cognitive theory, which highlights the role of self-efficacy and outcome expectancies. Self-efficacy is linked with feelings of personal control and specifically refers to people's belief in their ability to perform certain actions that will produce desired outcomes. Outcome expectancies are described as people's ability to consider the consequences of their actions and using this information to direct their behaviour. Bearing in mind these two aspects of social cognitive theory, patients' belief in their ability to conform to their medication instructions together with their expectations that it will improve their health will direct their medication-taking behaviour (i.e. their compliance).

The illness-perception questionnaire-revised and the medication-taking questionnaire were used to obtain information about patients' illness cognitions and their medication compliance. The correlational findings as well as the results produced by regression analysis revealed that, although illness cognitions can play a determining role in patients' compliance, the present findings found no relation between how patients take their medication and psychological factors, defined in terms of the self-regulation model. Only one of the factors used during factor analysis revealed to significantly predict medication. Limitations associated with the present study might account for this finding and it is recommended that future research should focus on a larger sample and also use supplementary assessment measures in conjunction with self-report measures.

Keywords: hypertension; illness cognitions; illness-perception questionnaire–revised; medication adherence model; medication compliance; medication-taking questionnaire; self-regulation; social cognitive theory

Chapter 1: Introduction

1. Introduction

The lack of compliance to prescribed medication use has been the focus of many past investigations attempting to understand why people act as they do in relation to medication use. Different studies focus on different contributing variables and different diseases/illnesses resulting in diverse results about what impacts compliant and non-compliant medication use. The present study attempted to focus on psychological factors with the main aim being to explore how these factors might contribute to non-compliant medication use amongst patients diagnosed with a chronic illness, specifically hypertension.

Pharmaceutical care includes three functions: identifying potential and actual problems related to medication use; dealing with these medication-related problems; and preventing the development of subsequent problems (Bondesson, Hellström, Eriksson & Höglund, 2009). Non-adherence is viewed to be the most important barrier to effective drug therapies and the negative effects associated with compliance impacts not only the individual but also the larger health care setting. Consequences include high rates of mortality, subsequent health problems, higher rates of hospital admission, and also results in greater financial burdens to health care providers (Taylor, 2012).

This study attempted to identify a possible relation between how patients' beliefs about their illness and medication play a role in their lack of compliance with their antihypertensive drug treatments. The importance of guaranteeing compliance to antihypertensive medication is crucial in the treatment and management of hypertension, as well as the prevention of subsequent cardiovascular illnesses (Edo, 2009; Taylor, 2012). Due to the importance of taking medications as prescribed, non-adherence is considered to be a worldwide health problem and it is argued to be the most important obstacle in controlling chronic illnesses such as hypertension (Clifford, Barber, Elliot, Hartley & Horne, 2006). This necessitates the need to investigate the possible existence of a relationship between psychological factors and compliance behaviour.

This chapter will firstly delineate the research problem followed by a discussion concerning hypertension as a health problem. The aim of the study and justifications for the study will also be provided. The research questions informing this investigation will be discussed and a brief overview of the research design and theory will be elaborated on. A

scope of the study will be given followed by a presentation about the outline of this chapter. A concluding section will summarise the addressed issues.

1.1 Research Problem

The research problem informing the current research project involves the lack of compliance amongst patients in terms of medication use. In the context of the present study the focus was on the lack of compliance amongst patients diagnosed with hypertension. Non-compliance is the main reason for poor blood pressure (BP) control and it is viewed to be "...the principal clinical problem in the management of essential hypertension" (Johnson, Williams & Marshall, 1999, p.319). Patients are often well informed concerning their illness/disease but they still fail to comply with the prescribed medication instructions provided to them by their general practitioners. Edo (2009) states that knowledge about the seriousness of the illness and the importance of taking one's medication as well as a lack of motivation, comprise some of the barriers to medication compliance. Thrall, Lip and Lane (2004) however argue that education and knowledge alone is not enough to change people's compliant behaviour. In some hypertension cases, lifestyle changes such as healthy eating, exercise or giving up smoking are often enough to manage the condition, but in more severe cases medication is required (Kaplan, 2006). Failure to execute such lifestyle changes or to comply with medication instructions can be harmful to patients' health and it can adversely impact the risks associated with hypertension. Edo (2009) also argues that "due to increased longevity, both the incidence and the complications of the disease are simultaneously increasing..." (p.2), thus emphasising the need to sensitise the population to the necessity of compliance in order to control blood pressure levels.

Pharmaceutical companies are of the opinion that a lack of education is thus not the main reason for the low compliant rate. They assert that beliefs and emotional elements are amongst the factors that comprise the obstacles to compliance (C. Schutte, personal communication, March 27, 2010; Horne, Weinman, Hankins, 1999). Emotional aspects are considered to be important determinants in how patients come to view their illness and how they attempt to deal with it. Accordingly Moss-Morris, Weinman, Petrie, Horne, Cameron and Buick (2002) argue that "...people develop parallel cognitive and emotional representations which, in turn, will give rise to problem-based and emotion-based coping procedures..." (p.2). Psychological factors as well as emotional reactions, beliefs, habits, communication patterns and general thought processes may thus prove to play a much greater

role in the lack of pharmacological compliance. McDonald, Garg and Haynes (2002) assert that understanding the multidimensional nature of compliance will allow health care professionals to manage patients' illnesses more effectively, permitting them to acknowledge all the factors that influence patients' medication-taking behaviour.

The World Health Organisation (WHO, 2003) states that poor compliance is the most important cause of inadequate blood pressure control and only 20-80% of patients receiving pharmacological treatment for hypertension are viewed to be good compliers. Uncontrolled blood pressure has also been reported to contribute to 500,000 strokes and 1 million myocardial infarctions each year (Johnson et al., 1999). Hypertension is considered to be an antecedent for more serious heart diseases, aneurysms and renal failure, and neglecting to follow pharmacological instructions can result in unnecessary complications and increased health care costs. Edo (2009) contends that many studies have been conducted on this topic but a focus on specific factors associated with pharmacological compliance is needed. The WHO (2003) argues that "there is a direct need for research to fill gaps in knowledge on adherence...in general such research should aim at gaining a better understanding of the determinants of adherence" (p.112).

1.2 Hypertension in the healthcare setting

Edo (2009) proclaims that hypertension is viewed as a leading cause of death in developing countries and the prevalence is increasing. Johnson et al. (1999) support this argument as they emphasize hypertension as a predominate health problem amongst elderly patients, with approximately 45% of people over the age of 65 diagnosed with hypertension. Accordingly it is stated that poor socio-economic status, illiteracy and unemployment are risk factors for subsequent poor compliance rates and 80% of fatalities resulting from hypertension and cardiovascular diseases arise in low and middle-income countries (Boutayeb & Boutayeb, 2005; Edo, 2009; WHO, 2003). Wedro and Stöppler (2010) concur in this regard as they specify limited education and low socio-economic classes as risk factors for the development of hypertension. In specific areas of Africa, such as the sub-Saharan regions, the incidence of hypertension was always thought to be minimal, but Opie and Seedat (2005) note that approximately 10 to 20 million people within this area are now diagnosed with hypertension. This may be due to the westernization and urbanization of such areas, resulting in increased levels of stress, changes in lifestyle patterns, smoking and diets, factors known to result in high blood pressure. Hudson (2010) affirms this argument as it is

noted that high blood pressure is becoming more prevalent amongst black populations as they become more urbanised and assume more Western ways of living and dieting.

In relation to this it has also been reported that the incidence of hypertension in Western rural parts of Africa amongst older patients, ranged from 30% to 40% compared to urban areas where the prevalence of hypertension is as high as 50% (Cappucio, Micah, Emmett, Kerry, Antwi, Martin-Peprah et al., 2004). More importantly a study undertaken by Steyn, Gaziano, Bradshaw, Laubschar and Fourie (2001), report the prevalence of hypertension cases of up to 50%-60% amongst older adults in South Africa. In relation to the growing prevalence of hypertension as well as the problems associated with non-compliance, consequent health risks and increasing pressure on health care systems are sure to follow if intervention programmes are not put in place to alleviate these problems, thereby improving the management and treatment of the condition.

Hudson (2010) claims that "by the year 2010 more South Africans will die from heart-related conditions than from Aids" (¶ 1). Accordingly it is argued that 6 million South Africans have problems with high blood pressure, which is considered to be a precondition for heart diseases, and unfortunately, health24 (2010) reports that the incidence of high blood pressure is increasing. Of those already diagnosed with the illness, some are known to be ineffective in managing and controlling their blood pressure. Studies conducted by the Medical Research Council (MRC) reported that one out of every four people between the ages of 15 and 64 have problems with high blood pressure (Hudson, 2010). More than 6.2 million South Africans have blood pressure levels higher than 140/90mm Hg, while over 3.2 million of these patients have blood pressure levels of up to 160/95mm Hg; levels that are considered to be dangerously high. It is further emphasised that blood pressure levels must be maintained at levels lower than 140/90mm Hg. This is achievable by means of pharmacological drug treatments or changes in dieting or other lifestyle alterations. Levels higher than 140/90mm Hg is considered to be dangerous as it can lead to organ complications, resulting in further health problems. With regards to compliance, Hudson (2010) asserts that patients should be informed about the consequences of uncontrolled or poorly managed blood pressure, resulting from failure to take their medication. Drug treatment is the most effective way of managing blood pressure levels accompanied by other advice such as weight loss, exercise, healthy eating and minimal alcohol intake and no smoking. It is for this reason that the problem of compliance must be addressed in an attempt to reduce consequent serious health risks and to focus on the implementation of interventions

aiming to minimize the growing incidence of hypertension within the healthcare setting. It is also noted that the problems associated with compliance directly relates to the availability of medical resources and access to such services. Taylor (2012) argues in accord that poor health care corresponds to political inequalities, as technological advances are achieved; racial disparities have in some aspects increased. Unequal treatment of patients is a prominent problem within the South African context as Wadee, Gilson, Thiede, Okorafor and McIntyre (2003) confirm that health care resources are unevenly distributed. This is beyond the scope of the present study but it is important for the researcher to acknowledge the possible impact the social context may have on the problem of adherence.

1.3 Aim of the study

The main aim of the present investigation was to demonstrate the possible existence of a relationship between psychological factors and the degree to which patients comply with their medication instructions. The project attempted to understand how patients' beliefs and conceptions about their illness and their pharmacological treatment determine their medication taking patterns and how this information can be used to inform intervention programs. Patients' beliefs were categorized in terms of the self-regulation model. A secondary aim is to contribute to existing knowledge on this topic, broadening our understanding of the issues involved in compliance and aiding health care practitioners in dealing with this problem, permitting them to help improve their patients' compliance to essential treatments. The objective of the present study was thus to determine the psychological factors that influence patients' decisions not to adhere to their prescribed medication and how this information can be used to address such problems.

1.4 Research Questions

Maree and Van der Westhuizen (2009) describe research questions as involving the questions that will inform the research study and that which the researcher attempts to answer throughout the course of the research process. Research questions should be stated using clear and concise language, allowing readers to understand what the study is attempting to achieve (Gravetter & Forzano, 2009; Mouton, 2005). The purpose of the present research study was to demonstrate the existence of a possible relation between variables. Specifically, the researcher attempted to identify a relationship between psychological factors and medication compliance. The research questions were stated as follows:

- **Research question 1** (Primary research questions)

What are the psychological factors that impact on non-compliance amongst patients diagnosed with hypertension/high blood pressure?

- **Research question 2** (Secondary research question)

How can the problem with non-compliance be overcome?

1.5 Justification and importance of the study

It has been highlighted that hypertension, as an asymptomatic illness, is one of the most treatable conditions if patients manage to take their medication as prescribed (Hekler, Lambert, Leventhal, Leventhal, Jahn & Contrada, 2008; Ross, Walker & MacLeado, 2004). Adhering to one's treatment instructions will allow for satisfactory blood pressure control thereby minimizing the development of subsequent health complications. The growing prevalence of hypertension as well as the magnitude of the problems associated with non-adherence, emphasise the need for research attempting to identify the contributing factors. Understanding what motivates patients to take their medication and what causes them to deviate from their prescribed instructions can help health care practitioners improve the health and well-being of all hypertensive patients (Taylor, 2012). The information can also benefit the health care system as a whole. The findings will be valuable in the development of intervention programmes aiming to manage and control non-adherence, possibly resulting in better blood pressure control and reduced occurrences of cardiovascular complications (Edo, 2009).

1.6 Theoretical framework

In order for the researcher to effectively answer the research question stated, it is essential that the research process be guided by a theoretical paradigm. According to Maree and Van der Westhuizen (2009) "a paradigmatic perspective refers to a way of viewing the world and entails certain assumptions by the researcher when he/she chooses a particular perspective" (p.19). The researcher thus exhibits preference for certain systems of meaning and ways of interpreting reality (Jordaan, 2009; Willig, 2009). The present research project was guided by social cognitive theory. Some of the factors that influence behaviour include self-regulation and self-influence (Bandura, 1991). Self-regulation concerns the monitoring of one's behaviour in terms of the surrounding environment. It refers to the processes by which people control, direct and changes their actions as they attempt to meet their goals (Taylor, 2012).

One crucial factor of this self-regulatory process involves self-efficacy, a mechanism that impacts thoughts, emotions, motivation and action. In line with social cognitive theory, social factors influence the process of self-regulation (Bandura, 1991; Inman, n.d.). The social cognitive theory is based on self-regulatory processes and in agreement with the assumptions described by this model, peoples' cognitions and emotions define their actions as well as the implementation of behaviour. Peoples' cognitions interact with environmental stimuli to produce certain actions (Bandura, 1989). The underlying cognitions, thought, feelings and beliefs, thus play a determining role in behavioural manifestations.

Social cognitive theory constitutes a particular perspective that allows researchers to understand human behaviour and also the factors that impact the process of change (Wade & Schneberger, 2006). Based on this theory, behaviour is the result of an intricate process of interactions between internal and external factors (Bandura, 1991). This theory also proposes that people perform actions and behave on the basis of certain intentions. These intentions can be described as the antecedents of behaviour and they can take the form of environmental cues or they may relate to specific cognitions (Bandura, 1991; Taylor, 2012). Self-regulation is an important aspect allowing people to monitor their own behaviour and also to regulate their actions based on feedback, either personal or environmental feedback (Luszczynska & Schwarzer, 2005). People generally develop certain views or perceptions about what they can do and they also consider the outcomes their actions might produce (Clark & Dodge, 1999). In a sense people thus form certain expectations about their actions (Bandura, 1991; Luszczynska and Schwarzer, 2005). The ideas or views people hold about particular actions or situations are described as cognitive representations (Taylor, 2012). These cognitive representations include the future appraisal of actions and impact the self-regulatory process.

The social cognitive theory emphasise perceived self-efficacy and outcome expectancies as the main components impacting behavioural change. Perceived self-efficacy is defined as people's perceptions about their ability to do something or to attain certain goals (Bandura, 1991; Conner & Norman, 2005; Glanz, Rimer & Lewis, 2002; Luszczynska & Schwarzer, 2005; Williams & Bond, 2002). Self-efficacy impacts different dimensions of people's functioning, including their emotions and cognitions. Self-efficacy affects the way people think and feel, and generally their appraisals of particular situations (Bandura, 1989). Bandura (1989), and Conner and Norman (2005) emphasise the notion that self-efficacy can be regarded as a type of antecedent to behavioural change or action. People's beliefs in their own abilities constitute an important aspect of motivation. The forethoughts or internal

monologues that people engage in and the thoughts they have before exhibiting certain actions, thus impact their motivation as well as their ability to perform the action (Taylor, 2012). Self-efficacy can thus either obstruct or improve people's level of motivation for executing certain actions. Outcome expectancies are the second aspect highlighted by the social cognitive theory, where people's beliefs about the consequences of their behaviour influence their actions. It is about people's perceived ideas about what outcome their actions will produce (Bandura, 1991; Glanz et al., 2002; Williams & Bond, 2002). Outcome expectancies also play an important role in changing health behaviours (Luszczynska & Schwarzer, 2005). When making health decisions, people tend to use different methods in conjunction with personal action. Social cognitive theory holds that both concepts, self-efficacy and outcome expectancies, are related since people consider themselves to be capable of controlling certain factors to produce a particular outcome. If people are able to judge certain actions based on the possible future consequences, they may also judge their ability to actually produce the desired result (Luszczynska & Schwarzer, 2005). Both outcome expectancies and self-efficacy should thus be viewed as influential in the initiation of health related changes (Luszczynska & Schwarzer, 2005).

The psychological factors were also defined in terms of a particular social cognitive model described as the self-regulation model, developed by Howard Leventhal (Meyer, Leventhal & Gutmann, 1985). It has been argued that social cognitive models offer ideal theoretical frameworks for the investigation of behaviours related to disease management such as compliance (Brewer, Chapman, Brownlee & Leventhal, 2002; Chen, Tsai & Lee, 2009; Haggar & Orbell, 2003). The self-regulation model is, however, different from the social cognitive theory used to guide the present study. Leventhal's model is described as a type of social cognitive model, but it is not synonymous to the theoretical model discussed above, though both models highlight the importance of cognitions. The self-regulation model demarcates patients' cognitive representations about their illness into 5 categories: identity or symptoms; consequences; timeline; cause and; controllability/cure. The self-regulation model and the underlying theoretical framework, social-cognitive theory, thus hold similar assumptions concerning people's behaviour. The relation between people's thoughts, beliefs and emotions impact their subsequent behavioural patterns.

Johnson (2002) developed the medication adherence model (MAM) for the purposes of understanding medication adherence. It is argued that the MAM "...was developed to describe the process of medication adherence and guide health care providers in assessing medication-

taking in individuals with hypertension" (Johnson, 2002, p.176). This model allows for the understanding of both intentional and unintentional actions related to medication-taking patterns. The MAM is comprised of three main concepts including: purposeful action; patterned behaviour and; feedback. The purposeful action dimension focuses on people's intentional decisions to take their medication. This is based on perceptions concerning the need, effectiveness and safety of the medication (Johnson & Rogers, 2006). The second dimension, patterned behaviour, focuses on the establishment of medication-taking patterns. This relates to people's ability to develop a routine for taking their medication, allowing it to become habitual. The last dimension feedback, relates to the use of information, such as blood pressure readings, to prompt compliance or non-compliance. This dimension thus involves the way people use information to guide their medication-taking behaviour (Lehane & McCarthy, 2007).

The present study was therefore guided by both the social cognitive theory and the assumptions of the self-regulation model, with the purpose of determining the role psychological factors play in the extent to which hypertensive patients comply, or fail to comply with their medication prescriptions.

1.7 Research method and design

A quantitative, correlational research design was used to demonstrate the possible existence of a relationship between psychological factors and patients' adherence to their medication regimes. Most of the participants had a main diagnosis of hypertension and were undergoing treatment with antihypertensive medication. The patients were sampled using a purposive sampling procedure and they were obtained from the Health Window data basis. The selection criteria described certain characteristics that patients' needed to conform to in order to be considered for inclusion. Health Window staff identified suitable candidates and each patient received an email detailing the research process. The email also contained a link that directed patients directly to the survey-monkey website, and requested them to complete the questionnaires. The participants were asked to complete a demographic information sheet as well as two questionnaires; one focusing on their cognitive representations and one regarding their medication compliance. The data analysis procedure involved both descriptive an inferential statistics to identify any existing relations.

1.8 Scope of the study

The research project centred on patients diagnosed with hypertension receiving outpatient treatment and obtaining information from a local pharmaceutical company, Health Window. The patients were chosen as part of the sample based on a selection criteria and their willingness to participate in the study. The findings may not be generalizable to other hypertension patients as the sample was specific to the Health Window data basis. Health Window offers pharmaceutical services to patients diagnosed with an array of illnesses. Some patients are also notified about their prescription refills, in an attempt to improve compliance. Participation in the present study was based on patients' willingness to partake in the study and those that completed the questionnaires might have been different from those that chose not to participate. Similarly, the medication dispensary process may also bias some patients' compliance compared to those not receiving these services. Some of the participants were also diagnosed with more than one illness and the results might not generalise to other patients, having a single diagnosis of high blood pressure. The results can however be used to provide health care professionals with a general idea concerning the role psychological factors play in determining hypertensive patients' compliance to their pharmacological treatment.

1.9 Structure of the thesis

The thesis will be structured as follows:

Chapters	Title of chapter	Overview and description
1	Introduction	Brief overview of the research problem, the aim of the study, the research design and methods used as well as a description of the scope of the study.
2	Literature Review and Theory	An in-depth description of current literature on the topic as well as a conceptualization of the concepts and models used: hypertension, compliance, the self-regulation model and the medication adherence model.
3	Research methodology and design	A discussion concerning the correlational research design used as well as the procedures used to obtain the sample and the data collection procedures.

4	Data analysis, results and interpretation	A description of the statistical methods used for the analysis of the data. The presentation of the findings and the interpretation thereof.
5	Discussion, conclusion and recommendations	A discussion about the meaning and the application of the findings. A concluding section highlighting some of the limitations and recommendations of the study.

1.10 Glossary of terms

Asymptomatic: Without symptoms – an illness without the manifestation of physical symptoms

Correlational research: A research design attempting to identify a relation between two or more variables as they exist naturally

Diastolic blood pressure: The measure of blood pressure between heartbeats (i.e when the heart is relaxed)

Hypertension: A chronic condition diagnosed when patients demonstrate consistent blood pressure levels of 140/90mmHG. It relates to the force of the blood against the walls of the arteries causing arteries to weaken overtime

Illness cognitions: Patients' 'lay' beliefs about their illness and symptoms

Medication compliance: The extent to which patients take their medication in accord with medical prescription and advice

Self-efficacy: The belief that one is capable of performing certain actions or bringing about desired outcomes

Self-regulation model: A common sense model proposed by Howard Leventhal describing people's tendency to focus on illness cognitions as a means of trying to understand their illness and symptomology

Social cognitive theory: A psychological theory about how people acquire behaviour by means of observation and a process of self-regulation. Main assumptions include the importance of self-efficacy, outcome expectancies and the reciprocal interaction between people and their environment

Systolic blood pressure: The measure of blood pressure when the heart is contracting

Outcome expectancies: **P**eople's beliefs about the consequences of their behaviour influence their actions

(Bandura, 1991; Conner & Norman, 2005; Glanz et al., 2002; Luszczynska & Schwarzer, 2005; Meyer et al., 1985; Taylor, 2012; Williams & Bond, 2002)

1.11 Conclusion

The present research project focused on the possible influence psychological factors may have on medication compliance amongst patients diagnosed with hypertension. The variables were defined based on two models: the self-regulation model, conceptualizing the psychological factors and the medication adherence model (MAM), describing medication adherence. The findings can be utilized for the development of intervention programs, providing better insight into how patients' beliefs and views about their diagnoses and medication regimes influence their compliance rates. The results can also contribute to future research, providing the basis for possible experimental research into how psychological factors might possibly cause non-compliance. A contribution to existing knowledge on this topic can thus also lead to a more comprehensive understanding of this health problem.

Chapter 2: Literature review and Theory

2. Introduction

This chapter provides an overview of past literature focusing on the topic of non-compliance. The results from previous studies will be discussed as well as authors' views concerning the factors impacting on non-compliance. This chapter focused on the conceptualization of concepts, during which definitions were clarified. All research must be guided by a theoretical framework, informing the formulation of the research questions, the data collection procedures and the interpretation of the findings. It is essential that a theory be chosen to act as a conceptual framework from which the researcher can define the research problem and conceptualize the concepts involved. This chapter also provided an outline of the underlying theory that guided the present investigation, social cognitive theory.

2.1 Underlying theoretical framework

To enable the researcher to effectively conduct a research project, a theoretical framework is needed to inform the decisions that are to be made. The underlying theory will influence the proposed process for answering the research question stated. It is therefore essential that a specific theory be chosen to guide the research project. The researcher generally views the research problem from a particular perspective and this view impacts the nature of the research process (Maree & Van der Westhuizen, 2009). Working from the view of a particular theory can thus be regarded as a type of lens through which the researcher sees the problem at hand. The way the research questions are formulated and how it is approached will depend on the researcher's theoretical point of departure. The theoretical perspective thus impacts the way the researcher understands reality. The theory is also described as the conceptual framework from which the researcher defines the research problem and it also establishes the means by which the data will be gathered (Edo, 2009). It is therefore important for the researcher to choose a specific theory and to discuss the relation between the theory and the research problem.

In accord with the aforementioned, the present research process will be guided by a social cognitive theory and assumptions of the self-regulation model. The self-regulation model was used as a means to conceptualise psychological factors.

Bandura (1991) argues that behaviour is motivated and regulated by a continuous process of self-influence. Self-regulation involves monitoring one's own behaviour in relation to the

social and environmental context. One crucial factor of this self-regulatory process involves self-efficacy, a mechanism that impacts thoughts, emotions, motivation and action. In line with social cognitive theory, social factors influence the process of self-regulation (Bandura, 1991; Inman, n.d.). Clark and Dodge (1999) indicate that self-efficacy is based on the interaction of personal, behavioural and environmental factors that together create our behavioural patterns. According to Bandura (1989) social cognitive theory is influenced by a model of causation involving "reciprocal determinism". Importantly it is stated that "self-regulatory systems lie at the very heart of causal processes" (Bandura, 1991, p.248). This model holds that behaviour, cognition and various other environmental and personal factors function as "interacting determinants". Reciprocal causation then involves the interaction between thought, affect and action and it is further argued that "expectations, beliefs, self-perceptions, goals and intentions give shape and direction to behaviour" (Bandura, 1989, p.3). People's thoughts, feelings, and beliefs therefore determine how they act.

Wade and Schneberger (2006) note that social cognitive theory offers a framework for understanding and changing human behaviour. The theory conceptualizes behaviour as the product of interaction between personal and environmental factors (Bandura, 1991). A person's behaviour is thus the result of cognition, the individual's thoughts as well as the subsequent actions involved (Wade & Schneberger, 2006). Human behaviour is usually considered to be purposeful and thus generally regulated by some form of forethought (Bandura, 1991). These forethoughts can take the form of self-talk or it may constitute the thoughts people have before performing a particular action. People thus tend to form beliefs about what they are capable of and they consider the possible consequences of future actions, they set goals, and they usually plan actions that will result in positive outcomes (Clark & Dodge, 1999). By considering actions as well as the potential consequences of such actions, people motivate and guide themselves through this anticipatory process (Bandura, 1991; Luszczynska and Schwarzer, 2005). Cognitive representations concerning possible future outcomes result in self-regulation and people modify their prospective actions based on this forethought. Social cognitive theory is thus significant in terms of health education and developing health interventions as it can explain how people acquire and sustain particular behavioural outcomes (University of Twente, 2010).

In terms of the interaction between the individual and their surrounding environment, people's beliefs and 'cognitive competencies' are formed and adapted by means of social influences and constructions within their social environment (University of Twente, 2010).

Peoples' thoughts and behaviours are thus mutually influenced by their socialising patterns within the environment (Bandura, 1991; Wade & Schneberger, 2006). An individual's behaviour can therefore impact his/her environment, and the environment in turn can impact people's behaviour, as people modify or change their behaviour based on their social surroundings. As a result, behaviour differs from one situation to the next and people adjust their actions based on the context (Wade & Schneberger, 2006). The same stimuli can thus evoke different behavioural patterns from different people or from one individual in different settings. Social cognitive theory can be valuable for understanding and predicting individual behaviour in this regard, and it can also aid researchers in identifying ways in which behaviour can be changed or modified (Bandura, 1991; Inman, n.d.; Luszczynska & Schwarzer, 2005).

The social cognitive model highlights two important factors that influence behaviour: perceived self-efficacy and outcome expectancies. Perceived self-efficacy concerns people's belief in their capacity to perform certain actions in order to reach an aspired outcome (Bandura, 1991; Conner & Norman, 2005; Glanz, Rimer & Lewis, 2002; Luszczynska & Schwarzer, 2005; Williams & Bond, 2002). Self-efficacy can be enhanced by means of different sources; it can be based on personal experience or mastery, social comparison or vicarious experience (learning from someone else), verbal opinions or persuasion (such as doctor-patient relations) and physiological feedback as well as emotions can also determine self-efficacy levels (Bandura, 1989; Luszczynska & Schwarzer, 2005). In relation to this, social cognitive theory holds that "...behavioural change is made possible by a personal sense of control" (Luszczynska & Schwarzer, 2005, p.128). If people believe that they are able to solve a problem, they are more likely to do so and they will feel a stronger sense of commitment and empowerment towards their ability to deal with the problem. In terms of the present study, if people perceive themselves as knowledgeable, thus understanding their illness and their medicinal treatment, they might feel that they are able to control their illness if they take their medication (Luszczynska & Schwarzer, 2005). Accordingly it can lead to a feeling of self-efficacy, which in turn can contribute to people committing to their decisions and actions, resulting in long-term compliance. It is noted that self-efficacy relates to personal control where people believe that they can cause and change events (Conner & Norman, 2005). This is described as a 'can do cognition' which enforces a feeling that people can control and change things in their lives by adapting their behaviour.

Bandura (1989) asserts that self-efficacy influences the way people feel, think and act, and a low sense of self-efficacy is considered to be related to a feeling of helplessness, or to a sense of not having control over one's circumstances. In the context of this study, it can thus be argued that people with a low sense of self-efficacy may feel that they are not able to control their hypertension, and as a result they fail to comply with their medication regimen. Schousboe (2009) and Taylor (2012) also emphasise self-efficacy as an important factor influencing medication compliance. Expectations of self-efficacy is viewed as self-regulatory cognitions that determine if action will be taken, how much effort will be used and how long this action will be sustained despite various obstacles and failures (Bandura, 1989; Luszczynska & Schwarzer, 2005; Taylor, 2012). Bandura (1989) and Conner and Norman (2005) stipulate that self-efficacy influence pre-action thoughts, because self-regulatory cognitions are an important part of motivation. Self-efficacy can thus either obstruct or improve people's level of motivation for executing certain actions.

Luszczynska & Schwarzer (2005) emphasize that "self-efficacy is directly related to behaviour" (p.129). Low levels of self-efficacy can hinder an individual's confidence that they can cope with stress, or in the case of the present project, it can adversely influence a patient's ability to cope with their illness and the subsequent treatment thereof. Emotions are also strongly related to people's self-efficacy levels, in that positive emotions result in higher levels of confidence, thereby allowing people to feel more competent in dealing with problem situations. Negative emotions on the other hand can result in pessimistic cognitions, influencing people's ability to find solutions to problems (Luszczynska & Schwarzer, 2005). If people are pessimistic about their illness and the medicinal treatment prescribed, these negative cognitions can influence the way they go about taking their medication. Compliance is thus directly related to patient's thought processes and how they view their illness and treatment in terms of the symptoms they experience as well as the time line of their illness and the curability thereof - their illness cognitions.

This aspect of the social cognitive model therefore impacts peoples' endeavour to change their risk behaviours and to sustain these changes despite various obstacles threatening to undermine their level of motivation (Bandura, 1991; Conner & Norman, 2005; Glanz et al., 2002; Luszczynska & Schwarzer, 2005; Stewart, Lee, Waller, Hughes, Low, Kennard et al., 2003; Williams & Bond, 2002). If people feel competent about controlling their illness and they understand the treatment prescribed, higher levels of self-efficacy can occur. Self-efficacy is strongly related to peoples' perceptions of personal control. Health

locus of control relates to peoples' perceptions concerning the degree to which their health is under personal control, controlled by a significant other or controlled by chance (Taylor, 2012). If people consider themselves to be in control of their health the belief that they are able to perform certain actions (i.e. self-efficacy), would play an important role in determining action. High levels of self-efficacy are thus related to high levels of personal control. In the case of health behaviours, if people have low levels of personal control, self-efficacy might be less salient in determining behaviour. People may then feel confident in their ability to deal with the diagnosis, thereby motivated to improve their health by means of taking their medication. This relates back to the four sources of self-efficacy, where physiological feedback can impact compliance. If people feel better after taking their medication they will be more likely to repeat this action, and persist with their medication compliance. It is further stated that if a certain type of behaviour or action has the desired outcome, the action is more likely to be repeated. Self-efficacy, as noted, relates to the belief that you are capable of performing a certain action and if you see yourself as competent in doing so, the behavioural pattern is likely to be replicated (Clark & Dodge, 1999). This self-regulatory process allows people to identify ways that are successful in preventing and dealing with illnesses and the subsequent treatment thereof.

Self-efficacy, competence and personal control are viewed to be strongly related (Taylor, 2012). Self-efficacy concerns peoples' belief that they are able to perform a particular action or that they are capable of controlling a particular behaviour (Bandura, 1991; Clark & Dodge, 1999; Taylor, 2012). Self-efficacy then also relates to the degree to which people perceive themselves as being competent to produce a certain outcome (Taylor, 2012). Personal control as argued, concerns the notion of subjective responsibility; people are responsible for their own health (Taylor, 2012). Luszczynska and Schwarzer (2005) support this argument as they state that behaviour change is made possible by having a sense of personal control. If people believe that they can do something to solve a problem, they become more confident in their ability to do so. It can thus be said that "perceived self-efficacy pertains to personal action control or agency" (Luszczynska & Schwarzer, 2005, p.128). Self-control, acknowledging responsibility for one's own treatment, and self-efficacy, believing that one is able to perform the actions needed to treat the illness, thus together play a determining role in compliance.

Outcome expectancies are another important aspect of social cognitive theory, where people's beliefs about the consequences of their behaviour influence their actions. It concerns people's perceived ideas about what outcome their actions will yield (Bandura, 1991; Glanz

et al., 2002; Williams & Bond, 2002). Outcome expectancies can be described in terms of different aspects; area of consequences, positive and negative consequences and short- and long term consequences (Luszczynska & Schwarzer, 2005). Area of consequences relate to physical outcomes and involve the notion of what will be expected or experienced after behaviour changes have been implemented. This is also directly related to short- and long term consequences. For example, if patients take their medication they might feel better, short term, and if they persist in complying with their medication instructions, they might improve their overall health in the long term. In the case of hypertension, however, one of the problems related to low compliance concerns the fact that this illness is asymptomatic in that no symptoms are directly experienced and immediate relief after taking medication is not necessarily present (Chen et al., 2009; Guimón, 1995; Hekler et al., 2008; Johnson and Rogers, 2006; Ross et al., 2004; Svensson, Kjellgren, Ahlner, & Säljö, 2000). In terms of the social cognitive theory's aspect of outcome expectancies, patients therefore expect to feel better, or to feel an improvement in their health after changing their non-compliant behaviour. The short-term consequences of such compliant behaviour might thus not be immediately evident, but in the long-run it results in positive outcomes. Social outcome expectancies relate to the social perception of behavioural change, more precisely, how other people will view one's changes in behaviour (Luszczynska & Schwarzer, 2005). Self-evaluative expectancies concern one's own views about the changes made. Changing one's behaviour can lead to improved confidence, feeling proud, or it may result in negative feelings. Based on the context of this study, if people change their non-compliant behaviour, they might improve their negative cognitions about how to deal with their illness, and become more convinced about the importance of their treatment.

According to Luszczynska and Schwarzer (2005) "expectancies about outcomes of personal actions and self-efficacy beliefs include the option to cope instrumentally with health threats by taking preventative action" (p.131). In terms of making health judgments, people repeatedly combine personal action with appropriate means. The social cognitive theory assumes that perceived self-efficacy includes the aspect of outcome expectancies in that people generally think that they can control the responses needed to yield desired outcomes. Conversely, outcome expectancies about what the result may be if people execute certain behavioural changes are also related to people's perception that they will be able to perform these actions in order to produce the wanted outcomes (Luszczynska & Schwarzer, 2005). In relation to the aforementioned, it is argued that both aspects of social cognitive

theory including outcome expectancies and self-efficacy, play active roles in adjusting health behaviours, eradicating disadvantageous practices and maintaining positive health related changes. Both these features are viewed to be predictors of behaviour, impacting on goal setting and the means used to achieve these goals (Clark & Dodge, 1999; Luszczynska & Schwarzer, 2005). Based on the perceived consequences of one's actions, these expectations impact on one's ultimate decision to bring about behavioural changes. Outcome expectancies encourage the ultimate decision to make changes, as people generally consider the positive and negative consequences of their actions (Clark & Dodge, 1999).

Williams and Bond (2002) state that social cognitive theory describes behaviour as resulting from an individual's belief that he/she is capable of executing certain actions, self-efficacy, coupled with the belief that the particular action will yield the desired outcome; outcome expectancy. The relation between self-efficacy and outcome expectancies thus relate to the prediction that people who belief in their ability to do something, will be more willing to deal with difficult situations and put in more effort in mastering particular tasks, despite the presence of obstacles. Believing that one is able to perform a particular task, directly relates to one's perceived consequences of the behaviour, i.e. outcome expectancies (Bandura, 1991; Williams & Bond, 2002). If one does not belief that the action will produce the desired outcome (outcome expectancies), one might also doubt one's ability to actually perform the action (self-efficacy).

Social cognitive theory then entails both outcome expectancies and self-efficacy and both are viewed to be instrumental in the initiation of health related changes (Luszczynska & Schwarzer, 2005). When people are diagnosed with an illness, such as hypertension, various factors are considered from what the diagnosis means to how it will be treated. Based on this, people tend to think about the consequences of the illness as well as the subsequent medicinal treatment, considering the prescribed instructions, the side-effects, the cost, alternative treatments, life-style changes as well as the timeline of such a diagnosis (Schousboe, 2009). All these possible outcomes impact patients' levels of self-efficacy, which in turn will determine the changes they want to make as well as the actual implementation of such behavioural changes. Luszczynska and Schwarzer (2005) are of the opinion that "perceived self-efficacy and outcome expectancies, therefore, are seen to be related to the adoption of health-promoting behaviours in a variety of settings" (p.133). Social cognitive theory thus plays an important part in predicting health behaviours and it has been used in various studies including medication compliance (Clark & Dodge, 1999; Williams & Bond, 2002).

Medication compliance is related to self-regulatory beliefs as argued by Luszczynska and Schwarzer (2005). Self-regulation relates to the capacity to alter one's behaviour in accord with internal- and external factors, thus relating to the ability to exercise self-influence on one's actions (Bandura, 1989). If people consider themselves to be capable of treating their illness by taking their medication (self-efficacy), together with the expectation that it will be successful in managing their illness (outcome expectancy), people might demonstrate high degrees of compliance with their prescribed drug treatments. The aim of the present study is concerned with the impact psychological factors may have on patients' medication compliance.

Psychological factors were defined according to the self-regulation model, which stipulates that patients tend to create a type of cognitive representation in their attempt to understand their illness (Kemp, Feely, Hay, Wild, & Cooper, 2007). Patients are inclined to develop a set of beliefs about their illness as a means of making sense of the diagnosis, constructing a personal view of the illness and how it would be treated. These beliefs are referred to as illness representations (Meyer et al., 1985). Illness representations play a substantial role in patients' outcome expectancies as well as their perceived levels of self-efficacy. If patients view their illness as treatable and they foster positive views about how to deal with the diagnosis, they might be optimistic about the overall health outcome. This can thus improve patients' willingness to comply with their medication regimens, given that they believe they are able to maintain their health through behavioural changes. However, it is possible that if patients argue that their medication is ineffective in treating their illness or they have negative views about their health outcome, they might not comply with their medication instructions and consequently they might demonstrate low compliance rates. The cognitive representations held by patients often reflect distorted views about the illness and the asymptomatic nature of hypertension also influence patients' experience of symptoms (Ross et al., 2004). According to the self-regulation model, patients view their illness in terms of the following dimensions: identity, consequences, timeline, causes and curability. A detailed discussion of this model will be provided in a later section.

The social cognitive theory holds the assumption that people's thought processes impact their behavioural decisions based on their outcome expectancies and their perceived self-efficacy (Bandura, 1991; Luszczynska & Schwarzer, 2005). The self-regulation model also highlights the role that people's cognitions play in terms of behavioural change (Kemp et al., 2007; Meyer et al., 1985). Patients construct various cognitive representations about their

illness in terms of their judgments about what the outcomes will be, both about the illness itself and the consequences of the treatments prescribed. These cognitive views are also influenced by patients' perceptions about how capable and effective they will be in dealing with such problems. Catz, Kelly, Bogart, Benotsch, & McAuliffe (2000) found that non-compliance is related to low levels of self-efficacy, which is understood as optimistic (i.e. positive) self beliefs about peoples' ability to follow their medication instructions. Self-efficacy is thus considered to have an important relation to medication compliance. Previous research suggested that low self-efficacy and low outcome expectancies result in inadequate medication compliance (Catz et al., 2000; Luszczynska & Schwarzer, 2005; Molassiotis, Nahas-Lopez, Chung, Lam, Li, & Lau, 2002; Stewart et al., 2003; Williams, & Bond, 2002). Clark and Dodge (1999) found that self-efficacy predicts subsequent disease management in terms of medication compliance. Social cognitive theory and social-regulation theory thus emphasises the role self-efficacy and outcome expectancies have as two of the most important self-regulatory factors for changing health behaviours.

In summary the present study was guided by both the social cognitive theory and the assumptions of the self-regulation model, with the purpose of determining the role psychological factors play on the extent to which hypertensive patients comply, or fail to comply with their medication prescriptions.

2.2 Literature Review

A statement often used in publications about compliance, is that mentioned by C. Everett Koop; "Drugs don't work in patients who don't take them" as cited in (Rafique, 2011). It is generally accepted that patients are well informed concerning their illness and they are aware of the instructions provided to them on how to use their prescribed medications. In relation to being knowledgeable about their illness and the importance of medication use it is often the case that patients do not adhere to their prescribed medication although they acknowledge the sometimes dangerous consequences (C. Schutte, personnel communication, December 30, 2009; Horne et al., 1999). Thrall et al. (2004) argue in this regard that being knowledgeable about one's illness and medication use is not sufficient to improve people's compliant behaviour and the complexity of the construct compliance further complicates the situation. Pharmaceutical care, as argued, is concerned with identifying problems related to medication use and eliminating and/or preventing such problems from occurring (Bondesson et al., 2009). The main drug-related problem is non-adherence to medication use, and it is a

persistent problem within the healthcare setting and the extent of this problem is well known (Lehane & McCarthy, 2007). In spite of the research that has been conducted on this topic for the past five decades, not much progress has been documented with regards to solving this problem (Lehane & McCarthy, 2007; Petrie, Jago & Devcich, 2007; Schousboe, 2009; Taylor, 2012). It has been well documented that many patients do not follow their medication instructions as directed and the impact of this problem results in increased health expenses and other health related problems (Taylor, 2012). Steyn et al. (2001) state in agreement that despite the availability of cost-effective pharmacological treatment and non-drug related options, hypertension is generally poorly managed and it contributes to the financial and epidemiological burden of chronic illnesses in South Africa. Failure to comply with medication regimes is known to lead to higher morbidity, mortality, hospital admissions, and financial cost as well as the overall degeneration of patients' health (Bondesson et al., 2009). Cutrona, Choudhry, Stedman, Servi, Liberman, Brennan et al. (2010) also note non-adherence as a critical source of increased mortality. The amount of research focusing on this topic is vast and different studies attempt to highlight different factors as possible reasons for non-compliance, but intervention strategies attempting to improve this common problem is limited in success. The possible role health care practitioners can play in this regard is still unknown as questions arise as to who should be responsible for administering interventions and what role doctors would play in this process (Cutrona et al., 2010; Taylor, 2012). This is supported by research which notes that healthcare interventions have not demonstrated much success with improving medication compliance and the effectiveness of health care professionals in understanding this problem is also becoming a topic of investigation (Petrie et al., 2007).

Lehane and McCarthy (2007) state that medication compliance holds particular significance for patients diagnosed with a chronic illness, and hypertension is considered to be chronic, affecting a large portion of western populations, and it is particularly prominent amongst older people. Hypertension is described as "elevated blood pressure [which] means that the force of the blood against the walls of the arteries is too high" (Zillmer, Spiers, & Culbertson, 2008, p. 351). High blood pressure is generally diagnosed when patients demonstrate consistent BP levels of > 140/90mmHg and overtime arteries weaken and it can burst causing heart attacks as well as other cardiovascular related problems (Taylor, 2012). This condition is becoming more prevalent in developing countries due to the consequences

associated with urbanization and westernization, resulting in a higher incidence of this illness in South Africa (Steyn et al., 2001).

The World Health Organization (2003) defines chronic conditions as "diseases which have one or more of the following characteristics: they are permanent, leave residual disability, are caused by non-reversible pathological alterations, require special training of the patient for rehabilitation or may be expected to require a long period of supervision, observation or care" (p.19). Timmreck, (1987) supports this definition. It is argued that poor adherence to medication is commonly associated with chronic diseases as it places a substantial degree of responsibility on patients and requires self-management. There is no single intervention strategy that has proved to be successful across different conditions and amongst different patients. The course of the illness in this sense may be a potential factor contributing to patients' inability to adhere to their pharmacological instructions (Thrall et al., 2004). Low levels of compliance is viewed as the main reason for why medical therapy and health progression are not reaching satisfactory levels and research about what psychological factors influence patients' decision making regarding their illness and medication use may prove to be valuable by providing insight into how these factors contribute to non-compliance (Edo 2009).

2.2.1 Conceptualization of compliance

Compliance is an important clinical issue in health care and various factors have been studied in relation to the problem of non-compliance and attempts have been made to address these factors for improving adherence (Lehane and McCarthy, 2005; McGann, Sexton, & Chyun, 2008; Figueiras, Marcelino, Claudino, Cortes, Maroco & Weinman, 2010). Compliance is defined as "the extent to which a person's behaviour in terms of taking medications, following diets or executing lifestyle changes coincides with medical or health advice" (McGann et al., 2008, p.153) Svensson et al. (2000) also support this definition. Compliance should also be understood in terms of persistence, as medication should be taken according to instruction on a continual basis, especially with regards to chronic conditions (Ho, Bryson & Rumsfeld, 2009). Non-compliance can take different forms, either being intentional, when a person consciously decides not to take their medication, or it may be unintentional, when a person simply forgets to take their medication. Berk, Hallam, Colom, Vieta, Hasty, Macneil and Berk (2010) highlighted that patients may actually change, rather than completely accept or abandon their treatment schedule. Berk et al. (2010) noted in

relation to this that "...varying medication regimens leads to partial (i.e., client takes only part of their full doses) or irregular (i.e., client stops and starts treatment sporadically for varying intervals) adherence as opposed to 'all or none' decisions about taking medications" (p.2). Non-compliance may also relate to the abuse of prescription drugs or patients may be selective in terms of their compliance, fully complying with certain prescriptions but neglecting others (Berk et al., 2010; Colom, Vieta, Sa'nchez-Moreno, Marti'nezz-Ara'n, Reinares, Goikolea, & Scott, 2005). Schousboe (2009) defined medication compliance as "...taking medication as recommended by the prescribing provider and dispensing pharmacist, presumably to maximize its effectiveness and safety" (p.3). Prescribed instructions will then include guidelines about how often the medication is to be taken, the dosage needed and whether it should be taken prior or with food, at particular times, such as in the afternoon or morning and also whether it includes doing or avoiding some activities when the medication is taken.

These factors highlight the dynamic and multifaceted nature of compliance. Based on the above definition, compliance is generally understood as taking the right dosage, at the specified/instructed time, and any deviations is considered a form of non-compliance. Compliance is thus associated with patients' decisions regarding their medication-taking behaviour and whether this behaviour is in accordance with professional advice and instruction (McGann, 1999; World Health Organization, 2003). It is noted that adherence and compliance can be distinguished from each other with the main difference being that "…adherence requires the patient's agreement to the recommendations" (World Health Organization, 2003, p.19). This means that adherence involves the active participation of patients and the need for effective communication between health care practitioners and patients are emphasised, while compliance simply relates to patients taking their medication or not, passively following the instructions. Vuckovich (2010) describes compliance as a form of coercion where, in the case of psychiatric patients, they are forced to take their medication. If the use of medication is based on coercion it cannot be viewed as adherence as the patient is not willingly or actively involved. Ho et al. (2009) support this definition of adherence as they characterize the active, voluntary involvement of patients aiming to produce a specified therapeutic outcome. The patient thus has a choice, they either adhere to their prescriptions or they choose not to. This definition also directly relates to the intentional and unintentional dimensions of the concept, where unintentional compliance refers to patients as passive recipients, while intentional compliance relates to the active involvement

of patients in maintaining their health (Lehane & McCarthy, 2007). Despite this differentiation the concepts of adherence and compliance will be used interchangeably in the present study as referring to McGann et al's (2008) definition, thus both concepts are taken to be synonymous in their description of medication use (Svensson et al., 2000).

Compliance is also described as a multi-factorial phenomenon as it can be understood in the context of the doctor-patient relationship, the complexity of the medication instructions or perceptions and stigma about the illness (Kemp et al., 2007). Berk et al. (2010), Rolley, Davidson, Dennison, Ong, Everett and Salamonson (2008) and Molassiotis et al. (2002) also acknowledge the multifaceted aspect of this construct as it is dependent on physical, social, economic and psychological deliberations. Cutrona et al. (2010) support the argument that compliance is influenced by multiple factors as they assert that intervention programmes work best if it taps into different areas known to play a role in how patients take their medications. Many research studies have indicated that nearly 50% of patients taking prescribed medication do not take their medication or they do not take the medication according to prescribed instructions (Chen et al., 2009; Donovan & Blake, 1992; Haynes, Taylor, & Sackett, 1979; Ho et al., 2009; Horne & Weinman, 1999; Kemp et al., 2007; McGann et al., 2008; Schousboe, 2009; World Health Organization, 2003). Non-compliers have also been estimated to be as high as 80% in some cases (Kemp et al., 2007).

Poor compliance to long-term treatments compromises the efficiency of the medication thus making this an important aspect for the health and wellbeing of the population. Interventions attempting to enhance compliance would then make a significant contribution at a primary prevention level as well as secondary prevention of subsequent negative health problems. In relation to this it is argued that intervention programs should be tailored to individuals' needs and to the particular condition diagnosed (World Health Organization, 2003). Thrall et al. (2004) agrees with this as they state that explanations and directions should be individually tailored to suit the needs of the patient as well as the particular condition at hand. The medication instructions should also be tailored to agree with the patient's lifestyle where possible, as this will improve the extent to which the individual takes his/her medication. This is why the need for accurate assessment of compliance is needed in order to gain insight into the factors that influence medication taking behaviour. Knowledge about these factors can then permit health care professionals and researchers to develop effective treatment programs contributing to better compliance as well as improved health care systems. It will also enable practitioners to determine the best method of intervention,

thus who should be involved in ensuring patients' adherence; the doctor, the nurses or the pharmacist for example. The World Health Organization (2003) however emphasises the fact that there is no 'gold standard' for assessing adherence and the use of different strategies is usually advised.

The capability of patients to optimally follow their medication prescriptions usually involves more than one obstacle as there are different dimensions of the problem due to the multifaceted characteristic of adherence (Berk et al., 2010; Davidson et al., 2008; Simoni, Asarnow, Munford, Koprowski, Belin, & Salusky, 1997). Social and economic factors, the health care system, the type of illness, and other patient-related factors can all play a role in why patients fail to concord to their pharmacological treatments (Lehane & McCarthy, 2007). An understanding of each of these factors is needed in order to address the insufficiencies associated with the improvement of adherence therapies (World Health Organization, 2003).

Adherence should also be described as a continuous and dynamic process. Patients' 'level-of-readiness' to follow health care instructions and advice is also a factor for consideration (Horne et al., 1999; Rothman, 2000). If patients are not ready to follow medication instructions then the practitioner's attempts to intervene will not be sufficient since the patients' readiness to comply with their prescriptions is not at an optimal level. Taylor (2012) also noted that if patients do not decide to follow their prescribed regimen, adherence will be low. Possidente, Bucci and McClain (2005) substantiate this claim as they argue that no one intervention can address the problem of adherence as many factors impact patients' decisions to take their medication. More importantly Taylor (2012) and Rothman (2000) noted that patients generally go through different stages as they are trying to adjust or change their health behaviour. In relation to this, Prochaska (1994) developed the transtheoretical model of behaviour change attempting to describe patients' decisions when they are confronted with a health problem. The level or stage of change will determine their readiness to admit to a problem and to take the appropriate remedial action (Taylor, 2012). Similarly, a patient's willingness and inclination to adhere to their treatment will determine their decision to comply with their prescribed treatment and ultimately the action they decide to take. These factors should thus be assessed and the progress of such readiness should continuously be reviewed (Horne et al., 1999; World Health Organization, 2003).

After diagnoses some patients may go through a number of different phases, ranging from denial to an acceptance that they are sick and must comply with medication treatments (Prochaska, 1994; Rothman, 2000). If patients are in denial, they may not take their

medication as prescribed as they might argue that they are not ill thereby compromising their adherence to needed medications (McGann et al., 2008). This is particularly evident in the case of hypertension, often described as the 'silent killer' or the hidden disease as this diagnosis is considered to be asymptomatic, as discussed later in this section (Taylor, 2012; Wedro & Stöppler, 2011).

In relation to the adherence rate of hypertensive patients it has been estimated that more than 50% of the population diagnosed with this illness do not take their medication as prescribed and this is viewed as an important challenge to research and practise within the health care setting as non-adherence is influenced by a number of factors (Brewer et al., 2002; McGann et al., 2008; Possidente et al., 2005). The impact of psychological factors was the main focus of this investigation and some of the findings found in past research will be discussed next.

2.2.2 Conceptualization of psychological factors in terms of the self-regulation model

Brewer et al. (2002) state that "no studies have used a psychological model such as...the self-regulation model to predict medication adherence..." (p.434). Few studies have explored the relation of psychological factors such as knowledge, attitudes and beliefs to compliance with medication use (Brewer et al., 2002). Bane, Hughes and McElnay (2006) also note that "psychological and emotional factors underlie and predict adherence behaviour more so than other factors" (p.187). As noted in the above subsection, many factors influence the extent to which patients comply with their medication regimes including a lack of association with the symptoms related to the illness, the complexity of the instructions prescribed, potential side-effects as well as other social and economic factors and these factors can be described as patients' illness perceptions (Buelow & Wang, 2006; Dubiel, Cwynar, Januszewicz & Grodzicki, 2005; Figueiras et al., 2010; Schousboe, 2009). The need for understanding patients' beliefs about their illness and medicinal treatment is also highlighted by Figueiras et al. (2010), Kemp et al. (2007) and Schousboe (2009). Accordingly, the psychological factors influencing the relation and management of chronic illnesses can be conceptualised as social cognitive models, stage models and the self-regulation model (Chen et al., 2009; Horne & Weinman, 1999; Leventhal, Diefenbach & Leventhal, 1992).

The basic assumption of the self-regulation model is "...that patients construct a cognitive representation in order to make sense of [the] illness" (Kemp et al., 2007, p.108). When

patients are diagnosed with a specific illness they tend to construct a set of belief patterns about their illness and this is what the self-regulation model attempts to convey, an understanding of the processes by which patients attempt to make sense of their diagnoses based on their illness representations (Meyer et al., 1985). It highlights the factors involved in patients' processing of information about their illness resulting in a subjective view of the illness and how he/she should go about treating it, or cope with the diagnoses (Hagger & Orbell, 2003; Taylor, 2012). The beliefs patients hold about their illness can have important implications for their adherence behaviour and their subsequent health and safety (Bokhour, Berlowitz, Long & Kressin, 2006; Petrie et al., 2007; Schousboe, 2009). These cognitive representations often reflect distorted views about the illness and the asymptomatic nature of hypertension also influence patients' experience of symptoms (Ross et al., 2004).

Patients' generally use information about their symptoms and their illness to make decisions about what type of treatment to follow and the extent of adherence is also influenced by the use of this information (Leventhal et al., 1992). Information is gathered from different sources including a person's 'lay' view of the illness based on previous social interactions and communication about different diseases. Patients often rely extensively on their lay referral network for informal diagnoses (Taylor, 2012). Information is also derived from experts such as doctors, nurses or other health care practitioners but it may also be based on patients own personal experiences (Hagger & Orbell, 2003). Patients ascribe meaning to certain experiences and symptoms of an illness which may impact future health decisions (Taylor, 2012). Patients' subjective beliefs about their diagnoses and how to go about treating it is therefore an essential factor for understanding medication adherence (Clifford et al., 2006). The self-regulation model is used to understand how patients make sense of their illness, thus how they form a representation of all the factors involved. This model will be used to inform the present investigation in terms of the psychological factors contributing to non-compliance. A detailed discussion of the model will follow.

2.2.3 The Self-regulation model

According to Leventhal's conception of the self-regulation model, the way people think about their illness or disease, 'their illness cognitions', can be categorized in terms of five distinct attributes or dimensions: 1) identity or symptoms which involves the person's label for the illness and their physiological experience of the disease; 2) consequences, this involves the individuals perception of the expected consequences of the illness; 3) timeline,

this involves the aspect of whether the illness is considered chronic or acute, stable or cyclical; 4) causes, this is related to the perception of co-variation of the illness and other related events and 5) controllability, this concept involves the aspect of severity, thus the seriousness of the disease, can the illness be treated or 'remedied' (Broadbent, 2010; Chen et al., 2009; Hekler et al., 2008; Johsnon & Rogers., 2006; Kemp et al., 2007; Leventhal et al., 1992).

These five dimensions relate to the way that patients' process information about their diagnoses and how this information is integrated into forming an overall representation of the illness as well as the behaviours necessary for coping with it. Identity involves patients' own subjective meaning ascribed to the label of the disease, such as cancer, hypertension or epilepsy. All these names/labels elicit certain cognitive experiences within each patient and these cognitive understandings then leads to a process where the individual links this particular label with certain symptoms and somatic experiences.

Consequences have to do with the patient's perception about the potential impact the illness will have on his/her lifestyle and quality of life. It relates to how it will influence their normal, everyday living and the adjustments that might be necessary in order to cope effectively with the illness (Hagger & Orbell, 2003: Petrie et al., 2007).

Timeline is concerned with patients' perceptions about the course of the illness, how long it will last and how this will impact their course of life. It relates to patients' views about how long they will require treatment and about when they will be 'cured'. This is also connected with the controllability or cure of the diagnoses, which has to do with the feeling of empowerment, the extent to which patients' believe they can control and cope with the illness. A patient's perceptions about the degree to which he/she can cope with or control their illness will impact the extent to which they adhere to their medication regimes.

Lastly causes has to do with the beliefs patients have about what caused the diagnoses, what is responsible for the illness, is it biological, emotional, psychological or environmental. In other words, did the illness develop as a result of some external factor such as pollution for example or due to internal factors like an unhealthy diet? The perceptions about what caused the illness are then also important factors for compliance, which not only relates to pharmacological directions but also to behavioural and lifestyle changes (Figueiras et al., 2010; Thrall et al., 2004). Patients' perceived causes of the disease will relate to their decision to follow medical advice and implement changes for coping with the illness such as losing weight, stop smoking or exercise and other commonly advised changes. In relation to

this it is emphasised that patients' beliefs and perceptions about their illness "...have been found to be important determinants of behaviour and [it] has been associated with a number of important outcomes, such as treatment adherence and functional recovery" (Petrie et al., 2007, p.163). Perceptions and medication compliance have been the focus of several investigations, attempting to understand it in relation to different determining factors.

Past research focusing on medication compliance often attempted to explore the relation between adherence and specific factors such as depression or a lack of knowledge in relation to medication use and as a result different studies utilize different questionnaires to suit the purposes of their studies. As Johnson and Rogers (2006) state "several instruments exist to measure health beliefs about medication taking...the limitations of existing measures [however] include the use of items unrelated to medication-taking behaviours, items that demonstrate potential response bias, failure of items to focus on reasons to take medications, or limited items addressing issues associated with long-term medication taking" (p.336). The medication adherence model (MAM) was developed to address medication use in low-threat situations and it is considered to be user friendly in the clinical setting (Johnson & Rogers, 2006). A discussion of the MAM will be provided next.

2.2.4 The medication adherence model (MAM)

The development of the MAM was informed by two types of non-adherence: intentional decisions to take or miss medications; and unintentional factors related to medications not taken (Hughes, 2004; Jonhson et al., 1999; Kemp et al., 2007; Wroe, 2002). Intentional non-adherence concerns patients' conscious decision to take or not to take their medication, this is thus a conscious decision made by them. Unintentional compliance however concerns a failure to take medication due to forgetfulness or a lack of understanding of the instructions, confusion and other factors that might result in low levels of adherence (Bokhour et al., 2006).

The MAM is concerned with three concepts: purposeful action; patterned behaviour, and feedback, which is accountable for long-term adherence to hypertensive medications (Johnson and Rogers, 2006; Lehane & McCarthy, 2007). In accordance with the medication adherence model it is suggested that patients must first make the decision, purposeful action, to use medication for hypertension after which patients can then develop 'patterned behaviour' to take their medication on a regular basis, thus developing routines as well as techniques for improving recall for medication use. Purposeful actions can then be related to

the patient's intention to take his/her medication based on their apparent need, efficiency and safety. Perceived need concerns patients' beliefs that the medication is necessary for controlling their blood pressure levels while perceived effectiveness relates to patients' views about how effective this medication is in remedying the condition (Lehane & McCarthy, 2007). Safety has to do with patients beliefs that the medication is safe and that no serious side effects will occur. Patterned behaviour is "described as the degree to which individuals initiate and establish a ritual, habit or pattern of taking medications through access, routine and remembering" (Lehane & McCarthy, 2005, p.700). This is an important aspect to note as all intervention programs should attempt to achieve this goal of helping individuals to set a routine that will suit their daily functioning and lifestyle needs. This is also why the prescription of a once-daily drug is better than having to take multiple types of medication and dosages at different times of the day (Inkster, Donnan, MacDonald, Sullivan & Fahey 2006).

Chronic conditions also require both physical and psychological adjustment and changes in patients' routines in order to effectively manage the illness. Chronic illnesses are most commonly associated with low compliance rates as it places a substantial burden on the patient's life and general functioning. Patients' illness representations are therefore an important determining factor of how well they will cope with the illness (Petrie et al., 2007). Hypertension is known to be a chronic, lifelong illness and it is unlikely that patients' diagnosed with the condition will reach a normal blood pressure level without drug treatment. The chronic nature of the illness thus also relates to the lifelong responsibility of patients to take their medication (Wedro & Stöppler, 2011).

Lastly feedback, referring to the degree to which information, facts or events influence compliance and non-compliance, can be obtained by using blood pressure readings. It can be of value by providing information about the current blood pressure as it provides a means of reinforcement for the purposeful action of taking the medication and it can also contribute to maintaining the medication taking routines (Johnson and Rogers, 2006). No measure of purposeful action exists and "an instrument that reflects prevention and health promotion with relation to the MAM needs to be developed" (Johnson & Rogers 2006, p.337). This attempt was undertaken by Johnson and Rogers (2006), which led to the development of the Medication-taking Questionnaire (MTQ) that will be used as the primary method of data collection to determine the degree of medication compliance amongst patients diagnosed with hypertension.

2.2.5 Illness cognitions and medication adherence

The above mentioned attributes concerning patients' illness cognitions can be used to predict health behaviours including medication compliance and it can also contribute to the development of instruments for the assessment of cognitive representations in relation to illnesses (Hagger & Orbell, 2003; Leventhal et al., 1992; Weinman, Petrie, Moss-Morris, & Horne, 1996). The value of gaining insight into what influences patients' pharmacological behaviour will permit researchers and other health professionals to understand what motivates people to use their medication as instructed. Past findings suggest that a lack of motivation to adhere to one's treatment prescriptions is related to misguided beliefs about the 'necessity' or the 'concerns' a patient has about the possible negative consequences of their disease (Edo, 2009). Petrie et al. (2007) argue that discussions with patients concerning their perceptions and ideas about their illness can help clarify any misconceptions and it can reduce other health related problems such as non-compliance. A patient's beliefs and emotional response to their diagnosis is therefore an important factor for understanding what influences patients' decision-making behaviour. Patients' ideas about their symptoms and diagnoses may not provide the context needed to permit them to make sense of what their illness is about, resulting in misunderstandings and inadequate coping strategies (Petrie et al., 2007; Ross et al., 2004). Although research suggests that hypertensive patients develop the perception that their medication is necessary, their beliefs about the possible negative side effects contributes to a lack of compliance (Ross et al., 2004). Knowing how patients make decisions about their medication regimes and what influences their medication taking behaviour, is related to patients perceptions concerning issues like the seriousness of their illness, the type of treatment needed, the effects associated with the treatment and patients overall insight about their diagnoses. Hypertensive patients for example often think they are cured and as a result they stop taking their medication (Bokhour et al., 2006). As highlighted earlier, Wedro and Stöppler (2011) support this argument as they emphasise the lifelong nature of hypertension, requesting patients to take their medication for the rest of their lives. This is sometimes misunderstood as patients often mistakenly assume that their condition is cured following a period of medication use. This is why the self-regulation model, focusing on different aspects of illness cognitions, is relevant and valuable for the investigation of the current research project.

In terms of whether a relation was found between illness cognitions and medication adherence, Brewer et al. (2002) found that patients' beliefs about the repercussions of the

disease was positively correlated to self-reported adherence, thus patients took their medications as prescribed based on the perceived consequences of the illness. This is also supported by a study undertaken by Figueiras et al. (2010) and Inkster, Donnan, MacDonald, Sullivan and Fahey (2006). Petrie et al. (2007) and Ross et al. (2004) also found similar results concerning patients' illness cognitions. Medication compliance amongst hypertensive patients is effected by patients' beliefs and views about the illness as well as the treatment. It may also impact the patient's expectations concerning their recovery, thus influencing their adherence rate (Bokhour et al., 2006; Horne & Weinman, 1999). The other attributes, symptoms, timeline, cause and cure, showed no significant relation to self-reported adherence (Brewer et al., 2002).

They do however acknowledge the limitations of the study but Brewer et al. (2002) state that "the [self-regulation model's] attributes of illness cognitions proved to be a useful tool for generating new hypotheses about psychological predictors for adherence..." (p.444), of which three attributes were found to be important in relation to compliance: consequences, symptoms and timeline. The usefulness of the self-regulation model is also argued for by Chen et al. (2008), Horne et al. (1999), Hagger and Orbell (2003) and Petrie et al. (2007).

In summary the self-regulation model holds the assumption that people tend to form certain cognitive representations about their illness in terms of various dimensions, while the MAM proposes that patients take their medication in terms of their perceived need as well as the perceived effectiveness of their medication. Both these models then hold that patients develop a set of beliefs about their illness and their prescribed treatments based on their own perceptions. Patients thus form perceptions about the illness in general relating to the self-regulation model, and they also form perceptions about their medication-taking behaviour, relating to the MAM. The psychological factors were conceptualized in terms of Leventhal et al's. (1992) description of the self-regulation model, and medication adherence was defined in line with the assumptions of the MAM.

2.3 An overview of past research focusing on medication compliance

An important factor of psychological research in the area of health is to gain insight into the factors that impact patients' adherence to their medication prescriptions or other related health behaviours in order to effectively manage and cope with the diagnosed illness. Knowledge in this area can then contribute to adequate intervention strategies and treatment instructions resulting in satisfactory levels of compliance (Hagger & Orbell, 2003). The

present study attempted to explore the possible psychological factors that may impact the medication use of patients diagnosed with hypertension by using the self-regulation model as the basis for arriving at a comprehensive understanding of non-compliance.

It is generally known that hypertension is a major risk factor for cardiovascular problems such as strokes, heart attacks or ischemic heart disease. Hypertension refers to blood pressure levels which depends on the amount of blood pumped out by the heart with every contraction, combined with the easiness with which the blood can flow through the vessels. If blood vessels get narrower the force with which blood flows, increases resulting in higher blood pressure levels (Wedro & Stöppler, 2011). As blood vessels get narrower, the intensity at which the heart pumps increases, placing more strain on the heart as it must work harder to get the blood flow going. For this reason hypertension can gradually result in heart problems as well as other organ complications (Taylor, 2012). Importantly, it is emphasised that people already diagnosed with hypertension and receiving treatment, fail to demonstrate satisfactory blood pressure levels. It is also noted that despite the well known prevalence of hypertension amongst older people, this condition also occurs in younger patients (Edo, 2009).

As discussed, in terms of high blood pressure, hypertension is diagnosed with consistent BP levels of ≥ 140/90mmHg. (Thrall et al., 2004). This description is in line with the World Health Organization-International Society for Hypertension's (WHO/ISH) definition, while the Hypertension Society of South Africa defines hypertension as blood pressure levels of ≥ 160/95mmHg (Steyn et al., 2001). It is emphasised that if the cut-off point for diagnosis is 160/95mmHg, approximately 3.3 million adults 15 years and older suffers from hypertension, but if the cut-off point is in relation to the WHO/ISH definition, an estimated 6 million South Africans will be diagnosed with hypertension. This is why the 160/95mmHg cut-off point is now being reconsidered as 3 million more people will be diagnosed, needing treatment (Steyn et al., 2001). This reconsideration will also enable health care professionals to potentially permit early treatment, thereby minimizing the consequent prevalence of cardiovascular illness whilst the problem of compliance can be addressed.

In agreement with the above mentioned, Cunha (2012) describes hypertension as being diagnosed when a patient demonstrates consistent BP levels higher than 140/90mmHg for about six months. Schoenstadt (2009) describes systolic BP, the top number, as an indication of the pressure in the arteries when the heart is beating while diastolic BP, the lower number, relates to a measure of pressure while the heart is relaxed, thus in between heartbeats. The

systolic pressure is the greatest force of pressure caused by the contractions of the heart, which is why systolic pressure is of particular value when diagnosing hypertension (Taylor, 2012). It is generally accepted that a mild form of hypertension involves a systolic blood pressure measurement between 140 and 159, moderate hypertension is indicative of levels between 160 and 179 whereas severe hypertension constitutes systolic blood pressure levels of 180 and over (Bakris, 2012). Edo (2009) notes the healthy blood pressure level as ≤ 120/80mm Hg. There are many different symptoms associated with this condition but the most reliable symptom for diagnostic purposes is based on a physical blood pressure reading. Due to the silent nature of this illness many people may suffer from hypertension for long periods of time without knowing it. When they are finally diagnosed the problems are often severe (Hudson, 2010; Cunha, 2012).

Hypertension is generally characterised by mild and unspecific symptoms, and as a result patients often need to be convinced that treatment is needed by justifying the treatment in relation to long-term health benefits and decreased risk factors (Svensson et al., 2000; Taylor, 2012). Johnson and Rogers (2006) state that many "chronic diseases are asymptomatic, exerting a seemingly nonthreatening silent impact on health" (p.336). Chen et al. (2009), Guimón (1995), and Hekler et al. (2008) and Ross et al. (2004) also note the asymptomatic nature of hypertension. It is viewed to be a 'symptomless' disease (Talyor, 2012). As a result hypertensive patients often neglect to take their medication as they do not feel sick or unwell. In accordance with the above mentioned hypertension can thus be understood as a chronic illness that is not associated with immediate threatening symptoms, but neglect to deal with this illness may result in serious problems and even death. Due to the asymptomatic nature of hypertension, patients often fail to seek treatment as they do not feel sick or if they have been diagnosed they exhibit unacceptable medication adherence. The main reason for ineffective BP control then is poor medication adherence and understanding the reasoning behind patients' lack of compliance with their antihypertensive medications is fundamental for more effective management (Thrall et al., 2004).

Based on the severity of the condition and the associated symptoms, different types of hypertension can be identified: primary hypertension and secondary hypertension. According to Coetzee (2010) and Taylor (2012), primary hypertension is diagnosed when the cause of the condition is unknown. This type is also referred to as essential hypertension (Cunha, 2012). Edo (2009) notes that essential hypertension is the most common type constituting "...95% of [all] cases" (p.23). In terms of this type of hypertension it is noted that no obvious

symptoms are present and those that are, may vary from one patient to the next. Some of the symptoms are also characteristic of other illnesses but the following symptoms are commonly associated with this form of hypertension (Coetzee, 2010; Cunha, 2012):

- Chronic headaches
- Dizziness
- Blurry or double vision
- Drowsiness/light headedness
- Nausea
- Shortness of breath
- Heart palpitations
- Fatigue
- Nosebleeds
- Frequent urination
- Tinnitus (a ringing or buzzing in the ears)

In comparison to primary or essential hypertension, secondary hypertension is considered to have a specific gene, other medical condition or organ accountable for the abnormally high blood pressure. Kidney conditions can for example often result in high blood pressure due to the fact that these organs are responsible for regulating salt and water intake. The kidney's failure to control the salt or water balance in the blood stream can result in high concentrations of salt, known to be one of the main causes of hypertension (Edo, 2009; Taylor, 2012; Wedro & Stöppler, 2011). Tumours, overactive adrenaline glands, thyroid dysfunctions, and pregnancy related symptoms are also known causes of secondary hypertension. Some other causes may include (Cunha, 2012; Edo, 2009; Taylor, 2012):

- Sleep apnea
- Contraceptive pills or anti-inflammatory pills
- Chronic renal diseases
- Primary aldosteronism
- Steroid treatments
- Aorta coarctation

The most serious and severe form of hypertension is malignant hypertension. This is described as a severe condition with blood pressure levels of 210/120mmHg (Kaplan & Calhoun, 2012). This form of hypertension is less prevalent, occurring in approximately 1 out of 200 people who suffer from high blood pressure. It is however noted that malignant

hypertension is more prevalent amongst black people than white people, males than females and people usually residing from poor socio-economic groups. Malignant hypertension can result in death in three to six months if it is left untreated (Coetzee, 2010; Myers & Caulfield, 2001; Symptoms of hypertension.com, 2011). Other types of hypertension include isolated systolic hypertension. This type of hypertension is diagnosed when the systolic blood pressure is continuously above 160mmHg while the diastolic is below 90mmHg. This usually occurs in elderly people due to age related changes in arteries and arteriosclerosis. White coat hypertension is synonymous with anxiety-induced hypertension, meaning that blood pressure readings are only high when health care professionals take the reading (Taylor, 2012). If the blood pressure levels are normal outside a clinical setting, no treatment is needed, but follow-ups are usually recommended. Life-style changes, minimizing salt and alcohol intake, weight loss and exercise are amongst the changes instructed to patients (Coetzee, 2010). Lastly, resistant hypertension is diagnosed when blood pressure levels cannot be reduced to levels lower than 140/90mmHg despite triple-drug treatments (Kaplan & Calhoun, 2012).

Hypertension affects more or less 20% of Western populations, although increases in this condition have been noted by the World Health Organization (2003), and it is known to be a major risk factor for the subsequent development of cardiovascular illnesses and its relation to high mortality rates (Chen et al., 2009; Brewer et al., 2002; Johnson & Rogers, 2006; Svensson et al., 2000; Zilmer et al., 2008). Taylor (2012) stated that it is estimated that approximately one out of four U.S. adults demonstrate high blood pressure levels, but due to the asymptomatic nature of the disease, at least one third of this group are not aware that they have the condition. According to the South African Demographic and Health Survey research conducted in 1998 high blood pressure readings, above 160/95mmHg, was found in people over the age of 15 comprising 11% of men and 13% of women (Steyn et al, 2000). The prevalence rate for hypertension in South Africa, for people aged 15 years and older, as noted, was estimated to be about 3.3 million people if the 160/95mmHg cut-off point is used. It is commonly known that men are more likely to suffer from the condition than women but Peltzer (2004) found that more women than men were aware of their condition. Taylor (2012) noted that women generally use health services more, not only because they have more diverse needs, but because it is more acceptable for women to use these services. In line with social norms, men are expected to be tough and ‘macho’ which often involves ignoring symptoms. Men are thus less likely to use health care services when compared to women (Leventhal et al., 1992). Due to this, more women than men are diagnosed resulting in a low

compliance rate amongst men, with only 9% of diagnosed males demonstrating satisfactory blood pressure levels compared to 23% of women receiving drug treatment (Gu, Burt, Paulose-Ram & Dillon, 2008). It is stated that urbanised males are however more likely to be diagnosed than non-urban males, emphasising the need to target rural areas in an attempt to increase awareness about the condition and to initiate treatment (Kaufman, Rotimi, Brieger, Oladokum, Kadiri, Osotimehin, et al., 1996). In agreement, Steyn (2005) reported that the duration of urbanisation predicted the prevalence of hypertension. Lifestyle changes are thus directly associated with the prevalence of the condition. There are also cultural differences in how quickly and also what kinds of symptoms are detected, but the reasons for these differences are not yet fully understood (Taylor, 2012).

Steyn (2005) emphasised hypertension as a prominent health problem within the South African context but the asymptomatic nature of the disease explains why many South Africans are not aware that they have the condition. Taylor (2012) noted the high incidence of hypertension amongst black individuals and Steyn (2005) supports this argument by highlighting the extent of the problem in rural Nigeria. Kaufman et al. (1996) reported that the risk of death increased by 60% in conjunction with an increase of 20mmHG in BP levels. It was argued that if hypertension were not present the mortality rate would be estimated at about 7%, accentuating the impact of hypertension on mortality rates. Connor, Rheeder, Bryer, Meredith, Beukes, Dubb, et al. (2005) conducted a survey on the prevalence of hypertension and the results showed that 59% of black African people, 55% of Indian and coloured people and 50% of white people were diagnosed with the illness. Surveys however often report hypertension to be more prominent amongst white people, but this may be related to the unequal access of health care services (Steyn, 2005).

Hypertension is considered to be a world-wide epidemic as Thrall et al. (2004) note that if all hypertensive patients in the UK for example, were able to minimize their BP to acceptable levels "...approximately 21400 stroke deaths, 41400 ischemic heart disease (IHD) deaths, and 125600 events (nonfatal stroke or IHD) could be prevented each year" (p.595). It is known that high BP levels increase the risk of ischemic heart disease three to four times as well as general cardiovascular problems about two to three fold (Steyn, 2005). Patients diagnosed with borderline hypertension has the ability to maintain and improve their BP levels thereby reducing their chances of such risks, but the need for medication compliance is crucial as these patients are three times more likely to experience a stroke and eight times more for those already diagnosed with hypertension (World Health Organization, 2003). It is also

noted that approximately 40% of acute myocardial infarctions or stroke can be ascribed to the condition of hypertension but despite these major risk factors and adequate treatments available, research shows that the majority of patients do not achieve satisfactory BP levels due to inadequate levels of compliance. It has also been argued that if hypertension remains untreated, it can negatively affect cognitive functioning which may result in learning, memory and attention problems (Brown, Sollers, Thayer, Zomderman & Waldstein, 2009; Mayo Clinic Staff, 2011; Taylor, 2012). Specifically it can lead to a condition known as dementia, a disease involving problems in thinking, speaking, memory, vision and movement. It can also result in mild cognitive impairment, involving problems with comprehension and memory including Alzheimer's disease. These cognitive dysfunctions may result due to damaged arteries caused by the high blood pressure (Mayo Clinic Staff, 2009).

Cappuccio et al. (2004) also report that hypertension is becoming more prevalent in Africa and this condition is the most common cause of cardiovascular illnesses on the continent. It is estimated that more than two-thirds of hypertensive patients do not have satisfactory BP control and improving compliance amongst such patients will not only prevent subsequent health risks but it will also enhance the economic functioning of health care systems (Inkster et al., 2006; Ross et al., 2004; Thrall et al., 2004; World Health Organization, 2003).

Regardless of the different forms of treatment available for controlling hypertension, non-adherence remains the major factor for poor disease management. Non-compliance is then viewed as the main reason for the inability of medical treatment and health progression to be effective (Taylor, 2012). This is in relation to the fact that although improved means for detection of hypertension has been available, research suggests that 60-75% of treated hypertensive patients fail to reach the recommended BP level of <150/90mmHg (Inkster et al., 2006). Failure to follow medication instructions as directed can result in unnecessary adjustments of medication and consequently the increase of health care costs.

Maguire, Hughes and McElnay (2008) and Brewer et al. (2002) indicate that hypertension is one of the most preventative causes of early mortality and control of blood pressure is of crucial importance in preventing cardiovascular problems. Svensson et al. (2000) supports this statement as it is indicated that "despite the proven efficacy of antihypertensive drugs, patient adherence with antihypertensives in clinical practice is commonly as low as 20-50%" (p.157). Chen et al. (2009), Horne and Weinman (1999) and Kemp et al. (2007) argues in

agreement by highlighting that 30-50% of chronic ill patients neglect to take their medication as prescribed. BP control necessitates the use of antihypertensive drugs that may vary in terms of the frequency of intake and the complexity involved is also often noted as a reason for poor adherence (Clifford et al., 2006; Inkster et al., 2006; Thrall et al., 2004). Brewer et al. (2002) state, in relation to hypertension, that "medication adherence [is] extremely important" (p.436), and non-adherence adversely impacts the effective treatment of this condition (Johnson et al., 2006; Maguire et al., 2008).

Adherence can be assessed in a variety of different ways of which three types of assessment are most commonly used: self-report measures, collateral reports (obtaining information from significant others in the patient's life) and indirect clinical observations (monitoring drug-level and other physiological factors) (Svensson et al., 2000). Other methods, such as in-depth interviewing, can also be used. Inkster et al. (2006) calculated adherence by dividing the number of days with treatment supply by the total number of days starting from the first prescriptions to the end period of the investigation. It can also be measured electronically, such as taking BP measures, attempting to show whether there is a relation between BP control and adherence rates. Thrall et al. (2006) refer to a method known as dispensed prescribing which is often regarded as one of the most effective methods for measuring adherence amongst large populations. In terms of this method "it is assumed that if a prescription is filled then patients would adhere to treatment but there is [however] no way of knowing whether patients actually took their treatment" (Thrall et al., 2006, p.296). This is also taken as a means of improving the sometimes negative critique raised against self-report measures for obtaining information about adherence, and the use of another method can then enhance the value of the data, supplementing the information gained from the administered questionnaires (Inkster et al., 2006; Petrie et al., 2007; Thrall et al., 2006). The problem with self-report measures however, is related to the fact that patients can easily answer the questions in a social desirable manner, not indicating their actual medication taking behaviour, and as such a true measure of adherence cannot be obtained. Different approaches to measurement are then used, but patients are generally requested to provide a subjective account of their compliant behaviour, which often results in the overestimation of compliance. It is also noted that the accuracy of the results are then often questionable due to this overestimation. This is related to patients' problems of recall and their inability to remember their actual rate of compliance (Lehane & McCarthy, 2007; World Health Organization, 2003).

Factors generally identified as having an impact on medication compliance involve: age; mental illness such as depression; and denial, both affective and cognitive denial (Bosley, Fosbury, & Cochrane, 1995; Harrison, 1998; Maguire et al., 2008; McGann et al., 2008). Apart from these factors a patient's understanding of the illness and the medication as well as the instructions provided influence the extent of medication use, and in addition, the side effects associated with the medication and the nature of the relationship between the patient and the practitioner, forgetfulness, previous bad experiences, distorted beliefs about medication or misunderstandings about medication prescriptions, and financial issues related to the cost of medication have also been known to impact adherence (Dowse & Ehlers, 2005; Guimón, 1995; Ho et al., 2009; Horne & Weinman, 1999; Johnson & Rogers, 2006; Maguire et al., 2008; Miloh & Annunziato, 2010; Svensson et al., 2000; Thrall et al., 2004). Patients' view of the health care system is also noted as a possible factor influencing adherence, their involvement with their health care system and the relationship they have with their general practitioners are very important for the provision of adequate knowledge about their diagnoses as well as their medication directions (Inkster et al., 2006). Although a patient's understanding of the diagnosis can be regarded as a motivation for taking their medication, knowledge is not enough to enhance compliance rates and Bondesson et al. (2009) and Thrall et al. (2004) argue that the patient-physician relationship is perhaps amongst the most important aspects for the improvement of medication adherence. This was however not the focus of the present study.

The explanations and terms used to explain the illness and the medication instructions should be tailored to suit the individual's needs and to permit the patient to understand the information provided. The doctor-patient relationship forms the basis for future interaction and it influences the degree of trust that the patient invests in the doctor and whether they have faith in their medical abilities. This then determines the level of agreement with the advice and instructions outlined by their practitioners (Clifford et al., 2006). Effective communication between doctor and patient is of crucial importance (Bokhour et al., 2006). Thrall et al. (2004) also highlight past findings showing that the active participation of patients in their own medication management also enhances compliance rates. Patients want to be supported by their health care practitioners, they want to see that they understand and empathise with their condition, reflecting an emotional expression. Improved patient-physician relationships can improve communication and it is emphasised as a potential strategy for enhancing compliance with medication. In terms of antihypertensive medication,

the chronic timeline of the illness often requires a lifelong need for medication use, and this has also been noted as a deterring factor for adherence. The present investigation aimed to focus on the possible impact that psychological factors such as beliefs may have on medication adherence, as patients' beliefs about their medications influence their adherence behaviour (Bane et al., 2006). Recent research emphasises the relation between specific beliefs about mediation and adherence behaviour and the need to understand these cognitive representations (Figueiras et al., 2010; Hagger & Orbel, 2003; Horne et al., 1999; Kemp et al., 2007; Petrie et al., 2007; Thrall et al., 2004; Treharne, Lyons & Kitas, 2004; Weinman & Petrie, 1997).

According to Maguire et al. (2008) different variables have been investigated with the purpose of identifying those variables involved in impacting medication compliance as "it is generally accepted that illness, health and associated behaviours are influenced not only by biology but also by psychological factors" (p.371). Past research focusing on the role that psychological factors may play in patient compliance identified depression, anxiety, the role of interpersonal problems and feelings of helplessness as possible determining factors (Bosley et al., 1995; Durant, Jay, Linder, Shoffitt & Litt, 1984; Wang, Bohn, Knight, Glynn, Mogun & Avorn, 2002).

With reference to the present investigation, the term psychological factors were defined in accordance with Maguire et al. (2008). They conceptualized the concept as representing patients' beliefs about their illness. Leventhal et al's. (1992) notion of psychological factors was defined in relation to the self-regulation model, which can impact the extent to which patients adhere to their medication prescriptions. Bane et al. (2006) note that "patients' beliefs may form the foundations of decisions as to whether medication should be taken as prescribed..." (p.190). In the context of Maguire et al's. (2008) investigation, they limited their study to the exploration of a specific psychological factor known to be a major health related concern namely, depression.

Depression is conceptualized as involving a variety of mental health problems associated with a lack of positive affect, negative mood states and a range of emotional, cognitive, physical and behavioural symptoms (Barlow and Durand, 2005). Recent research found a correlation between depression and non-adherence in patients with coronary heart disease and based on this it was concluded that hypertension combined with other psychological factors has a negative impact on adherence (Bane et al., 2006; Brewer et al., 2002; Johnson & Rogers, 2006; Kemp et al., 2007; Maguire et al., 2008).

Hagger and Orbell (2003) argue that both cognitive as well as emotional representations of an illness play a role in compliance. A patient's beliefs about their illness are thus not comprised of cognitive representations alone, but emotional representations also form part of how a patient comes to make sense of their illness and how they decide to cope with it. Patients' beliefs and attitudes about their diagnoses as well as their emotional processing of the information influence their subsequent behaviour and their level of agreement with their pharmacological directions, where negative beliefs correlate with non-compliance (Bondesson et al., 2009; Petrie et al., 2007; Thrall et al., 2004).

Maguire et al's. (2008) attempt to explore the impact of depressive symptoms and beliefs on medication adherence involved the utilization of a self-administered questionnaire measuring medication adherence, depressive symptoms and beliefs about medication in a sample of patients using antihypertensive medications. Results revealed that a number of psychological factors impacted adherence and it was found that patients over the age of 50 were more likely to comply with their medication use than those under the age of 50 (Maguire et al., 2008). Lehane and McCarthy (2007) also support this finding as they note that individuals aged 52-68 years demonstrate the highest levels of compliance. Inkster et al. (2006) however found no significant relation between demographic variables such as gender, age, and number of co-morbidities in terms of patients' compliance. Kemp et al. (2007) did a similar study focusing on the psychological factors that impact antiepileptic drug use. This investigation focused on the importance of illness cognitions or patients' beliefs about epilepsy and their medication and it emphasised the importance of patients' attitudes in terms of understanding their adjustment to their illness. Hagger and Orbell (2003) describe these illness representations as an interpretive schema that patients use to guide their medication-taking behaviour. The authors also highlight the relation between illness cognitions and the psychological and physical adjustments associated with the illness.

In relation to the psychological adjustments associated with a diagnosis past studies have shown that chronically ill patients exhibiting negative emotional and cognitive beliefs about their health status, fail to behave in accordance with their instructed medical advice and directions (Horne et al., 1999; Petrie et al., 2007; Ross et al., 2006; Thrall et al., 2004). Ross et al. (2004) conducted a study on compliance and found that patients who demonstrated higher emotional responses to their diagnoses and who expressed a lower sense of control over their illness were less likely to comply with their treatment. Bane et al's. (2006) investigation also focused on the impact of depressive symptoms on medication adherence

and results revealed a significant relation between medication adherence and depression. Patients' beliefs about the possible negative effects of medication use such as addiction and side-effects also correlated with non-adherence. Past research concerning depression as a psychological factor has found that it is related to non-adherence in a number of different diseases and this is why the role of medication beliefs in relation to compliance should be regarded as a research priority (Bane et al., 2006; Maguire et al., 2008). Patients will be more likely to take their medication in agreement with what has been outlined and instructed by their general practitioners if it makes sense to them to do so and if this is in line with their past experiences and personal beliefs about the diagnoses (Horne et al., 1999).

In summary it is emphasised that non-compliance with medication regimes is one of the major factors impacting on the treatment of patients diagnosed with a chronic illness such as hypertension (Bane et al., 2006; Guimón, 1995; Horne & Weinman, 1999; Maguire et al., 2008). Hypertension is a manageable conditioned treated by means of drug therapy and past research has demonstrated different variables that may impact compliance, of which psychological factors have been found to play an important role. Hekler et al. (2008) note that hypertension has increased in the past ten years and this increase is associated, amongst other things, with the problem of poor disease management. A focus on what factors influence adherence is thus needed in order to improve control of BP levels amongst hypertensive patients with a strong focus on those diagnosed with borderline hypertension, focusing on primary prevention. The reduction of subsequent health problems in those already diagnosed with hypertension should also be a major focus, implementing secondary prevention strategies.

2.4 Conclusion

In conclusion it is highlighted that the problems associated with non-adherence is adversely impacting the management and control of hypertension. Consequently the prevalence of this condition is increasing and if it is not treated properly, more serious illnesses will result. Attempting to understand patients' cognitive representations concerning their illness may provide information about how these cognitions influence their behavioural patterns in terms of taking their medication. In the context of the social cognitive theory, researchers may thus come to understand how patients' beliefs and views about their illness as well as their treatment prescription impact their medication-taking behaviour. This will permit health care professionals with the possibility to intervene in cases where poor

adherence is evident, whilst they gain a better understanding of how patients' beliefs influence their behaviour. Hypertension is becoming more prevalent due to the influences of urbanization and westernization, as such, populations should be educated and sensitized about the condition and the dangers involved if medication regimens are not adhered to. Understanding the problem of non-adherence and the role psychological factors play in this regard, may improve knowledge about why patients fail to comply with their medication prescriptions. The newly generated findings will thus enable healthcare professionals to inform people, thereby minimizing the misconceptions associated with the condition of hypertension and its pharmacological treatment.

Chapter 3: Research methodology and design

3. Introduction

It is important to describe the research design and methodology as the method of inquiry will influence the scientific value and the dissemination of the research results (Maree & Van der Westhuizen, 2009). The research design will determine the final conclusions made, such as possible causal inferences or simply a descriptive account of the investigation. The research design generally provides a framework for undertaking a research project. It usually denotes the participants that will be used, whether comparisons will be made between groups or within groups and it specifies the variables that will be investigated and also the relation between these variables (Gravetter & Forzano, 2009). A quantitative research methodology was used to address the research questions stated for the present study. Specifically, a correlational research design was used to determine the impact psychological factors may have on non-compliance amongst diagnosed hypertensive patients. Thus, the aim was to determine whether there is a relationship between psychological factors, as defined by the self-regulation model, and non-compliant medication use.

This chapter will focus on the research design used, discussing the correlational design as well as the sampling procedures used, the assessment process, the data collection methods, followed by the validity and reliability of the measures used. The data analysis procedures will be briefly outlined in the next subsection. Lastly, the ethical deliberations will also be discussed in this chapter.

3.1 Research methodology and research design

In order for any research study to be conducted a suitable methodology must be outlined followed by appropriate data collection and statistical analysis methods (Mouton, 2005). Generally there are two methodological approaches used to inform the collection of data, including: quantitative methods and qualitative methods (Gravetter & Frozano, 2009). Depending on the methodological departure, different theoretical paradigms will guide the research process, specifying suitable data collection methods as well as the methods to be used for analysing the gathered information. In terms of qualitative research, the focus is more subjectively oriented, focusing on the personal experiences of the research participants. This form of research is according to Ramchander (2004), a way "...to capture what people say and do as a product of how they interpret...their world, and to understand events from the

viewpoints of the participants" (p.105). Qualitative research is thus focused on gaining a detailed, in-depth understanding of how participants come to view that which is being questioned.

Quantitative research on the other hand, is more focused on measuring variables for each of the participants, using statistical procedures to analyse and interpret the findings (Gravetter & Forzano, 2009). Considering the present study, a structured data collection procedure was used to gain the information needed to address the research problem. Specifically a survey method was used. Accordingly, "reliable and valid data collection instruments are necessary to ensure the credibility of the study findings" (Edo, 2009, p.68). In terms of this methodological research, the theory provides the conceptual framework for the research process, guiding the design of the study as well as the interpretation of the findings. The social cognitive theory served as the guiding paradigm in the present quantitative research project. Quantitative research aims to investigate specific variables by isolating them in an attempt to minimize any confounding influences from other variables not being studied (Gravetter & Forzano, 2009; Mouton, 2005; Ramchander, 2004). Correlational research tends to focus less on controlling the factors present within the study's context compared to causal studies but the quality of the data collection should be reflective of the same rigid standards (D. Maree, personnel communication, July 20, 2011).

Yin (1994) and Darko-Ampem (2004) note that a research design can be regarded as the logical sequence that links the empirical data to the investigations' research questions as well as the final conclusions made based on the findings. The research design is viewed as the outline or structure of the research process focusing on three main problems: what kind of questions to study, what kind of data must be collected and, how the data must be analysed (Experiment Resources, 2008; Trochim, 2006; Yin, 1994). A research design can be described as "...a flexible set of guidelines that connect theoretical paradigms to strategies of inquiry and methods for collecting empirical material" (Darko-Ampem, 2004, p.134). The aim of a study plays an important role in choosing a research design as it will either allow the researcher to draw causal inferences or simply to conclude that two or more variables are related. The aim of the present investigation was to demonstrate the existence of a relation between psychological factors, as defined in terms of the self-regulation model, and medication compliance. The design solicits specific types of information and it also impacts the reliability of the findings (Experiment Resources, 2008). Descriptive designs for

example, provide the researcher with descriptive information only while correlational designs allow the researcher to identify relations between variables (Gravetter & Forzano, 2009).

A correlational research design was applied in the present study to inform data collection for the purposes of answering the research questions outlined. This type of design is concerned with measuring and describing two or more variables for each individual as it exists naturally (Gravetter & Forzano, 2009). It should thus be noted that the correlational method does not involve the manipulation of variables. Edo (2009) describes this design as being concerned with measuring the degree of a relation between selected variables. This research design includes describing the relationship between two variables, if a relation is present, but it is not concerned with explaining the relationship, as no causal inferences can be made based on the data produced by a correlational method (Gravetter & Forzano, 2009; Mouton, 2005; Shadish, Cook & Campbell, 2002; Trochim, 2001). This design only allows researchers to determine whether the investigated variables are correlated, thus, if an increase in one variable is consistently related to an increase or decrease in the other (Siddharth, 2011). Different types of correlations can be identified including: a positive correlation; a negative correlation; or no correlation (Gravetter & Forzano, 2009; Kalla, 2011). Positive correlations are indicative of increases in one variable related to increases in the other variable, while a negative correlation is present when increases in one variable corresponds to decreases in the other. No correlation simply means that the investigated variables have no relation, changes in either variable does not elicit changes in the other in a consistent manner. It is however, possible to use the relationship identified in correlational research as the basis for informing future experimental research. Attempts can then be made to demonstrate causal conclusions by establishing a cause-and-effect relation in terms of the correlational research results. If a strong correlation is observed, it is possible to use the one variable to make predictions about the other (Edo, 2009; Experiment Resources, 2008). The variables investigated in the current study were psychological factors and the medication adherence of hypertensive patients.

3.2 Research question

The research question informing the current investigation involved the possible impact psychological factors may have on the medication use of hypertensive patients. The pharmaceutical company, Health Window, discussed the problem of non-compliance identified in the company with employees from the University of Pretoria. They were

interested in finding out what the impact of psychological factors is on medication compliance, and as a result offered their assistance in the process of conducting the research. The main focus was thus on demonstrating the existence of a relationship between the psychological factors and the medication adherence of patients. A relationship would be present if changes in the psychological factors were related to changes in medication adherence in either direction. If a relation is found, the findings would be evidence that psychological factors impact the extent to which hypertensive patients adhere to their medication instructions as provided by their general practitioners. The independent variable was the psychological factors, defined according to the self-regulation model, with the dependent variable, medication adherence, measured to determine whether psychological factors are related to the degree of compliance. It must be noted that reference to "independent" and "dependent variables" is used heuristically and not to imply causation between the above mentioned variables. Both these variables were measured for each patient using a survey method (i.e. self-reported measures), with the purpose of determining whether there is a relation between psychological factors and the adherence behaviour of patients, as well as how strong this relation is.

3.3 Sample and sampling procedures

The sampling procedure involves selecting participants, meeting a set of pre-defined characteristics, from a population to take part in the research study. There are different procedures that can be used to select the participants for inclusion in the sample, each having some advantages and disadvantages (Trochim, 2006). The sample will then comprise the participants that have been selected from the overall population (Maree and Van der Westhuizen, 2009).

3.3.1 Population

Gravetter and Forzano (2009) define a population as "the entire set of individuals of interest to a researcher" (p.592). All the individuals present in a specific population will however not take part in the study as a smaller sample of individuals will be selected using a specific sampling technique. Depending on the nature of the sample and the procedures used to gain participants, the findings may be generalized to the entire population (Polit & Beck, 2008). More specifically, the target population consists of the individuals that the researcher is concerned with, while the accessible population refers to those individuals from the target

population that is accessible to the researcher for selection. In the context of this study the target population consisted of all the hypertensive patients between the ages of 40 and 70 years. The reason for this age group selection is that hypertension is generally known to affect older adults (Taylor, 2012), although the researcher does not deny the increasing prevalence of this condition amongst younger individuals. Anderson (1999) found that as age increased the prevalence of hypertension also increased after the age of 60. Health Window supplies medication to a diverse group of patients but a large part of the sample diagnosed with hypertension are older than 40. It is however noted that the age spectrum should not be viewed as an exclusion criteria mainly as a means of organisation or as a preliminary screening method for identifying patients. Participants under the age of 40 were therefore not excluded in the analysis. The accessible population thus comprised those patients who receive treatment medication from the Health Window pharmaceutical company and who were willing to partake in the study.

3.3.2 Selection criteria

In order for participants to be eligible for participation in the research study, they must meet a set of characteristics, described as selection criteria (Polit & Beck, 2008). Edo (2009) conducted a similar study on compliance and informed the criteria used for selection as well as the problem identification outlined by Health Window. The patients considered for inclusion in the current study needed to meet the following selection criteria:

- Outpatients who are receiving prescribed medication for a main diagnoses of hypertension
- Participants must be between the ages of 40-70 as hypertension is known to affect older people (Hekler et al., 2008; Lehane & McCarthy, 2007)
- Male and female patients currently under treatment with antihypertensive medication (Svensson et al., 2000).
- Patients with co-morbid psychological or other medical conditions were also included in the sample taking into account their secondary diagnoses.

The selection criteria were constructed based on previous projects and findings (Edo, 2009; Hekler et al., 2008; Lehane & McCarthy, 2007). Hypertension is present among younger as well as older age groups, but it is generally known to be more prevalent amongst older patients (WHO, 2003). The use of outpatients is related to the notion that patients receiving outpatient treatment is more responsible for their own medication-taking habits

compared to patients hospitalised receiving their medicine at specified times by nursing staff. It is also stated that co-morbid psychological or medical conditions might interfere with patients' medication compliance. Patients diagnosed with a psychological disorder such as depression may therefore have different reasons for not taking their medication than someone diagnosed with hypertension only. The selection criteria are thus based on past research and it will play an important role in how the findings are interpreted and compared to other studies.

3.3.3 Sampling technique

The present investigation employed a non-probability sampling method known as purposive sampling, indicated by the use of a specified selection criterion. According to Bhattacharyya (2004) and Trochim (2001), non-probability sampling does not involve the use of a random process for selecting participants. Purposive sampling can be described as a form of non-probability sampling in which "you sample with a purpose in mind" (Trochim, & Donnelly, 2007, p.56). Shadish et al. (2002) also describes purposive sampling as a means to select individuals to be part of a sample using "...a deliberate method that is not random" (p.511). This sampling method involves the selection of participants who form part of a predefined group, based on their fulfilment to a certain set of requirements (Bhattacharyya, 2004; Gravetter & Forzano, 2009; Trochim, 2001: Trochim & Donnelly 2007). The participants selected for inclusion in the present investigation thus comprised a sample of patients diagnosed with hypertension, recruited from the Health Window pharmaceutical company (C. Schutte, personal communication, December 30, 2009). The researcher thus attempted to sample only those patients diagnosed with hypertension. The sample however consisted of patients diagnosed with more than one medical diagnosis and some participants did not have high blood pressure, resulting in the exclusion of some participants.

This may however limit the representativeness of the sample as it will consist of a sample obtained from a single setting. The results might thus not generalise beyond the selected setting. The researcher does however not intend to generalise the findings but future researchers attempting to use the findings for further investigations should acknowledge the single setting used to obtain participants. The relationships found might be generalizable to other forms of medication taking patterns but the results might not be applicably generalised to other patients.

3.3.4 Sample size

A sample consists of the individuals selected from the population using a random or non-random process, and these individuals are meant to represent the population from which they were taken (Trochim, 2001). Sample size is an important factor as it may influence the extent to which the results can be generalized to the population as well as the statistical analysis that may be conducted on the findings. Generalizability was, however, not considered a main focus in the current project and the researcher rather focused on the relationships identified for the purposes of understanding the patients' compliant behaviour. Generally it is argued that the larger the sample, the more likely it is to represent the target population, but there are limits to the number of individuals it is practical to include in a study sample (Gravetter & Forzano, 2009). Originally 125 participants were selected but the response rate constituted a sample of 90-104 participants who actually completed all the questions stated. After exclusion of participants not diagnosed with hypertension, as well as missing/incomplete questionnaires, the sample only consisted of 88 participants.

3.4 Data collection and measures

Maree and Van der Westhuizen (2009) describe data collection as the means by which information will be gathered with the purpose of answering the research questions identified. Data collection thus involves the process by which data will be obtained from the participants included in the study sample. The methods used to gather information will depend on the purpose of the study as well as the methodological approach selected (Edo, 2009). The present investigation used a quantitative perspective and as such, a survey method was utilized to obtain the data, consisting of a number of questionnaires measuring both psychological factors and patients' medication adherence. Demographic information was also gathered from each patient including: sex, age, marital status, employment status, smoker/non-smoker, perceived quality of doctor patient relationship, history of hypertension, history of psychological disorders, type of antihypertensive medication, prescribed drug regime, and the dosage of medication.

3.4.1 The validity and reliability of the assessment measures

It is important to ensure the validity and reliability of assessment measures as this will influence the credibility and the scientific value of the findings generated from the study. Maree and Van der Westhuizen (2009) maintain that data verification is essential in research

as the findings must be consistent despite the application of the same measures at different times. Validity concerns the degree to which a measure accurately reflects and captures the construct it attempted to measure and it must be demonstrated in order for the findings to be respected by the scientific community, thereby representing responsible research (Howell, Miller, Park, Sattler, Schack, Spery, Widhalm, & Palmquist, 2005). Tariq (2009) argues in agreement that conclusions made based on the analysis of survey data will only be viewed as up to standard to the extent to which it is established to be valid.

In survey research it is important to ensure the validity of the assessment instruments used to gather the data. This is important as future research may expand on previous studies and if the instruments used are valid, the scientific truthfulness of the results will be proven. Instruments not assessing what it was designed for will produce invalid data thereby limiting the value and distribution of the findings (Foxcroft & Roodt, 2005). Using valid and reliable measurement instruments will contribute to the general validity of the study and the scientific dissemination of the results. Assessment measures that have been found to be valid and reliable will yield results that can be replicated and supported by subsequent research and it will improve the overall value of the findings (Howell et al., 2005). In relation to the measurement instruments used in the present investigation the validity of both the illness-perception questionnaire – revised (IPQ-R) and the medication-taking questionnaire (MTQ) was discussed in the above section. Both measures are regarded to be valid and have been used widely in research focusing on similar research problems (Broadbent, Petrie, Main, Weinman, 2006; Hamilton, 2003; Johnson, 2002; Lehane & McCarthy, 2007; Moss-Morris et al., 2002; Petrie et al., 2007). The findings were also compared to that of previous research using these measures and it was found to be consistent providing a concurrent validation of the findings.

A second important criterion for determining the quality and scientific value of research findings, involves establishing how reliable these findings are. Henson (2001) also stresses the importance of reliability when study effects and results are to be interpreted. Reliability concerns the degree to which a study, a test or any assessment measure produces similar results on repeated trails. This criterion is important in all research because if there is no consensus between independent researchers, attempting to replicate the findings, or to use research instruments and procedures consistently, researchers would not be able to make any adequate conclusions, formulate theories or make any claims regarding the scientific value and generalizability of the findings (Howell et al., 2005). In terms of assessment measures

Foxcroft and Roodt (2005) defines reliability as "...the consistency with which [a measure] measures whatever it measures" (p.28). Test reliability is thus about the consistency and stability of the research findings, thus whether similar results will be obtained when the assessment measures are redistributed at a different time, under the same conditions, to the same group of individuals. Reliable measures will yield the same or approximately the same results (Gravetter & Forzano, 2009). In terms of reliable research, there should be little variation in the obtained data when repeated measurements have been done. Edo (2009) and Henson (2001) highlight that reliable instruments are important in quantitative research as it enhances the power for identifying significant differences or relationships that may be present and it is also essential for understanding these relationships.

There are different methods available for testing reliability but generally the focus is on how stable the measures are and the internal consistency of the measurement items (Edo, 2009; Foxcroft & Roodt, 2005). The Cronbach α was reported for the measures used in the current research investigation. Generally it is argued that reliability should be viewed as the ratio of the true score variance to the observed score variance. An absolute true score is never attainable as human error and other factors always influence the measurement of data and as a result the obtained/observed score is considered to be an estimate of the true score and error (Foxcroft & Roodt, 2005). Edo (2009) discusses internal consistency as involving the degree to which the items of a measure consistently measure the variable it intends to measure, determined by calculating the Cronbach α value. This value gives researchers an indication of the reliability estimate. Internal consistency estimates, according to Henson (2001) "...relate to item homogeneity or the degree to which the items in a test jointly measure the same construct" (p.177). If the items are highly correlated, it is generally assumed that the construct of concern has been measured to a certain degree of consistency, meaning that the scores obtained are reliable (Henson 2001).

Researchers often question what counts as large internal consistency estimates or Cronbach α values in order for scores to be viewed reliable. Henson (2001) argues in this regard that the precise magnitude of the estimate will vary depending on the purpose of the study and the application of the scores. A Cronbach α value of .00 means that there is no reliability while a 1.00 is considered to be indicative of a perfect reliability score, which is however not possible in research due to the presence of measurement error. Generally values from .70-.90 are considered to be acceptable (Burns & Grove, 2005; Edo, 2009; Henson, 2001).

It is also important to distinguish between test reliability and design reliability. Unlike test reliability discussed above, design reliability concerns the replication of the research process aiming to produce similar results. Replication of the research study thus involves repeating the central procedures used in the original study. Although replication also concerns the validity of the original study, it can also support the reliability of the findings if similar results are obtained. Duplication of the original findings therefore also relates to the design reliability of the research study (Gravetter & Forzano, 2009).

3.4.2 Data collection instruments

The collection of data occurred over a period of 7 months with the study commencing during June 2011 and extending until January 2012 (See Appendix C for the assessment measures).

- **The Medication-Taking Questionnaire (MTQ)**

Johnson and Rogers (2006) argued that no measures of purposeful action existed, stating that "an instrument that reflects prevention and health promotion with relation to the MAM needs to be developed" (p.337). This attempt was undertaken by Johnson and Rogers (2006), which led to the development of the Medication-taking Questionnaire (MTQ). The MTQ was used as one of the primary methods of data collection to determine the degree of medication compliance amongst hypertensive patients. The information gathered using this questionnaire will enable the researcher to estimate the adherence rates of each patient.

The MTQ demonstrated good internal consistency, temporal stability and construct validity. Lehane and McCarthy (2007) also note that the "...instrument has demonstrated good face and content validity with patients diagnosed with a wide range of chronic illnesses including hypertension" (p.701). High reliability coefficients have also been demonstrated with an overall α of .70, and subscale α of .73 for the access scale, .77 for the routine scale, and .76 for the remembering subscale (Hamilton, 2003; Johnson, 2002; Lehane & McCarthy, 2007). The MTQ questionnaire was modified as the original could not be obtained. The MTQ consisted of 24 items and involved asking participants to rate their response on a 5-point Likert-scale. The first four items required participants to indicate their appropriate response, followed by items where they had to rate their level of agreement on a 5-point Likert-scale. The number of blood pressure medication taken was also assessed and individuals were asked to rate "how well they were able to take their medication for a given week..." (Johnson &

Roger, 2006, p.338). The MTQ: Purposeful Action items also involve a 5-point Likert-scale based on various levels of agreement. High MTQ scores are related to good medication taking behaviour (Johnson & Rogers, 2006). The MTQ according to Johnson and Rogers (2006) "provides a new instrument to further study the aspects of intentional medication taking in [relation] to behaviour and individual feedback with regard to hypertension and actual adherence" (p.349).

- **The Illness-Perception Questionnaire - Revised (IPQ-R)**

The Illness-Perception-Questionnaire (IPQ) was designed to measure the components associated with illness perceptions and it is argued that it can be tailored to assess any illness. A revised version (IPQ-R) was developed due to some psychometric problems and other related issues, though the time needed to complete this measure is considered to be extensive and a Brief Illness-perception-Questionnaire was thus also developed (Broadbent et al., 2006; Petrie et al., 2007). This version is however not considered to be adequate for assessing the psychological factors in accordance with the self-regulation model due to its limited nature. Despite the time duration needed for completion, the IPQ-R will be used in the present study to assess the dimensions outlined in the self-regulation model. This measure was designed to assess hypertension. Specifically the identity subscale included symptoms associated with hypertension. The IPQ-R is divided into three sections of which the identity and the causal scales are presented apart from the other dimensions. Overall the IPQ-R consists of 65 items. The identity scale consisted of symptoms commonly associated with hypertension and patients were asked to rate whether they have experienced these symptoms since their illness started on a yes/no scale. Patients were also asked to respond to questions concerning their beliefs about whether the symptoms are related to their illness based on a similar yes/no format (Moss-Morris et al., 2002). The consequences, timeline acute/chronic/cyclical, coherence and emotional dimensions are rated on a 5-point Likert scale with responses ranging from strongly agree to strongly disagree. This section consisted of 38 items. The casual dimension was presented separately from the other items and it entailed the same 5-point Likert scale consisting of 18 items.

The subscales demonstrated good internal reliability with Cronbach α 's ranging from .75 for the identity subscale, .79-.89 for the acute/chronic/cyclical timeline dimension, .84 for the consequences subscale, .81 for the personal control subscale, .80 for the treatment control subscale, .87 for the coherence subscale, .88 for the emotional representations, a good

Cronbach α of .86 for the psychological attributions scale, .77 for risk factors and the immunity subscale demonstrated a Cronbach α of .67 (O'Connor, Jardine & Millar, 2008; Moss-Morris et al., 2002). Broadbent et al. (2006) and Petrie et al. (2007) also noted that the items demonstrated good reliability and validity given its general use in past research focusing on similar topics. Moss-Morris et al. (2002) argued that the revised version of the IPQ "...has strengthened the psychometric properties of the original scale...including improving the reliability of the subscales" (p.12).

In summary it is argued that based on the aforementioned, the assessment measures used in the current study were viewed to be reliable as it has been successfully administered in different research projects. The use of these measures for the purpose of answering the research question about the role psychological factors play in medication compliance is thus considered to be acceptable.

3.5 Design Validity

Design validity is concerned with the extent to which the research study accurately answers the questions it attempted to answer (Gravetter & Forzano, 2009). It takes into consideration the success of the study in measuring what the research team intended to achieve with the study. Burns and Grove (2005) refer to this as 'study validity', relating it to an indication of the truthfulness of a statement. Design validity thus refers to the "...accuracy of the study findings reported by the researcher within the study context" (Edo, 2009, p.83).

Shadish et al. (2002) describe validity as referring "...to the approximate truth of an inference" (p34), and it is determined to estimate the accuracy of the results (Tariq, 2009). Claiming that the findings are valid relates to the extent to which evidence supports the conclusions as being true. The evidence for judging valid claims is based on the consistency of the findings and how it correlates with past research focusing on the same problems. It is however important to note in accord with Shadish et al. (2002) that validity conclusions are never absolute, rather "...various degrees of validity can be invoked" (p.34). Validity judgments should thus always be understood as approximate or tentative claims, never as conclusive valid or invalid findings. Shuttleworth (2008) states that in any given research project there is always the possibility that some unknown factor or variable contributed to the findings, making human error and fallible judgments part of every research project, thereby preventing us from making absolute claims regarding the validity of a study.

Generally internal validity is essential in experimental quantitative research, arguing that the observed differences between participants' scores are due to the manipulation of the independent variable and not as a result of other extraneous variables not accounted for in the study (Maree & Van der Westhuizen, 2009). Declaring that a study demonstrates a high degree of internal validity thus means that the study has generated a single, unambiguous explanation for the observed relation between the investigated variables and thus no alternative explanation should be possible (Gravetter & Forzano, 2009). Correlational research is however not concerned with making casual inferences but simply to demonstrate the existence of a relationship between two or more variables, as such this type of research is more inclined towards high degrees of external validity and not with internal validity. Edo (2009) agrees, stating that this type of validity is important in correlational studies. Correlational research is then usually argued to have poor internal validity (Gravetter & Forzano, 2009; Shadish et al., 2002). External validity is described as referring "...to the degree of certainty to which the findings can be inferred or generalised..." (Maree & Van der Westhuizen, 2009, p.30). This type of validity concerns the extent to which the research findings from the study sample can be generalised to the population from which it was drawn, thus can the findings be generalised to people and settings other than those used in the study (Howell et al., 2005; Shadish et al., 2002). In correlational research the focus is then more on whether the findings can also be applied to similar sample groups that did not participate in the study.

Statistical conclusion validity is also important in quantitative research and it is described as the use of fitting statistical procedures, thereby allowing researchers to conclude whether the independent and dependent variables co-vary, thus whether the investigated variables are correlated (Shadish et al., 2002). This type of validity is therefore concerned with the use of statistics to help researchers deduce accurate inferences. Statistical conclusion validity is about the statistical power of the study, which according to Parker (2001) "...is a function of α, sample size (N), and the effect size (ES)" (p .616). Effect size concerns the degree of covariation amongst the variables, whether changes in the independent variable is strongly correlated to changes in the dependent variable. In terms of the present investigation, the ES is equivalent to Pearson *r*, accordingly it is argued that increasing the α, sample size or effect size will improve the statistical power of the study (Parker, 2001). In relation to this, Parker uses Cohen's estimation of .80 as an indication of good statistical power, which means that

researchers should plan their investigations in order to obtain an 8 out of 10 chance of getting a statistically significant finding if one exists.

In terms of the present study's validity issues the researcher acknowledges the possible confounding influence from co-morbid psychological and medical conditions as well as the possibility of patients responding in a social desirable manner. The data obtained may thus not represent the true compliance of patients, producing inaccurate data. The correlational study however does not focus on the aspects of internal validity but rather attempts to produce generalizable data. Given this, the researcher notes that these factors can potentially influence the validity of the study and as such no definitive claims were made and interpretations were made with these issues in mind.

3.6 Procedure

The participants selected based on the criteria outlined was contacted via e-mail by Health Window staff and they were informed about the study. Those who agreed to participate in the investigation received information concerning the measures involved. The researcher was thus not directly involved in the recruiting of participants, ensuring the confidentiality of their information. The consent forms and questionnaires were uploaded on a website, where each patient was requested to complete the demographic information sheet, the IPQ-R based on the self-regulation model, as well as the MTQ. The website was designed using a Survey-monkey website. Survey-monkey is an online survey tool that permits researchers to upload their surveys and questionnaires and allows easy access for participants (Survey-monkey, 2012). Login details were sent to each willing participant and contact details of both the researcher and Health Window staff were made available in case of any questions. Any misconceptions were clarified telephonically or via email. The web-based assessment allowed the patients to complete the questionnaires on their own time permitting them to carefully respond to each item and in addition, it also contributed to the anonymity of the patients.

3.7 Data analysis

Maree and Van der Westhuizen (2009) affirm that in order to ensure the scientific value of one's quantitative research, "...it is essential to explain the statistical procedures...used to investigate the research questions..." (p.33). Data analysis involves "the systematic and synthesis of research data and the testing of a research hypothesis using these data" (Polit &

Beck, 2008, p.751). The present investigation relied on both descriptive and inferential statistics in order to draw conclusions and to summarise the findings. SPSS version 20 was used for the statistical analysis.

3.7.1 Descriptive statistics

Descriptive statistics provides information about the basics of the findings, not permitting the researcher to make any definitive conclusions (Edo, 2009; Field, 2009 Foster, Barkus, & Yavorsky, 2006). All these values were calculated in the present study and will be discussed in the results chapter.

3.7.2 Inferential statistics

Inferential statistics involves using statistical procedures to analyse the data and to draw conclusions on the basis of the findings. Different inferential statistics can be calculated but for the purposes of the present study correlational analysis and regression analysis was computed.

3.7.2.1 Correlational analysis

Correlational analysis is used to identify whether a relation exists between two or more variables and it can also provide an indication of how strong that relation is (Burns & Grove, 2005; Edo, 2009; Foster et al., 2006). The correlation between variables can also be in different directions, as mentioned above, meaning that positive or negative relations can be present depending on the nature of the association between the variables. In case of the present study a negative relationship would be for example if medication compliance decrease as patients concern over medication side-effects increases. A positive relationship then means that the two correlated variables change in the same direction, as one increases the other increases as well (Gravetter & Forzano, 2009). Pearson's r coefficient was calculated in this study, which is used with linear relationships. Pearson's correlation "...is a standardized measure of the strength of [a] relationship between two variables" (Field, 2009, p.791). The r value can range from +1 to -1, depending on the direction of the relation. The correlational findings are elaborated in the next chapter.

3.7.2.2 Regression analysis

Regression analysis is used to make predictions about variables, thus one variable, the independent variable, is used to make predictions about the dependent variable. In simple regression analysis one variable or outcome is predicted based on a single variable, in this case only one variable is used to make predictions about another variable (Field, 2009). The present investigation would involve using the independent variable, the psychological factors, to make predictions about the medication compliance of patients. Regression analysis was thus used to establish the extent to which medication compliance can be predicted on the basis of whether the predefined psychological factors were present. Edo (2009) describes regression analysis as a statistical test that measures the degree of the relations between dependent and independent variables, thereby allowing researchers to use the values of the independent variable to predict the outcomes of the dependent variable. It is however only used to describe existing relationships but no causality can be inferred on the basis of this analysis.

3.8 Ethical considerations

According to Gravetter and Forzano (2009) "research ethics concerns the responsibility of researchers to be honest and respectful to all individuals who are affected by their research studies or their reports of the studies' results" (p.98.). Researchers are expected to adhere to a code of ethics outlining a set of guidelines that will govern the research process as well as the application of the results (Barlow & Durand, 2005; Goddard and Melville, 2005). This section will provide a brief discussion of the ethical issues that were applicable to the present investigation and how these issues were addressed. The guidelines stated by the Ethics Committee of the University of Pretoria as well as the Health Professions Council of South Africa (HPCSA) were considered.

3.8.1 Ethical protection of the institutions involved

The institutions involved in the present investigation were the University of Pretoria as well as the Health Window pharmaceutical company. The researcher obtained written consent from the research ethics committee at the University of Pretoria as well as a letter of consent from the Health Window Company giving permission to use their patient data basis. Confidentiality and privacy were key issues in this study and the information of all relevant parties was kept private.

3.8.2 Ethical protection of the participants

Firstly and most importantly it is necessary to obtain informed consent, which constitutes the rights of the participants to provide voluntary permission to participate in the proposed research study. It is important to provide adequate information concerning the research study, the procedure and the application of the findings to the participants before they are expected to give their permission, thereby providing them with all the necessary information to make an informed decision (Barlow & Durand, 2005; Gravetter & Forzano, 2009). There are three important components of informed consent and each was taken into consideration during the present investigation (Adshead & Brown, 2003; Gravetter & Forzano, 2009). Information must be provided to the extent that it will enable the participants to make an informed decision. The proposed research study did not involve the use of deception and detailed information was provided in the informed consent form.

The second important component involves that of comprehension, does the patient understand the information provided (Adshead & Brown, 2003). Participants were allowed to ask questions in order to clarify any misconceptions. Personal email addresses of both the researcher and Health Window staff was provided in case any misunderstandings occurred, allowing participants to clarify any problems. Lastly, it is essential that participants are aware that participation is voluntary. Participants have free will, it is their choice to partake in the study and if they feel uncomfortable during any aspect of the procedure, they are free to withdraw from the study without any negative consequences (Gravetter & Forzano, 2009). No forms of coercion or any form of punishment was present during this research project. Participants were freely allowed to discontinue their participation if they chose to do so. This was also highlighted in the consent form. A consent form containing all the necessary information was provided to each participant during the research process in order to gain their written consent.

According to the ethical guidelines it is important for researchers to ensure that no harm will come to the research participants. The researchers should thus take the necessary steps to avoid any harm or to minimize harm where it is unavoidable (Gravetter & Forzano, 2009). The research participants must be protected from both physical and psychological harm. No harm was however involved in the present investigation. Privacy and confidentiality are important ethical considerations in most research projects. It involves the responsibility of the researcher to protect the confidential information revealed by the participants (Adshead & Brown, 2003; Gravetter & Forzano, 2009). The information obtained from the patients will

be stored in a safe place and no personal information, connecting the patients to their responses, will be used. Participants were therefore anonymous throughout the research process with neither the researcher nor the Health Window staff knowing which patient completed which questionnaire. It was also explained that the results will be available to the researcher as well as other relevant parties including the statistician, supervisor and the Health Window staff, but the information will be anonymous with no patient information revealed. The possible future use of the information for research was also explained to the patients.

3.8.3 Scientific honesty and integrity

It is argued that the main purpose for conducting research is to produce scientifically valid knowledge by using truthful, honest methods (Burns & Grove, 2005). Scientific deceit includes the fabrication or falsification of research findings or data, plagiarism and or the drawing of invalid conclusions. Edo (2009) stresses the importance that "research must be conducted and reported with honesty and integrity and in line with established national, institutional and professional codes of practice" (p.92). The present study is evidenced by true and honest reporting, conforming to the requirements for valid, scientific research. The data was collected based on ethical principles and it was available for inspection by a research supervisor. The help of a statistician was also incorporated thereby prohibiting the falsification and manipulation of data. The sources consulted for the completion of this study was acknowledged and all relevant sources were indicated and mentioned.

3.9 Conclusion

The present study involved the use of a survey method for the collection of data. The data was analysed using computer programmes and specific statistical procedures including: descriptive statistics, correlational analysis and regression analysis. Ethical issues relevant to the present research study were also considered and the research conformed to the requirements needed for scientific validation. The findings and the results are discussed and elaborated in the next chapter.

Chapter 4: Data analysis, results and interpretation

4. Introduction

The present study consisted of a quantitative research approach, focusing on the role psychological factors might play on the medication compliance of hypertensive patients. The study was conducted with a group of patients, sampled from the pharmaceutical company Health Window, preferably with a main diagnosis of hypertension, however, some of the participants had a main diagnosis other than hypertension. Additional diagnoses included depression, diabetes and other heart related illnesses. The researcher affirms that additional diagnoses may potentially have influenced the compliance to medication regimens differently compared to patients with a single hypertensive diagnosis. A total sample of 125 participants were obtained although only 105 participants actually completed the questionnaires (n=105). In some cases the sample consisted of less participants as some neglected to complete all the questions (n=95). The total sample of 125 patients were requested to complete two questionnaires, the IPQ-R and the MTQ, as well as a demographic information sheet via a link to the survey-monkey website specifically designed for the present investigation. The IPQ-R consisted of three scales, two of which were rated on a 5-point Likert scale, and another scale comprising of yes/no/don't know response. An open-ended question was also available, asking participants to list any other causes they perceive to be responsible for their diagnosed hypertension. The MTQ consisted of 34 items rated on a 5-point Likert scale, with the first two questions asking participants to indicate their daily dosage as well as their perceived compliance.

It should however be noted that as there were missing values in the data and not all of the participants had been diagnosed with hypertension, which was a prerequisite according to the selection criteria, some of the values and participants were excluded from analysis. The data set used during the formal analysis (inferential statistical procedures) thus included only those participants that had completed all the relevant questions and only those diagnosed with hypertension, either as a main diagnosis or a secondary diagnosis (n=88).

The aim of the current project was to demonstrate the existence of a relationship between psychological factors, including patients' illness perceptions, and how patients comply with their medication regimens. The results of this correlational research study will be discussed in this chapter with reference to the descriptive and inferential statistics. Incomplete questionnaires were accounted for in the study and response errors were indicated

as missing values. The data were presented in tables, and figures were also provided to visually represent the findings. The frequency tables are available in Appendix A. The analysis procedure consisted of two segments, the descriptive analysis of the data and the inferential statistical analysis of the findings. The second procedure included the more rigorous analysis where correlations between variables were examined.

It should be noted that the data were coded in order to make open-ended questions easier to analyse. The data were also subjected to reliability analysis, to determine the reliability and value of each item, and factor analysis was also performed in order to reduce the dimensions present in the data.

4.1 Demographic information

The first questionnaire completed by the participants involved eliciting demographic information. The majority of the sample, 37.6% was diagnosed as having hypertension/high blood pressure. Some of the patients listed subsequent disorders including diabetes, high cholesterol, heart problems, arthritis, and thyroid problems. A large part of the sample had co-morbid hypertension and diabetes (7.2%). Some of the patients, .4% listed diabetes as their main diagnosis. This data was based on the original data set containing 104 participants.

As discussed, the main focus of the present investigation was on hypertensive patients and those who did not have a diagnosis of hypertension, either as their main diagnosis or a secondary diagnosis was excluded from analysis. The new sample consisted of those patients diagnosed with high blood pressure and incomplete questionnaires were also removed from the data set (n=88). The findings show that 81.3% of the sample had a diagnosis of hypertension. Only 13.4% of participants listed additional illnesses. A number of participants, 10.2%, had been diagnosed with both hypertension and diabetes (See Table 4.1A in Appendix A). Participants were also questioned about any other diagnoses (See table 4.1B in Appendix A).

Participants were enquired about their hypertension, the duration of their illness, types of medication prescribed, the daily dosage and instruction as well as other health related questions such as co-morbid psychological disorders and other diagnoses. They were also asked about how well they consider themselves to be informed about their illness and their medication regimens.

4.1.1 Age (n=88)

The selection criteria permitted the use of patients between the ages of 40-70 years. Hypertension can affect any age group but it is generally considered to be prominent amongst elderly patients (Lehane & McCarthy, 2007). Steyn et al. (2001) also reported the high incidence of hypertension within the older South African population. The risk of developing hypertension therefore increases with age (Van Minah, Byass, Chuc & Wall, 2006). Age is then considered to be an important factor in the development of hypertension, but it can also be viewed as a deterrent factor in medication compliance (Bosley et al., 1995; Harrison, 1998; Maguire et al., 2008; McGann et al., 2008). The demographic questionnaire then also included asking patients their age and during analysis it was grouped into 5 categories: younger than 40; adult (40-50); middle aged (51-60); elderly (61-70) and; older than 70.

The age group younger than 40, represented 16.9% of the sample. The adult group comprised 23.8% of the sample while the middle aged group consisted of 27.2% of the sample and the elderly group corresponded to 19.2% of the sample. The age group older than 70, consisted of 7.8% of the sample. Table 4.1.1 shows that the majority of participants were from the age group (51-60), with the adult group (40-50) also highly represented in the sample. (See Appendix A for table 4.1.1). In total 51% of the participants were aged between 40-60 years. Based on the above data, hypertension seems to be more common amongst older people, specifically from the age of 40+. A total of 4.5% of the sample did not complete this question. Refer to the figure 1 below.

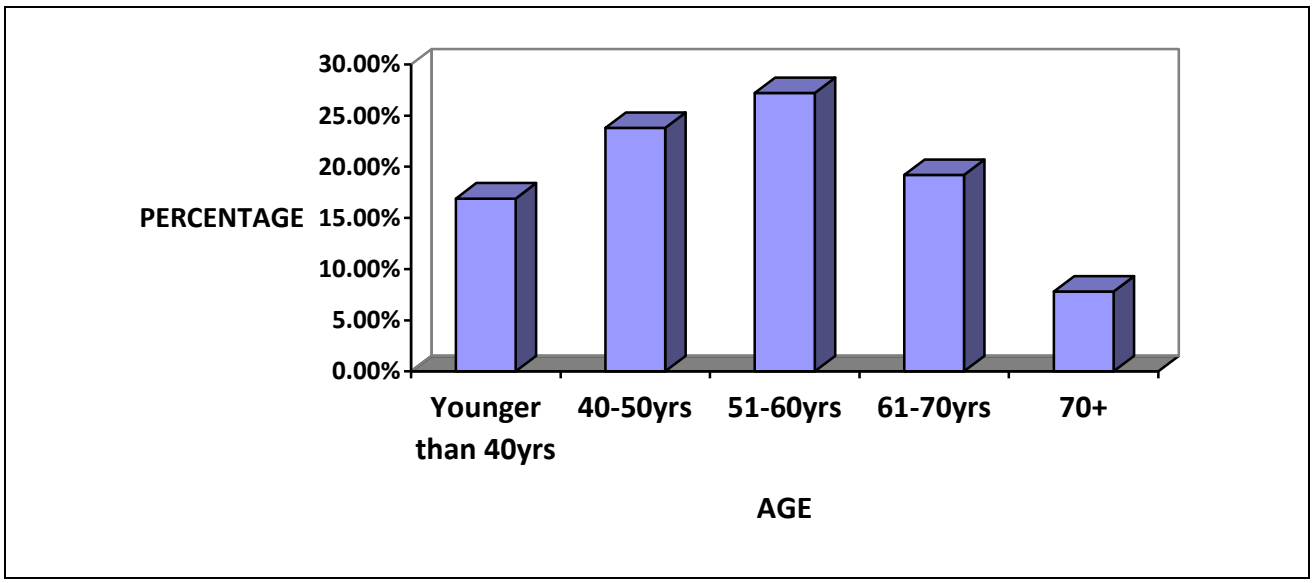


Figure 1: Age distribution of the sample (n=88)

4.1.2 Sex (n=88)

Patients were also asked to indicate their gender. It is commonly argued that hypertension is more prevalent amongst men than women but that woman tend to seek treatment more often than men (Peltzer, 2004; WHO, 2003). As a result, it is reported that women tend to demonstrate higher levels of adherence compared to men. Although the main aim of the present study was to establish whether a relationship exists between psychological factors, as defined in accord with the self-regulation model, and medication compliance, the researcher also reported on the gender difference found in terms of medication use based on the findings. The sample comprised of 44.4% males and 53.4% females (See table 4.1.2 in Appendix A). Some of the participants (2.3%) did not complete this question. Refer to figure 2 below.

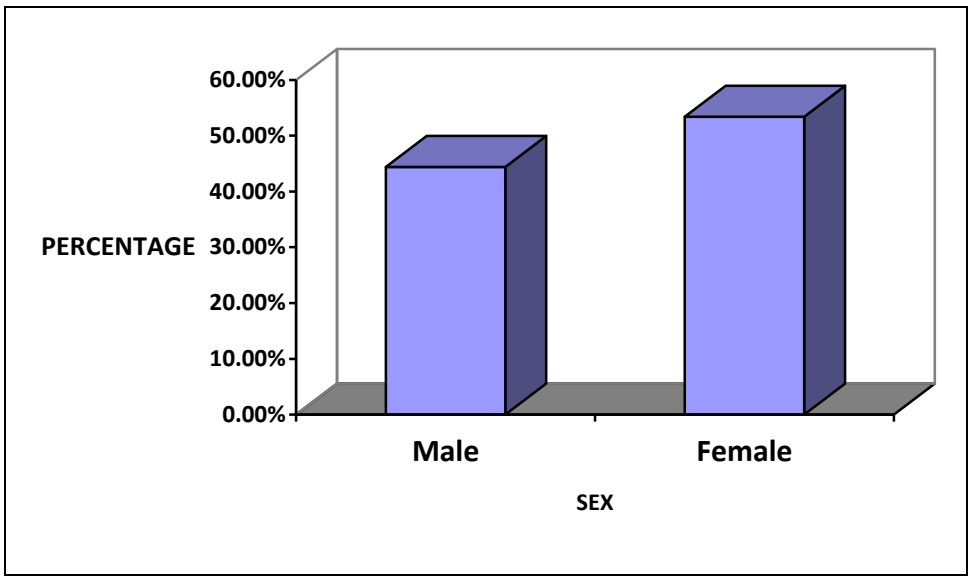


Figure 2: Percentage of male and female participants

4.1.3 Marital Status (n=88)

The marital status of patients was also reported. Past research has reported that there are many factors impacting the use of compliance and different stressors may be involved including personal problems (Lehane & McCarthy, 2007). The majority of patients, 76.1% are married. 11.4% of the sample is single; while only 8% of the sample is divorced (Table 4.1.3 is available in Appendix A). Those that are widowed consisted of 4.5% of the total sample. (See figure 3 below).

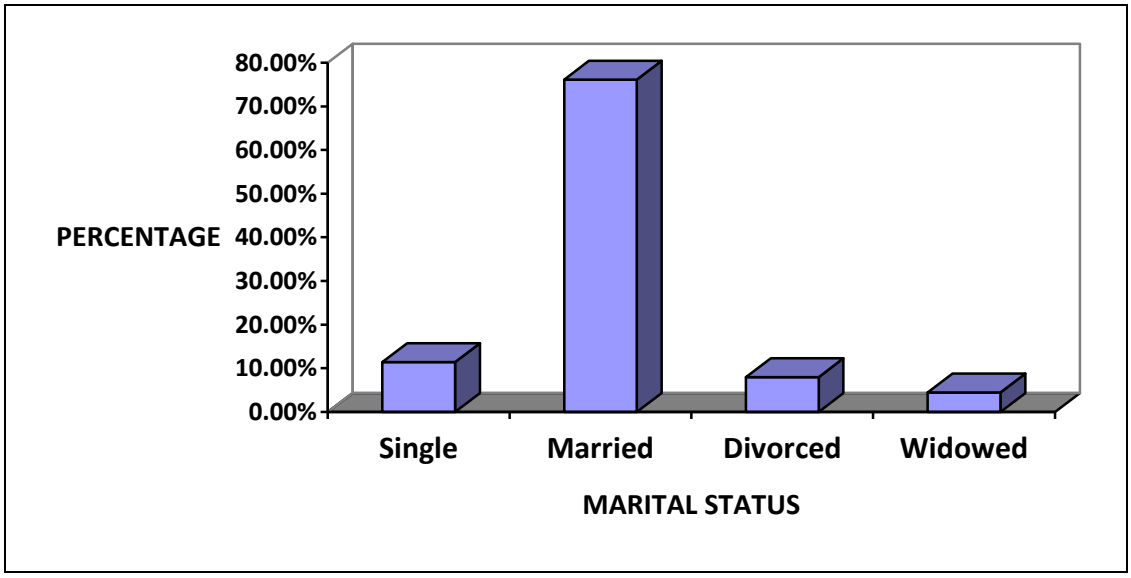


Figure 3: The relationship status of participants

4.1.4 Employment status (n=88)

Participants' employment status was also documented and based on the data the majority of participants were permanently employed (69.3%), 18.2% are retired and only 4.5% are unemployed (See table 4.1.4 in Appendix A). 5.7% of the sample indicated other in terms of their employment status. 2.3% neglected to answer this question. (Refer to figure 4 below)

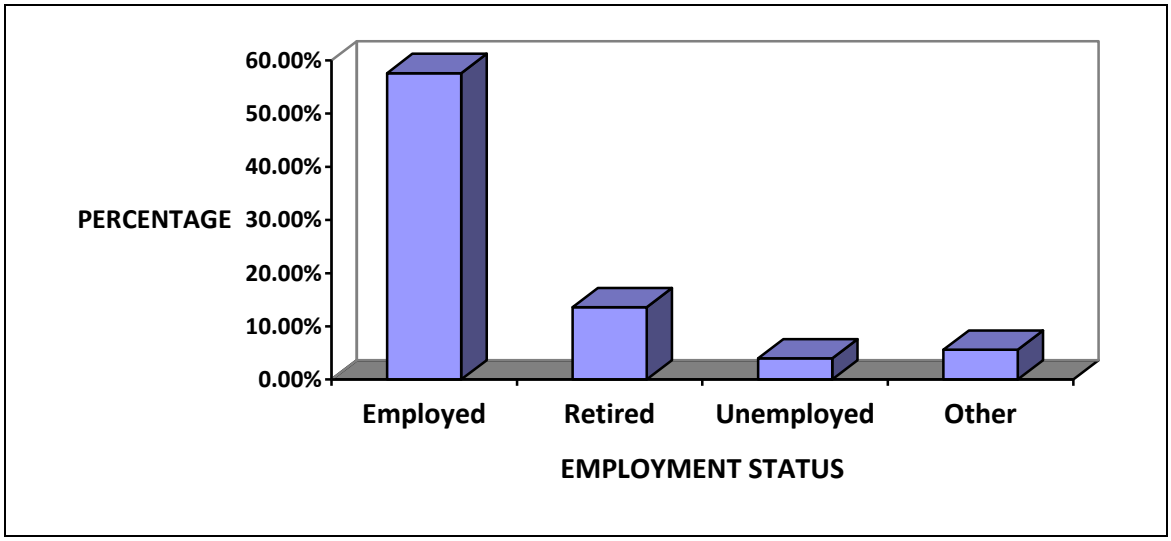


Figure 4: The employment status of participants

4.1.5 Educational background (n=88)

Patients were questioned about their educational background. It is assumed that educated patients will have a much better understanding of their illness as well as their medication prescription (Horne et al., 1999, Thrall et al., 2004). Most of the patients, 31.8%, had

completed high school and obtained their senior certificate, 51.2% indicated that they have a tertiary education (23.9% has a diploma while 27.3% has a degree). Only 13.6% indicated other forms of education (Table 4.1.5 is available in Appendix A). A few participants, 3.4% did not indicate their educational background (Refer to figure 5 below). Edo (2009) agrees that literate individuals are regarded as more competent in understanding the significance of the treatment. Based on the data this sample is regarded as a literate group and as such it is argued that they are likely to be proficient in understanding the need for treatment. But as past research suggests, knowledge alone is not sufficient for exerting compliant behaviour (Thrall et al., 2004).

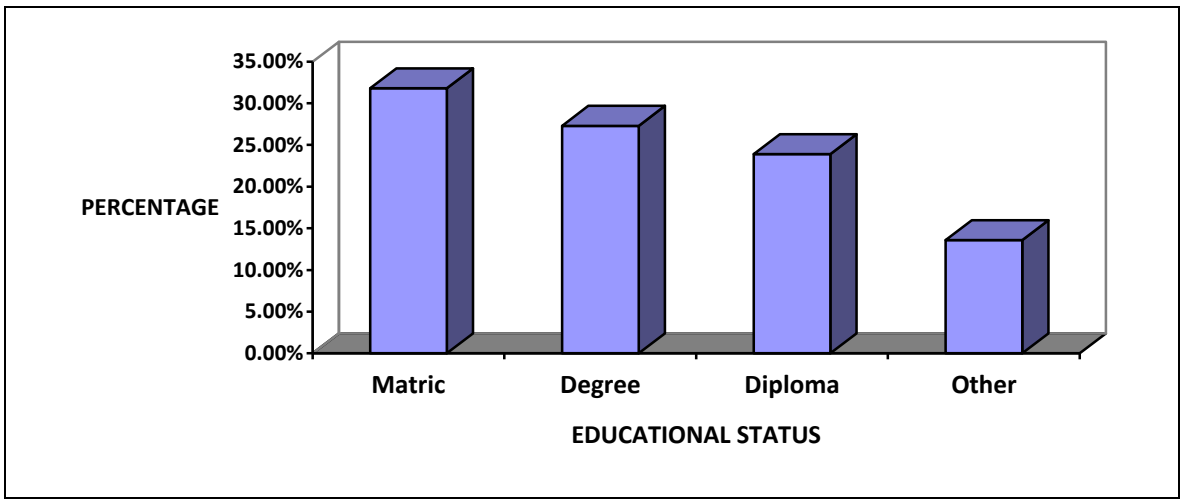


Figure 5: The educational status of participants

4.1.6 Smoker/non-smoker (n=88)

Smoking is regarded as a major health risk and patients were asked to indicate whether they are smokers or non-smokers. Patients were also asked about their history of smoking. 10.2% of the sample is smokers compared to 77.3% who are non-smokers. Only 11.4% of the sample indicated a history of smoking and 1.1% did not answer this question. Figure 6 below demonstrates the number of patients who rated themselves as smokers and non-smokers (See table 4.1.6 in Appendix A).

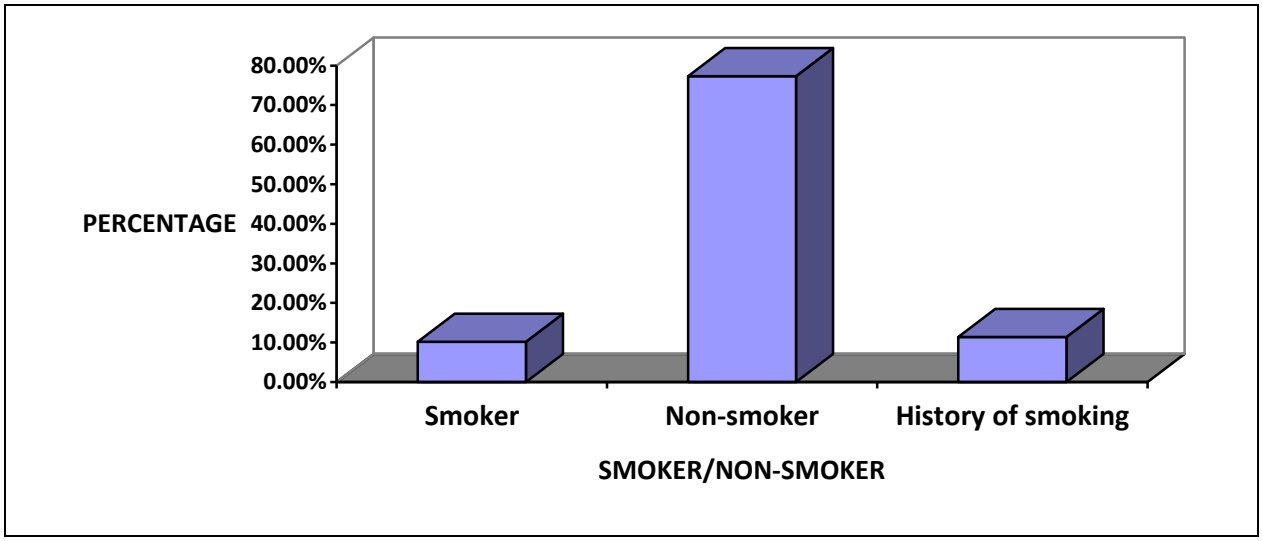


Figure 6: The smoking history of participants

4.1.7 Duration of illness

The duration of the diagnoses was also enquired, where patients were expected to indicate how long they have been suffering from hypertension. A history of hypertension in the family was also solicited from patients. The question was of an open-ended nature and the researcher coded each response in terms of 5 categories: less than 5 years; 5-10 years; 10-20 years; 20-30 years and more than 30 years. Some of the participants indicated the duration for each illness; these responses received a different code. Based on the data, 26.1% of the sample stated that they have been diagnosed with their illness for less than 5 years. 22.7% of the sample has been diagnosed for 5-10 years; 29.5% has been diagnosed for 10-20 years, and a small part of the sample, 3.4% have been diagnosed for 20-30 years. Only 4.5% of the sample stated that they have been diagnosed for more than 30 years. 7.9% did not answer this question and another 5.5% did not respond appropriately to the question. (Refer to Appendix A for the table 4.1.7A).

Regarding participants' history of hypertension the findings suggest that 75% of the sample who answered this question (n=88), indicated that they have a history of hypertension, while only 21.6% stated that they did not have a history of hypertension. (See figure 7 below). 3.4% did not answer this question (Table 4.1.7B is available in Appendix A).

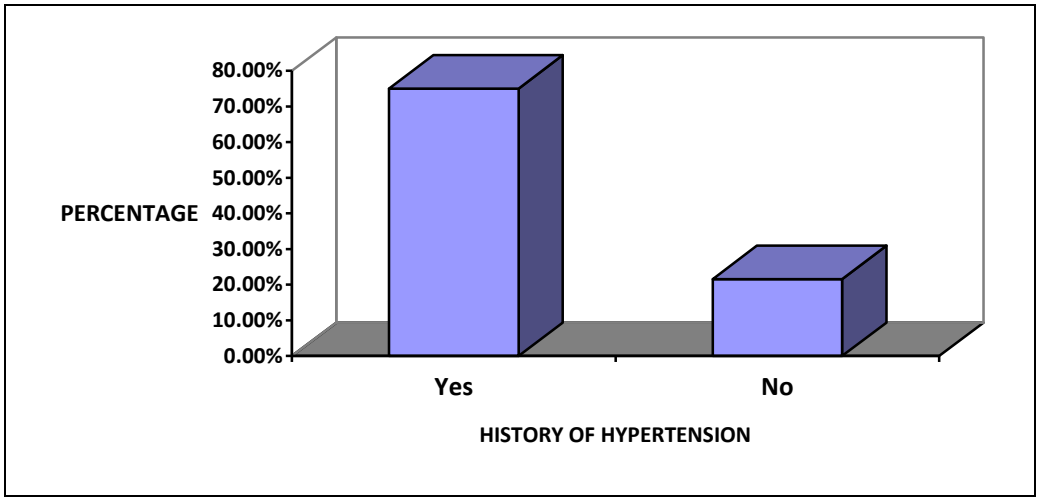


Figure 7: Participants' history of hypertension

4.1.8 Patients' knowledge about their illness and medication

Participants were also questioned about how informed they perceive themselves to be in terms of their hypertension and their medication instructions. Patients are usually considered to be well informed about their illness and they acknowledge the dangerous consequences associated with poor disease management (Horne et al., 1999; Thrall et al., 2004). Due to the general assumption that patients know the aftermath of failing to treat their illness, it is interesting to note that most patients still demonstrate insufficient blood pressure control as a result of poor compliance. Knowledge is thus known to be an important factor in how people go about treating their illness. Participants were then asked whether they consider themselves to be well informed about their illness by stating either yes/no. In accord with this, the data shows that 81.8% of patients considered themselves to be well informed about their illness compared to 17% who claimed otherwise while 1.1% did not complete this question. (See figure 9 below). Table 4.1.8A is provided in Appendix A.

The relationship between patients and their health care practitioners is considered to be a determining factor for subsequent treatment compliance and it also relates to the patients' understanding of both the treatment and their illness (Dubiel et al., 2005; Figueiras et al., 2010; Lehane & McCarthy, 2007). The data revealed that 60.2% (n=88) of the participants considered themselves to have a very good relationship with their health care practitioners, compared to others, 28.4% who reported a good relationship. 11.4% considered their relationship to be adequate (Refer to figure 8 below). None of the participants reported poor relationships with their health care professionals, suggesting that they are all on good terms with their doctors, nurses and other health related staff members. This factor is therefore not

viewed to impact compliance in terms of the present sample as poor relations are usually indicative of non-compliance though most patients reported being compliant, but non-compliance was prevalent as well (See table 4.1.8B in Appendix A).

Participants were further questioned about the type of anti-hypertensive medication they use. In relation to their diagnosis patients listed various types of medication. (See Appendix A for table 4.1.8C). When asked about their daily dosage and daily instructions most of the participants appeared to know when and how to take their medication. Based on the dosage per day, participants were asked to report the number of pills they take daily. The majority (58%) of the sample takes only one pill per day, a smaller part, 18.2% takes two tablets per day while 11.4% have to take three or more tablets daily to control their blood pressure (Reference is made to table 4.1.8D in Appendix A).

Information about the prescribed dosage per day can be divided into single dosage and multiple dosages. A single dose refers to one tablet a day while a multiple dosage requires patients to take one or more tablet/s multiple times a day (Edo, 2009). Generally most hypertensive patients take only one tablet a day (58%) while a few patients require multiple dosages (29.6%). The larger part of the sample is thus required to take single dosages. 12.4% of the sample did not respond as required or they did not complete the question.

Prescribed instructions were questioned as part of the MTQ. Table 4.1.8E is presented in Appendix A. The findings show that 73.9% of the participants take their medication in the morning only; 1.1% take their medication in the afternoon only; 4.5% takes their medication in the evening only; 2.3% has to take their medication in the morning and the afternoon and 9.14% takes their medication in the morning and the evening.

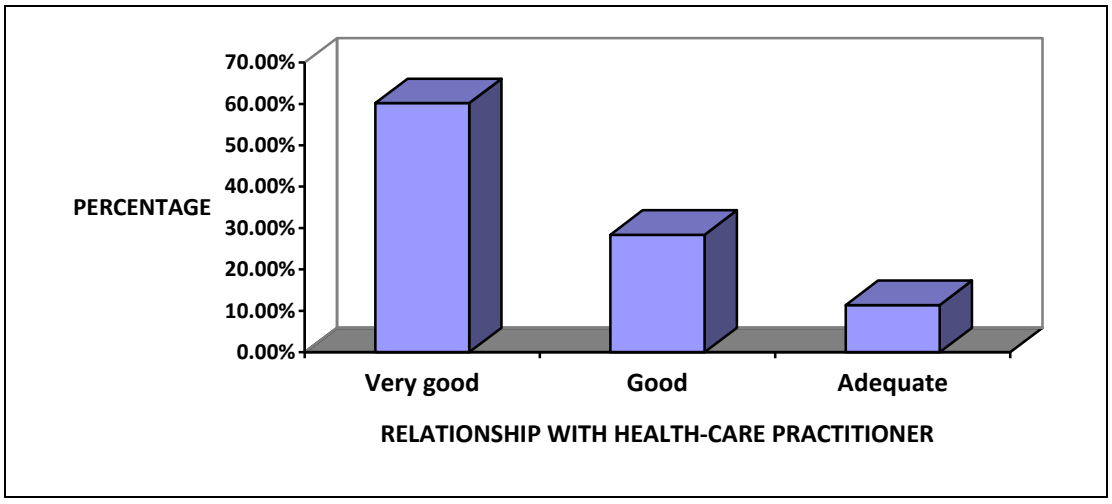


Figure 8: Doctor-patient relationship

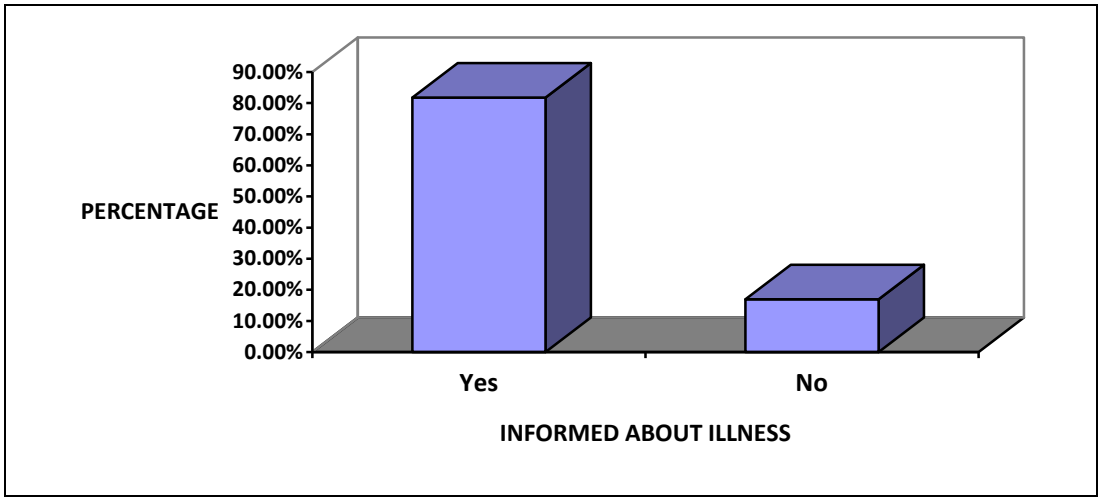


Figure 9: Participants' perceptions about being informed about their illness

4.1.9 Psychological disorders

The aim of the current research project was to establish whether psychological factors, in terms of patients' illness cognitions, influence their compliance with prescribed medication regimens. Previous research, conducted by Bane et al. (2006), suggests that psychological disorders, like depression, can adversely impact the medication-taking behaviour of patients. Although the focus of this project was not on the impact psychological disorders may have on patients' compliance, they were nevertheless questioned about their psychological health status as a possible precautionary measure, considering the confounding influence of a co-morbid psychological illness. The data revealed that 8% of the sample indicated a history of psychological disorders while 87.5% stated no prior history of psychological disorders (Refer to figure 10 below). 4.5% did not answer this question (Also see table 4.1.9A in Appendix A). Some of the participants did however state that they have been diagnosed with a secondary psychological disorder. The researcher noted this occurrence as a possible limitation to the findings. Some of the psychological disorders reported include: affective disorders such as depression and bipolar mood disorders (Refer to table 4.1.9B in Appendix A).

In response to the possible effects of co-morbid illnesses, the researcher attempted to identify those individuals with a diagnosis of hypertension, but some of these participants still had other illnesses in conjunction with their high blood pressure. Depression was diagnosed in 2.3% of the sample. A few participants, (3.4%) also listed depression as part of their main diagnosis. Other disorders reported include post-traumatic stress disorder, and anxiety attacks.

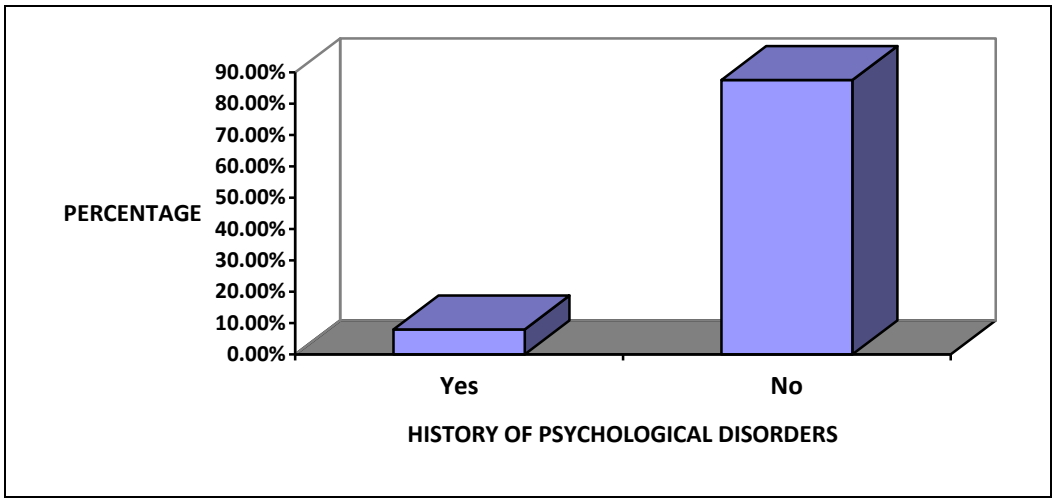


Figure 10: Participants' history of psychological disorders

4.2 Compliance with antihypertensive drug treatments

This section will discuss the data obtained from the MTQ. It will specifically focus on the question of how compliant patients were in taking their antihypertensive medications as prescribed. The medication-taking questionnaire consisted of 35 items and it focused on patients' perceptions about the need, effectiveness and safety benefits of their medication. It also asked patients to indicate how much pills they need to take and what their daily prescription entails. This questionnaire thus mainly focused on the physical medication-taking behaviour of the patients. The descriptive statistics will be provided in this section, with the inferential analysis provided in a later section.

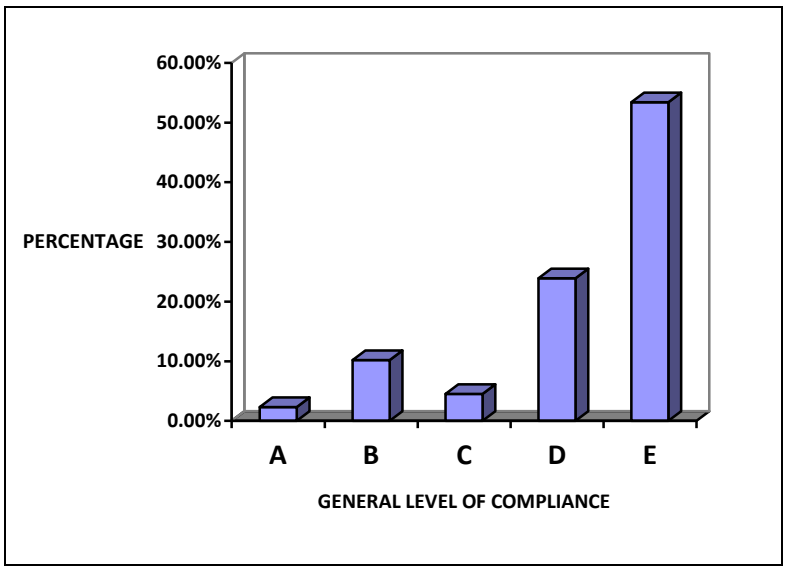
4.2.1 General compliance as rated by patients

Participants were asked about their views concerning their general compliance with their medication instructions. This question was thus based on patients own perceptions about how compliant they usually are in terms of taking their medication. It is therefore possible that patients might have distorted their true medication-taking behaviour and thus the researcher also mentions this as a limitation of the study. Participants might thus have responded in a social desirable manner instead of reporting their actual medication taking habits. The researcher had no means of controlling this factor due to ethical limitations.

Most patients demonstrated satisfactory levels of compliance as presented in figure 11 below. 53.4% of all patients showed good levels of compliance, reporting that they always take their medication as they should never skip a dosage. Only 2.3% of participants indicated

that they never take their medication, demonstrating unsatisfactory levels of compliance. The multifaceted definition of compliance however necessitates the need to consider all dimensions when deliberations are to be made about what constitutes satisfactory and unsatisfactory compliance. Simply taking ones medication does not necessarily mean that one is complaint, as one ought to take the medication correct in terms of daily dosage and instruction. Referring back to chapter 2 compliance was defined as "the extent to which a person's behaviour in terms of taking medications, following diets or executing lifestyle changes coincides with medical or health advice" (McGann et al., 2008, p.153; Svensson et al., 2000). Compliance also represents patients' decisions regarding their medication-taking behaviour and whether this behaviour is in agreement with professional advice and instruction (McGann, 1999; World Health Organization, 2003). Based on the aforementioned, 10.2% of the sample generally take their medication but often skip a day or more, and 4.5% of the sample take their medication but not as instructed. 23.9% of participants reported that they often unintentionally forget to take their medication. Some participants, 5.7% did not complete this question. The researcher argues that based on the definition of compliance used in this study, these categories will not be regarded as indicating compliance. It can thus be concluded that a total of 40.9% of the participants are considered to be non-compliant, either failing to take their medication completely or not taking it according to instruction. Reasons for non-compliance relates to either failing to take their medication completely or not taking their medication as instructed or prescribed.

The general level of compliance was viewed to be a more accurate depiction of how participants take their medication, and as such the data was coded, with a 0 indicating non-compliance and 1 indicating compliance. Only those participants that reported always taking their medication, never missing/skipping a dosage, were coded with a 1 while all others were coded with a 0, indicating non-compliance. Using the newly constructed variable, the sample (n=88) thus showed that 53.4% was compliant with their medication treatments while a large 46.6% was not. It is noteworthy that such a large part of the sample is non-compliant to their medication regimens, despite the positive views regarding their perceptions about the need and effectiveness of their medication for treating high blood pressure. Edo (2009) reported similar findings in terms of adherence to hypertensive drug treatments. Table 4.2.1 is available in Appendix A.



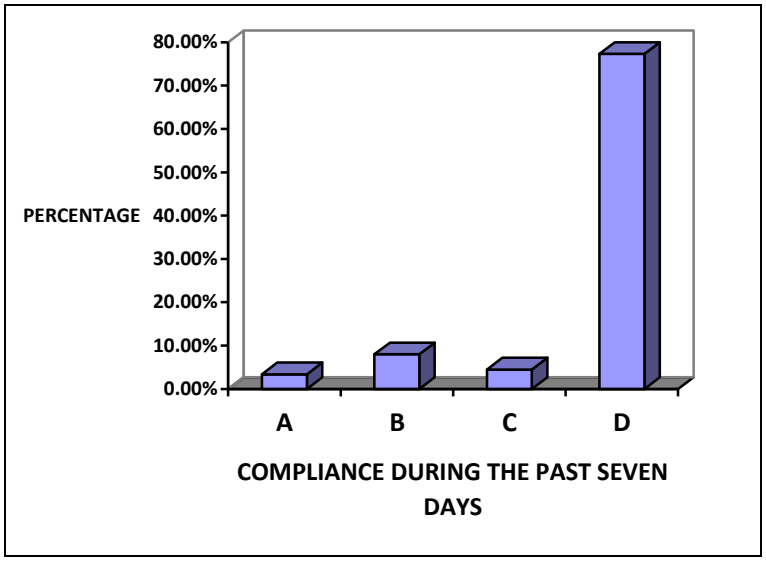
	KEY
A	I never take my medication
B	I take my medication but occasionally skip a day or more
C	I take my medication daily but not as instructed
D	I take my medication but sometimes unintentionally forget
E	I always take my medication and never miss a dosage

Figure 11: Participants' level of general compliance

4.2.2 Compliance during the past seven days as rated by patients

Participants were questioned about their compliance over the past seven days, and as stated above, the opportunity to respond in a social desirable way is also a factor here, possibly producing inaccurate information. Based on the data participants were grouped into four categories: never took medication; took medication but skipped one or more; not taken as prescribed and: always took medication. In relation to figure 12 below, 3.4% of patients were not able to take their medication at all, 8% skipped one or more dosages; 4.5% took their medication but not as instructed and lastly 77.3% always took their medication. The part of the sample that did not complete this question, constituted 6.8% of the sample. Patients who took their medications daily as instructed are regarded as compliant while those who did not take their medication, or failed to take it as prescribed are viewed to be non-compliant (15.9% of the sample). This conclusion is in line with the definition of compliance as highlighted in the above section. Neglecting to take ones medication as prescribed is considered to be a form of non-compliance. Table 4.2.2 is provided in Appendix A.

The low non-compliance observed in the data compared to the large part of the sample who reported compliance, may relate to the recall of specific rates of compliance compared to general rates. It is possible that the higher rates of compliance is due to the ease with which recent medication-taking patterns are recalled as opposed to having to recall ones compliance in general.



	KEY
A	I was not at all able to take my medication
B	I took my medication but skipped a day or more
C	I took my medication but not as instructed
D	I took my medication as instructed everyday

Figure 12: Patients' level of compliance over the past seven days

4.2.3 Adherence

The new variable was developed by means of a dichotomous method. Participants complying with their medication were assigned a score of one while those who reported any option other than always taking their medication, were assigned a zero. The value one thus indicated compliance and the value zero indicated non-compliance. The results show that 53.4% of participants comply with their treatment prescriptions while 46.6% did not comply with their treatment instructions (See table 4.2.3 in Appendix A). Refer to figure 13 below.

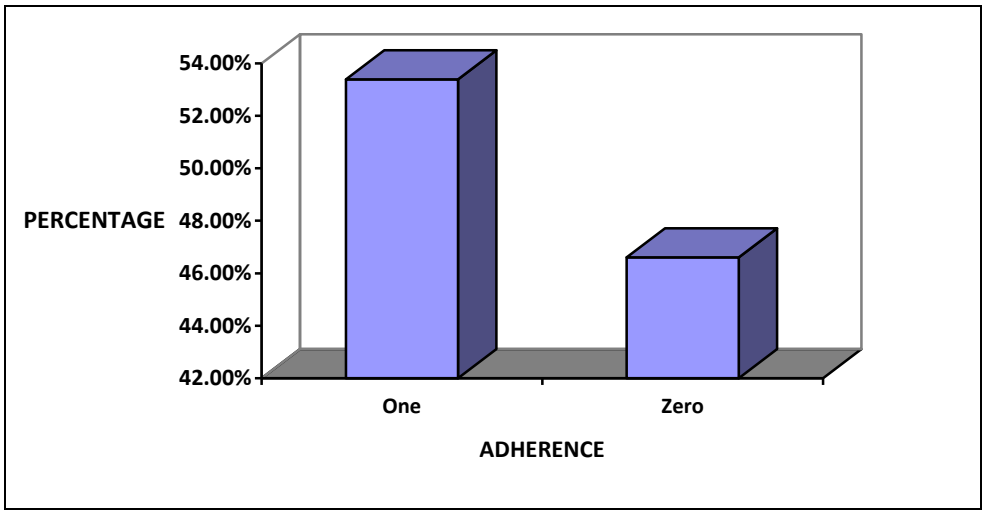


Figure 13: Patients' level of adherence

4.3 The Medication –taking questionnaire (MTQ)

The MTQ measured participants' level of compliance and it also assessed patients' views about their medication. The findings of the MTQ will be discussed in terms of the subscales.

4.3.1 Perceived need

Participants were asked to rate their level of agreement with several statements concerning their views about whether or not they needed the medication to treat their illness. The first question asked patients about the need for their blood pressure medication in preventing strokes. 30.7% of the sample (n=88) strongly agreed with this statement, 48.9% agreed, 12.5% of the participants remained impartial, 2.3% disagreed and only 1.1% of the sample strongly disagreed with this statement. Another 4.5% did not complete this question. Overall it appears that the majority of the sample (79%) agreed that their blood pressure pills keep them from having a stroke (See table 4.3.1 in Appendix A).

Taylor (2012) stated that pharmacological treatment is the most common form of treatment for hypertension. It is argued that some of the drug treatments elicit positive outcomes in terms of reducing blood pressure; however it can lead to increasing the overall sympathetic functions thereby escalating the likelihood of coronary heart disease instead of reducing it. Similarly Moll (2009) argued that high blood pressure medication can have a negative effect on ones cholesterol, in some cases worsening cholesterol levels even if it controls blood pressure levels. This might however be temporary. It can thus be said that some drug treatments can heighted sympathetic nervous system activities rather than decreasing it (Buelow & Wang, 2006; Harvard University, 2012).

In terms of the need for patients to take their blood pressure medication, the majority (89.8%) of the participants agreed with this statement. 40.9% strongly agreed and 48.9% agreed. Only 2.3% strongly disagreed, and 3.4% reported a neutral response. 4.5% did not answer this question (See table 4.3.2 in Appendix A). The researcher considers the large percentage agreeing with this statement as an indication that the patients understand the need to take their blood pressure medication. Hypertension is one of the most treatable illnesses, given that patients take their medication as prescribed. (Maguire et al., 2008; Brewer et al., 2002; & Taylor, 2012). The need to take ones blood pressure medication is thus of crucial importance. The data suggests that patients might not be as compliant as they should be, but it appears that they understand the importance of why they have to take their medication. It is therefore possible that patients are aware of the role that medication plays in controlling

blood pressure, but other factors are present when they consider taking their medication. This is also in agreement with the previous statement; blood pressure pills prevent me from getting a stroke, to which the majority of patients agreed as well. It is important to establish that patients understand the need for taking their medication and why they are doing so as it may affect long-term compliance. Patients might demonstrate good levels of compliance but if they are not knowledgeable about the need to take their medication, they might become incompliant at a later stage of their treatment. This was not the case with the present study, rather patients were not as compliant as they should be, but they appeared to grasp the essence of what the medication is for – controlling blood pressure and ultimately preventing stroke. The larger part of the sample took their medication but often skipped a day or more or they did not take their medication as they should. This is not as alarming as neglecting to take ones medication completely, but it is still considered to be unsatisfactory levels of compliance.

The question posed about taking blood pressure medication for health reasons, revealed that the majority (89.8%) of the participants agreed with this statement, 36.4% strongly agreed while 53.4% agreed. 2.3% of the participants reported a neutral perception and only 2.3% strongly disagreed that blood pressure pills are taken for their health (Table 4.3.3 is available in Appendix A). A few participants, 5.7%, did not complete this question. The overall part of the sample demonstrated that they need their blood pressure medication in order to maintain their health. Based on these results, the researcher highlights the general level of comprehension in terms of the perceived need for taking medication. Failing to understand that their health will be in jeopardy if they do not take their medication can result in subsequent health problems such as, heart attacks or other cardio-vascular related illnesses. (Clifford et al., 2006; Inkster et al., 2006; Johnson et al., 2006; Maguire et al., 2008; Taylor, 2012; Thrall et al., 2004). The participants appear to recognize the significance the medication plays in terms of regulating their health.

Participants were also enquired about their views that their blood pressure pills keep them from having health-related problems (See table 4.3.4 in Appendix A). Similar to the other questions, the larger part of the sample (45.5%) agreed that blood pressure pills keep them from having health related problems. 19.3% reported a neutral position and only 3.4% disagreed and strongly disagreed with this statement. The following statement considered that health problems were possible if patients fail to take their blood pressure pills (See table 4.3.5 in Appendix A). 78.4% agreed with this statement, with 34.1% strongly agreeing and 44.3%

agreeing. Only 3.4% disagreed and 2.3% strongly disagreed, while 10.2% reported a neutral response. 4.5% failed to complete this question. In agreement with what was highlight above, the participants generally show an understanding of why they need to take their medication and also the role it plays in maintaining their health.

Regarding the statement about it being problematic if the medication is not taken, 46.6% disagreed with this (See table 4.3.6 in Appendix A). The large part of the sample thus disagreed with this account, indicating that they acknowledge the fact that it is a problem if they miss their blood pressure pills. Only 4.5% strongly agreed and 8% agreed that if you miss your blood pressure pills it will not be a problem. 4.5% did not complete this question. Participants were asked about whether they would prefer treating their blood pressure without pills (Refer to table 4.3.7 in Appendix A). 17% strongly disagreed and 27.3% disagreed, which means that they favour pharmaceutical treatment and would not treat their blood pressure with other methods. 25% of the sample however stated that they agree with this statement, indicating that they would prefer other forms of treatment while 4.5% did not complete this question. The majority of the sample thus demonstrated an understanding that their blood pressure levels will not be controlled without their pills. The last statement asked, "I am OK if I do not take my blood pressure pills". 25% strongly disagreed and 39.8% disagreed with this argument (See table 4.3.8 in Appendix A). Only 5.7% reported levels of agreement that they will be ok if they do not take their medication. Generally the larger part of the sample understood that effective blood pressure control is dependent on taking ones medication, admitting that without it one will not be ok. 5.7% did not respond to this question.

In summary to this section of the MTQ the researcher argues that generally, the larger part of the sample appears to be aware of the important role that their medication plays in controlling their blood pressure levels. In accordance with the definition used to conceptualize compliance, most participants do not take their medication as prescribed or they often forget to take their medication. These participants are taken to be non-compliant as they are not following their prescribed instructions. It is thus noted that although the patients demonstrate good levels of awareness in terms of their perceived need for their medication, this knowledge alone does not seem to improve their general compliance.

4.3.2 Perceived effectiveness

The MTQ also asked patients about their views concerning the effectiveness of their medication. They were requested to rate their level of agreement with statements about how effective they believed the medication to be in terms of controlling their blood pressure. Compliance is often influenced by patients perceptions regarding the benefits they experience from taking their medication such as feeling better or seeing an improvement in their condition. Hypertension, as noted in previous chapters, is however classified as an asymptomatic disease which means that patients do not really experience symptoms directly or feel sick (Svensson et al., 2000; Wedro & Stöppler, 2011). Edo (2009) states in support that "the erroneous perception that hypertension is symptomatic is problematic because this could lead to non-compliance with treatment" (p.116). If patients perceive hypertension to manifest certain physical symptoms, they may neglect to take their medication if they do not experience any negative symptoms. As a result they may not often understand or agree with the treatment benefits associated with their medication since it is not associated with a direct physical improvement. Similarly it can be argued that if patients do not experience any symptoms they may mistakenly presume they are cured also resulting in non-compliance (Edo, 2009). The results indicated that 59.1% disagreed and 14.8% strongly disagreed that their blood pressure will come down enough without pills. Based on their responses, 73.9% of the participants hold the belief that their blood pressure can only be controlled with their medication. Only 6.8% of the sample agreed that their blood pressure can be controlled without their pills. 9.1 % of the sample was neutral regarding this statement and 4.5% did not complete this question. Reference is made to table 4.3.9 in Appendix A.

Patients are often categorized into positive and negative groups based on their perceptions concerning the effectiveness and benefits of their treatment medication. In relation to the current sample, most viewed their medication to be beneficial in controlling their blood pressure while some disagreed or fostered negative views about the efficiency of their drug treatments. The majority of the sample thus held positive perceptions about their treatment. Participants were also asked to rate their levels of agreement or disagreement in terms of whether they will have problems if they do not take their blood pressure pills. From the results it is clear that most participants (84%) agreed that they will have problems if they do not take their blood pressure pills (See table 4.3.10 in Appendix A). More precisely, 29.5% strongly agreed and 54.5% agreed with this statement. Only 2.3% disagreed and 1.1% strongly disagreed. 6.8% reported an impartial position and 5.6% did not respond to this

question. In terms of the perceived effectiveness, most patients agree that they need to take their medication to control their blood pressure and if they fail to do so, they will have problems. 61.4% agreed and 29.5% strongly agreed that their blood pressure pills control their blood pressure (See table 4.3.11 in Appendix A). A very small part of the sample, 1.1% strongly disagreed with this argument while only 2.3% reported a neutral view while 5.6% did not complete this question.

Members of the sample were also questioned about their perceptions concerning the benefits their blood pressure pills make towards their health. 26.1% strongly agreed and 51.1% agreed with this account. Only 4.5% disagreed that their medication benefits their health (See table 4.3.12 in Appendix A).

Although hypertension is known to be an asymptomatic illness or 'symptomless' (Edo, 2009; Svensson et al., 2000; Taylor, 2012; Wedro & Stöppler, 2011), participants were questioned about whether they feel better when they take their medication (See table 4.3.13 in Appendix A). 48.9% agreed and 17% strongly agreed while 5.7% disagreed and 1.1% strongly disagreed. It should however be noted that as discussed above, patients may not necessarily feel any physical improvement after taking their medication, but they may experience a sense of feeling better related to their emotional state.

Participants were questioned about the possibility that they have problems finding pills that will control their blood pressure. 47.7% disagreed and 18.2% strongly disagreed that they have problems finding a pill that works for them. Results also show that 6.8% and 5.7% strongly agreed and agreed irrespectively that they are having trouble finding the right medication to control their blood pressure (See table 4.3.14 in Appendix A). 14.8% neither agreed nor disagreed with this statement indicating a neutral position.

4.3.3 Perceived as safe

Patients were asked to rate their agreement concerning their views about how safe their medication is in terms of side effects and subsequent health problems. 34.1% of the sample viewed their side effects from their medication to be problematic, 12.5% strongly agreed and 21.6% agreed that the side effects they experience are a problem. The majority of the sample (37.5%) however disagreed with this statement and 4.5% strongly disagreed. The remaining, 19.3% of the participants responded with a neutral view (See table 4.3.15 in Appendix A). Different medications elicit different side effects and it is therefore possible that patients may also experience these effects differently (Dubiel et al., 2005; Figueiras et al., 2010;

Schousboe, 2009). For some of the patients it may be problematic and for others it is not something of concern. In terms of this sample the larger part seems to disagree that their side effects are problematic, but a large part also agrees that it is. Side effects can hinder effective compliance, as patients may not take their medication due to the unpleasant nature of the side effects (Buelow & Wang, 2006; Dubiel et al., 2005; Figueiras et al., 2010; Harvard University, 2012; Schousboe, 2009).

Apart from asking participants whether they perceived their medication's side effects to be problematic they were also asked about whether they viewed these side effects to be harmful (See table 4.3.16 in Appendix A). 34.1% disagreed, and 6.8% strongly disagreed that these effects are harmful. A large part of the sample, 31.8% remained neutral with regards to this argument and only 5.7% strongly agreed and 17% agreed that the side effects are detrimental to their health. Perceptions about whether the blood pressure medication is safe elicited a general level of agreement, 44.3% agreed and 11.4% strongly agreed that their blood pressure medication is safe (See table 4.3.17 in Appendix A). 33% neither agreed nor disagreed with this account but 4.5% disagreed and 2.3% strongly disagreed that their medication is safe. The smaller 6.8% of the sample thus do not consider their medication to be safe.

Regarding their views that taking their blood pressure pills is not a problem as it benefits their health, 48.9% agreed and 19.3% strongly agreed with this statement (See table 4.3.18 in Appendix A). Only 2.3% of the sample disagreed with this argument while 25% remained impartial with regards to this view. The majority of participants (38.6%) reported a neutral response to the argument that their blood pressure pills cause other health problems (See table 4.3.19 in Appendix A). 27.3% disagreed and 10.2% strongly disagreed, while 15.9% agreed and 3.4% strongly agreed that blood pressure pills cause other health problems.

Patients are often fearful of becoming dependent on their blood pressure medication and due to this they tend to demonstrate poor levels of compliance or they stop taking their medication completely (Buelow & Wang, 2006). Participants were asked about their views concerning this issue and 28.4% agreed compared to 30.7% who disagreed. There is not a large discrepancy between these two levels of agreement, only a 2.3% difference. Results also show that 8% strongly agreed and 6.8% strongly disagreed. The members who held a neutral position constituted 21.6% of the sample (Refer to table 4.3.20 in Appendix A).

In summary to this section the researcher interprets the above results as indicative that the majority of the sample seems to foster positive views about the safety of their medication.

There is however a large number of participants who held neutral views concerning particular arguments and this may suggest certain levels of uncertainty regarding this matter. Generally the current sample appears to perceive their medication as safe. Refer to table below for the means, standard deviation and variance.

Table 1: Descriptive statistics of the MTQ

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
A indicate when the medication is to be taken by marking the appropriate response next to the correct option	85	5.00	.00	5.00	127.00	1.4941	1.32399	1.753
B Please rate how well you generally take your medication by marking the appropriate box	88	7.00	-1.00	6.00	416.00	4.7273	1.94006	3.764
C Please rate how well you were able to take your medication for the past 7 days	88	5.00	-1.00	4.00	298.00	3.3864	1.30808	1.711
1.1 Perceived need - My blood pressure pills keep me from having a stroke	85	5.00	.00	5.00	345.00	4.0588	.91746	.842
1.2 Perceived need - I need to take my blood pressure pills	85	5.00	.00	5.00	363.00	4.2706	.89160	.795
1.3 Perceived need - I take my blood pressure pills for my health	85	5.00	.00	5.00	356.00	4.1882	.98191	.964
1.4 Perceived need - Blood pressure pills keep me from having health-related problems	85	5.00	.00	5.00	325.00	3.8235	1.03713	1.076
1.5 Perceived need - I could have health problems if I do not take my blood pressure pills	85	5.00	.00	5.00	341.00	4.0118	1.09647	1.202
1.6 Perceived need - It's not a problem if I miss my blood pressure pills	85	5.00	.00	5.00	324.00	3.8118	1.13907	1.297
1.7 Perceived need - I would rather treat my blood pressure without pills	85	5.00	.00	5.00	272.00	3.2000	1.27055	1.614
1.8 Perceived need - I am OK if I do not take my blood pressure pills	85	5.00	.00	5.00	317.00	3.7294	1.15870	1.343
2.1 Perceived effectiveness - My blood pressure will come down enough without pills	85	5.00	.00	5.00	314.00	3.6941	1.08038	1.167
2.2 Perceived effectiveness - I will have problems if I don't take my blood pressure pills	84	5.00	.00	5.00	345.00	4.1071	.87836	.772
2.3 Perceived effectiveness - My blood pressure pills control my blood pressure	84	5.00	.00	5.00	353.00	4.2024	.77272	.597
2.4 Perceived effectiveness - Blood pressure pills benefit my health	84	5.00	.00	5.00	336.00	4.0000	.89173	.795
2.5 Perceived effectiveness - I feel better when I take my blood pressure pills	84	5.00	.00	5.00	315.00	3.7500	.94263	.889

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
2.6 Perceived effectiveness - I have problems finding pills that will control my blood pressure	84	5.00	.00	5.00	303.00	3.6071	1.21256	1.470
3.1 Perceived as safe - The side effects from my blood pressure pills are a problem	84	4.00	1.00	5.00	252.00	3.0000	1.16164	1.349
3.2 Perceived as safe - The side effects from my blood pressure pills are harmful	84	4.00	1.00	5.00	269.00	3.2024	1.01530	1.031
3.3 Perceived as safe - My blood pressure pills are safe	84	4.00	1.00	5.00	303.00	3.6071	.85048	.723
3.4 Perceived as safe - Taking my blood pressure pills is not a problem because they benefit my health	84	3.00	2.00	5.00	327.00	3.8929	.74475	.555
3.5 Perceived as safe - My blood pressure pills cause other health problems	84	4.00	1.00	5.00	274.00	3.2619	.98322	.967
3.6 Perceived as safe - I will become dependent on my blood pressure pills	84	4.00	1.00	5.00	252.00	3.0000	1.11938	1.253
Valid N (listwise)	84							

4.4 Psychological factors (self-regulation model) – The IPQ-R

The second measure questioned participants about their perceptions concerning their hypertension and medication taking patterns. This questionnaire is inclined to measure the internal, psychological factors associated with patients' extent of compliance. This section will focus mainly on the descriptive statistics produced by the results while the more complicated inferential statistics will be discussed in later sections.

In relation to what has been discussed in previous chapters, past findings suggest that patients tend to form certain perceptions or ideas about their illness and this is associated with five main components. These categories together comprise patients' views about their illness called illness cognitions (Brewer et al., 2002; Bane et al., 2006; Chen et al., 2009; Dubiel et al., 2005; Figueiras et al., 2010; Horne & Weinman, 1999; Leventhal et al., 1992). These illness cognitions can be regarded as a frame of reference that patients use to make sense of their illness and the associated symptoms. They also use this framework to consider health risks and coping strategies regarding their illness and treatment conditions. The five main categories consist of: identity; consequences; timeline; causes and; cure/controllability. All five these categories are based on each patient's own personal ideas and views about their symptoms, the causes of their illness, how it can be controlled or cured and how long it will persist as well as the consequences involved (Leventhal et al., 1992). The illness-perception questionnaire's revised version (IPQ-R), specifically aimed at hypertension was used to

assess these internal psychological factors related to patients' medication compliance. The questionnaire was grouped into four different sections: views about high blood pressure; the experience of symptoms; views about symptoms and the causes of the illness.

It is also highlighted that the initial sample of 125 participants has decreased to a sample of only 88 participants. This reduction in sample size is due to the fact that missing values or incomplete questionnaires were excluded from the analysis and only those patients diagnosed with hypertension were included in the new sample as this was a requirement of the selection criteria.

4.4.1 Perceived views about high blood pressure (n=88)

The first section focused on patients views about their blood pressure. Questions included asking patients to rate their level of agreement with certain statements such as: "I expect to have this blood pressure for the rest of my life". This section consisted of 26 statements. Participants were asked about whether their blood pressure makes them anxious. 43.2% disagreed with this argument and 13.6% strongly disagreed. Some of the participants, 20.5% agreed that it does contribute to some anxiety with 6.8% strongly agreeing. 15.9% of the sample however neither agreed nor disagreed with this statement (See table 4.4.1 in Appendix A).

The findings show that in terms of the statement, 'I expect to have this high blood pressure for the rest of my life', 17% of the sample strongly agreed while 56.8% agreed with the statements compared to 10.2% who disagreed, and 3.4% who strongly disagreed, with 12.5% indicating a neutral disposition (See table 4.4.2 in Appendix A). Hypertension is known to be a chronic disease, which means that it cannot be cured and can thus only be managed or maintained by means of treatment interventions, either being pharmaceutical or life-style related (Edo, 2009; Taylor, 2012). Knowledge concerning the fact that patients will likely suffer from hypertension for a long time is important as it will require a continual level of compliance, often necessitating certain adjustments to their living conditions (Johnson & Rogers, 2006; McGann et al., 2008; Svensson et al., 2000; Taylor, 2012; WHO, 2003). Based on the data, it appears that most participants realise that they will have high blood pressure for the rest of their life.

Participants were questioned concerning their views about their high blood pressure and how it relates to them emotionally. They were asked to rate the statement "I get depressed when I think about my high blood pressure". Only 5.7% strongly agreed and 11.4% agreed

that they do get depressed when thinking about their high blood pressure. The other part of the sample, 28.4% strongly disagreed and 44.3% disagreed with this statement. A large part of the sample, (72.7%) does not get depressed when thinking about their hypertension (See table 4.4.3 in Appendix A).

The statement, "I go through cycles in which my blood pressure gets better and worse" was provided and participants were requested to rate their level of agreement. 9.1% of the sample strongly agreed, and 39.8% agreed that they do experience better and worse cycles with their high blood pressure. 17% of the participants neither agreed nor disagreed with the argument but 25% strongly disagreed and 8% disagreed that they go through cycles with their high blood pressure, possibly indicating a stable level of blood pressure control (See table 4.4.4 in Appendix A). Participants were also questioned about whether their blood pressure causes problems for the people close to them. Taylor (2012) stated that social support is a very important resource for improving compliance, especially with illnesses such as hypertension. Most of the participants (47.7%) disagreed that their blood pressure causes problems for those around them and 29.5% strongly disagreed in this regard. Only 4.5% strongly agreed and 6.8% agreed that their illness may be causing problems for others. 11.4% remained impartial concerning this matter (See table 4.4.5 in Appendix A).

Treatments, whether it be pharmaceutical or therapy related, has financial implications for patients. It is often the case that patients are unable to afford certain medications and for this reason they do not comply with their treatment regimens or they only choose to comply with those they can afford (Buelow & Wang, 2006; Dubiel et al., 2005; Figueiras et al., 2010; Schousboe,2009; Taylor, 2012). 10.2% strongly agreed and 18.2% agreed that their blood pressure does elicit certain financial consequences. 15.9% of the sample neither agreed nor disagreed with this statement while 36.4% disagreed with this account (See table 4.4.6 in Appendix A). Other members of the sample, 18.2% strongly disagreed, maintaining that their blood pressure does not have serious financial consequences.

Participants were questioned about whether they have the power to influence their blood pressure. 17% strongly agreed and 52.3% agreed that they do have the ability to influence their blood pressure (Refer to table 4.4.7 in Appendix A). Some of the participants, 15.9% disagreed and a smaller 5.7% strongly disagreed, indicating that they do not consider themselves able to influence their blood pressure. In terms of considering their high blood pressure a serious condition, 53.4% agreed and 21.6% strongly agreed with this matter (Refer

to table 4.4.8 in Appendix A). 15.9% of the sample disagreed and only 1.1% strongly disagreed, indicating that they do not view their blood pressure as a serious illness.

Participants were asked about their level of agreement in terms of whether the course of their blood pressure depends on them (See table 4.4.9 in Appendix A). Referring to the results, 42% agreed with this argument and 15.9% strongly agreed compared to 23.9% who disagreed that the course of their blood pressure is dependent on them. 8% strongly disagreed while 9.1% neither agreed nor disagreed with this statement. A patient's blood pressure levels are largely dependent on his/her level of compliance, which is related to the notion that the course of his/her blood pressure is ultimately in the hands of the patient.

The sample's understanding of the timeline related to their condition was also questioned. Hypertension is generally accepted to be a permanent rather than a temporary condition. The chronic nature of the disease does not lend itself towards temporary treatment, but rather requires a life-long commitment to ones medication (Edo, 2009; Johnson & Rogers, 2006; Schousboe, 2009; Svensson et al., 2000; Taylor, 2012; WHO, 2003). Overall it appears that the majority (62.5%) agrees that it is a permanent condition while only 11.4% disagrees and 3.4% strongly disagrees with this time related account (See table 4.4.10 in Appendix A).

Participants' level of agreement in terms of viewing their blood pressure as unpredictable was also questioned. The larger part of the sample, 42% disagreed with this account and 12.5% strongly disagreed that they find their blood pressure to be unpredictable. 21.6% agreed while another 21.6% of the participants reported a neutral position, neither agreeing nor disagreeing. Only 1.1% of the participants stated that they strongly agree that their blood pressure is unpredictable (See table 4.4.11 in Appendix A).

Views about the feelings associated with high blood pressure were also questioned. Participants were asked to rate their level of agreement with the statement, "My high blood pressure makes me feel afraid". 44.3% disagreed with this statement and 19.3% strongly disagreed. Some of the participants, 9.1% agreed that their blood pressure does make them feel afraid and 5.7% strongly agreed with this argument. 21.6% however reported neither agreeing nor disagreeing with this statement (See table 4.4.12 in Appendix A). In terms of whether their high blood pressure makes them feel angry, 50% disagreed and 20.5% strongly disagreed. Only a small number of participants 4.5% agreed that their blood pressure makes them feel angry and 5.7% strongly agreed in this regard (See table 4.4.13 in Appendix A). Impartial views were also evident as 18.2% of the sample neither agreed nor disagreed. Participants indicated their views about how their blood pressure affects others' perceptions

of them, more specifically how others see them. Based on the results, 45.5% of the participants disagreed, and 29.5% strongly disagreed that their blood pressure affects others' view of them. 17% of the sample however remained neutral on the matter, neither agreeing nor disagreeing (See table 4.4.14 in Appendix A).

The following statement, "My high blood pressure will improve in time" is similar to the previous statement about whether participants view their blood pressure to be permanent or temporary. As noted above, hypertension is considered to be a chronic condition and as such it can only be managed and maintained by means of pharmaceutical treatments, but it cannot be cured (Edo, 2009; Lehane & McCarthy, 2007; Steyn et al., 2001). It may thus be possible for patients' blood pressure to improve in the sense that it is controlled and stable, but not to the extent that it justified to stop medication treatment. Reviewing the data, it is clear that most of the participants, 31.8% neither agreed nor disagreed with this statement. It is thus inferred that the majority of the sample may not be certain as to whether their blood pressure pills improve their condition and to what extent (See table 4.4.15 in Appendix A). High blood pressure does affect the patient's everyday life, as it may necessitate certain lifestyle changes such as exercise, dieting, stop smoking or it may involve taking medication on a daily basis. The consequences of high blood pressure on patients' lives were questioned, and most of the participants 36.4% disagreed that their blood pressure has major consequences on their lives (See table 4.4.16 in Appendix A). Some, 20.5% agreed, indicating that they perceive their blood pressure as having an effect on their lives.

Participants were also asked about their views concerning how they can affect their blood pressure in terms of whether their actions determine the cycle of their blood pressure. Participants mostly (56.8%) agreed with this argument, confirming that they perceive their actions to determine whether their blood pressure gets better or worse. Only a few members of the sample disagreed with this statement (11.4%) and only 1.1% strongly disagreed, maintaining that their blood pressure is independent of their actions (See table 4.4.17 in Appendix A).

The chronic aspect of hypertension was further queried where participants were requested to rate their agreement or disagreement with the statement that their blood pressure will last for a long time. It is important for patients to acknowledge the persistent course of hypertension and based on the findings, 53.4% agreed that their condition will last for a long time (See table 4.4.18 in Appendix A). Perceptions about the effectiveness of their treatment were investigated and 62.5% of the sample agreed that their treatment can control their blood

pressure. 22.7% reported strongly agreeing with this statement (See table 4.4.19 in Appendix A). Similarly, participants were asked about the curability of their hypertension and 38.6% disagreed that their treatment will be effective in curing their blood pressure. Hypertension is not considered to be 'curable' in the sense that after a certain period of treatment it will improve to a degree that would allow patients to stop taking their medication. It is a chronic illness and as such the treatment can only manage the blood pressure levels but it cannot cure the illness (Edo, 2009; Johnson & Rogers, 2006; Svensson et al., 2000; Taylor, 2012). Only 22.7% of the participants agreed with the account that their treatment can cure their blood pressure. (See table 4.4.20) Thinking about their blood pressure does not seem to impact the majority of the sample as most (51.1%) disagreed with the statement "thinking about my blood pressure upsets me" (See table 4.4.21 in Appendix A). Understanding their high blood pressure and their perceptions about their condition is important. 53.4% of the participants considered themselves as having a clear picture and understanding of their high blood pressure levels while 20.5% neither agreed nor disagreed with this account (See table 4.4.22 in Appendix A). Most participants (59.1%) also agreed that the negative effects of their blood pressure can be prevented by their treatment (See table 4.4.23 in Appendix A).

In conclusion to this section it is highlighted that participants generally hold positive perceptions regarding the effectiveness of their medication. The data also suggest that the majority of participants understand the effects of their actions on their blood pressure and they also seem to acknowledge the need for taking their blood pressure pills. The chronic nature of hypertension may be an area where some participants demonstrate uncertainty as to whether their condition will be cured or improved. As discussed, hypertension is a condition that requires a long-term commitment to treatment regimens and it is necessary for patients to be well informed concerning this matter.

4.4.2 Perceptions about experienced symptoms

The second section focused on the symptoms patients may have experienced in terms of the identity domain. These symptoms include pain; sore throat; nausea; breathlessness; weight loss; fatigue; stiff joints; sore eyes; wheeziness; headaches; upset stomach; sleep difficulties; dizziness; loss of strength; loss of libido; impotence; feeling flushed; fast heart rate and pins and needles. This subdivision asked patients to state whether they have experienced a particular symptom recently and whether this symptom is related to their

illness or medication. There were 19 symptoms and they had to report yes, no or don't know to each follow up question. A brief overview of the findings is given below.

The symptom pain was listed and the majority of the sample 75% stated they have not experienced pain recently, while 23.9% indicated that they have. From the 23.9% that indicated that they have experienced this symptom, 9.1% found it to be related to their high blood pressure and 4.5% stated that it is related to their medication. In terms of whether the symptom is related to their blood pressure or their medication, 15.9% reported that they did not know. Another 6.8% of the sample experienced the symptom pain but found it to be unrelated to their illness and 15.9% indicated that it is unrelated to their medication (See tables 4.4.24 A, B and C). The next symptom, sore throat, revealed that 76.1% have not experienced this symptom, only 22.7% reported that they have but no one found it to be related to their high blood pressure, 13.6% stated no to this statement. Of those who have experienced this symptom, 15.9% stated that it is unrelated to their medication (See tables 4.4.25 A, B and C). The majority of participants, 79.5% reported that they have not experienced nausea; only 18.2% indicated that they have. The participants who indicated that they have been nauseous recently generally did not find this symptom to be related to either their blood pressure or medication, as 15.9% said no to both these questions. A minor 3.4% however found it to be related to their high blood pressure (See tables 4.4.26 A, B and C). Breathlessness has been experienced by 28.4% compared to 69.3% who denied experiencing this symptom recently. In terms of whether this symptom is related to their high blood pressure, 8% reported yes, and only 3.4% indicated that it is related to their medication (See tables 4.4.27 A, B and C).

Weight loss has been experienced by 15.9% of participants, but only 1.1% found it to be related to their high blood pressure but no one reported that it is related to their medication as 11.4% stated no in this regard (See tables 4.4.28 A, B and C). Fatigue appears to be more common, 51.1% have experienced this symptom recently. In relation to this, 12.5% reported that it is related to their high blood pressure and 5.7% viewed it to be related to their medication (See table 4.4.29 A, B and C). Stiff joints also seems to be more prevalent with 55.7% experiencing this symptom but only 1.1% found it to be related to their high blood pressure. Based on the findings, 18.2% reported that it is not related to their medication while 29.5% did not know whether it is medication related or not (See tables 4.4.30 A, B and C).

Sore eyes was experienced by 34.1% of the participants with 3.4% reporting it to be related to their high blood pressure and 3.4% reporting it to be linked to their medication (See

tables 4.4.31 A, B and C). Wheeziness has been reported by 21.6% of the sample and 1.1% stated that it is linked to their high blood pressure and 3.4% to their medication (See tables 4.4.32 A, B and C). Headaches is also a symptom commonly experienced with 48.9% stating that they have experienced headaches recently and 20.5% of those who have experienced headaches, perceives it to be connected to their high blood pressure whereas only 3.4% views it to be related to their medication (See tables 4.4.33 A, B and C). Only 20.5% of the participants noted that they have experienced an upset stomach recently, with 1.1% linking it to their high blood pressure. The members of the sample did however not report any connection between an upset stomach and their medication (See tables 4.4.34 A, B and C).

Sleep difficulties were reported by 36.4% of the sample and only 2.3% found it to be related to their high blood pressure, but no connection between sleep difficulties and medication was reported (See tables 4.4.35 A, B and C). Dizziness was reported by 35.2%; with 12.5% linking it to their high blood pressure and 4.5% relating it to their medication (See tables 4.4.36 A, B and C). Feelings of loss of strength was reported by 44.3% of participants and 5.7% stated that it is connected to their high blood pressure compared to 3.4% who found it to be linked to their medication (See tables 4.4.37 A, B and C). Loss of libido was reported by 40.9% of the sample with 9.1% finding it to be connected to their high blood pressure and 15.9% to their medication (See tables 4.4.38 A, B and C). Similarly impotence was reported by 18.2% of participants and 10.2% viewed this to be related to their high blood pressure and 6.8% considered it to be linked to their medication (See tables 4.4.39 A, B and C). Some of the participants, 26.1%, reported feeling flushed and 9.1% indicated it to be linked to their high blood pressure while 3.4% found it to be related to their medication (See tables 4.4.40 A, B and C).

Experiencing a fast heart rate was reported by 29.5% of participants and 14.8% viewed this to be connected to their high blood pressure with only 5.7% finding it to be related to their medication (See tables 4.4.41 A, B and C). Lastly, the sensation of “pins and needles” was experienced by 27.3% of the sample. Only 3.4% reported perceiving this to be related to their high blood pressure compared to 1.1% who noted that it was liked to their medication regimens (See tables 4.4.42 A, B and C).

A section asking patients to write down any additional symptoms they may have experienced were also included. Participants were also asked to indicate whether it is related to their medication or blood pressure (See tables 4.4.43A and B). Some of the symptoms are listed in table 2 below.

Table 2: Additional symptoms experienced by participants

	Frequency	Percent	Cumulative Percent
Valid	63	71.6	71.6
Asthma related to taking Ziak I think. Have just stopped	1	1.1	72.7
Blocks in front of eyes difficulty in seeing - high blood pressure	1	1.1	73.9
Blood pressure dropped considerably lately and I have since reduced my tablets to only 50% of the prescribed dosage.	1	1.1	75.0
Burning leg pain	1	1.1	76.1
burning sensation in my feet at night	1	1.1	77.3
Cough	1	1.1	78.4
Cramps in my legs I think due to water retention	1	1.1	79.5
Cramps in the legs and feet	1	1.1	80.7
Enige infeksie verhoog die bloeddruk, die gevolg is 'n verlies aan elektroliete veral sout. Dit maak my geweldig mislik sodat ek niks kan inneem en niks wil ook uitkom nie. (Any infection increases the blood pressure, resulting in loss of electrolytes such as salt. This makes me very irritable and contributes to other difficulties)	1	1.1	81.8
High pulse rate pain in the lower throat	1	1.1	83.0
I am not diagnosed. The high BP was due to the loss of my mother. I did not receive any medication and BP is back to normal 118/76	1	1.1	84.1
I am not taking any medicine yet	1	1.1	85.2
I do not have high blood pressure	1	1.1	86.4
I have been suffering non-stop with sinusitis for many years and I believe is since I started taking the hypertension medicine. In the mornings I experience mucus in my throat leading to coughing	1	1.1	87.5
leg cramps	1	1.1	88.6
Occasionally hear squirting at heartbeat rhythm	1	1.1	95.5
quick to get upset/angry with others and I think it is because of my high blood pressure.	1	1.1	96.6
ringing sound in my ears, loss of vision	1	1.1	97.7
Sensitive skin, bruise easily. Bleeds very easily, nose bleeds	1	1.1	98.9
When I took Renitec I used to have a persistent cough Frequent urination with the current medication	1	1.1	100.0
Total	**88**	**100.0**	

Another part of this section included asking patients about the symptoms they found to be related to their blood pressure. Patients were requested to state whether they agreed or disagreed with the statements based on their related symptoms. Only three statements were given “there is a lot which I can do to control my blood symptoms; my symptoms come and

go in cycles and; the symptoms of my high blood pressure change a great deal from day to day.

In terms of the first statement, 47.7% agreed that there is a lot which they can do to control their symptoms (See table 4.4.44 in Appendix A). Although 8% of participants disagreed, the data suggest that the majority of the sample consider themselves to be responsible for controlling their symptoms. The second statement questioned the cycle of the symptoms (See table 4.4.45 in Appendix A). The findings revealed that, 23.9% agreed that their symptoms come and go in cycles compared to 26.1% who disagreed. As extensively highlighted, hypertension is considered to be a 'symptomless' illness and it is therefore difficult to relate the experience of these symptoms directly to the condition (Taylor, 2012). Members of the sample however reported that there are symptoms that come and go. Regarding the changes of these symptoms on a day to day basis, 12.5% agreed that their symptoms change a great deal, while 30.7% disagreed with this argument (See table 4.4.46 in Appendix A).

4.4.3 Perceived causes

The last section of the questionnaire focused on patients' perceived causes of their hypertension. This division consisted of 18 statements asking patients to indicate their extent of agreement or disagreement. Items included listing possible causes such as 'stress or worry'.

Stress and worry is known to be a common contributing factor to the development of hypertension (Taylor, 2012). Participants were asked to rate their level of agreement and based on the results 52.3% of the sample agreed and 23.9% strongly agreed that stress and worry are possible causes of their hypertension (See table 4.4.47 in Appendix A).

Regarding the aspect of heredity, most participants, (72.8%) agreed (48.9% agreed and 23.9% strongly agreed) that genetic factors are involved in causing hypertension (See table 4.4.48 in Appendix A). Research shows that hypertension is hereditary and genetic factors are implicated in the development of the condition (Edo, 2009; Kaplan, 2006; Taylor, 2012). Identifying people at risk of developing hypertension can be targeted and changes could be implemented in order to improve their health habits. This will decrease their vulnerability to develop hypertension as well as subsequent health problems. Early intervention may prevent the need for pharmaceutical treatment thereby eliminating the problems associated with compliance (Taylor, 2012).

A germ or virus as possible causes of hypertension was also listed and 45.5% disagreed while 26.1% strongly disagreed with this statement (See table 4.4.49 in Appendix A). Essential hypertension is diagnosed in the majority of cases and this type of hypertension usually results from an unknown cause. Secondary hypertension is less common and may be the result of kidney failures (Edo, 2009; Taylor, 2012; Taylor, 2012; Wedro & Stöppler, 2011). The majority of the sample realise that hypertension is unlikely to be caused by a germ or virus. Most participants, 45.5%, agreed and 18.2% strongly agreed that one's diet and eating habits can contribute to causing hypertension. Only 11.4% of participants disagreed that dieting and eating habits are plausible causes (See table 4.4.50 in Appendix A).

Chance or bad luck as possible causes of hypertension revealed that 72.7% of participants disagreed (34.1% disagreed and 38.6% strongly disagreed) that these factors are connected to high blood pressure. Some members of the sample, 3.4% did however agree that chance or bad luck can play a role in causing hypertension (See table 4.4.51 in Appendix A). Other causes involved poor medical care in the past, but the majority of the sample, 34.1% disagreed and 23.9% strongly disagreed that this factor is linked to the condition. Agreement was however reported by 17% of the sample (See table 4.4.52 in Appendix A).

Pollution in the environment as a possible cause of high blood pressure showed only minimal levels of agreement with 8% agreeing that it can possibly result in elevated blood pressure levels. The larger part of the sample, 34.1% however disagreed and 26.1% strongly disagreed that pollution can cause high blood pressure. 21.6% of the participants neither agreed nor disagreed with this statement (See table 4.4.53 in Appendix A).

Another possible cause of hypertension included asking patients to agree or disagree with the factor – my own behaviour. Most of the participants (45.5%) agreed that their behaviour can cause high blood pressure, compared to 22.7% who disagreed (See table 4.4.54 in Appendix A). Similarly, participants were asked whether they perceive their mental attitude, such as thinking negatively, to contribute to causing high blood pressure (See table 4.4.55 in Appendix A). Based on the findings it appears that 38.6% of the sample disagreed while only 20.5% agreed that one's mental attitude can lead to high blood pressure.

In conjunction with stress and worry, family problems may also play a role in causing hypertension (Taylor, 2012). In relation to this, 36.4% agreed that family problems can increase blood pressure levels while 28.4% disagreed with this factor as a possible cause (See table 4.4.56 in Appendix A). Overworked falls within the same category as stress and worry and 44.3% of participants reported this as a possible cause of high blood pressure. Another

23.9% however disagreed that being overworked can cause high blood pressure (See table 4.4.57 in Appendix A).

An individual's emotional state as a possible cause for high blood pressure can be linked to the factor of negative thinking, stress and worry. The majority of the sample (34.1%) disagreed that this may be a possible cause of high blood pressure but 31.8% agreed that it may be a reasonable cause of the condition (See table 4.4.58 in Appendix A).

Hypertension is generally known to become more prevalent with age and it has been indicated that males are more at risk prior to the age of 50 while after the age of 55 both males and females are at similar risk levels for the development of high blood pressure (Steyn et al., 2001; Taylor, 2012). It is not uncommon for the condition to be diagnosed in younger individuals, but it usually becomes an expected problem as age increases. As a possible cause for hypertension, 40% of participants agreed, considering ageing an important causal factor. Some participants, 13.6%, however disagreed compared to the 56.8% who agreed with this argument (See table 4.4.59 in Appendix A). Alcohol is also recognized to be a risk factor in the development of hypertension (Goel, 2004). It is suggested that although alcohol might not be a direct cause of high blood pressure, the increased calories and overeating accompanying alcohol intake, might lead to high blood pressure. Goel (2004) thus argues that alcohol indirectly causes high blood pressure. Regarding participants' views of alcohol as a possible cause, 27.3% disagreed and 20.5% strongly disagreed with this argument. A part of the sample, 26.1% did however agree that alcohol can be a contributing factor to the development of high blood pressure (See table 4.4.60 in Appendix A).

Smoking is another risk factor for the development of subsequent health problems, including high blood pressure. Zahler and Piselli (n.d.) stated that smoking itself is considered to increase the likely development of heart disease, but smoking combined with other risk factors such as high blood pressure aggravates the diagnosis even more. These authors emphasises that "when smoking is combined with these factors...the total risk exceed(s) the sum of the individual risks...[which] can triple a person's risk of heart disease" (Zahler & Piselli, n.d., p.72).

The majority of the sample (29.5%) strongly disagreed and 28.4% disagreed that smoking is a possible cause for high blood pressure (See table 4.4.61 in Appendix A). Only 17% of the sample expressed agreement that smoking can be a potential cause for hypertension. Views about accidents or injuries as possible risk factors for the development of high blood pressure revealed that 38.6% disagreed and 26.1% strongly disagreed with this statement (See table

4.4.62 in Appendix A). A smaller 10.2% agreed that accidents or injuries might be possible causes for high blood pressure. Participants were asked to rate their level of agreement concerning the factor, my personality, as a possible cause for high blood pressure. The results show that 31.8% disagreed and 19.3% strongly disagreed, compared to 23.9% who agreed with this statement (See table 4.4.63 in Appendix A). The majority of the sample thus does not consider their personality to be a cause for their high blood pressure.

Lastly participants were asked whether they consider their poor immune system to play a role in the development of hypertension. The data showed that 39.8% disagreed and 19.3% strongly disagreed that your poor immune system can lead to high blood pressure. Some of the participants, 13.6%, agreed that a poor immune system might play a role in the development of hypertension while 14.8% remained impartial concerning this factor's causal contribution (See table 4.4.64 in Appendix A).

Participants were also asked to write down any other possible causes not listed in the above questions that they consider to be influential in the development of hypertension. Most participants however wrote down factors that were questioned as part of the IPQ-R. (See table 4.4.65 in Appendix A).

In conclusion to this section, the researcher discussed the IPQ-R which is a measure designed to assess participants' illness perceptions concerning their physiological experience of the illness i.e. their symptoms; perceptions of the expected consequences of the illness; whether the illness is considered chronic or acute, stable or cyclical; possible causes of the illness and; lastly the aspect of whether the illness can be treated or managed (Broadbent, 2010; Chen et al., 2009; Hekler et al., 2008; Johsnon & Rogers., 2006, Kemp et al., 2007; Leventhal et al., 1992). The results showed that participants generally seemed informed about what caused their condition and also about the symptoms involved, despite the symptomless aspect of the illness. Table 3 below provides the mean, standard deviation and variance of each of the possible causes.

Table 3: Descriptive statistics for the IPQ-R

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
IPQ1 Having this high blood pressure makes me feel anxious	88	4.00	1.00	5.00	232.00	2.6364	1.15651	1.338
IPQ2 I expect to have this high blood pressure for the rest of my life	88	4.00	1.00	5.00	329.00	3.7386	.97667	.954

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
IPQ3 I get depressed when I think about my high blood pressure	88	4.00	1.00	5.00	195.00	2.2159	1.14920	1.321
IPQ4 I go through cycles in which my high blood pressure gets better and worse	88	5.00	.00	5.00	276.00	3.1364	1.19560	1.429
IPQ5 My high blood pressure causes difficulties for those who are close to me	88	4.00	1.00	5.00	184.00	2.0909	1.04646	1.095
IPQ6 My high blood pressure has serious financial consequences	88	5.00	.00	5.00	231.00	2.6250	1.28932	1.662
IPQ7 I have the power to influence my high blood pressure	88	4.00	1.00	5.00	316.00	3.5909	1.12072	1.256
IPQ8 My high blood pressure is a serious condition	88	5.00	.00	5.00	327.00	3.7159	1.14419	1.309
IPQ9 The course of my high blood pressure depends on me	88	5.00	.00	5.00	291.00	3.3068	1.28079	1.640
IPQ10 My high blood pressure is likely to be permanent rather than temporary	88	4.00	1.00	5.00	325.00	3.6932	.95120	.905
IPQ11 My high blood pressure is very unpredictable	88	5.00	.00	5.00	223.00	2.5341	1.03889	1.079
IPQ12 My high blood pressure makes me feel afraid	88	4.00	1.00	5.00	209.00	2.3750	1.07546	1.157
IPQ13 My high blood pressure makes me feel angry	88	5.00	.00	5.00	195.00	2.2159	1.04440	1.091
IPQ14 My high blood pressure strongly affects the way others see me	88	5.00	.00	5.00	178.00	2.0227	.98234	.965
IPQ15 My high blood pressure will improve in time	88	5.00	.00	5.00	252.00	2.8636	1.13646	1.292
IPQ16 My high blood pressure has major consequences on my life	88	5.00	.00	5.00	256.00	2.9091	1.30107	1.693
IPQ17 What I do can determine whether my high blood pressure gets better or worse	88	4.00	1.00	5.00	328.00	3.7273	.89349	.798
IPQ18 My high blood pressure will last for a long time	88	4.00	1.00	5.00	317.00	3.6023	.92897	.863
IPQ19 My treatment can control my high blood pressure	88	4.00	1.00	5.00	350.00	3.9773	.85739	.735
IPQ20 My treatment will be effective in curing my high blood pressure	88	5.00	.00	5.00	283.00	3.2159	1.06619	1.137
IPQ21 When I think about my high blood pressure I get upset	88	5.00	.00	5.00	196.00	2.2273	1.09047	1.189
IPQ22 I have a clear picture or understanding of my high blood pressure	88	5.00	.00	5.00	327.00	3.7159	.94624	.895
IPQ23 The negative effects of my high blood pressure can be prevented (avoided) by my treatment	88	5.00	.00	5.00	324.00	3.6818	1.06723	1.139
IPQ24 Pain (I have experienced this symptom recently)	88	2.00	.00	2.00	153.00	1.7386	.46718	.218
IPQ25 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	88	3.00	.00	3.00	47.00	.5341	1.00515	1.010
IPQ26 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	88	3.00	.00	3.00	47.00	.5341	.95831	.918

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
IPQ27 Sore Throat (I have experienced this symptom recently)	88	2.00	.00	2.00	154.00	1.7500	.46113	.213
IPQ28 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	88	3.00	.00	3.00	54.00	.6136	1.09787	1.205
IPQ29 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	88	3.00	.00	3.00	50.00	.5682	1.02605	1.053
IPQ30 Nausea (I have experienced this symptom recently)	88	2.00	.00	2.00	156.00	1.7727	.47288	.224
IPQ31 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	88	3.00	.00	3.00	39.00	.4432	.96916	.939
IPQ32 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	88	3.00	.00	3.00	43.00	.4886	1.02827	1.057
IPQ33 Breathlessness (I have experienced this symptom recently)	88	2.00	.00	2.00	147.00	1.6705	.51910	.269
IPQ34 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	25	2	1	3	54	2.16	.850	.723
IPQ35 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	24	2	1	3	56	2.33	.702	.493
IPQ36 Weight Loss (I have experienced this symptom recently)	88	1.00	1.00	2.00	162.00	1.8409	.36786	.135
IPQ37 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	17	2	1	3	39	2.29	.588	.346
IPQ39 Fatigue (I have experienced this symptom recently)	88	2.00	.00	2.00	127.00	1.4432	.54368	.296
IPQ40 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	88	3.00	.00	3.00	101.00	1.1477	1.30022	1.691
IPQ41 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	88	3.00	.00	3.00	95.00	1.0795	1.30623	1.706
IPQ42 Stiff Joints (I have experienced this symptom recently)	88	2.00	.00	2.00	123.00	1.3977	.53691	.288
IPQ43 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	49	2	1	3	126	2.57	.540	.292
IPQ44 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	42	1	2	3	110	2.62	.492	.242
IPQ45 Sore Eyes (I have experienced this symptom recently)	88	2.00	.00	2.00	144.00	1.6364	.50700	.257
IPQ46 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	88	3.00	.00	3.00	81.00	.9205	1.31500	1.729
IPQ47 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	88	3.00	.00	3.00	67.00	.7614	1.21290	1.471

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
IPQ48 Wheeziness (I have experienced this symptom recently)	88	2.00	.00	2.00	155.00	1.7614	.45472	.207
IPQ49 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	19	2	1	3	51	2.68	.582	.339
IPQ50 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	20	2	1	3	50	2.50	.761	.579
IPQ51 Headaches (I have experienced this symptom recently)	88	2.00	.00	2.00	129.00	1.4659	.54560	.298
IPQ52 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	88	3.00	.00	3.00	88.00	1.0000	1.19385	1.425
IPQ53 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	37	2	1	3	91	2.46	.650	.422
IPQ54 Upset Stomach (I have experienced this symptom recently)	88	2.00	.00	2.00	156.00	1.7727	.44791	.201
IPQ55 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	21	2	1	3	51	2.43	.598	.357
IPQ56 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	19	1	2	3	46	2.42	.507	.257
IPQ57 Sleep Difficulties (I have experienced this symptom recently)	88	1.00	1.00	2.00	144.00	1.6364	.48380	.234
IPQ58 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	33	2	1	3	84	2.55	.617	.381
IPQ59 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	33	1	2	3	83	2.52	.508	.258
IPQ60 Dizziness (I have experienced this symptom recently)	88	1.00	1.00	2.00	145.00	1.6477	.48042	.231
IPQ61 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	31	2	1	3	68	2.19	.946	.895
IPQ62 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	29	2	1	3	69	2.38	.728	.530
IPQ63 Loss of Strength (I have experienced this symptom recently)	88	2.00	.00	2.00	135.00	1.5341	.52411	.275
IPQ64 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	40	2	1	3	97	2.43	.712	.507
IPQ65 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	34	2	1	3	84	2.47	.662	.439
IPQ66 Loss of Libido (I have experienced this symptom recently)	88	2.00	.00	2.00	138.00	1.5682	.52073	.271
IPQ67 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	37	2	1	3	86	2.32	.818	.670

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
IPQ68 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	32	2	1	3	61	1.91	.893	.797
IPQ69 Impotence (I have experienced this symptom recently)	88	2.00	.00	2.00	148.00	1.6818	.59780	.357
IPQ70 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	18	2	1	3	33	1.83	.924	.853
IPQ71 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	16	2	1	3	34	2.13	.957	.917
IPQ72 Feeling Flushed (I have experienced this symptom recently)	88	1.00	1.00	2.00	153.00	1.7386	.44190	.195
IPQ73 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	24	2	1	3	51	2.13	.900	.810
IPQ74 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	22	2	1	3	50	2.27	.703	.494
IPQ75 Fast Heart Rate (I have experienced this symptom recently)	88	1.00	1.00	2.00	150.00	1.7045	.45886	.211
IPQ76 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	27	2	1	3	51	1.89	.934	.872
IPQ77 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	25	2	1	3	58	2.32	.802	.643
IPQ78 Pins and Needles (I have experienced this symptom recently)	88	2.00	.00	2.00	150.00	1.7045	.48326	.234
IPQ79 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	26	2	1	3	70	2.69	.679	.462
IPQ80 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	23	2	1	3	62	2.70	.559	.312
IPQ82 If answer is YES: - This symptom is related to my HIGH BLOOD PRESSURE	16	2	1	3	30	1.88	.885	.783
IPQ83 If answer is YES: - This symptom is related to the MEDICINE I take for my high blood pressure	88	3.00	.00	3.00	25.00	.2841	.71033	.505
IPQ84 There is a lot which I can do to control my symptoms	87	5.00	.00	5.00	258.00	2.9655	1.68059	2.824
IPQ85 My symptoms come and go in cycles	87	5.00	.00	5.00	192.00	2.2069	1.61489	2.608
IPQ86 The symptoms of my high blood pressure change a great deal from day to day	87	5.00	.00	5.00	176.00	2.0230	1.56247	2.441
IPQ87 Stress or worry	86	5.00	.00	5.00	321.00	3.7326	1.28726	1.657
IPQ88 Hereditary - it runs in my family	86	5.00	.00	5.00	318.00	3.6977	1.29315	1.672
IPQ89 A Germ or virus	86	5.00	.00	5.00	313.00	3.6395	1.46257	2.139
IPQ90 Diet or eating habits	86	5.00	.00	5.00	294.00	3.4186	1.40976	1.987
IPQ91 Chance or bad luck	86	5.00	.00	5.00	325.00	3.7791	1.52162	2.315
IPQ92 Poor medical care in my past	86	5.00	.00	5.00	179.00	2.0814	1.24820	1.558

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
IPQ93 Pollution in the environment	86	5.00	.00	5.00	306.00	3.5581	1.39414	1.944
IPQ94 My own behaviour	86	5.00	.00	5.00	253.00	2.9419	1.41716	2.008
IPQ95 My mental attitude e.g. thinking about life negatively	86	5.00	.00	5.00	200.00	2.3256	1.30557	1.705
IPQ96 Family problems or worries	86	5.00	.00	5.00	241.00	2.8023	1.37044	1.878
IPQ97 Overwork	86	5.00	.00	5.00	253.00	2.9419	1.40046	1.961
IPQ98 My emotional state e.g. feeling down, lonely, anxious, empty	86	5.00	.00	5.00	237.00	2.7558	1.37144	1.881
IPQ99 Ageing	86	5.00	.00	5.00	267.00	3.1047	1.35498	1.836
IPQ100 Alcohol	86	5.00	.00	5.00	205.00	2.3837	1.30311	1.698
IPQ101 Smoking	86	5.00	.00	5.00	187.00	2.1744	1.42409	2.028
IPQ102 Accident or injury	86	5.00	.00	5.00	302.00	3.5116	1.48518	2.206
IPQ103 My personality	86	5.00	.00	5.00	272.00	3.1628	1.49399	2.232
IPQ104 Poor immune system	86	5.00	.00	5.00	289.00	3.3605	1.45451	2.116
Valid N (listwise)	0							

Illness perceptions play an important defining role in how patients go about treating their illness as well as the extent to which they comply with their medication instructions (Clifford et al., 2006; Hagger & Orbell, 2003; Kemp et al., 2007; Schousboe, 2009). Based on these findings, the researcher tentatively concludes that patients' views of their hypertension as well as their medication use did not appear to influence their degree of compliance. From the sample (n=88), the majority of participants, 53.4% demonstrated satisfactory levels of compliance on a general level compared to the poor compliance levels of 40.9% of the sample. Compliance thus appears to be high despite participants' erroneous views concerning their illness and mediation regimens.

Taking into account the medication-taking patterns of participants over the last seven days, 77.3% demonstrated satisfactory levels of compliance while only 15.9% reported poor ability to take their medication as they should. The high compliant rate may however be due to the self-administered questionnaire, allowing participants to distort their true compliant behaviour. This is a well known problem of self-report measures and as such different approaches to measurement are often used. Due to ethical factors however, the researcher was restricted to the use of self-administered questionnaires. Based on the data it is possible that the subjective account of their compliant behaviour resulted in participants overestimating their compliance. Overestimation can then also relate to factors such as an

inability to recall whether one took one's medication (Lehane & McCarthy, 2007; World Health Organization, 2003). It is however also possible that the higher rates in compliance can be ascribed to patients' ability to recall recent medication-taking patterns better than how they generally take their medication. The past seven days might have been easier to recall, thus accounting for the substantial improvement in compliance.

Adherence was also measured by excluding the past seven day's ratings. General compliance was considered to be a more accurate indication of compliance and a new variable, adherence was constructed, by assigning a 1 to all those who complied with their medication regimens and a 0 to those who did not. Results revealed that 53.4% of participants were compliant to their prescribed treatments while 40.9% was not.

4.5 Correlations between the research variables

This section will include a discussion about the correlations found between how patients take their medication and patients' perceptions about their illness and prescribed medication regimens. Here the focus will be on the inferential procedures performed on the results, specifically correlational analysis and regression analysis. The data was also coded and re-coded where necessary and additional statistical analysis was performed including: reliability analysis, factor analysis and chi-square analysis. The results will mainly focus on the relationships found between medication compliance and the psychological factors. Factor analysis was performed to reduce data dimension. Additionally the researcher also attempted to identify relations between the newly constructed factors using regression analysis.

As discussed, the MTQ measured patients' medication compliance as well as their perceptions regarding their medication, while the IPQ-R specifically measured patients' illness cognitions. The MTQ included two questions measuring compliance, the first question measured general compliance and the second question measured compliance during the past seven days. A new variable, adherence, was however constructed as general compliance was argued to provide a more accurate indication of compliance. A dichotomous method was used to construct this variable. A numerical value of 1 was assigned to those participants who always comply with their medication and the value 0 was assigned to those who reported non-compliance. The variable was also used in the correlational analysis. The "dependent variable" was thus medication compliance and the "independent variables" included the psychological factors outlined in the IPQ-R. The statistical significance level was set at $p \leq 0.05$.

4.5.1 Factor analysis

Field (2009) described factor analysis as "a multivariate technique for indentifying whether the correlations between a set of observed variables stem from their relationship to one or more latent variables in the data, each of which takes the form of a linear model" (p.786). Highly correlated variables suggest that each variable measures features of the same dimension, known as factors (DeCoster, 1998). Identifying variables that load high onto a single factor, then allows the researcher to reduce the data to a few set of factors. New factors are labelled based on what variables are included in the factor (Field, 2009). Refer to Appendix B for the factor analysis tables of both the IPQ-R and the MTQ.

After factor analysis was performed six factors were extracted from the IPQ-R and four factors were extracted from the MTQ. The IPQ-R factors included the following: factor 1: perceived negative impact of high blood pressure; factor 2: perceived internal causes of high blood pressure; factor 3: external locus of control – causes of my high blood pressure; factor 4: perceived self-efficacy and controllability of high blood pressure; factor 5: temporal nature of illness (chronic vs. temporary) and; factor 6: perceived experiences of blood pressure symptoms. The IPQ-R is based on the 5 dimensions of the self-regulation model (Leventhal et al., 1992). The measure thus consists of subscales measuring each of the dimensions included in the self-regulation model (identity, timeline, consequences, controllability and seriousness). The researcher notes that the IPQ-R consists of 4 scales. After the factor analysis procedure 6 factors were however identified.

The original scales of the MTQ are closely related to those identified during the factor analysis procedure. The factors identified in the MTQ included: factor 1**:** perceived necessity to take blood pressure pills; factor 2**:** perceived benefits of blood pressure pills; factor 3**:** side-effects of blood pressure pills and; factor 4**:** perceived worries about blood pressure pills.

Although the factor analysis revealed different factors than those observed in the original scales of the measures, the researcher did not use this data set for correlational analysis purposes because the original scales of the MTQ is closely related to those identified during the factor analysis procedure. In addition the analysis was limited to a small data set and factor analysis is generally suited for larger data sets (Field, 2009). The factor analysis was, however, used during regression analysis in conjunction with the original subscales. The final report of the correlational analysis was thus based on the 4 original subscales included in the IPQ-R and the MTQ.

4.5.2 Relationships between demographic information and medication compliance

Although the main focus was on answering the research question about whether a relation exists between how patients take their medication and their illness cognitions, the researcher also reported on the relations found between the demographic variables and compliance. Specifically, the researcher looked at the following variables: age; gender and daily dosage/prescription. This section will therefore focus on the question about what the relationship is between treatment compliance and age; gender and daily dosage. It should be noted that as this is not the main focus of the study, a brief discussion will be provided. Pearson's r was calculated for all the applicable variables.

4.5.2.1 Age

Correlational analysis was conducted on the variables age and medication compliance using SPSS version 20. As mentioned, the respondents were grouped into 5 categories: younger than 40; adult (40-50); middle aged (51-60); elderly (61-70) and; older than 70. Compliance was measured on both a general and a specific level, for the purposes of the current analysis, only general compliance will be taken into account as it is a more accurate representation of compliance. Only those participants who reported that they always take their medication, never skipping a dosage will be viewed as compliant. In the age group younger than 40, 6.8% demonstrated good general compliance compared to the 10% that did not. 11.4% of the age group 40-50 showed adequate levels of compliance while 12.3% showed poor compliance rates. Considering the age group 51-60, 12.5% of the group had good compliance levels, compared to 14.7% exhibiting poor rates of compliance. The age group 61-70 reported good levels of compliance with 14.7% adhering to their treatment regimens and only 4.5% reporting low adherence. Lastly, the group 70+ revealed that only 1.1% was not compliant compared to 6.7% who demonstrated good general compliance. From this it is inferred that adults younger than 40 and between the ages of 40-60 tend to demonstrate inadequate degrees of compliance, this is however not to be taken as a general conclusion due to the size and setting of the selected sample. It is in agreement with previous findings suggesting that age does play a role in treatment compliance (Lehane & McCarthy, 2007). Considering the data, older adults appear to be more compliant than younger adults. Low adherence rates ranging from 1.1% - 4.5% were found in the age groups 61-70 and older than 70 years. The middle aged group (51-60) demonstrated the lowest compliant rates. This

group can potentially be targeted by intervention programs in order to address the low compliant rates.

Pearson's correlational analysis was performed and the data shows that no relation exists between age and medication compliance, measured on a general level as well as during the past seven days. When the new variable adherence was, however, used it was found to be significantly correlated to age ($R = .267$; $p \leq 0.05$).

Bailey, Grossardt and Graves (2008) found that "...hypertension control rates ranged from 80.8% for persons aged 15 to 39 years to only 42.1% for persons age ≥ 80 years" (p.841). Bailey et al's. (2008) findings suggest that compliant rates decline with increases in age. The present data however revealed the contrary, with compliant rates improving with age (over 60 years). Non-compliance appears to decrease as patients get older. It should however be emphasised that this statement is specific to the present sample and should not be generalised to a larger hypertensive population. It can thus be said that patients younger than 60 were less compliant than those older than 60. From the age of 40, low compliant rates seem to increase, but after the age of 60 it declines, meaning that compliance starts to improve after the age of 60.

4.5.2.2 Gender

Sex was numerically coded with 1 indicating male and 2 indicating female. The findings were correlated by means of Pearson's *r* initially, though gender is generally regarded to be a categorical variable and thus better suited for chi-square analysis. A chi-square analysis was then also performed on the variable. Correlational analysis however revealed no significant correlations with general compliance, adherence or compliance over the past seven days ($n=88$; $p > 0.05$).

Chi-square analysis and cross tabulation was performed on the variables gender and medication compliance using SPSS version 20. Based on the results 22.7% of males and 29.5% females demonstrate good levels of compliance, while 21.6% of males and 23.9% of females show unsatisfactory levels of compliance. (See table 4 below) In agreement with the findings, it seems that females tend to be more compliant than males when taking their medication. Past studies demonstrate similar findings regarding the compliance levels of males and females (Gu et al., 2008; Pletzer, 2004). It is generally known that more men than women are affected by hypertension, but more women than men are aware of their diagnosis (Huxley, 2007; Maric, 2005; Van Minah et al., 2006; Pletzer, 2004). The present sample

however consisted of more females than males, which might account for the higher compliance levels. Hypertension may be more prominent amongst men than 'premenopausal women' but Huxley (2007) also notes that the sex differences, with regards to the incidence of hypertension, disappear after menopause. Consequently, it is argued that women tend to demonstrate better rates of compliance when compared to men, also observable in the current findings. Bailey et al. (2008) however found contradicting evidence, showing that antihypertensive treatment control is less effective in women than men, but discontinuation seems to be similar in both sexes. It is then also suggested that "...targets for hypertension control rates...[can] be gender specific and that the assumption that 1 target fits both genders...[can] be [regarded as] erroneous" (Bailey et al., 2008, p.846). No correlation was however found between compliance and gender, considering the chi-square analysis. Gender thus appears to be unrelated to predicting compliance.

In terms of the present study, the findings suggest that good compliance is more common amongst women than men.

Table 4: Gender and compliance

			SEX		Total
		.00	MALE	FEMALE	
Adherence	0	Count	1	19	21	41
		% within Adherence	2.4%	46.3%	51.2%	100.0%
		% within SEX	50.0%	48.7%	44.7%	46.6%
		% of Total	1.1%	21.6%	23.9%	46.6%
	1	Count	1	20	26	47
		% within Adherence	2.1%	42.6%	55.3%	100.0%
		% within SEX	50.0%	51.3%	55.3%	53.4%
		% of Total	1.1%	22.7%	29.5%	53.4%
Total		Count	2	39	47	88
		% within Adherence	2.3%	44.3%	53.4%	100.0%
		% within SEX	100.0%	100.0%	100.0%	100.0%
		% of Total	2.3%	44.3%	53.4%	100.0%

4.5.2.3 Daily dosage and prescription of medication regimens

Patients are given specific instructions on how and when to take their medication. The number of antihypertensive pills to be taken is also prescribed, but it may differ from patient

to patient depending on the severity of the blood pressure levels. Most patients take only one tablet daily while other patients are required to take more than one pill a day (Edo, 2009). Bailey et al. (2008) also noted the possible impact the number of medications may have on compliance. Specifically, it was stated that the more pills a patient is required to take, the less likely they were to comply with their treatment. Benson and Britton (2002) and Edo (2009) also support this notion, agreeing that single dose regimens work best. This can also be viewed as a possible contributing factor in why some patients discontinue their pharmacological therapy. In this regard, Bailey et al. (2008) argued that intensifying a patients' treatment by increasing the daily dosage might not always be beneficial for the effective treatment of high blood pressure. Taylor (2012) emphasised that adding more components to a treatment program does not necessarily elicit more effective results, instead it can lower compliance.

The instructions about how and when to take the medication, for example one pill in the morning after breakfast or one pill in the evening before supper, might also lead to confusion, resulting in patients unintentionally forgetting to take their medication, or not taking it according to prescribed guidelines. Ultimately it leads to non-compliance and possibly complete discontinuation. The present sample (n=88), showed that the majority of patients only consisted of single dosages, 58% while a smaller 29.6% of the sample required multiple dosages.

Of those who were only required to take a single pill daily, 33% demonstrated good compliance while 25% did not. The patients, who are required to take two pills a day, demonstrated lower levels of compliance with 13.6% adhering to their medication regimens and 4.5% showing poor compliance rates. Compliance decreases even further to a low 3.4% in patients having to take three or more tablets daily, compared to 8% who are viewed to be non-compliant (Refer to table 5 below). Considering the table below, some participants did not complete the question or did not respond as requested. It is thus possible that complications in taking more than one pill daily might lead to confusion or forgetfulness and this can possibly be a contributing factor in why these patients did not take their medication as they should. It is however also noted that poor compliance is higher amongst those taking only one tablet daily compared to those who take two a day, but the overall level of compliance is higher in the single dosage group. The researcher is not making any definitive conclusions based on this, as this was not the main aim of the study and the researcher did not control for the influence of other possible confounding variables. The characteristics of the

sample can also account for the discrepancy between multiple - and single dose groups, as most patients take only one pill a day, thereby inflating the compliance levels compared to the minimal part of the sample who takes more than one pill daily. It is thus only noted as a possible indication for why patients with multiple dosages demonstrated poor compliance.

The correlational analysis revealed no significant relation between dosage per day and general compliance or with the new variable, adherence. Edo (2009) also found no relation between patients' number of pills and their extent of compliance. Considering the variable measuring compliance during the past seven days, a significant correlation was found. Compliance measured during the past seven days is negatively correlated with prescribed dosage per day ($R = -0.28$, $p \leq 0.05$).

Table 5: Cross-tabulation between adherence and prescribed dosage

		Adherence		Total
		.00	1.00	
1 PILL DAILY	Count	3	2	5
	% within DOSAGE PER DAY	60.0%	40.0%	100.0%
	% within Adherence	7.3%	4.3%	5.7%
	% of Total	3.4%	2.3%	5.7%
2 PILLS DAILY	Count	22	29	51
	% within DOSAGE PER DAY	43.1%	56.9%	100.0%
	% within Adherence	53.7%	61.7%	58.0%
	% of Total	25.0%	33.0%	58.0%
3 OR MORE PILLS DAILY	Count	4	12	16
	% within DOSAGE PER DAY	25.0%	75.0%	100.0%
	% within Adherence	9.8%	25.5%	18.2%
	% of Total	4.5%	13.6%	18.2%
1/d	Count	7	3	10
	% within DOSAGE PER DAY	70.0%	30.0%	100.0%
	% within Adherence	17.1%	6.4%	11.4%
	% of Total	8.0%	3.4%	11.4%
2004/01/01	Count	0	1	1
	% within DOSAGE PER DAY	0.0%	100.0%	100.0%
	% within Adherence	0.0%	2.1%	1.1%
	% of Total	0.0%	1.1%	1.1%
	Count	1	0	1
	% within DOSAGE PER DAY	100.0%	0.0%	100.0%

		Adherence		Total
	% within Adherence	2.4%	0.0%	1.1%
	% of Total	1.1%	0.0%	1.1%
5/20 once per day	Count	1	0	1
	% within DOSAGE PER DAY	100.0%	0.0%	100.0%
	% within Adherence	2.4%	0.0%	1.1%
	% of Total	1.1%	0.0%	1.1%
n/a	Count	2	0	2
	% within DOSAGE PER DAY	100.0%	0.0%	100.0%
	% within Adherence	4.9%	0.0%	2.3%
	% of Total	2.3%	0.0%	2.3%
Nil	Count	1	0	1
	% within DOSAGE PER DAY	100.0%	0.0%	100.0%
	% within Adherence	2.4%	0.0%	1.1%
	% of Total	1.1%	0.0%	1.1%
Total	Count	41	47	88
	% within DOSAGE PER DAY	46.6%	53.4%	100.0%
	% within Adherence	100.0%	100.0%	100.0%
	% of Total	46.6%	53.4%	100.0%

4.6 The relationship between compliance and patients' illness cognitions

This section will include a discussion about the main focus of the present research project, looking at the relationship between patients' compliance and their perceptions regarding their medication and hypertension. The research question informing the discussion of this section includes asking: what the psychological factors are that impact non-compliance amongst patients diagnosed with hypertension/high blood pressure?

Pearson's correlational analysis was performed on the data to identify any associations between the variables along with regression analysis. The research assumed that the relationships found would be of a linear nature with the dependent variable, general compliance. Based on the correlational findings the researcher used the correlated variables as possible predictors for the 'dependent variable' (compliance) by means of regression analysis. The first part of the discussion will focus on the findings of the correlational analysis.

4.6.1 Correlational analysis

Significant relationships were considered in the data with statistical significance set at a 95% confidence level. As noted, participants were only considered compliant if they took their medication as they should, not skip a dosage. The question concerning the aspect of how patients' generally take their medication was calculated as an indication of compliance. The first subscale relating to participants views about their high blood pressure was firstly considered. Only two variables were found to be significantly correlated with compliance ($r = .245$, $p \leq 0.05$): "my high blood pressure will last for a long time" and "I have a clear picture or understanding of my high blood pressure" ($r = .270$, $p \leq 0.05$). No other variables about how patients viewed their high blood pressure were found to be related to compliance.

Compliance over the past seven days was significantly correlated with "I have a clear picture or understanding of my high blood pressure" ($r = .220$, $p \leq 0.05$). No other correlations were found between compliance over the past seven days and any of the other variables included in the first IPQ-R subscale. The newly constructed variable adherence was significantly correlated with "I expect to have this high blood pressure for the rest of my life" ($r = .241$, $p \leq 0.05$). A relation was also found between adherence and "My high blood pressure is likely to be permanent rather than temporary" ($r = .251$, $p \leq 0.05$).

The next subscale was the identity subscale, listing a number of symptoms asking patients to respond either yes/no to whether they have experienced this symptom, and whether they view it to be related to their hypertension or their medication. General compliance and compliance over the past seven days revealed no significant correlations ($p > 0.05$). Only one of the symptoms were found to be negatively correlated to the variable adherence, breathlessness ($r = -.243$, $p \leq 0.05$).

The remainder of the questionnaire included questions about the possible causes of hypertension as viewed by the participants. Only the variable measuring compliance over the past seven days revealed significant relations with my personality ($r = .223$, $p \leq 0.05$) and poor immune system ($r = .248$, $p \leq 0.05$). The data showed no significant correlations between general compliance and possible causes or between the new variable, adherence and causes.

The variables of the MTQ were also correlated with medication compliance, although this questionnaire is meant to measure medication-taking behaviour, the statements also relate to patients' perceptions regarding their medication. The MTQ consisted of three subscales: perceived need; perceived effectiveness and; perceived as safe. The firs subscale revealed

significant correlations between how patients generally take their medication and "I could have health problems if I do not take my blood pressure pills" ($r = .259$, $p \leq 0.05$) and with "It's not a problem if I miss my blood pressure pills" ($r = .267$, $p \leq 0.05$). General compliance was also significantly correlated to "I am ok if I do not take my blood pressure pills" ($r = .234$, $p \leq 0.05$). Compliance over the past seven days also revealed significant relationships with "I could have health problems if I do not take my blood pressure pills" ($r = .247$, $p \leq 0.05$) and "I am ok if I do not take my blood pressure pills" ($r = .214$, $p \leq 0.05$).

The first subscale, perceived need, revealed that only one variable, "I am Ok if I do not take my blood pressure pills", was significantly correlated with how patients take their medication as indicated by the new variable, adherence. The remaining statements showed no significant relation to how patients take their mediation. Participants' views concerning the need to take their medication thus appear to be unrelated to patients' actual medication taking patterns.

The other two subscales, perceived effectiveness and perceived as safe, showed no correlations with medication compliance ($p > 0.05$). How patients take their medication, or how they choose to adhere to their prescribed treatment regimens is thus unrelated to their perceptions concerning the effectiveness of their medication or their views about how safe their medication is.

In summary it is argued that there appears to be a minimal relationship between patients' illness cognitions, as measured by the IPQ-R, and their medication compliance. Patients' views about their high blood pressure do not seem to affect their level of compliance as much as previous research suggest. The sample characteristics and the specific research setting as well as the nature of the self-report measures may however have confounded the observed relationships and the researcher is therefore not making any conclusive claims regarding the findings.

4.6.2 Regression analysis

Regression analysis is utilized to isolate variables that can be used to make predictions about outcome variables. Simple regression analysis for example, involves using only one independent variable as a predictor of one dependent variable. Changes in the values of the independent variable will thus result in predictable changes in the outcome variable (Field, 2009). Multiple regression analysis involves using more than one independent variable to make predictions about the outcome variable. In the context of the present study, multiple

regression analysis was performed on the data based on the correlations identified during correlational analysis. The variables that were found to be associated with the dependent variable, compliance, were thus used as predictor variables in the multiple regression analysis.

The values of multiple R indicates the correlation between the predicted variable and the observed variable, the larger the values of multiple R, the larger the correlation is between the two variables. R^2 is interpreted as the amount of variation in the dependent/observed variable that is explained by the overall regression model (Field, 2009). The Beta values and the t-scores provide information about each individual variable's contribution to the variation in the outcome variable. In order for a regression model to be significant, both the model (F value) and the variables included should be significant at the statistical level set ($p \leq 0.05$).

The focus of the present investigation centred on the possible impact psychological factors may have on patients' medication compliance. Psychological factors were defined in relation to the self-regulation model, depicting these factors as patients' illness cognitions which relates to the different perceptions they have about their illness and medication. Using multiple regression analysis thus enables the researcher to determine the extent to which these psychological factors, or different perceptions, predict medication compliance. The five domains described in the self-regulation model will therefore represent the predictor variables, allowing the researcher to make predictions about patients' medication-taking behaviour. Both the variables included in the IPQ-R and the MTQ provide a measure of the five domains described in the self-regulation model.

Medication compliance was measured in terms of both how well patients generally take their medication and how well they took their medication during the past 7-days. A continuous variable was constructed by adding item B and C of the MTQ. Item B measured participants' level of general compliance while item C measured compliance over the past seven days. The newly constructed variable was thus used as the dependent variable with a low score indicating non-compliance and a high score indicating compliance. Both variables, although they are ordinal categorical variables, were then added and regarded as a continuous ordinal variable.

4.6.2.1 Regression analysis using the IPQ-R and the MTQ scales

An indication of medication compliance was thus obtained by adding the levels of general compliance and compliance over the past seven days. Referring to table 6 below, the values -

1.00 and .00 represent missing values or participants' failure to complete these questions. Based on this, 5 participants did not indicate their level of compliance. The other values indicate medication compliance, with low values representing non-compliance and high values representing compliance. The data shows that 52.3% of participants were compliant with their medication prescriptions while 42% of the sample was not.

Table 6: Medication compliance

Frequency	Percentage	Valid Percentage		Cumulative Percentage
-1.00	3	3.4	3.4	3.4
.00	2	2.3	2.3	5.7
.50	1	1.1	1.1	6.8
1.00	1	1.1	1.1	8.0
1.50	2	2.3	2.3	10.2
2.00	4	4.5	4.5	14.8
3.00	5	5.7	5.7	20.5
3.50	5	5.7	5.7	26.1
4.00	1	1.1	1.1	27.3
4.50	18	20.5	20.5	47.7
5.00	46	52.3	52.3	100.0
Total	**88**	**100.0**	**100.0**	

To investigate the impact psychological factors have on medication compliance regression analysis was performed. Regression analysis requires that a number of statistical threats be controlled.

Multicollineartiy is present when the data reveals strong correlations between two or more predictor variables in the regression model (Berger, 2003; Field, 2009). This creates a problem for multiple regression models because highly correlated predictors prevent the possibility of obtaining unique estimates of the regression coefficients (Field, 2009). Multicollineartiy was examined in the present data. The correlation matrix was used as an indication of possible existing relations but no correlations higher than .61 was found. Field (2009) suggest that correlations higher than .8 should be alarming. The Variance Inflation Factor (VIF) should not exceed 10, as this would indicate a strong correlation between predictor variables (Field, 2009). The tolerance (1/VIF) should be higher than 0.2 as values below 0.2 and 0.1 indicate serious problems (Berger, 2003; Field, 2009). The collinearity statistics revealed no tolerance values less than 0.2 and no VIF values as high as 10. VIF values are close to 1 confirming that collinearity is not a problem for this model. The

researcher can thus conclude that multicollinearity did not pose a problem for the interpretation of the current regression model (Refer to Appendix B part A for the tables).

The Durbin-Watson provides information about the assumption of independent errors and Field (2009) suggest that values below one or greater than three are indicative of possible problems. The closer to two, the better and for the present data the Durbin-Watson value = 2.407. The assumption of independent errors has thus been met.

A backward regression analysis was done. A continuous variable was created for compliance and all the subscales of the IPQ-R and the MTQ were entered in the analysis. The model identified was medication compliance = $(c + b_1x_1 + b_2x_2 \ldots + b_7x_7) + \varepsilon$ with the selected variables indicated in Table (6) for ease of reference. The analysis provided a model with a predictive power ($R = 0.289$, $R^2 = .084$, R^2 adjusted = -0.01). This model thus accounts for 84% of the variance observed in the outcome variable, compliance. The model was, however, not significant at $p \leq 0.05$ ($F_{(76)} = .993$). It should however be noted that for this model, only the predictor ipq_scale2, appears to make a significant contribution to predicting medication compliance ($t_{(76)} = 2.066$, $p \leq 0.05$). The beta values in table 7 provide information about the number of standard deviations that the outcome variable, compliance, will change as a result of one standard deviation change in the predictor (Field, 2009). Based on the equation for the regression model, the B values provide information about the relationship between medication compliance and each predictor variable. If the value is positive it means that a positive relationship is present between the predictor and the outcome variable whereas a negative coefficient suggests a negative correlation. A relations was found in the present data between ipq_scale2 and medication compliance (b = 0.269), which means that as the ipq_scale2 variables increase by 0.269 units, medication compliance will also increase with one unit. The model was however not significant, and predictive conclusions cannot be made. The ipq_scale2 was thus the only significant predictor of compliance ($p \leq 0.05$), but when only this predictor is used in regression analysis, using Enter mode, it fails to produce a model that is significant in predicting medication compliance ($F_{(86)} = 0236$, $p > 0.05$). The final model only contains the variable ipq_scale2, but this model was not significant at predicting medication compliance ($F_{(82)} = 2.337$, $p > 0.05$).

None of the models are significant at predicting medication compliance ($p > 0.05$). The researcher can thus conclude that neither the original subscales in the IPQ-R nor the subscales in the MTQ, significantly predicts medication compliance in terms of the present data set.

Table 7: Variables included in the regression model

Variable	Label	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
C	Constant	1.496	2.013		.743	.460
x_1	Ipq_scale1	.208	.379	.070	.549	.584
x_2	ipq_scale2	1.615	.782	.269	2.066	.042
x_3	ipq_scale3	.006	.036	.021	.168	.867
x_4	ipq_scale4	-.063	.159	-.047	-.395	.694
x_5	mtq_scale2	.342	.250	.183	1.364	.177
x_6	mtq_scale3	-.245	.226	-.142	-1.081	.283
x_7	mtq_scale4	-.230	.214	-.128	-1.074	.286

4.6.2.2 Regression analysis using the factors generated from the factor-analysis process

Factor analysis was performed on the present data set and six factors were identified for the IPQ-R and four factors for the MTQ. The six factors identified for the IPQ-R and included in the regression analysis involved: ipq_negative impact; ipq_internal causes; ipq_external causes; ipq_self-efficacy; ipq_temporality and; ipq_experience. The MTQ factors identified during analysis included the following: mtq_necessity for taking medication; mtq_benefits of taking medication; mtq_side-effects of medication and; mtq_not taking pills (See Appendix B part B for the tables).

The assumptions of regression analysis were taken into account. Specifically multicollinearity, referring to the threat of correlations between the predictor variables, was examined (Field, 2009). The VIF values revealed no values greater than 10 and none the tolerance values were below 0.2 or 0.1. The researcher could then conclude that multicollinearity was not present in the factor analysis data set.

The Durbin-Watson = 2.435, which means that the residual errors are independent as this value is close to two (Field, 2009). Durbin-Watson values lower than 1 and greater than 3 should be alarming.

A backward regression analysis was performed using the factors extracted from the factor analysis procedure. The remaining model demonstrated predictive power ($R = 0.226$, $R^2 = 0.051$, R^2 adjusted = 0.039). The model was significant at $p \leq 0.05$ ($F_{(82)} = 4.395$). Relating to the significant model, only the factor mtq_no pill was entered in the analysis. The eventual model identified was medication compliance = $(c + b_1x_1)$ where x1= mtq_no pill.

Table 8: Variables included in the regression model

Variable	Label	Unstandardised Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
C	(Constant)	2.736	.745		3.671	.000
X_1	mtq_no_pill	.111	.053	.226	2.096	.039

The mtq_no pill subscale (b = 0.111): this value demonstrates that each time, the mtq_no pill scale increases with 0.111 units, medication compliance will also increase with one unit (Refer to table 8).

This factor made a significant contribution to predicting medication compliance ($p \leq 0.05$) and as such, only this factor was entered in a second regression analysis procedure, using Enter mode. The results revealed that the regression model containing only this variable was significant at $p \leq 0.05$ ($F_{(83)} = 10.238$). Based on the data in table 9 below, mtq_no pill significantly predicts medication compliance (b = 0. 331) which means that each time the mtq_no pill scale increased with 0.331 units, medication compliance will also increase with one unit.

Table 9: Mtq_no pill scale

Variable	Label	Unstandardised Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
C	(Constant)	2.249	.634		3.547	.001
X_1	mtq_no_pill	.145	.045	.331	3.200	.002

In conclusion to this section, most of the variables, from both the IPQ-R and the MTQ appear to be poor predictors of medication compliance as only a few variables revealed to make a significant contribution, but in order to have predictive power both the variables and the model need to be significant (Field, 2009). Depending on the model used to make the predictions, different variables demonstrated different input levels. In terms of the original scales of the IPQ-R, none of the models were significant in predicting medication compliance. Considering the regression analysis data the researcher concludes that the reason why only a few predictors are left in the models might relate to the possibility that no linear relationship exists between medication compliance and the predictors in the IPQ-R or the MTQ. It may also be that the dependent variable, compliance, was not accurately reported due to misconceptions or inaccurate responses. The small sample size could also attribute to

the data being biased. The data however suggests that none of the original scales significantly predicts medication compliance.

The second regression analysis process revealed that only one of the newly constructed factors based on factor analysis, was significant at predicting compliance; the factor mtq_no pill. The variables loading high on this factor include: “I would rather treat my blood pressure without pills”, “I am ok if I do not take my blood pressure pills”, “It’s not a problem if I miss my blood pressure pills” and “I will become dependent on my blood pressure pills”. These variables thus seem to make a significant contribution to predicting medication compliance based on the regression analysis findings. The researcher can thus postulate that the perceptions about not drinking one’s medication can affect compliance. Directionality in this regard is, however, not suggested as the data is only based on correlational findings.

4.7 Conclusion

In conclusion it is highlighted that correlational analysis was performed with the three variables measuring compliance; general compliance, compliance during the past seven days and the new variable, adherence. Medication compliance was correlated with the variables from both the IPQ-R and the MTQ. It was also correlated with a set of demographic variables. Regression analysis was performed with both the factors extracted from factor analysis, as well as the original subscales included in the IPQ-R and the MTQ. For the purposes of regression analysis, medication compliance was calculated by adding general compliance and compliance over the past seven days. This variable was thus used as the outcome variable and the subscales from the different measures as the predictor variables. The next chapter will provide a summary of the findings.

Chapter 5: Discussion, conclusion and recommendations

5. Introduction

This chapter will conclude the study by presenting a discussion based on the findings. It will also summarise some of the limitations identified in the study as well as recommendations for future work. The reasoning for this study was motivated by Health Window, a pharmaceutical company, who observed that patients generally demonstrated low levels of compliance despite being aware of the risk factors associated with their diagnosis. The focus was directed to target hypertensive patients, which constitutes a large part of their patient data basis. Hypertension is one of the most treatable conditions given that patients comply with their prescribed drug treatments. Literature reviews and past research confirmed that non-compliance is the main reason for poor blood pressure control resulting in physical, psychological, social and financial implications. Taylor (2012) maintains that poor health management does not only affect the individual but the health care system as a whole, ensuing subsequent financial burdens. In order to address the issue of compliance it is important to identify the factors associated with medication-taking behaviour and to highlight those factors that safeguard against non-compliance.

The present investigation focused on the psychological factors that might play a role in the non-compliance of patients diagnosed with hypertension. Compliance was specifically directed towards those patients who are currently receiving pharmaceutical treatment in the form of anti-hypertensive medication. Psychological factors were explicitly conceptualised in terms of Leventhal's self-regulation model, maintaining that people generally tend to form certain illness cognitions about their disease and treatment. The study included a sample of patients diagnosed with hypertension from the Health Window data basis. The researcher also assumed that if a correlation was identified between these psychological factors and compliance, the information can be used to inform intervention strategies to address the problems connected to non-compliance. The research process was guided by a social cognitive theoretical framework which informed the methods of data collection as well as the analysis procedures. The study aimed to answer the following research question: What are the psychological factors that impact on non-compliance amongst patients diagnosed with hypertension/high blood pressure? A secondary research question asked how this problem can be overcome, hence the formation of intervention strategies. Specifically, the study attempted to answer the following questions concerning the main aim of the project:

- How compliant are participants with their anti-hypertensive medication? (Generally and during the past 7-days)
- What is the relationship between people's beliefs about the causes of their hypertension and their medication compliance?
- What is the relationship between people's beliefs about the symptoms of their hypertension and their medication compliance?
- What is the relationship between people's beliefs about the severity and course of their hypertension and their medication compliance?
- Lastly what is the relationship between people's beliefs about the controllability of their illness and their medication compliance?

5.1 Summary of the findings

This section will summarise some of the main findings of the present investigation. An overview of the sample characteristics will also be provided.

5.2 Sample characteristics

The initial sample consisted of 125 participants but some of the participants neglected to complete the questionnaires and the sample decreased to a 105 participants. It was also necessary to remove participants not diagnosed with hypertension from the sample. The sample thus used for analysis consisted of fewer participants than the initial sample.

The sample (n=86), two participants did not complete the question about their gender, comprised 39 (44.3%) males and 47 (53.4%) females with (2.3%) not reporting their sex. The majority (51%) of the sample consisted of participants aged between 40-60 years, while only 16.9% were younger than 40 years. This is in relation with literature suggesting that hypertension is more prevalent amongst older adults, but not uncommon amongst younger individuals. A large portion of the sample was educated with 31.8% having completed Grade 12 and 51.2% earning tertiary qualifications. Most of the participants were also employed (69.3%). Considering the duration of illness, 37.4% of participants have been suffering from hypertension for more than 10 years compared to 26% who have suffered from the condition for less than 5 years. The findings revealed that 58% of the sample is subject to mono-therapy compared to 29.6% who are prescribed multiple pills daily. Most of the participants (73.9%) also had a single dosage prescription only taking their medication in the morning. It is often necessary for patients to take more than one drug in order to control their blood pressure, or

individuals may have other co-morbid diagnosis's requiring them to treat both pharmaceutically. Taylor (2012) also emphasised the notion that complicated treatment regimens may result in low compliant rates, thus single dose treatments are argued to be better for improving compliance. As previously discussed, hypertension is a chronic condition for which a long-term commitment to treatment is necessary (Edo, 2009; Lehane & McCarthy, 2007; Svensson et al., 2000; Taylor, 2012). Prescriptions involving a single dose each day thus decrease the complications and frustrations associated with multiple dosages (Benson & Britton, 2002; Edo, 2009). Ho et al. (2009) argued in agreement that mono-therapy can improve adherence in hypertensive patients.

Regarding the presence of a co-morbid medical diagnosis, 13.4% of participants listed other medical diagnoses. The majority (47.7%) of the sample had a single diagnosis of hypertension while 33.6% of the sample listed hypertension in conjunction with other medical conditions. The most prevalent was diabetes, with 10.2% of the sample having both hypertension and diabetes. Some of the participants also reported diabetes to be their main medical diagnosis. Concerning co-morbid psychological disorders, 5.6% of the sample reported that they have been diagnosed with a psychological disorder, with mood disorders such as depression and bipolar disorder being the most common. Another 3.4% of the participants listed a psychological disorder, depression, as their main diagnosis.

5.3 Compliance with medication regimens

Compliance was measured by means of the MTQ, more particularly participants were asked to rate how compliant they perceive themselves to be in general and also to rate their compliance over the past seven days. In terms of their general levels of compliance, 53.4% reported that they always take their medication, never skipping a dosage compared to 2.3% who reported never taking their medication. The results also show that a large part of the sample reported levels of medication-taking patterns consisted with non-compliance (mean 4.7273; SD 1.94006). A closer look at the data thus revealed that 40.9% of participants do not take their medication as they should, reporting either skipping a dosage or more, or not taking their medication according to instruction. In terms of the definition used to conceptualise compliance, these participants are thus considered to be non-compliant with their medication prescriptions. The larger part of the sample did however report high levels of compliance, though this value may be overestimated, accounting for the limitations associated with self-report measures. In terms of how participants took their medication during the past seven

days, 77.3% indicated that that they always took their medication while only 3.4% reported not being able to take their medication at all. 15.9% of the sample is considered to be non-compliant (mean 3.3864; SD 1.30808).

This reported level of adherence is however also subject to the problems associated with self-report measures. Recalling medication-taking patterns over a short-term period, such as the past seven days, is also easier than considering it over longer periods (Edo, 2009).

As general compliance was argued to be more accurate than the seven day rating, the research coded all compliant participants with a 1 and non-compliant participants with a 0, constructing a new variable of adherence. Findings revealed that overall, 53.4% of participants are compliant while 46.6% are considered to be non-compliant. It is also noted that all further analysis was performed on the newly constructed variable of adherence, as well as general and specific compliance. The analysis was only done on the new sample (n=88), discarding missing values and those of participants not diagnosed with hypertension.

The non-compliance appears to be related to factors such as forgetfulness, and skipping a dosage or more, but it is not related to the medication or illness itself. None of the participants reported intentionally not taking their medication, rather it seems more accidental. The non-compliance reported by some of the participants was however still argued to be problematic as Edo (2009) highlights that this "...figures are unacceptable since hypertension medications should be taken as prescribed and not intermittently" (p.140).

5.4 Relationships between medication compliance and demographic variables

A number of demographic variables including; sex; age; marital status; employment status; educational status; perceived relationship with health care practitioners; informed about illness and; smoking history were analysed for correlations with how patients rated themselves in terms of their medication compliance, in general as well is over the past seven days: These demographic variables were also correlated to the new variable, adherence. Statistical significance was set at $p \leq 0.05$ (95% confidence). The data was interpreted on the basis of a two-tailed test, hence no directionality was implied. Based on the findings, there was no significant relationship between age and how people generally take their medication. Marital status, educational status, smoking history, informed about illness and perceived relationship with health care practitioner also revealed no significant correlation with how people generally take their medication. In relation to how patients took their medication over the past week, none of the demographic variables produced any significant correlates. A chi-

square analysis was also done on the data and revealed no statistical significance, concluding that the demographic variables do not seem to be good predictors of compliance. No significant relations were found as none of the demographic variables demonstrated standardized residuals outside ±1.96 at $p > 0.05$. Inkster et al. (2006) also found no relations between compliance and demographic variables such as gender, age and co-morbidities. Whether a person is single or married, or possesses a tertiary qualification or not for example, seems to be unrelated in determining their level of compliance.

Analysis using the new variable, adherence however revealed a significant relationship with age. Age thus seems to play a determining role in how patients' take their medication. This may however be specific to the current sample and should not be generalised to settings and people other than those used in this investigation. The highest compliance rates was observed within the elderly age group (61-70yrs) where compliance was 14.7% compared to the lowest levels observed within the age group 70+ (6.7%). It should however be noted that only a few participants are over the age of 70, thus possibly accounting for the lower rates in compliance.

5.5 Relationships between people's perceptions (IPQ-R) and their medication compliance

This section summarises the findings about the relations found between how participants rated their general level of compliance as well as their compliance over the past seven days and the IPQ results, specifically participants' views about their high blood pressure. Only a few significant correlations were found between patients' general level of compliance or their short-term compliance and their perceptions about their high blood pressure. "My blood pressure will last for a long time" and "I have a clear picture or understanding of my blood pressure" were significantly related to how patients generally take their medication ($p \leq 0.05$). A relationship was also found between the latter and how patients rated their medication compliance over the past seven days.

The new variable, adherence, was significantly correlated with the statement, "My blood pressure is likely to be permanent rather than temporary" and "I expect to have this high blood pressure for the rest of my life" ($p \leq 0.05$). The timeline dimension of the IPQ thus appears to be correlated to how patients take their medication. Considering compliance in general terms and the new variable, adherence, both were found to be significantly related to

factors regarding the chronic nature of hypertension. Acknowledging the life-long aspect of hypertension thus impacts the way patients tend to comply with their prescribed treatment.

In terms of perceived causes of high blood pressure, no relationships were found between the factors and how patients generally take their medication ($p > 0.05$). Short-term compliance over the past seven days revealed a significant relationship between personality and poor immune system. Adherence showed no significant relationships between any of the causal factors ($p > 0.05$). Perceptions about what caused the condition were therefore unrelated to how patients take their medication in terms of general compliance.

Regarding perceived views about the symptoms of hypertension, no relationships were found between how patients generally take their medication and their experience of the different symptoms ($p > 0.05$). Short-term compliance also revealed no relations between the symptoms and compliance. Adherence, the newly constructed variable, is significantly correlated with the experience of the symptom, breathlessness ($p \leq 0.05$), but perceptions regarding the symptoms ("There is a lot which I can do to control my symptoms") were not significantly correlated. The experience of breathlessness thus impacts the adherence level of patients diagnosed with hypertension, as indicated by the negative relation identified.

The present study demonstrated that patients' perceptions about their blood pressure in terms of causes, timeline, controllability and seriousness of hypertension are not strongly correlated to their levels of compliance. The psychological factors in this study, defined in terms of the self-regulation model, do not appear to be accurate predictors of medication compliance. The identity subscale, the perception of the symptoms associated with hypertension, did however indicate some relations between patients' level of compliance. This may however be due to the sample characteristics of the present study or to the limitations associated with the data collection methods. Based on the hypothesis concerning the impact of psychological factors on medication compliance, the data reveals some significant correlations, specifically among the variables measuring views about high blood pressure. The symptoms and causes subscales reveal minimal associations.

5.6 Relationships between medication compliance and the MTQ

The MTQ questioned patients' level of compliance in general, as well as on a short-term basis (i.e. during the past seven days). This questionnaire was subdivided into different sections including: perceived need for taking the blood pressure medication; perceived effectiveness of the medication for treating their condition and; perceptions regarding the

safety of the medication. According to the data a significant correlation was found between how patients' generally take their medication and their perceived need to do so ($p \leq 0.05$). Specifically, a relation was found between their perceived need to take their medication as it keeps them from having health related problems and general compliance. Perceptions concerning the statement, "it is not a problem if I miss my blood pressure pills", were also significantly correlated with compliance. Other relations include perceptions that "I am ok if I do not take my blood pressure pills".

Relations were also demonstrated between patients' compliance during the past seven days and perceived need to take their medication. Specifically, statements such as "I could have health problems if I do not take my blood pressure pills", and "I am ok if I do not take my blood pressure pills" were significantly correlated with how participants took their medication during the past seven days ($p \leq 0.05$).

Adherence was also significantly correlated with participants' perceptions about the statement that "I am ok if I do not take my blood pressure pills". This statement was related to all three conceptions of compliance. Participants' perceived views concerning the idea that they will be ok if they do not comply with their medication regimens, thus appears to impact their medication-taking patterns. The nature of this relationship is however unclear, as the correlational analysis preformed in the current study only allows the researcher to identify the existence of relationships, but no causal inferences can be made. The research cannot make any assumptions regarding the directionality of this observed relationship.

No significant associations were found between participants' level of compliance and their perceptions regarding the effectiveness and safety of their medication. The side-effects of their medication and the effectiveness of their treatment thus appear to show little statistical significance in predicting compliance. This was also confirmed by the regression analysis reported next. Findings suggest that participants had favourable perceptions regarding the need to take their medication, for example, participants recognised the importance of their blood pressure medication in terms of keeping them from having other health related problems. The IPQ results also revealed that 62.5% of the sample held positive views about their treatment's ability to control their high blood pressure.

Self-efficacy is an important assumption of the social cognitive theory, and Taylor (2012) postulates that self-efficacy affects people's ability to adhere to their treatment prescriptions. Patients' views about their ability to conform to their treatment regimens were associated with a personal sense of control, thereby affecting their level of compliance (Luszczynska &

Schwarzer, 2005). The following statements were considered to be indicative of self-efficacy: "I have the power to influence my blood pressure", "the course of my blood pressure depends on me", "What I do can determine whether my blood pressure gets better or worse". The causal statements indicative of self-efficacy include: my own behaviour, my mental attitude, example thinking negatively, my emotional state and my personality. All these factors provide information about participants' perceptions regarding their subjective ability to manage their condition. Reviewing the findings, the aspect of self-efficacy is demonstrated in 69.3% of the sample as they considered themselves capable to control their high blood pressure by agreeing that they have the power to impact their hypertension. Similarly, 57.9% reported that the course of their condition depends on them. Self-efficacy is also related to participants' (71.6%) views that what they do determine the severity of their condition, whether it gets better or worse. Respondents' perceptions about what causes their hypertension are also related to the notion of self-efficacy. 51.2% of the sample agreed that their own behaviour is a possible cause for their high blood pressure. Only 23.9% however considered their mental attitude in terms of negative thinking to be linked to the development of their condition. Participants' emotional state, including feelings of anxiety and depression were reported by 38.6% of participants, agreeing that their emotional condition does impact their high blood pressure. Similarly, 27.3% agreed that their personality can be a causal factor for the development of hypertension. All these factors are viewed within the context of self-efficacy, where patients' perceptions about their ability to manage or cause hypertension, potentially impact their medication compliance. No statistical associations between these factors and compliance were however found in the present study. The social cognitive theory assumes that people with high degrees of self-efficacy will demonstrate higher levels of compliance, this is however not the case with the present sample when self-efficacy is defined in terms of the above emphasised factors.

5.7 Predictor variables of treatment compliance – Regression analysis

Regression analysis was also done in order to identify some of the variables that contribute to predicting medication compliance. The subscales of the MTQ, perceived need, perceived effectiveness and perceived safety, and the subscales of the IPQ-R were examined for their ability to predict the dependent variable, medication compliance. Regression analysis revealed that none of the variables contained in the original subscales of either the IPQ-R or the MTQ were able to produce regression models that were significant at predicting

compliance. None of the variables were thus considered to be significant predictors of how patients take their medication ($p > 0.05$).

Regression analysis was also performed using the factors extracted during factor analysis. One model was found to significantly predict medication compliance, the model containing only mtq_no pill. This factor demonstrated high loadings from the following variables; "I would rather treat my blood pressure without pills", "I am ok if I do not take my blood pressure pills," "It's not a problem if I miss my blood pressure pills" and "I will become dependent on my blood pressure pills". This factor thus relates to patients' decisions not to take their medication, hence showing non-compliance due to various reasons. The correlational analysis revealed that all three measures of compliance; general compliance, compliance over the past seven days and the new variable adherence all demonstrated a significant correlation with the statement "I am ok if I do not take my blood pressure pills".

The researcher thus concludes that the factor mtq_no pill significantly predicts medication compliance, specifically patients' beliefs that they will be ok if they do not take their high blood pressure medication.

5.8 Limitations and future recommendations

The researcher acknowledges the limitations associated with the present investigation. The sample is not viewed to be representative of a large hypertension population; rather the sample was collected from Health Window's data basis. This implies that the present sample might be different from that of patients sampled from another data basis or from hypertensive patients in the general public, those that are not part of any pharmaceutical company. As part of the Health Window data basis, patients' may already be sensitised to the aspect of compliance as health window relies on dispensed prescribing (i.e. reminding patients to collect their monthly prescriptions). The sample size in conjunction with the research setting thus limits the generalizability of the findings. The exclusion of certain participants further limits the ability to generalise the findings beyond the present sample settings. The sample size (n=88) is then also viewed to be relatively small when considering the findings, but the data was submitted to various analytical procedures, attempting to ensure its accuracy. The aim of the study was however not to generalise the findings beyond the boundaries of the present investigation. Co-morbid psychological and other medical diagnoses are regarded as eliciting possible confounding effects on the observed relations. It is possible that co-morbid psychological or medical illnesses impact the level of compliance differently amongst

different patients. The most important limitation is however related to the drawbacks associated with the use of self-report measures. Requesting patients to elicit information about their medication compliance can be difficult as they may not report accurate information. Research shows that patients generally tend to overestimate their level of compliance (Lehane & McCarthy, 2007; World Health Organization, 2003), which may relate to an inability to recall compliant behaviour, or it may simply be due to their attempt to demonstrate satisfactory findings. Ethical reasons however prevented the use of more direct methods for measuring blood pressure control, forcing the researcher to rely on the subjective accounts of the participants. In an attempt to improve this limitation, the researcher requested information about compliance on both a general as well as a specific level.

It is recommended that future research use more direct methods of measuring compliance, such as the physical monitoring of blood pressure in conjunction with self-report measures and also reviewing clinical and pharmaceutical records, in order to corroborate it with the self-reported findings. Attempts should also be made to collect a more diverse sample, with the focus being on patients with a single diagnosis of hypertension. The researcher further recommends that compliance should not be limited to medication only, but lifestyle modifications should also be considered. Qualitative research can also improve our understanding of medication compliance and its barriers. Qualitative research may offer more detailed information about what impacts non-compliance, and future research should be directed at including alternative methods to quantitative measures. In agreement with Edo (2009) the researcher also calls for more research reporting the effectiveness of compliance, relating to either lifestyle changes or medication regimens, in improving the prognosis of hypertension. Such information can be used to advance current and future intervention programs aimed at addressing non-compliance. Finally the relationships identified in the current project can also inform future research and act as a foundation for experimental research, intending to demonstrate causality.

5.9 Conclusion

This research study included a quantitative research strategy, specifically a correlational design, attempting to demonstrate possible relations between patients' illness cognitions (psychological factors) and compliance with antihypertensive drug treatments. The social cognitive theory was applied to guide the investigation in terms of data collection, analysis and interpretation. The findings revealed that the larger part of the sample reported being

compliant to their treatment prescriptions, but non-compliance was also reported which is still considered to be unacceptable given the associated negative health implications.

Non-compliance included patients failing to take their medication according to instruction, or skipping a dosage or more. It also involved not taking the prescribed medication at all, although this was reported by a very small part of the sample.

Relations were identified between medication compliance and some of the variables included in the various subscale but the demographic variables, however, appeared to be poorly related to the degree of compliance. Regression analysis revealed that patients' perceptions regarding the views that they will be ok if they do not take their medication or it is not problematic if they neglect to take their mediation and views about treating their condition without pharmaceutical prescriptions, proved to be significant predictors for patients' decisions to take or not to take their medication.

The findings of this study can be used to inform prospective intervention programs, and it can also improve the effectiveness of support groups offered at Health Window. The information can also be extended to other health care companies and health-care practitioners, informing them about the issue of non-compliance and about the factors involved. Doing so may prove to be useful in that health-care practitioners can now focus on improving patient's knowledge concerning the condition and the crucial importance of adhering to their treatment regimens. Theunissen, de Ridder, Bensing and Rutten (2003) support this argument as their research suggests that providing health-care practitioners with the tool to discuss patients' illness cognitions aid patients' understanding of their condition and it may also improve their levels of compliance. Although minimal relations were found between medication compliance and patients' illness cognitions, general practitioners may still benefit from using this information as a means for discussing patients' lay view of their condition.

Relating to the second research question about how the problem of non-compliance can be overcome, the researcher concludes that based on the present findings, there is no definitive or clear answer. The results did not reveal any significant correlations between patients' illness cognitions and patients' level of compliance. The only factor that appeared to make a significant contribution in predicting compliance relates to participants' beliefs about not having to take their medication. Doctors and pharmaceutical companies may thus provide patients with more information about the misconceptions that skipping dosages or not taking one's medication is 'ok'. One option for overcoming the problem of compliance may then be

to ensure adequate knowledge and instruction about medication compliance. But compliance is a multifaceted construct, and one method of intervention might not be successful in addressing this problem. Future research may therefore attempt to find a solution to the problem of adherence, considering the findings generated from the current project.

6. References

Anderson, G.H. (1999). Effect of age on Hypertension: Analysis of over 4.800 referred hypertensive patients. *Saudi Journal of Kidney Diseases and Transplantation 10*(3), 286-297.

Adshead, G., & Brown, C. (Eds.). (2003). *Ethical issues in forensic mental health research*. London: Kingsley Publishers.

Bailey, K.R., Grossardt, B.R., & Graves, J.W. (2008). Novel use of Kaplan-Meier methods to explain age and gender differences in hypertension control rates. *Hypertension, 51*, 841-847.

Bakris, G.L. (2012). *Management of severe asymptomatic hypertension (hypertensive urgencies).* Retrieved July 5, 2012, from http://www.uptodate.com/contents/management-of-severe-asymptomatic-hypertension-hypertensive-urgencies

Bandura, A. (1991). *Social cognitive theory of self-regulation*. Organizational Behavior and Human Decision Processes, 50, 248-287.

Bandura, A. (1989). *Social cognitive theory*. Retrieved August 30, 2011, from http://des.emory.edu/mfp/Bandura1989ACD.pdf

Bane, C., Hughes, C.M., & McElnay, J.C. (2006). The impact of depressive symptoms and psychosocial factors on medication adherence in cardiovascular disease. *Patient Education and Counselling, 60*(2), 187-193.

Barlow, D.H., & Durand, V.M. (2005). *Abnormal psychology: An integrative approach* (4th ed.). Belmont, CA: Thomson and Wadsworth.

Benson, J., & Britten, N. (2002). Primary care: Patients' decisions about whether or

not to take antihypertensive drugs: qualitative study. *British Medical Journal, 325*, 873-877.

Berger, D.E. (2003). *Introduction to multiple regression*. Retrieved April 20, 2012, from http://wise.cgu.edu/downloads/Regression.doc

Berk, L., Hallman, K.T., Colom, F., Vieta, E., Hasty, M., Macneil, C., & Berk, M. (2010). Enhancing medication adherence in patients with bipolar disorder. *Human Psychopharmacology Clinical Experiments, 25*, 1-16.

Bhattacharyya, D.K. (2004). *Research methodology.* New Delhi: Excel Books.

Bokhour, B.G., Berlowitz, D.R., Long, J.A., & Kressin, N.R. (2006). How do providers assess antihypertensive medication adherence in medical encounters? *Journal of General Internal Medicine, 21*, 577-583.

Bondesson, A., Hellström, L., Eriksson, T., & Höglund, P. (2009). A structured questionnaire to assess patient compliance and beliefs about medicines taking into account the ordered categorical structure of data. *Journal of Evaluation in Clinical Practice, 15*, 713-723.

Bosley, C., Fosbury, J., & Cochrane, G. (1995). The psychological factors associated with poor compliance with treatment in asthma. *European Respiratory Journal, 6*, 899-904.

Boutayeb, A., & Boutayeb, S. (2005). The burden of non-communicable diseases in developing countries. *International Journal for Equity in Health, 4*(2).

Brewer, N.T., Chapman, G.B., Brownlee, S., & Leventhal, E.A. (2002). Cholesterol control, medication adherence and illness cognition. *British Journal of Health Psychology, 7*, 433-447.

Broadbent, E. (2010). Illness perceptions and health: Innovations and clinical

applications. *Social and Personality Psychology Compass*, *4*(4), 256-266.

Broadbent, E., Petrie, K.J., Main, J., & Weinman, J. (2006). The brief illness perception questionnaire. *Journal of Psychosomatic Research, 60*, 631-637.

Brown, J.P., Sollers, J.J. Thayer, J.F., Zonderman, A.B., & Waldstein, S.R. (2009). Blood pressure reactivity and cognitive function in the Baltimore longitudinal study of ageing. *Health Psychology, 28*(5), 641-646.

Buelow, J.M., & Wang, C. (2006). *Medication-taking behaviour of patients with epilepsy*. Retrieved March 1, 2012, from http://www.touchbriefings.com/pdf/2454/Buelow[1].pdf

Burns, N., & Grove, S.K. (2005). *The practice of nursing research: conduct, critique & utilisation* (5th ed.). St. Louis: Elsevier Saunders.

Cappucio, F.P., Micah, F.B., Emmett, L., Kerry, S.M., Antwi, S., Martin-Peprah, R., et al. 2004). Prevalence, detection, management and control of hypertension in Ashanti, West Africa. *Hypertension, 43*, 1017-1022.

Catz, S.L., Kelly, J.A., Bogart L.M., Benotsch, E.G., & McAuliffe, T.L. (2000). Patterns, correlates, barriers to medication adherence among persons prescribed new treatments for HIV disease. *Health Psychology*, *19*(2), 124-133.

Chen, S., Tsai, J., & Lee, W. (2009). The impact of illness perception on adherence to therapeutic regimens of patients with hypertension in Taiwan. *Journal of Clinical Nursing, 18*, 2234-2244.

Clark N.M., & Dodge, J.A. (1999). Exploring self-efficacy as a predictor of disease management. *Health Education and Behaviour*, *26*(1), 72-89.

Clifford, S., Barber, N., Elliot, R., Harley, E., & Horne, R. (2006). Patient-centred

advice is effective in improving adherence to medicines. *Pharmacy World and Sciences, 28*(3), 165-170.

Coetzee, K. (2010, February 8). *Types of hypertension*. Retrieved February 2, 2011, from http://www.health24.com/medical/Condition_centres/777-792-815-1775,17124.asp

Colom, F., Vieta, E., Sa'nchez-Moreno, J., Marti'nezz-Ara'n, A., Reinares, M., Goikolea, J.M., & Scott, J. (2005). Stabilizing the stabilizer. Group psychoeducation enhances the stability of serum lithium levels. *Bipolar Disorder, 7*(5), 32-36.

Connor, M. & Norman, P. (Eds.). (2005). *Predicting Health Behaviour: Research and Practice with social cognition models* (2nd ed.). Berkshire, England: Open University Press. Available from http://ihepsa.com/files/predicting%20Health%20beh%20avior.pdf#page=18

Connor, M., Rheeder, P., Bryer, A., Meredith, M., Beukes, M., Dubb, A., et al. (2005). The South African Stroke Risk in General Practice study. *South African Medical Journal, 9*, 334-339.

Cunha, J.P. (2012). *High Blood Pressure*. Retrieved July 5, 2012, from http://www.medicinenet.com/high_blood_pressure/article.htm

Cutrona, S.L., Choudhry, N.K., Stedman, M., Servi, A., Liberman, J.N., Brennan, T., et al. (2010). Physician effectiveness in interventions to improve cardiovascular medication adherence: A systematic Review. *Journal of General Internal Medicine, 25*(10), 1090-1096.

Darko-Ampem, K.O. (2004). *Research design and methodology*. Retrieved February 5, 2010, from http://dspacedev.stir.ac.uk/bitstream/1893/71/4/Chapter%204.pdf

DeCoster, J. (1998). *Overview of factor analysis*. Retrieved April 20, 2012, from http://www.stat-help.com/factor.pdf

Donovan, J., & Blake, D. (1992). Patient non-compliance: Deviance or reasoned decision making? *Social Science & Medicine, 34*(5), 507-513.

Dowse, R., & Ehlers, M. (2005). Medicine labels incorporating pictograms: do they influence understanding and adherence?. *Patient Education and Counselling, 58*(1), 63-70.

Dubiel, M. Cwynar, M., Januszewicz, A., & Grodzicki, T. (2005). Patient's education in arterial hypertension. *Blood Pressure, 14*, 53-56.

Durant, R.H., Jay, M.S., Linder, C.W., Shoffitt, T., & Litt, I. (1984). Influence of psychosocial factors on adolescent compliance with oral contraceptives. *Journal of Adolescent Health Care, 5*(1), 1-6).

Edo, T.A. (2009). *Factors affecting compliance with anti-hypertensive drug treatment and required lifestyle modifications among hypertensive patients on Praslin Island*. Published dissertation, UNISA, Pretoria, South Africa.

Experiment Resources. (2008). *Types of research designs*. Retrieved February 5, 2010, from http://www.experiment-resources.com/research-designs.html

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage Publications Ltd.

Figueiras, M., Marcelino, D.S., Claudino, A., Cortes, M.A., Maroco, J., & Weinman, J. (2010). Patients' illness schemata of hypertension: The role of beliefs for the choice of treatment. *Psychology and Health, 25*(4), 507-517.

Foster, J., Barkus, E., & Yavorsky, C. (2006). *Understanding and using advanced statistics*. London: Sage Publications Ltd.

Foxcroft, C., & Roodt, G. (2005). *An introduction to psychological assessment in the South African context* (2nd ed.). Cape Town: Oxford University Press.

Glanz, K., Rimer, B.K. & Lewis, F.M. (2002). *Health Behavior and Health Education. Theory, Research and Practice*. San Fransisco: Wiley & Sons.

Goddard, W., & Melville, S. (2005*). Research methodology: An introduction* (2nd ed.). South Africa: Juta & Co. Ltd.

Goel, S. (2004). *Causes & cure of blood pressure*. New-Delhi: Diamond Pocket Books Pvt. Ltd. Retrieved March 5, 2012, http://books.google.co.za/books?id=JD0b4pKs2QkC&pg=PA30&dq=Alcohol+and+smoking+as+causes+of+high+blood+pressure&hl=en&sa=X&ei=kstVT9OfM-eQ0AXjmKTeCQ&ved=0CEAQ6AEwAg#v=onepage&q=Alcohol%20and%20smoking%20as%20causes%20of%20high%20blood%20pressure&f=false

Gravetter, F.J., & Forzano, L.B. (2009). *Research Methods for the Behavioral Sciences* (3rd ed.). Belmont, CA: Wadsworth: Cengage Learning.

Gu, Q., Burt, V.L., Paulose-Ram, R., & Dillon, C.F. (2008). Gender differences in hypertension treatment, drug utilization patterns, and blood pressure control among US adults with hypertension: data from the National Health and Nutrition Examination Survey 1999-2004. *American Journal of Hypertension, 21*(7), 789-798.

Guimón, J. (1995). The use of group programs to improve medication compliance in patients with chronic diseases. *Patient Education and Counselling, 26*, 189-193.

Hagger, M.S., & Orbell, S. (2003). A meta-analytic review of the commonsense model of illness representations. *Psychology and Health, 18*(2), 141-184.

Hamilton, G. (2003). Measuring adherence in a hypertension clinical trial. *European Journal of Cardiovascular Nursing, 2*(3), 219-228.

Harrison, B. (1998). Psychological aspects of asthma in adults. *Thorax, 53*, 519-525.

Harvard University. (2012). *Medications for treating hypertension*. Retrieved March 1, 2012, from http://www.health.harvard.edu/newsletters/Harvard_Womens_Health_Watch/2009/August/Medications-for-treating-hypertension

Haynes, R., Taylor, W., & Sackett, D. (Eds.). (1979). *Compliance in health care*. Baltimore: Johns Hopkins University Press.

Health24.com. (2010, February 8). *Types of hypertension*. Retrieved January 24, 2011, from http://www.health24.com/medical/Condition_centres/777-792-815-1775,17124.asp

Henson, R.K. (2001). Methods plainly speaking: Understanding internal consistency reliability estimates: A conceptual primer on coefficient alpha. *Measurement and Evaluation in Counselling and Development, 34*, 177-189.

Hekler, E.B., Lambert, J., Leventhal, E., Leventhal, H., Jahn, E., & Contrada, R.J. (2008). Commonsense illness beliefs, adherence behaviors, and hypertension control among African Americans. *Journal of Behaviour Medicine, 31*, 391-400.

Ho, P.M., Bryson, C.L., & Rumsfeld, J.S. (2009). Medication adherence: Its importance in cardiovascular outcomes. *Circulation, 119*, 3028-3035.

Horne, R., & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *Journal of Psychosomatic Research, 47*(6), 555-567.

Horne, R., Weinman, J., & Hankins, M. (1999). The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology and Health, 14*, 1-24.

Howell, J., Miller, P., Park, H.H., Sattler, D., Schack, T., Spery, E., Widhalm, S., & Palmquist, M. (2005). *Reliability and validity*. Retrieved March 2, 2010, from

http://writing.colostate.edu/guides/research/relval/

Hudson, M. (2010, February 9). *Hypertension in SA*. Retrieved January 24, 2011, from http://www.health24.com/medical/Condition_centres/777-792-815-1778,16793.asp

Hughes, C.M. (2004). Medication non-adherence in the elderly – How big is the problem?. *Drugs and Aging, 21*, 798-811.

Huxley, V.H. (2007). Sex and the cardiovascular system: the intriguing tale of how women and men regulate cardiovascular function differently. *Advances in Physiology Education, 31*, 17-22.

Inkster, M.E., Donnan, P.T., MacDonald, T.M., Sullivan, F.M., & Fahey, T. (2006). Adherence to antihypertensive medication and association with patient and practice factors. *Journal of Human Hypertension, 20*, 295-297.

Inman, J. (n.d.). *Social cognitive theory: A synthesis*. Retrieved September 2, 2011, from http://www.wetherhaven.com/Documents/socialcognitivetheory.pdf

Johnson, M.J. (2002). The medication adherence model: a guide for assessing Medication taking. *Research and Theory for nursing practice: An International Journal, 16*, 179-192.

Johnson, M. J., & Rogers, S. (2006). Development of the purposeful action medication taking questionnaire. *Western Journal of Nursing Research, 28*(3), 335-351.

Johnson, M.J., Williams, M., & Marshall, E.S. (1999). Adherent and nonadherent medication taking in elderly hypertensive patients. *Clinical Nursing Research, 8*, 318-335.

Jordaan, W. (2009). *Theories and Paradigms* [Study Notes]. Unpublished manuscript, SLK751, University of Pretoria.

Kaplan, M.N. (2006). *Kaplan's clinical hypertension (*9th ed.). Philadelphia: Lippincott Williams & Wilkins.

Kaplan, N.M., & Calhoun, D.A. (2012). *Definition, risk factors, and evaluation of resistant hypertension*. Retrieved July 5, 2012, from http://www.uptodate.com/contents/definition-risk-factors-and-evaluation-of-resistant-hypertension?source=search_result&search=resistant+hypertension&selectedTitle=1%7E52

Kemp, S., Feely, M., Hay, A., Wild, H., & Cooper, C. (2007). Psychological factors and use of antiepileptic drugs: Pilot work using an objective measure of adherence. *Psychology, Health & Medicine, 12*(1), 107-113.

Kaufman, J.S., Rotimi, C.N., Brieger, W.R., Oladokum, M.A., Kadiri, S., Osotimehin, B.O., et al. (1996). The mortality risk associated with hypertension: preliminary results of a prospective study in rural Nigeria. *Journal of Human Hypertension, 10*, 461-464.

Lehane, E., & McCarthly, G. (2007). An examination of the intentional and unintentional aspects of medication non-adherence in patients diagnosed with hypertension. *Journal of Clinical Nursing, 16*, 698-706.

Leventhal, H., Diefenbach, M., & Leventhal, E.A. (1992). Illness cognitions: Using common sense to understand adherence and affect cognition interaction. *Cognitive Therapy and Research, 16*, 143-163.

Luszczynska, A., & Schwarzer, R. (2005). *Social cognitive theory*. In M. Conner & P. Norman (Eds.), Predicting health behaviour (2nd ed., pp.127-169). Berkshire, England: Open University Press.

Maguire, L.K., Hughes, C.M., & McElnay, J.C. (2008). Exploring the impact of depressive symptoms and medication beliefs on medication adherence in hypertension: A primary case study. *Patient Education and Counselling, 73*(2), 371-376.

Maree, K., & Van der Westhuizen, C. (2009). *Head start in designing research proposals in the social sciences.* Cape town: Juta & Company Ltd.

Maric, C. (2005). Sex differences in cardiovascular disease and hypertension. *Hypertension, 46*, 475-476.

Mayo Clinic Staff. (August 2, 2011). *High blood pressure dangers: Hypertension's effects on your body. High blood pressure is a risk factor for more than heart disease. Discover what complications high blood pressure can cause*. Retrieved March 1, 2012, from http://www.mayoclinic.com/health/high-blood-pressure/HI00062

McDonald, H.P., Garg, A.X., & Haynes, R.B. (2002). Interventions to enhance patient adherence to medical prescriptions: Scientific Review. *Journal of the American Medical Association, 288*(22), 2868-2879.

McGann, E. (1999). Medication compliance in adults with asthma. *American Journal of Nursing, 99*(3), 45-46.

McGann, E.F., Sexton, D., & Chyun, D.A. (2008). Denial and compliance in adults with asthma. *Clinical Nursing Research, 17*(3), 151-170.

Meyer, D., Leventhal, H., & Gutmann, M. (1985). Common-sense models of illness: the example of hypertension. *Health Psychology, 4*, 115-135.

Miloh, T., & Annunziato, R. (2010). Adhering to your non-adherent patients: the challenge of non-compliance. *Acta Paediatrica, 99*, 335-337.

Moll, J. (2009). *Can my high blood pressure medication affect my cholesterol?*. Retrieved March 1, 2012, from http://cholesterol.about.com/od/treatments/f/bloodpressuremeds.htm

Molassiotis, A., Nahas-Lopez, V., Chung, W.Y.R., Lam. S.W.C., Li, C.K.P., & Lau, T.F.J. (2002). Factors associated with adherence to antiretroviral medication in HIV-infected patients. *International Journal of STD and Aids, 13*(5), 301-310.

Moss-Morris, R., Weinman J., Petrie, K.J., Horne, R., Cameron, L.D., & Buick, D. 2002). The revised illness perception questionnaire (IPQ-R). *Psychology and Health, 17*(1), 1-16.

Mouton, J. (2005). *How to succeed in your Master's and Doctoral studies: A South African guide and resource book.* Pretoria: Van Schaik publishers.

Myers, T., & Caulfield, M. (2001). *Managing patients with difficult hypertension.* Retrieved February 2, 2011, from http://0search.proquest.com.innopac.up.ac.za/docview/233430638/abstract/12D6F122467308E912E/2?accountid=14717

O'Connor, S.M., Jardine, A.G., & Millar, K. (2008). The prediction of self-care behaviours in end-stage renal disease patients using Leventhal's self-regulatory model. *Journal of Psychosomatic Research, 65*(2), 191-200.

Opie, L.H., & Seedat, Y.K. (2005). Hypertension in Sub-Saharan African populations. *Circulation, 122*, 3562-3568.

Parker, R.M. (2001). Power, control and validity in research. *Journal of Learning Disabilities, 23*(10), 613-620.

Peltzer, K. (2004). *Health beliefs and prescription medication compliance among diagnosed hypertension clinic attenders in a rural South African hospital*. Retrieved February 2, 2011, from http://www.ncbi.nlm.nih.gov/pubmed/15777026

Petrie, K.J., Jago, L.A., & Devcich, D.A. (2007). The role of illness perceptions in patients with medical conditions. *Current Opinion in Psychiatry, 20*, 163-167.

Polit, D.F., & Beck, C. T. (2008). *Nursing research: generating and assessing evidence for nursing practice* (8th ed.). Philadelphia: Lippincott Williams & Wilkins.

Possidente, C.J., Bucci, K.K., & McClain, W.J. (2005). Motivational interviewing: A tool to improve medication adherence? *American Journal of Health-System Pharmacists, 62*, 1311-1314.

Prochaska, J.O. (1994). Strong and weak principles for progressing from pre-contemplation to action on the basis of 12 problem behaviours. *Health Psychology, 13*, 47-51.

Rafigue, F. (15, May 2011). *Drugs don't work in patients who don't take them: what the industry can do*. Retrieved April 30, 2012, from http://www.pjonline.com/blog_entry/drugs_don%E2%80%99t_work_in_patients_who_don%E2%80%99t_take_them_what_the_pharmaceutical_industry_can_do

Ramchander, P. (2004). *Research design and methodology*. Retrieved March 5, 2010, from http://upetd.up.ac.za/thesis/available/etd-08262004-130507/unrestricted/05chapter5.pdf

Rolley, J.X., Davidson, P.M., Dennison, C.R., Ong, A., Everett, B., & Salamonson, Y. (2008). Medication adherence self-report instruments: Implications for practice and research. *Journal of Cardiovascular Nursing, 23*(6), 497-505.

Ross, S., Walker, A., & MacLeod, M.J. (2004). Patient compliance in hypertension: role of illness perceptions and treatment beliefs. *Journal of Human Hypertension, 18*, 607-613.

Rothman, A.J. (2000). Toward a theory-based analysis of behavioural maintenance. *Health Psychology, 19*, 64-69.

Schousboe, J.T. (2009). *Determinants of oral medication compliance in osteoporosis: The role of medication beliefs*. Published dissertation, University of Minnesota. Retrieved March 1, 2012, from

http://conservancy.umn.edu/bitstream/48073/1/Schousboe_umn_0130E_10118.pdf

Schoenstadt, A. (2009). *Systolic and diastolic blood pressure*. Retrieved July 5, from, http://blood-pressure.emedtv.com/systolic-blood-pressure/systolic-and-diastolic-blood-pressure.html

Shadish, W.R., Cook, T.D., & Campbell, D.T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Canada: Houghton Mifflin Company.

Shuttleworth, M. (2008). *Validity and reliability*. Retrieved February 5, 2010, from http://www.experiment-resources.com/validity-and-reliability.html

Siddharth, K. (2011). *Correlational study*. Retrieved February 5, 2010, from http://www.experiment-resources.com/correlational-study.html

Simoni, J.M., Asarnow, J.R., Munford, P.R., Koprowski, C.M., Belin, T.R., & Salusky, I.B. (1997). Psychological distress and treatment adherence among children on dialysis. *Paediatric Nephrology*, *11*, 604-606.

Steyn, K. (2005) *Hypertension in South Africa*. Retrieved July 5, 2012, from http://www.mrc.ac.za/chronic/cdlchapter8.pdf

Steyn, K., Gaziano, T.A., Bradshaw, D., Laubschar, R., & Fourie, J. (2001). Hypertension in South African adults: results from the demographic and health survey, 1998. *Journal of Hypertension*, *19*, 1717-1725.

Stewart, S,M., Lee, P.W.H., Waller, D., Hughes, C.W., Low, L.C.K., Kennard, B.D., et al. (2003). A follow-up study of adherence and glycemic control among Hong Kong youths with diabetes. *Journal of Paediatric Psychology*, *28*(1), 67-79.

Surveymonkey (2012). *Surveymonkey*. Retrieved July 5, 2012, from

http://www.surveymonkey.com/?utm_source=adwords&utm_medium=ppc&utm_term=surveymonkey&utm_network=g&utm_campaign=e&source=SearchNetwork&placement=&cmpid=brand&mkwid=sDfPF1gR1&pcrid=21979620116&pmt=e&kw=surveymonkey&gclid=CPiN4cLIhLECFZMctAodwQ5E9g

Svensson, S., Kjellgren, K.I., Ahlner, J., & Säljö, R. (2000). Reasons for adherence with antihypertensive medication. *International Journal of Cardiology, 76,* 157-163.

Symptoms of Hypertension.com. (2011). *What is hypertension and what are the common symptoms?*. Retrieved January 27, 2011, from http://www.symptoms-of-hypertension.com/

Tariq. (2009, January 2). *Validity in research design*. Retrieved March 2, 2010, from http://www.activecampaign.com/blog/validity-in-research-design/

Taylor, S.E. (2012). *Health Psychology* (8th ed.). New York: McGraw Hill.

Theunissen, N.C.M., de Ridder, D.T.D., Bensing, J.M., & Rutten, G.E.H.M. (2003). Manipulation of patient-provider interaction: discussing illness representations or action plans concerning adherence. *Patient Education and Counselling, 51*, 247-258.

Thrall, G., Lip, G.Y.H., & Lane, D. (2004). Compliance with pharmacological therapy in hypertension: can we do better, and how?. *Journal of Human Hypertension, 18*, 595-597.

Timmreck, T.C. (1987). *Dictionary of health services management* (2nd ed.). Retrieved October 1, 2010, from http://openlibrary.org/books/OL2744425M/Dictionary_of_health_services_management

Treharne, G.J., Lyons, A.C., & Kitas, G.D. (2004). Medication adherence in rheumatoid arthritis: Effects of psychosocial factors. *Psychology, Health & Medicine, 9*(3), 337-349.

Trochim, W.M.K. (2001). *Research methods knowledge base* (2nd.). USA: Atomic Dog Publishing.

Trochim, W.M.K. (2006, October 20). *Introduction to design.* Retrieved March 2, 2010, from http://www.socialresearchmethods.net/kb/desintro.htm

Trochim, W.M.K.., & Donnelly, J.P. (2007). *Research methods knowledge base* (3rd.). Belmont, CA: Thomson custom publishing.

Van Minah, H., Byass, P., Chuc, N.T.K., & Wall, S. (2006). Gender differences in prevalence and socioeconomic determinants of hypertension: findings from the WHO STEPs survey in a rural community of Vietnam. *Journal of Human Hypertension, 20*, 109-115.

University of Twente. (2010, September 7). *Social cognitive theory*. Retrieved September 2, 2011, from http://www.utwente.nl/cw/theorieenoverzicht/Theory%20clusters/Health%20Communication/Social_cognitive_theory.doc/

Vuckovich, P.K. (2010). Compliance versus adherence in serious and persistent mental illness. *Nursing Ethics, 17*(1), 77-85.

Wade, M., & Schneberger, S. (2006, February 2). T*heories used in IS research: Social cognitive theory*. Retrieved September 2, 2011, from http://www.istheory.yorku.ca/socialcognitivetheory.htm

Wadee, H., Gilson, L., Thiede, M., Okorafor, O., McIntyre, D. (2003). *Health care inequity in South Africa and the public/private mix*. Retrieved July 5, 2012, from http://www.ruig-gian.org/ressources/comeliau-health_SouthAfrica-Wadee-Gilson-Thiede-Okorafor-McIntyre.pdf?ID=122&FILE=/ressources/comeliau-health_SouthAfrica-Wadee-Gilson-Thiede-Okorafor-McIntyre.pdf

Wang, P.S., Bohn, R.L., Knight, E., Glynn, R.J., Mogun, H., & Avorn, J. (2002). Noncompliance with antihypertensive medications: The impact of depressive symptoms and psychosocial factors. *Journal of General Internal Medicine, 17*(7), 504-511.

Wedro, B.C., & Stöppler, M.C. (2011). *High Blood Pressure*. Retrieved February 2, 2011, from http://www.emedicinehealth.com/high_blood_pressure/page5_em.htm

Weinman, J., & Petrie, K.J. (1997). Illness perceptions: A new paradigm for psychosomatics?. *Journal of Psychosomatic Research, 42*(2), 113-116.

Weinman, J., Petrie, K.J., Moss-Morris, R., & Horne, R. (1996). The illness perception questionnaire: A new method for assessing the cognitive representation of illness. *Psychology and Health, 11*, 431-445.

Williams, K.E., & Bond, M.J. (2002). The role of self-efficacy, outcome expectancies and social support in the self-care behaviours of diabetics. Psychology, *Health & Medicine, 7*(2), 127-141.

Willig, C. (2009). *Introducing Qualitative research in Psychology* (2 ed.). Open University Press.

World Health Organization. (WHO) (2003). *Adherence to long-term therapies: Evidence for action*. Retrieved June 16, from http://apps.who.int/medicinedocs/pdf/s4883e/s4883e.pdf

Wroe, A.L. (2002). Intentional and unintentional nonadherence: A study of decision making. *Journal of Behavioural Medicine, 25*, 355-372.

Yin, R.K. (1994). *Case study research: Design and methods*. (2nd ed.). Thousand Oaks: Sage publications.

Zahler, R.M.D. & Piselli, C.R.N. (n.d.). *Smoking, alcohol and drugs.* Retrieved March 5, 2012, from http://www.med.yale.edu/library/heartbk/6.pdf

Zillmer, E.A., Spiers, M.V., & Culbertson, W.C. (2008). *Principles of Neurospychology* (2nd ed.). Belmont, CA: Wadsworth and Cengage Learning.

APPENDIX A – Descriptive Statistics: Frequency Tables

Table 4.1A Main diagnosis

MAIN DIAGNOSIS		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		4	4.5	4.5	4.5
	HYPERTENSION/HIGH BLOOD PRESSURE	42	47.7	47.7	52.3
	HIGH BLOOD PRESSURE; HIGH CHOLESTEROL & DIABETES II	2	2.3	2.3	54.5
	HIGH BLOOD PRESSURE & TIA	1	1.1	1.1	55.7
	HEART	1	1.1	1.1	56.8
	HYPERTENSION; HIGH CHOLESTEROL & ARTHRITIS	1	1.1	1.1	58.0
	HYPERTENSION AND OVERACTIVE THYRIOD	1	1.1	1.1	59.1
	ANKOLYSING SPONDYLITIS & HYPERTENSION	1	1.1	1.1	60.2
	DIABETES II: HYPERTENSION; DEPRESSION & BRUSITIS IN SHOULDER	1	1.1	1.1	61.4
	DEPRESSION	2	2.3	2.3	63.6
	HEART & HYPERTENSION	1	1.1	1.1	64.8
	HIGH CHOLESTEROL & HIGH BLOOD PRESSURE	4	4.5	4.5	69.3
	HYPERTENSION & DIABETES	9	10.2	10.2	79.5
	CHRONIC BRONCHITIS; HIGH BLOOD PRESSURE & HIGH CHOLESTEROL	1	1.1	1.1	80.7
	HEART ATTACK	1	1.1	1.1	81.8
	DIABETES; HIGH BLOOD PRESSURE & HIGH GLUCOSE COUNT	1	1.1	1.1	83.0
	DIABETIC II	4	4.5	4.5	87.5
	KIDNEY TRANSPLANT & DIABETES II	1	1.1	1.1	88.6
	HIGH BLOOD PRESSURE AND GOUT	1	1.1	1.1	89.8
	HYPERTENSION; DIABETES & HEART PROBLEMS	2	2.3	2.3	92.0
	BLOCKED ARTERIES	1	1.1	1.1	93.2

MAIN DIAGNOSIS		Frequency	Percent	Valid Percent	Cumulative Percent
	DIABETES; STENT; SPINAL STENOSIS; HYPERTENSION & PNEUMONIA	1	1.1	1.1	94.3
	HYPERTENSION; HIGH BLOOD SUGAR LEVEL	1	1.1	1.1	95.5
	POSTPARTUM CARDIOMYOPATHY	1	1.1	1.1	96.6
	HYPERTESIOM & EYE SIGHT	1	1.1	1.1	97.7
	HYPERTENSION; HYPERLIPEDEMIA & TIA	1	1.1	1.1	98.9
	Diagnosed about 10 years ago, but well controlled with medication.	1	1.1	1.1	100.0
	Total	88	100.0	100.0	

Table 4.1B Additional diagnoses

		Frequency	Percent	Valid Percent	Cumulative Percent
		28	31.8	31.8	31.8
	Sinus	2	2.3	2.3	34.1
	Anxiety attackts	1	1.1	1.1	35.2
	Elevated blood glucose levels	1	1.1	1.1	36.4
	High cholesterol & arthritis	1	1.1	1.1	37.5
	Cancer, gall stones & bone calsification	1	1.1	1.1	38.6
	Cholesterol	4	4.5	4.5	43.2
	Hypothyroidism	1	1.1	1.1	44.3
Valid	Hypothyroid & cholesterol up	1	1.1	1.1	45.5
	Diabetes 2	7	8.0	8.0	53.4
	Hypercholestrolemia & Osteoarthritis	1	1.1	1.1	54.5
	History of blood clots & cellulitis on legs	1	1.1	1.1	55.7
	Osteoarthritis	1	1.1	1.1	56.8
	Heartburn	1	1.1	1.1	58.0
	Allergies to cat hair, dust & pollen	1	1.1	1.1	59.1
	Ulserative colitis	1	1.1	1.1	60.2
	Acid reflux	1	1.1	1.1	61.4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High blood pressure & high glucose count	1	1.1	1.1	62.5
	Asthma	2	2.3	2.3	64.8
	Insulin resistant	1	1.1	1.1	65.9
	Back pain	1	1.1	1.1	67.0
	Gout, periodically diabetes	1	1.1	1.1	68.2
	Sore back	1	1.1	1.1	69.3
	Type II Diabtes & cholesterol	1	1.1	1.1	70.5
	High cholesterol & osteoporosis	1	1.1	1.1	71.6
	Depression	1	1.1	1.1	72.7
	Hypertension	1	1.1	1.1	73.9
	Blood clots	1	1.1	1.1	75.0
	Poor blood circulation & gastric acides	1	1.1	1.1	76.1
	8 Years	1	1.1	1.1	77.3
	Geen	1	1.1	1.1	78.4
	n/a	3	3.4	3.4	81.8
	N/A	1	1.1	1.1	83.0
	Nil	1	1.1	1.1	84.1
	No	2	2.3	2.3	86.4
	Non	1	1.1	1.1	87.5
	None	5	5.7	5.7	93.2
	None	6	6.8	6.8	100.0
	Total	88	100.0	100.0	

Table 4.1.1 Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4	4.5	4.5	4.5
	27.00	1	1.1	1.1	5.7
	30.00	1	1.1	1.1	6.8
	32.00	1	1.1	1.1	8.0
	33.00	1	1.1	1.1	9.1
	36.00	2	2.3	2.3	11.4
	37.00	3	3.4	3.4	14.8
	38.00	2	2.3	2.3	17.0
	39.00	4	4.5	4.5	21.6
	40.00	1	1.1	1.1	22.7

	Frequency	Percent	Valid Percent	Cumulative Percent
41.00	2	2.3	2.3	25.0
42.00	2	2.3	2.3	27.3
43.00	3	3.4	3.4	30.7
44.00	3	3.4	3.4	34.1
46.00	1	1.1	1.1	35.2
47.00	4	4.5	4.5	39.8
48.00	2	2.3	2.3	42.0
49.00	3	3.4	3.4	45.5
51.00	3	3.4	3.4	48.9
52.00	5	5.7	5.7	54.5
53.00	1	1.1	1.1	55.7
54.00	2	2.3	2.3	58.0
56.00	4	4.5	4.5	62.5
57.00	1	1.1	1.1	63.6
58.00	2	2.3	2.3	65.9
59.00	2	2.3	2.3	68.2
60.00	4	4.5	4.5	72.7
62.00	3	3.4	3.4	76.1
63.00	3	3.4	3.4	79.5
64.00	3	3.4	3.4	83.0
65.00	3	3.4	3.4	86.4
66.00	2	2.3	2.3	88.6
67.00	1	1.1	1.1	89.8
69.00	1	1.1	1.1	90.9
70.00	1	1.1	1.1	92.0
72.00	2	2.3	2.3	94.3
73.00	1	1.1	1.1	95.5
74.00	1	1.1	1.1	96.6
76.00	1	1.1	1.1	97.7
77.00	1	1.1	1.1	98.9
82.00	1	1.1	1.1	100.0
Total	88	100.0	100.0	

Table 4.1.2 Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	MALE	39	44.3	44.3	46.6
	FEMALE	47	53.4	53.4	100.0
	Total	88	100.0	100.0	

Table 4.1.3 Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SINGLE	10	11.4	11.4	11.4
	MARRIED	67	76.1	76.1	87.5
	DIVORCED	7	8.0	8.0	95.5
	WIDOWED	4	4.5	4.5	100.0
	Total	88	100.0	100.0	

Table 4.1.4 Employment Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	EMPLOYED	61	69.3	69.3	71.6
	UNEMPLOYED	4	4.5	4.5	76.1
	RETIRED	16	18.2	18.2	94.3
	OTHER	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Table 4.1.5 Educational Background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	3.4	3.4	3.4
	MATRIC	28	31.8	31.8	35.2
	DIPLOMA	21	23.9	23.9	59.1
	DEGREE	24	27.3	27.3	86.4
	OTHER	12	13.6	13.6	100.0
	Total	88	100.0	100.0	

4.1.6 Smoker/non-smoker

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SMOKING	9	10.2	10.2	11.4
	HISTORY OF SMOKING	10	11.4	11.4	22.7
	NON-SMOKING	68	77.3	77.3	100.0
	Total	88	100.0	100.0	

Table 4.1.7A Duration of illness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	5.7	5.7	5.7
	LESS THAN 5 YEARS	23	26.1	26.1	31.8
	5-10 YEARS	20	22.7	22.7	54.5
	10-20 YEARS	26	29.5	29.5	84.1
	20-30 YEARS	3	3.4	3.4	87.5
	30 YEARS+	4	4.5	4.5	92.0
	HYPERTENSION 10 YEARS TYROID 30 YEARS DIABETES 11 8 YEARS+	1	1.1	1.1	93.2
	HYPERTENSION 22 YEARS CHRONIC DEPRESSEION 17 YEARS BRUSITUS 4 YEARS	1	1.1	1.1	94.3
	TRANSPLANT 17 YEARS DIABETES 18 MONTHS	1	1.1	1.1	95.5
	STENT 20YRS DIABETIS 10 YEARS				
	HYPERTENTION/PNEUMONIA 2 YEARS SPINAL STENONUS 2 YEARS	1	1.1	1.1	96.6
	HYPERTENSION 40 YEARS DIABETES 20 YEARS	1	1.1	1.1	97.7
	n/a	1	1.1	1.1	98.9
	None	1	1.1	1.1	100.0
	Total	88	100.0	100.0	

Table 4.1.7B History of hypertension

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	3.4	3.4	3.4
	YES	66	75.0	75.0	78.4
	NO	19	21.6	21.6	100.0
	Total	88	100.0	100.0	

Table 4.1.8A Informed about illness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	72	81.8	81.8	83.0
	NO	15	17.0	17.0	100.0
	Total	88	100.0	100.0	

Table 4.1.8B Perceived relationship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VERY GOOD	53	60.2	60.2	60.2
	GOOD	25	28.4	28.4	88.6
	AVERAGE	10	11.4	11.4	100.0
	Total	88	100.0	100.0	

Table 4.1.8C Type of anti-hypertensive medication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	5.7	5.7	5.7
	?	1	1.1	1.1	6.8
	1x Amloc 10mg,1x Crestor 20mg1x Tareg160mg daily	1	1.1	1.1	8.0
	Adalat 30 and Coversil plus	1	1.1	1.1	9.1
	Adco retic and Concor	1	1.1	1.1	10.2
	Amloc 10ml	1	1.1	1.1	11.4
	Amloc 5, Prexum	1	1.1	1.1	12.5
	Approval/Moxotens/Zildem/Triplene Forte	1	1.1	1.1	13.6

	Frequency	Percent	Valid Percent	Cumulative Percent
Atacand 16mg	1	1.1	1.1	14.8
bilocor 5mg and prexum plus	1	1.1	1.1	15.9
Burinex	1	1.1	1.1	17.0
Caduet	1	1.1	1.1	18.2
CARLOC / COZA COMP	1	1.1	1.1	19.3
Carvetrend, Pritor, Aldactone	1	1.1	1.1	20.5
cipipat / fortzar / nebilet	1	1.1	1.1	21.6
cipla lozartan 50	1	1.1	1.1	22.7
co – mycardis	1	1.1	1.1	23.9
Co Diavan	1	1.1	1.1	25.0
co diovan and lumanor	1	1.1	1.1	26.1
Co Tareg.	1	1.1	1.1	27.3
Co-aprovel 12.5/150 diuretic	1	1.1	1.1	28.4
Co-Diovin 80 (before) Carloc - 12.5 and Dapamax 2.5(Now)	1	1.1	1.1	29.5
co-priotor, zanidip	1	1.1	1.1	30.7
Codiovan	1	1.1	1.1	31.8
coversol plus	1	1.1	1.1	33.0
Coversol Plus	1	1.1	1.1	34.1
Coversyl Plus and Caduet 5/10	1	1.1	1.1	35.2
Cozaar Comp	2	2.3	2.3	37.5
COZAAR COMP	1	1.1	1.1	38.6
Cozaar Comp; Caduet 5/10; asprin	1	1.1	1.1	39.8
Enap	1	1.1	1.1	40.9
Exforge; Ridaq	1	1.1	1.1	42.0
Fortzaar	1	1.1	1.1	43.2
Garloc	1	1.1	1.1	44.3
Generic of Co Diovan	1	1.1	1.1	45.5
hydroless cant remember the name of the other pills	1	1.1	1.1	46.6
Irbewin	1	1.1	1.1	47.7
Lisinprorol	1	1.1	1.1	48.9
Lomanor, just stopped Ziak	1	1.1	1.1	50.0
Lominor / Unknown product	1	1.1	1.1	51.1
Micardis 40	1	1.1	1.1	52.3
n/a	2	2.3	2.3	54.5

	Frequency	Percent	Valid Percent	Cumulative Percent
NATRILIX SR, PREXUM and ASPAVOR	1	1.1	1.1	55.7
No	1	1.1	1.1	56.8
None	1	1.1	1.1	58.0
none since retiring	1	1.1	1.1	59.1
Not known	1	1.1	1.1	60.2
Perinda; Carloc; Cynt	1	1.1	1.1	61.4
PHARMAPRESS 20mg	1	1.1	1.1	62.5
Pharmapress/Amloc/Concor	1	1.1	1.1	63.6
Plexum	1	1.1	1.1	64.8
Plexum Plus	1	1.1	1.1	65.9
PREXIM....LEXAMIL..;CIPLAVAS C 10	1	1.1	1.1	67.0
Prexum	2	2.3	2.3	69.3
Prexum 10mg	1	1.1	1.1	70.5
prexum plus	1	1.1	1.1	71.6
Prexum plus	1	1.1	1.1	72.7
Prexum Plus	4	4.5	4.5	77.3
PREXUM PLUS	1	1.1	1.1	78.4
Prexum Plus and Xanidip	1	1.1	1.1	79.5
Prexum, Carloc & Nebilet	1	1.1	1.1	80.7
Prexxum Plus	1	1.1	1.1	81.8
Ridaq	1	1.1	1.1	83.0
TABLET	1	1.1	1.1	84.1
Tablets	1	1.1	1.1	85.2
Tareg	1	1.1	1.1	86.4
TAREG 80	1	1.1	1.1	87.5
Tareg 80 Ziak 5/6.25mg	1	1.1	1.1	88.6
TAREG,	1	1.1	1.1	89.8
Tarka 180mg	1	1.1	1.1	90.9
Two different types (Co-Diovan and something else)	1	1.1	1.1	92.0
Vascodialator (amloc 10mg), vascular medicines (Co-Diovan 160)	1	1.1	1.1	93.2
Vectoral 4 mg	1	1.1	1.1	94.3
VECTORIL, AMLATE,ECOTRIN	1	1.1	1.1	95.5
Vectoryl	1	1.1	1.1	96.6

		Frequency	Percent	Valid Percent	Cumulative Percent
	Zartan	1	1.1	1.1	97.7
	Ziak	1	1.1	1.1	98.9
	Ziak 6.5mg and Diovan 40mg	1	1.1	1.1	100.0
	Total	88	100.0	100.0	

Table 4.1.8D Prescribed dosage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	5.7	5.7	5.7
	1 PILL DAILY	51	58.0	58.0	63.6
	2 PILLS DAILY	16	18.2	18.2	81.8
	3 OR MORE PILLS DAILY	10	11.4	11.4	93.2
	1/d	1	1.1	1.1	94.3
	2004/01/01	1	1.1	1.1	95.5
	5/20 once per day	1	1.1	1.1	96.6
	n/a	2	2.3	2.3	98.9
	Nil	1	1.1	1.1	100.0
	Total	88	100.0	100.0	

Table 4.1.8E Prescribed instruction

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	5	5.7	5.9	5.9
	MORNING ONLY	65	73.9	76.5	82.4
	AFTERNOON ONLY	1	1.1	1.2	83.5
Valid	EVENING ONLY	4	4.5	4.7	88.2
	MORNING AND AFTERNOON	2	2.3	2.4	90.6
	MORNING AND EVENING	8	9.1	9.4	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.1.9A Psychological disorders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4	4.5	4.5	4.5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	7	8.0	8.0	12.5
	NO	77	87.5	87.5	100.0
	Total	88	100.0	100.0	

Table 4.1.9B Type of psychological disorders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		77	87.5	87.5	87.5
	AFFECTIVE DISORDER WITH ANXIETY ATTACKTS	1	1.1	1.1	88.6
	BIPOLAR MOOD DISORDER (PREVIOUS MAJOR DEPRESSION)	1	1.1	1.1	89.8
	DEPRESSION	2	2.3	2.3	92.0
	POST TRAUMATIC STRESS DISORDER	1	1.1	1.1	93.2
	hole family	1	1.1	1.1	94.3
	Mother also suffered from Hypertension and arthritis	1	1.1	1.1	95.5
	Mother had it	1	1.1	1.1	96.6
	n/a	1	1.1	1.1	97.7
	N/A	1	1.1	1.1	98.9
	suffering loss of business	1	1.1	1.1	100.0
	Total	88	100.0	100.0	

Table 4.2.1 General compliance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not completed	3	3.4	3.4	3.4
	Not completed	2	2.3	2.3	5.7
	I never take my medication	2	2.3	2.3	8.0
	I take my medication but occasionally skip a day or more	9	10.2	10.2	18.2
	I take my medication daily but not as instructed	4	4.5	4.5	22.7
	I take my medication but sometimes unintentionally forgets	21	23.9	23.9	46.6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I always take my medication and never miss a dosage	47	53.4	53.4	100.0
	Total	88	100.0	100.0	

Table 4.2.2 Compliance over the past seven days

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not completed	3	3.4	3.4	3.4
	Not completed	3	3.4	3.4	6.8
	I was not at all able to take my medication at all	3	3.4	3.4	10.2
	I took my medication but skipped a day or more	7	8.0	8.0	18.2
	I took my medication but not as instructed	4	4.5	4.5	22.7
	I took my medication as instructed everyday	68	77.3	77.3	100.0
	Total	88	100.0	100.0	

Table 4.2.3 Adherence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	41	46.6	46.6	46.6
	1.00	47	53.4	53.4	100.0
	Total	88	100.0	100.0	

The Medication-taking Questionnaire (MTQ)

Perceived need

Table 4.3.1 My blood pressure pills keep me from having a stroke

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.2	1.2
	STRONGLY DISAGREE	1	1.1	1.2	2.4
	DISAGREE	2	2.3	2.4	4.7
	NEUTRAL	11	12.5	12.9	17.6
	AGREE	43	48.9	50.6	68.2
	STRONGLY AGREE	27	30.7	31.8	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.2 I need to take my blood pressure pills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.2	1.2
	STRONGLY DISAGREE	2	2.3	2.4	3.5
	NEUTRAL	3	3.4	3.5	7.1
	AGREE	43	48.9	50.6	57.6
	STRONGLY AGREE	36	40.9	42.4	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.3 I take my blood pressure pills for my health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.4	2.4
	STRONGLY DISAGREE	2	2.3	2.4	4.7
	NEUTRAL	2	2.3	2.4	7.1
	AGREE	47	53.4	55.3	62.4
	STRONGLY AGREE	32	36.4	37.6	100.0

		Frequency	Percent	Valid Percent	Cumulative Percent
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.4 Blood pressure pills keep me from having health-related problems

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	1	1.1	1.2	1.2
	STRONGLY DISAGREE	3	3.4	3.5	4.7
	DISAGREE	3	3.4	3.5	8.2
Valid	NEUTRAL	17	19.3	20.0	28.2
	AGREE	40	45.5	47.1	75.3
	STRONGLY AGREE	21	23.9	24.7	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.5 I could have health problems if I do not take my blood pressure pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	2	2.3	2.4	2.4
	STRONGLY DISAGREE	2	2.3	2.4	4.7
	DISAGREE	3	3.4	3.5	8.2
Valid	NEUTRAL	9	10.2	10.6	18.8
	AGREE	39	44.3	45.9	64.7
	STRONGLY AGREE	30	34.1	35.3	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.6 It's not a problem if I miss my blood pressure pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	1	1.1	1.2	1.2
	STRONGLY AGREE	4	4.5	4.7	5.9
Valid	AGREE	7	8.0	8.2	14.1
	NEUTRAL	9	10.2	10.6	24.7

		Frequency	Percent	Valid Percent	Cumulative Percent
	DISAGREE	41	46.6	48.2	72.9
	STRONGLY DISAGREE	23	26.1	27.1	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.7 I would rather treat my blood pressure without pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	1	1.1	1.2	1.2
	STRONGLY AGREE	6	6.8	7.1	8.2
	AGREE	22	25.0	25.9	34.1
Valid	NEUTRAL	17	19.3	20.0	54.1
	DISAGREE	24	27.3	28.2	82.4
	STRONGLY DISAGREE	15	17.0	17.6	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.8 I am OK if I do not take my blood pressure pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	2	2.3	2.4	2.4
	STRONGLY AGREE	3	3.4	3.5	5.9
	AGREE	5	5.7	5.9	11.8
Valid	NEUTRAL	18	20.5	21.2	32.9
	DISAGREE	35	39.8	41.2	74.1
	STRONGLY DISAGREE	22	25.0	25.9	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Perceived Effectiveness

Table 4.3.9 My blood pressure will come down enough without pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	1	1.1	1.2	1.2
	STRONGLY AGREE	5	5.7	5.9	7.1
	AGREE	6	6.8	7.1	14.1
Valid	NEUTRAL	8	9.1	9.4	23.5
	DISAGREE	52	59.1	61.2	84.7
	STRONGLY DISAGREE	13	14.8	15.3	100.0
	Total	85	96.6	100.0	
Missing	System	3	3.4		
Total		88	100.0		

Table 4.3.10 I will have problems if I don't take my blood pressure pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	1	1.1	1.2	1.2
	STRONGLY DISAGREE	1	1.1	1.2	2.4
	DISAGREE	2	2.3	2.4	4.8
Valid	NEUTRAL	6	6.8	7.1	11.9
	AGREE	48	54.5	57.1	69.0
	STRONGLY AGREE	26	29.5	31.0	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.11 My blood pressure pills control my blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	1	1.1	1.2	1.2
	STRONGLY DISAGREE	1	1.1	1.2	2.4
	NEUTRAL	2	2.3	2.4	4.8
Valid	AGREE	54	61.4	64.3	69.0
	STRONGLY AGREE	26	29.5	31.0	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		

	Frequency	Percent	Valid Percent	Cumulative Percent
Total	88	100.0		

Table 4.3.12 Blood pressure pills benefit my health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.2	1.2
	DISAGREE	4	4.5	4.8	6.0
	NEUTRAL	11	12.5	13.1	19.0
	AGREE	45	51.1	53.6	72.6
	STRONGLY AGREE	23	26.1	27.4	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.13 I feel better when I take my blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.2	1.2
	STRONGLY DISAGREE	1	1.1	1.2	2.4
	DISAGREE	5	5.7	6.0	8.3
	NEUTRAL	19	21.6	22.6	31.0
	AGREE	43	48.9	51.2	82.1
	STRONGLY AGREE	15	17.0	17.9	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.14 I have problems finding pills that will control my blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.4	2.4
	STRONGLY AGREE	6	6.8	7.1	9.5
	AGREE	5	5.7	6.0	15.5
	NEUTRAL	13	14.8	15.5	31.0
	DISAGREE	42	47.7	50.0	81.0
	STRONGLY DISAGREE	16	18.2	19.0	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		

	Frequency	Percent	Valid Percent	Cumulative Percent
Total	88	100.0		

Perceived as safe

Table 4.3.15 The side effects from my blood pressure pills are a problem

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	11	12.5	13.1	13.1
	AGREE	19	21.6	22.6	35.7
	NEUTRAL	17	19.3	20.2	56.0
	DISAGREE	33	37.5	39.3	95.2
	STRONGLY DISAGREE	4	4.5	4.8	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.16 The side effects from my blood pressure pills are harmful

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	5	5.7	6.0	6.0
	AGREE	15	17.0	17.9	23.8
	NEUTRAL	28	31.8	33.3	57.1
	DISAGREE	30	34.1	35.7	92.9
	STRONGLY DISAGREE	6	6.8	7.1	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.17 My blood pressure pills are safe

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	2	2.3	2.4	2.4
	DISAGREE	4	4.5	4.8	7.1
	NEUTRAL	29	33.0	34.5	41.7
	AGREE	39	44.3	46.4	88.1
	STRONGLY AGREE	10	11.4	11.9	100.0

		Frequency	Percent	Valid Percent	Cumulative Percent
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.18 Taking my blood pressure pills is not a problem because they benefit my health

		Frequency	Percent	Valid Percent	Cumulative Percent
	DISAGREE	2	2.3	2.4	2.4
	NEUTRAL	22	25.0	26.2	28.6
Valid	AGREE	43	48.9	51.2	79.8
	STRONGLY AGREE	17	19.3	20.2	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.19 My blood pressure pills cause other health problems

		Frequency	Percent	Valid Percent	Cumulative Percent
	STRONGLY AGREE	3	3.4	3.6	3.6
	AGREE	14	15.9	16.7	20.2
	NEUTRAL	34	38.6	40.5	60.7
Valid	DISAGREE	24	27.3	28.6	89.3
	STRONGLY DISAGREE	9	10.2	10.7	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		
Total		88	100.0		

Table 4.3.20 I will become dependent on my blood pressure pills

		Frequency	Percent	Valid Percent	Cumulative Percent
	STRONGLY AGREE	7	8.0	8.3	8.3
	AGREE	25	28.4	29.8	38.1
	NEUTRAL	19	21.6	22.6	60.7
Valid	DISAGREE	27	30.7	32.1	92.9
	STRONGLY DISAGREE	6	6.8	7.1	100.0
	Total	84	95.5	100.0	
Missing	System	4	4.5		

	Frequency	Percent	Valid Percent	Cumulative Percent
Total	88	100.0		

The Illness-Perception Questionnaire - Revised

Views about your high blood pressure

Table 4.4.1 Having this high blood pressure makes me feel anxious

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	12	13.6	13.6	13.6
	DISAGREE	38	43.2	43.2	56.8
	NEITHER AGREE NOR DISAGREE	14	15.9	15.9	72.7
	AGREE	18	20.5	20.5	93.2
	STRONGLY AGREE	6	6.8	6.8	100.0
	Total	88	100.0	100.0	

Table 4.4.2 I expect to have this high blood pressure for the rest of my life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	3	3.4	3.4	3.4
	DISAGREE	9	10.2	10.2	13.6
	NEITHER AGREE NOR DISAGREE	11	12.5	12.5	26.1
	AGREE	50	56.8	56.8	83.0
	STRONGLY AGREE	15	17.0	17.0	100.0
	Total	88	100.0	100.0	

Table 4.4.3 I get depressed when I think about my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	25	28.4	28.4	28.4
	DISAGREE	39	44.3	44.3	72.7
	NEITHER AGREE NOR DISAGREE	9	10.2	10.2	83.0
	AGREE	10	11.4	11.4	94.3
	STRONGLY AGREE	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Table 4.4.4 I go through cycles in which my high blood pressure gets better and worse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	7	8.0	8.0	9.1
	DISAGREE	22	25.0	25.0	34.1
	NEITHER AGREE NOR DISAGREE	15	17.0	17.0	51.1
	AGREE	35	39.8	39.8	90.9
	STRONGLY AGREE	8	9.1	9.1	100.0
	Total	88	100.0	100.0	

Table 4.4.5 My high blood pressure causes difficulties for those who are close to me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	26	29.5	29.5	29.5
	DISAGREE	42	47.7	47.7	77.3
	NEITHER AGREE NOR DISAGREE	10	11.4	11.4	88.6
	AGREE	6	6.8	6.8	95.5
	STRONGLY AGREE	4	4.5	4.5	100.0
	Total	88	100.0	100.0	

Table 4.4.6 My high blood pressure has serious financial consequences

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	16	18.2	18.2	19.3
	DISAGREE	32	36.4	36.4	55.7
	NEITHER AGREE NOR DISAGREE	14	15.9	15.9	71.6
	AGREE	16	18.2	18.2	89.8
	STRONGLY AGREE	9	10.2	10.2	100.0
	Total	88	100.0	100.0	

Table 4.4.7 I have the power to influence my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	5	5.7	5.7	5.7
	DISAGREE	14	15.9	15.9	21.6
	NEITHER AGREE NOR DISAGREE	8	9.1	9.1	30.7
	AGREE	46	52.3	52.3	83.0
	STRONGLY AGREE	15	17.0	17.0	100.0
	Total	88	100.0	100.0	

Table 4.4.8 My high blood pressure is a serious condition

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	STRONGLY DISAGREE	1	1.1	1.1	3.4
	DISAGREE	14	15.9	15.9	19.3
	NEITHER AGREE NOR DISAGREE	5	5.7	5.7	25.0
	AGREE	47	53.4	53.4	78.4
	STRONGLY AGREE	19	21.6	21.6	100.0
	Total	88	100.0	100.0	

Table 4.4.9 The course of my high blood pressure depends on me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	7	8.0	8.0	9.1
	DISAGREE	21	23.9	23.9	33.0
	NEITHER AGREE NOR DISAGREE	8	9.1	9.1	42.0
	AGREE	37	42.0	42.0	84.1
	STRONGLY AGREE	14	15.9	15.9	100.0
	Total	88	100.0	100.0	

Table 4.4.10 My high blood pressure is likely to be permanent rather than temporary

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	3	3.4	3.4	3.4
	DISAGREE	10	11.4	11.4	14.8
	NEITHER AGREE NOR DISAGREE	9	10.2	10.2	25.0
	AGREE	55	62.5	62.5	87.5
	STRONGLY AGREE	11	12.5	12.5	100.0
	Total	88	100.0	100.0	

Table 4.4.11 My high blood pressure is very unpredictable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	11	12.5	12.5	13.6
	DISAGREE	37	42.0	42.0	55.7
	NEITHER AGREE NOR DISAGREE	19	21.6	21.6	77.3
	AGREE	19	21.6	21.6	98.9
	STRONGLY AGREE	1	1.1	1.1	100.0
	Total	88	100.0	100.0	

Table 4.4.12 My high blood pressure makes me feel afraid

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	17	19.3	19.3	19.3
	DISAGREE	39	44.3	44.3	63.6
	NEITHER AGREE NOR DISAGREE	19	21.6	21.6	85.2
	AGREE	8	9.1	9.1	94.3
	STRONGLY AGREE	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Table 4.4.13 My high blood pressure makes me feel angry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	18	20.5	20.5	21.6
	DISAGREE	44	50.0	50.0	71.6
	NEITHER AGREE NOR DISAGREE	16	18.2	18.2	89.8
	AGREE	4	4.5	4.5	94.3
	STRONGLY AGREE	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Table 4.4.14 My high blood pressure strongly affects the way others see me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	26	29.5	29.5	30.7
	DISAGREE	40	45.5	45.5	76.1
	NEITHER AGREE NOR DISAGREE	15	17.0	17.0	93.2
	AGREE	3	3.4	3.4	96.6
	STRONGLY AGREE	3	3.4	3.4	100.0
	Total	88	100.0	100.0	

Table 4.4.15 My high blood pressure will improve in time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	3.4	3.4	3.4
	STRONGLY DISAGREE	5	5.7	5.7	9.1
	DISAGREE	25	28.4	28.4	37.5
	NEITHER AGREE NOR DISAGREE	28	31.8	31.8	69.3
	AGREE	22	25.0	25.0	94.3
	STRONGLY AGREE	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Table 4.4.16 My blood pressure has major consequences on my life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	STRONGLY DISAGREE	7	8.0	8.0	10.2
	DISAGREE	32	36.4	36.4	46.6
	NEITHER AGREE NOR DISAGREE	16	18.2	18.2	64.8
	AGREE	18	20.5	20.5	85.2
	STRONGLY AGREE	13	14.8	14.8	100.0
	Total	88	100.0	100.0	

Table 4.4.17 What I do can determine whether my high blood pressure gets better or worse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	1	1.1	1.1	1.1
	DISAGREE	10	11.4	11.4	12.5
	NEITHER AGREE NOR DISAGREE	14	15.9	15.9	28.4
	AGREE	50	56.8	56.8	85.2
	STRONGLY AGREE	13	14.8	14.8	100.0
	Total	88	100.0	100.0	

Table 4.4.18 My high blood pressure will last for a long time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	3	3.4	3.4	3.4
	DISAGREE	8	9.1	9.1	12.5
	NEITHER AGREE NOR DISAGREE	20	22.7	22.7	35.2
	AGREE	47	53.4	53.4	88.6
	STRONGLY AGREE	10	11.4	11.4	100.0
	Total	88	100.0	100.0	

Table 4.4.19 My treatment can control my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	2	2.3	2.3	2.3

		Frequency	Percent	Valid Percent	Cumulative Percent
	DISAGREE	5	5.7	5.7	8.0
	NEITHER AGREE NOR DISAGREE	6	6.8	6.8	14.8
	AGREE	55	62.5	62.5	77.3
	STRONGLY AGREE	20	22.7	22.7	100.0
	Total	88	100.0	100.0	

Table 4.4.20 My treatment will be effective in curing my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY AGREE	3	3.4	3.4	4.5
	AGREE	20	22.7	22.7	27.3
	NEITHER AGREE NOR DISAGREE	23	26.1	26.1	53.4
	DISAGREE	34	38.6	38.6	92.0
	STRONGLY DISAGREE	7	8.0	8.0	100.0
	Total	88	100.0	100.0	

Table 4.4.21 When I think about my high blood pressure I get upset

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	STRONGLY DISAGREE	17	19.3	19.3	21.6
	DISAGREE	45	51.1	51.1	72.7
	NEITHER AGREE NOR DISAGREE	11	12.5	12.5	85.2
	AGREE	9	10.2	10.2	95.5
	STRONGLY AGREE	4	4.5	4.5	100.0
	Total	88	100.0	100.0	

Table 4.4.22 I have a clear picture or understanding of my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	1	1.1	1.1	2.3

		Frequency	Percent	Valid Percent	Cumulative Percent
	DISAGREE	7	8.0	8.0	10.2
	NEITHER AGREE NOR DISAGREE	18	20.5	20.5	30.7
	AGREE	47	53.4	53.4	84.1
	STRONGLY AGREE	14	15.9	15.9	100.0
	Total	88	100.0	100.0	

Table 4.4.23 The negative effects of my high blood pressure can be prevented (avoided) by my treatment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	STRONGLY DISAGREE	3	3.4	3.4	4.5
	DISAGREE	11	12.5	12.5	17.0
	NEITHER AGREE NOR DISAGREE	7	8.0	8.0	25.0
	AGREE	52	59.1	59.1	84.1
	STRONGLY AGREE	14	15.9	15.9	100.0
	Total	88	100.0	100.0	

Perceptions about experienced symptoms

Table 4.4.24A Pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES4	21	23.9	23.9	25.0
	NO	66	75.0	75.0	100.0
	Total	88	100.0	100.0	

Table 4.4.24B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	65	73.9	73.9	73.9
	YES	8	9.1	9.1	83.0
	NO	6	6.8	6.8	89.8
	DONT KNOW	9	10.2	10.2	100.0
	Total	88	100.0	100.0	

Table 4.4.24C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	65	73.9	73.9	73.9
	YES	4	4.5	4.5	78.4
	NO	14	15.9	15.9	94.3
	DONT KNOW	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Table 4.4.25A Sore throat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	20	22.7	22.7	23.9
	NO	67	76.1	76.1	100.0
	Total	88	100.0	100.0	

Table 4.4.35B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	66	75.0	75.0	75.0
	NO	12	13.6	13.6	88.6
	DONT KNOW	10	11.4	11.4	100.0
	Total	88	100.0	100.0	

Table 4.4.25C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	66	75.0	75.0	75.0
	YES	1	1.1	1.1	76.1
	NO	14	15.9	15.9	92.0
	DONT KNOW	7	8.0	8.0	100.0
	Total	88	100.0	100.0	

Table 4.4.26A Nausea

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	YES	16	18.2	18.2	20.5
	NO	70	79.5	79.5	100.0
	Total	88	100.0	100.0	

Table 4.4.26B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	71	80.7	80.7	80.7
	YES	3	3.4	3.4	84.1
	NO	6	6.8	6.8	90.9
	DONT KNOW	8	9.1	9.1	100.0
	Total	88	100.0	100.0	

Table 4.4.26C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	71	80.7	80.7	80.7
	NO	8	9.1	9.1	89.8
	DONT KNOW	9	10.2	10.2	100.0
	Total	88	100.0	100.0	

Table 4.4.27A Breathlessness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	YES	25	28.4	28.4	30.7
	NO	61	69.3	69.3	100.0
	Total	88	100.0	100.0	

Table 4.4.27B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	7	8.0	28.0	28.0
	NO	7	8.0	28.0	56.0
	DONT KNOW	11	12.5	44.0	100.0
	Total	25	28.4	100.0	
Missing	System	63	71.6		
Total		88	100.0		

Table 4.4.27C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	3.4	12.5	12.5
	NO	10	11.4	41.7	54.2
	DONT KNOW	11	12.5	45.8	100.0
	Total	24	27.3	100.0	
Missing	System	64	72.7		
Total		88	100.0		

Table 4.4.28A Weight loss

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	14	15.9	15.9	15.9
	NO	74	84.1	84.1	100.0
	Total	88	100.0	100.0	

Table 4.4.28B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	1.1	5.9	5.9
	NO	10	11.4	58.8	64.7
	DONT KNOW	6	6.8	35.3	100.0
	Total	17	19.3	100.0	
Missing	System	71	80.7		
Total		88	100.0		

Table 4.4.28C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		74	84.1	84.1	84.1
	NO	10	11.4	11.4	95.5
	DONT KNOW	4	4.5	4.5	100.0
	Total	88	100.0	100.0	

Table 4.4.29A Fatigue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	YES	45	51.1	51.1	53.4
	NO	41	46.6	46.6	100.0
	Total	88	100.0	100.0	

Table 4.4.29B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	44	50.0	50.0	50.0
	YES	11	12.5	12.5	62.5
	NO	9	10.2	10.2	72.7
	DONT KNOW	24	27.3	27.3	100.0
	Total	88	100.0	100.0	

Table 4.4.29C This symptom is related to the medication I take for my

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	49	55.7	55.7	55.7
	YES	5	5.7	5.7	61.4
	NO	12	13.6	13.6	75.0
	DONT KNOW	22	25.0	25.0	100.0
	Total	88	100.0	100.0	

Table 4.4.30A Stiff Joints

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	YES	49	55.7	55.7	58.0
	NO	37	42.0	42.0	100.0
	Total	88	100.0	100.0	

Table 4.4.30B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	1.1	2.0	2.0
	NO	19	21.6	38.8	40.8
	DONT KNOW	29	33.0	59.2	100.0
	Total	49	55.7	100.0	
Missing	System	39	44.3		
Total		88	100.0		

Table 4.4.30C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	16	18.2	38.1	38.1
	DONT KNOW	26	29.5	61.9	100.0
	Total	42	47.7	100.0	
Missing	System	46	52.3		
Total		88	100.0		

Table 4.4.31A Sore eyes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	30	34.1	34.1	35.2
	NO	57	64.8	64.8	100.0
	Total	88	100.0	100.0	

Table 4.4.31B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	57	64.8	64.8	64.8
	YES	3	3.4	3.4	68.2
	NO	6	6.8	6.8	75.0
	DONT KNOW	22	25.0	25.0	100.0
	Total	88	100.0	100.0	

Table 4.4.31C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	61	69.3	69.3	69.3
	YES	3	3.4	3.4	72.7
	NO	8	9.1	9.1	81.8
	DONT KNOW	16	18.2	18.2	100.0
	Total	88	100.0	100.0	

Table 4.4.32A Wheeziness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	19	21.6	21.6	22.7
	NO	68	77.3	77.3	100.0
	Total	88	100.0	100.0	

Table 4.4.32B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	1.1	5.3	5.3
	NO	4	4.5	21.1	26.3
	DONT KNOW	14	15.9	73.7	100.0
	Total	19	21.6	100.0	
Missing	System	69	78.4		
Total		88	100.0		

Table 4.4.32C This symptom is related to the mediation I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	3.4	15.0	15.0
	NO	4	4.5	20.0	35.0
	DONT KNOW	13	14.8	65.0	100.0
	Total	20	22.7	100.0	
Missing	System	68	77.3		
Total		88	100.0		

Table 4.4.33A Headaches

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	2.3	2.3	2.3
	YES	43	48.9	48.9	51.1
	NO	43	48.9	48.9	100.0
	Total	88	100.0	100.0	

Table 4.4.33B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	44	50.0	50.0	50.0
	YES	18	20.5	20.5	70.5
	NO	8	9.1	9.1	79.5
	DONT KNOW	18	20.5	20.5	100.0
	Total	88	100.0	100.0	

Table 4.4.33C This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	3.4	8.1	8.1
	NO	14	15.9	37.8	45.9
	DONT KNOW	20	22.7	54.1	100.0
	Total	37	42.0	100.0	
Missing	System	51	58.0		
Total		88	100.0		

Table 4.4.34A Upset stomach

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	18	20.5	20.5	21.6
	NO	69	78.4	78.4	100.0
	Total	88	100.0	100.0	

Table 4.4.34B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	1.1	4.8	4.8
	NO	10	11.4	47.6	52.4
	DONT KNOW	10	11.4	47.6	100.0
	Total	21	23.9	100.0	
Missing	System	67	76.1		
Total		88	100.0		

Table 4.4.34C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	11	12.5	57.9	57.9
	DONT KNOW	8	9.1	42.1	100.0
	Total	19	21.6	100.0	
Missing	System	69	78.4		
Total		88	100.0		

Table 4.4.35A Sleep difficulties

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	32	36.4	36.4	36.4
	NO	56	63.6	63.6	100.0
	Total	88	100.0	100.0	

Table 4.4.35B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	2	2.3	6.1	6.1
	NO	11	12.5	33.3	39.4
	DONT KNOW	20	22.7	60.6	100.0
	Total	33	37.5	100.0	
Missing	System	55	62.5		
Total		88	100.0		

Table 4.4.35C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	16	18.2	48.5	48.5
	DONT KNOW	17	19.3	51.5	100.0
	Total	33	37.5	100.0	
Missing	System	55	62.5		
Total		88	100.0		

Table 4.4.36A Dizziness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	31	35.2	35.2	35.2
	NO	57	64.8	64.8	100.0
	Total	88	100.0	100.0	

Table 4.4.36B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	11	12.5	35.5	35.5
	NO	3	3.4	9.7	45.2
	DONT KNOW	17	19.3	54.8	100.0
	Total	31	35.2	100.0	
Missing	System	57	64.8		
Total		88	100.0		

Table 4.4.36C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	4	4.5	13.8	13.8
	NO	10	11.4	34.5	48.3
	DONT KNOW	15	17.0	51.7	100.0
	Total	29	33.0	100.0	
Missing	System	59	67.0		
Total		88	100.0		

Table 4.4.37A Loss of strength

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	39	44.3	44.3	45.5
	NO	48	54.5	54.5	100.0
	Total	88	100.0	100.0	

Table 4.4.37B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	5	5.7	12.5	12.5
	NO	13	14.8	32.5	45.0
	DONT KNOW	22	25.0	55.0	100.0
	Total	40	45.5	100.0	
Missing	System	48	54.5		
Total		88	100.0		

Table 4.4.37C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	3.4	8.8	8.8
	NO	12	13.6	35.3	44.1
	DONT KNOW	19	21.6	55.9	100.0
	Total	34	38.6	100.0	
Missing	System	54	61.4		
Total		88	100.0		

Table 4.4.38A Loss of Libido

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	36	40.9	40.9	42.0
	NO	51	58.0	58.0	100.0
	Total	88	100.0	100.0	

Table 4.4.38B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	8	9.1	21.6	21.6
	NO	9	10.2	24.3	45.9
	DONT KNOW	20	22.7	54.1	100.0
	Total	37	42.0	100.0	
Missing	System	51	58.0		
Total		88	100.0		

Table 4.4.38C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	14	15.9	43.8	43.8
	NO	7	8.0	21.9	65.6
	DONT KNOW	11	12.5	34.4	100.0
	Total	32	36.4	100.0	
Missing	System	56	63.6		
Total		88	100.0		

Table 4.4.39A Impotence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	6.8	6.8	6.8
	YES	16	18.2	18.2	25.0
	NO	66	75.0	75.0	100.0
	Total	88	100.0	100.0	

Table 4.439B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	9	10.2	50.0	50.0
	NO	3	3.4	16.7	66.7
	DONT KNOW	6	6.8	33.3	100.0
	Total	18	20.5	100.0	
Missing	System	70	79.5		
Total		88	100.0		

Table 4.4.39C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	6	6.8	37.5	37.5
	NO	2	2.3	12.5	50.0
	DONT KNOW	8	9.1	50.0	100.0
	Total	16	18.2	100.0	

		Frequency	Percent	Valid Percent	Cumulative Percent
Missing	System	72	81.8		
Total		88	100.0		

Table 4.4.40A Feeling Flushed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	23	26.1	26.1	26.1
	NO	65	73.9	73.9	100.0
	Total	88	100.0	100.0	

Table 4.4.40B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	8	9.1	33.3	33.3
	NO	5	5.7	20.8	54.2
	DONT KNOW	11	12.5	45.8	100.0
	Total	24	27.3	100.0	
Missing	System	64	72.7		
Total		88	100.0		

Table 4.4.40C This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	3.4	13.6	13.6
	NO	10	11.4	45.5	59.1
	DONT KNOW	9	10.2	40.9	100.0
	Total	22	25.0	100.0	
Missing	System	66	75.0		
Total		88	100.0		

Table 4.4.41A Fast heart rate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	26	29.5	29.5	29.5
	NO	62	70.5	70.5	100.0
	Total	88	100.0	100.0	

Table 4.4.41B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	13	14.8	48.1	48.1
	NO	4	4.5	14.8	63.0
	DONT KNOW	10	11.4	37.0	100.0
	Total	27	30.7	100.0	
Missing	System	61	69.3		
Total		88	100.0		

Table 4.4.41C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	5	5.7	20.0	20.0
	NO	7	8.0	28.0	48.0
	DONT KNOW	13	14.8	52.0	100.0
	Total	25	28.4	100.0	
Missing	System	63	71.6		
Total		88	100.0		

Table 4.4.42A Pins and needles

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.1	1.1	1.1
	YES	24	27.3	27.3	28.4
	NO	63	71.6	71.6	100.0
	Total	88	100.0	100.0	

Table 4.4.42B This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	3.4	11.5	11.5
	NO	2	2.3	7.7	19.2
	DONT KNOW	21	23.9	80.8	100.0
	Total	26	29.5	100.0	
Missing	System	62	70.5		
Total		88	100.0		

Table 4.4.42C This symptom is related to the medication I use for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	1.1	4.3	4.3
	NO	5	5.7	21.7	26.1
	DONT KNOW	17	19.3	73.9	100.0
	Total	23	26.1	100.0	
Missing	System	65	73.9		
Total		88	100.0		

Tables 4.4.43A This symptom is related to my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	7	8.0	43.8	43.8
	NO	4	4.5	25.0	68.8
	DONT KNOW	5	5.7	31.3	100.0
	Total	16	18.2	100.0	
Missing	System	72	81.8		
Total		88	100.0		

Table 4.4.43B This symptom is related to the medication I take for my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	73	83.0	83.0	83.0
	YES	8	9.1	9.1	92.0
	NO	4	4.5	4.5	96.6
	DONT KNOW	3	3.4	3.4	100.0
	Total	88	100.0	100.0	

Views about experienced symptoms

Table 4.4.44 There is a lot which I can do to control my symptoms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	18	20.5	20.7	20.7
	DISAGREE	7	8.0	8.0	28.7
	NEITHER AGREE NOR DISAGREE	12	13.6	13.8	42.5
	AGREE	42	47.7	48.3	90.8
	STRONGLY AGREE	8	9.1	9.2	100.0
	Total	87	98.9	100.0	
Missing	System	1	1.1		
Total		88	100.0		

Table 4.4.45 My symptoms come and go in cycles

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	23	26.1	26.4	26.4
	STRONGLY DISAGREE	3	3.4	3.4	29.9
	DISAGREE	23	26.1	26.4	56.3
	NEITHER AGREE NOR DISAGREE	13	14.8	14.9	71.3
	AGREE	21	23.9	24.1	95.4
	STRONGLY AGREE	4	4.5	4.6	100.0
	Total	87	98.9	100.0	
Missing	System	1	1.1		
Total		88	100.0		

Table 4.4.46 The symptoms of my high blood pressure change a great deal from day to day

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	23	26.1	26.4	26.4
	STRONGLY DISAGREE	6	6.8	6.9	33.3
	DISAGREE	27	30.7	31.0	64.4
	NEITHER AGREE NOR DISAGREE	14	15.9	16.1	80.5
	AGREE	11	12.5	12.6	93.1

		Frequency	Percent	Valid Percent	Cumulative Percent
	STRONGLY AGREE	6	6.8	6.9	100.0
	Total	87	98.9	100.0	
Missing	System	1	1.1		
Total		88	100.0		

Perceived Causes

Table 4.4.47 Stress or worry

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	5	5.7	5.8	5.8
	STRONGLY DISAGREE	1	1.1	1.2	7.0
	DISAGREE	8	9.1	9.3	16.3
Valid	NEITHER AGREE NOR DISAGREE	5	5.7	5.8	22.1
	AGREE	46	52.3	53.5	75.6
	STRONGLY AGREE	21	23.9	24.4	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.48 Hereditary – it runs in my family

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	5	5.7	5.8	5.8
	STRONGLY DISAGREE	1	1.1	1.2	7.0
	DISAGREE	8	9.1	9.3	16.3
Valid	NEITHER AGREE NOR DISAGREE	8	9.1	9.3	25.6
	AGREE	43	48.9	50.0	75.6
	STRONGLY AGREE	21	23.9	24.4	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.49 Germ or virus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	9.1	9.3	9.3
	STRONGLY AGREE	3	3.4	3.5	12.8
	AGREE	1	1.1	1.2	14.0
	NEITHER AGREE NOR DISAGREE	11	12.5	12.8	26.7
	DISAGREE	40	45.5	46.5	73.3
	STRONGLY DISAGREE	23	26.1	26.7	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.50 Diet or eating habits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	6.8	7.0	7.0
	STRONGLY DISAGREE	4	4.5	4.7	11.6
	DISAGREE	10	11.4	11.6	23.3
	NEITHER AGREE NOR DISAGREE	10	11.4	11.6	34.9
	AGREE	40	45.5	46.5	81.4
	STRONGLY AGREE	16	18.2	18.6	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.51 Chance or bad luck

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	9.1	9.3	9.3
	STRONGLY AGREE	2	2.3	2.3	11.6
	AGREE	3	3.4	3.5	15.1
	NEITHER AGREE NOR DISAGREE	9	10.2	10.5	25.6
	DISAGREE	30	34.1	34.9	60.5
	STRONGLY DISAGREE	34	38.6	39.5	100.0
	Total	86	97.7	100.0	

		Frequency	Percent	Valid Percent	Cumulative Percent
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.52 Poor medical care in my past

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	9.1	9.3	9.3
	STRONGLY DISAGREE	21	23.9	24.4	33.7
	DISAGREE	30	34.1	34.9	68.6
	NEITHER AGREE NOR DISAGREE	11	12.5	12.8	81.4
	AGREE	15	17.0	17.4	98.8
	STRONGLY AGREE	1	1.1	1.2	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.53 Pollution in the environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	8.0	8.1	8.1
	AGREE	7	8.0	8.1	16.3
	NEITHER AGREE NOR DISAGREE	19	21.6	22.1	38.4
	DISAGREE	30	34.1	34.9	73.3
	STRONGLY DISAGREE	23	26.1	26.7	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.54 My own behaviour

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	8.0	8.1	8.1
	STRONGLY DISAGREE	7	8.0	8.1	16.3
	DISAGREE	20	22.7	23.3	39.5
	NEITHER AGREE NOR DISAGREE	7	8.0	8.1	47.7
	AGREE	40	45.5	46.5	94.2

		Frequency	Percent	Valid Percent	Cumulative Percent
	STRONGLY AGREE	5	5.7	5.8	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.55 My mental attitude e.g. thinking about life negatively

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	8	9.1	9.3	9.3
	STRONGLY DISAGREE	12	13.6	14.0	23.3
	DISAGREE	34	38.6	39.5	62.8
Valid	NEITHER AGREE NOR DISAGREE	11	12.5	12.8	75.6
	AGREE	18	20.5	20.9	96.5
	STRONGLY AGREE	3	3.4	3.5	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.56 Family problems or worries

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	6	6.8	7.0	7.0
	STRONGLY DISAGREE	8	9.1	9.3	16.3
	DISAGREE	25	28.4	29.1	45.3
Valid	NEITHER AGREE NOR DISAGREE	10	11.4	11.6	57.0
	AGREE	32	36.4	37.2	94.2
	STRONGLY AGREE	5	5.7	5.8	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.57 Overwork

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	8.0	8.1	8.1
	STRONGLY DISAGREE	6	6.8	7.0	15.1

		Frequency	Percent	Valid Percent	Cumulative Percent
	DISAGREE	21	23.9	24.4	39.5
	NEITHER AGREE NOR DISAGREE	8	9.1	9.3	48.8
	AGREE	39	44.3	45.3	94.2
	STRONGLY AGREE	5	5.7	5.8	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.58 My emotional state e.g. feeling down, lonely, anxious, empty

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	7	8.0	8.1	8.1
	STRONGLY DISAGREE	5	5.7	5.8	14.0
	DISAGREE	30	34.1	34.9	48.8
Valid	NEITHER AGREE NOR DISAGREE	10	11.4	11.6	60.5
	AGREE	28	31.8	32.6	93.0
	STRONGLY AGREE	6	6.8	7.0	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.59 Ageing

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	7	8.0	8.1	8.1
	STRONGLY DISAGREE	6	6.8	7.0	15.1
	DISAGREE	12	13.6	14.0	29.1
Valid	NEITHER AGREE NOR DISAGREE	9	10.2	10.5	39.5
	AGREE	50	56.8	58.1	97.7
	STRONGLY AGREE	2	2.3	2.3	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.60 Alcohol

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	6.8	7.0	7.0
	STRONGLY DISAGREE	18	20.5	20.9	27.9
	DISAGREE	24	27.3	27.9	55.8
	NEITHER AGREE NOR DISAGREE	14	15.9	16.3	72.1
	AGREE	23	26.1	26.7	98.8
	STRONGLY AGREE	1	1.1	1.2	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.61 Smoking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	8.0	8.1	8.1
	STRONGLY DISAGREE	26	29.5	30.2	38.4
	DISAGREE	25	28.4	29.1	67.4
	NEITHER AGREE NOR DISAGREE	7	8.0	8.1	75.6
	AGREE	15	17.0	17.4	93.0
	STRONGLY AGREE	6	6.8	7.0	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.62 Accident or injury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	8.0	8.1	8.1
	STRONGLY AGREE	3	3.4	3.5	11.6
	AGREE	9	10.2	10.5	22.1
	NEITHER AGREE NOR DISAGREE	10	11.4	11.6	33.7
	DISAGREE	34	38.6	39.5	73.3
	STRONGLY DISAGREE	23	26.1	26.7	100.0
	Total	86	97.7	100.0	

		Frequency	Percent	Valid Percent	Cumulative Percent
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.63 My personality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	8.0	8.1	8.1
	STRONGLY AGREE	3	3.4	3.5	11.6
	AGREE	21	23.9	24.4	36.0
	NEITHER AGREE NOR DISAGREE	10	11.4	11.6	47.7
	DISAGREE	28	31.8	32.6	80.2
	STRONGLY DISAGREE	17	19.3	19.8	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.64 Poor immune system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	9.1	9.3	9.3
	STRONGLY AGREE	1	1.1	1.2	10.5
	AGREE	12	13.6	14.0	24.4
	NEITHER AGREE NOR DISAGREE	13	14.8	15.1	39.5
	DISAGREE	35	39.8	40.7	80.2
	STRONGLY DISAGREE	17	19.3	19.8	100.0
	Total	86	97.7	100.0	
Missing	System	2	2.3		
Total		88	100.0		

Table 4.4.65 Additional causes of my high blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20	22.7	22.7	22.7
	1. Stress 2. family history.	1	1.1	1.1	23.9
	Ageing	1	1.1	1.1	25.0

	Frequency	Percent	Valid Percent	Cumulative Percent
career/work pressures on me before retiring. the 'rat race' on the Reef.	1	1.1	1.1	26.1
Diabetes	1	1.1	1.1	27.3
Diabetes, Stress, Injury causing permanent pain	1	1.1	1.1	28.4
family had it / smoking / over weight	1	1.1	1.1	29.5
Family history Smoking Diet	1	1.1	1.1	30.7
generic inherit	1	1.1	1.1	31.8
Genetic ageing past alcohol use	1	1.1	1.1	33.0
grieve, broken arm	1	1.1	1.1	34.1
Hereditary	1	1.1	1.1	35.2
Hereditary	2	2.3	2.3	37.5
hereditary diet	1	1.1	1.1	38.6
Hereditary Demanding work Not pursuing healthy day-to-day living habits	1	1.1	1.1	39.8
hereditary overweight job stress	1	1.1	1.1	40.9
Hereditary Poor immune system	1	1.1	1.1	42.0
hereditary rich food alcohol	1	1.1	1.1	43.2
Hereditary Stress Lack of exercise	1	1.1	1.1	44.3
Hereditary Stress Life style	1	1.1	1.1	45.5
HEREDITARY WEIGH EATING HABITS AGE	1	1.1	1.1	46.6
Hereditary, Diet, Stress	1	1.1	1.1	47.7
Hereditary, Overweight, Food Intake	1	1.1	1.1	48.9
hereditary, previous diet & eating habits, lack of exercise.	1	1.1	1.1	50.0
Hereditary, stress, worries	1	1.1	1.1	51.1
Hereditary; poor ability to handle stress	1	1.1	1.1	52.3
Hereditary; Stress	1	1.1	1.1	53.4
Heredity Poor diet lack of exercise	1	1.1	1.1	54.5
heredity stress lifestyle	1	1.1	1.1	55.7
Hereditary Diet	1	1.1	1.1	56.8
Hereditary	1	1.1	1.1	58.0
High stress level	1	1.1	1.1	59.1
i know my diabetes is the cause of my high blood pressure	1	1.1	1.1	60.2

	Frequency	Percent	Valid Percent	Cumulative Percent
Infection Stress	1	1.1	1.1	61.4
Lack of exercise Salt	1	1.1	1.1	62.5
Lifestyle eg. overweight, no exercise Hereditary Stress	1	1.1	1.1	63.6
n/a	1	1.1	1.1	64.8
Over Weight	1	1.1	1.1	65.9
OVER WEIGHT	1	1.1	1.1	67.0
Overweight Hereditary Stress	1	1.1	1.1	68.2
Overweight Stress Heredity	1	1.1	1.1	69.3
Overweight & inactive	1	1.1	1.1	70.5
OVERWORKED - INCREASE IN WEIGHT - STRESS	1	1.1	1.1	71.6
Poor weight management on my side	1	1.1	1.1	72.7
Post menopause Age	1	1.1	1.1	73.9
Runs in family Overweight inactivity	1	1.1	1.1	75.0
Smoking Alcohol Not enough exercise	1	1.1	1.1	76.1
Smoking Not enough exercise because of back and ankle pain	1	1.1	1.1	77.3
smoking stress	1	1.1	1.1	78.4
Smoking, Bad diet , Hereditary	1	1.1	1.1	79.5
Stress related, family, financial, being alone.	1	1.1	1.1	80.7
Stress	1	1.1	1.1	81.8
Stress Diet	1	1.1	1.1	83.0
stress bad eating habits lack of exercise	1	1.1	1.1	84.1
Stress Diet Lack of exercise	1	1.1	1.1	85.2
Stress Overweight Family History	1	1.1	1.1	86.4
Stress Weight heredity	1	1.1	1.1	87.5
Stress and Heredity	1	1.1	1.1	88.6
Stress at work Worry My temper	1	1.1	1.1	89.8
Stress or worry Overwork Family problems or worries	1	1.1	1.1	90.9
Stress, diet and work environment	1	1.1	1.1	92.0
Stress, Don't eat meat but lots of cheese	1	1.1	1.1	93.2

	Frequency	Percent	Valid Percent	Cumulative Percent
Stress, Hereditary, Family problems	1	1.1	1.1	94.3
stress, lifestyle, ageing	1	1.1	1.1	95.5
Stress, Overworked, Hereditary	1	1.1	1.1	96.6
Work	1	1.1	1.1	97.7
work pressure unhealthy lifestyle	1	1.1	1.1	98.9
WORK PRESSURE, HEREDITARY, AGEING, PHYSICAL BUILD - DIET	1	1.1	1.1	100.0
Total	88	100.0	100.0	

APPENDIX B – Factor analysis and Regression analysis

IPQ-R

Communalities

	Initial	Extraction
IPQ1 Having this high blood pressure makes me feel anxious	1.000	.710
IPQ2 I expect to have this high blood pressure for the rest of my life	1.000	.765
IPQ3 I get depressed when I think about my high blood pressure	1.000	.693
IPQ4 I go through cycles in which my high blood pressure gets better and worse	1.000	.450
IPQ5 My high blood pressure causes difficulties for those who are close to me	1.000	.723
IPQ6 My high blood pressure has serious financial consequences	1.000	.608
IPQ7 I have the power to influence my high blood pressure	1.000	.741
IPQ8 My high blood pressure is a serious condition	1.000	.546
IPQ9 The course of my high blood pressure depends on me	1.000	.706
IPQ10 My high blood pressure is likely to be permanent rather than temporary	1.000	.804
IPQ11 My high blood pressure is very unpredictable	1.000	.512
IPQ12 My high blood pressure makes me feel afraid	1.000	.835
IPQ13 My high blood pressure makes me feel angry	1.000	.781
IPQ14 My high blood pressure strongly affects the way others see me	1.000	.605
IPQ15 My high blood pressure will improve in time	1.000	.538
IPQ16 My high blood pressure has major consequences on my life	1.000	.627

	Initial	Extraction
IPQ17 What I do can determine whether my high blood pressure gets better or worse	1.000	.723
IPQ18 My high blood pressure will last for a long time	1.000	.790
IPQ19 My treatment can control my high blood pressure	1.000	.728
IPQ20 My treatment will be effective in curing my high blood pressure	1.000	.491
IPQ21 When I think about my high blood pressure I get upset	1.000	.676
IPQ22 I have a clear picture or understanding of my high blood pressure	1.000	.598
IPQ23 The negative effects of my high blood pressure can be prevented (avoided) by my treatment	1.000	.707
IPQ84 There is a lot which I can do to control my symptoms	1.000	.842
IPQ85 My symptoms come and go in cycles	1.000	.805
IPQ86 The symptoms of my high blood pressure change a great deal from day to day	1.000	.798
IPQ87 Stress or worry	1.000	.598
IPQ88 Hereditary - it runs in my family	1.000	.504
IPQ89 A Germ or virus	1.000	.793
IPQ90 Diet or eating habits	1.000	.612
IPQ91 Chance or bad luck	1.000	.793
IPQ92 Poor medical care in my past	1.000	.479
IPQ93 Pollution in the environment	1.000	.839
IPQ94 My own behavior	1.000	.723
IPQ95 My mental attitude e.g. thinking about life negatively	1.000	.752
IPQ96 Family problems or worries	1.000	.603
IPQ97 Overwork	1.000	.604
IPQ98 My emotional state e.g. feeling down, lonely, anxious,empty	1.000	.706
IPQ99 Ageing	1.000	.664
IPQ100 Alcohol	1.000	.584
IPQ101 Smoking	1.000	.557

	Initial	Extraction
IPQ102 Accident or injury	1.000	.815
IPQ103 My personality	1.000	.752
IPQ104 Poor immune system	1.000	.780

Extraction Method: Principal Component Analysis.

Rotated component matrix

	Component					
	1	2	3	4	5	6
IPQ12 My high blood pressure makes me feel afraid	.878	.103	.114		.117	.164
IPQ5 My high blood pressure causes difficulties for those who are close to me	.835			.111		
IPQ13 My high blood pressure makes me feel angry	.832	.200			.148	.159
IPQ21 When I think about my high blood pressure I get upset	.793	.160				
IPQ1 Having this high blood pressure makes me feel anxious	.774	.198			.219	.132
IPQ3 I get depressed when I think about my high blood pressure	.774	.241		-.140	.102	
IPQ6 My high blood pressure has serious financial consequences	.736	-.118		.169		-.143
IPQ14 My high blood pressure strongly affects the way others see me	.720	.169				.211
IPQ16 My high blood pressure has major consequences on my life	.705		.335			
IPQ11 My high blood pressure is very unpredictable	.635	.146		.104	.152	.225
IPQ4 I go through cycles in which my high blood pressure gets better and worse	.543	.159		.319	.130	.103
IPQ8 My high blood pressure is a serious condition	.478	-.106	.233	.416	.276	
IPQ95 My mental attitude e.g. thinking about life negatively	.263	.802		.171		
IPQ98 My emotional state e.g. feeling down, lonely, anxious ,empty	.330	.746	.101	.130	-.101	

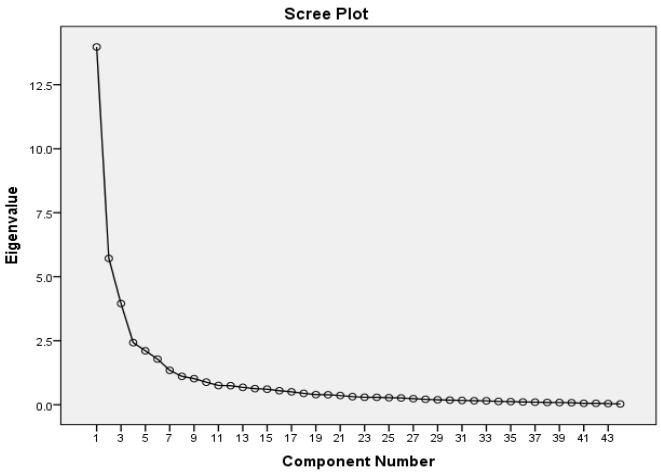
	Component					
IPQ94 My own behaviour	.136	.742	.287	.244		.104
IPQ97 Overwork		.716	.274			
IPQ96 Family problems or worries	.252	.677	.106		-.133	.213
IPQ99 Ageing	.134	.667	.297		.284	.148
IPQ100 Alcohol		.608	.242		.383	
IPQ87 Stress or worry	.210	.598	.381	.152	-.108	.128
IPQ101 Smoking		.581	.162	-.103	.419	
IPQ92 Poor medical care in my past	.291	.568			.177	.196
IPQ90 Diet or eating habits		.538	.387	.322	-.138	.224
IPQ103 My personality	.113		.842		.103	.103
IPQ102 Accident or injury		.196	.838	.166	.119	.179
IPQ93 Pollution in the environment		.389	.810	.109	.129	
IPQ104 Poor immune system		.286	.802	.227		
IPQ91 Chance or bad luck		.356	.777	.239		
IPQ89 A Germ or virus		.488	.692	.273		
IPQ20 My treatment will be effective in curing my high blood pressure	.220		.554	.130	.317	-.130
IPQ88 Hereditary - it runs in my family		.357	.500		.193	.278
IPQ7 I have the power to influence my high blood pressure	.129	.184		.816	.125	
IPQ9 The course of my high blood pressure depends on me		.324		.768		
IPQ17 What I do can determine whether my high blood pressure gets better or worse	.137		.261	.755	.236	
IPQ23 The negative effects of my high blood pressure can be prevented (avoided) by my treatment		.105	.170	.736	.246	.254
IPQ22 I have a clear picture or understanding of my high blood pressure	.153		.327	.593	.335	
IPQ19 My treatment can control my high blood pressure	.143		.272	.561	.510	.241
IPQ15 My high blood pressure will improve in time	.185		.385	.539	-.220	.128
IPQ18 My high blood pressure will last for a long time	.226		.141	.256	.806	
IPQ2 I expect to have this high blood pressure for the rest of my life	.283		.146	.187	.785	

	Component					
IPQ10 My high blood pressure is likely to be permanent rather than temporary	.309		.115	.322	.769	
IPQ85 My symptoms come and go in cycles	.229	.233				.826
IPQ84 There is a lot which I can do to control my symptoms		.282	.203	.242	.130	.803
IPQ86 The symptoms of my high blood pressure change a great deal from day to day	.346	.211				.793

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.



MTQ

Communalities

	Initial	Extraction
1.1 Perceived need - My blood pressure pills keep me from having a stroke	1.000	.654
1.2 Perceived need - I need to take my blood pressure pills	1.000	.829
1.3 Perceived need - I take my blood pressure pills for my health	1.000	.706
1.4 Perceived need - Blood pressure pills keep me from having health-related problems	1.000	.557
1.5 Perceived need - I could have health problems if I do not take my blood pressure pills	1.000	.660
1.6 Perceived need - It's not a problem if I miss my blood pressure pills	1.000	.575
1.7 Perceived need - I would rather treat my blood pressure without pills	1.000	.582
1.8 Perceived need - I am OK if I do not take my blood pressure pills	1.000	.656
2.1 Perceived effectiveness - My blood pressure will come down enough without pills	1.000	.562
2.2 Perceived effectiveness - I will have problems if I donâ€™t take my blood pressure pills	1.000	.717
2.3 Perceived effectiveness - My blood pressure pills control my blood pressure	1.000	.861
2.4 Perceived effectiveness - Blood pressure pills benefit my health	1.000	.754
2.5 Perceived effectiveness - I feel better when I take my blood pressure pills	1.000	.736
2.6 Perceived effectiveness - I have problems finding pills that will control my blood pressure	1.000	.531

	Initial	Extraction
3.1 Perceived as safe - The side effects from my blood pressure pills are a problem	1.000	.791
3.2 Perceived as safe - The side effects from my blood pressure pills are harmful	1.000	.833
3.3 Perceived as safe - My blood pressure pills are safe	1.000	.715
3.4 Perceived as safe - Taking my blood pressure pills is not a problem because they benefit my health	1.000	.768
3.5 Perceived as safe - My blood pressure pills cause other health problems	1.000	.732
3.6 Perceived as safe - I will become dependent on my blood pressure pills	1.000	.650

Extraction Method: Principal Component Analysis.

Rotated component matrix

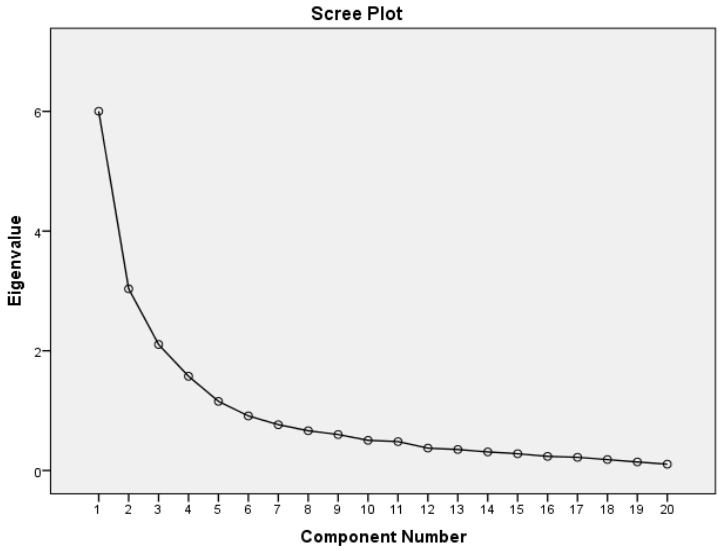
	Component				
	1	2	3	4	5
1.2 Perceived need - I need to take my blood pressure pills	.859	.227		.190	
1.3 Perceived need - I take my blood pressure pills for my health	.784	.176	.101	.225	
1.1 Perceived need - My blood pressure pills keep me from having a stroke	.774	.162		-.138	
1.5 Perceived need - I could have health problems if I do not take my blood pressure pills	.759	.248		.136	
1.4 Perceived need - Blood pressure pills keep me from having health-related problems	.669		.108	.309	
2.3 Perceived effectiveness - My blood pressure pills control my blood pressure	.236	.873			-.181
2.4 Perceived effectiveness - Blood pressure pills benefit my health	.128	.835	.181		

	Component				
2.2 Perceived effectiveness - I will have problems if I donâ€™t take my blood pressure pills	.262	.794		.112	
2.5 Perceived effectiveness - I feel better when I take my blood pressure pills	.130	.793		.172	.235
3.2 Perceived as safe - The side effects from my blood pressure pills are harmful		-.128	.870		-.238
3.5 Perceived as safe - My blood pressure pills cause other health problems	.111		.842		
3.1 Perceived as safe - The side effects from my blood pressure pills are a problem	-.242	.252	.772	.221	-.156
3.3 Perceived as safe - My blood pressure pills are safe	.300	.162	.721		.277
3.4 Perceived as safe - Taking my blood pressure pills is not a problem because they benefit my health	.382	.281	.635	-.191	.321
1.8 Perceived need - I am OK if I do not take my blood pressure pills	.407	.114		.630	.274
1.6 Perceived need - It's not a problem if I miss my blood pressure pills	.362		-.126	.602	.247
2.1 Perceived effectiveness - My blood pressure will come down enough without pills	.187	.459		.555	
2.6 Perceived effectiveness - I have problems finding pills that will control my blood pressure		.338	.374	.521	
3.6 Perceived as safe - I will become dependent on my blood pressure pills			.129		-.794
1.7 Perceived need - I would rather treat my blood pressure without pills				.439	.616

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.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4
6
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Component Number

A Regression analysis – IPQ-R and MTQ original scales

Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.289[a]	.084	-.001	1.21870	.084	.993	7	76	.443
2	.289[b]	.083	.012	1.21099	.000	.028	1	76	.867
3	.286[c]	.082	.023	1.20423	-.002	.132	1	77	.717
4	.279[d]	.078	.031	1.19927	-.004	.350	1	78	.556
5	.252[e]	.063	.028	1.20098	-.014	1.229	1	79	.271
6	.213[f]	.045	.022	1.20491	-.018	1.531	1	80	.220
7	.166[g]	.028	.016	1.20865	-.018	1.509	1	81	.223
8	.000[h]	.000	.000	1.21835	-.028	2.337	1	82	.130

a. Predictors: (Constant), mtq_scale4, ipq_scale3, mtq_scale2, ipq_scale4, Ipq_scale1, ipq_scale2, mtq_scale3

b. Predictors: (Constant), mtq_scale4, mtq_scale2, ipq_scale4, Ipq_scale1, ipq_scale2, mtq_scale3

c. Predictors: (Constant), mtq_scale4, mtq_scale2, Ipq_scale1, ipq_scale2, mtq_scale3

d. Predictors: (Constant), mtq_scale4, mtq_scale2, ipq_scale2, mtq_scale3

e. Predictors: (Constant), mtq_scale4, mtq_scale2, ipq_scale2

f. Predictors: (Constant), mtq_scale4, ipq_scale2

g. Predictors: (Constant), ipq_scale2

h. Predictor: (constant)

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.324	7	1.475	.993	.443[b]
	Residual	112.878	76	1.485		
	Total	123.202	83			
2	Regression	10.283	6	1.714	1.169	.332[c]
	Residual	112.920	77	1.466		
	Total	123.202	83			
3	Regression	10.089	5	2.018	1.391	.237[d]
	Residual	113.114	78	1.450		
	Total	123.202	83			
4	Regression	9.581	4	2.395	1.665	.166[e]
	Residual	113.622	79	1.438		
	Total	123.202	83			
5	Regression	7.814	3	2.605	1.806	.153[f]
	Residual	115.389	80	1.442		
	Total	123.202	83			
6	Regression	5.606	2	2.803	1.931	.152[g]
	Residual	117.597	81	1.452		
	Total	123.202	83			
7	Regression	3.414	1	3.414	2.337	.130[h]
	Residual	119.788	82	1.461		
	Total	123.202	83			

Model		Sum of Squares	df	Mean Square	F	Sig.
8	Regression	.000	0	.000	.	.[i]
	Residual	123.202	83	1.484		
	Total	123.202	83			

a. Dependent Variable: mtq_scale1compliance

b. Predictors: (Constant), mtq_scale4, ipq_scale3, mtq_scale2, ipq_scale4, Ipq_scale1, ipq_scale2, mtq_scale3

c. Predictors: (Constant), mtq_scale4, mtq_scale2, ipq_scale4, Ipq_scale1, ipq_scale2, mtq_scale3

d. Predictors: (Constant), mtq_scale4, mtq_scale2, Ipq_scale1, ipq_scale2, mtq_scale3

e. Predictors: (Constant), mtq_scale4, mtq_scale2, ipq_scale2, mtq_scale3

f. Predictors: (Constant), mtq_scale4, mtq_scale2, ipq_scale2

g. Predictors: (Constant), mtq_scale4, ipq_scale2

h. Predictors: (Constant), ipq_scale2

i. Predictor: (constant)

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.496	2.013		.743	.460	-2.513	5.505		
	Ipq_scale1	.208	.379	.070	.549	.584	-.547	.964	.753	1.329
	ipq_scale2	1.615	.782	.269	2.066	.042	.058	3.172	.710	1.409
	ipq_scale3	.006	.036	.021	.168	.867	-.065	.077	.749	1.335
	ipq_scale4	-.063	.159	-.047	-.395	.694	-.379	.253	.857	1.167
	mtq_scale2	.342	.250	.183	1.364	.177	-.157	.840	.673	1.485
	mtq_scale3	-.245	.226	-.142	-1.081	.283	-.695	.206	.699	1.430
	mtq_scale4	-.230	.214	-.128	-1.074	.286	-.656	.196	.854	1.171
2	(Constant)	1.534	1.988		.772	.443	-2.424	5.492		
	Ipq_scale1	.215	.375	.072	.575	.567	-.531	.961	.762	1.313
	ipq_scale2	1.578	.744	.263	2.119	.037	.095	3.060	.773	1.294
	ipq_scale4	-.055	.150	-.041	-.364	.717	-.354	.245	.943	1.061
	mtq_scale2	.346	.247	.185	1.398	.166	-.147	.838	.681	1.469
	mtq_scale3	-.245	.225	-.142	-1.090	.279	-.693	.203	.699	1.430
	mtq_scale4	-.228	.212	-.127	-1.074	.286	-.651	.195	.856	1.168
3	(Constant)	1.354	1.914		.707	.481	-2.457	5.165		
	Ipq_scale1	.220	.372	.074	.592	.556	-.521	.962	.763	1.311
	ipq_scale2	1.604	.737	.267	2.178	.032	.138	3.071	.780	1.281
	mtq_scale2	.333	.244	.178	1.368	.175	-.152	.818	.695	1.439
	mtq_scale3	-.251	.223	-.145	-1.123	.265	-.694	.193	.703	1.423
	mtq_scale4	-.221	.210	-.123	-1.051	.296	-.640	.198	.863	1.159
4	(Constant)	2.122	1.401		1.514	.134	-.668	4.911		
	ipq_scale2	1.461	.693	.244	2.109	.038	.082	2.841	.875	1.143
	mtq_scale2	.375	.232	.201	1.618	.110	-.086	.837	.760	1.316
	mtq_scale3	-.246	.222	-.143	-1.108	.271	-.688	.196	.704	1.421
	mtq_scale4	-.234	.208	-.130	-1.124	.264	-.649	.180	.873	1.146
5	(Constant)	2.046	1.402		1.460	.148	-.744	4.835		
	ipq_scale2	1.309	.680	.218	1.924	.058	-.045	2.662	.911	1.098

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
6	mtq_scale2	.252	.204	.135	1.237	.220	-.153	.658	.986	1.015
	mtq_scale4	-.278	.205	-.155	-1.359	.178	-.686	.129	.906	1.104
	(Constant)	3.060	1.141		2.683	.009	.791	5.330		
7	ipq_scale2	1.240	.680	.207	1.823	.072	-.113	2.593	.917	1.091
	mtq_scale4	-.251	.204	-.139	-1.229	.223	-.657	.155	.917	1.091
	(Constant)	2.624	1.087		2.413	.018	.461	4.787		
8	ipq_scale2	.999	.653	.166	1.529	.130	-.301	2.298	1.000	1.000
	(Constant)	4.274	.133		32.150	.000	4.009	4.538		

a. Dependent Variable: mtq_scale1compliance

B Regression analysis – Factors extracted during factor analysis

Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.368[a]	.135	.017	1.20819	.135	1.140	10	73	.345	
2	.367[b]	.135	.030	1.20008	.000	.010	1	73	.919	
3	.367[c]	.134	.042	1.19240	-.001	.043	1	74	.836	
4	.366[d]	.134	.054	1.18497	-.001	.055	1	75	.816	
5	.364[e]	.132	.065	1.17834	-.002	.141	1	76	.708	
6	.361[f]	.130	.075	1.17196	-.002	.159	1	77	.691	
7	.344[g]	.119	.074	1.17243	-.012	1.063	1	78	.306	
8	.322[h]	.104	.070	1.17472	-.015	1.312	1	79	.255	
9	.283[i]	.080	.057	1.18284	-.024	2.124	1	80	.149	
10	.226[j]	.051	.039	1.19417	-.029	2.578	1	81	.112	2.435

a. Predictors: (Constant), ipq_experience, mtq_benefits, ipq_temporality, ipq_External_cause, ipq_neg_impact, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause, mtq_necessity

b. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, ipq_neg_impact, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause, mtq_necessity

c. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, ipq_neg_impact, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause

d. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause

e. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, mtq_side_effects, mtq_no_pill, ipq_internal_cause

f. Predictors: (Constant), ipq_temporality, ipq_External_cause, mtq_side_effects, mtq_no_pill, ipq_internal_cause

g. Predictors: (Constant), ipq_temporality, mtq_side_effects, mtq_no_pill, ipq_internal_cause

h. Predictors: (Constant), mtq_side_effects, mtq_no_pill, ipq_internal_cause

i. Predictors: (Constant), mtq_no_pill, ipq_internal_cause

j. Predictors: (Constant), mtq_no_pill

k. Dependent Variable: mtq_scale1compliance

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.643	10	1.664	1.140	.345[b]
	Residual	106.560	73	1.460		
	Total	123.202	83			
2	Regression	16.627	9	1.847	1.283	.261[c]
	Residual	106.575	74	1.440		
	Total	123.202	83			
3	Regression	16.565	8	2.071	1.456	.188[d]
	Residual	106.637	75	1.422		
	Total	123.202	83			
4	Regression	16.488	7	2.355	1.677	.127[e]
	Residual	106.715	76	1.404		
	Total	123.202	83			
5	Regression	16.290	6	2.715	1.955	.082[f]
	Residual	106.913	77	1.388		

Model		Sum of Squares	df	Mean Square	F	Sig.
	Total	123.202	83			
	Regression	16.069	5	3.214	2.340	.049[g]
6	Residual	107.133	78	1.374		
	Total	123.202	83			
	Regression	14.609	4	3.652	2.657	.039[h]
7	Residual	108.594	79	1.375		
	Total	123.202	83			
	Regression	12.805	3	4.268	3.093	.032[i]
8	Residual	110.397	80	1.380		
	Total	123.202	83			
	Regression	9.874	2	4.937	3.529	.034[j]
9	Residual	113.328	81	1.399		
	Total	123.202	83			
	Regression	6.267	1	6.267	4.395	.039[k]
10	Residual	116.935	82	1.426		
	Total	123.202	83			

a. Dependent Variable: mtq_scale1compliance

b. Predictors: (Constant), ipq_experience, mtq_benefits, ipq_temporality, ipq_External_cause, ipq_neg_impact, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause, mtq_necessity

c. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, ipq_neg_impact, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause, mtq_necessity

d. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, ipq_neg_impact, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause

e. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, ipq_self_efficacy, mtq_side_effects, mtq_no_pill, ipq_internal_cause

f. Predictors: (Constant), mtq_benefits, ipq_temporality, ipq_External_cause, mtq_side_effects, mtq_no_pill, ipq_internal_cause

g. Predictors: (Constant), ipq_temporality, ipq_External_cause, mtq_side_effects, mtq_no_pill, ipq_internal_cause

h. Predictors: (Constant), ipq_temporality, mtq_side_effects, mtq_no_pill, ipq_internal_cause

i. Predictors: (Constant), mtq_side_effects, mtq_no_pill, ipq_internal_cause

j. Predictors: (Constant), mtq_no_pill, ipq_internal_cause

k. Predictors: (Constant), mtq_no_pill

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.074	1.521		2.021	.047		
	mtq_necessity	-.010	.048	-.031	-.198	.844	.478	2.093
	mtq_benefits	-.015	.048	-.043	-.303	.763	.579	1.726
	mtq_side_effects	-.040	.041	-.124	-.979	.331	.744	1.344
	mtq_no_pill	.111	.065	.226	1.707	.092	.674	1.484
	ipq_neg_impact	-.003	.016	-.023	-.188	.851	.796	1.257
	ipq_internal_cause	-.023	.017	-.195	-1.358	.179	.575	1.740
	ipq_External_cause	.015	.020	.107	.763	.448	.608	1.646
	ipq_self_efficacy	.015	.039	.051	.379	.706	.658	1.520
	ipq_temporality	.078	.070	.141	1.121	.266	.748	1.337

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
2	ipq_experience	-.004	.036	-.013	-.102	.919	.742	1.347
	(Constant)	3.082	1.509		2.043	.045		
	mtq_necessity	-.010	.048	-.032	-.208	.836	.481	2.080
	mtq_benefits	-.014	.047	-.041	-.293	.771	.593	1.687
	mtq_side_effects	-.040	.040	-.123	-.981	.330	.748	1.337
	mtq_no_pill	.110	.064	.224	1.729	.088	.697	1.434
	ipq_neg_impact	-.003	.016	-.025	-.214	.832	.828	1.208
	ipq_internal_cause	-.023	.016	-.200	-1.477	.144	.639	1.564
	ipq_External_cause	.015	.019	.108	.781	.437	.613	1.633
	ipq_self_efficacy	.014	.039	.049	.371	.712	.671	1.491
	ipq_temporality	.079	.069	.142	1.147	.255	.757	1.321
3	(Constant)	3.111	1.493		2.084	.041		
	mtq_benefits	-.018	.042	-.055	-.440	.661	.752	1.330
	mtq_side_effects	-.040	.040	-.124	-1.002	.320	.751	1.331
	mtq_no_pill	.108	.063	.220	1.728	.088	.712	1.405
	ipq_neg_impact	-.004	.016	-.028	-.234	.816	.834	1.199
	ipq_internal_cause	-.024	.016	-.204	-1.532	.130	.653	1.532
	ipq_External_cause	.015	.019	.109	.797	.428	.614	1.629
	ipq_self_efficacy	.011	.036	.039	.318	.751	.781	1.280
	ipq_temporality	.074	.064	.133	1.159	.250	.877	1.141
4	(Constant)	2.967	1.352		2.195	.031		
	mtq_benefits	-.018	.042	-.054	-.439	.662	.752	1.330
	mtq_side_effects	-.039	.039	-.120	-.985	.328	.766	1.305
	mtq_no_pill	.106	.061	.215	1.723	.089	.731	1.369
	ipq_internal_cause	-.025	.015	-.211	-1.638	.106	.688	1.453
	ipq_External_cause	.016	.019	.117	.882	.381	.650	1.539
	ipq_self_efficacy	.013	.035	.044	.375	.708	.814	1.228
	ipq_temporality	.073	.063	.132	1.156	.251	.879	1.138
5	(Constant)	3.134	1.269		2.469	.016		
	mtq_benefits	-.016	.041	-.048	-.398	.691	.763	1.310
	mtq_side_effects	-.034	.037	-.105	-.917	.362	.861	1.162
	mtq_no_pill	.107	.061	.218	1.760	.082	.733	1.363
	ipq_internal_cause	-.025	.015	-.211	-1.651	.103	.688	1.453
	ipq_External_cause	.017	.018	.124	.955	.343	.665	1.504
	ipq_temporality	.072	.063	.130	1.152	.253	.880	1.137
6	(Constant)	2.994	1.213		2.468	.016		
	mtq_side_effects	-.038	.035	-.117	-1.070	.288	.929	1.076
	mtq_no_pill	.099	.057	.201	1.741	.086	.840	1.190
	ipq_internal_cause	-.026	.015	-.221	-1.774	.080	.716	1.396
	ipq_External_cause	.018	.018	.132	1.031	.306	.680	1.470
	ipq_temporality	.074	.062	.134	1.189	.238	.884	1.131
7	(Constant)	3.223	1.193		2.702	.008		
	mtq_side_effects	-.044	.035	-.136	-1.261	.211	.956	1.046
	mtq_no_pill	.114	.055	.232	2.085	.040	.903	1.108
	ipq_internal_cause	-.019	.013	-.163	-1.465	.147	.902	1.108
	ipq_temporality	.071	.062	.129	1.145	.255	.886	1.129
8	(Constant)	4.017	.973		4.129	.000		
	mtq_side_effects	-.050	.034	-.156	-1.457	.149	.980	1.020

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	mtq_no_pill	.130	.053	.265	2.465	.016	.969	1.032
	ipq_internal_cause	-.023	.013	-.194	-1.791	.077	.958	1.044
	(Constant)	3.171	.786		4.033	.000		
9	mtq_no_pill	.125	.053	.253	2.346	.021	.974	1.026
	ipq_internal_cause	-.020	.013	-.173	-1.606	.112	.974	1.026
	(Constant)	2.736	.745		3.671	.000		
10	mtq_no_pill	.111	.053	.226	2.096	.039	1.000	1.000

a. Dependent Variable: mtq_scale1compliance

APPNEDIX C – Assessment Measures

DEMOGRAPHIC INFORMATION SHEET

Please mark the applicable answer with an X where appropriate or complete where indicated:

1. Sex:

Male	1
Female	2

2. Age: _____

3. Marital status

Single	1
Married	2
Divorced	3
Widowed	4
Other	5

4. Employment status:_____

5. Educational background:_____

6. Smoker/non-smoker

7. Main medical diagnoses: _____

8. Other medical illnesses if present:_____

9. Duration of hypertension:_____

10. History of hypertension: Yes/No

11. History of psychological disorders: Yes/No

If yes, please specify: _____

12. Perceived relationship with health practitioner/nurse:

Very Good	1
Good	2
Average	3
Not good	4
Poor	5

13. Type of anti-hypertensive medication:_____

14. Prescribed dosage per day (example two/three pills a day**):_____**

15. Prescribed instruction (example: take medication in the morning or afternoon after lunch or breakfast**): _____**

16. Would you consider yourself well-informed about your illness?

Yes/No

17. Would you consider yourself well-informed about your medication instructions?

Yes/No

MEDICATION-TAKING QUESTIONNAIRE: PURPOSEFUL ACTION

A. Please indicate the daily dosage of blood pressure medication taken.
Also indicate when the medication is to be taken by marking the appropriate response with an X in the middle column.

Example

Dosage: **2 pills**

5	**X**	Morning and Evening

Dosage: _____ pills

	Mark with X	**Time**
1		**Morning Only**
2		**Afternoon Only**
3		**Evening Only**
4		**Morning and Afternoon**
5		**Morning and Evening**
6		**Morning, Afternoon and Evening**

B. Please rate how well you generally take your medication by marking the appropriate box with an X in the middle column.

	Mark with X	**I.....**
1		**never take my medication**
2		**take my medication but occasionally skip a day or more**
3		**take my medication daily but not as instructed**
4		**take my medication but sometimes purposely neglect to**
5		**take my medication but sometimes unintentionally forgets**
6		**always take my medication and never miss a dosage**

C. Please rate how well you were able to take your medication for the past 7 days by marking the appropriate box with an X in the middle column.

	Mark with X	**I.....**
1		**was not at all able to take my medication at all**
2		**took my medication but skipped a day or more**
3		**took my medication but not as instructed**
4		**took my medication as instructed everyday**

Please rate the following statements by ticking either: *agree; occasionally agree; rarely agree; almost never agree* or *never agree*

1.	**Perceived need**	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1.1	My blood pressure pills keep me from having a stroke					
1.2	I need to take my blood pressure pills					
1.3	I take my blood pressure pills for my health					
1.4	Blood pressure pills keep me from having health-related problems					
1.5	I could have health problems if I do not take my blood pressure pills					
1.6	It's not a problem if I miss my blood pressure pills					
1.7	I would rather treat my blood pressure without pills					
1.8	I am OK if I do not take my blood pressure pills					

2.	**Perceived effectiveness**	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**

2.1	My blood pressure will come down enough without pills					
2.2	I will have problems if I don't take my blood pressure pills					
2.3	My blood pressure pills control my blood pressure					
2.4	Blood pressure pills benefit my health					
2.5	I feel better when I take my blood pressure pills					
2.6	I have problems finding pills that will control my blood pressure					

3.	**Perceived as safe**	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
3.1	The side effects from my blood pressure pills are a problem					
3.2	The side effects from my blood pressure pills are harmful					
3.3	My blood pressure pills are safe					
3.4	Taking my blood pressure pills is not a problem because they benefit my health					
3.5	My blood pressure pills cause other health problems					
3.6	I will become dependent on my blood pressure pills					

(This measure was adopted from Johnson and Rogers, 2006)

The Illness-perception Questionnaire – Revised

- We are interested in your views about your high blood pressure.
- These are statements other people have made about their high blood pressure.
- Please show how much you agree or disagree with each of the following statements about your high blood pressure by ticking one of the boxes.

VIEWS ABOUT YOUR HIGH BLOOD PRESSURE

Views about your high blood pressure	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) Having this high blood pressure makes me feel anxious					
2) I expect to have this high blood pressure for the rest of my life					
3) I get depressed when I think about my high blood pressure					
4) I go through cycles in which my high blood pressure gets better and worse					
5) My high blood pressure causes difficulties for those who are close to me					
6) My high blood pressure has serious financial consequences					
7) I have the power to influence my high blood pressure					
8) My high blood pressure is a serious condition					
9) The course of my high blood pressure depends on me					
10) My high blood pressure is likely to be permanent rather than temporary					
11) My high blood pressure is very unpredictable					
12) My high blood pressure makes me feel					

afraid					
13) My high blood pressure makes me feel angry					
14) My high blood pressure strongly affects the way others see me					
15) My high blood pressure will improve in time					
16) My high blood pressure has major consequences on my life					
17) What I do can determine whether my high blood pressure gets better or worse					
18) My high blood pressure will last for a long time					
19) My treatment can control my high blood pressure					
20) My treatment will be effective in curing my high blood pressure					
21) When I think about my high blood pressure I get upset					
22) I have a clear picture or understanding of my high blood pressure					
23) The negative effects of my high blood pressure can be prevented (avoided) by my treatment					

YOUR VIEWS ABOUT SYMPTOMS YOU MAY HAVE EXPERIENCED SYMPTOM

- We would like to ask you about any SYMPTOMS you may have experienced since finding out about your high blood pressure.
- Some people do experience symptoms related to high blood pressure whilst others don't.
- Similarly, some people experience symptoms that are related to their medicines and others don't.

- Here is a list of common symptoms.
- Please show whether you have experienced each of the following symptoms recently by circling Yes or No.
- For each symptom that you have experienced recently, please then show whether you believe it is related to your HIGH BLOOD PRESSURE or to the MEDICINE you take for your high blood pressure.
- If you don't know whether the symptom is related to your high blood pressure or the medicine you take for your high blood pressure, please circle Don't Know.

SYMPTOM:

1) I have experienced this symptom recently If answer is **YES**

   a. This symptom is related to my **HIGH BLOOD PRESSURE**

   b. This symptom is related to the **MEDICINE** I take for my high blood pressure

1) Pain NO/YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know
2) Sore Throat NO/YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know
3) Nausea NO YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know
4) Breathlessness NO YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know
5) Weight Loss NO YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know
6) Fatigue NO YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know
7) Stiff Joints NO YES If YES
   a. YES NO Don't Know
   b. YES NO Don't Know

8) Sore Eyes NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

9) Wheeziness NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

10) Headaches NO YES If YES

a) YES NO Don't Know

b) YES NO Don't Know

11) Upset Stomach NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

12) Sleep Difficulties NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

13) Dizziness NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

14) Loss of Strength NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

15) Loss of Libido NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

16) Impotence NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

17) Feeling Flushed NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

18) Fast Heart Rate NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

19) Pins and Needles NO YES If YES

a. YES NO Don't Know

b. YES NO Don't Know

- If you have experienced **any other symptoms** recently that you believe may have been related to your high blood pressure or the medicine that you take for your high blood pressure, please write them in the table below.
- Please show whether you believe they are related to your high blood pressure or to the medicine you take for your high blood pressure by circling yes, no or don't know.

Symptom: This symptom is related to my **high blood pressure**

YES NO Don't Know

This symptom is related to the **medicine** I take for my high blood pressure

YES NO Don't Know

Symptom:	**High blood pressure**	**Blood pressure medication**
	YES NO Don't Know	YES NO Don't Know
	YES NO Don't Know	YES NO Don't Know
	YES NO Don't Know	YES NO Don't Know

IF YOU HAVE EXPERIENCED SYMPTOMS THAT YOU THINK ARE RELATED TO YOUR HIGH BLOOD PRESURE, PLEASE ANSWER THE FOLLOWING QUESTIONS. IF NOT, PLEASE GO ON TO THE NEXT PAGE. YOUR VIEWS ABOUT SYMPTOMS YOU MAY HAVE EXPERIENCED (continued)

VIEWS ABOUT YOUR HIGH BLOOD PRESSURE SYMPTOMS

- We are interested in your views about your symptoms related to your high blood pressure.
- These are statements other people have made about their symptoms.
- Please show how much you agree or disagree with them by ticking one of the boxes.

1) There is a lot which I can do to control my symptoms
2) My symptoms come and go in cycles
3) The symptoms of my high blood pressure change a great deal from day to day

POSSIBLE CAUSES OF YOUR HIGH BLOOD PRESSURE

- We are interested in your own views about what caused your high blood pressure.
- Below is a list of possible causes.
- Please show how much you agree or disagree that they were causes FOR YOU by ticking one of the boxes for each possible cause.
- As people are very different, there are no correct answers for these questions.

	Causes	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1	Stress and worry					
2	Hereditary – it runs in the family					
3	Germ or virus					
4	Diet or eating habits					
5	Chance or bad luck					
6	Poor medical care in my past					
7	Pollution in the environment					
8	My own behaviour					
9	My mental attitude e.g. thinking about life negatively					
10	Family problems or worries					
11	Overwork					
12	My emotional state e.g. feeling down, lonely, anxious, empty					
13	Ageing					
14	Alcohol					
15	Smoking					
16	Accident or injury					
17	My personality					
18	Poor immune system					

- In the table below, please list the three most important factors that you believe caused YOUR high blood pressure.

- You may use any of the items from the box above, or you may have additional ideas of your own.
- If you can't think of three things that you think caused your high blood pressure, just write one or two.

The most important causes of my high blood pressure for me:

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