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Student number: 9905955

DECLARATION

I declare that **"KNOWLEDGE, BELIEFS AND PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS IN VHEMBE DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA"** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete reference and that this work has not been submitted before for any other degree at any institution.

.....

Signature

(Ralineba Tshinyadzo)

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KNOWLEDGE, BELIEFS AND PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS IN VHEMBE DISTRICT OF LIMPOPO PROVINCE, SOUTH AFRICA

STUDENT NUMBER: 9905955

STUDENT : **Ralineba Tshinyadzo**

DEGREE : **Magister Curationis**

DEPARTMENT : **Advanced Nursing Science**

SUPERVISOR : **Prof. M.L. Netshikweta**

CO-SUPERVISOR : **Dr N.H. Shilubane**

ABSTRACT

Diabetes mellitus is a chronic disease affecting millions of people worldwide. Over 140 million people worldwide were estimated to have type 2 diabetes mellitus in the year 2000 and this prevalence is projected to rise to over 280 million by the year 2025. Diabetes mellitus is a progressive disease that can lead to debilitating complications and premature death if not effectively controlled. The study sought to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe beliefs and practices for diabetes management among such patients. A quantitative descriptive design was used to collect data. A self-administered questionnaire was designed and translated into local spoken language (Tshivenda) by experts from the department of African Languages at the University of Venda. Data were analysed using the Statistical Package for Social Sciences (SPSS). Content validity and reliability of the instrument were ensured. As many as 51 (51.0%) of the respondents reported that they knew what diabetes mellitus was, whereas 49 (49.0%) did not know. Knowledge of the role of obesity and physical inactivity in producing diabetes was very low, with only 4 (8.9%) and 7 (15.5%) of the respondents reporting these as risk factors for diabetes mellitus, as compared to 34 (75.5%) of the respondents who had the knowledge that heredity is also associated with being predisposed to diabetes mellitus. Almost 62 (62.0%) of the respondents believed that diabetes could cause complications. A majority of 93 (93%) of the respondents reported that they were able to monitor blood sugar levels regularly. Findings of this study revealed that the level of diabetes knowledge among the respondents was very good. However, knowledge of signs and symptoms of diabetes mellitus was very low, while the danger of blindness was also very low, since the respondents were never examined by eye specialists in

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order to rule out eye complications. A comprehensive diabetes education programme is necessary to improve the knowledge of diabetes mellitus.

Key concepts

Diabetes, knowledge, beliefs, practices, Limpopo province

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DEDICATION

I dedicate this dissertation to:

My late dear Mom and Dad, Mr Nelwamondo Wilson and Mrs Nelwamondo Mutshekwa, who did not live to witness the completion of this dissertation.My loving husband Edward, for his encouragement, as well as my brother Enos who encouraged and motivated me to further my studies.

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KNOWLEDGE, BELIEFS AND PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS IN VHEMBE DISTRICT OF LIMPOPO PROVINCE, SOUTH AFRICA

By

RALINEBA TSHINYADZO

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at the

UNIVERSITY OF VENDA

Supervisor: Prof ML Netshikweta

Co-supervisor: Dr NH Shilubane

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LIST OF ABBREVATIONS

DM	Diabetes mellitus
RSA	Republic of South Africa
SA	South Africa
WHO	World Health Organization
IDF	International Diabetes Federation
USA	United State of America
CDG	Chronic Disease and Geriatric Services
LP	Limpopo Province
NIDDM	Non-insulin dependent diabetes mellitus
IDDM	Insulin dependent diabetes mellitus
GDM	Gestational diabetes mellitus
MRDM	Malnutrition-related diabetes mellitus
BMI	Body mass index
ADA	American diabetes association
T2DM	Type 2 diabetes mellitus
TIDM	Type 1 diabetes mellitus
SPSS	Statistical Package for Social Sciences
HbA1c	Glycosylated hemoglobin
PA	Physical Activity
BP	Blood Pressure
CI	Confidence Interval
HTA	Health Technology Assessments
LDL	Low-density lipoprotein
GHB	Glycated Hemoglobin
OHA	Oral Hypoglycaemic Agents
PAID	Problem Areas in Diabetes
PCDS	Perceived Competence for Diabetes Scale
QUOROM	Quality of Reporting of Meta-analyses
RCT	Randomized controlled trial

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SD	Standard Deviation
LOCF	Last Observation Carried Forward
MeSH	Medical Subject Headings
MI	Motivational Interviewing
MINT	Motivational Interviewing Network of Trainers
MITI	Motivational Interviewing Treatment Integrity

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CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

During the last ten years, the prevalence of diabetes mellitus has increased dramatically in many parts of the world. The disease is now a worldwide public health problem, particularly in the developing countries, including the Republic of South Africa (RSA)– more than in the affluent countries. The total number of people with diabetes is projected to rise from 171 million in 2010 to 366 million in 2030 worldwide. In South Africa (SA), at the beginning of 2011 approximately 1.9 million people had been diagnosed with diabetes type 2. The mortality rate is higher among people with diabetes than among the rest of the population with an excess mortality of 45% in 2010 (Lawrie & Good 2013:451).

Excess mortality is mainly due to diabetes-related diseases developed because of poorly controlled diabetes. The socio-economic impact of diabetes and diabetes care in SA was estimated to be R24 billion per year in 2009, including the health sector's annual cost for treating diabetes and diabetes-related diseases. Moreover, the social costs of production due to diabetes represent another R10 billion yearly. The increasing prevalence of the disease and hereby also increasing social costs – combined with the fact that the disease is associated with increased morbidity and mortality emphasizes the importance of effective diabetes care (Idemyor 2010:668).

In some diabetic patients, the pancreas produces little or no insulin. However in other cases, body cells may not respond adequately or use appropriate amounts of insulin that are produced by the body. Insulin is a hormone which converts sugar and starches into energy for the body to use (Carmel, Ellen & Sheridan 2009:110). The study sought to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe beliefs and practices for diabetes management or self-care among patients suffering from type 2 diabetes.

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1.2 BACKGROUND OF THE STUDY

Diabetes mellitus is a growing health problem, particularly in developed countries. Global projections of diabetes mellitus estimate that by 2015 the total number of individuals with diabetes will be 240.3 million worldwide, with 24.7 million people with type 1 diabetes and 215.6 million with type 2 (WHO 2007:11). This is double the number estimated in 2005. In Australia, there were an estimated 870,000 people with diabetes in 2005, of which at least half were unaware they had the condition. This figure is expected to rise to 960,000 by 2015 worldwide (WHO 2007:11).

Type 2 diabetes is the most common form of diabetes and constitutes the majority of cases worldwide. It comprises 80-90% of all diabetes cases, making it a significant public health issue in the majority of developed countries. There is an increasing body of evidence to suggest that type 2 diabetes is a consequence of increasing levels of obesity, decreased levels of activity, and increased food availability – a result of 'modernization' (Xu & Pan 2010:229). Type 2 diabetes on the other hand, is 'late onset' diabetes, and develops more commonly in people over 40 years of age. It is primarily managed through diet and exercise. Individuals with type 2 diabetes are not usually dependent on insulin injections. This is because impaired insulin secretion and cell resistance to insulin cause the condition – it is not caused by insulin shortage (Garber 2007:1851).

Type 2 diabetes is often the result of an individual being overweight for many years. This leads to cells becoming insulin-resistant, as a result of increased levels of sugar being stored as fat and processed. Consequently, the function of the beta cells deteriorates, and this signals the progression of disease from a state of insulin resistance to clinical diabetes. Prolonged and continued beta cell exhaustion can result in reliance on insulin injections. Complications are usually common in individuals with type 2 diabetes, largely because of the longer latent period of disease prior to diagnosis. The disease can go undetected for a number of years, during which time mild symptoms develop – these may become life-threatening (Idemyor 2010:748).

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The International Diabetes Federation (IDF) made estimates in 2009 that the global number of adults with diabetes mellitus will increase by 54% from 284.6 million in 2015 to 438.4 in 2030. Furthermore (IDF 2009:456) suggests that each year 7 million people will develop diabetes mellitus. The largest proportional and absolute increase will occur in developing countries, where the prevalence will rise from 4.2% to 5.6% (IDF Diabetes Atlas 2011:2). About 366 million adults worldwide in the age group of 40-59 years had diabetes mellitus in 2011 and this number is estimated to increase to 552 million in 2030 (IDF Diabetes Atlas 2011:1). Diabetes mellitus is one of the most common non-communicable diseases globally and is a condition associated with significant morbidity and mortality (Norris, Nichols, Casperson, Glasgow, Engelgam & Jacl 2002:36). It is the fourth or fifth leading cause of death in most developed countries and there is evidence that it is epidemic in many developing countries and newly industrialized nations (Farmer, Wade, French, Goyder, Kinmonth & Neil 2005:25). According to World Health Organization (WHO), an alarming increase in the population with type 2 diabetes mellitus both in developed and developing countries over the next two decades is expected (WHO 2007:11). Type 2 diabetes mellitus is considered a disease of poor lifestyle with physical inactivity, obesity and urbanization contributing to the increased prevalence of the disease (Levitt 2008:1376).

Diabetes mellitus affects most people worldwide and it poses major public health socioeconomic challenges (Mbanya, Motala, Sobngwi, Assau & Enoru 2010:2257). In 2007, WHO (2007:11) reported that 3.8 million deaths occurred among different age groups and sex, as well as social status. According to Roglic, Unwin, Benneth, Mathers, Tuomilehlo, Nag, Connolly and King (2005:2132), these are preventable deaths, especially in individuals aged between 35 to 65 years. The majority of the population lives in the United State of America (USA), Mexico and Canada and these regions account for the vast majority of people with diabetes (IDF Diabetes Atlas 2011:3). By 2030, the adult diabetes population is expected to rise in North American and Caribbean region from 37, 7 million people to 51, 2 million people. At the same time, diabetes prevalence is expected to increase to 3, 8% of the adult population in Africa and 8,7% in South and Central America (IDF Diabetes Atlas 2011:3). People with diabetes mellitus in the European region and Western Pacific region in 2011 were estimated to be 52, 6 million (8.1%) and 131, 9 million (8,5%) respectively; these regions coincidentally have the highest number of people with

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diabetes (IDF Diabetes Atlas 2011:3). However, the prevalence rate of the African region at 3.8% is significantly lower than 8, 5% and 9,1% in the Western Pacific region and Middle East and North Africa region respectively (IDF Diabetes Atlas 2011:3). A study conducted in the USA by Nadir, William, Adil-Yousif, Al-Geed and Al-Okkah (2011:146) report that the prevalence of diabetes mellitus is equally high at 8.6% in the rural areas and 13.2% amongst the urban population.

Health in Sub-Saharan Africa (SSA) has been traditionally dominated by infectious diseases, HIV/AIDS and poverty, with rapid urbanization, non-communicable diseases (NCD) such as diabetes mellitus are quickly becoming a new priority for health in the region (IDF Diabetes Atlas 2011:2). The prevalence of diabetes mellitus in Sub-Saharan Africa is rising quickly (Mbanya et al. 2010:2259; Tuei, Maiyoh, & Ha 2010:433). The IDF estimates the prevalence of diabetes in Sub-Saharan Africa (SSA) to be about 3.3% in 2010 (IDF 2009:456). The projected growth of diabetes in SSA is 98% from 12,1million in 2015 to 23, 3 million in 2030. Mortality attributable to diabetes mellitus in SSA is estimated in 2015 at 6% of total mortality, an increase from 2, 2 to 2, 5 in the year 2010. The results indicate that the absolute and relative mortality rate is highest in the age group between 20-39 years and mostly in the economically productive population (IDF 2009:452).

The condition was previously thought to be rare or not documented in rural Africa, but over the past few decades it has emerged as an important non-communicable disease (Motala, Omar & Pirie 2003:78; Levitt 2008:1376). In their study, Mbanya et al. (2010:2257) further indicated that the rate of undiagnosed diabetes is escalating in the most countries of SSA including SA, and people who are not aware that they have the disease are at high risk of developing chronic complications. This result therefore, indicates that the rate of diabetes related morbidity and mortality in SSA region could grow substantially. Rapid urbanization and major changes in life-style could be the cause of this epidemic. Kenya Studies by Maina, Ndegwa, Njenga and Muchemi (2011:17) as well as Mash, De Vries and Abudul (2007:49) show the prevalence of 4.2% - 6% in the general population with a prevalence rate of 2.2% in rural areas and high as 12.2% in urban areas. Maina et al. (2011:17) reported that the rise of these determinants of chronic diseases reflects the major forces driving social, economic and cultural change in the

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Kenyan society. They further indicated that the same factors are driving the epidemiological landscape with chronic non-communicable diseases as becoming major contributors to the national disease burden. South Africa like any Sub-Saharan countries and the world at large is no exception, the prevalence of diabetes among South African adults from age 30 years and above has increased by 50% between 2009 to date, and an increase is expected by some 11 million new diabetes diagnoses by the year 2020. According to Mashau (2011:42) diabetes is an increased health problem in SA with few resources available for diabetes care and yet is a lifelong disease. Managing diabetes through drugs is cumbersome and costly. Health systems are seeking increasingly effective and efficient means of providing diabetes care. It is estimated that diabetes mellitus is the sixth leading cause of death and affects over five percent of South Africans, and maintaining patients living with diabetes is costly (Piette, Richardson & Valenstein 2004:156). Eighty percent of people with diabetes live in low-and middle-income countries and 183 million people (50%) with diabetes are undiagnosed (IDF Diabetes Atlas 2011:1).

According to Roglic et al. (2005:2132), diabetes mellitus in South Africa (SA) is common and has emerged as an epidemic of the 21st century; the prevalence of adult onset diabetes ranges from 5% in whites to 13, 5%. Amongst the black population, the prevalence is 6-8%, and in the coloured population of Western Cape it is 8%. Data from South Africa also shows estimates of type 2 diabetes varying between 3 and 28,7% cases affected by the disease (http://www.semda.org.za/prevalenceddata.htm). Bradley and Puoane (2006:3) reported similar findings that the highest prevalence of type 2 diabetes mellitus was found amongst the Indian communities in Durban to be13% – and the elderly coloured communities of Cape Town as28.7%. As inany other countries, type 2 diabetes mellitus is more common amongst the 30 year age group and above (Hjelm, Mufunda, Nambozi and Kemp 2003:424). According to Moodley and Rambiritch (2007:49), the South African population who were diagnosed with diabetes was predominantly from the affluent urban communities; however, due to westernization of the rural communities, diabetes is fast becoming prevalent in the rural African population and threatens to overwhelm the health care system in the near future.

Diabetes is responsible for about 6000 deaths per year in South Africa. Many of the deaths are of middle aged people and could be prevented (Mash 2005:6). In their study, Bradley and Puoane

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(2006:10) indicated that diabetes constitutes a significant health problem in South Africa. To curb this scourge, public health interventions are required to prevent diabetes or delay the onset of its complications. This will entail a high risk approach targeting individuals at risk of diabetes through lifestyle modification and aggressive treatment for those with the disease. A study conducted in the Eastern Cape by Dondashe (2010:124) reported that knowledge is the greatest weapon in the fight against diabetes mellitus. Information can help people assess their risk of diabetes, motivate them to seek proper treatment and care, and inspire them to take charge of their diseases. Moodley and Rambiritch (2007:16) as well as Mukwevho, Shilubane and Maputle (2013:9) also emphasized that knowledge regarding diabetes mellitus are required for the purpose of prevention of complications and control of the disease. The purpose of this study therefore, was to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe beliefs and practices regarding the management of this illness.

1.3 PROBLEM STATEMENT

With rapid westernisation and sedentary lifestyle in the past few years in South Africa, diabetes mellitus has become one of the greatest disease burdens in terms of mortality and morbidity and medical care costs. The prevalence of diabetes in South Africa is among the highest in the world (Mashau 2011:22). In 2005, South Africa experienced 14% prevalence of diabetes, of the total population (51, 77 million people) but 10.2 million people remain undiagnosed as reported by Mashau (2011:44).

Diabetes mellitus is the most common clinical condition seen by physicians and professional nurses in their daily practices. Nurses and doctors are confronted with the burden of caring for poorly controlled patients and patients who are not adhering to diabetes medications.Some form of preventable diabetes mellitus complications are often present in such cases. Despite diverse efforts to prevent and control diabetes mellitus complications, adherence to management guidelines– including physical activity– remains low, as documented above. In South Africa, patients with diabetes mellitus receive free medications in all health facilities, including health care clinics that participated in this study. Nevertheless, adherence to medication remained ineffective in 80.0% of patients, in spite of free and available diabetes medication. Diabetes

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mellitus morbidity and mortality rates may not decrease unless knowledge, proper practices and adherence to diabetes medications of at least 95.0% are maintained, throughout these patients' lives. Therefore, nursing researchers have been exploring determinants of physical activity (PA) in order to maintain or improve the adherence to recommended treatments. It is in this light that the researcher, as a professional nurse working with patients diagnosed as diabetic, thought to assess the level of knowledge and describe beliefs and practices on diabetes mellitus in order to recommend that preventive health education be offered to the communities in Vhembe district and South Africa as a whole.

1.4 PURPOSE OF THE STUDY

The purpose of this study was to assess the level of knowledge that diabetic patients have regarding the management of diabetes mellitus and to describe their beliefs and practices regarding this condition.

1.5 THE RESEARCH QUESTION

In order to attain the purpose of this study the following research questions were posed:

- What knowledge do diabetic patients have regarding diabetes mellitus in Vhembe district of Limpopo province, South Africa?
- What beliefs do diabetic patients have regarding diabetes mellitus in Vhembe district Limpopo province, South Africa?
- What practices do diabetic patients have regarding diabetes mellitus in Vhembe district Limpopo province, South Africa?

1.6 RESEARCH OBJECTIVES

Burns and Grove (2011:156) explain objectives as "clear, concise, declarative statements expressed in the present tense and for clarity with only one or two variables".
The objectives of the study were to:

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- assess the knowledge that diabetic patients have regarding diabetes mellitus in Vhembe district of Limpopo province, South Africa.
- describe the beliefs, and practices on the diabetes mellitus among people with diabetes mellitus in Vhembe district of Limpopo province, South Africa.
- provide recommendations on the management of diabetes mellitus.

1.7 SIGNIFICANCE OF THE STUDY

The results of this study could add to the existing body of knowledge regarding diabetes mellitus in Vhembe district as well as the entire RSA. Based on the information gathered on this research project, recommendations could be made for the development of health promotion activities and health education material needed by diabetic patients and the community at large. The researcher could consider the results as offering a basic understanding of patients' knowledge, beliefs and practices regarding diabetes mellitus. Finally, these research findings could yield further research.

1.8 DEFINITION OF CONCEPTS

Diabetes mellitus: It is a heterogeneous group of metabolic diseases that are characterized by chronic hyperglycemia and disturbances in carbohydrate, lipid, and protein metabolism (Barnett and Braunstein 2005:583).

In this study, diabetic mellitus refers to type 2 diabetes with a fasting blood sugar of above 8mmol/L and random blood sugar level of above 12mmol/L.

Knowledge: Is a fact, information, understanding and skills that a person has acquired through experience or education (Oxford Advance Learners Dictionary, 2006:656).

In this study, knowledge refers to the information that diabetic patients have regarding type 2 diabetes and its management.

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Diabetic patients: in this study diabetic patients are all males and females aged 40 years and above with a diagnosis of type 2 diabetes mellitus and on anti-diabetes drug for six months and above.

Beliefs: refers to opinions that one accepts as true or real (Oxford Advance Learners Dictionary, 2006:97).

In this study, beliefs shall refer to anything that diabetic patients who participated in this study accept as true and real regarding diabetes mellitus.

Practices: refers to an activity done regularly; a habit or custom (Oxford Advance Learners Dictionary, 2006:905).

In this study, practices shall mean action taken in the management of diabetes mellitus by diabetic patients who participated in this study.

1.9 RESEARCH METHODOLOGY

According to LoBiondo-Wood and Haber (2006:116), the methodology of research projects strongly influences the research process because it defines the method of carrying out the research and presenting the methods for data collecting and measurement as well as the techniques used for data analysis. This study describes the research settings, design, population, sample and sampling techniques, ethical consideration, data collection instrument and method used for data collection as well as data analysis. These concepts were elaborated in chapter 3 of this dissertation.

1.9.1 Research Setting

Burns and Grove (2006:362) define the setting as the location where a study is conducted. The research setting in which the research study takes place can be natural or controlled environment. This study was conducted in a natural setting at randomly selected health care clinics under Vhembe district, Limpopo province. Focus was based on three clinics in Vhembe District, which

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were Tshisahulu, Tswinga and Phiphidi clinic where diabetic patients were managed. The concept of research settings are explained in chapter 3.

1.9.2 Research Design and Methods

A quantitative descriptive design was utilized. The study population comprised of (n=100) diabetic patients from sampled health care clinics under Vhembe District. A self-administered questionnaire was used to collect data. All respondents who came to the sampled clinics on the day of data collection in that clinic were included in the study. The responses were 100%, the sample was predominantly female 61 (61%) and male 39 (39%). Descriptive statistics were used to analyse data.

1.9.3 Population and Sampling

Burns and Grove (2009:123) define population is the total number of individuals who have the same characteristics defined for a specific study while Brink (2006:124) sees a sample as part or fraction of a whole, or a subset of a larger set, selected by the researcher to participate in a research study. In this study, population comprised of all diabetic patients who consulted at the three sampled health care clinics under Vhembe district, Limpopo province.

1.9.3.1 Sampling method for the respondents

In this study purposive sampling was used. According to Polit and Beck (2010:279) as well as Grinnell and Unrau (2005:153), purposive sampling involves selecting people who are judged to be typical of the population or particularly knowledgeable about the issue under study. The sample consisted of hundred type 2 diabetic patients who consulted the three sampled health care clinics and who met the criteria for inclusion.

1.9.3.2 Sampling of the clinics

In this study, probability simple random sampling approach was used. In probability sampling approach, each unit in the population has a chance of being selected and the sample can be used to be representative of the population from which it has been selected; as such generalizations of findings can be made to the population (Burns & Grove 2009:479). Lists of all clinics in Vhembe district have been obtained from Regional department of Health Vhembe district. From the list,

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clinics were randomly selected by writing down the clinic names and putting them in a box. The researcher used a neutral enrolled nurse from one of the clinics which was not included as area of research. The enrolled nurse stirred the pieces of paper in the box and picked one piece of paper each time. The process was repeated three times, and 3 clinics were randomly selected. The researcher adopted these clinics as sites for this study.

1.9.3.3 Inclusion and exclusion criteria

1.9.3.3.1 Inclusion criteria

Inclusion criteria are characteristics that a subject or an element must possess in order to be part of the target population (Burns & Grove 2009:345). In this study, to be included the respondent has to be:

- a type 2 diabetic patient.
- male or female aged forty years and above.
- on diabetic treatments for more than six months and were willing to participate.
- at the sampled health care clinics for consultation on the day of data collection.

1.9.3.3.2 Exclusion criteria

Exclusion criteria are characteristics that exclude a population from the study (Polit & Beck 2005:71). To be excluded in the study the respondents should be:

- a diabetic patient aged below 40 years.
- a diabetic patient aged 40 years and above who is psychiatric patient.
- a diabetic patient who did not give consent.

1.9.4 Research Instrument

The researcher used a self-administered, structured questionnaire to collect data. The researcher developed a questionnaire guided by the objectives of the study following an extensive search of literature review. The design of the questionnaire took time and effort and it was drafted a number of times in consultation with a statistician and the supervisors of the study at the University of Venda, who critically reviewed and verified the interpretations of the questions in the questionnaire before being finalized. The questionnaire was also evaluated by experts in diabetic clinics.

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1.9.5 Data Collection

Data collection methods are the process of gathering data to address a research problem (Polit & Beck 2005:716). In this study data was collected using a structured self-administered questionnaire. The questionnaire consisted of fixed and open-ended questions. Details of this were discussed in chapter three of this dissertation.

1.9.6 Data Analysis

Data analysis in quantitative research can be regarded as the technique by which researchers convert data into numerical form and subject it to statistical analysis (Rubin & Babbie 2005:552). In this quantitative study, descriptive statistics were used. Graphs, pie charts, tables and figures were used to display the results. Open-ended questions in the questionnaire were grouped and analysed quantitatively.

1.10 VALIDITY AND RELIABILITY

Validity refers to the extent to which the instrument measures what it is supposed to measure (Brink 2006:159; Polit & Hungler 2005:347). In this study validity was ensured by giving the questionnaire to supervisors, statisticians and experts in diabetes clinics that critically reviewed and verified the interpretations of the questions, before being finalized for data collection.

Reliability of instrument refers to the degree to which the instrument can be depended upon to yield consistent results if used repeatedly over time on the same person, or if used by two researchers (Brink 2006:163). In this study the questionnaire was piloted to ten diabetic patients who were not included in the main study. During piloting the researcher did not influence the completion of the questionnaire and the respondents were exposed to the same questions.

1.11 ETHICAL CONSIDERATION

In the study involving human beings or animals, a researcher has to deal with ethical issues (Polit & Beck 2010:150). The researcher ensured strict compliance with ethical standards to protect the right of participants and of the institution where data was collected. Permission was granted by

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University Higher Degree Committee, Department of Health and Social Development Research Committee of Limpopo Province and the District Manager in Vhembe District, Limpopo province. The principles of respect for persons were considered. Confidentiality was ensured by guarding against unauthorized access to data and questionnaire (Burns & Grove 2006:196). Details of these will be elucidated in chapter 3.

1.12 SCOPE AND LIMITATION OF THE STUDY

The study covered only selected clinics of Vhembe district, Limpopo Province, excluding other clinics from other District, which shall mean that findings of this study will not be generalized to all districts of Limpopo province. The study was limited also to adult patients only; young people were excluded.

1.13 STRUCTURE OF THE DISSERTATION

This study was presented in five (5) chapters organized as follows:

Chapter 1

Chapter one is an overview of the study covering background of the study, problem statement, purpose of the study, research questions, objectives of the study, significance of the study, definition of concept, research design and method.

Chapter 2

Chapter two is a literature review which includes introduction, literature reviewed, knowledge and beliefs about diabetes mellitus, general knowledge about diabetes mellitus, knowledge and beliefs on the causes of diabetes mellitus, knowledge and beliefs about risk factors, knowledge of complications of diabetes mellitus, beliefs and practices on diabetic management, cultural beliefs and practices which influence diabetic management.

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Chapter 3

Chapter three contains research methodology used for the study which includes the research design, population, sample and sampling techniques, data collection methods and instruments, data analysis, ethical considerations and measures to ensure validity and reliability.

Chapter 4

Chapter four focused on the data analysis, interpretation and presentation of research findings.

Chapter 5

This chapter contains conclusion, limitations of the study and recommendations.

1.14 CONCLUSION

This chapter provided an overview of the study which included introduction and background of the study, problem statement, purpose of the study, research questions, objectives of the study, significance of the study, definition of concept, an introduction of the research design and methods. The next chapter displays the literature review.

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CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter addressed the research problem, research questions and significance of the study, definition of key concepts, foundations of the study, research design, measures of ensuring validity and reliability of the study, ethical considerations and the scope and limitations of the study. This chapter focuses on the review of relevant literature on diabetes mellitus, and on factors influencing patients' adherence rates on the diabetic medication. Mashau (2011:45) indicates that literature on diabetes mellitus knowledge, beliefs and practices in Vhembe district appears to be less available than literature on diabetes retinopathy.

2.1.1 Purpose of the Literature review

This chapter examined previous studies, covering the period 2001 to 2013 focusing on the following:

- The definition of diabetes mellitus.
- Patients' knowledge of the disease.
- Beliefs of and practices which influence the management of diabetes mellitus.
- Factors influencing adherence on diabetes mellitus medication and maintenance of the diet.
- Strategies for improving patients' adherence to diabetes therapy.

2.2 LITERATURE REVIEWED

Literature has been reviewed from different studies regarding knowledge, beliefs about diabetes mellitus, and diabetes management. Many studies on diabetes mellitus were conducted worldwide; however, the researcher identified limited studies on diabetes mellitus conducted in Limpopo Province of South Africa. The researcher could not identify any study on diabetes

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mellitus in Vhembe district. From the diabetes complications and various practices witnessed by the researcher as associated with the diabetic patients, the researcher felt that it is important to embark on a study of this nature in Vhembe district. Therefore many unanswered questions on diabetes mellitus and its management among patients with diabetes mellitus could be answered.

2.2.1 Type 1 and 2 Diabetes Mellitus

Diabetes is a metabolic disease that is diagnosed on the basis of sustained high concentration of glucose in the blood (Garber 2007:1850). According to the World Health Organization (WHO 2006:86) the current diagnostic criteria for diabetes are: 1) plasma glucose concentration measured after an overnight fast above 7.0 mmol/L; and/or 2) plasma glucose concentration measured two hours after a 75g oral glucose load above 11.0mmol/l. Diabetes occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. Type 1 diabetes results from autoimmune mediated destruction of the beta cells of the pancreas. Insulin is vital for individuals with type 1diabetes to avoid ketoacidosis, coma and death.

Type 2 diabetes is characterized by resistance to the action of insulin and disorder of insulin secretion, either of which may be the predominant feature. Individuals with this type of diabetes do not need insulin to survive. Type 2 diabetes, which is the most common type, is often a result of excess body weight and physical inactivity in genetically predisposed individuals. Over time, diabetes can increase the risk of health-related problems including blindness, kidney damage, nerve damage, amputation of lower limbs and cardio vascular disease (Clark 2006:578). Although diabetes cannot be cured, the disease can be managed by non-pharmacological and pharmacological strategies, where improvements in glycaemic control are important factors in delaying the onset and progression of diabetes-related complications (Nisar, Khan, Qudri and Sher 2008:667).

It is the most common type of diabetes, with millions of non-Hispanic white Americans and Hispanic/Latino Americans diagnosed with this disease. In this form of diabetes (previously called non-insulin-dependent diabetes or adult-onset diabetes) the body experiences peripheral insulin resistance. Insulin resistance refers to decreased tissue sensitivity to insulin, making

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insulin less effective at stimulating glucose uptake by the tissue. This results in a need for more insulin production as a compensatory response. However, the beta cells develop a progressive insulin secretory impairment because they cannot keep up the increased demand of insulin. Ultimately there is not enough insulin to meet the body's needs – a state of hyperglycemia then occurs and type 2 diabetes mellitus develops (Ogunbanjo 2006:568; ADA 2010:11).

Rother (2007:1499) explained the major role of overweight and obesity to insulin resistance and, subsequently, the development of type 2 DM. The pathogenic mechanisms of free fatty acids and excessive amounts of adiposities are associated with impaired insulin sensitivity. A study conducted by Gul (2010:128) demonstrated that type 2 DM can be prevented or delayed in people at high risk of the disease through weight reduction and increased participation in physical activity. As a result, the increasing degree of insulin resistance can lead to hyperglycemia and type 2 DM diagnosis. Hyperglycemia plays a significant role in type 2 DM long-term complications. Hyperglycemia may damage blood vessels and nerves as well as other body organs. Microvascular and macrovascular complications increase morbidity and mortality rates and reduce quality of life (Peterson, Silverstein, Kaufman & Warren- Boulton 2007:659; Bazzano, Serdula & Liu 2005:312; Cooke & Plotnick 2008:379). Coronary and peripheral arterial disease and stroke are considered macrovascular complications.

The prevalence of macrovascular complications, especially cardiovascular disease (CVD), is higher in people with type 2 DM than in the non-diabetes population (ADA 2010:11). Also, macrovascular complications represent the most frequent and serious complications of the disease. Microvascular complications include nephropathy (kidney damage), neuropathy (nerve damage), and retinopathy (retina damage) (Gul 2010:129). The abnormalities in lipid components and blood pressure contribute to accelerating CVD complications (Caliskan, Ozdemir, Ocaktan and Idil (2006:142). Intermittent claudications, ulcers and amputations are problems associated with a poor circulatory system (Garber 2007:1851). Multiple modifiable factors explain type 2 DM long-term complications including uncontrolled hyperglycemia, hypertension, dyslipidemia, smoking, eating habits, obesity and physical inactivity. Obesity, particularly abdominal adiposity, is associated with atherogenesis; also, it is linked to hyperglycemia, hypertension, dyslipidemia and hyperinsulinemia (Barnett and Braunstein

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2005:584). Glycaemic control is essential to the management of DM and reducing complications. The recommended level of glycaemic control for most patients is having Glycosylated hemoglobin (HbA1C) less than 7%. Pharmacological treatment and lifestyle changes in nutrition and physical activity are important aspects to be included in therapeutic goals in order to control hyperglycemia, hypertension, dyslipidemia, and to reduce and maintain body weight (ADA 2010:61; Rother 2007:1499).

2.3 KNOWLEDGE AND BELIEFS ABOUT DIABETES MELLITUS

2.3.1 Self-management and self-care among patients with diabetic mellitus

Treatment of diabetes leading to improved control is a 24-hour-a-day activity and often includes changes in lifestyle, most of which patients with diabetes must take responsibilityfor themselves on a dailybasis. Self-management of diabetes involves a number of considerations and choices that the patient with diabetes must make on a daily basis (Farmer, Kinmonth & Sutton 2006:321). It requires that patients are able to reconcile their resources, values and preferences with a therapeutic regimen of a healthy diet, exercise, no smoking, low alcohol intake, glucose monitoring and, for some patients, medication. Self-management of diabetes is closely connected to the self-care concept, which can be related to the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health and well-being (Saaddine, Honeycutt, Narayan, Zhang, Klein & Boyle 2008:1741).

The self-care concept in this thesis is inspired by Orem theory of self-care and is seen as a health resource in the individual. The Orem theory of self-care as a fundamental need in humans is based on the values of autonomy and independence. In Orem's understanding, self-care is a learned and purposeful activity of the individual that requires a certain level of maturity enabling the individual to perform effective, purposeful, controlled and consistent actions. The theory also encompasses healthcare providers to help a person with their actual or potential self-care deficits. In this thesis, self-care is seen as context dependent ability. Therefore, the self-care activity is not only a process directed inwards and affected by personal conditions, but the ability to conduct self-care is also affected by interpersonal and external conditions (Rotchford & Rotchford

2002:536). Thus, the context and the dynamics of available resources determine the conduct of self-care activities by patients themselves at Sibasa local area and South Africa at large.

2.3.2 Self-management and health education

The patient's own role in diabetes treatment and recognition of the need to educate patients in diabetes self-management has long been considered to be important (Farmer et al. 2006:321). The concern about educating patients in self-care relating to their diabetes was emphasized by the researcher. Since then several guidelines for diabetes care– including education – have been developed. Among these is The World Health Organization's guideline for a national program for diabetes mellitus, which stressed the importance of developing effective patient education programs to maintain the health and quality of life of individuals with diabetes. It has been observed at the Sibasa local area where the study focused on managing the daily care of diabetes, that it appears to be a challenging task for many patients; their ability to be involved in the daily routine of diabetes care seems to be grounded in psychological, motivational as well as educational factors (Rotchford & Rotchford 2002:536).

2.3.3 Previous research in diabetes self-management intervention

The increase of diseases with a multi factorial etiology, including a strong social component in prosperous countries has given rise to research in health prevention and health promotion (Clark 2006:578). With regard to diabetes, the research in this area has focused mainly on how to encourage people with diabetes to undertake a prolonged regime of self-management. Previous systematic reviews and meta-analyses sought to find evidence that self-management intervention using educational or behavioral strategies, stimulates the individual's performance of diabetes self-care to increase target behaviour actions, such as blood glucose monitoring, diet care, physical activity and medical care among adults (Peupet, Mijinyawa, Akagu & Azara 2007:10; Rafique, Azam and White 2006:9; Shilubane & Potgieter 2007:61). These studies indicated modest but significant improvements in glycaemic control in educational and behavioral interventions in diabetes, although the improvement on glycaemic control seemed to decrease over time. The effect of self-management intervention on reduction in glycosylated haemoglobin seemed to be affected by baseline values of HbA1c, i.e. the higher baseline values of HbA1c, the greater the reduction. There was no strong evidence that interventions to improve self-

management behaviours were effective in reducing morbidity and mortality among patients with diabetes (Gul 2010:129; Tham, Ong, Tan, & How 2004:503). Studies to substantiate the effectiveness for self-management intervention to affect long-term behaviour are therefore needed. Effects on the outcomes such as lipids, weight and blood pressure varied indicating the need for more studies to establish knowledge in this area (Westaway & Seager 2004: 618). This was also true for research on psychological factors, though there was an indication that psychological distress tends to be evident among patients with diabetes who are receiving psychological therapy (Kiawi, Edwards, Shu, Unwin, Kamedjeu and Mbanya (2006:505). The organization of self-management intervention including methodological strategies was not well expounded. The contact time (time in hours) between healthcare professional and patient, however, seemed to have an influence on the self-management in diabetes care results, and strategies based on case management seemed to be more robust in improving glycaemic control compared to other quality improvement strategies for type 2 diabetes (Tuei et al. 2010:439).

2.3.3.1 Type 2: Non - insulin dependent diabetes mellitus (NIDDM)

Non-insulin dependent diabetes mellitus (NIDDM) may range from predominantly insulin resistance with relative insulin deficiency to a predominantly secretory defect with or without insulin resistance. Type 2 diabetes mellitus (T2 DM) is most commonly found in older age groups (over 40 years), although lately it has been observed among obese adolescents. The South African national guidelines on management of diabetes mellitus, defines type 2 diabetes mellitus as a condition resulting from predominantly insulin resistance with relative insulin deficiency (DOH 2005:4). Risk factors for type 2 diabetes mellitus include old age, increased body mass index (BMI) and a certain body fat distribution, weight gain in adulthood, ethnicity, family history of diabetes, low birth weight, sedentary lifestyle, individuals with hypertension impaired glucose tolerance, impaired fasting glucose, and prior gestational diabetes. It is estimated that about 85-95% of all people living with diabetes mellitus in developing countries suffer from type 2 diabetes mellitus (Rother 2007:1499).

2.3.3.2 Gestational diabetes mellitus (GDM)

This diabetes mellitus develops only during pregnancy when there is a high degree of glucose intolerance.

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2.3.3.3 Malnutrition-related diabetes mellitus (MRDM)

This is a rare type of diabetes mellitus associated with long-term malnutrition. This type of diabetes mellitus is characterized by insulin-openia, insulin resistance, hyperglycemia and failure of the beta-cells (insulin-producing cells in the pancreas). It is also known as tropical diabetes or tropical pancreatic diabetes.

2.3.4 Diagnosis of diabetes mellitus

Diabetes mellitus is characterized by recurrent or persistent hyperglycemia. The WHO diagnostic criteria (2006:86) for diabetes include the following:

- Fasting plasma glucose level at or above 7.0mmol/L (126mg/dL);
- Plasma glucose at or above 11.1 mmol/L (200mg/dL) two hours after a 75g oral glucose load as in a glucose tolerance test;
- Symptoms of hyperglycemia and non-fasting plasma glucose at or above 11.1mmol/L (200mg/d); and
- Glycosylated haemoglobin (haemoglobin A1C) at or above 6.5.

2.3.5 Causes and symptoms of diabetes mellitus

2.3.5.1 Causes

The causes of diabetes mellitus are unclear; however the causes are believed to involve both hereditary (genetic factors passed on in families) and environmental factors. Research has shown that some people who develop diabetes mellitus have common genetic markers (Clark 2006:578). In type 1 diabetes, the immune system, the body's defense system against infection, is believed to be triggered by a virus or another micro-organism that destroys cells in the pancreas that produces insulin. In type 2 diabetes mellitus, age, obesity, and family history of diabetes is believed to be the cause. In type 2 diabetes mellitus, the pancreas may produce enough insulin; however, cells have become resistant to the insulin produced and it may not work effectively.

2.3.5.2 Symptoms of diabetes mellitus

According to Majra and Acharya (2009:13) diabetic patients should be informed regarding diabetes mellitus, such as causes of diabetes mellitus, signs and symptoms, diabetic care and management of the illness. This could reduce the risk of hospitalization due to complications and

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for an improved patient compliance. Diabetes symptoms can begin gradually so that a person may not know that s/he has it. Early signs are lethargy, extreme thirst, and frequent urination. Other symptoms may include sudden weight loss, slow wound healing, urinary tract infections, gum disease, or blurred vision (Garber 2007:1851). Study by Rother (2007:1499) indicated that 53.2% of the respondents in Northwest Ethiopia thought that diabetes mellitus was characterized by raised blood sugar only, and doesn't affect all parts of the body. This study was supported by similar studies in Pakistan and India which reported that 54% and 57.8% of participants didn't know signs and symptoms of diabetes mellitus (Gul 2010:130). Similarly, frequent urination and weight loss which was reported as the most common diabetes symptom by 82.9% of participants was consistent with the study conducted in Indian (Saaddine et al . 2008:1741).

2.3.6 Knowledge of diabetic mellitus

Diabetes knowledge may intensify the ability of diabetic patients to cope and adjust to their illness (Farmer et al. 2006:321). Patients with greater understanding and knowledge of their disease and medication have been shown to have better glycaemic control (Farmer et al. 2006:321). In other words, the condition requires competent self-care, which can be developed from a thorough understanding of the disease process and the management challenges both by patients and family members (Rotchford & Rotchford 2002:536). In contrast, poor diabetes knowledge is associated with increased rate of hospitalization (Rotchford & Rotchford 2002:536). Study by West and Goldberg (2002:850) indicated that higher school education has a positive effect on diabetic knowledge. Farmer et al. (2006:265) recommended that knowledge remains an important prerequisite to good compliance with medical therapy. Furthermore, they propose that increased knowledge about a specific health problem leads to improved adherence to a treatment plan and subsequently to desirable outcomes.

Gagliardino, Gonzalez and Caporal (2007:304), suggest that improving people's knowledge about diabetes mellitus may improve their attitudes towards the illness and thus will in the long run cause them to embrace healthier lifestyles. Similarly Norris et al. (2002:39) shows that appropriate diabetes knowledge is effective for good diabetes control. In contrast, Baradan and Knill-Jones (2004:144) indicate that biomedical knowledge does not necessarily mean effective control; rather economic, cultural and particular familial influences can facilitate or hinder

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procedures for diabetes control. This was also found by Shilubane (2010:46) who demonstrated that lack of money does interfere with control of blood glucose.

Several studies were conducted around the world both in developed and developing countries that showed that people have limited knowledge of diabetes mellitus (Maina et al. 2011:4; Gul 2010:129; Peupet et al. 2007:10; Rafique, Azam and White 2006:9; Shilubane & Potgieter 2007:61). This is supported by studies by Jabbar, Hameed, Chawla and Akhter 2007:94; and Sivaganam, Namasivayam, Rajasekaran, Thirumalaikolundu & Ravindranath (2002:417) who reported that there is inadequate knowledge about the nature of diseases, risk factors and complications. Rafique et al. (2006:9) provide further evidence that there is a lack of information on diabetes mellitus and its risk factors and large proportions of communities never receive any diabetes education at all.

A study conducted among community members (general population) in Kenya by Maina et al. (2011:4), shows a serious deficiency of knowledge of diabetes mellitus. Of those interviewed, only 27% people had good diabetes knowledge. According to Maina et al. (2011:4), it was found that of the studied population there is an inequality in the quality of diabetes education reaching each region in the country. Diabetes education in Kenya is done within health facilities and targeted only those with the disease. Maina et al. (2011:18) suggested that there must be a systematic education curriculum for diabetes education for all levels of health care, from community to the highest referral level. Such practices may minimize the risk of diabetes mellitus in the general population and will delay the onset of complicationsfor patients.

Peupet et al. (2006:10) found a similar level of lack of knowledge of diabetes mellitus by 30%, among patients with the disease in Jos state, Nigeria. In their study in Western Nepal, Upadhyay, Palaian, Shankar and Mishra (2008:8) found a low level of knowledge about diabetes mellitus amongst diabetic patients due to the personality of the patients. Another study by Gul (2010:129), found that knowledge about diabetes mellitus was very poor among type 2 diabetic patients with the duration of one year to more than ten years. Of the studied population, males had higher knowledge of diabetes mellitus, i.e. 42% compared tofemales12%. In South Africa at public sectors' primary health care centers in Cape Town– Hague, Emerson, Dennison, Nuvsa

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and Levitt (2005:799) conducted a study and found that there is a lack of knowledge about diabetes mellitus. The absence of further education related to diabetes care has been identified as a barrier to optimal diabetes care.

However in certain other areas people are well informed on diabetes, for example Chennai where of the studied population 75.5% of the subjects knew about the condition called diabetes mellitus, and 25% of the population were not aware of the disease. Of those that know 77.6% were male and 73.6% were female. In their study, Sivaganam et al. (2002:417) further found that those with better knowledge about diabetes mellitus were young and educated. They suggested it could be due to inappropriate ways of providing information to the patients and most importantly, due to lack of consultation time; which was a result of huge patient loads and lack of appropriately trained staff. Another high level of diabetes knowledge was found in a study conducted by Muninarayana, Balachandra, Hiremathu, Krishina and Anil (2010:19) in Kolar about prevalence of diabetes mellitus. Of the studied population 50.8% of the respondents were aware of diabetes mellitus and 49.2% of them were not aware of the disease. Most of the surveyed populations were in the age group of 30-45 years and most of the populations were female 54%, while 46% were male. Most of the respondents were literate by 56.3% with 80% in a sedentary occupation.

In a study, conducted by Moodley and Rambiritch (2007:16) on the assessment of the level of knowledge about diabetes mellitus in KwaZulu-Natal, they found that the Indian population has better knowledge about diabetes with 75.9% compared to the African population with 52.2%. Moodley and Rambiritch (2007:16) concluded that there is a great need of increasing awareness and continuous education on diabetes mellitus and its complications with regular assessment of diabetes knowledge in the primary health care sector. They further suggested that the increased diabetes awareness activities should be in the form of mass media campaigns, public lectures and door to door campaigns on a mass scale. Similarly, Upadhyay et al. (2008:9) recommend awareness programmes for the patients suffering from diabetes so as to improve their level of diabetes knowledge. Another suggestion by Muninarayana et al. (2010:19) is that in order to improve a patient's diabetes knowledge, general practitioners, family practitioners and all health

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providers must be involved in imparting health education, being the primary health care providers.

In another study conducted, Pakistan lacks structured education and information programmes regarding diabetes mellitus for both people at risk and for people suffering from it; all these contributed to poor level of knowledge about diabetes mellitus (Norris et al. 2002:39). In their study, Baradan and Knill-Jones (2004:143) found that knowledge about diabetes mellitus among ethnic groups in Glasgow was very low. All these findings show that there is a need for providing diabetes education to various communities, and at the moment there are no comprehensive primary educational programmes for diabetes in the RSA. Through a supermarket approach that is being implemented in the primary health care facilities, individuals no longer receive formal health education regarding chronic non-communicable diseases; only those individuals with chronic disease like diabetes mellitus receive health education. This practice therefore leaves the community with no knowledge about the disease and they tend to ignore it and the possible complications. Another problem resulting from insufficient quality health education in the community, is the limited knowledge of diabetes among health care workers who are expected to deliver health education to the community (Trepp, Wiile, Wieland and Reinhart 2010:370; Gornall, Levesque and Sigal 2008:371).

2.3.7 Knowledge and beliefs on causes of diabetes mellitus

From a medical perspective "beliefs" are ideas that constitute obstacles to appropriate behaviour (UNIAIDS 1999:6). Understanding patients' behaviour during illness requires understanding of their beliefs about the particular disease. In a study conducted by Hjelm and Mufunda (2010:10) among Zimbabwean diabetic patients, they found that many patients were unsure of the causes of diabetes mellitus while some believe it is caused by biomedical (antihypertensive drug, pancreatic disease). They further found that other potential causes of diabetes mellitus are individual factors such as obesity, an unhealthy diet and supernatural causes such as fate, punishment from God or spirits. These findings are similar to those that have been found in Europe, citing medically oriented causes, e.g. heredity and obesity (Hjelm, Bard, Nyberg, and Apelqvist 2005:50). Hughes, Puoane, and Bradley (2006:12), conducted a study to assess community health workers' knowledge and beliefs in managing diabetes and they found that

there was an agreement among CHW that patients suffering from diabetes believed to have been bewitched because they experience itching of the body. When itching extends to the vagina they believe that it is a snake that is eating in the vagina.

In another study conducted in a rural hospital of South Africa among non-insulin dependent diabetes by Bopape & Peltzer (2002:13), they found that most patients do not know the cause of diabetes mellitus and why they had it. However, 23% mentioned that they believed it was caused by eating too much sugar, others mentioned eating too much fats, western diet and heredity. Other people believed that diabetes is a foreign disease. Similarly, Fleming and Gillibrand (2009:146) in their study in Bangladesh found that Bangladeshi believe that diabetes mellitus was generally attributed to the event or agent outside the body rather than to primary failure of an organ within it. Furthermore, all informants believed that the primary cause of diabetes and poor diabetic control was eating too much sugar or a western diet. These Bangladeshi informants also believed that diabetes is due to heredity through shared blood rather than inherited predisposition.

2.3.8 Knowledge about risk factors

The major risk factors for diabetes mellitus in Sub-Saharan Africa are similar to those in other regions of the world, whether this refers to the modifiable risk factors, such as urbanization, obesity, physical inactivity, or those that are not mutable, such as increasing age and ethnicity. Excessive weight gain leading to obesity is one of the major risk factors for type 2 diabetes mellitus and risks of the disease increase with increased body mass index (IDF 2006:2). Sukha and Rubin (2007:121) in their study indicated that age is a risk factor for the development of diabetes mellitus. Evidence suggests that obesity, physical inactivity, high diet in fats and low intake of dietary fibres increase the risks of type 2 diabetes mellitus (Bazzano, Serdula & Liu 2005:312). Obesity could act as a diabetogenic factor by increasing resistance of the action of insulin and the individual is genetically predisposed to type 2 diabetes mellitus (Bazzano et al. 2005: 312).

Traditional in developing economies, being overweight is perceived as a sign of health, wealth and power. The authors indicated that prevention of diabetes and increasing level of physical

activity, changing societal perception of health and improving knowledge about the risks factors of diabetes and steps to promote physical activity, must receive urgent attention of policy makers and health care planners. According to Mayosi, Flisher, Lalloo, Sitas, Tollman & Bradshaw (2009:934) South African health services are primarily curative in their approach to non-communicable diseases like diabetes mellitus and hypertension, therefore diseases such as diabetes mellitus are rarely diagnosed and often inadequately treated. Tuei et al. (2010:439) indicated that if non-communicable diseases like diabetes mellitus are left untreated, patients suffering from T2 DM are at greater risk of developing cardiovascular disease, diabetic retinopathy that leads to loss of vision, diabetic neuropathy, and potential complications resulting in lower extremity amputation.

According to Mohan, Raj, Shanthirani, Datta, Unwin and Mohan (2005:286), they found that there is misconception about risk factors of diabetes mellitus; only 12% were aware that risk factors like obesity and physical inactivity could predispose people to diabetes. Of the studied population, 31.2% participants of non-diabetic patients believe that family history of diabetes is the cause of diabetes mellitus. Even among the self-reported diabetic patients 38.2% believe that family history of diabetes can cause diabetes mellitus (Mohan et al. 2005:285). In a study conducted in Khyber Teaching Hospital Peshawar by Gul (2010:130), of the studied population most patients were aware of the risk factors that cause diabetes mellitus. Knowledge score regarding diabetes risk factors ranged from 40% to 92%. They mentioned risk factors like hypertension, hyperlipidaemia; sedentary lifestyle and cigarette smoking in patients with type 2 diabetes mellitus. These findings are comparable with a study result in Singapore where there is a knowledge score of 31-91% (Tham, Ong, Tan, & How 2004:503). In their study, Tham et al. (2004:503) found that 45% of the studied population had never received diabetes education. For those who received it, the source of information was a doctor by 78%, media 4% and relatives 10% respectively. Most of the patients were illiterate. In a study conducted in Cameron, Kiawi, Edwards, Shu, Unwin, Kamedjeu and Mbanya (2006:505), found that the studied population believed that being overweight and obese was a sign of good living and good health that derives from a local perception of obesity as an indicator of affluence and high status. They associated obesity with diabetes mellitus but acknowledged that obesity was linked with hypertension.

According to Muninarayana et al. (2010:19) about prevalence of diabetes mellitus in Kolar, of 31 cases of diabetes mellitus only 45% of respondents were aware of the risk factors for diabetes i.e. among diabetic and non-diabetic populations. Even among diabetics, 16% did not know about the risk factors for diabetes. Knowledge on the role of obesity and physical inactivity in producing diabetes was very low. Studies in India and Pakistan show that obesity and overweight problems are fewer in rural areas compared to urban areas (Nisar, Khan, Qudri and Sher 2008:667; Lau, Debarn, Thomas, Asha, Vusan and Alex 2009:305). Similarly a study by Muninarayana et al. (2010:20) in a rural area showed only 30% of the non-diabetic population and 22% of the diabetic population were overweight. The reason may be that in India and Pakistan they consume whole grain meal rather than refined meal and being more physically active and less sedentary than the urban people (Nisar et al. 2008:668).

2.3.9 Knowledge of complications of diabetic mellitus

Persisted elevation of blood glucose may lead to long-term complications that include macro vascular and micro vascular damage. The long-term complication of diabetes, particularly type 2 diabetes, presents a formidable threat that requires comprehensive management of glycaemic and a myriad of cardiovascular risk factors (ADA 2010: 59). Although a few diabetic patients die from acute metabolic complications, the major problem is the excess mortality and morbidity as a result of the long-term complication of diabetes. The factors associated with these are duration of diabetes, early onset of the diabetes, obesity, raised blood pressure and proteinuria (Peterson, Silverstein, Kaufman & Warren- Boulton 2007:659). However, people diagnosed with type 2 diabetes mellitus are at increased risk of significant reduction in the life expectancy and quality of life (Bazzano et al. 2005: 311).

According to Mohan et al. (2005:285), of the studied population only 19.0% knew that diabetes could cause complications. Of those who knew that diabetes mellitus could cause complications 55.7% were not able to specify a single organ which could be affected. For those who knew, they mentioned foot problems 21.8%; 15.9% knew kidney disease and 16.3% knew eye disease. Similarly, a study in Kolar by Muninarayana et al. (2010:19) found that knowledge about complications was poor. Most respondents 75% were not aware of the long-term effect of

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diabetes mellitus. Most of the complications mentioned by non-diabetic were eye problems 7.1%, followed by kidney disease 6.4%, foot problems 6.1%, and heart attack 5.7%.

Another study by Gul (2010:129) found that knowledge about diabetes complications was very poor where 23% of the patients already had complications when they went for a first consultation about diabetes. Only 11% of the patients believed it to be necessary to visit an ophthalmologist yearly, while 9% were of the opinion that they should visitan ophthalmologist only when they have problems. A qualitative survey conducted in Cameron to assess knowledge, attitudes and behaviour towards diabetes and its risk factors found that knowledge about diabetes complications was low and sometimes completely absent. Participants tend to perceive the threat to health posed by diabetes as low (Kiawi et al. 2006:504). According to Caliskan et al. (2006:142), it was reported that a majority 77.2% of the diabetics had diabetes-related ocular complications. According to Saaddine et al. (2008:1741), regular eye screening for signs of diabetic retinopathy is essential as diabetic patients can not benefit fully from treatment once they experience loss of vision.

2.4 BELIEFS AND PRACTICES ON DIABETIC MELLITUS MANAGEMENT

According to Mayosi et al. (2009:934), beliefs and practices on the management of diabetic mellitus among patients living with diabetes differ drastically from place to place and from culture to culture. The overall aim of diabetes management is to achieve the normal metabolic control through a broad based intervention with lifestyle modification. However, the goal of diabetes management is to relieve any symptom of diabetes mellitus, achieve physical activity, achieve health, achieve and maintain normal body weight and fasting plasma glucose of lower than 7 mmol/l (Davidson 2005: 641). Mchunu and le Roux (2010:85) indicated that local behaviour practices and beliefs, as well as community specific external and internal barriers to change, contribute to prevalence of type 2 diabetes mellitus, by promoting non-participation in physical activity. Physical exercise is important because of its effect of lowering the blood sugar level and reducing cardio vascular risk factors. People with type 2 diabetes mellitus should be managed through intensive medical therapy with a tailored, stepwise approach of lifestyle modification, oral hypoglycaemic agent and insulin (Vinik 2007:1236; Schwarz, Lindstrom,

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Kissimova-Scarbeek, Szybinski, Barengo, Peltonen & Tuomilehlo 2008:168). Management of type 2 diabetes mellitus should begin with an individualized regimen of diet, exercise, and medical counseling targeted to reduce body weight by 5-10%. The primary goal of this approach is to achieve and maintain ideal glycaemic control, while secondary benefits includes weight loss and reduction in risk factors for common co-morbidities of type 2 diabetes, such as hypertension and cardiovascular disease (Warren 2004:8). Findings from a study conducted in Northwest Ethiopia by Feleke, Alemayehu and Adane (2013:117) on the assessment of the level and associated factors with knowledge and practice of diabetes mellitus among diabetic patients, 50.5% of the respondents were not aware that they should manage diabetes mellitus through weight reduction by dietary management. According to Odili, Isiboge and Eregie (2011:641) in their study in Nigerian City, reported that Glycosylated haemoglobin test (HbA1c test) was not done. Whilst Arslantas, Unsal, Metintas and Koc (2008:264) have reported similar findings of patients being uninformed about theGlycosylated haemoglobin test.

Khattab, Khader, Al-Khawaldeh and Ajlouni (2009:273) reported that the highest level of poor glycaemic control was among patients on a combination of oral anti diabetic agent and insulin. The study conducted in Singapore and Pakistan reveals better knowledge of glycaemic control. In Singapore 42% of diabetic patients were able to check their blood glucose level at home while in Pakistan 61% were able to check their blood glucose once a week (Tham et al. 2004:504; Gul 2010:129). These findings differ from RSA findings where Bopape & Peltzer (2002:39) indicated that South African diabetic patients cannot manage their disease well as they could not control their blood sugar level. Westaway & Seager (2004: 618), reported that only 8% of South African diabetic patients achieve optimal metabolic control, while 25% achieve acceptable metabolic control. These findings were very similar to the findings in China, Hong Kong, where a majority of the patients could not afford to monitor their glucose regularly (Viral, Shah, Kamdar & Nishit 2009:118). According to Gul (2010:130), knowledge that diabetes mellitus is manageable withan anti-diabetic drug was also low. Fifty to eighty per cent of the patients knew that diet and oral hypoglycaemic drugs can help control blood sugar. Of the studied population, 18% believed that following abalanced diet – low in sugar – is important for diabetes control, while 52% thought that only eating sweets should be stopped.

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According to Kiawi et al. (2006:504), most participants believed that the right place to seek treatment for their health, including diabetes care, was a modern health care facility. However people also seek alternative or complimentary treatment from a folk healer and other sources, due to financial problems inpaying the service bills. In a study conducted by Rafique et al. (2006:9) they found that in the Indian subcontinent, traditional medicine plays an important role in diabetes care – a number of plants, herbs and vegetable are used therapeutically. Among the studied population, 25% of the participants thought that regular use could cure diabetes; of the 92.5% of participants who had type 2 DM, 11.4% were on a diet alone and 76.0% were on oral hypoglycemia.

According to the American Diabetes Association (ADA 2010:63), sugar control is only one part of medical care and body weight maintenance, while blood pressure control, hypercholestelaemia treatment and smoking cessation are equally important in diabetes management. A study by Bopape and Peltzer (2002:38) conducted in rural hospitals of South Africa found that people have different practices in managing diabetes mellitus. There are a considerable number of patients, i.e. 80% who were found to treat their diabetes with medication obtained from hospitals. Two per cent of the participants used traditional medicine like 'Moshunkwane' (chewed leaves of a tree), especially when they feel dizzy. They also believe in using 'African Potato' (root boiled and drank while still hot), and 'Lavita' (herbal tea boiled and drank when cool). Patients mentioned that these home remedies were better than medication as they do not dry the mouth; one patient indicated that she prefers home remedies, especially Lavita as it is an all purpose remedy.

In a study conducted by Hunt, Arar and Akana (2002:216), where they interviewed Mexican Americans with type 2 diabetes, they found that most actively used biomedical treatments for diabetes mellitus were home remedies used by 3% of the participants. However, most had never or rarely tried herbs and viewed them as supplemental to medical treatment. Most said prayer influences health by reducing stress and bringing healing power to medicine. In the study conducted in a rural hospital in South Africa, 20% used traditional medicine for diabetes management. Peltzer, Khoza, Lekhuleni, Madu, Cherian and Cherian (2001:42) in their study about the concept and treatment for diabetes among traditional and faith healers in the Limpopo

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province, South Africa, found that 92% of the traditional healers and 90% of the faith healers indicated that diabetes mellitus is curable and they used prayer, diet and herbs.

Other reviewed literature revealed that there is a clear relationship between spirituality/religion and management of Type 2 DM (Spency & Williams 2006:124). This was supported by Choi, Kim, Kim, Choi, Baik and Lee 2007:552) who found that more spiritual Type 2 DM patients had poor self-care than the non-spiritual patients. Meaning that instead of adhering to the health care professional recommendations they believed they can be cured by praying to God, and other religious related beliefs. Furthermore,Samuel-Hodge, Watkins, Rodwell and Hooten (2008:501) found that patients who are more spiritually inclined, were associated with poor Type 2 DM management/self-care abilities, meaning that those patients who do not pray much had good coping abilities and belief inthe health care provider's advice and recommendations. Hence, the findings revealed that there was a positive correlation between less religious beliefs and good coping self-care ability.

Research findings by Hjelm and Mufunda (2010:10) indicate that diabetes patients are likely to follow medical recommendation, especially regarding diet and exercise. It has been found that in Zimbabwe, diabetic patients had not complied with follow-up appointments since more than 60% lacked comprehension of their disease and the use of medicine prescribed to them. Maduna (2004:576) in his study conducted in Khayelitsha, Cape Town found that some people do not use treatment (tablets) because they believe it causes kidney disease. They believe that tablets build up in the body; some people do not take treatment but take other mixtures such as aloe and camphor. They prepare the mixture themselves; boiling guava leaves, mixing it with other substances. People believed in this mixture because they grew up drinking it as part of their culture. Furthermore, Maduna (2004:575) found that certain western treatments are combined with traditional treatments; some people take a break from using the treatment for a week while trying the mixture that a neighbour or a friend has advised them to use, but after some time the body gives a signal to go back on their treatment.

South Africa has a national guideline for the management of diabetes mellitus, but despite the existence of this guideline, the implementation thereof appears to be poor. This has been seen by

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a low proportion of patients who have been examined specifically to identify the occurrence of diabetes related complications and those who have been referred to a specialist, for example a dieticianor/and ophthalmologist (Gagliardino et al. 2007:304). Perera, De Silva and Perera (2013:646) on diabetic knowledge among type 2 diabetic patients attending a primary health care clinic in Sri Lanka, reported that a majority 68.0% of the respondents knew that feet should be examined regularly for any lesions that could lead to lower extremities amputations and as many as 50.0% of the respondents knew the importance of visual screening. A South African study showed that patients are not sufficiently educated about diabetes mellitus and these results in the inability to manage their disease well (Moodley & Rambiritch, 2007:16).

2.4.1 Cultural Beliefs and Practices which influence diabetic management

A cultural assessment of any community would help health care workers to gain a better understanding of the prominent health beliefs and endeavour to deliver an appropriate cultural sensitive and competent diabetic care plan (WHO 2007:14). Culture is a very broad concept that is defined as the sum of attitudes, customs and beliefs that distinguish one group of people from another. Culture is transmitted through language, material objects, rituals, institutions and arts, from one generation to the next (Houghton Mifflin Company 2005:336). In Collins (2001:1012), culture is described as a"total of inherited ideas, beliefs, values and knowledge, which constitute the shared basis of social actions". It is a" total range of activities and ideas of a group of people with shared traditions, which are transmitted and reinforced by members of the group". A belief is defined by Collins (2001:879) as a firm opinion or acceptance of things as existing, and cultural beliefs and attitudes about health and illness play an important role in how individuals perceive, experience and manage health (Santos, Hurtado-Ortiz, & Sneed 2009:397).

From these definitions, culture may be seen as a concept that encompasses attributes and attitudes that explains who we are and how we interact as human beings, from the perspective of the nuclear family settings to the entire world (Santos et al. 2009:397). Throughout centuries of patients care particularly in diabetes management, the need to consider cultural factors in the care of people living with the condition has been identified for years, regardless of their origin (Tripp-Reimer, Choi, Kelly & Enslein 2007:16). Common health belief and behaviour can be found across different ethnic groups. For example, it is common that health is seen as a state of

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equilibrium and illness caused by either deficiency or excess of something. Diabetes mellitus is often believed to be caused by either ingesting too much sugar or sweets brought on by stress, worry, or is a form of punishment for immoral behaviour (Tripp-Reimer et al. 2007:16).

Cultural beliefs can be barriers to effective diabetic management as they greatly influence the perception of body image, value system, symptoms identification and interpretation in response to body dysfunction, hence care seeking behaviour that they would embark on (Van Houtum 2005:1678). For example a heavier body is indicative of health and happiness amongst some Native American tribes (Peterson et al. 2007:660). Cultural factors and health beliefs differ in Sub-Saharan Africa, where under-nutrition and opulence coexist. Mchunu and le Roux (2010:85) indicated that local behaviour practices and beliefs, as well as several community specific external and internal barriers to change contribute to the prevalence of type 2 diabetes mellitus, by promoting non-participation in physical activity. Food remains a daily challenge and being overweight can thus be perceived as a sign of wealth. Nthangeni, Steyn, Alberts, Steyn, Levitt and Laubscher (2002:329), found that patients with low health literacy were unable to follow nutrition advice, especially when this advice was presented in the way that did not relate to their cultural environment and in the ways that were not easy to comprehend.

Patients 'belief about the illness would determine the first therapeutic decision in the advent of a disease. In the RSA many people turn to the skills of traditional medicine to treat their conditions (Maduna 2004:575); this is supported by the findings by (Clarke 2008:5) amongst rural Zulu people where it was shown that out of ten patients, four would first consult a traditional healer before they attend any medical facility. Patients' beliefs in the context of their culture will affect their health belief and behaviour, their illness belief and practices (Van Houtum 2005:1678).

It is believed that cultural factors influence health seeking behaviours in chronic conditions. For example, in the RSA a qualitative study among the Xhosa women with a breast lump found that cultural perception of the importance of the female breast, the meaning of the lump and the cause of the lump influence health seeking behaviour (Mdodolo, de Villiers, & Ehlers 2003:86). In many of traditional African countries action taken against any disease is based on the cultural beliefs about the cause of the disease. The power of beliefs related to any disease, particularly

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type 2 diabetes mellitus, sometimes leads to a strange course of action where fortune–tellers and sangomas are being consulted. According to Tshabalala (2001:43), in one part of South Africa a diabetic patient may scoop pineapple flesh, pour urine in the shell and burry the shell in the garden, believing that diabetes is also buried.

In their study on nutritional management in children and adolescents with diabetes, Carmel, Ellen & Sheridan (2009:100) indicated that nutritional management is the cornerstone of diabetes care and education. Furthermore, they indicate that culture and socio economic status influence and dominate dietary habits. A study by Caballero (2004:505) in the United States found that minority population has a high risk of developing diabetes mellitus because of genetic predisposition. These is due to people eating unhealthy foods, eating large portions and are not engaging in regularly physical activity. A study by Baradan and Knill-Jones (2004:144) on Glasgow, among type 2 diabetes mellitus it was found that a majority of patients i.e. 67% did not practice diet control at home. Forty-five per cent of participants said that they eat one meal per week outside the home. In a study conducted in Pakistan at a university hospital in Karachi, Rafique and colleagues found that people believe that individuals suffering from diabetes mellitus should not eat root vegetable as they are generally considered to be sweet (Rafique et al. 2006:9). Another common perception in Pakistan is that there is no restriction on the amount of bread taken which is prepared from gram flour (chickpea flour). The authors suggest that there is a need to educate diabetic patients on nutrition.

2.5 FACTORS INFLUENCING ADHERENCE ON DIABETES MELLITUS MEDICATION AND MAINTENANCE OF THE DIET

Matsuyama and Raskin (2005:188) defined adherence as an "active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behaviour to produce a therapeutic result". Implicit in the concept of adherence is choice and mutuality in goal setting, treatment planning, and implementation of the regimen. Patients internalize recommendations of treatment given by health care providers and decide to either adhere to it or not.

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Patients' ability to adhere to their treatment regimen is crucial for successful management of type 2 diabetes. However, one study has shown difficulty maintaining optimal adherence with all aspects of therapy. Various aspects of medication regimens can influence diabetic patients' long-term adherence to treatment programs. These include side effects, hypoglycaemia, and frequency of administration. Adherence to medication regimens appears to decrease with an increasing number of doses per day. Complex regimens may also interfere with adherence and ultimately the success of therapy (Chang, Haynes, McDonald, Garg & Montague 2002:2).

The relative convenience of drug regimens can be an important determinant of patients' willingness and ability to adhere to effective therapy and therefore affect ultimate efficacy. Patients who have difficulty in maintaining adequate adherence need more intensive strategies than do patients who have less difficulty with adherence (Osterberg & Blaschke 2005:487).

2.5.1 Factors Influencing Adherence

2.5.1.1 Patients related factors

2.5.1.1.1 Demographic and socio-economic factors

Recognized predictors of good glycaemic control in diabetic patients include adherence to medication, engaging in physical activity, compliance with dietary advice, regularly attending a diabetes clinic, receiving diabetes education, existing co-morbidities as well as age and sex (Alberti, Boudriga, Nabli & Damm 2007:2013; Nthangeni et al. 2002:329). Shigaki, Ge, Kruse, Lemaster, Mehr, Moore, C & Sheldon (2010:202) discovered that old age was associated with high level of diet and medication adherence, low Glycosylated Hemoglobin level and few symptom of diabetes mellitus related depression. Rhee, Barnes, Cook, Culler, El-Kebbi, Gallina (2005:240) in their study also revealed that older adults were found to adhere conscientiouslyto appointments, and were associated with low level of HbA1c; they usually visit a health care professional for HbA1c test. Hosler and Melnik (2005:418) revealed that young people were associated with low adherence to blood sugar monitoring, blood pressure lowering medications, and aspirin. In contrast, Olshansky, Bryce, Fitzgerald, Fischer, Hess, & McTigue (2008:1004) demonstrated that young people having type 2 DM were associated with an ability to shift views or mentality and motivation to engage in healthy lifestyles.

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Factors that may influence patients' attitude to health, as well as their health seeking behaviour may include ones knowledge, culture and beliefs (Baradan & Knill-Jones 2004:143). Study have shown that diabetic patients, who have an adequate knowledge about their disease and who receive regular counseling are most likely to adhere to diabetes medication and this will lead to better glycaemic control (Khattab, et al. 2009:273).

Some studies examined the association between education attainment and the incidence of diabetes and found that low level of education is associated with type 2 diabetes (Ezenwaka & Offiah 2002:91; Fox, Gerber, Bolinder, Chen & Kumar 2006:388). In a cross sectional study of National Population Health Survey, they found that people who attain less than a high school diploma were almost twice as likely to report having diabetes as those with a bachelor degree or more (Fox et al. 2006:388). A recent cross sectional study found that type 2 diabetes risk was higher in the least educated who were obese and inactive, compared to the more educated (Puoane, Steyn, Bradshaw, Laubscher, Fourier & Lambert 2002:1038). Another cross sectional study from the National Health Interview Survey found that women with low education had a higher prevalence of diabetes than the better educated. These studies suggest that having education and knowledge promote an interest in one's health and will strongly influence people's ability to reduce diabetes risks by successfully adopting to a healthier life style. Low socioeconomic status and low levels of education have been associated with lower medication adherence and result in diabetes-related morbidity (Ezenwaka & Offiah 2002:91).

In their study on medication adherence and diabetes control in urban African Americans with type 2 diabetes, Hill-Briggs, Gary, Bone, Hill, Levine and Brancati (2005:349) found that the specific behaviours associated with poorer diabetes control were due to patients who forgot to take medication, shortage of medication and knowledge of blood glucose monitoring. Grant, Devit, Singer, and Meig (2003:1408) carried out a study to determine medication adherence (for oral hypoglycaemic agents, insulin, antihypertensive, lipid lowering medicines and aspirin) and predictors of suboptimal adherence in a community, found that adherence decreases with increased number of medication. This is also supported by (Odegard & Gray 2008:692) where they indicated that persons with co-morbid chronic diseases experience a wide range of barriers to self-care, often leading to poor adherence to treatment or glycaemic control. Duration/Length

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of type 2 diabetes mellitus diagnosis can contribute to self-care/diabetes management among type 2 diabetes mellitus patients. The above statement revealed that ongoing type 2 diabetes mellitus diagnosis and treatment has positive correlation on the improved self-care activities, which could be developed through experience, and view changes from being ill to a healthy lifestyle. The above statement was supported by Chiou, Bai and Chang (2009:3308) who stated that having being diagnosed with type 2 diabetes mellitus for a long time – at least for 14 years and above – were associated with high self-care ability. Study done by Xu and Pan (2010:228) discovered that long duration (mean duration 9 years) of type 2 diabetes mellitus had a positive relationship with adherence to recommended medications and monitoring of regular blood glucose. Beverly, Penrod and Wray (2007:25) indicated that diabetes management and treatment adherence in the context of marriage is greatly influenced by spouses' beliefs.

2.5.1.2 Psychological factors

Psychological factors are also associated with treatment adherence. Health beliefs, such as perceived seriousness of diabetes, vulnerability to complications, and the efficacy of treatment, can predict better adherence. Patients adhere well to treatment when the treatment regimen makes sense to them, when it seems effective, when they believe in the benefits of treatments, when they feel they have the ability to succeed at the regimen, and when their environment supports regimen-related behaviours (De Vries 2008:139). Psychological problems such as anxiety, depression, and eating disorders have also been associated with non-adherence to diabetes treatment (Rubin & Williams 2004:146).

Chao, Nau, Aikens and Taylor (2005:508); Odegard and Capoccia (2007:1014) in their studies on depression influencing diabetes medication adherence in older patients, states that depression significantly impairs adherence to treatment in patients with type 2 diabetes mellitus and the degree of adherence worsens with the depth of the depression. Since depressed patients are less likely to report that they have not been adherent, impaired glycaemic control might be falsely attributed to ineffective treatment and additional drugs unnecessarily added to the regimen (Odegard & Capoccia 2007:1014). However, forgetting to take medications is not solely a feature of affective disorders. In a study of medication usage in a real-world, cross-sectional population of patients with type 2 diabetes treated for ≥ 10 years, 20% of participants reported

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that they regularly forgot to take their medications without any particular explanation (Dunning & Manias 2005:14). Racial, ethnic, and socioeconomic factors can also significantly affect adherence.

Kilbourne, Reynolds, Good, Sereika, Justice, Fine, & Chao (2005:208), carried out independent studies on depression influencing diabetes medication adherence in older patients and depressive symptoms associated with diabetes medication usage as a factor of non-adherence. They have observed that depression is associated with inadequate medication adherence. The effect of depressive symptoms on diabetes medication was mediated through perceived general barriers, perceived side effect barriers and self-efficacy which may partly explain the association of depression with patients' belief about the use of diabetes medication. Among the barriers to adherence in T2DM, a patient's fear of side effects such as weight gain, increased risk of cardiovascular events, and hypoglycaemia are among the most influential factors (Pollack, Purayidathil, Bolge & Williams 2010:204). Common side effects should also be considered as a factor influencing adherence on diabetes mellitus medication. Health care providers/physicians must always have knowledge of and consider more uncommon side effects, because adherence is more likely to be influenced in each patient by common events. While each category of antihyperglycemic medication carries with it a set of side effects, the two most common, and probably most salient from a side-effect profile, are hypoglycaemia and weight gain (White & Campbell 2008:7).

Plausible patient challenges in adhering to diabetes medication include poor patient education, therapy with multiple drugs, believing one has diabetes only when his/her sugar is high, worrying about side-effects of diabetes medication, lack of self-confidence in controlling diabetes and feeling medicines are hard to take (difficulty reading prescription labels). Some of these challenges are potentially modifiable and should be considered for educational interventions to improve diabetes outcomes (Odegard & Capoccia 2007:1014).

2.5.2 Health care provider factors

Social support provided by nurses or physicians has been shown to promote adherence of diabetic patients to diet, medications, self-monitoring of blood glucose (SMBG), and weight loss

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(De Vries 2008:139; Shilubane 2010:46). The health care provider can play an important role in encouraging diabetes patients to adhere to diabetes treatment. Characteristics such as good communication skills, enthusiasm and care may determine whether a health care professional will influence adherence to diabetes medication, but these cannot be easily measured as such characteristics are difficult to test. Nurses play an important care giver role in the primary care setting in South Africa. However despite this important role that they undertake, chronic diseases are not extensively covered in their training (Steyn & Levitt 2006:476).

South Africa nurses often lack skills to intensively deal with chronic diseases (Hague et al. 2005:798). In addition to basic training, continued education and a need for regular assessment of these healthcare providers' knowledge and skills regarding diabetes is essential (Moodley & Rambiritch 2007:17). As part of comprehensive care, healthcare professionals need to offer counseling on diet and lifestyle modification as well as ensure that patients are well educated about their disease. It is important that personnel are adequately trained to perform these tasks. The study that researched dietary compliance in South African type 2 diabetics also showed that although some health care professionals offered dietary counseling, these professionals had little training in nutrition and knowledge of foods that are traditionally eaten. This study highlighted that inadequate and inaccurate dietary counseling given by healthcare professionals can influence glycaemic control (Nthangeni et al. 2002:329).

2.5.3 Diet related factor

Lifestyle changes of diet and exercise are extremely important for people who have pre-diabetes, or who are at high risk of developing type 2 diabetes mellitus. Lifestyle interventions can be very effective in preventing or postponing the progression to diabetes. These interventions are especially important for overweight people. Even moderate weight loss can help reduce diabetes risk (Beran & Yudkin 2006:1695).

The American Diabetes Association (ADA 2008:5) recommends that people who are at high risk for developing type 2 diabetes mellitus should eat high-fibre and whole-grain foods. Eating food high in fibre, especially those found in whole grain cereals and breads can help reduce type 2 diabetes mellitus risk and reduce diabetes complications. Patients who are diagnosed with

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diabetes need to be aware of their heart health nutrition and, in particular, controlling high blood pressure and cholesterol levels. In addition, they need to know the treatment goals for a diabetes diet which include the following:

- Achieve near normal blood glucose levels. People with type 1 and type 2 diabetes mellitus who are taking insulin or oral medication must coordinate calorie intake with medication or insulin administration, exercise, and other variables to control blood glucose levels.
- Protect the heart and aim for healthy lipid (cholesterol and triglyceride) levels and control of blood pressure.
- Achieve reasonable weight. Overweight patients with type 2 diabetes mellitus who are not taking medication should aim for a diet that controls both weight and glucose level. A reasonable weight is usually defined as what is achievable and sustainable, and helps achieve normal blood glucose levels. Children, pregnant women, and people recovering from illness should be sure to maintain adequate calories for health.

There is no diet which is specific for a diabetic patient. Patients should meet with a professional dietician to plan an individualized diet within the general guidelines that takes into consideration their own health needs. A patient with type 2 diabetes mellitus who is overweight and insulin-resistant may need to have a different carbohydrate-protein balance than a slim patient with type 1 diabetes mellitus in danger of kidney disease. Because regulating diabetes is an individual situation, everyone with this condition should get help from a dietary professional in selecting the diet best for them (Mbanya & Gill 2004:371).

The traditional African diet is rich in carbohydrates (i.e. rice, corn or flour, sorghum and millet, roots and tubers, yams, plantains, potatoes and cassava) and when accompanied by meat, fish or vegetables, is ideal for patients with type 2 diabetes (Mbanya & Gill 2004:371). However, the traditional diet is changing to a more western influenced diet high in fat and kilojoules. Similarly Mayosi et al (2009:936) indicated that rapid expansion and growth of small towns and peri-urban areas in South Africa, leads to the increase in the prevalence of type 2 diabetes mellitus due to distinct nutritional transition, that has pushed individuals away from following ahealthy traditional high-fibre, low-fat, low-calorie diet, towards the excessive consumption of refined

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carbohydrates, low fibre foods, fats and red meats. Such changes in diet contribute to the diversity and complexities of diets across Sub-Saharan Africa countries, which when coupled with a lack of dieticians in most health institutions, make it difficult to prescribe a standard for the management of people with diabetes mellitus (Mbanya & Gill 2004:371). Such changes in diet contribute to the diversity and complexities of diets across Sub-Saharan Africa countries, which when coupled with a lack of dieticians in most health institutions, make it difficult to prescribe a standard for the management of people with diabetes mellitus. The nurses or doctors who are not adequately trained to provide complex dietary advice to people with diabetes mellitus are therefore responsible for supervising the diet of patients (Beran & Yudkin 2006:1695). Successful adherence depends greatly on the acceptability of the prescribed diet and on continuous counseling.

A prospective study found that regular consumption of white rice is associated with an increased risk of type 2 diabetes mellitus whereas replacement of white rice by brown rice or other whole grains was associated with a lower risk. A review which included 19 studies on diet and risk of type 2 diabetes mellitus: "the role of fat and carbohydrate" concluded that a higher intake of polyunsaturated fat and long-chain fatty acid is beneficial, whereas higher intake of saturated fat and trans fat adversely affects glucose metabolism and insulin resistance (Mbanya & Gill 2004:371). Another prospective study by De Vries (2008:142) found higher consumption of butter, potatoes and whole milk to be associated with increased risk of type 2 diabetes mellitus. Higher consumption of fruits and vegetable was associated with reduced risk of type 2 diabetes mellitus. The possible mechanisms suggested are that insoluble fibre intake was consistently associated with improved insulin sensitivity and decreases risk of type 2 diabetes mellitus. Furthermore large observational studies have suggested an association between low vitamin D status or low vitamin D intake and increased incidence of type 2 diabetes mellitus. The suggested mechanisms are that vitamin D deficiency may contribute to beta cell dysfunction, insulin resistance and inflammation that may result in type 2 diabetes mellitus. The effect of dietary habits has in all these studies been shown to be independent of Body Mass Index (BMI) change.

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2.6 STRATEGIES FOR IMPROVING PATIENTS' ADHERENCE TO DIABETES THERAPY

Adherence to a medication regimen is usually defined as the extent to which patients take medications as prescribed (Osterberg & Blaschke 2005:487). As far as adherence is concerned, the term adherence implies passive submission of the patient to the prescriber's authority and obeys treatment regimens. Adherence implies the self-initiated choice of the patient to closely follow a treatment plan. The prescribers must monitor the patient's adherence to the medication and usage instructions to ensure they benefit from the therapy (Mahesh & Parthasarathi 2004:56). For long-term self-administered medications, as in the case of diabetes, the methods of helping people adhere to regimens that have been tested and found to be successful, have typically been complex and labour-intensive. These methods have modest effects at best on adherence – and inconsistent effects on clinical outcomes.

Morris (2004:48) states the simplest and single most important actions that healthcare providers can take to improve adherence to diabetes therapy, as the following:

- Select medications that permit the lowest daily dose frequency possible.
- Negotiating priorities with people with diabetes.
- Provide clear instructions and assessing their knowledge and understanding.
- Reminding them about appointments.
- Monitoring adherence with treatments and appointments.
- Calling them if they miss appointments for required follow-up care.
- Engage the family members if needed, and with the person's permission.

Sudhakar and Nagavi (2002:174) and WHO (2003:97) also state strategies to improve medication adherence to diabetes therapy as:

- Correct and complete instruction regarding medication should be given to the patient. Both verbal and written instructions may be given.
- Simple and affordable treatment regimen should be prescribed as far as possible.
- Effective health care provider-patient-pharmacist communication should be conducted in an atmosphere of trust and confidence.

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- Patient perception about medication use should be assessed.
- Patient should be encouraged to correlate drug intake with daily events/habits, maintain required modifications, use in case of chronic disease; and family members should be motivated.
- Counseling involves providing patients with verbal information related to their illness and its treatment, life style modification. Post counseling should be done to evaluate if patient understands and recalls information given.
- Clarify the patient's expectations for treatment and answering questions.
- Explaining how medication works to control or prevent diabetes symptoms.
- Determine whether the patient can afford to buy the prescribed medication and if not, considering alternative therapies or payment methods.
- Patient may benefit from the use of reminder devices such as calendars.

Chang et al. (2002:2) mentioned other factors that may improve patients' adherence to diabetes therapy as modifying beliefs and human behaviour and social factors.

2.6.1 Modifying Beliefs and Human Behaviour

For interventions that are complex and require lifestyle modifications, it is worthwhile to address patients' beliefs, intentions, and self-efficacy (perceived ability to perform action). This is because knowledge alone is not sufficient to enhance adherence in recommendations involving complex behaviour. Clinicians can optimize behaviour change by ensuring that the patients perceive themselves to be at risk due to lack of adoption of healthy habits, perceive their medical conditions to be serious, believe in the benefit of the suggested treatment, must have their own ways to address their fears and concerns and perceive themselves as having the requisite skills to live a healthy lifestyle. Thus, by knowing which of these beliefs is below a level presumed necessary for good adherence, the provider may tailor interventions to suit the unique needs of each patient (Chang et al. 2002:2).

2.6.2 Social factors

Family relationships play an important role in diabetes management. Studies have shown that low levels of conflict, high levels of cohesion and organization, and good communication patterns are associated with better regimen adherence (Griffith & Field 2006:374). Greater levels

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of social support, particularly diabetes-related support from spouses, family members and support groups are associated with better regimen adherence (Shilubane 2010:46). Social support also serves to buffer the adverse effect of stress on diabetes management (Griffith, Field & Lustman 2006:374).

2.7 KEY FINDINGS AND GAPS

The literature reviewed in this chapter examined an array of studies on diabetes mellitus around the world which raised a number of questions; the answers might not be within the scope of the current study. However, some of the areas covered by these studies and the gaps identified are highly relevant to the current study in RSA. Most of the studies in developing countries and Sub-Saharan Africa show that there is inadequate knowledge of diabetes amongst patients with diabetes – and health care workers who are expected to deliver quality diabetes care to the community (Trepp et al. 2010:370).

2.7.1 Observed gaps in the reviewed studies

Most of the diabetes studies reviewed in this chapter is from both developed and developing countries, including Sub-Saharan Africa and South Africa. However, the majorities of these studies are quantitative in nature and collected data from patients in urban and/or rural areas using structured questionnaires. There are few qualitative studies from Sub-Saharan Africa that collected data through in-depth interviews and/or focus group discussions with diabetics at the hospital and clinic settings. Studies assessing knowledge, beliefs and practices in patients suffering from diabetes in Vhembe do not exist. The current study, therefore, was intended to fill this gap. Diabetes education was found to be a barrier to optimal diabetes care and is done only within a health facility and targeted only those affected with diabetes mellitus (Hague et al. 2005:799).

2.8 CONCLUSION

This chapter presented an overview of the literature related to the key concepts and issues covered in this dissertation. The focus here was to identify and evaluate the various studies on

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diabetes mellitus in relation to knowledge, beliefs and practices regarding the disease, particularly from both developed and developing countries, including RSA. In this chapter, relevant literature on the general knowledge about diabetes mellitus, knowledge and beliefs on the causes of diabetes mellitus, knowledge about risk factors and knowledge about complications of diabetes mellitus has been described. Type 2 diabetes mellitus is a significant health problem worldwide. Preventive and disease control interventions are crucial for reducing diabetes chronic complications. The next chapter will present the research methodology adapted to assessthe level of knowledge of diabetic patients regarding diabetes, and to identify their beliefs and practices in managing their condition.

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CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1. INTRODUCTION

The previous chapter presented the literature review on diabetes mellitus. This chapter describes the design and research methodology that was used in this study. The knowledge, beliefs and practices of this disease by patients who were diagnosed as positive at Sibasa local area of Vhembe district, and the relationships between self-management, beliefs and outcome expectancies among patients who were on diabetes treatments and diagnosed with type 2 DM were explored. It includes a description of the sample size and characteristics, the research settings, the procedures for sample recruitment, data collection, and human rights protections. Finally, this chapter describes the instruments used as well as the data analysis procedures.

3.2 PURPOSE OF THE STUDY

The purpose of this study was to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe their beliefs and practices regarding the disease. The researcher endeavored to find out the extent of knowledge that diabetic patients have and what their beliefs and practices are regarding diabetes mellitus.

3.3 RESEARCH OBJECTIVES

The objectives of the study were to:

- assess the knowledge that diabetic patients have regarding diabetes mellitus in Vhembe district of Limpopo province, South Africa.
- describe the beliefs, and management practices of diabetes mellitus among people with this disease in Vhembe district of Limpopo province, South Africa.
- provide recommendations on the management of diabetes mellitus.

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3.4 RESEARCH SETTING

The research setting is "the environment in which the research study takes place and can be a natural or controlled environment". Natural setting is real-life study environment without any changes made for the purpose of the study (Burns & Grove 2006:325). Participants were recruited from three randomly sampled health care clinics in Vhembe district of Limpopo province, South Africa. The diabetic clinics are located at the Sibasa local areas. The clinics provide services to adult patients with different diabetes mellitus and other diseases.

The study was conducted in the three randomly sampled health care clinics in Vhembe district of Limpopo province, South Africa. The study was conducted in a natural setting, as there was no manipulation of the environment; no changes were made to the community area, and no special treatment given to the respondents, which could have affected the results. The data was collected during normal working hours, Monday to Friday. Therefore, the respondents remained in the natural surroundings common known to them, which are adopted during consultation hours and in health meetings.

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Figure 3.1: Districts of Limpopo map and the research focal area

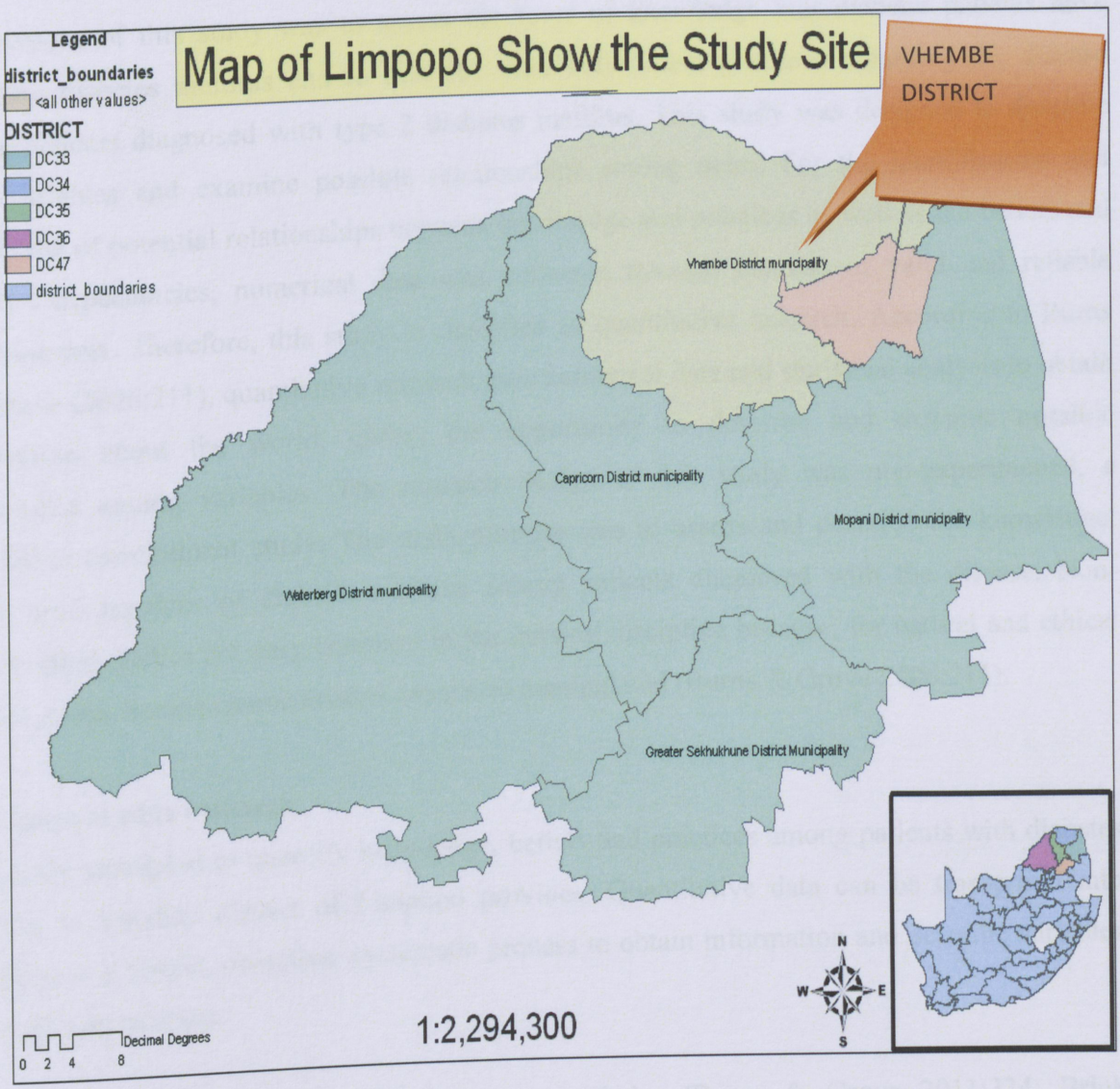

Figure 3.1: Limpopo Map showing Vhembe district: Adopted from: Vhembe district regional office

Figure 3.1 displays the map and the research area on which the study focused in Vhembe district of Limpopo province of South Africa.

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3.5 RESEARCH DESIGN

The purpose of this study was to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe their beliefs and practices regarding the disease among patients diagnosed with type 2 diabetes mellitus. This study was designed to describe these variables and examine possible relationships among them. For the identification and description of potential relationships between knowledge and practices as well as the beliefs and outcome expectancies, numerical data was collected through the use of valid and reliable questionnaires. Therefore, this study is classified as quantitative research. According to Burns and Grove (2006:211), quantitative research uses numerical data and statistical analysis to obtain information about the world, giving the opportunity to describe and examine possible relationship among variables. The research design of this study was non-experimental, a descriptive correlational study. The main purpose was to assess and describe the knowledge, beliefs and practices of diabetic mellitus among patients diagnosed with the disease. Non-experimental studies are very common in the nursing discipline because, for natural and ethical reasons, many human characteristics cannot be manipulated (Burns & Grove 2006:211).

3.5.1 Quantitative research

This study attempted to quantify knowledge, beliefs and practices among patients with diabetes mellitus in Vhembe district of Limpopo province. Quantitative data can be transposed into numbers, in a formal, objective, systematic process to obtain information and describe variables and their relationships.

Quantitative research has the following characteristics (Burns & Grove 2011:324; Brink 2006:10-11):

- There is a single reality that can be defined by careful measurement.
- It is usually concise.
- It describes and examines relationships, and determines causality among variables, where possible.

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- Statistical analysis is conducted to reduce and organize data, determine significant relationships and identify differences and/or similarities within and between different categories of data.
- The sample should be representative of a large population.
- Reliability and validity of the instruments are crucial.
- Comprehensive data collected by employing different methods and/or instruments should result in a complete description of the variable or the population studied.
- It provides an accurate account of characteristics of particular individuals, situations, or groups.

3.5.2 Descriptive

The study was descriptive in that the researcher collected detailed descriptions of the knowledge, beliefs and practices among patients with diabetes mellitus. The information found was described accurately. Burns and Grove (2011:44) define the purpose of descriptive research as "to provide the opinions of respondents regarding the phenomenon being studied". Descriptive research provides an accurate portrayal or account of the characteristics of a particular individual event, or group in real-life situations for the purpose of discovering new meaning, describing what exists, determining the frequency with which something occurs, and categorizing information (Burns & Grove 2006:734). Descriptive studies provide valuable baseline information. In this study, the researcher attempted to assess and describe knowledge, beliefs and practices among patients with diabetes mellitus in Vhembe district of Limpopo province.

3.6 RESEARCH METHODS

Research methodology refers to the steps, procedure and strategies for gathering and analyzing the data in research investigation (Polit & Hungler 2005:120).

3.6.1 Population and sampling

3.6.1.1 Population

Stommel and Wills (2004:297) defined a population as any universe of subjects, cases, units, or observations. However, Polit and Beck (2005:534) see a population as the entire set of

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individuals (or objects) having some common characteristic(s); sometimes referred to as the universe. The population of this study comprised all the patients diagnosed with diabetes mellitus at Sibasa local area of Vhembe district in South Africa. Brink (2006:11) refers to population of a study as a total number of individuals who have the same characteristics defined for a specific study.

3.6.1.2 Target population

Target population and accessible population are associated terms. The target population, according to Stommel and Wills (2004:444), refers to the population of all potential study units that meet the study inclusion criteria in which the researcher is interested. Polit and Beck (2005:537) confirm that a target population is the entire population in which the researcher is interested and to which s/he would like to generalize the results of a study. According to Burns and Grove (2005:423), the target population refers to the population of all potential study units that meet the study inclusion criteria in which the researcher is interested. The main motivation for selecting diabetic patients who are at the age group of 40 and above, is the fact that persons of 40 years and above are at high risk of becoming a target to develop diabetes mellitus.

A target population relates to the accessible population, which is the study population defined in terms of geographic location, institutional affiliation, or study unit characteristics to which the researcher has access, given the available resources (Stommel & Wills, 2004:435). The accessible population as the population of subjects available for a particular study as confirmed by Polit and Beck (2005:525), authors further concur is often a non-random subset of the target population. Furthermore, the accessible population according to Stommel and Wills (2004:299) as well as Burns and Grove (2005:434), was confirmed to be a population, often fixed in terms of considering the time and space from which the actual sample is drawn. The target population as well as the accessible population for this study included all the patients diagnosed with diabetes mellitus at Sibasa local area of Vhembe district in South Africa. Stommel and Wills (2004:299) defined the study population as the subset of the target population that is accessible to the researcher, at least in principle, if there are sufficient resources. These accessible study populations are more limited in time and spaces and are also defined in terms of specific inclusion and exclusion criteria. Thus, the researcher included only the patients who were

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diagnosed with diabetes mellitus, and had been on diabetes treatments for a period of six months and more at Sibasa local area of Vhembe district in South Africa.

3.6.1.3 Sample and sampling techniques

Stommel and Wills (2004:443) defined a sample frame as the list or data bank that represents all elements/units/participants of an accessible target population; used as a basis for random sampling of participants. While Polit and Beck (2005:536) share the same sentiments that a sampling frame is a list of all the elements in the population, from which the sample is drawn. While the accessible population is considered to be an "aggregate of cases that conform to the designated criteria and that are accessible to the researcher as a pool of subjects for the study" (LoBiondo-Wood & Harber 2006:249).

For the purpose of this study, the researcher obtained the list of all patients diagnosed with diabetes mellitus at the sampled clinic under Sibasa local area during the time of this research. A convenience sampling technique was used to obtain a sample per location – subset of the accessible study population that was selected to be in the study sample. The study sample refers to the subset of cases, units, or observations from a larger population of cases, units, or observations (Stommel & Wills 2004:443). The sample comprised hundred male and female patients diagnosed with diabetes mellitus in each of the designated diabetes clinic/health centres at Sibasa local area of Vhembe district in South Africa, respectively, amounting to a total of 100 respondents.

A non-probability convenience sampling technique was used in this study. Non-probability convenience sampling refers to the selection of the most readily available persons as participants in a study; also known as accidental sampling (Polit & Beck 2005:537). Convenience sampling is a non-probability approach to selecting participants based on their (easy) accessibility to the researcher (Stommel & Wills 2004:436-437).

A convenience sampling technique was selected for this study using the most accessible participants for the study. The key reason for this was the practical difficulty of obtaining probability samples from the diabetes patients on treatments for more than six months at the Sibasa local area, Vhembe district in South Africa. Patients who are willing to disclose their

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diabetes status at rural areas such as Vhembe district are scarce, implying that they are very secretive of their diabetes status. The researcher requested that health facility managers' identity patients diagnosed with diabetes, and who are already on treatment for a period of six months and more, for participation in data collection for this study. Persons included in the study were patients diagnosed with diabetes mellitus and already on their monthly supply of treatments received from the sampled clinics at Sibasa local area of Vhembe district. Diabetes patients from similar backgrounds, under the age of 40 years, were excluded from the study. The main problem with convenience sampling is that members of such a sample may have certain characteristics, often unrecognized, if not explicitly studied or thought about, that distinguishes them from the overall target population. Members of the study sample could involve an element of self-selection, thus, subjectivity or bias. It might be difficult to gauge the extent to which findings from a particular study could be applicable to broader populations.

3.6.1.4 Inclusion criteria

Polit and Hungler (2005:254) stress that "it is essential to be specific about the criteria for inclusion in the population and the eventual sample". These criteria are referred to as eligibility criteria. In order to participate in the study, the respondents had to:

- be a diabetes male and female patient aged from 40 years and above
- be residing within the jurisdiction of the Sibasa local area
- has to be present, or visit the clinic for diabetes during the time of the data collection
- give a written informed consent for participating.

3.6.1.5 Exclusion criteria

Exclusion criteria are the characteristics that the potential respondents lack in order not to be included in the study (Burns & Grove 2006:367). The exclusive criteria are:

- Non-diabetes patients
- Diabetes mellitus patients aged below 40 years
- Diabetes patients who did not give consent to participate in the study.

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3.6.2 Sampling of the health clinics

For the purpose of this study, the researcher obtained the list of all clinics available at Sibasa local area of Vhembe district in South Africa consulting 200 diabetic patients per month. Simple random sampling of the clinics was done to obtain the required number of three clinics at Sibasa local area of Vhembe district. Statistics for the diabetic patients served by Sibasa local area clinics provided a point of reference in terms of deciding which health clinics were to be considered as the study focal area. The mean of 200 patients diagnosed with diabetes mellitus who visit the sampled clinics per month, was used as a cut-off point for the clinic to be considered. To this effect, health clinics recording less than 200 consultations and dispensing of the diabetes treatments per month at Sibasa local area were not considered as part of the participating clinics for this study.

3.6.3 Sampling of participants

De Vos, Strydom, Fouche & Delport (2011:227) maintain that sampling is a vital step in any research as it forms a part of delineating the inquiry. A non-probability convenience sampling technique was used in this study. Non-probability convenience sampling refers to the selection of the most readily available persons as participants in a study; also known as accidental sampling (Polit & Beck 2005:537). Only the respondents, whose ages were from 40 years and above, and who consulted the sampled clinics during the time of data collection were recruited to participate in the study. The reason for the age criterion, from 40 years and above, was the fact that the older the individual becomes, the higher the prevalence of DM. The DM prevalence in adults between 35-64 years of age increased from 5.7% (35-44 years old) to 21.2% (55-64 years old). Another reason for selecting this age group was the fact that most of them are at risk to develop diabetes mellitus type 2. The selection of the respondents followed the consultations with the professional nurses at the sampled clinics that render the diabetes services at Sibasa local area of Vhembe district in SA.

3.6.4 Sample Size

The research questions intended to assess and describe the knowledge, beliefs and practices of diabetes mellitus among diabetes patients. According to Burns and Groove (2006:365), there are many rules for calculating sample size for regression. One of the most common rules is 10-15

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cases for each predictor in the model. According to this rule, to obtain statistical significance, the sample size for this study with three predictors could be among 30-45 subjects. Burns and Groove (2006:365) also discussed Green's rules for calculating the minimum acceptable sample size. The first rule is based on the regression model overall test; the minimum sample size is calculated as 50+8k (k = number of predictors). The second rule is based on an individual predictor test; the minimum sample size is 104+k (k = number of predictors). The sample size for this study, set at three predictors, could be 74 (50+24) or 107 (104+3). Green recommends calculating the minimum sample size using both equations and then selecting the largest value. Therefore, the sample size for this study was rounded up to 100 respondents.

3.7 RELIABILITY ANDVALIDITY

3.7.1 Reliability

Polit and Beck (2005:331) describe the reliability of a tool as the consistency with which the tool measures the attribute it is supposed to measure. If a study and its results are reliable, other researchers using the same method will obtain the same results. A pre-test was conducted with ten respondents similar to the study sample; however these ten respondents were excluded from the main study, to determine the clarity of the items and consistency of the responses (Lo-Biondo-Wood & Harber 2006:197). The pilot testing of the questionnaire provided an idea to the researcher on time expectancy to complete a questionnaire, and an average of 30 minutes was expected.

3.7.1.1 Stability

According to Polit and Beck (2005:331) stability of an instrument is the extent to which similar scores are obtained on separate occasions. Assessments of stability involve procedures that evaluate test-retest reliability. Test-retest reliability was done on ten diabetic patients on separateoccasional and scores the same results.

3.7.2 Validity

According to Babbie (2007:146), validity refers to "the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration". Validity can be sub-

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categorized as external and internal validity. Burns and Grove (2006:218) describe external validity as "the extent to which the results can be generalized beyond the sample used in the study. This usually depends on the degree to which the sample represents the population". Low external validity in this study implies that the results can apply only to diabetes patients in Vhembe district of Limpopo province (Lo-Biondo-Wood & Harber 2006:197). The external validity of this study may have been compromised as there was no guarantee that the respondents had similar knowledge, beliefs and practices regarding diabetes mellitus. Internal validity is the extent to which knowledge, attitudes and practices among diabetes patients is a true reflection of reality rather than the result of the effects of extraneous or chance variables.

3.7.2.1 Content validity

Content validity refers to the adequacy of coverage of the content being measured (Polit & Hungler, 2005 335). In this study, content validity was ensured by extensive review of literature in the field of diabetes mellitus.

3.7.2.2 Face validity

Face validity refers to whether the instrument appears to be measuring the target construct (Polit & Beck 2010:336). Similarly, face validity according to Polit and Hungler (2005:357), refers to the extent to which a measuring instrument appears to be measuring what it is supposed to measure. In this study the researcher constructed the questionnaire in such a way that it could measure the attributes to be studied which were knowledge, beliefs and practices that diabetic patients have regarding diabetes mellitus. The questionnaire was critically checked by supervisors of this study and was also assessed by experts in the field of diabetes mellitus.

3.8 DATA COLLECTION

Polit and Beck (2005:32) define data as "information obtained during the course of an investigation or study". In this study, a self-administered questionnaire was used to obtain data relevant to the research objectives and questions. The purpose of this study was to assess the level of knowledge, and to describe their beliefs and practices in managing diabetes mellitus. After obtaining a consent form from the respondents to participate in the study, the researcher

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administered the questionnaire, after which respondents completed self-administered questionnaires in an already prepared room to maintain confidentiality. Diabetes patients who could not read and write were assisted by the research assistants who were trained to use the questionnaire, to complete the self-administered questionnaires. The duration of the respondents' participation in the study was approximately 45 minutes: 10 minutes for the consent process, 15 minutes for the questionnaire administered by the researcher and 20 minutes for the self-administered questionnaires. Following the completion of all study questionnaires, the researcher firstly checked for any missing data, and placed the data into a closed envelope before the respondents left.

3.8.1 Data collection instrument

The data collection instrument for this study was a questionnaire. Burns and Grove (2006:426) state that a questionnaire is a printed self-report form designed to elicit information and is developed with specific items to assist with the data collection. It was used to gather information from a large number of participants. A structured questionnaire has been developed to elicit responses relevant to achieve the aim of the study. The advantages of using a questionnaire to collect data for this study was the fact that it required less time to administer (LoBiondo-Wood & Haber 2006:301). After an in-depth literature review, the researcher developed the questionnaire and was guided by supervisors and statisticians. The final questionnaire was discussed with the supervisors, statisticians and diabetes experts in the three sampled health clinics, and accepted terms of face and content validity. According to Babbie (2007:244), a questionnaire is "a document containing questions designed to solicit information appropriate for analysis. Usually it is information from respondents about their knowledge, beliefs, and practices on diabetes mellitus".

3.8.1.1 Characteristics of a questionnaire

Brink (2006:304) states that the following aspects characterize a questionnaire:

- Each participant enters his/her responses on the questionnaire, saving the researcher's time, compared to the time required to conduct personal interviews.
- It is less expensive than conducting an interview.

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- Respondents feel that because they remain anonymous, they can express themselves in their own words without fear of identification. This aspect was well maintained in this study.
- Data on a broad range of topics may be collected over limited period.
- The format is standard for all subjects and independent of the interviewer's mood.

3.8.1.2 Development of the questionnaire

The researcher derived the questions from the literature review (see chapter 2), from the researcher's personal observations, and from consultation with the professional nurses working with diabetes patients at all health care facilities in Vhembe district. A questionnaire was designed to assess the knowledge and describe the beliefs and practices of diabetic patients along with corresponding demographic variables. The questionnaire was piloted on ten patients to determine its validity. The study was approved by the ethical committee of the University of Venda and the ethical committee of the Limpopo provincial Department of Health and social development. The questionnaire was given to two independent experts i.e. two diabetes specialists working with diabetes patients, to evaluate the face and content validity as well as the conceptual components of the questionnaire accurately reflected the knowledge, beliefs and practices adopted by diabetes patients. The questionnaire was corrected and discussed with the statistician, the language editor and the researcher's supervisors from the University of Venda. Polit and Hungler (2005:419) emphasize that experts on the content should be consulted to analyse the adequacy of items representing the topic under study.

The reviewers supported the assertion that the components of the questionnaire accurately reflect the essence of the concepts being studied and that the questions were appropriate to the knowledge, beliefs and practices on diabetes mellitus. The questionnaire was typed and translated into the local language (Tshivenda). An expert in African languages translation edited the translation and certified that the same meanings were conveyed by specific items in English and in the Tshivenda versions of the questionnaire (see Annexure F).

3.8.1.3 Structure of the questionnaire

The questionnaire consisted of three sections as follows:

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SECTION A: BIOGRAPHICAL INFORMATION

The section contained (15) questions on the demographic data, questions about age, birth year, gender, education level, marital status, the number of people living in the house, employment, occupation, annual household income, residential address. Some questions were answered by making a check mark (□) and four questions were answered by writing the information in the provided space. Close-ended questions were used in this section. The purpose of eliciting such information was to secure a descriptive profile of the respondents and to ensure a basis for data analysis in relation to other sections of the questionnaire as per objectives of the study.

SECTION B: KNOWLEDGE OF DIABETES MELLITUS

This section contained (9) closed – ended questions and (1) open-ended question designed to elicit information regarding the knowledge on diabetes mellitus among patients suffering from type 2 diabetes.

SECTION C: BELIEFS AND PRACTICES ON DIABETES MANAGEMENT

The items contained in the questionnaire, comprising both open-ended and fixed questions, attempted to assess the knowledge, attitudes and the practices among the patients with diabetes mellitus in Vhembe district of Limpopo province in South Africa.

3.8.1.4 Administration of the questionnaire

The researcher made appointments with the Operational Managers of each of the sampled health care clinics in Vhembe district and the responsible professional nurse to assist the researcher on the identifying of the patients in each sampled health clinic. The researcher visited the randomly sampled health care clinics, namely Tswinga, Tshisahulu and Sibasa clinics in person. The administrators provided the researcher with the names and contact details of the professional nurses who were trained by the researcher on how to use the questionnaire and also serve as research assistants, who assisted with the whole process.

The researcher explained the nature and purpose of the study to the potential respondents, informed them that participation was voluntarily, and asked them to participate in the study. Respondents who were willing to participate in the study were required to sign a consent form

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with information about the study. After giving their informed consent, the respondents were led to a private room and given the questionnaire. The researcher was assisted by three professional nurses, one in each sampled health care clinic, who verified that the respondents who were entering the consulting room where the researcher was, had a consent form in his/her possession. When the respondents entered the consulting room on the specific data-collection days from June 2013 to October 2013, they were given a questionnaire to complete. The respondents who couldn't read and write were assisted by the researcher and the research assistants. To minimize response bias, the researcher remained inside the room to clarify items in the questionnaire if needed, but without interfering. One hundred diabetes patients completed and returned questionnaires. The completed questionnaires were handed to a statistician for data capturing and analysis.

3.8.1.5 Advantages of a questionnaire

The advantages of a questionnaire in this study were as follows:

- Questionnaires were less expensive to administer than conducting interviews, as interviews may have required hiring and training interviewers/field workers.
- The respondents' anonymity was ensured during data collection by not writing their names on the questionnaires, so that the findings could not be linked to any respondent.
- The response rate could be monitored because the questionnaires were distributed and collected by the researcher.

3.8.1.6 Pilot study

The first 10 participants of this study comprised the sub-sample that evaluated possible language barriers, the level of comprehension and the internal consistency of the Tshivenda and English versions of the knowledge, beliefs and practices of diabetic mellitus. The inclusion criteria, settings and recruitment process of this sub-sample were identical to those of the principal/main study. The analysis of the data gathered during the pilot testing was focused on internal consistency results. Ambiguity and misconception on other questions were attended to at the end of the pilot process.

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3.9 ETHICAL CONSIDERATIONS

Nurses are often faced with ethical dilemmas in their daily duties, as are researchers, when people act as study respondents in an investigation. First, the researcher obtained written permission to conduct the study and to use the three sampled health care clinics for data collection from Vhembe district of Limpopo province. The researcher exercised care to safeguard the rights of individuals and institutions (Brink 2006:31). In this study, the researcher observed the ethical principles of beneficence, respect for human dignity, fair treatment, and protection of human rights, and honesty in data processing.

3.9.1 Beneficence

The principle of beneficence encompasses freedom from harm and exploitation (Lo-Biondo-Wood & Harber 2006:270). No physical harm resulted from the completion of the questionnaires, but some psychological discomfort may have resulted from the nature of certain questions. The researcher's telephone numbers were provided should any respondent wished to discuss any aspect. The researcher would have referred respondents who experienced psychological discomfort as a result of completing the questionnaires to a counsellor, but no respondents indicated or expressed discomfort.

3.9.2 Respect for human dignity

Respect for human dignity includes the right to self-determination and to full disclosure (Polit & Beck 2010:154). The respondents' right to self-determination was honoured because they:

- Could decide independently, without any coercion, whether or not to participate in the study
- Had the right not to answer any questions that caused discomfort
- Could disclose or not disclose personal information
- Could ask for clarification about any aspect that caused some uncertainty

The right to full disclosure was respected because the researcher described the nature of the study as well as the respondents' rights to participate or refuse to participate in the study. This was included in the informed consent (see Annexure F).

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Each respondent voluntarily signed a consent form. The signed consent form was folded and placed in a box prior to completion of the questionnaire. Each completed questionnaire was placed in a separate container. No signed consent form could be linked to any specific questionnaire. This ensured the respondents' anonymity. Confidentiality was maintained because no names were disclosed in the research project. Any respondent who wished to obtain the findings could contact the researcher.

3.9.3 Benefit

The respondents were informed that they would receive no monetary benefit from participating in the study. The findings could benefit the health providers in formulating health education guidelines that will enhance better life styles for diabetic patients (Burns & Grove 2006:194).

3.9.4 Protection of human rights

The researcher explained the nature and purpose of the study and the type of information required by the respondents. The respondents clearly understood what was going on in this study and then gave informed consent (Burns & Grove 2009:190).

3.9.5 Fair treatment

Right to fair treatment is based on the ethical principle of justice (Burns & Groove 2009:198).In this study all the respondents were fairly selected and treated, the researcher selected the respondents according to the research problem of the knowledge, beliefs and practices among diabetic patients.

3.10 DATA ANALYSIS

This is a process of bringing order, structure and meaning to the mass of collected data (De Vos 2011:333). The researcher adhered to the principle of honesty with regard to data. No data was fabricated and the data was keyed into the computer as presented by respondents and then analysed. Data was analysed with the assistance of a statistician and the Statistical Package of Social Science (SPSS) was used to analyse data. Descriptive statistics, frequency tables and

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percentages were used in the data analyses to determine the knowledge, beliefs and practices of diabetes mellitus among the patients diagnosed with the disease.

3.11 CONCLUSION

This chapter discussed the research design and methodology of the study. The researcher used a quantitative, descriptive, exploratory design and a questionnaire as data-collection instrument. Chapter 4 describes the data analysis and interpretation.

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CHAPTER 4

DATA ANALYSIS AND INTERPRETATIONS

4.1. INTRODUCTION

The previous chapter discussed the research design and methods. This chapter focuses on the data analysis using the Statistical Package for Social Science (SPSS). Data collected enabled the researcher to assess the level of knowledge that the diabetic patient has regarding diabetes mellitus and to describe their beliefs and practices regarding the condition. The statistical information was derived from a sample of 100 respondents who completed the questionnaires. The percentages were calculated on the number of responses to each item and not the total number of questionnaires received. This was done as a function of the SPSS V19.0 Software based on the advice of the statistician.

4.2 PURPOSE OF THE STUDY AND OBJECTIVES OF THE STUDY

The purpose of this study was to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe beliefs and practices regarding diabetes mellitus and diabetes management.

The objectives of this study were to:

- assess the knowledge that diabetic patients have regarding diabetes mellitus in Vhembe district of Limpopo province, South Africa.
- describe the beliefs, and management practices of diabetes mellitus among people with diabetes mellitus in Vhembe district of Limpopo province, South Africa.
- provide recommendations on the management of diabetes mellitus.

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4.3 DATA COLLECTION

Data was collected by means of self-administered questionnaires which were distributed personally by the researcher to the respondents at the sampled health care clinics. Upon arrival at the randomly sampled health care clinics, the researcher reported to the operational managers who directed the researcher to the diabetes clinic in each research focal area. The operational manager explained to the researcher that all diabetic patients who met the inclusion criteria had a concern form in their possession. All diabetic patients who met the inclusion criteria had the concern form in their hands when entering the consulting room. They were given an opportunity to complete the questionnaire following an explanation regarding the study. Collected data was analyzed using the statistical package for social science (SPSS) V 19.0 Software.

Questionnaire layouts were:

SECTION A: BIOGRAPHICAL DATA

The section contained 15 questions which sought biographical information such as age, gender, marital status, residential address, schooling and employment status. Close-ended questions were used in this section. The purpose of eliciting such information was to secure a descriptive profile of respondents and to ensure a basis for data analysis in relation to other sections of the questionnaire as per objectives of the study.

SECTION B KNOWLEDGE OF DIABETES MELLITUS

This section contained nine fixed questions and one open-ended question designed to elicit information regarding the knowledge on diabetes mellitus among patients suffering from type 2 diabetes.

SECTION C: BELIEFS AND PRACTICES ON DIABETES MANAGEMENT

This section contained 16 fixed and open-ended questions to elicit information regarding beliefs and practices on diabetes management. A 3-point like type scale was used to respond to certain questions in this section, using frequency responses, i.e. yes;no; ordo not know.On other questions they ticked the best option and completed on the space provided.

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4.4 DATA ANALYSIS

Data analysis entails categorizing, ordering, manipulating and summarizing the data and describing them in meaningful terms (Brink 2006:170). Data captured from the questionnaire was subjected to computer analysis with the help of a professional statistician. The most powerful tool that the researcher can use in analysing quantitative data is statistics (Brink 2006:171). Statistical analysis enables the researcher to organize, interpret, and communicate numerical information (Polit & Beck 2010:379). In this study data was analyzed in accordance with the research objectives.

Statistics are either descriptive or inferential. In this study descriptive statistics were applied and the frequency, percentages and means of response were reflected. Findings were presented in tables, pie charts, graphs and figures to enhance interpretation. Data was analyzed using SPSS V19.0 Software.

4.5 DISCUSSION OF THE RESULTS

The accessible population which was also the total population was N=100. The response rate was 100. All the respondents completed the questionnaire.

4.5.1 Biographic data

A brief profile of the respondents was obtained. The demographic information in this section included: age, gender, marital status, occupational status, religion/faith, level of education, type of diabetes and duration of the illness, and type of treatment in use. Questions on whether a patient suffered from a related condition, forexample hypertension, were asked and whether there was someone with diabetes in the family. A total of one-hundred respondents were given a questionnaire to complete. Both sexes were represented in the sample, the results show that a majority of the respondents were female (n=61; 61.0%), males (n=39; 39.0%).

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4.5.1.1 Age of respondents in years (n= 100)

Table 4.1: Respondents age in years

Age	No	%
40- 49	38	38.0%
50-59	32	32.0%
60-69	24	24.0%
70 and above	6	6.0%
Total	100	**100.0%**

Table 4.1: Respondents' age in years

Table 4.1 indicates that out of the 100 respondents who answered this question, 38 (38.0%) of the respondents were in the age group of 40-49 years, while 32 (32.0%) of the respondents were in the age group of 50-59 years, 24 (24.0%) of the respondents were in the age group of 60-69 years; a minority 6 (6.0%) of the respondents were in the age group of 70 years and above. As in many other countries, type 2 diabetes mellitus is more common amongst the 30 year age group and above (Hjelm et al. 2003:424). The variable of age in years was considered important because it could determine the receptivity of some practices as well as the knowledge about diabetes in rural Vhembe district of Limpopo province in South Africa. Similar age distributions of patients with diabetes mellitus were reported by studies as important in the knowledge of the disease and its management (International Diabetes Federation 2011:1). Shigaki et al. (2010:202) discovered that older people adhered better to diet and medications than younger people and they usually visited health care professionals for the HbA1c test (Glycosylated hemoglobin test).

4.5.1.2 Respondents' residential areas (n= 100)

Table 4.2: Respondents' residential areas

Areas of residents	No	%
Rural	94	94.0%
Semi-urban	1	1.0%
Township	5	5.0%
Total	100	**100.0%**

Table 4.2: Respondents' residential areas

Three residential areas were distributed, where the respondents lived as demonstrated in table 4.2. Out of 100 respondents to this question, amajority 94 (94.0%) of the respondents were from rural areas. Only 1 (1.0%) of the respondents reported the residence as semi-urban, about (5.0%) of the respondents reported to be residing in a township. There is a variation in diabetes prevalence between rural and urban settings, as urban people tend to be less active than rural people, and urban people tend to shift in lifestyle from a relatively healthy traditional pattern to an urban scenario of increased food quantity, and eating junk food. In this study residential areas of the respondents was an important factor; in their study Misra, Singhal and Khurana (2010:289) find that rapid expansion and growth of small towns and peri-urban areas in South Africa, leads to an increase in the prevalence of type 2 diabetes mellitus. This is due to a distinct nutritional transition that has influenced individuals from eating a healthy, traditional high-fibre, low-fat, low-calorie diet, towards the excessive consumption of refined carbohydrates, low fibre foods, fats and red meats. According to Moodley and Rambiritch (2007:49), the South African population who were diagnosed with diabetes mellitus was predominantly from the affluent urban communities, presently due to westernization of the rural communities; diabetes is fast becoming prevalent in the rural African population and threatens to overwhelm the health care system in the near future.

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4.5.1.3 Distribution of the respondents according to gender (n=100)

Figure 4.1: Distribution of the respondents according to gender

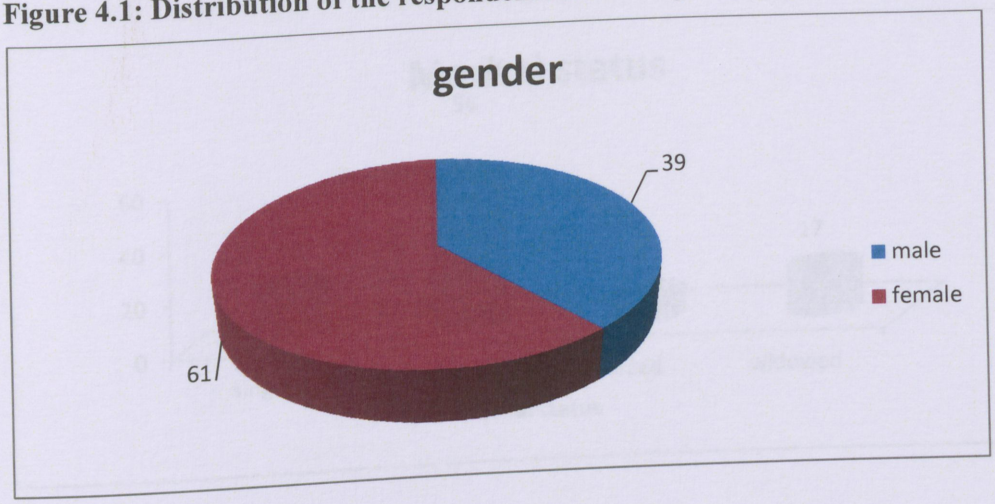

Figure 4.1: Distribution of the respondents according to gender

Figure 4.1 indicates that of the studied population, 39 (39.0%) of the respondents were males and 61 (61.0%) of the respondents were females; this indicated that a majority of patients affected by diabetes mellitus were females as compared to males.Another possibility may be the tendency to lack of compliance among men who suffer from diabetes mellitus, not to attend a clinic for their treatment. However, there was no statistical significance about relationship of gender and diabetes mellitus, and that was not the focus of this study. However, the importance of gender was taken into consideration in order to conclude that among males and females, the adherence to medications is usuallymaintained by women more thanby males, as was reported by Odegard and Capoccia (2007:1015).

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4.5.1.4 Marital status of the respondents (n= 100)

Figure 4.2: Distribution of the respondents according to marital status

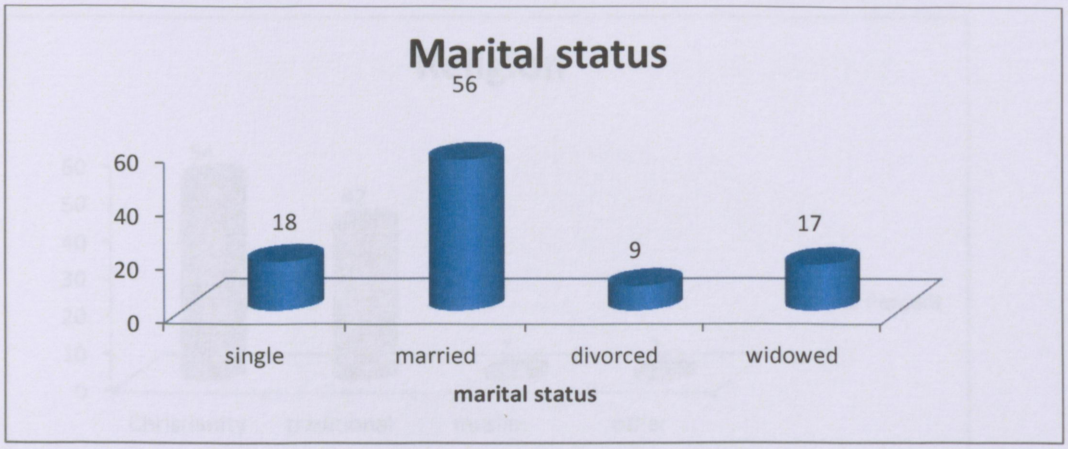

Figure 4.2: Distribution of the respondents according to marital status

Figure 4.2 displays distribution of respondents according to marital status. The majority 56 (56.0%) of the respondents were married and 18 (18.0%) of the respondents were single. A minority 9 (9.0%) of the respondents were divorced while 17 (17.0%) of the respondents were widowed. Marital status was considered in terms of receptivity of the information regarding health education. Moodley and Rambiritch (2007:16) in their study reported that married female patients with diabetes mellitus were more cooperative with health professionals in terms of diabetics' medications adherence, while Beverly et al. (2007:25) indicated that diabetes management in the context of marriage is greatly influenced by spouses' beliefs.

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4.5.1.5 Respondents' religious status (n= 100)

Figure 4.3: Distribution of the respondents according to religious status

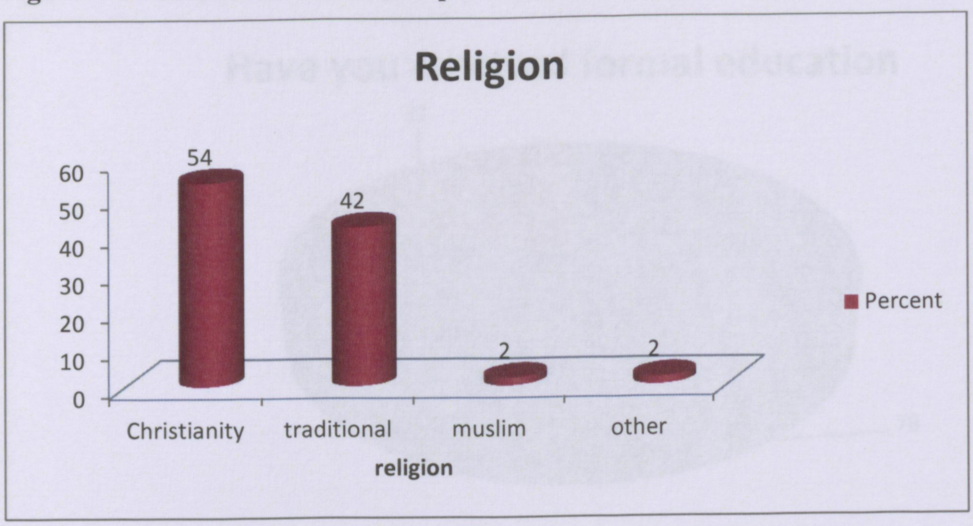

Figure 4.3: Distribution of the respondents according to religious status

Figure 4.3 displays distribution of the respondents according to religious status. As many as 54 (54.0%) of the respondents follow the Christian faith, while 42 (42.0%) of the respondents reported to be traditional believers, only 2 (2.0%) of the respondents reported that they were Muslim, whereas 2 (2.0%) of the respondents believed in other religions not mentioned. Religious beliefs impact strongly on diabetes management and practices. This was supported by a statement made by Chio et al. (2009:3310) who found that more spiritual type 2 diabetes mellitus patients revealed poor self-care than non- spiritual patients, because they believed they can be cured when praying to God and other religious related beliefs, instead of following recommended medications.

4.5.1.6 Respondents' educational status (n= 100)

Figure 4.4: Responses to the question 'have you received formal education?'

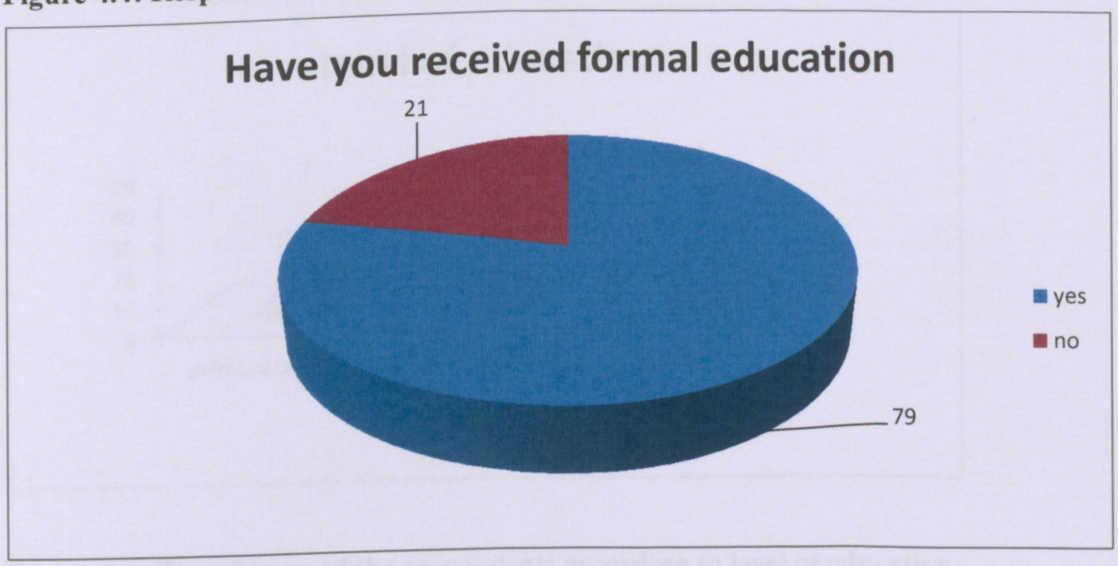

Figure 4.4: Responses to the question on formal education

According to figure 4.4, majority 79 (79.0%) of the respondents indicated that they had received formal education, while 21 (21.0%) of the respondents indicated that they had not received formal education. Therefore, majority 79 (79.0%) of the respondents indicated that they are able to read and write. An educated person would be able to realize the consequences of not adhering to diabetes mellitus treatments. According to Tham et al. (2004:506), education of individuals should be considered a priority. Educated patients are very receptive and understanding in terms of knowledge accumulation and ability to follow instructions. Proper adherence in any medication is associated with knowledge; whilst Barnett and Braunstein (2005:594) warn that lack of knowledge among patients with diabetes mellitus leads to complications, mortality and morbidity rate.

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4.5.1.7 Respondents' highest level of education attained (n=82)

Figure 4.5: Distribution of the respondents according to level of education

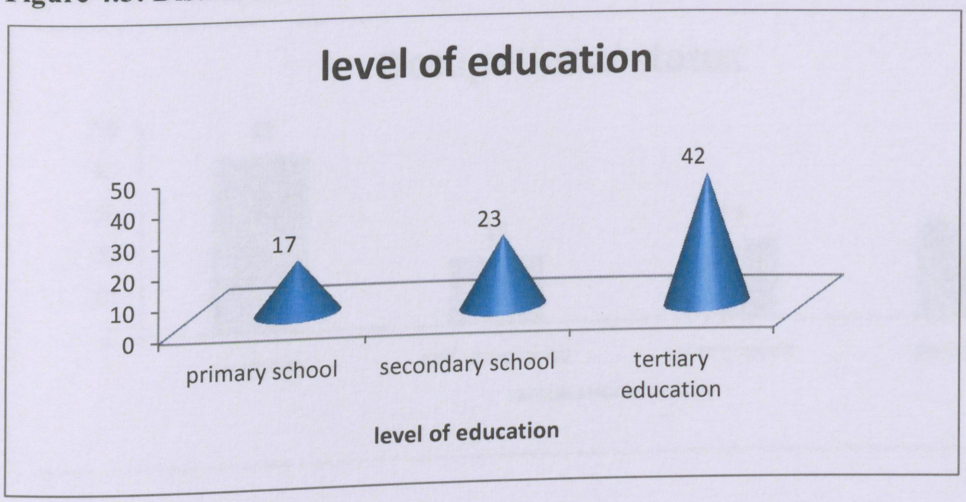

Figure 4.5: Distribution of the respondents according to level of education

Figure 4.5 shows that out of 100 respondents, a majority 82 (82.0%) were considered to be literate as they had attended school. As many as 42 (51.2%) of the respondents reported that they had completed tertiary education, while 17 (20.7%) of the respondents reported they had completed their primary school, and 23 (28.0%) of the respondents reported they had obtained secondary education. Education has an influence on how patients would choose to manage their condition through acquired knowledge about diabetes mellitus. Education of the person with diabetes mellitus was found to be an essential component in the management of diabetes mellitus. To ensure appropriate management, the basic knowledge and skills should be acquired by the patient and his/her family, and the health care team should work closely with the patient to promote self-care. There is an association between education and knowledge of diabetes mellitus since education of an individual patient also influences adherence to the prescribed medications.

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4.5.1.8 Respondents' occupational status (n=100)

Figure 4.6: Distribution of the respondents according to occupational status

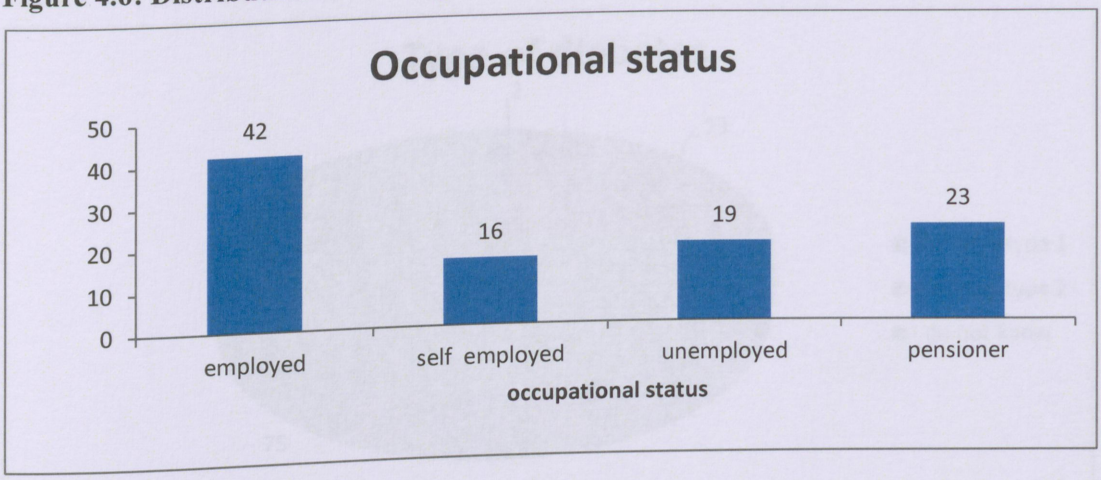

Figure 4.6: Distribution of the respondents according to occupational status

Out of 100 respondents, as many as 42 (42.0 %) of the respondents were employed. Minority 16 (16.0%) of the respondents were self-employed, while 19 (9.0%) of the respondents were unemployed, whereas 23 (23.0%) of the respondents reported that they were pensioners. Occupation also had much influence on management of diabetes mellitus; because some of the respondents of this study 2 (2.0%) reported that they experienced difficulties in terms of adhering to diabetic treatments due to financial constraints which led to inability to pay for transport to clinics.

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4.5.1.9 Type of diabetes respondents have (n= 100)

Figure 4.7: Distribution of the respondents according to type of diabetes

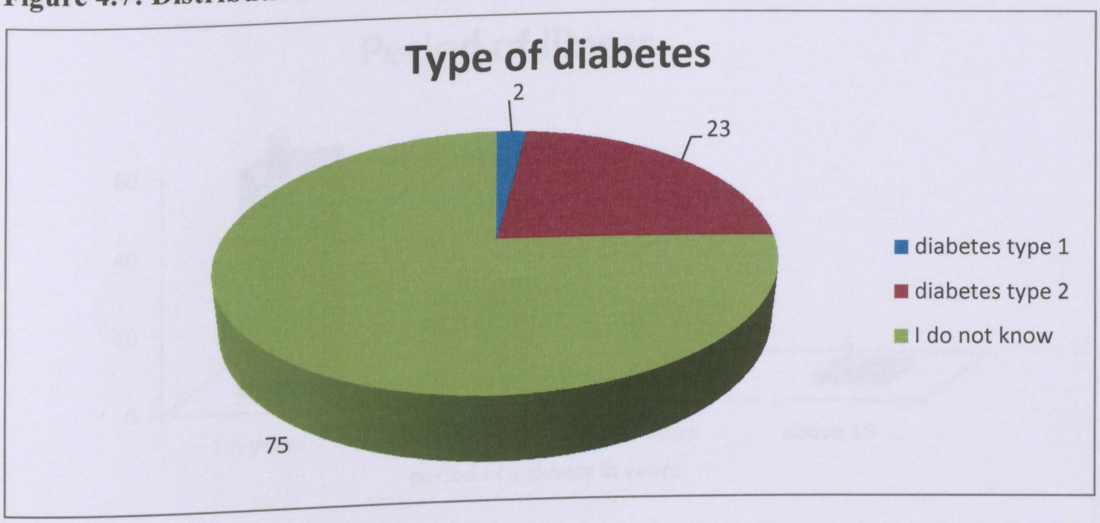

Figure 4.7: Distribution of the respondents according to type of diabetes mellitus

Figure 4.7 displays the type of diabetes mellitus that the respondents were suffering from. Out of 100 respondents, almost 23 (23.0%) were suffering from type 2 diabetes, minority 2 (2.0%) from type 1 diabetes mellitus, a majority 75 (75.0%) of the respondents did not know the type of diabetes they had.

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4.5.1.10 Period of illness (n= 100)

Figure 4.8: Distribution of the respondents according to period of illness in years

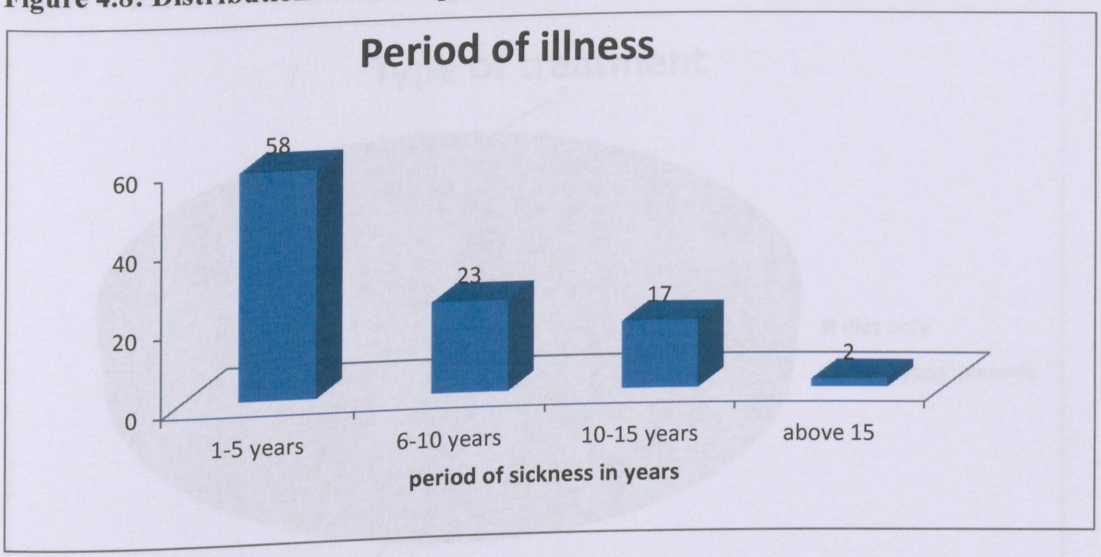

Figure 4.8: Distribution of the respondents according to period of illness in years

Figure 4.8 shows distribution of the respondents according to the period of illness in years. Majority 58 (58.0%) of the respondents had diabetes mellitus for the period between 1-5 years, almost 23 (23.0%) of the respondents had diabetes mellitus for the period between 6-10 years; however, 17 (17.0%) of the respondents reported to have had diabetes mellitus between the period of 10-15 years. Lastly, a minority 2 (2.0%) of the respondents reported to have had diabetes mellitus for the period of above 15 years. Period/length of type 2 diabetes mellitus diagnosis can contribute to diabetes management/self-care among these patients. A study done by Xu and Pan (2010:228) revealed that long duration (mean period 9 years) of type 2 diabetes mellitus had a positive relationship with adherence to recommended medications and monitoring of regular blood glucose.

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4.5.1.11 Distribution of the respondents according to type of treatment (n= 100)

Figure 4. 9: Distribution of the respondents according to type of treatment

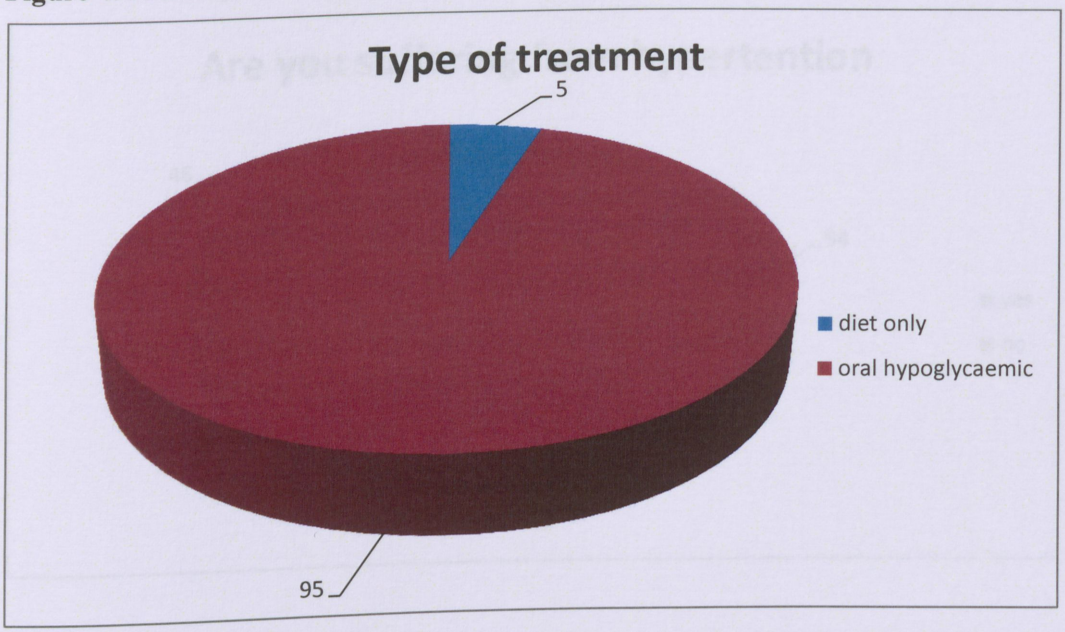

Figure 4. 9: Distribution of the respondents according to type of treatment

Figure 4.9 displays type of treatments used by the respondents in the management of diabetes mellitus. Out of 100 respondents, the majority 95 (95.0%) of the respondents were using oral hypoglycaemic treatments, only 5 (5.0%) of the respondents reported to had been diagnosed diabetic patients but not on medications; they were maintaining their conditions by diet only. Findings of this study indicated that the respondents were complying in the manner in which they manage their condition as indicated by the majority, 95 (95.0%) of the respondents who were on oral hypoglycaemic treatments, while 5 (5.0%) were still managing their condition (diabetes mellitus) by diet only.

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4.5.1.12 Respondents' hypertension status (n= 100)

Figure 4.10: Responses to question, if having hypertension

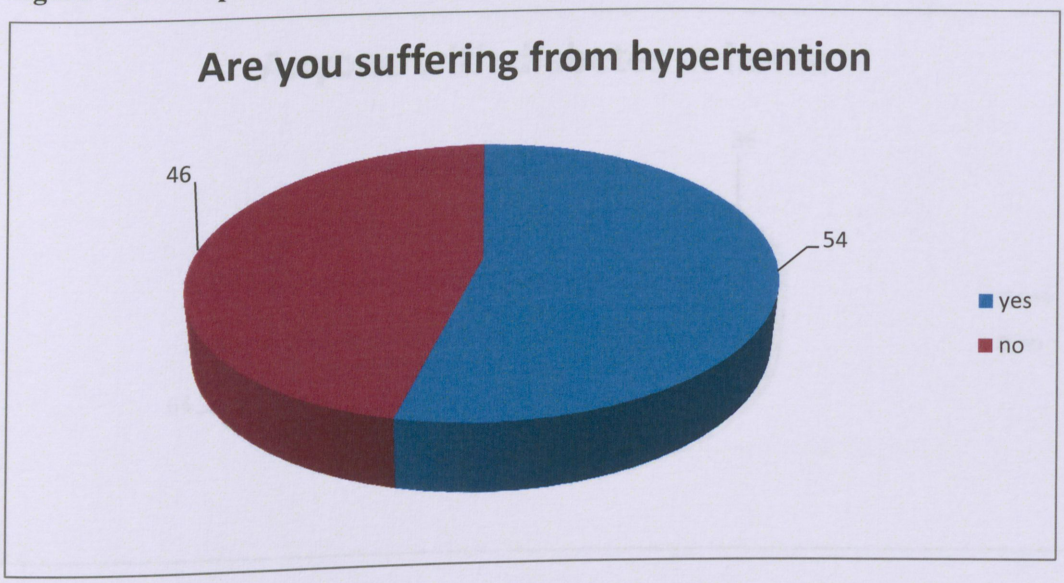

Figure 4.10: Responses to question, if having hypertension

Out of 100 respondents, majority 54 (54.0%) of the respondents answered by ticking yes to the question, 'Are you suffering from hypertension?.' As many as 46 (46.0%) of the respondents answered no to the question, almost 46 (46.0%) of the respondents reported to have more than two chronic conditions, i.e. 'Are you suffering from hypertension besides the diabetes mellitus?' Having a multitude of diseases can often lead to or enhance difficulties in treatment compliance/adherence and lifestyle modification. Persons with co-morbid chronic diseases experience a wide range of barriers to self-care, often leading to poor adherence to treatment or glycaemic control (Odegard & Gray 2008:692).

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4.1.2.13 History of diabetes mellitus within the family members (n= 100)

Figure 4.11: Responses if there is anyone with diabetes mellitus in the family

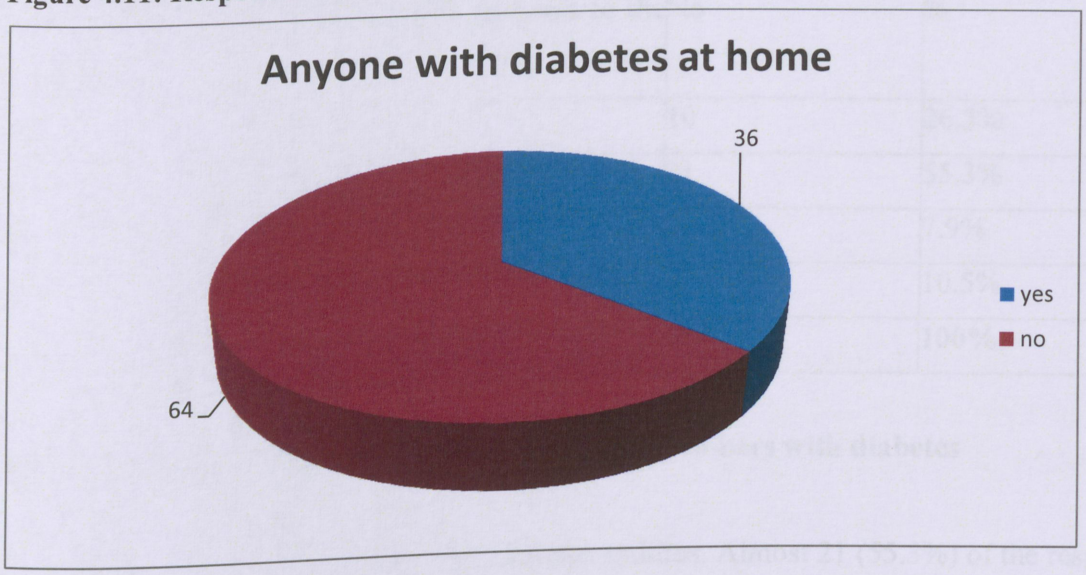

Figure 4.11: Responses to the question'is there anyone with diabetes mellitus in the family?'

Out of 100 respondents, only 36 (36.0%) of the respondents' family members had diabetes mellitus, to the contrary – these findings did not support those of Mohan et al. (2005:286) that reported that diabetes mellitus runs in the family; majority 64 (64.0%) of the respondents reported that their family members were never diagnosed with diabetes mellitus. The important of screening family members of the patients suffering from diabetes mellitus is vital for early diagnoses and prevention of diabetic related complications. Poor knowledge of screening other family members for diabetes mellitus was reported from Northwest Ethiopia by Feleke et al. (2013:117), who indicated that 51.2% of the respondents did not realize the importance of screening other family members.

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4.5.1.14 Respondent's relationship to the family members (n=38)

Table 4.3: Respondents' relationship to the family members

Relationship of family members with diabetes to the respondent	No	%
Parent	10	26.3%
Sibling	21	55.3%
Child	3	7.9%
Other	4	10.5%
Total	38	**100%**

Table 4.3: Respondents' relationship to the family members with diabetes

Table 4.3 analysis family members with diabetes mellitus. Almost 21 (55.3%) of the respondents reported that they had a sibling suffering from diabetes mellitus. However 10 (26.3%) of the respondents agreed that their parents were also affected by diabetes mellitus, whilst 3 (7.9%) of the respondents indicated that their children were also affected by diabetes mellitus; 4 (10.5%) of the respondents had a different relationship with respondents. Nadir et al. (2011:144) warns that offspring of the parents, who both are affected by diabetes mellitus, have potential/chances to be diabetic patient as well.

4.5.1.15 Respond if diabetes a topic that is discussed at home (n=100)

Table 4.4: Responses to question if diabetes mellitus a topic of discussion at home

Is diabetes a topic that is discussed at home	No	%
Yes	30	30.0
No	70	69.0
Total	100	**100%**

Table 4.4: Responses to question if diabetes mellitus a topic of discussion at home

Table 4.4 shows the responses on whether diabetes mellitus is a topic of familial discussion in the family. Out of 100 respondents, only 30 (30.0%) of the respondents reported that they always discuss about diabetes mellitus in their homes, while the majority 70 (70.0%) of the respondents reported that diabetes mellitus was not usually a topic of discussion. This indicates that the respondents together with their family members did not have enough knowledge regarding diabetes mellitus; therefore diabetes education is needed to empower patients with the knowledge. Social support from spouses and family members also serves to buffer the adverse effect of stress on diabetes management (Griffith et al. 2006:374). Shilubane (2010:46) adds that greater levels of social support, particularly diabetes-related support from spouses, family members and support groups are associated with better regimen adherence. Furthermore, Didem et al. (2008:265) supported the above statement by reporting that diabetic patients in Turkey receivedsufficientsupport from family members, where family members cooked food suitable for them, reminded them to adhere to medications and encouraged them to follow-up.

4.5.2 SECTION B: KNOWLEDGE OF DIABETES MELLITUS

This section of the questionnaire revealed the knowledge, beliefs and practices regarding diabetes mellitus

4.5.2.1 Respondents' knowledge about diabetes mellitus (n=100)

Table 4.5: Respondent' knowledge about diabetes mellitus

Do you know what diabetes is?	No	%
Yes	51	51%
No	49	49%
Total	100	**100%**

Table 4.5: Respondents' knowledge about diabetes mellitus

Table 4.5 reveals the number of the respondents who knew what diabetes is and those who said they did not know. Out of 100 respondents, majority 51 (51.0%) of the respondents indicated that they knew what diabetes mellitus is while 49 (49.0%) of the respondents did not have enough information on the disease.

4.5.2.2 Respondents' knowledge about the nature of the disease (n=100)

Table 4.6: Respondents' knowledge about the nature of the disease

Diabetes in your own words	No	%
Disease of losing weight	43	43.0%
High blood pressure	55	55.0 %
High blood sugar	2	2.0%
Total	100	**100%**

Table 4.6: Respondents' knowledge about the nature of disease

Table 4.6 displays responses of 100 of the respondents who attended to this question. Surprisingly, almost 45 (45.0%) of the respondents indicated that diabetes mellitus was the

disease of losing weight. The majority 55 (55.0%) of the respondents, amazingly associated diabetes mellitus with high blood pressure. Contradictory to this variable, only a minority of the respondents i.e. 2 (2.0%) reported to be knowledgeable about diabetes mellitus. This revealed that the respondents were not well informed about the nature of their disease and this might lead to poor diabetic care. Rotchford and Rotchford (2002:536) indicated that poor diabetes knowledge was associated with increased rate of hospitalization.

4.5.2.3 Respondents' knowledge of any risk factors of the diabetes (n=100)

Table 4.7: Respondents' knowledge of any risk factors of the diabetes

Do you know any risk factors	No	%
Yes	45	45%
No	55	55%
Total	100	**100%**

Table 4.7: Respondents' knowledge of any risk factors of the diabetes

Table 4.7 compares the percentages of respondents who had information about the risk factors of diabetes mellitus. As many as 55 (55.0%) of the respondents were not aware of the risk factors of diabetes mellitus, while 45 (45.0%) of the respondents were aware of the risk factors. The results are similar to the results found by Muninarayana et al. (2010:20) where 45% of respondents were aware of the risk factors for diabetes mellitus.

4.5.2.4 Known risk factors of diabetes (n=45)

Table 4.8: Known risk factors of diabetes

Risk factors of diabetes	No	%
Family history of diabetes	34	75.5%
Physical inactivity	7	15.6%
Obesity	4	8.9%
Total	45	**100%**

Table 4.8: Known risk factors of diabetes

Table 4.8 describes risk factors that the respondents of this study had regarding the diabetes mellitus. Examples of these risk factors were family history of diabetes mellitus, physical inactivity, and obesity. Knowledge on the role of obesity and physical inactivity as risk factors for diabetes mellitus was very low. Very few respondents 4 (8.9%) had information that obesity was a risk factor of diabetes mellitus, followed by 7 (15.5%) of the respondents who believed that physical inactivity was a risk factor. Almost 34 (75.5%) of the respondents had information on family history of diabetes mellitus as risk factor of diabetes mellitus. These findings were higher than the findings by Mohan et al. (2005:285), where (38.2%) of the respondents believed that a family history of diabetes mellitus can cause the disease. Poor knowledge of risk factors could hinder non communicable diseases like diabetes mellitus to be diagnosed early and treated adequately. According to Bazzano et al. (2005:312), obesity is a major risk factor for the development of type 2 diabetes mellitus, and is associated with insulin resistance, and deterioration of pancreatic cell functioning.

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4.5.2.5 Respondents' knowledge of signs and symptoms of diabetes (n=100)

Table 4.9: Respondents' knowledge of signs and symptoms of diabetes

Do you know any signs and symptoms of diabetes?	No	%
Yes	58	58.0%
No	42	42.0%
Total	100	**100%**

Table 4.9: Respondents' knowledge of signs and symptoms of diabetes

Table 4.9 displays responses to knowledge of signs and symptoms in percentages, of the studied population; majority 58 (58.0%) of the respondents agreed that they knew signs and symptoms of diabetes mellitus, whereas 42 (42.0%) of the respondents answered that they did not have information on signs and symptoms of the disease. Poor knowledge as identified among the respondents of this study might hinder the positive lifestyle of people with diabetes mellitus as well as those that are not yet diagnosed. People with poor knowledge of diabetes mellitus may never seek medical assistance even if they experience signs and symptoms.

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4.5.2.6 Types of signs and symptoms known by respondents (n=100)

Table 4.10: Response to the knowledge of sign and symptoms

Sign and symptoms	Tick		Unticked	
	Number	Percentage	Number	Percentage
frequent urination	43	54.4	36	45.6
excessive thirst	12	15.2	67	84.8
excessive hunger	25	31.6	54	68.4
weight loss	43	54.4	36	45.6
high blood sugar	27	34.2	52	65.8

Table 4.10: Response to the knowledge of sign and symptoms

Table 4.10: displays respondents' knowledge of signs and symptoms of diabetes mellitus. Examples of these signs and symptoms were frequent urination, weight loss, excessive thirst, excessive hunger and high blood sugar. As many as 67 (84.8%) of the respondents reported that they were not aware that thirst may be a sign of diabetes mellitus. As many as 43 (54.4%) of the respondents reported that they did not recognize frequent urination and weight loss as signs and symptoms of the disease. Almost 27 (34.2%) of the respondents reported that when their blood sugar was found high, it indicates that they had diabetes mellitus, while 25 (31.6%) of the respondents reported that weight loss was an indication of having diabetes mellitus. The number will not add up to 100% as some of the respondents ticked multiple answers to signs and symptoms according to the knowledge they have.

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4.5.2.7 Respondents' knowledge of the cause of diabetes (n=100)

Table 4.11: Respondents' knowledge on the cause of diabetes

Do you know the cause of diabetes?	No	%
Yes	59	59.0%
No	41	41.0%
Total	100	**100%**

Table 4.11: Respondents' knowledge on the cause of diabetes

Table 4.11 shows respondents' knowledge about the cause of diabetes mellitus. From a group of 100 respondents, 59 (59.0%) responded positively that they had information about the cause of diabetes mellitus, while 41 (41.0%) of the respondents did not have information about the cause of diabetes. Findings from the study by Bopape and Peltzer (2002:13), conducted in a rural hospital of South Africa among non-insulin dependent diabetes mellitus patients, reported that 43.1% of the respondents did not know the cause of diabetes mellitus.

4.5.2.8 Known causes of diabetes (n=66)

Table 4.12: Known causes of diabetes

Causes of diabetes	No	%
Eating too much sugar	44	66.7%
Eating too much fats	5	7.6%
Heredity	17	25.8%
Total	66	**100%**

Table 4.12: Known causes of diabetes

Table 4.12 displays the causes of diabetes mellitus as believed by the respondents. Out of 100 respondents, as many as 44 (66.7%) of the respondents had information that eating too much sugar could cause diabetes, while 17 (25.8%) of the respondents believed that heredity was one of the causes of diabetes mellitus. Minority 5 (7.6%) of the respondents believed that eating too

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much fats causes diabetes mellitus. This findings differ with the findings by the study conducted in a rural hospital of South Africa by Bopape and Peltzer (2002:13), where they reported that 23.0% of the respondents mentioned that diabetes mellitus was caused by eating too much sugar. Respondents had better knowledge regarding the cause of diabetes mellitus, because eating too much sugar and fats could predispose people to obesity and obesity is a risk factor of diabetes mellitus.

4.5.2.9 Knowledge about complications of diabetes (n=100)

Table 4.13: Knowledge about complications of diabetes

Do you know whether diabetes can cause complications?	No	%
Yes	62	62.0%
No	38	38.0%
Total	100	**100%**

Table 4.13: Knowledge about complications of diabetes

Table 4.13 displays the respondents' knowledgeaboutawareness of diabetic complications. Majority 62 (62.0%) of the respondents knew that diabetes mellitus could cause complications, while 38 (38.0%) of the respondents did not have this knowledge. The findings are significantly high to the findings of the study conducted in Kolar by Muninarayana et al. (2010:19), as well as by Mohan et al. (2005:285) where only 19% of the whole population knew that diabetes mellitus could cause complications.

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4.5.2.10 Known complications of diabetes mellitus (n=100)

Table 4.14: Responses to the question which complication of diabetes do you know?

complications of diabetes	Tick		Unticked	
	Number	Percentage	Number	Percentage
loss of vision	50	58.1	36	41.9
amputation	35	41.2	50	58.8
kidney failure	21	25	63	75
poor wound healing	32	38.6	51	61.4
heart failure and stroke	17	20	68	80

Table 4.14: Distribution of complication known by the respondents

Table 4.14 displays diabetic complications known by the respondents. As many as 50 (58.1%) of the respondents had knowledge that diabetes mellitus could cause loss of vision, while only 35 (41.2%) of the respondents knew that most amputations of the lower extremities in diabetic patients was the result of a diabetic complication. Minority 32 (38.6%) of the respondents had knowledge that diabetes mellitus could cause poor wound healing as a complication of the disease. Majority 68 (80.0%) of the respondents did not know that diabetes mellitus could cause heart failure as complications and 63 (75.0%) of the respondents did not have information that this disease could cause kidney failure as complications. Findings reveal that knowledge about diabetic complications was poor. Muninarayana et al. (2010:19) and Mohan et al. (2005:285) find similar results of poor knowledge about diabetic complications. The number will not total 100% as some of the respondents ticked multiple answers to this question.

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4.5.3 SECTION C: BELIEFS AND PRACTICES ON DIABETES MELLITUS MANAGEMENT

4.5.3.1Measures used to manage diabetes mellitus by respondents (n=100)

Figure 4.12: Measures used to manage diabetes mellitus

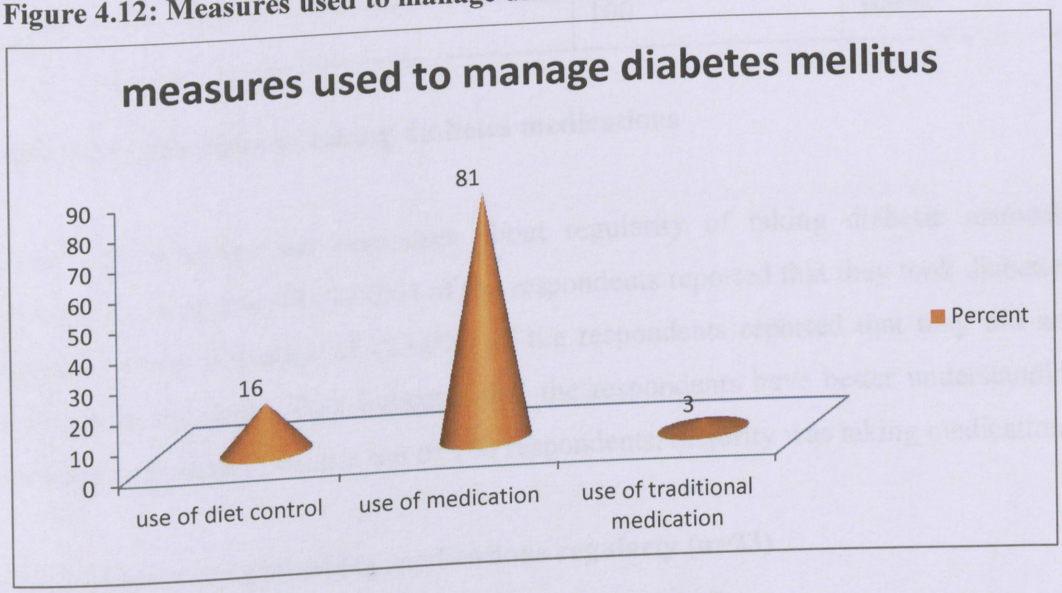

Figure 4.12: Measures used to manage diabetes mellitus

Figure 4.12 displays measures used by the respondents to manage diabetes mellitus. Majority 81 (81.0%) of the respondents used medication to manage the illness, while a few i.e.16 (16.0%) of the respondents used diet control. Minority 3 (3.0%) of the respondents reported that they used traditional medication to treat diabetes mellitus. Majority of the respondents 81 (81.0%) had good practices on the management of diabetes. These findings were similar to the finding by Bopape and Peltzer (2002:38) where in rural hospitals of South Africa, 80% of the patients were using medications prescribed by the hospital, while 2.0% of the participants were found to use traditional medicine like 'Moshunkwane'.

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4.5.3.2 Response to the question whether medications are taken regularly (n=100)

Table 4.15: Practices of taking diabetes medications

Do you take your medications regularly?	Number	%
Yes	77	77.0%
No	23	23.0%
Total	100	**100%**

Table 4.15: Practices of taking diabetes medications

Table 4.15 analyses the responses about regularity of taking diabetic medication by the respondents. Majority 77 (77.0%) of the respondents reported that they took diabetic medication regularly, while minority 23 (23.0%) of the respondents reported that they did not take their medications regularly. This indicates that the respondents have better understanding of taking medication regularly because out of 100 respondents, majority was taking medication regularly.

4.5.3.3 Reason for not taking medications regularly (n=23)

Table 4.16 Reason for not taking medications regularly

Reason for not taking medication regularly	No	%
No money to go to clinic to take medication	2	8.7%
I work far from the clinic	1	4,3%
I go only when I am not feeling well	1	4,3%
Sometimes I just stop taking treatment	1	4,3%
Stop tablets and use traditional medicine	1	4,3%
No response	17	73.9%
Total	23	**100%**

Table 4.16: Reason for not taking medications regularly

Table 4.16 shows the pattern of medication compliance among diabetic patients. Of the 100 respondents, only 2 (8.7%) reported that they did not go to the clinic to take their medications due to financial problems, while 1 (4.3%) of the respondents reported his reason for not taking

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medication regularly as the problem of working far from the clinic; 1 (4.3%) reported only going to the clinic for treatment when not feeling well. One of the respondents reported that he decided to stop taking medications without any reason, while 1 (4.3%) stopped medications and used traditional medicines instead. Majority 17 (73.9%) did not respond to this question. Dunning and Manias (2005:14) in their study of medication usage among patients with type 2 diabetes mellitus for more than10 years, reported that 20% of the respondents forgot to take their medications regularly without any particular explanation.

4.5.3.4 Response to the question if diabetes mellitus can be cured (n=100)

Figure 4.13: Responses to the question if diabetes mellitus can be cured

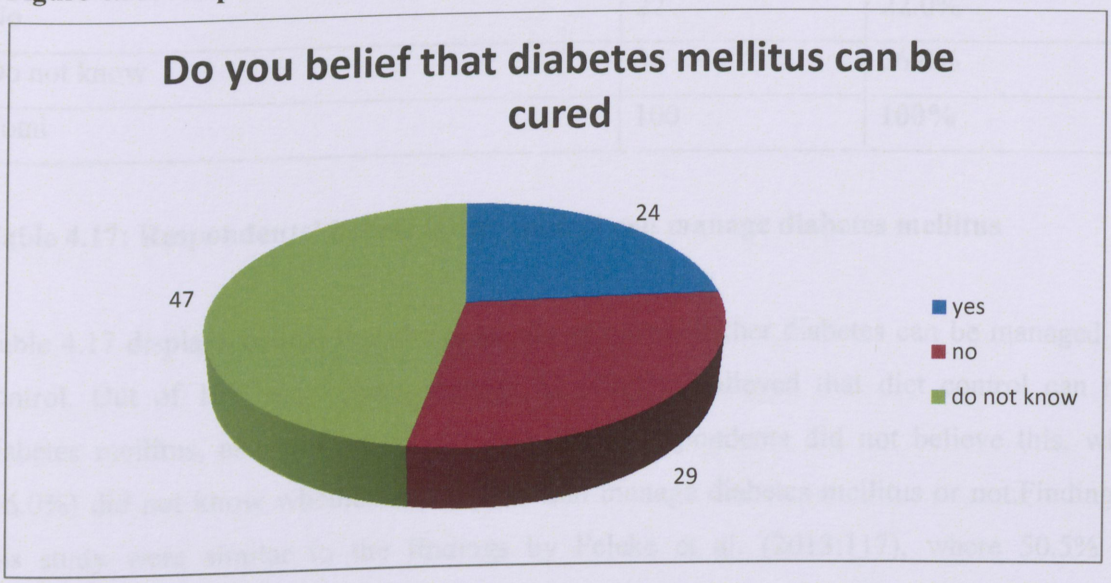

Figure 4.13: Responses to the question if diabetes mellitus can be cured

Figure 4.13 indicates beliefs in percentages whether diabetes mellitus can be cured or not. Almost 24 (24.0%) of the respondents reported that they believe that the disease can be cured, while 29 (29.0%) of the respondents reported that they did not believe that diabetes mellitus can be cured. As many as 47 (47.0%) of the respondents reported that they did not know whether diabetes mellitus can be cured or not. Findings from this study were contrary to the findings by Coronado et al. (2004:576) where Mexican Americans' diabetes patients believed that type 2 diabetes mellitus is a curable condition when treated by natural therapy rather than western

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medicine. This finding reveals that the respondents are not well informed and are not aware that diabetes mellitus is an incurable condition. Barnett and Braunstein (2005:584) indicated that once a person is diagnosed as having diabetes mellitus, this implies major change in the future life because that person has to cope with the disease for the rest of his/her life.

4.5.3.5 Respondents' beliefs if diet control can manage diabetes mellitus (n=100)

Table 4.17: Respondents' beliefs if diet control can manage diabetes mellitus

Do you believe that diet control can manage diabetes mellitus	No	%
Yes	42	42.0%
No	22	22.0%
Do not know	36	36.0%
Total	100	**100%**

Table 4.17: Respondents' beliefs if diet control can manage diabetes mellitus

Table 4.17 displays beliefs that the respondents have whether diabetes can be managed by diet control. Out of 100 respondents, almost 42 (42.0%) believed that diet control can manage diabetes mellitus, as many as 22 (22.0%) of the respondents did not believe this, while 36 (36.0%) did not know whether diet control can manage diabetes mellitus or not.Findings from this study were similar to the findings by Feleke et al. (2013:117), where 50.5% of the respondents were not aware that they could manage diabetes mellitus through weight reduction by dietary management.

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4.5.3.6 Responses to the question of regularly visiting a clinic (n=100)

Figure 4.14: Responses to the question of regularly visiting a clinic

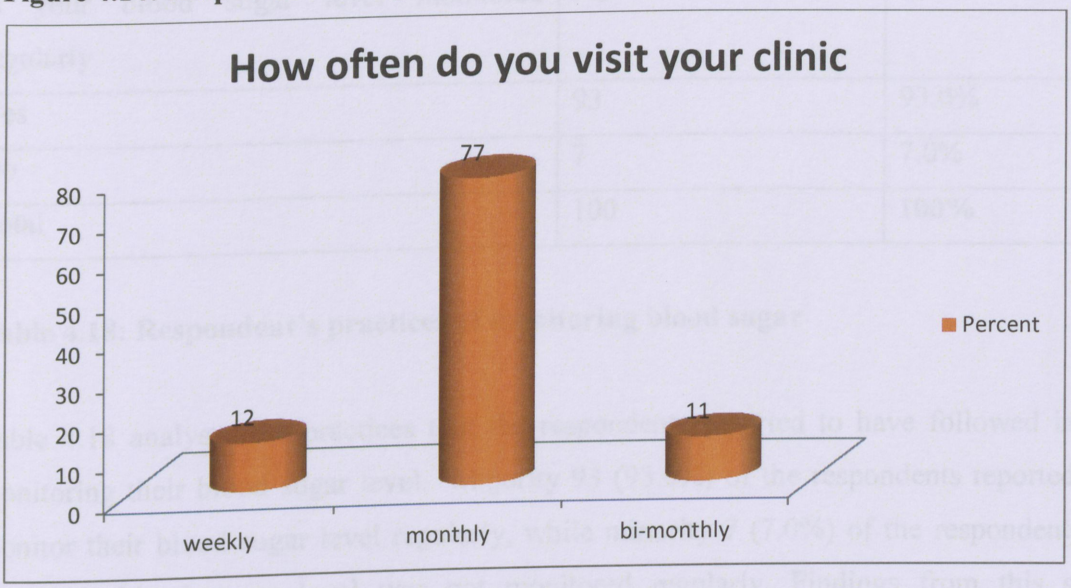

Figure 4.14: Responses to the question of regularly visiting a clinic

Figure 4.14 summarizes the responses with respect to regularity of visitinga clinic for diabetes management. Out of 100 respondents, only 12 (12.0%) reported to have visited the clinic weekly. Majority 77 (77.0%) of the respondents reported that they visited the clinic on a monthly basis, whilst 11(11.0%) visited the clinic bi-monthly. The respondents are more knowledgeable about visiting the clinic on a regular basis for diabetes mellitus management.

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4.5.3.7 Respondents' practices of monitoring blood sugar (n=100)

Table 4.18: Respondents' practices of monitoring blood sugar

Is your blood sugar level monitored regularly	No	%
Yes	93	93.0%
No	7	7.0%
Total	100	**100%**

Table 4.18: Respondent's practices of monitoring blood sugar

Table 4.18 analyses the practices that the respondents reported to have followed in terms of monitoring their blood sugar level. Majority 93 (93.0%) of the respondents reported that they monitor their blood sugar level regularly, while minority 7 (7.0%) of the respondents reported that their blood sugar level was not monitored regularly. Findings from this study was significantly higher than the findings by Westaway et al. (2003:846), who reported that only 8% of South African diabetic patients could monitor their blood sugar level regularly. Certain studies reported that Glycosylated haemoglobin test (HbA1c test) was not done, Odili et al. (2011:641) and Arslantas et al. (2008:264). Majority of the respondents 93 (93.0%) reported to adhering to the best practices in terms of blood sugar monitoring. Similarly, Gul (2010:129) as well as Tham et al. (2004:504) reported similar findings that Pakistan diabetic patients adhere well to the practices of monitoring their blood sugar level, as 61% were able to check their blood glucose once per week, while in Singapore 42% of diabetic patients were able to check their blood glucose level at home. These findings differ from the findings in China, Hong Kong where majority of the patients could not afford to monitor their glucose regularly (Viral et al. 2009:118).

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4.5.3.8 Responses to the question of blood sugar monitoring (n=93)

Figure 4.15: Responses to the question of blood sugar monitoring

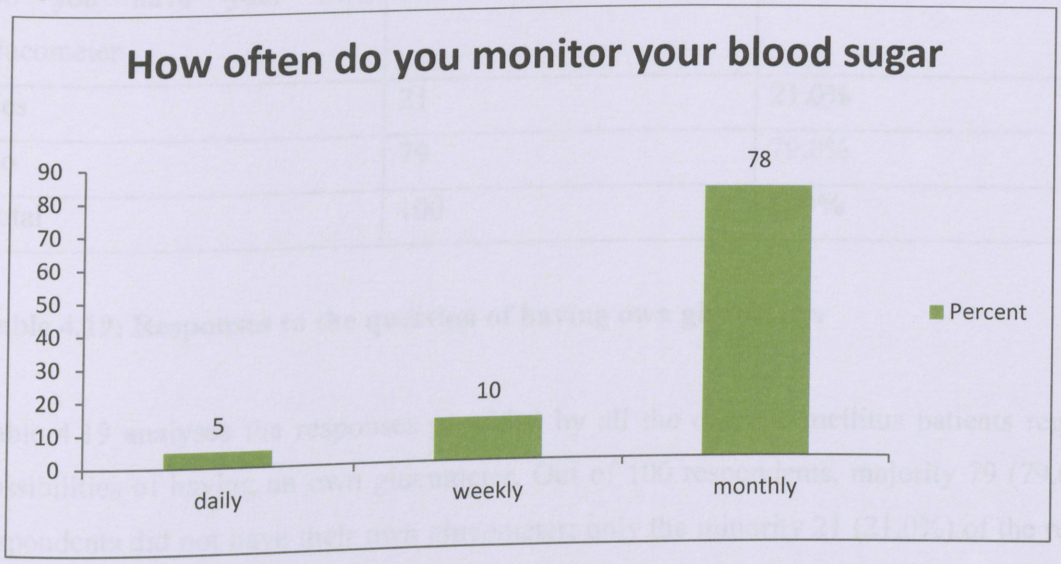

Figure 4.15: Responses to the question of blood sugar monitoring

Figure 4.15 displays the practices that the respondents follow on monitoring blood sugar levels. Out of the 100 respondents, majority 78 (83.9%) of the respondents reported that their blood sugar level was monitored monthly. Few, 10 (10.6%) of the respondents reported that their blood sugar level was monitored weekly, while only 5 (5.4%) of the respondents reported that their blood sugar level was monitored on a daily basis. Findings of this study reveal that diabetic control in certain other respondents was suboptimal; under normal circumstances diabetic patients do visit the clinic monthly, except when the blood sugar level is not controlled, patients can visit the clinic frequently. Findings from the Pakistan study indicated that as many as 61% of the respondents did monitor their blood sugar level once per week (Tham et al. 2004).

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4.5.3.9 Responses to the question of having own glucometer (n=100)

Table 4.19: Responses to the question of having own glucometer

Do you have your own glucometer	No	%
Yes	21	21.0%
No	79	79.0%
Total	100	**100%**

Table 4.19: Responses to the question of having own glucometer

Table 4.19 analyses the responses provided by all the diabetic mellitus patients regarding the possibilities of having an own glucometer. Out of 100 respondents, majority 79 (79.0%) of the respondents did not have their own glucometer; only the minority 21 (21.0%) of the respondents indicated that they have their own glucometer. According to Davidson (2005:641), home blood glucose monitoring is a component of effective therapy to achieve good glycaemic control in insulin dependent diabetics. Self monitoring of blood glucose allows patients to evaluate their individual responses to therapy and to assess whether they are achieving their glycaemic targets.

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4.5.3.10 Responses to the question whether urine is being checking at every visit (n=100)

Table 4.20: Practices of checking urine

Is your urine being checked at every visit	No	%
Yes	22	22.0%
No	78	78.0%
Total	100	**100%**

Table 4.20: Practices of checking urine

Table 4.20 shows respondents' practices of checking urine when going for follow-up at the clinic. Out of 100 respondents, only 22 (22.0%) of the respondents indicated that their urine was checked when visiting the clinic on every follow-up and 78 (78.0%) of the respondents indicated that their urine was not checked at every visit. This practice of not checking the urine of the diabetes patients by health care providers may cause some negative impact on the health of individuals as some diabetes complications may not be detected.

4.5.3.11 Responses if respondents have been seen by a doctor for their disease (n=100)

Table 4.21: Respondents' practices of seen by a doctor for their disease

have you been seen by a doctor for your diabetes	No	%
Yes	51	51.0%
No	49	49.0%
Total	100	**100%**

Table 4.21: Respondents' practices of seen by a doctor for their disease

Table 4.21 shows whether respondents were ever seen by the doctor to review their reaction to treatment of their diabetes mellitus. Out of 100 respondents, as many as 51 (51.0%) of the respondents were seen by the doctor at their respective clinics as a review strategy to check how

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the patient was responding to the treatment of diabetes mellitus, since this is the best practice on the control or management of the disease. As many as 49 (49.0%) of the respondents reported that they were never seen by the doctor. However, nurses were the only professionals behind patients' success in terms of diabetes mellitus check-ups. This result was an indication of best practice on diabetes management.

4.5.3.12 Responses to the question of seen a doctor (n=100)

Table 4.22: Respondents practices of seen a doctor

How often	No	%
Monthly	4	7.8 %
Half yearly	21	41.2%
Yearly	19	37.3%
Specify another time : 1.At first diagnose 2 .When blood sugar is high	 11 6	 21.5% 11.8%
Total	51	**100%**

Table 4.22: Respondents' practices of seen by a doctor

Table 4.22 shows the frequencies of the respondents to be seen by doctors for their diabetes management. Out of 100 respondents, almost 21 (41.2%) reported that they were seen by doctors for their diabetes twice per year (half yearly), while 19 (37.3%) of the respondents reported to have been seen by doctors on a yearly basis, although they visit the clinics on a monthly basis. Only the minority 4 (7.8%) reported that they were seen by doctors on a monthly basis; 11 (21.5%) were seen when their blood sugar level was high and 6 (11.8%) were referred to the doctors immediately when informed that they had diabetes mellitus. Findings from this study proved that the respondents were not managed well in relation to periodical review by a doctor, as stated in the guideline for managing a chronic condition stating that patients should be reviewed every six months.

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4.5.3.13 Respondents' belief if diabetic patient can benefit from physical exercise (n=100)

Table 4.23: Respondents' belief if diabetic patient can benefit from physical exercise

Do you believe that a diabetic patient can benefit from physical exercise	No	%
Yes	41	41.0%
No	15	15.0%
Do not know	44	44.0%
Total	100	**100%**

Table 4.23: Respondents' belief if diabetic patients can benefit from physical exercise

Table 4.23 displays beliefs that respondents have regarding physical exercise. Almost 41 (41.0%) of the respondents believed that they can benefit from physical exercise, while 15 (15.0%) of the respondents did not believe in physical exercise. As many as 44 (44.0%) did not have any information on whether diabetes patients could benefit from physical exercise. According to Bazzano et al. (2005:312), physical inactivity increases the risks of type 2 diabetes. This statement is supported by Mchunu and le Roux (2010:85) who indicated that local behaviour practices and beliefs, as well as community specific external and internal barriers to change, contribute to prevalence of type 2 diabetes mellitus, by promoting non-participation in physical activity. Physical exercise is important because of its effects of lowering blood sugar levels and reducing cardio vascular risk factors.

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4.5.3.14 Explanation on how diabetic patients would take good care of their feet (n=21)

Table 4.24: Respondents' practices of taking care of their feet

Explain how diabetic patients can take good care of their feet	No	%
Do not walk without shoes	2	9.5%
Not cutting nails	2	9.5%
Washing and drying them regularly	3	14.3%
Wearing closed shoes	1	4.8%
Wearing shoes always	4	19.0%
Wearing shoes of your size	9	42.9%
Total	21	**100%**

Table 4.24: Respondents' practices of taking care of their feet

Table 4.24 displays respondents' practices on how to take good care of their feet. Out of 100 respondents, only 2 (9.5%) of the respondents indicated that a diabetic patient should not walk without shoes and should not cut nails, since cutting of nails could cause injury or trauma to the toes. This in turnmay result in foot ulcers, potentially leading to diabetics complications that could result in lower extremities amputation. At least 3 (14.3%) of the respondents indicated that they washed their feet and dried them regularly, 1 (4.8%) indicated to wearing closed shoes, 4 (19.0%) indicated wearing of shoes always and 9 (42.9%) indicated to wear shoes of your correct size. This finding differs much with the findings by Perera et al. (2013:646) where their study found that majority 68.0% of the respondents knew that feet should be examined regularly for any lesions. Since caring for the feet by diabetic patients and the nurses is the most important thing to be done, many diabetic patients, particularly the elderly patients, are losing their limbs due to poor knowledge on how to care for their feet. Health education campaigns in the diabetic clinics and on the diabetic week/month should focus on care of the feet including types of shoes to be worn by diabetic patients.

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4.5.3.15 Responses if patients had been referred to a dietician(n=100)

Table 4.25: Responses if patients had been referred to a dietician

Have you been referred to a dietician	No	Percentage
Yes	61	61.0%
No	39	39.0%
Total	100	**100%**

Table 4.25: Responses if patients had been referred to a dietician

Table 4.25 shows whether the respondents were ever referred to a dietician. Out of 100 respondents, as many as 61 (61.0%) of the respondents indicated that they were referred to a dietician for dietary advice and 39 (39.0%) of the respondents reported that they were never referred to a dietician. This practice of health care providers not referring diabetic patients to dieticians,revealeda poor practice of diabetes management.

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4.5.3.16 Responses to the question whether patients had been referred to an eye specialist (n=100)

Table 4.26: Responses to the question whether patients had been referred to an eye specialist

have you been referred to an eye specialist	No	%
Yes	42	42.0%
No	58	58.0%
Total	100	**100%**

Table 4.26: Responses to the question whether patients had been referred to an eye specialist

Out of 100 respondents, as many as 42 (42.0%) of the respondents reported that they were referred to an eye specialist. Majority 58 (58.0%) of the respondents reported that they had never been referred to eye specialist. Although diabetes mellitus is currently the leading cause of new cases of blindness in adults in many industrialized countries and an increasingly more frequent cause of blindness elsewhere (WHO 2006:14), in this study fewer respondents 42 (42.0%) were seen by an eye specialist as compared to the minority of participants of 4.9% in Bangladesh, who were aware of consulting an ophthalmologist annually for visual screening Hague et al. (2005:799). Vision loss related to eye disease among people with diabetes is an important disability that threatens independence and can lead to depression, reduced mobility, and reduced quality of life (Bazzano et al. 2005:313). In a study conducted in Ankara by Caliskan et al. (2006:142), it was reported that majority 77.2% of the diabetics had diabetes-related ocular complications. According to Saaddine et al. (2008:1741), regular eye screening for signs of diabetic retinopathy is essential as diabetic patients cannot benefit fully from treatment once they experience loss of vision. It appears that health care professionals are not adhering to protocols.

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4.6 CONCLUSION

Chapter four presented the results of data analysis and interpretation of the data using descriptive statistics, tables, pie charts and bar graphs. The findings showed responses of diabetic patients regarding the knowledge that they had regarding diabetes mellitus and the practices and beliefs they had in managing diabetes mellitus. The results were supported by references to the literature review where applicable. The next chapter in this dissertation will present the conclusion, limitations and recommendations based on research findings.

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CHAPTER 5

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter four presented the results of data analysis and interpretation of findings. Chapter 5 presents the conclusions, based on the research results, of the study to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe their beliefs and practices regarding the disease. Following the analysis and interpretation of the data, objectives of the study were correlated with the study results. A number of comments could be made with regard to those diabetic patients' knowledge, beliefs and practicesregardingdiabetes mellitus.

5.2 OVERVIEW OF THE STUDY

5.2.1 Purpose of the Study

The purpose of this study was to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe their beliefs, practices and management regarding the disease. The intention was to provide a basis for appropriate interventions as well as for opportunities for the department of health to produce diabetes education policies and programmes taught by responsible persons. Furthermore, information and strategies generated in this study could be used to reduce the number of unintended diabetic complications among diabetic patients in Vhembe district, South Africa and the world.

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The study sought to answer the following questions:

- What knowledge do diabetic patients have regarding diabetes mellitus in Vhembe district of Limpopo province?
- What beliefs do diabetic patients have regarding diabetes mellitus in Vhembe district Limpopo province?
- What practices do diabetic patients have regarding diabetes mellitus in Vhembe district Limpopo province?

5.2.2 Objectives of the Study

The objectives guiding this study were to:

- assess the knowledge that diabetic patients have regarding diabetes mellitus in Vhembe district of Limpopo province, South Africa.
- describe the beliefs, and management practices of diabetes mellitus among people with this disease in Vhembe district of Limpopo province, South Africa.
- provide recommendations on the management of diabetes mellitus.

5.3 SUMMARY AND INTERPRETATION OF RESULTS

5.3.1 SECTION A: BIOGRAPHICAL DATA

Findings of this study revealed that most of the respondents who participated in this study were patients suffering from type 2 diabetic diabetes mellitus. Even though majority 75 (75.0%) of the respondents did not know the type of diabetes they had, almost 23 (23.0%) were suffering from type 2 diabetes, minority 2 (2.0%) were suffering from type 1 diabetes mellitus. Out of the 100 respondents who participated in this study, majority of the respondents were females as compare to males. These findings were similar to the findings of the study conducted in Turkey by Didem et al. (2008:268) in which the researchers reported on the respondents' knowledge of diabetes mellitus;female patients constitute the majority of the sample. Contrary, an England study by Baradan and Knill-Jones (2004:114), found that most of their respondents were males. In this study, the majority of the respondents were in the age group of 40 to 69 years. According to

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Hjelm, Mufunda, Nambozi and Kemp (2003:424), South Africa, like many other countries, type 2 diabetes mellitus is more common amongst the 30 year age group and above. Majority of the respondents from this study were from rural areas as compared to few of the respondents who were from semi-urban and township areas. Moodley and Rambiritch (2007:49) indicated in their study that initial African population who were diagnosed with diabetes was predominantly from the affluent urban communities; however, due to westernization of the rural communities, diabetes is fast becoming prevalent in the rural African population. Many of the respondents single, except 56 (56.0%) of the respondents who were married and 18 (18.0%) of the respondents were never married; minority 9 (9.0%) of the respondents were divorced, while 17 (17.0%) of the respondents were widowed. In religious affiliation, majority 54 (54.0%) of the respondents adhere to Christianity, while 42 (42.0%) of the respondents reported to be traditional believers. Only 2 (2.0%) of the respondents reported that they were Muslim, whereas 2 (2.0%) of the respondents believed in other religions not mentioned.It was important to enquire about religion because patients who are not affiliated to churches would opt to engage themselves in other practices as treatments for diabetes mellitus, such as the use of traditional medicines.

An encouraging part in this study was that the majority of the respondents were educated. According to Tham et al. (2004:506), education of individuals with diabetes mellitus should be considered very important. Educated patients are very receptive and understanding in terms of knowledge accumulation and ability to follow instructions. Many of the respondents' 42 (42.0 %) were employed, 23 (23.0%) of the respondents were pensioners, minority 16 (16.0%) of the respondents were self-employed, while 19 (9.0%) of the respondents were unemployed. Financial worries come up when government is unable to supply the clinics with chronic medication as it is the case in most government clinics in Vhembe district because patients who are unemployed cannot afford to buy medications.

5.3.2 SECTION B: KNOWLEDGE OF DIABETES MELLITUS

5.3.2.1 Knowledge about diabetes mellitus and its cause

As many as 51 (51.0%) of the respondents indicated that they knew what diabetes mellitus was while 49 (49%) of the respondents did not know what diabetes mellitus was. Contrary to the

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above variable, only minority of the respondents 2 (2.0%) displayed a very low knowledge about diabetes mellitus when indication was made that it is a disease of high blood sugar, while majority reported that diabetes mellitus was a disease of losing weight and high blood pressure. As many as 44 (66.7%) of the respondents knew that eating too much sugar could cause diabetes, while 17 (25.8%) of the respondents knew that heredity was one of the causes of diabetes mellitus. Minority 5 (7.6%) of the respondents believed that eating too much fats causes diabetes mellitus. This is supported by the study conducted in a rural hospital of South Africa by Bopape and Peltzer (2002:13), where they reported that 23.0% of the respondents mentioned that diabetes mellitus was caused by eating too much sugar.

5.3.2.2 Knowledge about risk factors of diabetes mellitus

Many of the respondents were not aware of the risk factors associated with diabetes mellitus. Very few respondents knew that physical inactivity and obesity were the risk factors of this illness. Although most patients were aware of the risk factors, almost 34 (75.5%) of the respondents knew that a family history of the disease could be a rise factor. Very few respondents 4 (8.9%) had knew that obesity is a risk factor of diabetes mellitus, while 7 (15.5%) of the respondents were of the opinion that physical inactivity is a potential risk factor. These findings indicate poor knowledge of risk factors for diabetes mellitus among patients with this condition.

5.3.2.3 Knowledge about signs and symptoms

More than halve 58 (58.0%) of the respondents in this study agreed that they knew the signs and symptoms of diabetes mellitus, whereas 42 (42.0%) of the respondents reported that they did not have information on signs and symptoms of the disease. Poor knowledge as identified among the respondents of this study might hinder a positive lifestyle of people with diabetes mellitus as well as those that are not yet diagnosed. This was revealed by this study when the majority 67 (84.8%) of the respondents were found to be unaware that thirst is a sign of diabetes mellitus, whereas 43 (54.4%) of the respondents reported that they did not know that frequent urination and weight loss are possible symptoms of diabetes mellitus. Only a few, i.e. 27 (34.2%) of the respondents reported that they knew that having diabetes mellitus, the blood sugar level of

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individuals or patients would be high, while 25 (31.6%) of the respondents reported that weight loss is an indication that s/he he may have diabetes mellitus.

5.3.2.4 Knowledge about complications of diabetes mellitus

Although more than halve of the respondents 62 (62.0%) knew that diabetes mellitus could cause complications, only a small percentage were aware of the specific complications like poor wound healing, heart and kidney failure. A majority of the respondents had information that diabetes mellitus could cause loss of vision. The health history information gathered in the study included the presence of retinopathy, neuropathy, nephropathy and high blood pressure since most of the respondents reported that they had never consulted an eye specialist; as well as the symptoms of tiredness and fatigue which could be influenced by cognitive interpretation. Some socio-cultural barriers to best practice on diabetes treatments were found to be the main cause of various complications such as foot ulcers and blindness (Perera et al. 2013:647).

5.3.3 SECTION C: BELIEFS AND PRACTICES ON DIABETES MANAGEMENT

5.3.3.1 Beliefs and practices about the management of diabetes mellitus

Overall score on the management of diabetes was good. Majority 81 (81.0%) of the respondents had better practices in terms of management of diabetes mellitus, with only 3 (3.3%) of the respondents reported to having used traditional medicines. The findings showed that the majority 77 (77.0%) of the respondents were taking their medications regularly as a means to manage the disease. The practice of monitoring blood sugar level was very good; majority 93 (93%) of the respondents reported that they monitor their blood sugar level by means of regular attendance at the diabetes clinics. These findings differ with the findings of the study done in China, Hong Kong, where the majority of the patients could not afford to monitor their glucose regularly (Viral et al. 2009:118). However, in the present study only few 7 (7.0%) of the respondents reported that their blood sugar level was not monitored regularly. The findings revealed better practices of visiting health care clinics; majority 77 (77.0%) of the respondents reported that they visited the clinic on a monthly basis. The practice of feet care was poor– majority 79 (79%) of the respondents had no idea on how to care for their feet. This study revealed the practices of visiting an eye specialist for eye examination as poor. Majority 58 (58.0%) of the respondents

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had never been referred to an eye specialist. Almost 24 (24.0%) of the respondents reported that they believe that diabetes mellitus can be cured, while fewer respondents reported that they did not believe that it can be cured. Findings were more similar to the findings by Viral et al. (2009:118) who reported that 38.3% of the participants believed that diabetes mellitus was a curable disease, especially when they used bitter substances. As many as 47 (47.0%) of the respondents in this study reported that they did not know whether diabetes mellitus can be cured or not.

5.3.3.2 Respondents' belief if diabetic patients can benefit from physical exercise

Congruently, almost 44 (44.0%) of the respondents in this study said they did not know whether they could benefit from physical exercise. Almost 41 (41.0%) respondents of this study said they believed they can benefits from physical exercise. This may be due to several factors such as inappropriate ways of providing information and most importantly lack of time of health care providers to be with patients for longer period during consultation due to the huge patient loads and lack of appropriately trained support staff like educators. Lack of time is a socio-cultural barrier to physical activity previously reported in different age groups from diverse ethnicities, including Hispanics and in studies conducted in rural South Africa, as well as in the United States of America (USA), Mash, De Vries & Abudul (2007:45; Morris, 2004:23). This was also supported by the findings of the study by Tham et al. (2004:506) who reported that the socio-cultural barriers, such as those mentioned must be considered in research studies on physical exercises and for the development of culturally sensitive physical activity programmes.

5.4 LIMITATIONS OF THE STUDY

The study was restricted to three sampled health clinics at Sibasa local areas within Vhembe district, South Africa. Limitations for this study were identified pertaining to the sample characteristics, instruments and data collection procedures. The study used a convenience sample of male and female patients aged 40 and above, diagnosed with type 2 diabetes mellitus and were on diabetic treatment for 6 or more months. Data was collected using only three sections on the questionnaires. All study data were gathered by self-administered methods. This represents a limitation because participants could be influenced by social desirability and human memory

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during self-report, which can consequently influence data accuracy (Polit & Beck 2005:334). To facilitate understanding of questions and minimize problems in distinguishing between degrees of knowledge, beliefs and practices of diabetes mellitus, the researcher handed the questionnaire to each respondent. This was a positive strategy to ensure consistency in the data collection process but it also represents a validity threat. Throughout the research process, the research may become more adept at administering the questionnaire, which could have an effect on data collection and the conclusions (Polit & Beck 2005:334). Data collection was performed only by the researcher, and at the beginning of the study, one clinic/setting was scheduled for each day. This represented a limitation regarding the number of respondents that could be recruited from the different settings simultaneously. In spite of these limitations, it can be concluded that these respondents did not follow best practices in terms of complying with the diabetes treatments. Therefore, the findings of this study may not be generalised to the whole of South Africa, since only three clinics were sampled as the areas of focus.

5.5 IMPLICATIONS FOR NURSING PRACTICE

This study's intent was to assess and describe knowledge, beliefs and the practices of diabetes mellitus among patients diagnosed with the disease at Sibasa local areas of Vhembe district, South Africa. Findings from this study research highlight the importance of physical exercise, health education on what diabetes mellitus is, how to control the blood sugar level and the diet patients with diabetes mellitus should follow. All these must be included as part of physical activity educational sessions and counseling to emphasize short, medium and long-term benefits for diabetes patients. Strategies to increase appropriate self-management beliefs are also imperative. Guiding patients to develop realistic goals, the use of incremental steps in the knowledge of diabetes mellitus, such as to attend support groups in the sampled clinics, a physical activity plan, clinicians and peer role modeling and continuous feedback are some examples of strategies to increase knowledge and good practice. Based on these study results, proper lifestyle modification such as physical activity, proper adherent to medications, proper diabetic diet and other lifestyle modification programmes are still necessary.

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Self-efficacy, perceived benefits and barriers play an important role in the ability to engage in physical activity. The influence of age, history of medical diagnoses, gender role and type of diabetes mellitus also had much influence on the management of the disease.

5.6 RECOMMENDATIONS

5.6.1 Recommendations from the findings

Based on the findings of this study, the following recommendations are made for facilitating the improvement to the use of diabetes health services and the adherence to diabetes treatments by the patients.

- It is recommended that the directorate for chronic diseases and geriatrics (CDG) should encourage the supply of pamphlets with diabetes mellitus information to the health facilities as a method of information dissemination (preferably, local language to be used).
- The government should make use of media (radio and television) to convey diabetes messages to the entire society that could includes giving information on signs and symptoms of diabetes mellitus, its management and complications.
- In-service-training and workshops should be organized for health care providers to keep them updated to new developments regarding diabetes mellitus.
- Health care providers should provide proper diabetes health education to patients and the entire community.
- Patients need to be informed timely about the danger/complications of uncontrolled diabetes; and health care nurses must refer or make an appointment for diabetic patients to be seen by an ophthalmologist annually for eye screening and glaucoma evaluation.
- The government should establish diabetes mellitus clinics and encourage health professionals to specialize in this field so that they can have a better knowledge and understanding of the disease.
- Patients need to be reviewed by visiting doctors at their respective clinics and dietician must work closely with diabetic patients to assess their nutritional needs and develop a food plan.

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- Workshops related to diabetes mellitus should be organized for both health care providers and traditional healers.
- Therefore, current guidelines and policies should be reinforced, so that all diabetic patients receive at least one annual physical examination as well as six monthly HbA1c blood tests.

5.6.2 Recommendations for further research study

- Diabetes diagnosis among patients with type 2 diabetes mellitus should be considered in future research to explore their identifying potential physical activity barriers.
- When focusing on older adults, the grandparents' and caregivers' role within the family dynamics could also be explored in future nursing research. Furthermore, crucial concepts such as motivation, self-esteem, body image and body size perception as physical activity barriers should be explored.
- One potential area of research related to physical activity could be distinguishing between leisure and non-leisure physical activities in this population.
- Nursing research about physical activity must continue and move towards experimental study designs in which interventional programs can be implemented to enhance this behaviour.
- However, prior research is necessary to build the supporting knowledge base that best applies to adults with type 2 diabetes mellitus.
- An existing issue that needs to be addressed in nursing research with this population is the identification and selection process of instruments.
- On that note, language translation and cultural factors are among the important areas that need to be considered and appropriately addressed before instrument selection and utilization.
- Similar study be conducted, that will cover more clinics and a larger area in Vhembe district.

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5.7 CONCLUSIONS

In conclusion, in this study, the researcher assessed and described the knowledge, beliefs and the practices of diabetes mellitus among patients diagnosed with diabetes mellitus at Sibasa local areas of Vhembe district, Limpopo province in South Africa. Although the overall knowledge about diabetes mellitus among the respondents was adequate, there were critical gaps in their knowledge. In particular, knowledge about the causes of diabetes mellitus and about signs and symptoms of diabetes mellitus was very poor. This study identified areas where there were gaps in the respondent's knowledge. Respondents of this study had no information regarding issues of heredity and family history. Knowledge of consulting an eye specialist was indeed very poor, and awareness of foot-care was slim as well. In terms of risk factors associated with diabetes mellitus, almost three quarter, i.e.55 (55%) of the respondents had no information regarding risks brought about by diabetes mellitus. The findings could be used in an integrated programme to improve patient self-management monitoring.

Since this study was conducted at only 3 health care clinics, the results did not reflect the knowledge of the general population and further studies are required, particularly in different settings to identify patients' educational needs and methods to improve self-management of diabetes. Findings on beliefs regarding physical exercise by patients with diabetes mellitus were low. This revealed the need to establish a diabetes mellitus support group where, in group meetings, they can teach each other about self-care. It was also revealed that there is a need for a multidisciplinary approach including a well-trained community doctor, dietician, diabetic nurse and community based education programmes. This is even more important in resource limited areas such as the rural areas of Limpopo province.

This study further revealed certain traditional practices used to prevent and to treat diabetes mellitus among the respondents of this study. Findings revealed certain beliefs among patients with diabetes mellitus. Some patients preferredconsulting traditional healers when feeling pressurized. They also indicated a need for health care professionals to take time to explain the etiology and different treatments and the complications associated with diabetes mellitus.

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This study suggests that many negative implications and tiredness reported by some of the respondents are common among patients with diabetes. In order to make these beliefs positive, health education is recommended as very essential. Therefore, access to health education, needs to improve in the Sibasa local areas, the rest of the province, in fact the whole of South Africa and the world at large.

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ANNEXURE A

APPROVAL LETTER FROM UNIVERSITY OF VENDA

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RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF THE RESEARCHER/ INVESTIGATOR:
Ralineba T

PROJECT TITLE: Knowledge, beliefs and practices among patients with diabetes mellitus in Vhembe district of Limpopo province, South Africa

PROJECT NO: SA/10/PDC/04

SUPERVISORS/CO-RESEARCHERS/CO-INESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Ralineba T	University of Venda, Department of Advanced Nursing Science (Student)	Investigator: Student
Prof. M.L. Netshikweta	University of Venda, Department of Advanced Nursing Science	Supervisor
Dr. N.H. Shilubane	University of Venda, Department of Advanced Nursing Science	Co-Supervisor

ISSUED BY:
UNIVERSITY OF VENDA, HEALTH, SAFETY AND RESEARCH ETHICS COMMITTEE

Date Considered: 08 March 2013
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee .....
Name of the Chairperson of the Committee: PROF. G.E. EKOSSE

University of Venda

University of Venda
Private Bag X5050,Thohoyandou,0950, LIMPOPO PROVINCE,SOUTH AFRICA
TELEPHONE (015) 962 8504/8484/8313 FAX (015) 962 8439

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ANNEXURE B

REQUEST FOR PROVINCIAL PERMISSION

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TO: LIMPOPO PROVINCIAL GORVERNMENT
DEPARTMENT OF HEALTH

FROM: MS T. RALINEBA

DATE: 12 MAY 2013

RE: REQUEST TO CONDUCT RESEARCH

1. The above matter refers:
2. Permission is hereby requested to conduct research at the Department's health care facility. Title of my research is **KNOWLEDGE, BELIEFS AND PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS IN VHEMBE DISTRICT OF LIMPOPO PROVINCE,SOUTH AFRICA**

Selected health facilities are Tshisahulu, Tswinga and Phiphidi clinics.

The research project is a requirement for the MCUR degree. The researcher shall observe all the ethical principles of collecting data.

3. Attached find permission letter from University of Venda Ethical Committee.

Regards

.....

T. Ralineba

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ANNEXURE C

PROVINCIAL LETTER OF APPROVAL

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LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT

12 April 2013 Ref:4/2/2

Ralineba T
University of Venda
P/Bag X 5050
0950

Dear Ralineba T

Knowledge, beliefs and practices among patients with diabetes mellitus in Vhembe district of Limpopo province, South Africa

Permission is herby granted Ralineba T to conduct a study as mentioned above in Limpopo Province of South Africa.

- The Department of Health and Social Development will expect a copy of the completed research for its own resource centre after completion of the study.
- The researcher is expected to avoid disrupting services in the course of his study.
- The researcher/s should be prepared to assist in interpretation and implementation of the recommendation where possible
- The institution management where the study is being conducted be made aware of this.
- A copy of the permission letter can be forwarded to Management of the Institutions concerned

HEAD OF DEPARTMENT
HEALTH AND SOCIAL DEVELOPMENT
LIMPOPO PROVINCE

18 College Street, Polokwane, 0700. Private Bag x9302, POLOKWANE, 0700
Tel: (015) 293 6000, Fax: (015) 293 6211/20 Webs te: http\\www.limpopo.gov.za

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ANNEXURE D

INFORMATION LETTER FOR RESPONDENTS

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INFORMATION LETTER FOR RESPONDENTS

RESEARCH TOPIC: knowledge, beliefs and practices among patients with diabetes mellitus in Vhembe district of Limpopo Province

Researcher: T Ralineba

I am herewith inviting you to participate in the above mentioned research. The purpose of the study is to assess the level of knowledge that diabetic patients have regarding diabetes mellitus and to describe their beliefs and practices regarding diabetes mellitus. Findings may be utilized to develop strategies to promote healthy living to those affected by diabetes mellitus and members of the community and to prevent diabetes complications.

When you participate in this study there are no risks or discomfort, you are assured that confidentiality and anonymity will be maintained. Your name will not appear on the questionnaire, so that data will not be linked with your name. Data will be kept in a safe place. Your participation in this study is voluntary, and you have the right to withdraw at any time without penalty. The completion of this questionnaire will take 20-30 minutes. The original copy of this agreement will be given to you.

For any questions and clarity contact me at 0159631753 (work) or 083 717 2651

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ANNEXURE E

CONSENT FORM FOR RESPONDENTS

UNIVERSITY OF VENDA

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I .....,here by freely consent to participate in this study. I have heard, read and understand the proposed study and any questions that I had, have been answered and will be answered in future. I understand that participation in this study is completely voluntary and I may withdraw at any time without penalty.

.....
Signature of the participant

.....
Date

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ANNEXURE F

ENGLISH QUESTIONNAIRE FOR THE RESPONDENTS

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ANNEXURE F

QUESTIONNAIRE

Knowledge, beliefs and practices among patients with diabetes mellitus in Vhembe district, Limpopo province

Answer each question by placing a "tick" in the appropriate box or write down your response in the space provided.

SECTION A: BIOGRAPHIC INFORMATION

1. Your age at your last birthday. ☐

2. Where do you live? .....

3. Your gender

☐ Male
☐ Female

4. Indicate your marital status

☐ Single
☐ Married
☐ Divorced
☐ Widower

5. Indicate your religion/faith

☐ Christianity
☐ Traditional
☐ Muslim
☐ Other (specify).....

6. Have you received formal education?

☐ YES
☐ NO

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7. If yes, what is your level of education?

- [ ] Primary school
- [ ] Secondary school
- [ ] Tertiary school

8. What is your occupational status?

- [ ] Employed
- [ ] Self-employed
- [ ] Unemployed
- [ ] Pensioner

9. Type of diabetes you have

- [ ] Diabetes type 1
- [ ] Diabetes type 2
- [ ] I do not know

10. Period of illness

- [ ] 1 – 5 years
- [ ] 6 – 10 years
- [ ] 10-15 years
- [ ] Above 15 years

11. Mention the type of treatment you are using

- [ ] Diet only
- [ ] Oral hypoglycaemic (tablets)

12. Are you suffering from hypertension?

- [ ] Yes
- [ ] No

13. Is there anyone with diabetes mellitus in the family?

- [ ] Yes
- [ ] No

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14. If yes, how related are you to that person

- ☐ Parent
- ☐ Sibling
- ☐ Child
- ☐ Other

(specify).....

15. Is diabetes mellitus a topic that is discussed at home?

- ☐ Yes
- ☐ No

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SECTION B: KNOWLEDGE OF DIABETES MELLITUS

16. Do you know what diabetes mellitus is?

- ☐ Yes
- ☐ No

17. What is diabetes mellitus in your own words……

18. Do you know of any risk factors of diabetes mellitus?

- ☐ Yes
- ☐ No

19. If yes, what are the risk factors you know?

- ☐ Family history of diabetes
- ☐ Physical inactivity
- ☐ Obesity

20. Do you know any signs and symptoms of diabetes?

- ☐ Yes
- ☐ NO

21. If yes, what are the signs and symptoms of diabetes?

- ☐ Frequent urination
- ☐ Excessive thirst
- ☐ Excessive hunger
- ☐ Weight loss
- ☐ High blood sugar

22. Do you know the cause of diabetes mellitus?

- ☐ Yes
- ☐ No

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23. If yes, what are the causes of diabetes mellitus?

- ☐ Eating too much sugar
- ☐ Eating too much fats
- ☐ Heredity

24. Do you know any complications of diabetes?

- ☐ Yes
- ☐ No

25. If yes, what are the complications of diabetes?

- ☐ Loss of vision
- ☐ Amputation
- ☐ Kidney failure
- ☐ Poor wound healing
- ☐ Heart failure and stroke

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SECTION C: BELIEFS AND PRACTICES ON DIABETES MANAGEMENT

26. What measures can one take to manage diabetes (indicate what you use)

- ☐ Use of diet control
- ☐ Use of medication
- ☐ Use of traditional medication

27. Do you take your medication regularly?

- ☐ Yes
- ☐ No

28. If no, indicate why…..

29. Do you believe that diabetes mellitus can be cured?

- ☐ Yes
- ☐ No
- ☐ Do not know

30. Do you believe that diet control can manage diabetes?

- ☐ Yes
- ☐ No
- ☐ Do not know

31. How often do you visit your clinic for diabetes management?

- ☐ Weekly
- ☐ Monthly
- ☐ Bi-monthly

32. Is your blood sugar level being monitored regularly?

- ☐ Yes
- ☐ No

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33. How often is your blood sugar being monitored?

- [ ] Daily
- [ ] Weekly
- [ ] Monthly

34. Do you have your own glucometer at home?

- [ ] Yes
- [ ] No

35. Is your urine being checked at every visit?

- [ ] Yes
- [ ] No

36. Have you ever been seen by a doctor for your diabetes

- [ ] Yes
- [ ] No

37. If yes, how often?

- [ ] Monthly
- [ ] Half-yearly
- [ ] Yearly
- [ ] Specify another time……..

38. Do you believe that diabetic patients can benefit from physical exercise?

- [ ] Yes
- [ ] No
- [ ] Do not know

39. Explain how diabetic patients can take good care of their feet……

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40. Have you ever been referred to the following specialized person?

40.1Dietician

☐ Yes

☐ No

40.2 Eye specialist (Ophthalmologist)

☐ Yes

☐ No

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ANNEXURE F

TSHIVENDA QUESTIONNARIE

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ANNEXTSHA F (B)

MBUDZISAVHATHU

Ndivho, vhutenda tenda na maitele vhukati ha vhalwalaho vhulwadze ha swigiri (diabetes mellitus) khatshitiriki tsha Vhembe, kha Provintsi ya Limpopo

Fhindulani mbudziso inwe na inwe nga u koreka bogisi kana u nwala phindulo yanu ho teaho.

TSHIPIDA TSHA A: MAFHUNGO NGA HA MUTHU

1. Minwaha yanu musi ni tshipembelela u bebwa hanu lwa u fhedzisela. ☐

2. Ni dzulangafhi? .....

3. Mbeu yanu

☐ Tshiduna

☐ Tshikadzi

4. Sumbedzani zwa mamalo

☐ U saathu mala/malwa

☐ U mala/malwa

☐ U talwa

☐ Olovhelwaho

5. Sumbedzani vhurereli / lutendo lwanu

☐ Tshikhriste

☐ Sialala

☐ Musulumani

☐ Vhunwe

(sumbedzani).....

6. No dzhena tshikolo?

☐ Ee

☐ Hai

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7. Arali hu ee no dzhena na guma ngafhi?

- [ ] Tshikolo tsha phuraimari
- [ ] Tshikolo tsha sekondari
- [ ] TshikolotshaTheshiari

8. Ni a shumana?

- [ ] Ndo tholwa
- [ ] Ndi a dishuma
- [ ] A thishumi
- [ ] Ndi phenshenini

9. Lushaka lwa vhulwadze ha swigiri

- [ ] Lushakalwa 1 lwavhulwadze ha swigiri
- [ ] Lushakalwa 2 lwavhulwadze ha swigiri
- [ ] A thidivhi

10. Tshifhinga tsha u lwala

- [ ] Minwaha 1 – 5
- [ ] Minwaha 6 – 10
- [ ] Minwaha 10-15
- [ ] Ntha ha minwahaya 15

11. A mbani dzilafho line na khou li shumisa

- [ ] Zwiliwa fhedzi
- [ ] Philisi (Oral hypoglycemic)

12. Ni na mutsiko wa malofha (hypertension)?

- [ ] Ee
- [ ] Hai

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13. Huna munwe o no lwala vhulwadze ha swigiri hayani?

☐ Ee

☐ Hai

14. Arali huee, nina vhushakadenae?

☐ Mubebi

☐ Khaladzi/murathu

☐ Nwana

☐ Zwinwe

(sumbedzani).....

.....

15. Vhulwadze ha swigiri vhu a ambiwa ngaho hayani?

☐ Ee

☐ Hai

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TSHIPIDA TSHA B: NDIVHO YA VHULWADZE HA SWIGIRI (DIABETES MELLITUS)

16. Ni a divha uri vhulwadze ha swigiri (diabetes mellitus) ndi mini?

☐ Ee
☐ Hai

17. Ni rimini ni tshi amba vhulwadze ha swigiri (diabetes mellitus) nari mini nga maipfi anu.....

.....

18. Ni a divha masiandaitwa o no diswa nga vhulwadze ha swigiri (diabetes mellitus)?

☐ Ee
☐ Hai

19. Arali hu ee, ndi afhio masiandaitwa ane na a divha?

☐ U vha kha lushaka lwa vha lwalaho vhulwadze ha swigiri
☐ U saitanyonyoloso
☐ U khwathesa

20.Ni a divha tsumbo dza vhulwadze ha swigiri?

☐ Ee
☐ Hai

21. Arali hu ee, ndi dzifhio tsumbo dza vhulwadze ha swigiri?

☐ U dzulela u runda
☐ U dzulela u pfesadora
☐ U dzulela u pfesandala
☐ U fhungudzea ha tshileme
☐ U engedzea ha swigirimalofhani

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22. Ni a divha zwiitisi zwa vhulwadze ha swigiri (diabetes mellitus)?

- [ ] Ee
- [ ] Hai

23. Arali hu ee, ndi mini zwi no ita malwadze a swigiri (diabetes mellitus)?

- [ ] U ḽesa swigiri
- [ ] U ḽesa mapfura
- [ ] U wana vhulwadze kha vhabebi

24. Ni a divha thaidzo dza vhulwadze ha swigiri (diabetes)?

- [ ] Ee
- [ ] Hai

25. Arali huee, ndi dzifhio thaidzo dza vhulwadze ha swigiri (diabetes)?

- [ ] U pofula
- [ ] U thukhulwa mirado
- [ ] U kundelwa u shuma ha tswio
- [ ] U lenga u fhola ha zwilonda
- [ ] U kundelwa ha mbilu na u oma mirado

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TSHIPIDA TSHA C: VHUTENDATENDA NA MAITELE A U LANGULA VHULWADZE HA SWIGIRI

26. Ndi maga afhioa ne a nga shumiswa u langula vhulwadze ha swigiri (diabetes) (Sumbedzani zwine nashumisa)

- ☐ U shumisa u langula zwine wa la
- ☐ U shumisadzilafho
- ☐ U shumisa dzilafho la sialala

27. Ni nwa mushonga wanu tshifhinga tshothe?

- ☐ Ee
- ☐ Hai

28. Arali zwisongo ralo ambani uri ndi ngani? .....

29. Ni a tenda uri vhulwadze ha swigiri (diabetes mellitus) vhu a ilafhea?

- ☐ Ee
- ☐ Hai
- ☐ A thidivhi

30. Ni a tenda uri ndangulo ya zwiliwa i a konou laula vhulwadze ha swigiri-?

- ☐ Ee
- ☐ Hai
- ☐ A thidivhi

31. Ni ya lunga na kiliniki ya hanu u langula vhulwadze ha swigiri (diabetes)?

- ☐ Vhege inwe na inwe
- ☐ Nwedzi munwe na munwe
- ☐ Kha minwedzi mivhili minwe na minwe

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32. Tshikalo tsha swigiri yanu ya malofhani tshia lavheleswa tshifhinga tshoṱhe na?

☐ Ee
☐ Hai

33. Swigiri yanu ya malofhani ilavheleswa lungana ?

☐ Duvha linwe na linwe
☐ Vhege inwe na inwe
☐ Nwedzi munwe na munwe

34. Hayani hanu nina tshikalo tshanu tsha u kala swigiri (glucometer)?

☐ Ee
☐ Hai

35. Murundo wanu u a sedzuluswa tshifhinga tshothe ni tshi dalela kiliniki?

☐ Ee
☐ Hai

36. No no vhuya na vhonwa nga dokotela kha vhulwadze hanu ha swigiri (diabetes)?

☐ Ee
☐ Hai

37. Arali huee, Ndi lungana?

☐ Nwedzi munwe na munwe
☐ Luvhili nga nwaha munwe na munwe
☐ Nwaha munwe na munwe
☐ Ambani tshinwe tshifhinga……..

38. Ni a tenda uri vhalwadze vhaswigiri vhaa vhuelwa nga u ita nyonyoloso?

☐ Ee
☐ Hai
☐ A thidivhi

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39. Talutshedzani uri vhalwadze vhaswigiri vhanga londota hani milenzhe yavho zwavhudi

.....

40. No no vhuya na pfi ni yo vhona vhomakone vha tevhelaho?

40.1Muḓivhi wa zwa malele (Dietician) ☐ Ee
☐ Hai

40.2 Makone wa zwamato (Ophthalmologists)

☐ Ee
☐ Hai

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ANNEXURE G
CERTIFICATE OF LANGUAGE EDITING

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14 August 2014

THIS IS TO CERTIFY THAT:

I have edited a manuscript titled: *Knowledge, Beliefs and Practices among patients with diabetes Mellitus in Vhembe district of Limpopo Province, South Africa*,for a student: Ms RalinebaTshinyadzo, Student number 9905 955. Ms Tshinyadzo is studying towards the degree of Magister Curationis in the Department of Advanced Nursing Science at the University of Venda in South Africa.

The scope of my editing comprised:

- Spelling
- Tense
- Vocabulary
- Punctuation
- Word usage
- Language and sentence structure
- Checking of referencing style

It has been a pleasure working with this student. She has also displayed integrity in paying the editor promptly and keeping communication lines open.My best wishes for a successful career accompany her.

Yours faithfully,

Charlotte Stevens (Ms)
Stevens Editing and Proofreading Services
e: stevensediting@vodamail.co.za
+27 0 81 863 6389
+61 43 576 6572

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ANNEXURE H

MAP OF THE LIMPOPO PROVINCE SHOWING VHEMBE DISTRICT

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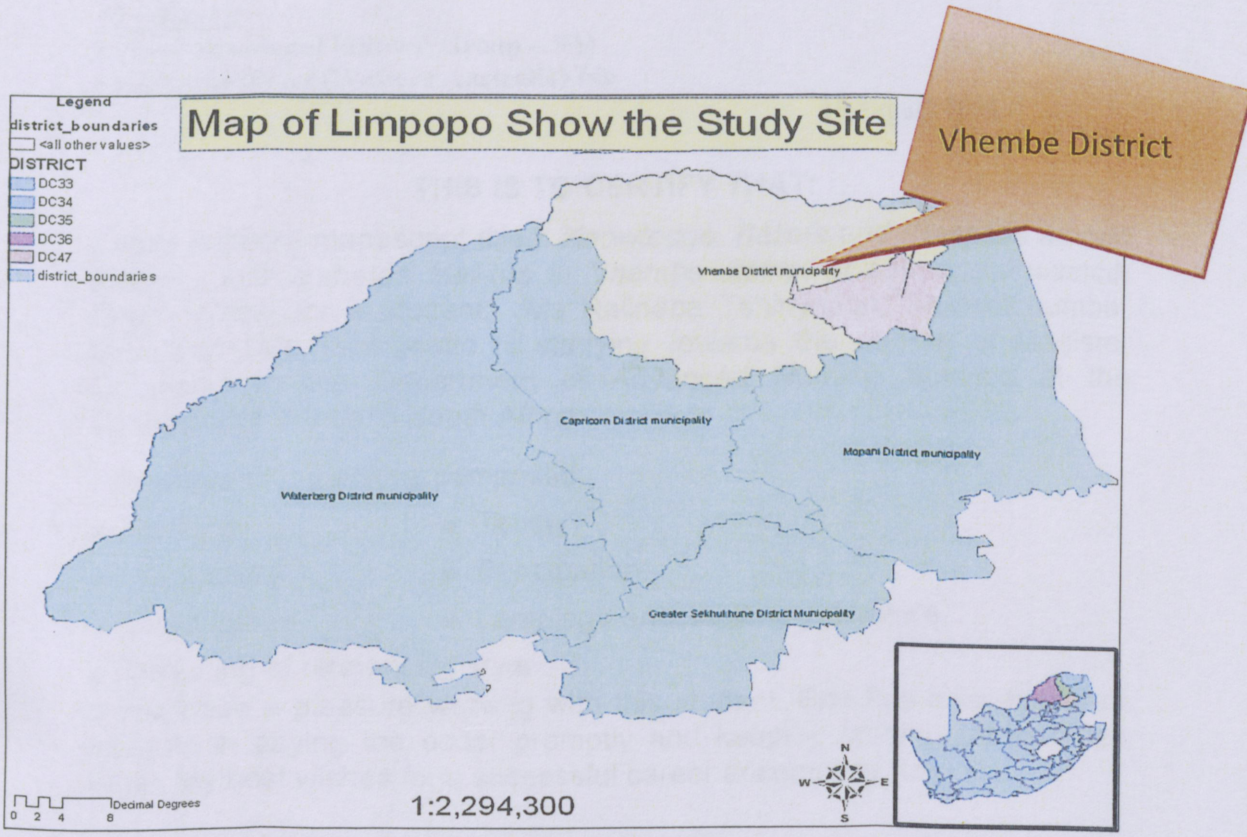

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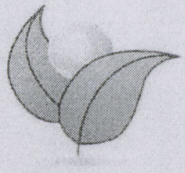

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