DIABETES-RELATED KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) OF ADULT PATIENTS WITH TYPE 2 DIABETES IN THE FREE STATE, SOUTH AFRICA

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Dissertation submitted in fulfilment of the requirements for the degree

Magister Scientiae:

Nutrition

In the

Department of Nutrition and Dietetics

University of the Free State

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BLOEMFONTEIN

January 2016

DECLARATION OF INDEPENDENT WORK

DECLARATION WITH REGARD TO INDEPENDENT WORK

I, Maretha le Roux, identity number 6206290030086 and student number 2013202870, do hereby declare that this research project submitted to the University of the Free State for the degree MAGISTER SCIENTIAE: Diabetes-related knowledge, attitude and practices of adults with type 2 diabetes mellitus in the Free State, South Africa, is my own independent work, and has not been submitted before to any institution by myself or any other person in fulfilment of the requirements for the attainment of any qualification. I further cede copyright of this research in favour of the University of the Free State.

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SIGNATURE OF STUDENT **DATE**

ACKNOWLEDGEMENT

This study would not have been possible without the assistance of the following persons:

- My supervisor, Prof CM Walsh, for her advice, assistance and encouragement;
- My co-supervisor, Dr M Reid, for giving me the opportunity to take part in a larger study;
- Dr J Raubenheimer from the Department of Biostatistics, University of the Free State, for the valuable input regarding the statistical analysis of the data;
- Jackie Viljoen and Elzabe Pienaar for the language and technical editing;
- The participants for taking part in the study;
- The National Research Foundation (NRF) for financial assistance;
- My husband, Clarence, for his love and support;
- My children, family, friends and colleagues for their interest and moral support; and
- My Heavenly Father, for his love and grace and for giving me the ability and opportunity to undertake this study.

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LIST OF ABBREVIATIONS

ABET	Adult basic education and training
AIDS	Acquired Immuno Deficiency Syndrome
ART	Antiretroviral Treatment
BMI	Body Mass Index
CHC	Community Health Care
DHS	District Health System
DHIS	District Health Information System
DM	Diabetes Mellitus
DOH	Department of Health
FBDG	Food Based Dietary Guidelines
GDM	Gestational Diabetes Mellitus
GLM	General Linear Model
HbA1c	Glycated haemoglobin
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
IDF	International Diabetes Federation
KAP	Knowledge, attitude and practices
KHP	Kennis, houding en praktyke
NCDs	Non-Communicable Diseases
NHI	National Health Insurance
NSDA	Negotiated Service Delivery Agreement
PHC	Primary Health Care
PHIS	Provincial Health Information System
SANHANES	South African National Health and Nutrition Examination Survey
SADHS	South African Demographic and Health Survey
T2DM	Type 2 Diabetes Mellitus/Tipe 2 Diabetes Mellitus
TPB	Theory of Planned Behavior
U/w	Underweight
WC	Waist circumference
WHO	World Health Organization

LIST OF APPENDICES

SUMMARY

Worldwide Type 2 Diabetes Mellitus (T2DM) is a growing public health problem and is closely linked to overweight and obesity. Many patients with T2DM in South Africa are overweight or obese which has been associated with rapid urbanisation in South Africans over the past 20 years. Urbanisation has resulted in a nutrition transition, characterised by a transition from healthier traditional diets to a more Western unhealthy diet and a sedentary lifestyle. Although it is a common assumption that improvements in knowledge, attitude and practices would be the answer to the diabetic epidemic, researchers agree that good knowledge of diabetes does not always translate to behaviour change. The purpose of this study was thus to determine current diabetes-related knowledge, attitude and practices (KAP) of adults with T2DM in the Free State.

This research study was designed as a quantitative descriptive observational study. The population included adult patients older than 18 years with T2DM visiting 12 community health centres and 10 primary health care clinics in the five districts in the Free State. Within the selected facilities, convenience sampling took place until a total of 255 adult participants had been included.

An adapted South African-Diabetes KAP questionnaire was used to gather information about demographics and associated factors, quality of life, diabetes-related KAP and perceived care. Participants were also weighed and measured.

The questionnaire was piloted in a sample of 5 adult patients with T2DM in Mangaung Metro district. Ethics approval was obtained from the Health Research Ethics Committee, University of Free State.

Two hundred and fifty five questionnaires were completed in 22 public health facilities. The majority of participants were black African (92%, n= 235), which is a reflection of the national distribution in South Africa where the majority of citizens are black (80%). Only 8.6% of participants had completed high school and 10% were illiterate. The median age of participants was 57 years,[range:19 to 84] and the median age of diagnosis of T2DM was 48 years [range: 15 to 80].

An overwhelming 87% of participants were either overweight or obese. The majority of the participants (67% of males and 98% of females) had a waist circumference above the recommended cut-off points which is associated with an increased risk of developing T2DM in both sexes. It was therefore not surprising that the majority (61%; n=155) were diagnosed with T2DM following metabolic syndrome related symptoms and another 11% (n=29) with other health related symptoms. This could also explain the predominance of females (75%; n=193) was attributed to glucose intolerance that is associated with higher visceral fat, which is more common in South African women than in men.

Participants in the present study had poor knowledge of T2DM. Only half of the participants knew the normal range of blood glucose, although almost 90% knew the common signs of high blood glucose and two thirds were knowledgeable about complications associated with diabetes. Participants were ignorant about food groups, which is a concern considering that healthy eating is a pivotal aspect of treatment.

The attitude of the participants toward their disease, in the present study was mostly negative. The majority (81%, n=206) of participants felt that they would be a quite different person if they did not have diabetes. A further 71% (n=181) felt that diabetes was the worst thing that had ever happened to them, and 79% (n=201) felt embarrassed about having diabetes.

Poor diabetes-management practices were reported by the majority of participants, characterised by low levels of physical exercise and poor eating habits. Although the majority (96%; n=245) of participants were knowledgeable about the benefits of physical exercise, only 31% (n=78) reported exercising every day during the

preceding week. The poor practices were also reflected in the high rates of overweight and obesity that are closely associated with a lack of physical activity and a sedentary lifestyle in general.

A statistically significant correlation was found between knowledge and attitudes, indicating that better knowledge about diabetes could be associated with a more positive attitude towards diabetes. Unfortunately this did not translate to improved behaviour. Participants with a higher level of education obtained higher scores in questions related to knowledge and attitude about diabetes, but not, interestingly, in their practice scores.

Poor knowledge, a negative attitude and poor practices related to diabetes, were observed in a high percentage of the participants included in this study. Barriers to sustaining improved lifestyles and successful self-management activities should be further researched since these could make a valuable contribution to improving the health and quality of life of people with T2DM.

OPSOMMING

Tipe 2 diabetes mellitus (T2DM) is wêreldwyd 'n groeiende openbare gesondheidsprobleem en word gekoppel aan oormassa en vetsug. Talle pasiënte met T2DM in Suid-Afrika is oormassa of vetsugtig wat in studies met vinnige verstedeliking in Suid-Afrikaners oor die afgelope 20 jaar geassosieer word. Verstedeliking het gelei tot 'n verandering in eetgewoontes, wat gekenmerk word deur 'n verandering van `n tradisionele gesonder dieet, na `n meer Westerse ongesonde dieet en onaktiewe leefstyl. Alhoewel dit 'n algemene aanname sou wees dat verbetering in kennis, houding en praktyke die antwoord op die diabetes epidemie sou wees, is navorsers dit eens dat goeie kennis van diabetes nie altyd gedrag verander nie. Die doel van hierdie studie was dus om die huidige diabetes-verwante kennis, houding en praktyke (KHP) van volwassenes met T2DM in die Vrystaat te bepaal, en om te bepaal hoe dit verband hou met mekaar.

Hierdie navorsingstudie is as 'n kwantitatiewe beskrywende waarneming studie ontwerp. Die populasie het volwasse pasiënte ouer as 18 jaar, met T2DM ingesluit. Twaalf gemeenskapgesondheidsorgsentrums en 10 primêre gesondheidsorg klinieke in die vyf distrikte in die Vrystaat is besoek. Binne die geselekteerde fasiliteite, het gerieflikheidsteekproefneming plaasgevind, totdat 'n totaal van 255 volwasse deelnemers ingesluit is.

'n Aangepaste Suid Afrikaanse-Diabetes KHP-vraelys is gebruik om inligting oor demografie en verwante faktore, lewenskwaliteit, diabetes-verwante KHP en waargeneemde sorg, in te samel. Deelnemers is ook geweeg en gemeet.

`n Loodstudie is op 5 volwasse pasiënte met T2DM in Mangaung Metro-distrik gedoen. Etiese goedkeuring is van die Gesondheidswetenskappe Navorsingsetiekkomitee, Universiteit van die Vrystaat verkry.

Twee honderd vyf en vyftig vraelyste is in 22 openbare gesondheidsfasiliteite voltooi. Die meerderheid van die deelnemers was swart (92%, n=235), wat 'n weerspieëling van die nasionale populasie-verspreiding in Suid-Afrika is, waar die meerderheid van die burgers swart is (80%). Slegs 8.6% van die deelnemers het hoërskoolopleiding ontvang en 10% was ongeletterd. Die mediaan ouderdom [reikwydte: 19 tot 84] van die deelnemers was 57 jaar en die mediaan ouderdom ten tye van diagnose van T2DM, was 48 jaar [reikwydte: 15 tot 80].

'n Oorweldigende 87% van die deelnemers was oormassa of vetsugtig. Die meerderheid van die deelnemers (67% van die mans en 98% van vroue) het 'n middellyfomtrek bo die aanbevole afsnypunte gehad, wat verband hou met 'n verhoogde risiko van die ontwikkeling van T2DM in albei geslagte. Dit was dus nie verbasend dat die meerderheid deelnemers (61%; n=155) gediagnoseer is met T2DM nadat hulle metaboliese sindroom-verwante simptome gehad het en 'n verdere 11% (n=29) met ander gesondheids-verwante simptome gepresenteer het nie. Die meerderheid was vroue (75%; n=193) wat toegeskryf word aan glukose intoleransie wat geassosieer word met meer abdominale vet, wat meer algemeen in Suid-Afrikaanse vroue as mans voorkom.

Deelnemers in die huidige studie het swak kennis van T2DM gehad. Slegs die helfte van die deelnemers het geweet wat die normale waarde vir bloedglukose vlakke is, alhoewel byna 90% geweet het wat die algemene tekens van hoë bloedglukose is, en twee derdes ingelig was aangaande die komplikasies wat verband hou met diabetes. Deelnemers was verder onkundig oor voedselgroepe, wat 'n rede tot kommer is, aangesien gesonde eetgewoontes 'n belangrike aspek van behandeling is.

Die houding van die deelnemers jeens hulle siektetoestand in die huidige studie was meestal negatief. Die meerderheid (81% , n=206) van die deelnemers het gevoel dat hulle 'n heel ander mens sou gewees het as hulle nie diabetes gehad het nie. 'n Verdere 71% (n=181) was van mening dat diabetes die ergste ding is wat nog ooit met hulle gebeur het, en 79% (n=201) het skaam gevoel daaroor.

Swak diabetes-hanterings praktyke was `n kenmerk in die meerderheid deelnemers en het hoofsaaklik ontoereikende fisiese oefening en swak eetgewoontes ingesluit. Hoewel die meerderheid (96%; n=245) van die deelnemers ingelig was oor die voordele van fisiese oefening, het slegs 31% (n=78) elke dag gedurende die vorige week geoefen. Swak praktyke is ook weerspieël in die hoë voorkoms van oormassa en vetsug wat nou verband hou met 'n gebrek aan fisiese aktiwiteit en 'n onaktiewe lewenstyl.

In die huidige studie was daar 'n statisties beduidende korrelasie tussen diabetes-verwante kennis en houdings gevind, wat aandui dat 'n beter kennis oor diabetes geassosieer kan word met 'n meer positiewe houding teenoor die siekte. Ongelukkig het dit nie gelei tot verbeterde praktyke nie. Interessant genoeg, het deelnemers met 'n hoër vlak van opvoeding het beter gevaar in die vrae met betrekking tot kennis en houding oor diabetes, maar nie in hul praktyke nie.

Diabetes-verwante KHP van die deelnemers in hierdie studie populasie was swak. Swak diabetes-verwante kennis, 'n negatiewe houding en swak praktyke, is waargeneem in 'n baie hoë persentasie van die deelnemers in hierdie studie. Hindernisse tot die handhawing van verbeterde lewenstyl en suksesvolle self-bestuursaktiwiteite moet verder nagevors word, aangesien dit `n waardevolle bydrae kan maak tot verbetering van gesondheid en lewenskwaliteit in pasiente met T2DM.

CHAPTER 1

Overview of the study

1.1 INTRODUCTION AND MOTIVATION FOR THE STUDY

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder, with a prevalence that is estimated to rise worldwide (World Health Organization, 2013). T2DM affects all age groups, nationalities and classes (Tunceli, Bradley, Nerenz, Williams, Pladevali & Lafata, 2005:2666; Bradshaw, Norman, Pieterse & Levitt, 2007:701; Daar, Singer, Persad, Pramming, Matthews, Beaglehole, Bernstein, Borysiewicz, Colagiuri, Ganguly, Glass, Finegood, Koplan, Nbel, Sarna, Sarrafzadegan, Smith, Yach & Bell, 2007:494; Kiberenge, Ndegwa, Njenga & Muchemi, 2010:2; Amod, Motala, Levitt, Berg, Young, Grobler, Heilbrunn, Distille, Pirie, Dave, Huddle, Jivan, Paruk, May, Raal, Blom, Ascott-Evans, Brown, Mollentze, Rheeder, Tudhope, Van Rensburg, Ganie, Carrihill & Rauff, Van Zyl, Randeree, Khutsoane, Joshi, Raubenheimer & Guideline Committee, 2012:S4; Hanson, Gluckman, Ma, Matzen & Biesma, 2012:2).

The majority of patients with T2DM, are adults from the economically active population in low- and middle-income countries (Tunceli *et al*., 2005:2662; Narayan, Ali & Koplan, 2010:1196). South Africa is classified as a middle-income country where not just the prevalence of T2DM is also expected to rise (World Health Organization (WHO), 2013), but also the percentage of deaths attributable to T2DM (Statistics South Africa, 2014:51).

The increase in the prevalence of T2DM can be attributed to unhealthy attitudes and practices related to T2DM. The most obvious assumption is that poor attitudes and practices, due to poor knowledge of the condition and how to prevent and manage it (Ng, Chan, Lian, Chuah, Waseem & Kadirvelu, 2012:724). Knowledge directly influences the attitude and practices of patients with T2DM and is vital to decrease not just the incidence, but also the morbidity and mortality linked to the disease. The

attitude of patients on the other hand, directly influences knowledge and practices (Faber & Kruger, 2005:238).

The assumption is made that patients who are knowledgeable about T2DM are more likely to take ownership of their condition and become involved in their treatment (Abdo & Mohammed, 2010:127; Kiberenge *et al*., 2010:2; Damasceno, Zanetti, De Carvalho, De Souza & De Araujo, 2012:690; Ng *et al*., 2012:724). Only a few studies have reported on the knowledge related to diabetes mellitus in patients living with T2DM. A serious lack in knowledge was found in a study undertaken in Kenya, amongst community members affected by T2DM. Less than one third of interviewees had good knowledge of T2DM (Kiberenge *et al*., 2010:2). Similar results were found in other studies in Pakistan and Qatar (Gul, 2010:130; Kheir, Greer, Yousif, Algeed & Alokkah, 2011:189; Shisana, Labadarios, Rehle, Simbayi, Zuma, Dhansay, Reddy, Parker, Hoosain, Naidoo, Hongoro, Mchiza, Steyn, Dwane, Makoae, Maluleke, Ramlagan, Zungu, Evans, Jacobs, Faber & SANHANES-1 Team, 2013:188). Patients with T2DM staying in rural areas and from low socio-economic groups were found to be most ignorant (Abdo & Mohamed, 2010:123; Kiberenge *et al*., 2010:2). Studies have also found that patients with T2DM are not knowledgeable about the risk of complications associated with the condition (Moodley & Rambiritch. 2007:16c; Gulabani, John & Isaac, 2008:204; Al-Adsani, Moussab, Al-Jasem, Abdella & Al-Hamade, 2009:125; Ayele, Tesfa, Abebe, Tilahun & Girma, 2012:2).

The most common long-term complications affecting quality of life of patients with T2DM, include disabilities due to stroke, cardiovascular disease and visual impairment (Brown & Heeley-Creed, 2013:78). Obesity increases the risk of developing T2DM as well as the risk of complications. (Shisana *et al*., 2013:85).

Long-term complications of diabetes mellitus result in a lowered quality of life and reduced life expectancy (Kikkawa, 2000:S183; Tesfaye & Gill, 2011:4). Depression has also been reported to affect quality of life of patients with T2DM (Goldney, Phillips, Fisher & Wilson, 2004:1066; Schram, Baan & Pouwer, 2009:112). Huang, Brown, Ewigman, Foley and Meltzer (2007:2478) report that in their study, patients with T2DM perceived treatment as a significant burden on quality of life.

The improvement of a patient's quality of life, is a primary goal of T2DM management. This goal can be accomplished through improving patients' knowledge of T2DM (Gul, 2010:128), but is hampered by the low health literacy of patients with T2DM (Wengryn & Hester, 2011:41). Health literacy relates to the patient's ability to process information and to understand the consequences of unhealthy behaviours (Himmelfarb & Hughes, 2011:177). Attitude, further, has an influence on the likelihood of making lifestyle changes, which in turn can predict the behaviour practices and outcomes of patients with T2DM (Delamater, 2006:72; Kheir *et al*., 2011:186).

Practices related to T2DM are negatively influenced by conditions such as anxiety and old age (Browne, Nefs, Pouwer & Speight, 2015:137). On the other hand, T2DM-related support from family and health professionals is very likely to improve T2DM practices and outcomes (Delamater, 2006:72; Moodley & Rambiritch 2007:16c; Gulabani *et al.,* 2008:204; Al-Adsani *et al.,* 2009:125; Daly, Hartz, Xu, Levy, James, Merchant & Garrett, 2009:28; Ayele *et al*., 2012:2).

Van Zyl, Van der Merwe, Walsh, Van Rooyen, Van Wyk and Groenewald (2010:75) report that the practices of patients with T2DM in urban and rural communities in the Free State, leave much to be desired. There is an urgent need to address the burden of chronic conditions such as T2DM (Groenewald, Van Wyk, Walsh, Van Zyl & Van der Merwe, 2009:505; Tesfaye & Gill 2011:7; Yach, Hawkes, Gould & Hofman, 2004:2616). In an effort to influence knowledge, attitude and practices (KAP) of patients with T2DM, the health care sector needs to be mobilised (Amod *et al*., 2012:S4). In general, current public health services in South Africa focus more on curative than on preventative interventions (Hughes, Puoane & Bradley, 2006:10; Kautzky & Tollman, 2009:24), which ideally should change to a more integrated primary care system (Narayan *et al.,* 2010:1198). The South African National Department of Health introduced the Primary Health Care (PHC) Re-engineering Programme in 2011 with the main objective of improving the health of all South Africans. The National Health Insurance (NHI) Plan and District Health system (DHS) are further initiatives from the national government to improve coverage of PHC services (Mayosi, Lawn, Van Niekerk, Bradshaw, Karim & Coovadia, 2012:9; South Africa, Department of Health, 2011:3).

PHC is a public health strategy based on the viewpoint that health benefits are better achieved when people's basic needs are met first (Dookie & Singh, 2012:2). Community health care (CHC) centres are seen as the link between PHC clinics and Level 1 District Hospitals. CHC centres differ from province to province, but aim to make health care services more accessible to patients by rendering a 24-hour service. Patients with T2DM need to be managed primarily at PHC clinics as these clinics are easily accessible for patients, being situated in communities where patients live. However, the majority of patients with T2DM prefer CHC centres for follow-up care, because permanent doctors and other members of the multi-disciplinary team visit these facilities more regularly than they do PHC clinics (Mosiea, 2013).

A multi-disciplinary team approach in the PHC system is recommended for improved health outcomes in diabetes management. Ideally, the multi-disciplinary team should include a well-trained doctor, dietitian, pharmacist and diabetic nurse (Gul, 2010:130). The dietitian's expertise, holistic understanding of the condition, evidence-based practice and communication skills, are essential in tackling diabetes since eating habits are often an area with which patients with T2DM struggle, yet it is an important aspect in the management of T2DM (Delahanty, 2010:365). The dietitian can assist the patient in developing and implementing lifestyle changes to improve diabetes management and outcome. Nutrition services should therefore be integrated into all areas of PHC to encourage healthy lifestyles (Crustolo, Kates, Ackerman & Schamehorn, 2005:1652). In the Free State, the shortage of dietitians in the PHC system is however a major challenge.

1.2 PROBLEM STATEMENT

An increase in chronic diseases in the Free State, of which T2DM is one, has resulted in an increase in morbidity and mortality, which places a high burden on the health care budget (Kiberenge *et al.,* 2010:2). T2DM is a significant humanitarian and economic burden worldwide (Tunceli *et al*., 2005:2666; Kiberenge *et al.*, 2010:2; Hanson *et al*., 2012:2). Behaviour modification is essential to address the burden of T2DM, and behaviours related to healthy eating habits, physical exercise, regular blood glucose monitoring and medication adherence are especially important (Smalls, Walker, Hernandez-Tejada, Campbell, Davis & Egede, 2012: 385).

In terms of health, adequate knowledge on behavioural modification has been identified as the most important aspect to influence patients' attitude and practices positively (Kheir *et al*., 2011:186). Despite this, KAP of patients with T2DM are reported to be challenging in areas where the incidence of T2DM is high (Upadhay, Palaian, Shankar & Mishra, 2007:9), and this is also true in the Free State (Groenewald *et al*., 2009:502).

Globally, knowledge related to healthy eating habits, has been found to be insufficient, despite the fact that it is critical in the management of patients with T2DM (Moodley & Rambiritch, 2007:16c; Gulabani *et al*., 2008:204; Al-Adsani *et al*., 2009:125; Ayele *et al*., 2012:2).

The present study aimed to determine current diabetes-related KAP of adults with T2DM in the Free State in order to motivate and plan interventions to address the problem.

1.3 AIM AND OBJECTIVES

The following aim and objectives were set for this study:

1.3.1 Aim

The main aim of the present study was to assess the diabetes-related knowledge, attitude and practices of adults with T2DM in the Free State, South Africa.

1.3.2 Objectives

To reach the aim of this study, the following objectives were set:

1. to compile a profile of demographic and associated factors, quality of life and anthropometry of adult patients with T2DM in the Free State public health sector; and

2. to determine diabetes-related KAP and perceived care of adult patients with T2DM in the Free State public health sector.

1.4 OUTLINE OF THE DISSERTATION

This dissertation is divided into six chapters. Figure 1.1 illustrates the different stages of the research report.

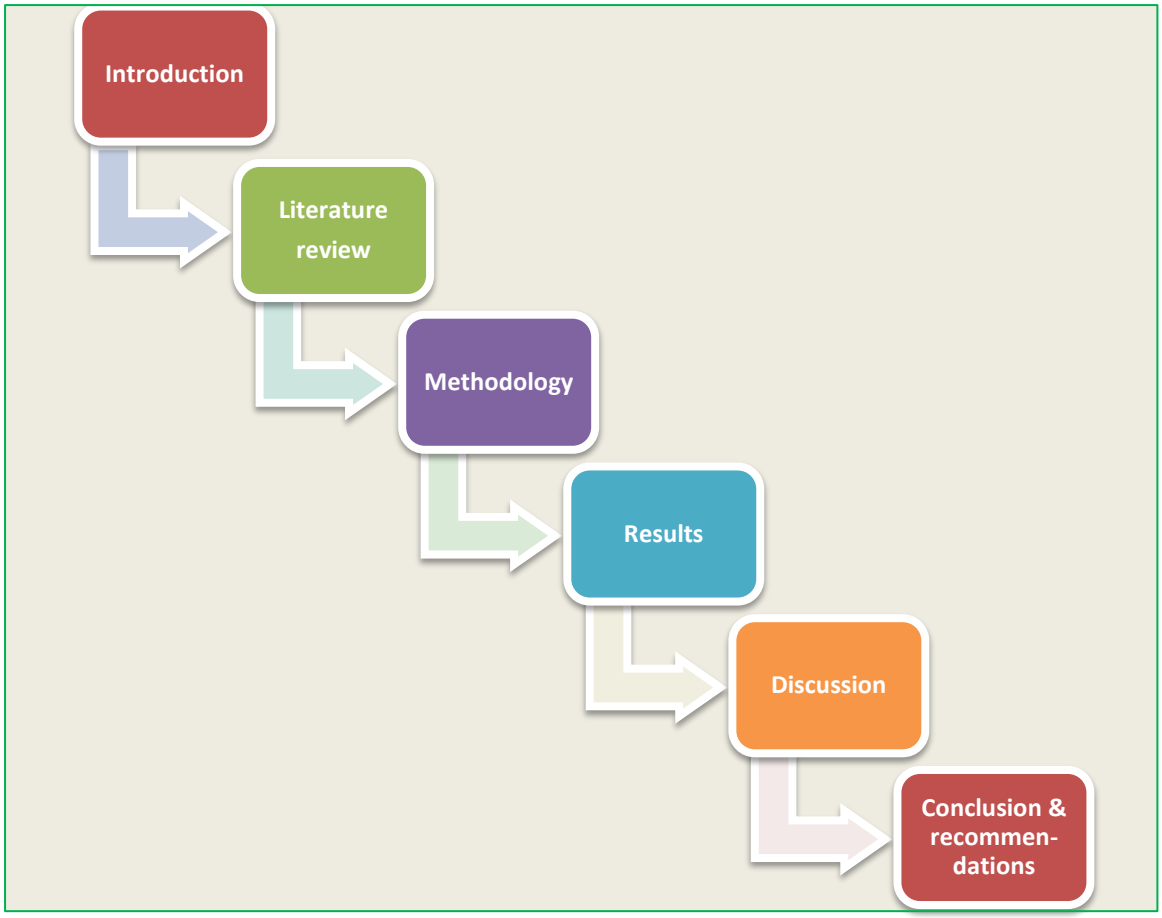

FIGURE 1.1: Outline of the dissertation

Chapter 1 provides an introduction and motivation for the study and describes the aim and objectives of the study.

Chapter 2 comprises the literature review.

Chapter 3 gives an overview of the methods used in this study and includes the study design, sampling, study procedures and ethical considerations.

Chapter 4 reflects the results of the study.

Chapter 5 includes a discussion of the results, while Chapter 6 provides the conclusions drawn from this study, as well as recommendations for practice and further research.

CHAPTER 2

Literature review

2.1 INTRODUCTION

In the previous chapter, the researcher presented an introduction to some of the challenges with regard to T2DM, globally and in the Free State. This chapter will review various aspects of T2DM and related determinants as discussed in the relevant literature. Firstly, the researcher will give an overview of the current situation related to health care within the public health sector in South Africa, with specific emphasis on PHC. Thereafter, a short discussion of the etiology, symptoms, complications, diagnosis and management of T2DM will follow. Lastly, the researcher will discuss Ajzen's theory of planned behaviour (Ajzen, 1991) and how this theory links with KAP of adult patients with T2DM.

Figure 2.1 illustrates how the researcher has progressed in the research process, here reporting on the literature review that has been conducted.

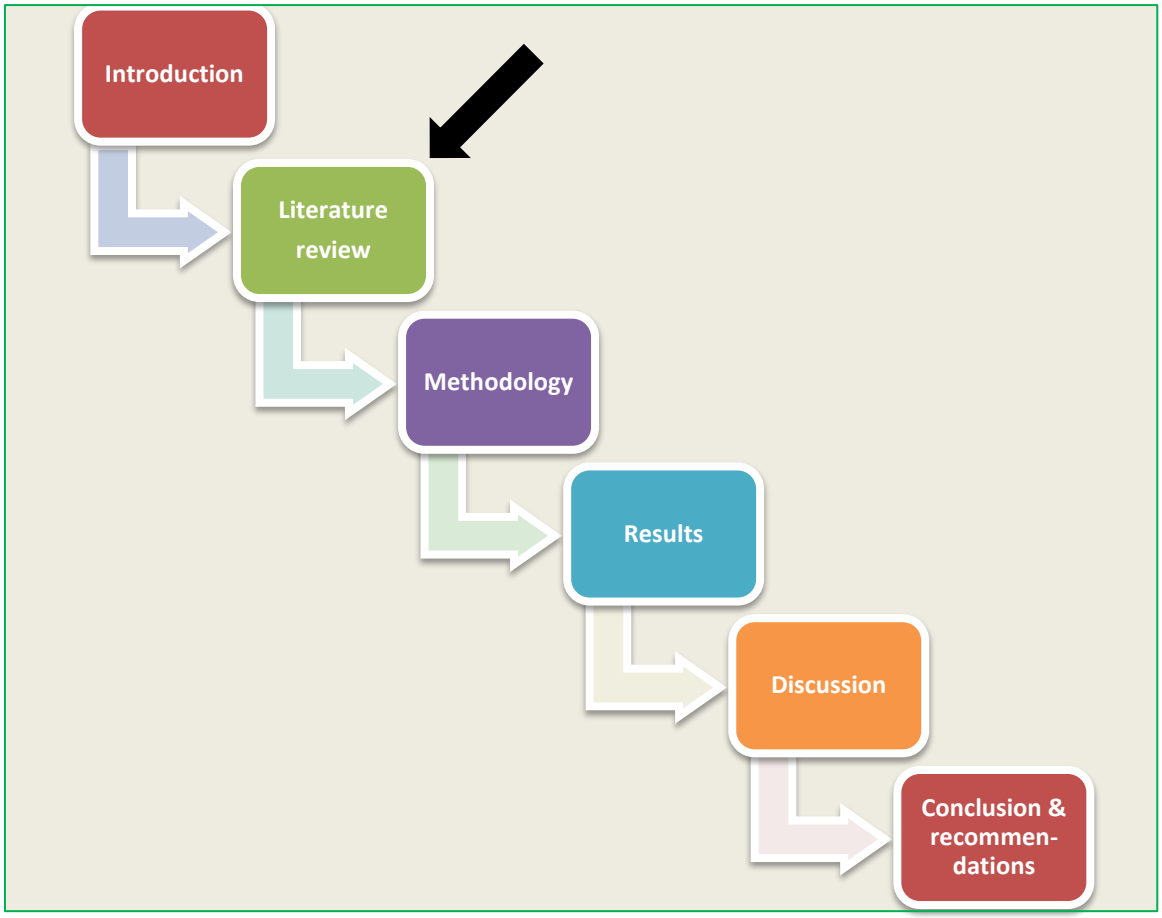

FIGURE 2.1: Development of the study: Literature review

2.2 PUBLIC HEALTH SECTOR IN SOUTH AFRICA

The public sector forms the largest health care system in the country, with the majority of the population relying on a public health care system that, relative to the private sector, has a disproportionately low amount of financial and number of human resources at its disposal (Distiller, 2004:16; Coovadia, Jewkes, Barron, Sanders & McIntyre, 2009:826; Atagubal, Day & McIntyre, 2014:1).

The priority for the public health sector is to improve the health status of the entire population and to contribute to government's vision of *'a long and healthy life for all South Africans'* (South Africa, Department of Health, 2010:3). This vision is also reflected in the Negotiated Service Delivery Agreement (NSDA), where one of the objectives of the Department of Health is *'Increasing life expectancy'* (South Africa, Department of Health, 2010:3).

One of the challenges in reaching this objective, is the increasing prevalence in morbidity and mortality rates related to non-communicable diseases (NCDs), of which T2DM is one (Steyn, Mann, Bennett, Temple, Zimmet, Tuomilehto, Lindstrom & Louheranta, 2004:149; Norman, Bradshaw, Schneider, Joubert, Groenewald, Lewin, Steyn, Vos, Laubscher, Nannan, Nojilana & Pieterse, 2007:639; Naledi, Barron & Schneider, 2011:20). Other NCDs include cardiovascular disease, chronic respiratory conditions and cancers, as well as mental disorders, oral disease, eye disease, kidney disease and muscular-skeletal conditions (including arthritis and rheumatoid conditions). The NCDs are grouped together because these conditions share the same modifiable risk determinants which are related to lifestyle (South Africa, Department of Health, 2013:16).

2.2.1 Strategies of the health sector to reach its objectives

As early as 1978, at Alma-Ata, PHC was acknowledged as an approach to accomplish *"health for all"* (Denill & Rendall-Mkosi, 2012:23). Prior to Alma-Ata, the approach in health care globally was more geared towards curative than preventative interventions (Hughes *et al.*, 2006:10; Kautzky & Tollman, 2009:24).

The PHC approach was implemented as the cornerstone of the South African national health care system in 1994 (South Africa, Department of Health, 2010: 3). Prior to that, the South African health system was built on apartheid ideology and characterised by racial and geographic differences, resulting in health care that was not always accessible for all (Sibiya & Gwele, 2013:388). The PHC approach was expected to provide a more comprehensive, integrated service; however, integration of health services remains a challenge in South Africa (Narayan *et al.,* 2010:1198; Van Rensburg, 2012:27; Sibiya & Gwele, 2013:388).

The management of NCDs, including T2DM, is an example of poor integration of health services (Naledi *et al*., 2011:19). By the early 21st century, NCDs were poorly detected, managed and monitored in the health system in South Africa, resulting in high mortality. The PHC system was not as effective as initially anticipated, mainly due to the historical imbalances in health care delivery and the quadruple burden of disease (a combination of poverty-related infectious diseases, lifestyle-related non-communicable diseases, trauma and the rapidly increasing HIV and AIDS epidemic) in South Africa (Naledi *et al*., 2011:19; Dookie & Singh, 2012:1; Mayosi *et al*., 2012:5).

These challenges and the changing disease profile, forced the health care system in South Africa to undergo several transformations. The most recent of these was the introduction of the PHC re-engineering programme, introduced in 2011 (Mayosi *et al*., 2012:9). PHC re-engineering is key to the success of the NSDA implementation process and seeks to shift the PHC system from a largely passive, curative, vertically and individually oriented system, to one with a more proactive, integrated and population-based approach (Hughes *et al.,* 2006:10; Kautzky & Tollman, 2009:24; Naledi *et al*., 2011:23).

The NHI Plan and the DHS are other recent initiatives from the national government to accomplish their vision. One of the key objectives of the NHI, is the provisioning of a comprehensive package of care supported by a re-engineered PHC to focus mainly on health promotion, preventative care and rehabilitative services (Mayosi *et al*., 2012:9; Sibiya & Gwele, 2013:388).

The NHI has been introduced in phases since 2011 and is in line with international thinking and trends to achieve universal coverage and to strengthen and improve public health services (Van Rensburg, 2012:134). Prevention, early detection and effective treatment of NCDs form integral parts of this system (South Africa, Department of Health, 2013:61). On the other hand, the DHS, which is the vehicle for the delivery of the PHC service packages through PHC clinics, CHC centres and district hospitals, aims to create an integrated, district-based PHC system where all services and resources are managed under one authority (Dookie & Singh, 2012:2; Van Rensburg, 2012:152).

A vital component of the DHS is the District Health Information System (DHIS). This system contains the collection, compilation, analysis and maintenance of health-related data and is the basis for sound decision making at all levels, especially the lowest level, being the community (Naledi *et al*., 2011:22; Van Rensburg, 2012:155). The DHIS aims to evaluate the health status of the population on a monthly basis and to monitor all health-related indicators. The aim of the DHIS is to inform the DHS about the progress in reaching the NSDA objectives (Naledi *et al*., 2011:22).

According to the DHIS, health objectives are not achieved, and the public health system is continuously overburdened, mainly due to the overwhelming quadruple burden of disease. Although much of South Africa's disease burden is due to preventable causes, socio-economic issues such, as poverty, play a significant role in the health status of the population, and certain groups of the population remain more vulnerable, specifically those in rural areas (Dookie & Singh, 2012:2). Coovadia *et al*. (2009:819) are of the viewpoint that the impoverishment of the black population during apartheid, still has an influence on the health of South Africans.

2.2.2 Influencing determinants on health status

Race, gender and geographic distribution are significant determinants of poverty in South Africa (Van Rensburg, 2012:269). Provinces like the Western Cape and Gauteng, are more urban, and poverty rates in those provinces are lower than in rural provinces like Limpopo and the Eastern Cape. Although the Free State is not the poorest province, high levels of poverty exist in this province (Van Rensburg, 2012:269).

In addition to poverty, other indicators of wellbeing that affect health status, include access to water and sanitation, adequate housing and food security (Norman *et al*., 2007:639). Only 45.6% of South African households are food secure according to the first South African National Health and Nutrition Examination Survey SANHANES-1 undertaken in 2012 (Shisana *et al*., 2013:145). Malnutrition and hunger are determinants that directly affect the health and wellbeing of people, and

malnourished people are more susceptible to contracting diseases associated with underdevelopment (Norman *et al*., 2007:639; Redelinghuys, 2012: 272).

The relationship between ill health and poverty has been demonstrated in international research (Talbot & Verrinder, 2010:13). Poverty and lack of information resources, together with the environment in which they live, lower the morale of people and they are prone to embark on negative lifestyle choices (Pullen, 2006:37). Such negative lifestyle choices may result in a sedentary lifestyle with poor nutrition choices, thus pre-disposing people to the development of T2DM (Pullen, 2006:37; Dookie & Singh, 2012:3).

Large numbers of patients from impoverished communities, in South Africa, visit public PHC clinics (Dookie & Singh, 2012:1). Health promotion, being a key component of the public health sector, should address the various aspects of health, like lifestyle-related issues. Diet should be a priority for health promotion, as it plays an important role as an element of most chronic diseases (South African Medical Research Council, 2006:45; Dookie & Singh, 2012:2; Parker, Steyn, Levitt & Lombard, 2012:2). Unfortunately, information, education and counselling material are scarce in facilities, especially in local languages; hence, health promotion material is not reaching communities (Hubley & Copeman, 2008:21; Parker *et al*., 2012:7).

Another challenge for health promotion is to develop, implement and sustain appropriate and relevant strategies to address lifestyle practices (Talbot & Verrinder, 2010:14; Dookie & Singh, 2012:3). Community participation and engagement is critical to ensure that health promotion activities reach communities and influence behaviour (Hattingh & Janks, 2012:11). Other challenges include a shortage of key health personnel and an inability to measure and track changes within communities (Dookie & Singh, 2012:4; Hattingh & Janks, 2012:11).

Gul (2010:130) and Malathy, Narmadha, Ramesh, Alvin and Dinesh (2011:6) recommend a multi-disciplinary team approach in the PHC system for improvement in health outcomes. Ideally, the multi-disciplinary team should include a well-trained doctor, dietitian, pharmacist and nurse who collaborate well and can work as a team. The nurse in PHC clinics and CHC centres plays a pivotal role in preventing, managing and minimising the complications associated with T2DM (Lawal, 2008:1113).

T2DM care in South Africa is suboptimal due to staff shortages, budget constraints and high patient loads, which lead to inadequate consultation times and poor record keeping (Butler, 2011:45; Dookie & Singh, 2012:2). Furthermore, health workers are not adequately trained, are demotivated, do not adhere to protocols for patient management, and experience challenges communicating with patients due to language barriers and literacy level of patients (Hughes *et al*., 2006:10).

In the Free State, like the rest of the country, the high mortality relative to the prevalence of T2DM, is a reflection of suboptimal health care delivery for T2DM (Bradshaw *et al*., 2007:704). Access to health care facilities, as well as the provision of medication and equipment such as syringes, testing strips and glucometers, is often challenging in the public health sector, despite these services forming part of the Bill of Rights of the South African Constitution (Republic of South Africa, Act No 108 of 1996). Many citizens of the Free State have high expectations of being able to make use of these services, particularly when diagnosed with a chronic condition. Effective services, however, depend on available resources (Parker *et al*., 2012:2; Volksblad, 2014a; Volksblad, 2014b; Volksblad, 2014c; Volksblad, 2014d).

2.3 TYPE 2 DIABETES MELLITUS (T2DM)

T2DM is a global clinical and public health problem with a challenging epidemiology. The majority of patients with T2DM are adults who are still economically active, and the growing incidence and health implications for those affected, make T2DM a major public health issue (Lawal, 2008:1113). Diabetes is estimated to have caused

5.1 million deaths globally and cost 548 billion USD in health care spending, during 2013 (Redelinghuys, 2012:280; International Diabetes Federation (IDF), 2013:11).

2.3.1 Prevalence

The most recent estimates by the IDF (2015:11) indicate that 8.3% of adults – 382 million people – have T2DM, and the number of people with the disease is set to rise beyond 592 million in less than 25 years, indicating a higher rate of increase than previously predicted. In Africa, the IDF estimates the prevalence to increase with 109% in the next 25 years, which is higher than any other continent. These figures pose a major threat to global development (IDF, 2015:15).

More than 80% of people in middle and low-income countries worldwide are affected by T2DM (Redelinghuys, 2012:280; IDF, 2013:11). South Africa has approximately 2.6 million people living with T2DM (Coovadia *et al*., 2009:817). South Africa is, after Nigeria, the country with the highest number of T2DM cases in sub-Saharan Africa (IDF, 2013:56).

In a study by Peer, Steyn, Lombard, Lambert, Vythilingum and Levitt (2012:8) in an urban black population in Cape Town, it was found that the prevalence of T2DM had increased significantly compared to two decades before, and it was expected to increase further. The Free State, with nearly three million people, is home to about 6% of the population of the country and it is estimated that 5% of the T2DM population of South Africa lives in the Free State (Bradshaw *et al*., 2007:701). According to the General Household Survey of 2013 (Statistics South Africa, 2014:25), 3.7% of older people (above 60 years) in the Free State were diagnosed with T2DM, of whom the majority were females. In a study by Van Zyl, Van der Merwe, Walsh, Van Rooyen, Van Wyk and Groenewald (2010:75), the prevalence of self-reported T2DM in Mangaung, in the Free State was 10.8%. The only other information on the prevalence of T2DM in the Free State dates back to 1996 when Levitt (1996:41) reported a higher prevalence of T2DM in the Free State, when compared to other provinces in South Africa.

Screening surveys have shown that many undiagnosed cases of T2DM occur in the Free State, as is the case worldwide (Wild, Roglic, Green, Sicree & King, 2004:1049; Groenewald *et al*., 2009:502; Hall, Thomsen, Henriksen & Lohse, 2011:564; Van Zyl, Van der Merwe, Walsh, Groenewald & Van Rooyen, 2012:3). Worldwide, approximately 175 million cases are undiagnosed, of which the largest proportion is found in sub-Saharan Africa (IDF, 2013:11). The rising prevalence of T2DM cannot be blamed on any one particular cause, as it is a result of the complex relationship between genetic, social and environmental determinants in high-, middle- and low-income countries (D'Adamo & Caprio, 2011:S161).

The increasing prevalence of T2DM is, however, related to a number of determinants, two of which are a sedentary lifestyle and exposure to an obesogenic environment (i.e. an environment tending to cause obesity) that has become more common due to globalisation and industrialisation (Visscher & Seidell, 2001:356). Overweight and obesity are further estimated to contribute to approximately 58% of T2DM cases (Xu, Song, You, Zhang, Greenland, Ford, He & Liu, 2010:4). An ageing population is another contributing factor (Deshpande, Harris-Hayes & Schootman, 2008:2; Song, 2008:61; Peer *et al*., 2012:8) and the poorest regions in low and middle-income countries are mostly affected by the older population that are increasing. In South Africa, 7.8% of the population is 60 years and older (Statistics South Africa, 2014:6) and this population group is more likely to suffer from NCDs than younger people (Statistics South Africa, 2014:21).

2.3.2 Etiology

T2DM is defined as a disorder of glucose control due to impaired insulin production by pancreas and/or uptake of glucose from the blood into the cells (Lawal, 2008:1106; Amod *et al*., 2012:S5). A disorder in the balance between insulin sensitivity and insulin secretion represents the most important player in the development of T2DM (D'Adamo & Caprio, 2011:S161; Amod *et al*., 2012:S5; Franz, 2012:679).

The progression from normal glucose tolerance to T2DM involves intermediate stages of impaired fasting glucose and impaired glucose tolerance, also known as the pre-diabetes stage. The impaired ability to metabolise carbohydrates and fats results in an increased concentration of glucose (hyperglycaemia) and lipids (hyperlipidaemia) in the circulating blood stream.

A number of risk determinants for T2DM have been identified and these are classified as non-modifiable and modifiable determinants.

2.3.2.1 Non modifiable risk determinants

Non-modifiable determinants are age, race, family history, gender and low birth weight (Deshpande *et al*., 2008:1254; Wermelink, Thiele-Manjali, Koschack, Lucius-Hoene & Himmel, 2014:3).

The researcher has already alluded to the aging population in South Africa and the increasing risk of T2DM in this population group. Persons above 50 years of age are found to be most at risk and have a five-fold higher chance of developing T2DM than their counterparts in the 20–30 year age group (Xu *et al*., 2010:4). This may be attributable to changes in body composition with increased age resulting in higher body mass index (BMI) in the elderly (Visscher & Seidell, 2001:369; Lazzer, Bedogni, Lafortuna, Marazzi, Busti, Galli, Col, Agosti & Satorio, 2010:76). A study in a rural population in India has shown that the majority of patients with T2DM were above 64 years of age (Valliyot, Sreedharan, Muttappallymyalil & Valliyot, 2013:37). Despite the increased prevalence of T2DM in the older population, Song (2008:61) has noted that T2DM is becoming more common among younger persons across different ethnic populations.

All races are affected by the T2DM epidemic, but globally, China is the country with the highest number of T2DM cases, followed by India (Xu *et al*., 2010:4; IDF, 2013:34). Indian countries have a 10–15-fold increase in prevalence (Shrivastava, Singhal, Shrivastava & Gupta, 2011:2643). India is, like South Africa, a middle-income country, which means that they are having the same gross national income

per capita. In South Africa, there is little data on the prevalence of T2DM amongst the white population, but the Indian population also has the highest prevalence of T2DM, followed by the coloured and black population (Bradshaw *et al*., 2007:700).

The risk for developing T2DM increases if one or both parents have or had the disease. The risk is lower when a single parent has, of had T2DM, compared to when both parents have, or had T2DM. The prevalence of T2DM increases from 6% in the absence of a family history, to 20% when both parents have, or had, the disease (Xu *et al*., 2010:4; D'Adamo & Caprio, 2011:S161; Valliyot *et al*., 2013:38). The risk is also higher when there is history of gestational T2DM (Valliyot *et al*., 2013:37). In spite of above discussed findings, a study by Malathy *et al*. (2011:68), done in India, found that more than two-thirds of T2DM patients had no family history of T2DM. The present author is of the viewpoint that it is probably indicative of the rapid increase in T2DM in the general population.

Females have also been reported to have a higher risk of developing T2DM than males due to glucose intolerance that is associated with high visceral fat distribution (McKnight, Myrie, MacKay, Brunton & Bertolo, 2012:107). A history of obesity in women may genetically and environmentally predispose them to T2DM (Shai, Jiang, Manson, Stampfer, Willett, Colditz & Hu, 2006:1588; Shrivastava *et al*., 2011:2644). This is in line with the statistics in South Africa that showed that the majority of older patients with T2DM, were females (Statistics South Africa, 2014:28). However, in another study undertaken in the southern Free State, more women were found to be obese, but men had a higher risk of having impaired fasting glucose (Groenewald *et al*., 2009:505). The findings discussed above are in contrast to the IDF (2013:34) reports that, globally, more men have T2DM than women.

Pregnant women could develop high blood glucose during pregnancy, which is referred to as gestational diabetes mellitus (GDM) (Lawal, 2008:1108). GDM develops in 1–3% of pregnancies and may disappear after birth, but often reappears in later life (Lawal, 2008:1108). It is estimated that 21 million cases of high blood glucose in pregnancy contribute to the global burden of T2DM (IDF, 2013:13). The risk increases for these women to give birth to high birth weight or stillborn babies,

and the babies also have a higher lifetime risk of obesity and developing T2DM (IDF, 2013:13).

Low birth weight infants, on the other hand, who were exposed to catch up growth, are also at higher risk of developing NCDs in adulthood (Morrison, Duffield, Muhlhausler, Gentili & McMillen, 2010:670). Catch-up growth, which often follows nutritional deprivation during foetal life and infancy, may play a role in early programming for T2DM (King, Keuky, Seng, Khun, Roglic & Pinget, 2005:1639; McKnight *et al*., 2012:107). There is also growing evidence that childhood under-nutrition and stunting (which can be considered modifiable risk determinants) increase the risk of obesity and consequently NCDs in adulthood (Jehn & Brewis, 2009:28).

2.3.2.2 Modifiable risk determinants

Modifiable risk determinants include increased BMI, physical inactivity, poor nutrition and hypertension (Deshpande *et al*., 2008:1254; Wermelink *et al*., 2014:3).

Although many studies have highlighted increased BMI as a key risk factor for the development of T2DM (Klein, Sheard, Pi-Sunyer, Daly, Wylie-Rosett, Kulkarni & Clark, 2004:2067; Schienkiewitz, Schulze, Hoffman, Kroke & Boeing, 2006:427; Deshpande *et al*., 2008:1254), others found that waist circumference, waist–hip ratio and BMI were equivalent in predicting increased risk of T2DM (Steyn *et al*., 2004:151; Wassink, Van der Graaf, Van Haeftent, Spiering, Soedamah-Muthu & Visseren, 2011:938).

Vazquez, Duval, Jacobs and Silventoinen (2007:115) and Patel and Singh (2013:379) are of the view that the distribution of body fat – and specifically abdominal obesity – is a better predictor of T2DM than BMI alone. However, the association between obesity, waist circumference, and T2DM as well as the inter-individual and population differences, still remain unclear (Alberti, Zimmet & Shaw, 2006:473; Eckel, Kahn, Ferrannini, Goldfine, Nathan, Schwartz, Smith & Smith, 2011:1424).

Since obesity is such a strong predictor of T2DM, it appears that the rapid increase in the prevalence of T2DM, seen in many populations in recent decades, is almost certainly related to increasing rates of obesity (Steyn *et al*., 2004:151; Casey, 2011:18). The incidence of obesity continues to increase due to longer working hours in sedentary job positions, consumption of fast food and highly processed, energy-dense foods, labour-saving devices, and physical inactivity (Wild *et al*.,2004:1047; Moodley & Rambiritch, 2007:16a). The South African Demographic and Health survey (SADHS), done in 2003, found that 30% of South Africans were either overweight or obese (Amod *et al*., 2012:S4). The SANHANES-1 (Shisana *et al*., 2013:144), done in 2012, also reported an increase in overweight and obesity when compared with the SADHS of 2003, especially amongst females.

Not all patients with T2DM are obese and, vice versa, less than half of all obese individuals develop T2DM, indicating that other determinants are involved as well. The majority of patients with T2DM are, however, obese with central visceral adiposity (Shai *et al*., 2006:1588).

HIV-infected patients on anti-retroviral treatment (ART) have an increased risk of developing metabolic syndrome, which predisposes them to T2DM and cardiovascular disease (Steyn *et al*., 2004:151; Hall *et al*.,2011:564). The metabolic syndrome is a combination of several determinants which may share a common etiology, which each is a risk factor for cardiovascular disease and T2DM (Byrne & Wild, 2005:381). The syndrome, which is referred to as a pre-diabetic condition, is characterised by abdominal obesity (South African Medical Research Council, 2006:116). Abdominal obesity is associated with a cluster of metabolic disturbances, such as hyperglycaemia and dyslipidaemia and is referred to as the metabolic syndrome due to these metabolic risk determinants. Other components of the metabolic syndrome are raised blood pressure, insulin resistance, dyslipidaemia, a pro-inflammatory state and a pro-thrombotic state (Alberti *et al*., 2006:73).

People who are physically more active in the work that they perform, such as labourers, are less likely to develop T2DM than sedentary workers, which show that physical activity plays a protective role (Valliyot *et al*., 2013:37). Physical activity has shown positive effects not only on lipids, blood pressure and glucose homeostasis but also on stress as it contributes to a sense of wellbeing (Byrne & Wild, 2005:370). Even low to moderate exercise on a regular basis has health benefits, as it helps to metabolise carbohydrates and thus decreases insulin requirements (Lawal, 2008:1112). Exercise further enables weight loss by burning fat, lowering blood glucose, cholesterol, triglycerides and blood pressure (Klein *et al*., 2004:2068; Howteerakul, Suwannapong, Rittichu & Rawdaree, 2007:47). Physical activity is promoted by Byrne and Wild (2005:335) and they define it as –

> *"the daily accumulation of a least 30 minutes of self-selected activities which includes all leisure, occupational, or household activities that are at least moderate in their intensity and could be planned or unplanned activities that are part of everyday life"* (Byrne & Wild 2005:368).

In South Africa, the *"fast food culture",* as well as the increasing availability of inexpensive energy-dense nutrient-poor foods in urban areas, contributes to excess weight gain in adults (who were often undernourished as children), resulting in the growing prevalence of T2DM (Steyn *et al*., 2004:151; Malathy *et al*., 2011:68). This transition to a Western lifestyle can be attributed to the rapid urbanisation in South Africa over the past 20 years. Migrating families lose the ability to grow their own food and the mother tends to be sent into the workforce; thus, the family becomes doubly dependent on cheap, commercially prepared food sources (Steyn *et al*. 2004:147; Moodley & Rambiritch, 2007:16c; Deshpande *et al*., 2008:1254; Jehn & Brewis, 2009:34; Wassink *et al*., 2011:932; Amod *et al*., 2012:S4; Erasmus, Soita, Hassan, Blanco-Blanco, Vergotine, Kengne & Matsha, 2012:841).

Hypertension is another strong risk factor for T2DM and is present in about one third of patients with T2DM at diagnosis (Xu *et al*., 2010:4). Hypertension in T2DM is aggressive and, unless it is treated, progresses rapidly to renal failure (Xu *et al*., 2010:4; Mollentze, 2012:s21). As far back as 1995, Mollentze, Moore, Steyn, Joubert, Steyn, Oosthuizen and Weich (1995:93) reported that the prevalence of

hypertension in an indigenous black population, aged 25 years and older in the Free State, was 29% (Van Zyl et *al*., 2010:75). In the study by Van Zyl *et al.* (2010:75), that was undertaken more recently in the Free State, the prevalence of self-reported hypertension was 63%. In a rural study in India, subjects with hypertension had a 4.6-fold chance to develop T2DM, compared to those with normal blood pressure (Valliyot *et al*., 2013:38). Age, which also plays a role in the prevalence of T2DM, is also associated with a progressive rise in systolic blood pressure, as aging vessels become stiffer due to loss of elasticity. Isolated systolic hypertension occurs earlier in people with T2DM when compared to people without the condition (Valliyot *et al*., 2013:38).

2.3.3 Symptoms

The classic symptoms of T2DM are polyuria, polydipsia and polyphagia. Other common symptoms are blurred vision due to osmotic changes in fluid levels in the eyes (Casey, 2011:17), weight loss, fatigue due to metabolic changes, irritability, numbness in the feet and hands, recurrent infections, and delayed wound healing (Lawal, 2008:1109).

According to Li, Drury and Taylor (2013:189), T2DM has a high symptom burden; however, Brown and Heeley-Creed (2013:78) report that many patients with T2DM are often asymptomatic and some are living with the disease for up to 12 years before being diagnosed.

2.3.4 Complications

Due to patients often being asymptomatic, persons with T2DM may present with complications at a late stage (Casey, 2011:19). In some instances, the complications are already present before T2DM is diagnosed (Casey, 2011:19; Brown & Heeley-Creed, 2013:78).

Patients often develop complications due to ignorance of the condition and the resultant poor glycaemic control (Malathy *et al*., 2011:68). Degenerative complications are often the cause of high morbidity and premature mortality in patients with T2DM (Bradshaw *et al*., 2007:700). The three most significant risk determinants for complications are long-term hyperglycaemia, hypertension and hypercholesterolemia (Lawal, 2008:1109). Improvements in blood glucose control, blood pressure, and cholesterol level can reduce a person's risk of complications significantly (Deshpande *et al*., 2008:1255). Complications will be further discussed under immediate and long-term complications (see section 2.3.4.1 and 2.3.4.2).

2.3.4.1 Immediate complications

Hyperglycaemia is responsible for most of the symptoms experienced during diabetes (Casey, 2011:16; Li *et al*., 2013:189). The most severe clinical manifestation is non-ketotic-hyperosmolar coma which may, in the absence of treatment, lead to death in older patients (Amod *et al*., 2012:S5). Diabetic ketoacidosis is characterised by the formation of excessive ketones in the urine resulting from an increased demand for insulin, inadequate adjustment of insulin injection to meet the required needs of the body, and increased resistance to insulin (Lawal, 2008:1109).

Older patients with T2DM experience more physical symptoms, such as acute pain, arthritis, burning feet, shortness of breath and constipation. This may be related to higher rates of comorbid conditions with age (Sudore, Karter, Huang, Moffet, Laiteerapong, Schenker, Adams, Whitmer, Liu, Miao, John & Schillinger, 2012:1674). Other immediate complications are increased risk of infections such as influenza, pneumonia, skin infections, vaginal thrush and itching (Steyn *et al*., 2004:151; Deshpande *et al*., 2008:1255; Hall *et al*., 2011:564). Patients with T2DM also have an increased risk of periodontitis if their blood glucose control is poor (IDF, 2013:26).

Hypoglycaemia (i.e. low, <4mmol/L, glucose levels in the blood) is another serious complication in patients on longstanding insulin and sulphonylurea treatment (Mollentze, 2012:S20; Shafiee, Mohajeri-Tehrani, Pajouhi & Larijani, 2012:3). In patients on insulin therapy, hypoglycaemia can also result from a low food intake or a delayed meal following insulin administration, or by an insulin overdose (Lawal, 2008:1110).

Increased or unexpected activity may increase the metabolic rate and also cause hypoglycaemia (Lawal, 2008:1110; Shafiee *et al*., 2012:4). The initial presentation of hypoglycaemia is hunger and light-headedness (Lawal, 2008:1110). Aggressive behaviour, altered cognitive function, confusion, dizziness and irritability are common symptoms of hypoglycaemia and, if not treated, patients can go into a coma and may die or have brain damage (Broom & Whittaker, 2004:2373; Deshpande *et al*., 2008:1255; Lawal, 2008:1110; Shafiee *et al*., 2012:1).

2.3.4.2 Long-term complications

Long-term complications of T2DM are due to microvascular or macrovascular effects of hyperglycemia. Macrovascular complications include stroke, cardiovascular disease and peripheral vascular disease (Deshpande *et al*., 2008:1255). Peripheral vascular disease may lead to bruises or injuries that do not heal, gangrene, and, ultimately, amputation. These complications are also the major causes of mortality in people with T2DM (Deshpande *et al*., 2008:1255).

Microvascular complications associated with poorly controlled blood glucose levels, include nervous system damage (neuropathy), renal system damage (nephropathy), eye damage (retinopathy), and cognitive and sexual dysfunction. In the long term, these can result in reduced quality of life and decreased life expectancy (Kikkawa, 2000:S183; Steyn *et al*., 2004:151; Tesfaye & Gill, 2011:4).

Conversely, regular episodes of hypoglycaemia can also cause damage to organs and especially the brain. Severe hypoglycaemia in older adults increases the risk of dementia (Mollentze, 2012:S20). Patients with T2DM should be fully informed about the triggering determinants for hypoglycaemia, and be familiar with the symptoms (Mollentze, 2012:S20). The symptoms of hypoglycaemia depend on the duration and severity of hypoglycaemia, and are often the result of incorrect use of insulin, especially if the patient is engaged in physical activity (Amod *et al*., 2012:S19).

2.3.5 Diagnosis and monitoring

T2DM is diagnosed by means of biochemical tests, which should be considered if the patient complains of symptoms, or has complications. The most accurate measure is fasting plasma glucose, which should be 4–7 mmol/L in non-diabetic individuals (Amod *et al*., 2012: S7; South Africa, Department of Health, 2014:10).

Symptoms, in addition to the following criteria, are applied in the diagnosis of diabetes mellitus:

- casual blood glucose of more than 11,1 mmol/L;
- fasting plasma glucose of more than 7 mmol/L;
- two-hour plasma glucose more than 11,1 mmol/L during oral glucose tolerance test; and
- HbA1c > 6.5% (Butler, 2011: 41; Amod *et al*., 2012:7; Franz, 2012:682).

The primary target for glycaemic control is a glycated haemoglobin (HbA1c) of < 7 % (South Africa, Department of Health, 2014:70). HbA1c is the predominant form of glycated haemoglobin present in red blood cells and is formed when the normal haemoglobin A reacts non-enzymatically and in a dose-dependent manner with glucose, therefore it can give an indication of blood glucose control (South Africa, Department of Health, 2014:70). As the half-life of red blood cells are approximately 120 days, HbA1c remains in the circulation for around three months; therefore, the amount of HbA1c present is expressed as a percentage of HbA and is proportional to the glucose concentration over that time (South Africa, Department of Health, 2014:70). HbA1c is a useful tool for guiding therapy and predicting outcomes and is

considered the gold standard for assessing long-term glycaemia (Giugliano, Ceriello & Esposito, 2008:218S; South Africa, Department of Health, 2014:70)

2.3.6 Management of T2DM

Managing T2DM affects every aspect of life of both the patient and his/her friends and family (Funnel & Anderson 2004:123; Huang *et al*., 2007:2482).

Optimal management of T2DM includes improvements in diet and physical activity (Blue, 2007:146; White, Terry, Troup, Rempel, Norman, Mummery, Riley, Posner & Kenardy, 2012:282) and keeping the patient's blood glucose levels as normal as possible to control symptoms and avoid complications (Khattab, Khader, Al-Khawaldeh & Ajlouni, 2010:84; Amod *et al*., 2012:4)**.** However, fewer than 50% of patients with T2DM meet glycaemic targets and fewer than 10% achieve glycaemic, lipid and blood pressure targets, despite evidence that multifactorial interventions are available and effective to improve morbidity and mortality outcomes (Saaddine, Cadwell, Gregg, Engelgau, Vinicor, Imperatore & Narayan, 2006:468). It is thus clear that other determinants also influence the management of patients with T2DM or their ability to make use of available interventions (Funnel, 2006:154)**.** Those determinants will be discussed in section 2.4 after the section on pharmacological (section 2.3.6.1) and self-management of adult patients with T2DM (section 2.3.6.2).

2.3.6.1 Pharmacological management

There are three main types of hypoglycaemic agents available in the public sector: biguanides, sulphonylureas and insulin (South Africa, Department of Health, 2014:70). Metformin is the only product available under the biguanides and is referred to as the "anchor" oral anti-diabetic agent in the management of T2DM (South Africa, Department of Health, 2014:70). It reduces the amount of glucose that the liver releases into the bloodstream and improves the cell's sensitivity to insulin (South Africa, Department of Health, 2014:70).

Metformin can reduce HbA1c by 1–2% and sulphonylureas by 1,5–2%. Sulphonylureas should be added if HbA1c targets are not met within three to six months (Mollentze, 2012:S20). Sulphonylureas, in contrast to biguanides, increase the amount of insulin that is produced by the pancreas. When the HbA1c is above 9%, insulin therapy is advised (Mollentze, 2012:S20). Older patients with T2DM often require insulin to achieve glycaemic control; thus, insulin may be added to other therapies (South Africa, Department of Health, 2014:18). Intermediate or long-acting insulin is given with oral medication while with biphasic insulin all oral medication will discontinue, except Metformin (South Africa, Department of Health, 2014:70).

2.3.6.2 Self-management

The successful management of T2DM requires a highly complex, strict self-management regime, and the responsibility mostly lies with the individual. It further requires lifelong commitment to the strict self-management plan, as well as knowledge and understanding of what to do, and when and how to do it (Funnel & Anderson, 2004:123; Byrne & Wild 2005:386; Parry, Peel, Douglas & Lawton, 2006:97; Daly *et al*., 2009:288; Kheir *et al*., 2011:189; Ayele *et al*., 2012:1; Wermeling *et al*., 2014:8).

Lifestyle modification, which focuses on diet and physical activity, forms the basis of T2DM self-management (Byrne & Wild, 2005:386; Parry *et al*., 2006:97; Deshpande *et al*., 2008:1254; Eckel *et al*., 2011:1424). Together with these lifestyle interventions, regular monitoring of blood glucose levels, blood pressure and blood lipid levels is recommended to prevent or delay the onset of T2DM-related complications (Parry *et al*., 2006:97; Deshpande *et al*., 2008:1254).

Many patients experience devastating complications because they struggle with the responsibility of self-management. Some patients feel that the strict self-management itself, affects their quality of life, due to mixed emotions and the overwhelming lifestyle changes that are required (Funnel & Anderson 2004:123; Ayele *et al*., 2012:5; Amod *et al*., 2012:S13; Sperl-Hillen, Beaton, Fernandes,

Worley, Vazquez-Benitez, Hanson, Lavin-Tompkins, Parsons, Adams & Spain, 2013:104; Wermelink *et al*., 2014:8).

Another aspect that influences self-management, is the fact that many patients with T2DM are asymptomatic and do not experience pain and discomfort. They consequently do not perceive their diagnosis as serious, resulting in them not adhering to treatment regimens (Ayele *et al*., 2012:5; Brown & Heeley-Creed, 2013:78; Wermelink *et al*., 2014:6).

Other determinants influencing the behaviour of patients, are discussed under KAP (see 2.4) by applying Ajzen's (1991) theory of planned behaviour (TPB).

2.4 KNOWLEDGE, ATTITUDE AND PRACTICES (KAP)

Knowledge, attitude and practices (KAP) of patients with T2DM are essential determinants that need to be understood before embarking on interventions (Abdo & Mohammed, 2010:123). Many models have been developed over the years to explain practices or behaviour, but the theory of planned behaviour (TPB) is considered to be one of the most effective and influential theories for the prediction of different types of behaviour and has been widely used to understand the barriers in health-related behaviour (Armitage & Conner, 2001:19; Bilic, 2005:246).

2.4.1 Theory of planned behaviour (TPB)

The TPB represents an extension of the theory of reasoned action to predict an individual's intention to engage in a specific behaviour (Ajzen, 1988:117). The TPB was developed by Icek Ajzen (Ajzen, 1988:117), and intended to explain all behaviour over which people have the ability to exert self-control (Kagee & Van der Merwe, 2006:700).

Ajzen, Joyce, Sheikh and Cole (2011:101) are of the view that knowledge is no guarantee for healthy behaviour, nor is ignorance necessarily the main cause of unhealthy behaviour. Various determinants, which are often hard and difficult to

change, influence health behaviour. Dissociations between knowledge and behaviour have been documented in many health-related areas (Wallace, 2002:170; Ajzen *et al*., 2011:101).

According to Ajzen *et al*. (2011:102), researchers agree that knowledge is not enough to bring about behaviour change and that motivation is a prerequisite for behaviour change. Ayele *et al*. (2012:5) note that, although knowledge is a critical factor for behaviour change, patients with good knowledge will not necessarily follow the recommended practices. This concept was demonstrated in a study by Malathy *et al*. (2011:5) where 80% of patients knew the symptoms of hypoglycaemia and 76% knew what to do when they develop these symptoms, yet only 17% carried packets of glucose with them.

The TPB further assumes that the probability of an individual to engage in specific health behaviour is correlated with the strength of his or her intention to engage in the behaviour (Ajzen *et al*., 2011:102). A behavioural intention represents an individual's commitment to act and is itself the outcome of a combination of several variables (Ajzen *et al*., 2011:102).

The key component to this model is, therefore, behavioural intent (Ajzen *et al*., 2011:103). Intentions are defined as a person's motivation to perform a specific behaviour (Bilic, 2005:244). Intentions are determined by three conceptually independent determinants, namely attitudes, subjective norms and perceived behavioural control (Bilic, 2005:244; Ajzen *et al*., 2011:103). Figure 2.2 reflects an explanation of Ajzen's TPB:

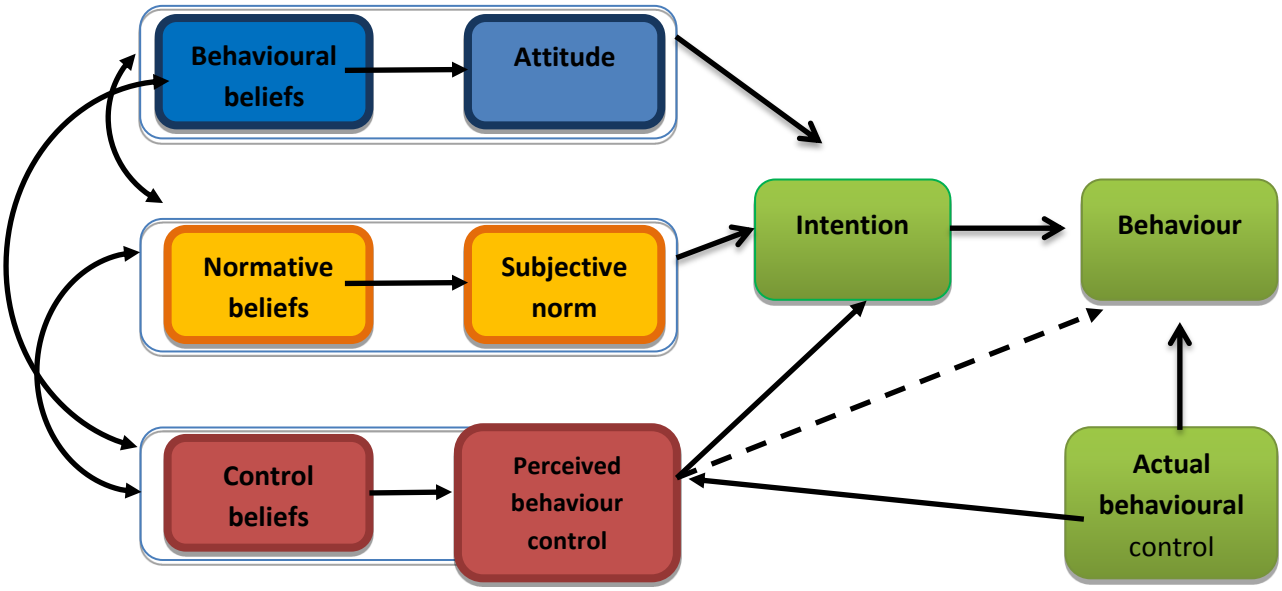

FIGURE 2.2: Ajzen's theory of planned behaviour (Ajzen, 1991)

Attitude, the first determinant of intentions, refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour in question (Bilic, 2005:245). It entails a consideration of the outcomes of performing the behaviour. The second determinant is a social factor known as *"subjective norm".* This refers to the belief about whether most people approve or disapprove of the behaviour (Bilic, 2005:245). The third determinant is called perceived behavioural control, and refers to the person's assessment of his or her ability to perform the behaviour (Bilic, 2005:245).

Each of these determinants acts as an antecedent toward the intention to perform a specific behaviour and is further preceded by beliefs (Ajzen *et al*., 2011:103). Three types of beliefs – behavioural, normative, and control beliefs are identified. These beliefs guide intentions and behaviours (Ajzen *et al*., 2011:103). The consequences of behaviour (behavioural beliefs) are assumed to determine attitudes toward the behaviour. Beliefs about the expectations and behaviours of others (normative beliefs) are assumed to determine subjective norms and beliefs about potential inhibiting determinants (control beliefs), which in turn are assumed to determine perceived behavioural control. Attitudes, subjective norms and perceptions of control, in turn, combine to produce intentions which, together with actual control, determine performances of the behaviour (Ajzen *et al*., 2011:103). The TPB is

therefore comprised of six determinants that jointly represent a person's actual control over the behaviour (Ajzen *et al*., 2011:103).

Different aspects related to the behaviour of patients with T2DM, like diet, exercise and adherence to medications, have been researched by applying the TPB model (Blue, 2007:142; Omondi, Walingo, Mbagaya & Othuon, 2010:264; Plotnikoff, Lippke, Courneya, Birkett & Sigal, 2010:8; White *et al*., 2012:282; Jannuzzi, Rodrigues, Cornelio, Sao-Joao & Gailani, 2014:8). Through this model, determinants that influence beliefs and attitudes have been explored, which can assist health professionals in targeting these barriers, which in turn can guide interventions to promote the required behaviour (Blue, 2007:142; Mann, Ponieman, Leventhal & Halm, 2009:592; Jannuzzi *et al*., 2014:2).

In the discussion that follows, the researcher will refer to the TPB and how it was applied to her study on KAP of adult patients with T2DM.

2.4.2 Application of theory of planned behaviour to adult patients with type 2 diabetes mellitus

According to the TPB, a person's intention to act out a specific behaviour originates with an informational foundation, that closely links with the *knowledge* component of this study's intended KAP survey. Patients with T2DM have certain beliefs, which eventually influence their behaviour or practice (Delamater, 2006:76). These beliefs form part of the knowledge section of the TPB and do not necessarily refer to the level of knowledge of the patient.

The three groups of beliefs which are identified, namely behavioural, normative and control beliefs (Ajzen *et al*., 2011:102), can be applied to the management of T2DM. *Behavioural* beliefs depict the link between a specific T2DM-related behaviour and a consequence that leads from this behaviour (Ajzen *et al*., 2011:102). *Normative* beliefs reflect the link between a specific T2DM-related behaviour and an expectation the patient may have due to the enacted behaviour (Ajzen *et al*., 2011:102). Flowing from the normative beliefs, are subjective norms. The subjective

norm not only provides a link between the specific T2DM-related behaviour, but now the probability is linked to the expectations of peers, family members and other important people in the patient's life. *Control* beliefs describe factors the patient perceives to potentially either support or hinder him or her in being in control of T2DM-related issues. Lastly, the patients' perceived behavioural control reflects the link between a specific T2DM-related behaviour and the patient's perception of his or her ability to accomplish the specific behaviour (Ajzen *et al*., 2011:102).

In line with the KAP survey, specific attention is further given to the *attitude* of the patient as an element playing a role in the actual T2DM-related behaviour or practice of the patient (Ajzen *et al*., 2011:103). Patients' attitudes towards T2DM-related issues, as well as their subjective norms and perceived behavioural control of such issues, all strengthen or weaken the patients' intention to perform a specific T2DM-related behaviour. The researcher regarded Azjen's reference to behaviour as equal to what the KAP survey refers to as *Practice* (Ajzen, 1991). Therefore, patients' T2DM-related behaviour will depend on their intention to act out behaviour, as well as the actual behavioural control the patient has in the long run over performing such behaviour.

Figure 2.3 explains the application of the TPB on the researcher's KAP survey.

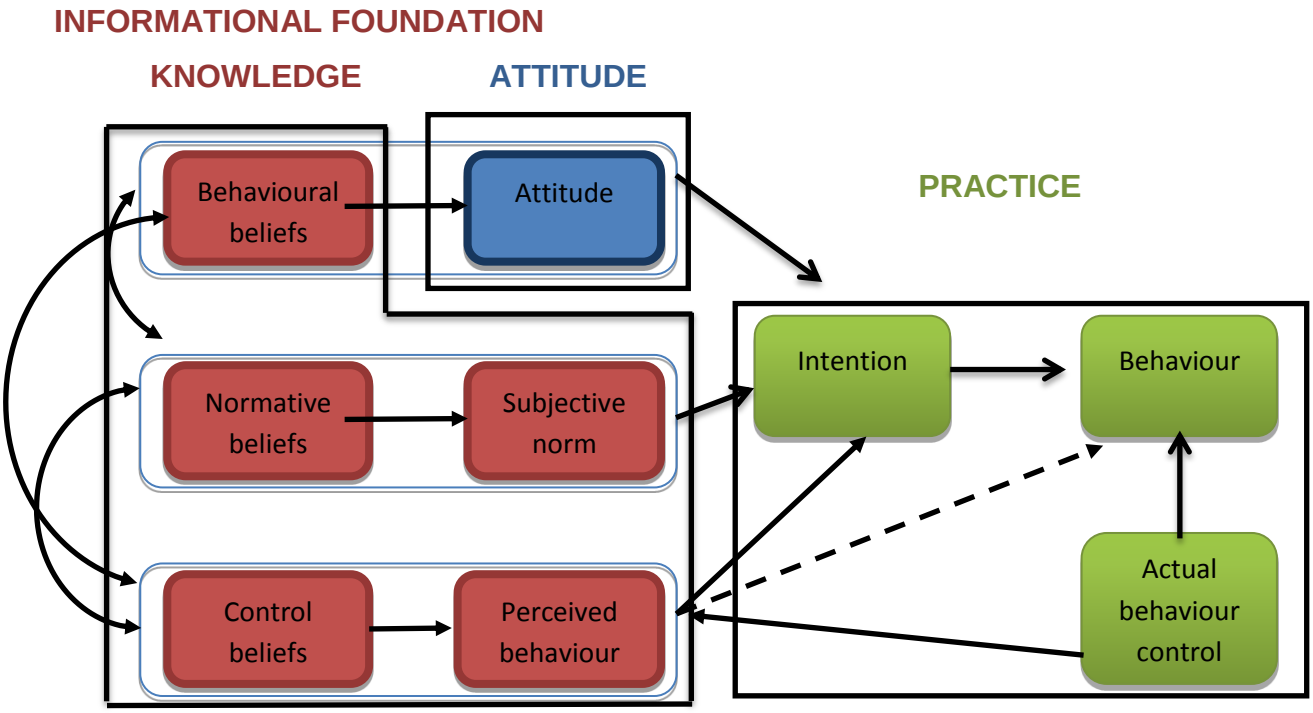

FIGURE 2.3: **Application of the theory of planned behaviour (adapted from Ajzen, 1991)**

2.4.2.1 Knowledge

Although Ajzen *et al.* (2011:102) states that knowledge is not a prerequisite for behaviour change, many researchers are of the opinion that behavioural beliefs can be addressed through improving the knowledge of patients (Al-Khaldi & Al-Sharif, 2005:114; Moodley & Rambiritch, 2007:16; Malathy *et al*., 2011:65). The link between knowledge and behaviour is, however, problematic (Peel, Parry, Douglas & Lawton, 2004:270).

Figure 2.3 indicates *"knowledge",* which refers to behavioural beliefs, normative beliefs, subjective norms, control beliefs and perceived behavioural control.

i Behavioural beliefs

In a systematic review by Rintala, Jaatinen, Paavilainen and Astedt-Kurki (2013:17), researchers agreed that healthy eating is the most challenging part of a patient's

self-management (Daly *et al*. 2009:287). This important aspect of self-management is mostly influenced by the patients' behavioural beliefs towards their eating habits. Khattab *et al*. (2010:86) found the same tendency in their study in Jordan, where more than 80% of patients did not adhere to the healthy eating plan prescribed by the dietitian and more than two-thirds did not become physically active. Li *et al*. (2013:192) further report that patients in their study often mentioned the temptation to snack and eat foods not allowed in their diet plan. Lifestyle and culture were other aspects identified to influence behavioural beliefs (Wermelink *et al*., 2014:5). Wermelink *et al*. (2014:6) reported that overweight patients in their study felt that diet recommendations are incompatible with their lifestyle and culture, and they were therefore reluctant to adhere.

Participating adult patients with T2DM in Broom and Whitthaker's study in Australia, (2004:2372) who acknowledged that their unhealthy lifestyle contributed to their condition, were found to be more successful with self-management activities due to positive behavioural beliefs, than patients who felt that genetic determinants were the cause (Broom & Whittaker, 2004:2375). Behavioural beliefs of patients with a family history of T2DM were influenced negatively, as these patients were more prone to believe that lifestyle changes will not make a difference to their treatment (Broom & Whittaker, 2004:2375; Parry *et al*., 2006:100; Huang *et al*., 2007:2481).

Misconceptions about diabetes further influence behavioural beliefs in patients negatively. In a study by Mann *et al*. (2009:592) in a minority population in New York, 33% of patients expected their doctor to cure them of diabetes, 12% believed that they had diabetes only when their blood glucose levels were high, and 36% believed that they would not always have diabetes. Furthermore, patients who believe self-management will not cure diabetes, which it would not, are less likely to self-manage successfully (Broom & Whittaker, 2004:2375; Parry *et al*., 2006:100; Huang *et al*., 2007:2481).

Chinese patients visiting facilities in Southern California, believed that over-consumption of sugar causes diabetes; therefore, they felt that, by controlling their sugar intake alone, no other self-care activities were necessary (Washington & Wang-Letzkus, 2009:318). In this Southern California study, the patients' behavioural beliefs thus affected the successful management of diabetes.

Symptoms of hypoglycaemia can often be mistaken for those of being drunk, and thus make patients may feel stigmatised by these experiences. Having to inject insulin injections, on the other hand, can be confused with being a *"drug addict",* due to ignorance of the public in general. Hence, patients with T2DM might feel vulnerable and constantly struggle to self-manage their condition optimally, which will affect their behavioural beliefs negatively (Broom & Whittaker, 2004:2373).

ii Normative beliefs and subjective norms

"Subjective norms" refer to the belief about whether peers and people of importance to the person approve or disapprove of the behaviour (Ajzen *et al*., 2011:102).

Because self-management takes place in daily life and in social situations, family, friends and health care workers influence the patient's normative beliefs and subsequently his or her subjective norms, which, in turn, influence the patient's intention to embark successfully on self-management (Peer *et al*., 2012: 8; Rintala *et al*., 2013:4). Howteerakul *et al*. (2007:47) recommend that family members should be aware of the important role they play in patients' treatment. Positive social support from patients' children, spouses and health care staff, should be included in the motivation of patients with T2DM to improve subjective norms and health outcomes (Jannuzzi *et al*., 2014:6).

In their systematic review, Rintala *et al*. (2013:17) reported that family members, especially spouses, play a significant role in making, and maintaining, lifestyle changes. A close spousal bond strengthens subjective norms and is associated with a positive effect on self-management (Chesla, Fisher, Mullan, Skaff, Gardiner, Chun & Kanter, 2004:2852; Rintala *et al*., 2013:15), whereas unresolved conflict in a family is associated with poor subjective norms, with a negative effect on self-management (Chesla *et al*., 2004:2852).

Normative beliefs are influenced by family members or close friends in the sense that, if they hold negative beliefs about self-management and the patient values their

opinions, the patient will be reluctant to make any changes to self-management behaviours; hence, his subjective norms will be influenced negatively (Chesla *et al*., 2004:2852). In a study by Li *et al*. (2013:192), participants were concerned that friends would perceive them differently if they knew they had diabetes and patients consequently feared that the knowledge would change their relationship, therefore they did not tell their friends about their condition. The normative belief that friends will perceive them differently, thus, influenced patients' subjective norms.

As previously discussed, healthy eating was identified as the most challenging part of self-management of patients (Rintala *et al*., 2013:17). Family support is very necessary in this regard, as the eating patterns and choice of food of the family are affected by diabetes, and the patients' normative beliefs will subsequently be affected (Miller & DiMatteo, 2013:423; Rintala *et al*., 2013:17). Families often continue to purchase and prepare unhealthy food for the household, which the patient is not allowed to eat. This causes conflict and resentment in the family (Vijan, Stuart, Fitzgerald, Ronis, Hayward, Slater & Hofer, 2004:36). Family traditions and culture play an important social role in families and influence normative beliefs (Rintala *et al*., 2013:16). A balance needs to be struck between the culture of the family and the requirements of healthy eating, to strengthen subjective norms (Rintala *et al*., 2013:16).

An understanding relationship between the patient and the health care worker can further encourage optimal adherence to self-management activities, resulting in improved glycaemic control, better quality of life, and more positive subjective norms (Bonds, Camacho, Bell, Duren-Winfield, Anderson & Goff, 2004:6; Gulabani *et al*., 2008:2005). How patients are spoken to by members of the multidisciplinary team also affects patients' management in the sense that they are not supported to solve problems or make lasting changes in their lives by simply being told what they should do. Words such as *'naughty', 'you should have known better'* and *'bad patient'* were mentioned by patients as making them feel like disobedient children and hence, negatively affecting their subjective norms (Broom & Whittaker, 2004:2379).

Dietitians should also ensure that they use terminology that patients understand to ensure positive subjective norms. To further strengthen subjective norms, they should consider other normative beliefs, like patients' food preferences, culture and religious beliefs, when giving diet recommendations (Vijan *et al*., 2004:36). According to Funnel (2013:S24), health care workers should acknowledge their patients' struggles, and show that they care, through active listening and empathy, in an effort to improve patients' subjective norms.

iii Control beliefs and perceived behavioural control

Control beliefs influence perceived behavioural control, which refers to the person's assessment of his or her ability to perform the required behaviour (Bilic, 2005:245).

One's ability to execute the expected self-management activities is described as *'self-efficacy'* or, according to the TPB, *'control beliefs'* (Ajzen *et al*., 2011:102). Self-efficacy predicts that the more a person feels capable of both anticipating and coping with problems, the less vulnerable such person is to feeling overwhelmed by these problems (Gherman, Schnur, Montgommery, Sassu, Veresiu & David, 2011:402). Furthermore, perceived self-efficacy is likely to be determined by the patient's intellectual understanding of the importance of self-management activities on his or her health, which enhances control beliefs and subsequently the patient's perceived behavioural control (Kagee & Van der Merwe, 2006:709).

Self-efficacy is further associated with lower HbA1c levels, resulting in a better quality of life (Kagee & Van der Merwe, 2006:709). Measuring self-efficacy was highlighted as a very important diagnostic tool for patients with T2DM as it can be a predictor of the success rate of self-management (Kagee & Van der Merwe, 2006:709). In a study by Li *et al*. (2013:192), patients experienced a sense of helplessness due to unpredictability of their blood glucose levels resulting in them feeling out of control of their lives and subsequently losing hope and motivation, which affected their perceived behavioural control negatively. Broom and Whittaker (2004:2379) noted the same sense of helplessness in their study. Coping strategies, like learning from experience and seeking information, were identified by another

group of patients and are important for strengthening control beliefs. Other successful strategies to strengthen control beliefs included prayer and religious faith (Li *et al*., 2013:193).

According to Mishali, Omer and Heyman (2011:85), taking medication is less dependent on control beliefs than other self-management activities, which require more behaviour change, such as diet and exercise. This explains higher rates of adherence to medication due to an increase in perceived behavioural control (Mann *et al*., 2009:591). On the other hand, patients may have difficulty adhering to medication due to information overload, which affects their control beliefs negatively, resulting in perceived poor behavioural control (Mann *et al*., 2009:591).

Pharmacological treatment and blood glucose monitoring were further associated with increased feelings of satisfaction and lower HbA1c levels, which are an indication of strong perceived behavioural control (Daly *et al*., 2009:288). It is therefore important for patients to overcome barriers which prevent them from engaging successfully in these activities, in order to ensure that their control beliefs are strengthened and their perceived behavioural control improve (Daly *et al*., 2009:288).

It is thus clear that the more patients feel in control of their T2DM, the stronger their control beliefs, and the more likely they are to persevere with effective self-management. Patients who are adherent to self-management activities become confident that they can perform these activities as prescribed by their health care worker, which leads to better glycaemic control (Daly *et al*., 2009:286). On the other hand, patients who are less adherent to self-management activities, have a greater probability of thinking that it is very difficult to include self-management activities in their daily schedule and that it is difficult to accomplish self-management activities, (Gherman *et al*., 2011:405); hence, their control beliefs are poor and their perception of behavioural control is negatively affected, which results in poor glycaemic control and complications in the long run.

2.4.2.2 Attitude

According to the TPB, *"attitude"* refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour in question. This entails a consideration of the outcomes of performing the behaviour (Bilic, 2005:245).

Patients with T2DM are often blamed for *"not looking after themselves"* and are regarded as people who *"lack self-control"* (Broom & Whittaker, 2004:2373). Negative connotations like these influence patients' attitude negatively and make them feel discriminated against; therefore, they prefer to stay anonymous due to fear of standing out in a group, which affects their self-management behaviour negatively (Broom & Whittaker, 2004:2373).

Broom and Whittaker (2004:2378) reported that patients will rather choose foods that compromise blood glucose control food when socialising with peers to prevent being labelled as a *"diabetic"* or to stand out in a group. This behaviour is the cause of negative attitudes that stem from patients' evaluation of the behaviour in question. Holidays and social occasions, like Christmas, were further noted by patients as very challenging periods, which hence affected their attitude towards self-management (Vijan *et al*., 2004:35). Patients tend to feel guilty when they eat food that compromise blood glucose control during holidays or become depressed about not being able to eat favourite food items, which further influence their attitude negatively (Franks, Hemphill, Seidel, Stephens, Rook & Salem, 2012:908).

In a study by Vijan *et al*. (2004:34), patients had a negative attitude towards their diet and described the strict recommendations as *"burdensome"* and *"challenging".* Patients felt that it is their right to eat and drink what they want, because they are adults, and that eating is often the only pleasure they still have (Broom & Whittaker, 2004:2377; Vijan *et al*., 2004:35).

These negative attitudes toward dietary and exercise recommendations (Franks *et al*., 2012:908; Li *et al*., 2013:192) are often due to patients not understanding that diet and exercise form part of their treatment regime (Janzen Claude, 2011:244).

Once patients are educated about these aspects, they take ownership of their condition and their attitude changes positively (Kheir *et al*., 2011:186). Negative attitudes towards dietary changes and exercise should therefore be identified and addressed in patients to ensure better health outcomes.

Negative attitudes towards the diagnosis of T2DM can develop more rapidly if the patient feels that he or she does not have the knowledge and support to deal with the condition (Peel *et al*., 2004:273). Other negative emotions, like pessimism, anxiety, frustration with the symptoms, stress and concerns about complications, make living with T2DM stressful and affect the attitude and motivation of patients to conduct the behaviour in question (Goldney *et al*., 2004:1069; Gois, Dias, Raposo, Carmo & Barbosa, 2012:3).

Despite the challenges highlighted regarding the attitude of patients, Broom and Whittaker (2004:2378) found that the diagnosis in some overweight patients prompted a dramatic change in their lifestyle, which brought about a positive attitude. On the other hand, Mishali *et al*. (2011:85) found that overweight patients were more likely to be depressed, and this was associated with negative attitudes.

It is evident that the attitudes of patients affect their behaviour (Franks *et al*., 2012:908). Therefore it is important to acknowledge the different beliefs of patients that influence their attitude towards T2DM and which guide their intention to conduct the behaviour in question.

2.4.2.3 Practice

"Practice" refers to the strength of a patient's intention to engage in specific health behaviour and his or her commitment or motivation to perform a specific behaviour (Ajzen *et al*., 2011:103). This statement is reflected in the findings from several studies discussed in this literature review (Kagee & Van der Merwe, 2006:711; Mann *et al*., 2009:591). Overall, the findings give cause for concern, since poor practices have significant implications for the long-term consequences of T2DM.

According to the TPB model, it is expected that the intention to perform a particular behaviour increases as the person's attitudes and subjective norms become more positive (Bilic, 2005:244). The theory also suggests that, if an intention is held constant, the actual execution of behaviour is more likely with a greater perceived behavioural control (Armitage & Christian, 2003:189).

The TPB questions the current behavioural intervention strategies used in health promotion (Ajzen *et al*., 2011:116). Most of these health promotion activities focus on imparting accurate and factual information and assume that once people have a good understanding of the topic, they will engage in the required behaviour. Unfortunately, this is not always the case (Ajzen *et al*., 2011:116).

Instead of trying to make sure that people have accurate information, clinicians need to find out which information the patients actually possess and how this information affects intentions and behaviour (Ajzen *et al*., 2011:116). Emphasis should be placed on knowledge that guides the behaviour of interest or beliefs about the behaviour. Once the behavioural, normative and control beliefs have been identified in the population of interest, knowledge on the beliefs that are contradictory to the behaviour can be addressed, and the supportive beliefs that lead to the formation of new beliefs and desired behaviour, can be strengthened (Kagee and Van der Merwe, 2006:711; Ajzen *et al*., 2011:116).

Because of the effect of the condition on the quality of life of patients, it is important for health care workers to better their understanding of behaviour that is necessary to manage T2DM. Patients' beliefs, thoughts and feelings that may support or hamper self-management efforts, need to be identified and addressed before health care workers embark on interventions (South African Medical Research Council, 2006:19; Mishali *et al*., 2011:82; Redelinghuys, 2012:280; White *et al.*, 2012:282).

2.5 CONCLUSION

Patients with T2DM should be given an opportunity to identify their perceived challenges and difficulties and they should be assisted by health care workers to

shape and reshape their lifestyles to cope with diabetes to ensure successful practices. Health care workers and family members should furthermore encourage patients to be confident in their ability to succeed (Gherman *et al*., 2011:406; Mishali *et al*., 2011:86). Lifestyle interventions should focus on helping patients to feel more confident about the recommended behaviours to ensure positive outcomes (Tuomilehto, Lindstrom, Eriksson, Valle, Hamalinen, Lanne-Parikka, Keinanen-Kiukaanniemi, Laakso, Louheranta, Rastas, Salminen & Uusitupa, 2001:1349; Giugliano *et al*., 2008:220S; Gherman *et al*., 2011:406).

Successful self-management is imperative to improve the morbidity and mortality of patients with T2DM (Norman *et al*., 2007:639). The goals of health care workers should therefore be to strengthen the patients' behavioural, normative and control beliefs, which influence their attitudes, because patients who believe they have the skill to successfully negotiate the challenging road of self-management, are more likely to engage in successful self-management (Gherman *et al*., 2011:406; Mishali *et al*., 2011:86).

CHAPTER 3

Methodology

3.1 INTRODUCTION

In the previous chapter, the researcher presented an overview of the literature on T2DM and its related factors. This chapter will present a discussion on the methodology of the research study with reference to the research design, sample, procedures and ethical considerations.

Figure 3.1 illustrates how the researcher has progressed in the research process, here discussing the methodology of the research study.

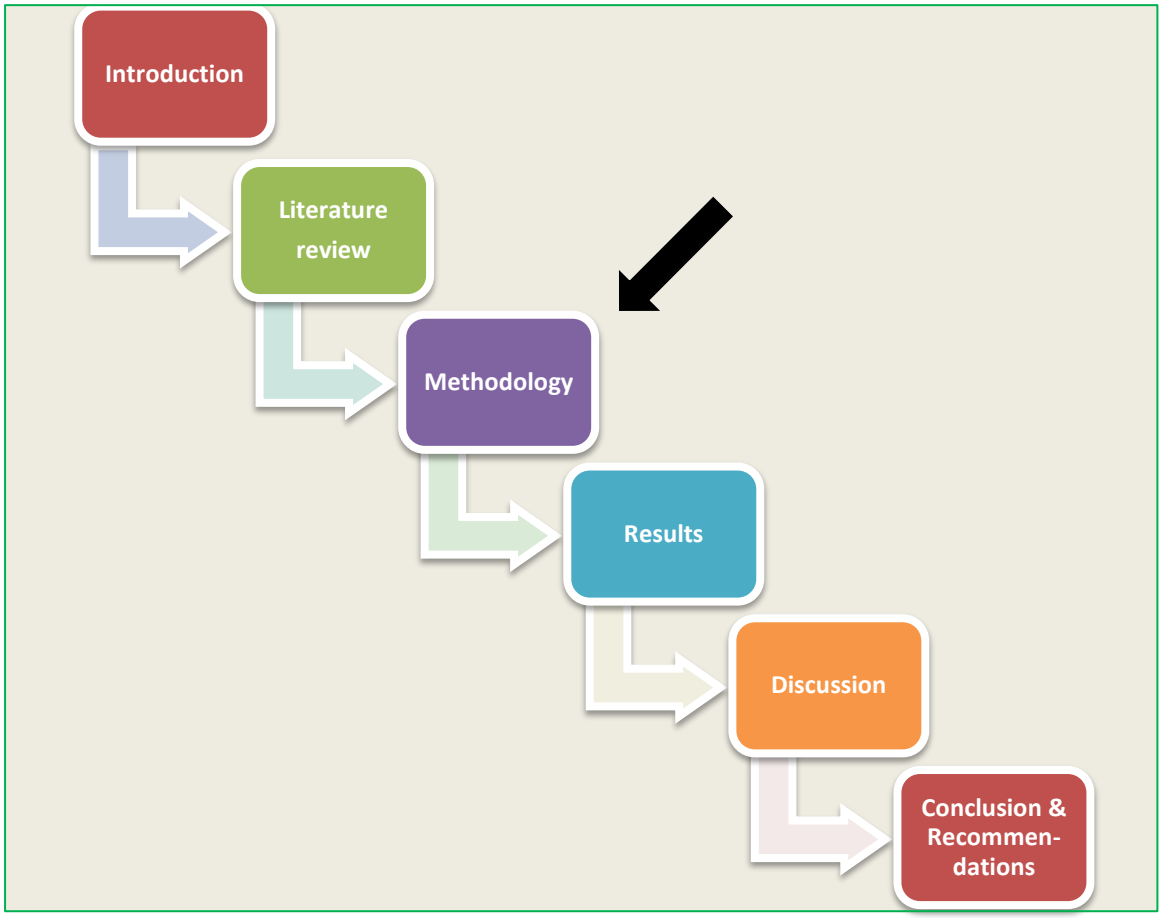

FIGURE 3.1: Development of the study: Methodology

3.2 RESEARCH DESIGN

This research study was designed as a quantitative descriptive observational study.

3.3 STUDY POPULATION AND SAMPLE

According to Burns and Grove (2011:51), a population is “the totality of all subjects that conform to a set of stipulations, including the entire group of persons that is of interest to the researcher and to whom the research results can be applied”. “A sample, on the other hand, is a quota of the research population nominated to participate in the study, to represent the research population” (Burns & Grove, 2011:51).

3.3.1 Population

For the purpose of this study, the population included all adult patients with T2DM visiting all CHC centres in the five districts in Free State, namely Mangaung Metro, Xhariep, Lejweleputswa, Fezile Dabi and Thabo Mofutsanyane. Adult patients with T2DM from four PHC clinics in Botshabelo, two PHC clinics in Thaba N’chu, as well as adult patients with T2DM referred to National District Hospital, in Bloemfontein, from PHC clinics in Mangaung, were also included in the study population (see Table 3.1). There was uncertainty about the population size of adult patients with T2DM in the Free State since the Provincial Health Information System (PHIS) only collects monthly data on newly diagnosed adult patients with T2DM.

3.3.2 Sample selection

A total of 255 participants were selected by means of convenience sampling from 10 CHC centres, 12 PHC clinics and 1 district hospital in the Free State. PHC clinics in Mangaung Metro refer patients with T2DM to National District Hospital, which is a district hospital in Mangaung Metro. This facility was also included in the study because of the high daily patient load.

A total of 169 participants were interviewed in Mangaung Metro and the other 86 participants were from CHC centres in the remaining 4 districts namely: Xariep, Lejweleputswa, Fezile Dabi and Thabo Mafutsanyana. The distribution is captured in table 3.1.

TABLE 3.1: Summary of population and sampling

DISTRICT	CHC CENTRES	PHC CLINICS	NATIONAL DISTRICT HOSPITAL	PATIENTS WITH T2DM (sample)
Mangaung Metro	4	7	Representing 3 PHC clinics	169
Xhariep	1			11
Lejweleputswa	1			2
Fezile Dabi	5			63
Thabo Mofutsanyane	1			10
Total	12 facilities	7 facilities	3 facilities	255 patients

3.3.2.1 Inclusion criteria

The following patients were included in the study:

- male and female adult patients (18 years and older) with T2DM, who received treatment from a CHC centre in one of the five districts in the Free State, and selected PHC clinics in Mangaung Metro, as well as National District Hospital; and

- who signed informed consent to participate in the survey.

3.3.2.2 Exclusion criteria

The following patients were excluded from the study:

- patients with T2DM who were mentally disabled;

- patients with T2DM who were not medically able to participate due to complications inhibiting them to speak and interact with comfort; and

- patients with T2DM who could not speak English, Afrikaans or Sesotho.

3.4 MEASUREMENTS

The measurements applied to this study will now be discussed:

3.4.1 Operational definitions

The following variables were determined:

- demography;
- anthropometry;
- quality of life;
- history of T2DM diagnosis;
- KAP; and
- patient's perception of care received

Operational definitions for each of these variables will be discussed in the sections that follow.

3.4.1.1 Demography

For the purpose of this study, demography referred to basic demographics, namely gender, age, home language and the education level of the patient.

3.4.1.2 Quality of life

For the purpose of this study, quality of life was determined by the responses to questions related to the patient's perspective of his or her health, mobility, self-care, activities, pain, anxiety and feelings of depression which were coded (Addendum G).

3.4.1.3 History of T2DM diagnosis

For the purpose of this study, history of T2DM diagnosis refers responses to questions related to when and how the patient was diagnosed and which medication the patient was using.

3.4.1.4 Knowledge, attitude and practices related to T2DM

For the purpose of this study, knowledge of patients were assessed based on responses to questions related to knowledge of the following aspects:

- poor control of T2DM;
- weight loss;
- relationship between foods eaten and blood glucose levels;
- normal blood glucose ranges;
- nutrition knowledge on macronutrients like carbohydrates, proteins and fats;
- symptoms of uncontrolled blood glucose;
- consumption of fruit and vegetables;
- signs of high blood glucose levels;
- complications;
- exercise;
- medication;
- hypoglycaemia;
- taking care of feet;
- causes of T2DM;
- benefits of exercise; and
- conditions aggravating T2DM.

Questions included in the Attitude section of the questionnaire were designed to measure the prevailing attitudes, beliefs and misconceptions in the population pertaining to T2DM. The questions covered the following topics:

- beliefs related to T2DM;
- feelings about T2DM;
- perceptions on T2DM;
- controlling T2DM;
- the effect of T2DM on the patient's social life; and
- health services for patients with T2DM.

Questions addressing practices covered:

- medication;
- lifestyle, e.g. exercise, eating habits, consumption of soft drink and alcohol; and
- examining of feet.

A score was obtained for each component of KAP.

3.4.1.5 Anthropometry

For the purpose of this study anthropometry comprised calculation of the patient's BMI, and measuring the waist circumference. The BMI was interpreted using Table 3.2.

i Body mass index (BMI)

The BMI refers to the weight (kg) of a person divided by his or her height (m) squared, and this can be used to assess a patient's weight status. Table 3.2 indicates the different classifications of body weight status based on BMI that was used in this study.

TABLE 3.2: Classification of BMI (World Health Organization, 2006)

BMI CLASSIFICATION	PRINCIPAL CUT-OFF POINTS (KG/M²)
Underweight	< 18.5
Severely thin	< 16.0
Moderate thinness	16.0–16.99
Mild thinness	17.00–18.49
Normal range	18.5–24.9
Overweight	≥ 25
Pre-obese	25.0–29.9
Obese	≥ 30
Obese class 1	30–34.9
Obese class 2	35–39.9
Obese class 3	≥ 40

ii Waist circumference

For the purpose of this study, waist circumference referred to the minimal abdominal circumference located midway between the lower rib margin and the iliac crest (Lee & Nieman, 2009:245). The cut-off point that indicates risk for waist circumference in women is >80 cm and >94 cm in men, as recommended for the sub-Saharan population (Alberti *et al.,* 2006).

3.4.1.6 Patient's perception of care received

For the purpose of this study, the patient's perceived care received included:

- whether the patient felt comfortable at this facility;
- the patient's perception of medical care provided;
- complaint procedure;
- cleanliness of facility;
- privacy during examinations;
- confidentiality of records;
- respect shown by nurses and doctors;
- health information provided about diabetes;
- information on medication use provided;
- information on lifestyle changes provided;

- opportunity to ask questions;
- language used by staff;
- accessibility of facility;
- waiting time; and
- whether the patient had been referred for nutrition-specific counselling and by whom.

The participant's answers were classified as satisfied, dissatisfied or not applicable.

3.4.2 Techniques

The following techniques were used to obtain the necessary information:

3.4.2.1 Questionnaire

A questionnaire is a method of gathering information from respondents. For the purpose of this study, a questionnaire was designed to gather information about the demographics and associated factors, quality of life, KAP, anthropometry and perceived care.

An adapted South African-Diabetes KAP questionnaire was used for this study. The following steps, as described in Bryman (2012:185) were used to adapt the questions in the questionnaire:

- a comprehensive literature review to determine what is already known on the subject;

- consultation and evaluation of existing validated instruments from studies where the operational definitions correspond with the planned study (Upadhay, Mohammed, Alukar, Mishra & Palaian, 2012). The Diabetes Knowledge Scale and the Psychological Adjustment to Diabetes scale was consulted (Bradley, 1994), as well as the EQ-5D value set of the EuroQol System (EuroQol Group, nd:online);

- development of a table of specifications to be covered in the questions, depicting the essential content as adapted to the South African context (Amod *et al*., 2012);

- arrangement of the questions in a logical flow, according to the set objectives of the study; and

- review of existing and validated instruments to adapt the South African-Diabetes KAP questionnaire (see Addendum A) and assessment of the validity of questions by a multidisciplinary expert team (Bryman, 2012:171).

All demographic information and questions related to quality of life, history of diabetes diagnosis, KAP, anthropometry, perceived care and the nutrition counselling, were obtained from the T2DM patients by the researcher and two Sesotho-speaking fieldworkers through a questionnaire completed in a personal structured interview. If the patient did not understand English or Afrikaans, a Sesotho-speaking fieldworker was used. A questionnaire was compiled to be used by the fieldworker and researcher (Attached as Addendum A). A guideline was compiled for the completion of the questionnaire to which the fieldworkers could refer (Addendum B).

3.4.2.2 Anthropometric measurements

i Weight

The weight of patients was measured using a SECA digital electronic scale. The scale was placed on a hard surface. The participants were weighed without shoes and with minimal clothing. The participants had to stand in the middle of the scale and could not hold onto anything. The weight was measured accurately to the nearest 0.1 kg (WHO, 2008:9).

ii Height

The height of patients was measured to the nearest 0.1 cm, using a SECA stadiometer. The stadiometer was placed on a hard surface. All participants were measured without shoes. The patients were measured with feet together and heels, buttocks and shoulders against the back of the meter. Arms were relaxed next to the body and head in the Frankfort position (WHO STEPS surveillance, 2008:8).

iii Waist circumference

To measure the waist, the subject wore little clothing, stood erect, with the abdomen relaxed, arms at the sides and feet together (Klein, Allison, Heymsfield, Kelley, Leibel, Nonas & Kahn, 2007:1198). The researcher who measured the participant, faced the participant and placed an inelastic tape measure around the participant's waist, midway between the lower rib margin and the iliac crest (Lee & Nieman, 2009:245). The measurement was taken at the end of a normal expiration, without the tape compressing the skin (Klein *et al*., 2007:1198). The measurement was recorded to the nearest 0.1 cm.

3.4.3 Reliability and validity

The reliability and validity of the questionnaire and anthropometric measurements will now be discussed:

3.4.3.1 Reliability

Reliability is the tendency towards consistency found in repeated measurements of the same phenomenon (Burns & Grove, 2011:332). If a study and its results are reliable, it means that the same results would be obtained if the study were to be replicated by other researchers using the same instrument. The more consistent the results are that are given by the repeated measures, the more reliable the measurement procedures are (Burns & Grove, 2011:332).

i Questionnaire

The questionnaire was designed in such a way that leading questions were not asked. A number of open-ended questions were asked to allow participants to give their own answers. The order in which the questions were asked, was also carefully considered to avoid influencing the participant's answers to subsequent questions. The time required to complete the questionnaire was kept as short as possible to avoid fatigue of the participant which could lead to invalid and unreliable data. The questionnaire was compiled in English, and translated into Afrikaans and Sesotho to enable participants to answer questions in their first language.

A guideline was developed for the training of the fieldworkers to ensure that they ask questions in the same way. They were trained on the completion of the questionnaire prior to the pilot study.

ii Anthropometric measurement

All anthropometric measurements were taken by the trained researcher and trained fieldworkers with the same equipment, which ensured reliability of the measurements. Calibration of equipment and repeating measurements twice and noting the average of the two measurements, also contributed to increased measurement reliability.

The fieldworkers were trained on taking anthropometric measurements prior to the pilot study.

3.4.3.2 Validity

Validity refers to the extent to which an instrument measures what it claims to measure, as well as the degree to which evidence and theory support the interpretation of the measurement (Burns & Grove, 2011:334).

i Questionnaire

To ensure the validity of the questionnaire, questions were based on the literature related to the topic. A guideline was developed for the fieldworkers on the completion of the questionnaire to enhance the validity, since all questions and possible explanations were the same throughout. A pilot study was performed to ensure that all questions were easily understood by participants.

ii Anthropometric measurement

The validity of the anthropometric measurements was ensured by following standardised methods as recommended by Lee and Nieman (2009:166).

3.5 PILOT STUDY

A pilot study is a mini version of the larger study to guide the planning of the research (Polit & Beck, 2012:195).

The questionnaire was piloted in Mangaung Metro district in the Free State. The questionnaire for the pilot was completed with a sample of five adult patients with T2DM. The researcher and the fieldworkers completed the questionnaire in English, Afrikaans and Sesotho, and determined the time needed to complete each questionnaire, as well as how well the questions were understood by participants. After the pilot study, certain words which were found to be confusing for the participants e.g. “hypoglycaemia”, was changed to “low blood sugar”. The structure of other questions were changed to make it easier for the participants to understand e.g. instead of asking “It does not matter if I lose weight, as long as I do not eat too much bread” was changed to “Eating less bread will make me lose weight”. Questions on exercise were changed to “physical work or exercise” instead of “activities that make me sweat”.

Although the BMI and waist circumference (WC) measurements of participants fall under the “Demographic profile”, the measurements were moved to the end of the questionnaire for practical reasons.

3.6 PROCEDURES

Approval to undertake this study was obtained from the Ethics Committee of the Faculty of Health Sciences of the University of the Free State (Addendum C) and the Free State Department of Health (Addendum D). Approval for an amendment was obtained by the Ethics committee for changes made to the questionnaire.

The researcher contacted the clinic manager to inform her about the survey that would be done at the selected facilities. A copy of the approval letter from the Free State Department of Health (Addendum D) was given to her. The names of all the facilities and telephone numbers were obtained from her.

The researcher calculated the distances between the CHC centres in the five districts, and the PHC clinics that had been selected within Mangaung, and National District Hospital. Thereafter the programme for data collection was finalised.

The questionnaire was revised and finalised after the pilot study. Site visits to the selected CHC centres, PHC clinics and National District Hospital were organised by the researcher. The clinic manager was requested to make available a private area where interviews could be conducted. The researcher undertook to minimise disruption of the functions at the facility.

The clinic manager asked patients diagnosed with T2DM whether they would be interested in participating in the research. Such identified patients were approached by the researcher to participate in the study. Study participants did not lose their place in the queue and once the interview had been done, the patients returned to their place in the queue.

All participants signed an informed consent form (Addendum C) in their language of choice and an information document (Addendum F) was given to them. The researcher and fieldworker completed the relevant questionnaire (Addendum A) with the identified number of available adult T2DM patients in the facility at the time of the visit.

Data was collected by the researcher, who is Afrikaans- and English-speaking and two Sesotho-speaking fieldworkers. The researcher and fieldworkers did not wear uniforms and introduced themselves as researchers, rather than health workers to minimise it influencing the respondent's answers.

The aim and objectives of the research was explained to each participant, as well as the procedure that would be followed to complete the questionnaire (as mentioned in the information document). Patients were weighed and measured to calculate their BMI, and their waist circumference was measured, after which the questionnaire was completed in an interview with each participant

3.7 LIMITATIONS

The population size of adults with T2DM in the Free State was unknown and is regarded as a limitation as a representative sample size could not be determined.

3.8 STATISTICAL ANALYSIS

Questionnaires were coded by the researcher and fieldworkers, and data was captured by the Information and Communication Technology Services on the UFS campus. Information obtained through the questionnaire was analysed by a biostatistician at the Department of Biostatistics at the University of the Free State. Descriptive statistics, namely frequencies and percentages for categorical data and medians and percentiles for continuous data, were calculated.

Knowledge scores were calculated simply as the sum of correct answers to the knowledge items (Addendum H). Thus knowledge scores could range between 0

and 22, with 0 indicating wrong answers to all items, and 22 correct answers to all items.

The practice and attitude items, however, could indicate a positive (e.g. compliance with a recommended practice) or a negative (e.g. non-compliance with a recommended practice) component, as well as a neutral position. As such, the scoring was adjusted, so that agreement with the positive component of the item would have one score added, agreement with the negative component of the item would have one score deducted, and agreement with the neutral position would leave the score unchanged. Thus the practice scores could range between -10 (agreement with all negative item components) and +10 (agreement with all positive item components). Similarly, the attitude scores could range between -18 (agreement with all negative item components) and +18 (agreement with all positive item components).

While this did allow for direct comparison along the continuum of positive versus negative attitude, it did have one drawback, namely that middle-range scores could not distinguish between respondents who were neutral on most items, or those who were positive on some and negative on others.

For the analysis, descriptive statistics are reported as frequencies with percentages for categorical data, or as medians with ranges and means with standard deviations, for continuous data. Pearson correlations between the knowledge, attitude and practice scores are reported.

To establish whether differences existed across various categorical variables (e.g. gender), multivariate analysis of variance was computed using the general linear model (GLM) (SAS proc GLM). p-values <0.01 were considered statistically significant.

3.9 ETHICAL ASPECTS

This study forms part of Phase 1 of a bigger study with the title *"Health dialogue with adult patients with chronic diseases in the Free State: Towards a model for low and middle income countries".* Ethical approval has been obtained for the bigger study by the principle investigator, Doctor M. Reid.

The present study was directed by the three primary ethical principles on which standards of ethical conduct in research should be founded, as was expressed in the Belmont Report. The application of the principles of beneficence, respect for human dignity and justice will be discussed and how the researcher complied in this study to these principles (Polit & Beck, 2012:170).

The principle of beneficence encompasses freedom from harm and exploits probable benefits that can stem from the study (Polit & Beck, 2012:170). Harm was minimised in this study by keeping to the agreements between researcher, fieldworkers and patient as stipulated in the informed consent form. It was further minimised through ethical approval from the Ethics Committee of the Faculty of Health Sciences from the University of the Free State (Addendum C) as well as approval from the Free State Department of Health to conduct the study at facilities in the Free State (Addendum E).

Personnel of the CHC centres, PHC clinics and National District Hospital determined the willingness of T2DM patients to partake in the study. All participants signed informed consent (Addendum E) prior to the interview and an information document with the aim and objectives of the study was given to all participants before they signed the consent form (Addendum F). These forms strived to minimise harm or exploitation. Participation was voluntary and respondents were given the freedom to withdraw from the study if they wished.

Respect for human dignity is maintained in research when participants' right to full disclosure, right to autonomy and right to informed consent is adhered to (Polit & Beck, 2012:171). The consent form signed by respondents preceding the interview,

contributed to the researcher's honest commitment to respect the dignity of the respondents and so maintain their rights to full disclosure, self-determination, informed consent and confidentiality.

Respondents' rights to self-determination were honoured because respondents could decide independently, without any coercion, whether or not to participate in the study. They had the right not to answer any questions that caused discomfort, to disclose or not to disclose personal information, and to 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 participants' rights to participate or to refuse to participate in the study, in the information document (Addendum F). Each participant voluntarily signed a consent form, which could not be linked to any specific questionnaire. This ensured confidentiality of the respondents. Confidentiality of the information was further maintained by using codes in the data analysis and results.

Justice goes hand in hand with participants being treated honestly (Burns and Grove, 2011:706). The right to justice was recognised by the sampling of participants with no favouritism towards gender, age and race.

Participants were informed that the results may be published. It was made clear to them that they would not receive remuneration, and that the study would have no cost implications for them. The final report will be made available to the Free State Department of Health once completed.

CHAPTER 4

Results

4.1 INTRODUCTION

In the previous chapter the researcher presented the methodology of the survey. In this chapter the results of this study are presented. The first section will report on the profile of the participants and on their diabetes-related KAP and perceived care.

Figure 4.1 illustrates how the researcher has progressed in the research process, here reporting on the results of the survey.

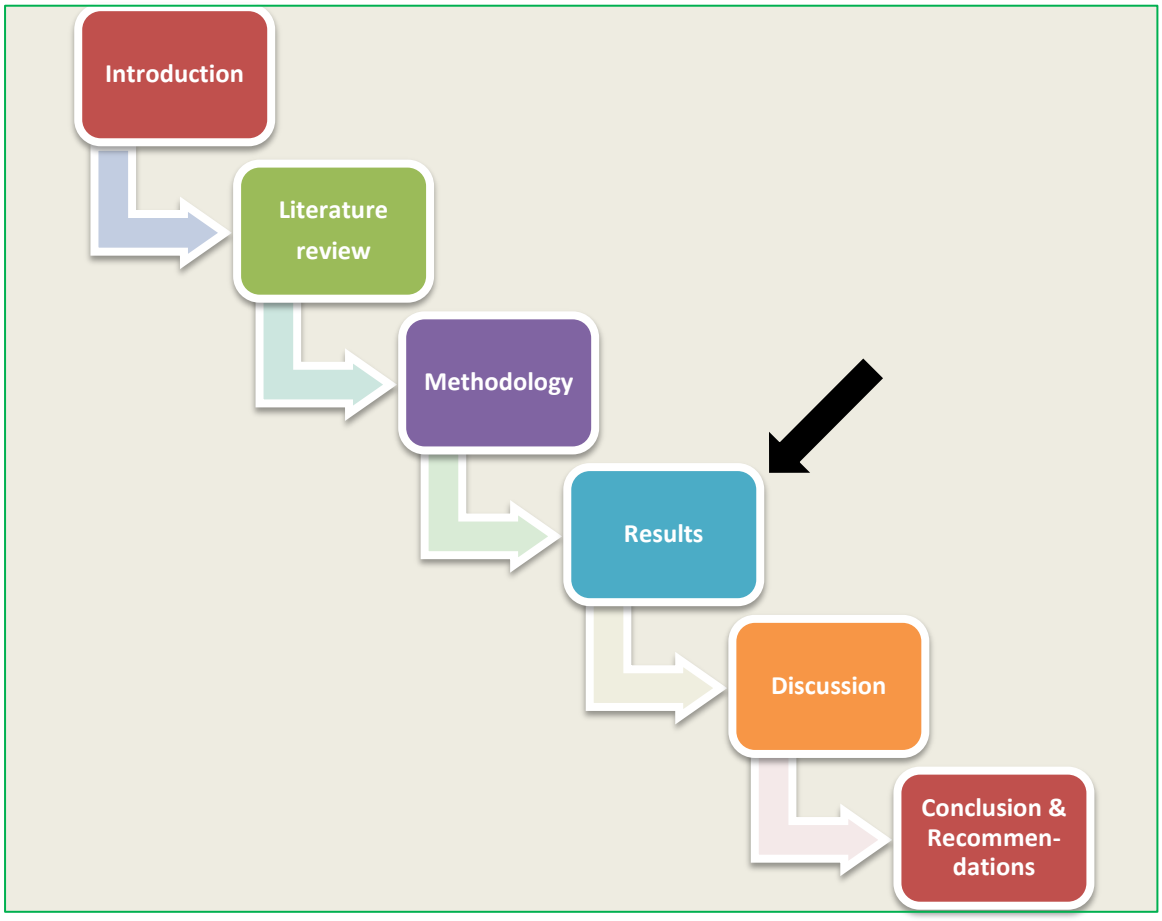

FIGURE 4.1: Development of the study: Results

4.2 PATIENT PROFILE

Of all the participants in this study, 76% were female and 24% were male. Their ages ranged from 19 to 84 years, and nearly two-thirds (64%) were Sesotho-speaking. Of participants, 56% were interviewed in their home language (Afrikaans – 6%; English – 1% and Sesotho – 49%). Setswana (17%), isiXhosa (9%), isiZulu (2%) and Shona (<1%) (Zimbabwean language) speaking participants were interviewed in either Afrikaans, English or Sesotho. Thirty one percent of participants had some high school education followed by participants with some primary school education (29%). Overall 47% that had completed primary school, 9% had completed high school and only 10 participants (4%) had a degree or diploma. Adult Basic Education and Training (ABET) was completed by 4% of participants and 10% had no schooling (Table 4.1).

TABLE 4.1: Patient profile

VARIABLE	n	%
Gender of patient		
– Male	62	24.3
– Female	193	75.7
Home language		
– Afrikaans	17	6.7
– English	3	1.2
– Sesotho	163	63.9
– Setswana	43	16.8
– IsiXhosa	23	9.0
– IsiZulu	5	2.0
– Shona	1	0.4
Highest level of education		
– No schooling	25	9.8
– ABET	9	3.5
– Some primary school	73	28.7
– Completed primary school	37	14.5
– Some high school	79	31.0
– Complete high school	22	8.6
– Diploma/Degree	10	3.9

TABLE 4.2: Median age distributions

VARIABLE	Minimum	Median	Maximum
Median age of patient	19	57	84
Median years of diagnosis	0	7	39
Median age on diagnosis	15	48	80

The median age of the participants was 57 years, with 19 years being the minimum and 84 years the maximum. The median years that participants had been diagnosed with diabetes mellitus were seven years and the median age on diagnosis, 48 years (Table 4.2).

4.3 ANTHROPOMETRIC STATUS OF PARTICIPANTS

For the purpose of this study, anthropometric status included BMI and waist circumference. The weight status of participants as indicated by BMI is presented in table 4.3

Overall, 65% of participants were classified as obese and 27% were overweight. Only 13% of participants fell in the normal weight category. The combined figure for overweight and obesity was 92% for women compared to 71% for men.

TABLE 4.3: Body mass index (BMI)

One female participant's BMI could not be calculated due to the height of the participant that was not recorded.

VARIABLE	n-254	%
Underweight	2	0.8
Normal	32	12.6
Overweight	55	21.7
Obese Class 1	79	31.1
Obese Class 2	44	17.3
Obese Class 3	42	16.5

TABLE 4.4: Body mass index: Men

VARIABLE	n - 62	%
Underweight	1	1.6
Normal	17	27.5
Overweight	21	33.9
Obese Class 1	17	27.4
Obese Class 2	3	4.8
Obese Class 3	3	4.8

TABLE 4.5: Body mass index: Women

VARIABLE	n - 192[1]	%
Underweight	1	0.5
Normal	15	7.9
Overweight	34	17.7
Obese Class 1	74	38.5
Obese Class 2	29	15.1
Obese Class 3	39	20.3

TABLE 4.6: Waist circumference

VARIABLE	n	%
Men, **>94 cm**	43	69
Women, **>80 cm**	190	98

Nearly all women (98%) and two-thirds of men (69%) had a waist circumference above the cut-off points.

4.4 QUALITY OF LIFE

The results related to the quality of life of the participants are presented in Table 4.8. Less than one third of participants (31%) considered themselves ill at the time of the research. Most of these participants (64%) had metabolic syndrome-related symptoms, and 35% had other health-related symptoms. Some of the participants had more than one illness. Most of the participants did not have problems walking around (90%), did not have problems with self-care activities, such as washing and dressing (96%) or usual activities such as work, study, housework, family or leisure

[1] One female participant's BMI could not be calculated

activities (92%). Stress or anxiety was reported by 70% of participants and 54% indicated that they felt depressed.

TABLE 4.7: Quality of life

VARIABLE	n	%
Currently ill		
– No	177	69.4
– Yes	78	30.6
Type of illness (n-78)		
– Metabolic syndrome-related symptoms	50	64.1
– Other health-related symptoms	31	35.0
– Not health-related symptoms	2	2.6
Problems walking about		
– Yes	26	10.2
– No	229	89.8
Problems with self-care such as washing and dressing		
– Yes	10	3.9
– No	245	96.1
Problems with usual activities such as work, study, housework, family or leisure activities		
– Yes	21	8.2
– No	234	91.8
Recent feelings of stress or anxiety		
– Yes	179	70.2
– No	76	29.8
Recent feelings of depression		
– Yes	138	54.1
– No	116	45.5
– Unsure	1	0.4

4.5 HISTORY OF DIABETES DIAGNOSIS

The results related to the history of diabetes diagnosis are presented in Table 4.8. Most of the participants (61%) were diagnosed after presenting with metabolic syndrome-related symptoms, followed by provider-initiated screening (24%) and then other health-related symptoms (11%). Provider-initiated screening refers to screening which is routinely recommended by health care providers to persons attending health care facilities as a standard component of medical care.

More than two-thirds (67%) of participants were on oral glucose lowering medication, 15% on a combination of oral glucose lowering medication and insulin, and 11% on insulin only. Two participants (1%) were not on medication and 6% did not specify on which glucose lowering medication they were.

Of the participants 77% were on metabolic syndrome-related medication (e.g. hypertension medication). Another 7% of participants were on ART, 5% on asthma mediation and 4% on treatment for arthritis.

TABLE 4.8: History of diabetes diagnosis

VARIABLE	N	%
Symptoms leading to diagnoses (8 participants mentioned more than one symptom)		
– Metabolic syndrome-related symptoms	155	60.8
– Other health-related symptoms	29	11.4
– Provider-initiated screening	60	23.5
– Death of family member	8	3.1
– Pregnancy	11	4.3
Medication/therapy participants currently use (some patients used a combination of medication)		
– Insulin	28	11.0
– Diabetic tablets	171	67.1
– Insulin and diabetic tablets	38	14.9
– Antiretroviral treatment (ART)	18	7.1
– Epilepsy	1	0.4
– Asthma	12	4.7
– Arthritis	10	3.9
– None	2	0.8
– Pain	2	0.8
– Metabolic syndrome-related (Hypertension, Cholesterol, Asthma, Heart, Arthiritis, Water pills)	197	77.3
– Psychological	3	1.2
– Other	7	2.8
– Diabetes unspecified	16	6.3

4.6 KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO T2DM

In the following section, the data related to KAP and T2DM will be discussed.

TABLE 4.9: Scores on knowledge, attitude and practices sections

	Mean	Min	Max
Knowledge	**8.9**	**2**	**16**
Attitude	**0.6**	**-16**	**16**
Practice	**2.2**	**-8**	**8**

4.6.1 Knowledge related to T2DM

The results related to the knowledge of participants are presented in Table 4.10. Thirty seven percent of participants indicated that family history causes diabetes, whereas 27% reported lifestyle and related factors, 17% reported emotional triggers, and 2% reported other medical conditions as the cause of diabetes mellitus. Almost half (50%) of participants where knowledgeable with regard to the normal range of blood glucose, common signs of high blood glucose (89%), and the most important thing to do when blood glucose is low (59%).

Most of the participants were unsure about the classification of food into food groups, while those who did classify it, mostly did so incorrectly. Cooking oil (66%), pap (55%), bread (50%) and milk (53%) were the only foods that were classified correctly as fat, carbohydrates and protein, respectively by half to two thirds of patients. Fruit (53%) and vegetables (53%) were wrongly classified as protein by most of the participants. The high level of “unsure” answers may reflect non-comprehension of the concepts of carbohydrate, protein and fat in this fairly low educated population.

Most of the participants were relatively knowledgeable about diabetes medication. Most of the participants correctly indicated that diabetes medication should be taken for life (86%), 73% knew that diabetes medication cannot cure diabetes, and 79% indicated that one should not stop taking your medication when feeling sick. One in four patients still did not know these important facts which all patients with diabetes should know. Of the participants, 78% indicated that poor control of diabetes could

result in a greater possibility of complications, whereas 12% reported that this statement was false, and another 10% were unsure.

Only 55% of participants correctly indicated that sore feet are common in people with diabetes, while only 31% indicated correctly that diabetes medication may cause swelling of the feet and 28% were not sure whether sore feet are common in people with diabetes. Almost half of the participants (47%) correctly indicated that people with diabetes may have poor blood circulation in their feet, while 20% incorrectly indicated that this is not the case, and a third (33%) were unsure.

Nearly all participants (96%) indicated that physical exercise is important for people with diabetes. Overall, 91% indicated that exercise helps with blood glucose control, while 83% indicated that it helps with painful feet and 91% indicated that it helps with weight loss. When participants were asked about factors that can make diabetes worse, 86% reported that blood pressure, 75% indicated that epilepsy, and 93% that being overweight, makes diabetes worse.

TABLE 4.10: Knowledge of participants with T2DM

VARIABLE	n	%
Causes of diabetes		
– Family history	96	37.6
– Lifestyle or diet-related factors	69	27.0
– Emotional triggers	42	16.5
– Other medical conditions	5	2.0
– Do not know	43	16.9
Normal range of blood glucose (n-252)[2]		
– Correct	125	49.6
– Incorrect	46	18.3
– Unsure	81	32.1
Most-common signs of high blood sugar		
– Correct	227	89.0
– Incorrect	17	6.7
– Do not know	11	4.3
The most important thing to do when you feel the beginning of low-blood sugar [3]		
– Correct	150	56.4
– Incorrect	49	18.4
– Almost correct	14	5.3
– Do not know	53	19.9
Types of health complications usually associated with diabetes		
– Death	38	14.9
– Sickness	4	1.6
– Correct	127	49.8
– Incorrect	29	11.4
– Do not know	57	22.3

[2] 3 were missing
[3] 11 participants gave more than one answer. All answers were coded

TABLE 4.10: Knowledge of participants with T2DM (continued)

VARIABLE	n	%
Food classification according to carbohydrates, protein and fat		
Cooking oil/Fish-oil		
– Carbohydrates	8	3.1
– Protein	4	1.6
– Fat	169	66.3
– Unsure	74	29.0
Food classification according to carbohydrates, protein and fat		
Pap		
– Carbohydrates	141	55.3
– Protein	24	9.4
– Fat	1	0.4
– Unsure	89	34.9
Bread		
– Carbohydrates	127	49.8
– Protein	37	14.5
– Fat	1	0.4
– Unsure	90	35.3
Lentils		
– Carbohydrates	63	24.7
– Protein	54	21.2
– Fat	1	0.4
– Unsure	137	53.7
Baked beans		
– Carbohydrates	59	23.1
– Protein	59	23.1
– Fat	2	0.8
– Unsure	135	53.0
Chicken feet		
– Carbohydrates	13	5.1
– Protein	31	12.2
– Fat	49	19.2
– Unsure	162	63.5
Organ meat		
– Carbohydrates	15	5.9
– Protein	26	10.2
– Fat	63	24.7
– Unsure	151	59.2
Vegetables		
– Carbohydrates	34	13.3
– Protein	136	53.3
– Fat	85	33.3
– Unsure		

TABLE 4.10: Knowledge of participants with T2DM (continued)

VARIABLE	n	%
Fruit		
– Carbohydrates	32	12.6
– Protein	136	53.3
– Fat	1	0.4
– Unsure	86	33.7
Milk		
– Carbohydrates	13	5.1
– Protein	135	52.9
– Fat	25	9.8
– Unsure	82	32.2
Sardines in tomato sauce		
– Carbohydrates	40	15.7
– Protein	47	18.4
– Fat	11	4.3
– Unsure	157	61.6
"Diabetes medication can cure diabetes"		
– True	47	18.5
– False	187	73.3
– Unsure	21	8.2
"Diabetes medication should be taken for life"		
– True	220	86.2
– False	19	7.5
– Unsure	16	6.3
"You should stop taking your diabetes medication when you feel sick"		
– True	37	14.5
– False	202	79.2
– Unsure	16	6.3
"Poor control of diabetes could result in a greater chance of complications"		
– True	199	78.0
– False	31	12.2
– Unsure	25	9.8
"Eating less bread will make me lose weight"		
– True	121	47.4
– False	105	41.2
– Unsure	29	11.4
"Salty food will prevent my sugar levels from dropping"		
– True	86	33.7
– False	133	52.2
– Unsure	36	14.1

TABLE 4.10: Knowledge of participants with T2DM (continued)

VARIABLE	n	%
"Diabetic medication may cause swelling of the feet"		
– True	78	30.6
– False	106	41.6
– Unsure	71	27.8
"Sore feet are common in people with diabetes"		
– True	140	54.9
– False	62	24.3
– Unsure	53	20.8
"People with diabetes may have poor circulation of blood in the feet"		
– True	120	47.1
– False	51	20.0
– Unsure	84	32.9
Physical exercise is important for people with diabetes		
– True	245	96
– False	5	2.0
– Unsure	5	2.0
Physical work or regular exercise help with:		
Blood sugar control		
– True	233	91.3
– False	5	2.0
– Unsure	17	6.7
Painful feet		
– True	211	82.8
– False	20	7.8
– Unsure	24	9.4
Weight loss		
– True	231	90.6
– False	12	4.7
– Unsure	12	4.7
Factors worsening diabetes		
High blood pressure		
– True	220	86.2
– False	19	7.5
– Unsure	16	6.3
Epilepsy		
– True	192	75.3
– False	15	5.9
– Unsure	48	18.8
Overweight		
– True	237	93.0
– False	10	3.9
– Unsure	8	3.1

4.6.2 Attitudes related to T2DM

The results related to the attitudes of the participants are presented in Table 4.12.

TABLE 4.11: Attitudes related to T2DM

VARIABLE	n	%
"If I did not have diabetes I think I would be quite a different person"		
– Disagree	42	16.5
– Neutral	7	2.8
– Agree	206	80.7
"I dislike being referred to as 'a diabetic' "		
– Disagree	181	71.0
– Neutral	3	1.2
– Agree	71	27.8
"Diabetes is the worst thing that has ever happened to me..."		
– Disagree	74	29.0
– Neutral	0	0
– Agree	181	71.0
"Most people will find it difficult to adjust to having diabetes:		
– Disagree	68	26.7
– Neutral	19	7.5
– Agree	168	65.8
"I often feel embarrassed about having diabetes"		
– Disagree	201	78.8
– Neutral	1	0.4
– Agree	53	20.8
"There is not much I seem to be able to do to control my diabetes"		
– Disagree	139	54.5
– Neutral	7	2.7
– Agree	109	42.8
"There is little hope of leading a normal life with diabetes"		
– Disagree	134	52.6
– Neutral	5	2.0
– Agree	116	45.4
"The proper control of diabetes involves a lot of sacrifice and inconvenience"		
– Disagree	107	42.0
– Neutral	11	4.3
– Agree	137	53.7

TABLE 4.11: Attitudes related to T2DM (continued)

VARIABLE	n	%
"I avoid telling people I have diabetes"		
– Disagree	86	33.7
– Neutral	1	0.4
– Agree	168	65.9
"Being told you have diabetes is like being sentenced to a lifetime of illness"		
– Disagree	118	46.3
– Neutral	8	3.1
– Agree	129	50.6
"My diabetic diet spoils my social life"		
– Disagree	118	46.3
– Neutral	8	3.1
– Agree	129	50.6
"In general, nurses need to be more sympathetic in their treatment of people with diabetes"		
– Disagree	96	37.6
– Neutral	5	2.0
– Agree	154	60.4
"Having diabetes over a long period changes the personality"		
– Disagree	85	33.3
– Neutral	8	3.1
– Agree	162	63.6
"I often find it difficult to decide whether I feel sick or well"		
– Disagree	111	43.5
– Neutral	7	2.8
– Agree	137	53.7
"Diabetes can be controlled		
– Disagree	25	9.8
– Neutral	4	1.6
– Agree	226	88.6
"There is really nothing you can do if you have diabetes"		
– Disagree	143	56.1
– Neutral	2	0.8
– Agree	110	43.1
"There is really no-one I feel I can talk to openly about my diabetes"		
– Disagree	179	70.2
– Neutral	1	0.4
– Agree	75	29.4
"I believe I have adjusted well to having diabetes"		
– Disagree	32	12.5
– Neutral	2	0.8
– Agree	221	86.7

TABLE 4.11: Attitudes related to T2DM (continued)

VARIABLE	n	%
"I often think it is unfair that I should have diabetes when other people are so healthy"		
– Disagree	122	47.8
– Neutral	2	0.8
– Agree	131	51.4

The majority of participants (81%) felt that they would be quite a different person if they did not have diabetes, and 64% felt that *"having diabetes over a long period changes the personality".*

Of the participants, 71% felt that diabetes is the worst thing that has ever happened to them, and 51% agreed that *"being told you have diabetes is like being sentenced to a lifetime of illness".* On the other hand, the majority (71%) of participants did not mind being referred to as *"a diabetic".*

Almost two-thirds of participants (66%) felt that most people find it difficult to adjust to having diabetes, 79% felt embarrassed about having diabetes, and 66% avoided telling people that they had diabetes.

Although 87% of participants agreed to the statement *"I believe I have adjusted well to having diabetes",* 45% agreed that *"there is little hope of leading a normal life with diabetes"* and 43% agreed with the statement that *"There is not much I seem to be able to do to control my diabetes".*

The majority of participants (51%) felt that their diabetic diet spoiled their social life. Although 54% agreed with the statement that *"the proper control of diabetes involves a lot of sacrifice and inconvenience",* 89% agreed that *"Diabetes can be controlled"* and 87% agreed that *"I believe I have adjusted well to having diabetes"*.

4.6.3 Practices related to T2DM

The results related to the practices of the participants are presented in Table 4.12.

TABLE 4.12: Practices related to T2DM

VARIABLE	n	%
Forgot to take diabetic medication in the last week		
– Not on medication	2	0.8
– Never	212	83.0
– Less than once	6	2.4
– Once a week	27	10.6
– 2-3 times a week	5	2.0
– Nearly every day	2	0.8
– Every day	1	0.4
Physical work or exercise done in the last week		
– Never	47	18.4
– Less than once a week	5	2.0
– Once a week	27	10.6
– 2-3 times a week	64	25.1
– Nearly every day	34	13.3
– Every day	78	30.6
Average time physical work or exercise lasted		
– 10-20 min	6	2.4
– 20-30 min	40	15.7
– More than 30 min/day	162	63.5
– Did not do physical work or exercise in the last week	47	18.4
Frequency of eating refined starch, such as white bread or cake		
– Never	94	36.8
– Once a month	83	32.6
– Nearly once a week	51	20.0
– Nearly every day	14	5.5
– Every day	10	3.9
– Once per week	3	1.2
Frequency of eating fatty food, like slap chips or vet koek		
– Never	87	34.0
– Once a month	79	31.0
– Nearly once a week	67	26.3
– Nearly everyday	19	7.5
– Every day	1	0.4
– Once per week	2	0.8

TABLE 4.12: Practices related to T2DM (continued)

VARIABLE	n	%
Frequency of eating food with lots of salt, like Russians or poloni or using stock cubes in food preparation		
– Never	88	34.5
– Once a month	69	27.1
– Nearly once a week	59	23.1
– Nearly every day	28	11.0
– Every day	9	3.5
– Once per week	2	0.8
Frequency of eating vegetables		
– Never	1	0.4
– Once a month	2	0.8
– Nearly once a week	77	30.2
– Nearly every day	71	27.8
– Every day	99	38.8
– Once per week	4	1.6
– When I have money	1	0.4
Frequency of eating fruit		
– Never	8	3.1
– Once a month	10	3.9
– Nearly once a week	57	22.4
– Nearly every day	46	18.0
– Every day	128	50.2
– Once per week	1	0.4
– When I have money	5	2.0
Mostly drank		
– Diet/lite soft drinks	89	34.9
– Sweetened soft drinks	87	34.1
– Low-sugar soft drinks	3	1.2
– Do not drink soft drinks	66	25.9
– Unspecified	3	1.2
– Diluted juice	7	2.8
Frequency of drinking these soft drinks		
– Never	1	0.4
– Once a month	26	10.2
– 2-3 times a month	50	19.6
– Weekly	39	15.3
– 2-3 times a week	43	16.9
– Nearly every day	16	6.3
– Every day	14	5.5
– Do not drink soft drinks	66	25.8

TABLE 4.12: Practices related to T2DM (continued)

VARIABLE	n	%
Frequency of alcoholic drinks in the last month		
– Never	209	82.0
– Once a month	22	8.6
– 2-3 times a month	10	3.9
– Weekly	10	3.9
– Every day	1	0.4
– Special occasions	3	1.2

The majority of participants (83%) reported that they never forget to take their medication and 14% that they regularly skip their medication. Only one third of participants (31%) did physical work or exercise every day, and 64% indicated that the physical work or exercise lasted for more than 30 minutes per day.

Only a third of participants reported that they never ate refined starch, such as white bread or cake (37%), fatty food, like slap chips or vetkoek (34%) and food with lots of salt, like russians or poloni or used stock cubes in food preparation (35%).

Vegetables (39%) and fruit (50%) were eaten every day by a large percentage of participants. Diet/lite soft drinks were used by about a third of participants (35%) and 26% used juice that were diluted. Sweetened soft drinks were used by 34%. Almost 20% of the participants used soft drinks 2–3 times a month followed by 2–3 times a week (17%) and weekly (15%). The majority of participants did not drink an alcoholic drink in the preceding month (82%).

4.7 PERCEIVED CARE

The results related to the perceived care of the participants are presented in Table 4.13.

Diabetes-related services include screening of patients, education on lifestyle modification, monitoring of blood glucose and monitoring of medication adherence. An average of 90% of participants was satisfied with all the diabetes-related services they received at the facilities, except for the waiting times, with which only about 60% were satisfied.

Participants who received nutrition counselling, received it mostly from nurses (50%) followed by dietitians (44%).

TABLE 4.13: Perceived care

VARIABLE	N	%
Facility comfort (n-253 due to 2 patients attending facility for the first time)		
– Yes	243	96.1
– No	9	3.5
– Uncertain	1	0.4
Perception of diabetes-related services in facilities:		
Medical care provided		
– Satisfied	246	96.4
– Dissatisfied	7	2.8
– Not applicable	2	0.8
Complaint procedure		
– Satisfied	209	82.0
– Dissatisfied	14	5.5
– Not applicable	32	12.5
Cleanliness		
– Satisfied	246	96.4
– Dissatisfied	7	2.8
– Not applicable	2	0.8
Privacy during examinations		
– Satisfied	246	96.5
– Dissatisfied	4	1.5
– Not applicable	5	2.0

TABLE 4.13: Perceived care (continued)

VARIABLE	N	%
Confidentiality of records		
– Satisfied	217	85.1
– Dissatisfied	5	2.0
– Not applicable	33	12.9
Respect shown by most nurses		
– Satisfied	242	94.9
– Dissatisfied	11	4.3
– Not applicable	2	0.8
Respect shown by most doctors		
– Satisfied	237	92.9
– Dissatisfied	6	2.4
– Not applicable	12	4.7
Health information about diabetes		
– Satisfied	228	89.4
– Dissatisfied	10	3.9
– Not applicable	17	6.7
Information on medication use		
– Satisfied	239	93.7
– Dissatisfied	4	1.6
– Not applicable	12	4.7
Information on lifestyle changes		
– Satisfied	232	91.0
– Dissatisfied	6	2.4
– Not applicable	17	6.6
Opportunity to ask questions		
– Satisfied	227	89.0
– Dissatisfied	13	5.1
– Not applicable	15	5.9
Language used by staff		
– Satisfied	252	98.8
– Dissatisfied	2	0.8
– Not applicable	1	0.4
Hours facility open		
– Satisfied	249	97.6
– Dissatisfied	5	2.0
– Not applicable	1	0.4
Waiting time		
– Satisfied	152	59.6
– Dissatisfied	101	39.6
– Not applicable	2	0.8

TABLE 4.13: Perceived care (continued)

VARIABLE	N	%
If you received nutrition counselling, by whom?		
– Dietitian	76	44.2
– Nurse	88	50.0
– Doctor	6	2.4
– Nurse and dietitian	1	0.5
– Counsellors	1	0.5
– Did not receive nutrition counselling	83	31.8

4.8 ASSOCIATIONS BETWEEN VARIABLES

Associations between KAP and other variables (gender, level of education, counselling received, facility visited, years of diagnosis, BMI and waist circumference) were determined and are indicated in the following tables.

4.8.1 Associations between KAP of participants with T2DM

The correlation between KAP of participants with T2DM is shown in Table 4.14. The only statistically significant correlation was found between Knowledge and Attitudes, indicating that better knowledge about diabetes could be associated with a more positive attitude towards diabetes.

TABLE 4.14: Pearson correlation between knowledge, attitudes and practices of participants with T2DM

VARIABLE	N	Knowledge	Attitudes	Practices
Knowledge	255		0.33**	0.1
Attitudes	255			1

** p<0.01 were considered significant

TABLE4.15: GLM analysis of mean KAP scores compared by gender

		MEAN			
VARIABLES	N	Male (n=62)	Female (n=193)	F Value	P
Knowledge	255	8.7	9.1	1.2	0.3
Attitude score	225	0.2	0.8	0.3	0.6
Practice score	255	2.2	2.3	0	0.9

The GLM analysis showed that the males and females did not differ significantly in either their Knowledge, Attitude, or Practice scores.

TABLE 4.16: GLM analysis of mean KAP scores compared by level of education

	MEAN				
VARIABLES	*1 (n=107)	**2 (n=116)	***3 (n=32)	F Value	P
Knowledge score	8.5	9.2	9.9	5.1	
Attitude score	0.1	0.2	3.8	4.3	
Practice score	2.4	2.2	2.0	0.2	0.8

**Group1: No schooling, ABET and some primary school*
***Group2: Completed primary school and some high school*
****Group 3: Completed high school and diploma or degree*

The GLM analysis shows that the respondents in the various educational groups did differ significantly in terms of their Knowledge and Attitude scores, but not, interestingly, in their practice scores. When looking at the various groups in more detail by means of an ANOVA with a post hoc Scheffé test, it was found that, of the three possible inter-group comparisons, the only significant difference was between group 3 and group 1, with group 3 showing much higher knowledge scores than respondents in group 1. For the attitude scores, the post hoc analysis showed that the respondents in group 3 had markedly (and significantly) more positive attitudes than respondents in both groups 1 and 2, although respondents in groups 1 and 2 scored about the same on the attitude scores.

TABLE 4.17: GLM analysis of mean KAP scores compared by counsellor (dietitian, nurse, doctor, or no counselling)

	MEAN					
VARIABLES	Dietitian (n=76)	Nurse (n=88)	Doctor (n=6)	No counselling (n=79)	F Value	P
Knowledge score	8.9	8.9	9	9.3	0.5	0.7
Attitude score	0.4	0.7	0	1.0	0.1	1
Practice score	2.8	2	3	1.9	1.5	0.2

Unexpectedly, there was no noteworthy difference in KAP of participants that received counselling from a dietitian, nurse, doctor or no counselling at all.

TABLE 4.18: GLM analysis of mean KAP scores compared by facilities visited

MEAN				
VARIABLES	Mangaung facilities (n=169)	Country facilities (n=86)	F Value	P
Knowledge score	9.1	8.6	3	0.1
Attitude score	1.1	-0.3	2.5	0.1
Practice score	2.3	2.0	0.5	0.5

The mean KAP scores of participants from facilities in Mangaung and more rural areas did not differ significantly.

TABLE 4.19: GLM analysis of mean KAP scores compared by years of diagnosis

MEAN				
VARIABLES	<10 years (n=91)	>10 years (n=151)	F Value	P
Knowledge score	8.8	9.3	0.1	0.2
Attitude score	0.9	0.5	-0.1	0.4
Practice score	2.0	2.7	0.2	

The p-value of 0.01 shows that there was a significant association between practices of participants and years of diagnosis, with those being diagnosed with diabetes more than 10 years ago, having a higher median score (2.7) than participants that were diagnosed with diabetes within the past ten years (2.0) (p=0.01).

TABLE 4.20: GLM analysis of mean KAP scores compared by BMI

MEAN					
VARIABLES	U/w and normal (n=34)	Overweight (n=55)	Obese class 1, 2 & 3 (n=165)	F Value	P
Knowledge score	9.0	8.6	9.0	0.1	0.3
Attitude score	0.2	0.5	0.6		0.9
Practice score	3.0	2.9	1.9	-0.1	0.1

TABLE 4.21: Association between KAP and waist circumference

	MEAN				
VARIABLES	<80 cm (n=7)	80-87.9 cm (n=11)	>88 cm (n=236)	F Value	P
Knowledge score	8.3	8.9	9.0		0.6
Attitude score	-0.4	-0.2	0.7		0.8
Practice score	1.0	2.3	2.3		0.7

No association between KAP and BMI or waist circumference was found in this sample.

4.9 Summary

Poor knowledge, a negative attitude and poor practices related to diabetes, were observed in a high percentage of the participants included in this study. A statistically significant correlation was found between knowledge and attitudes, indicating that better knowledge about diabetes could be associated with a more positive attitude towards diabetes. Unfortunately this did not translate to improved behaviour. Participants with a higher level of education obtained higher scores in questions related to knowledge and attitude about diabetes, but not, interestingly, in their practice scores.

CHAPTER 5

Discussion

5.1 INTRODUCTION

The main objective of this study was to compile a profile of demographic and associated factors of adult patients with T2DM and to determine their KAP and perception of care. In this chapter, the results will be discussed, possible reasons for findings will be given and results will be compared to the findings of other relevant studies.

Figure 5.1 illustrates how the researcher progressed in the research process, here discussing the results of the study.

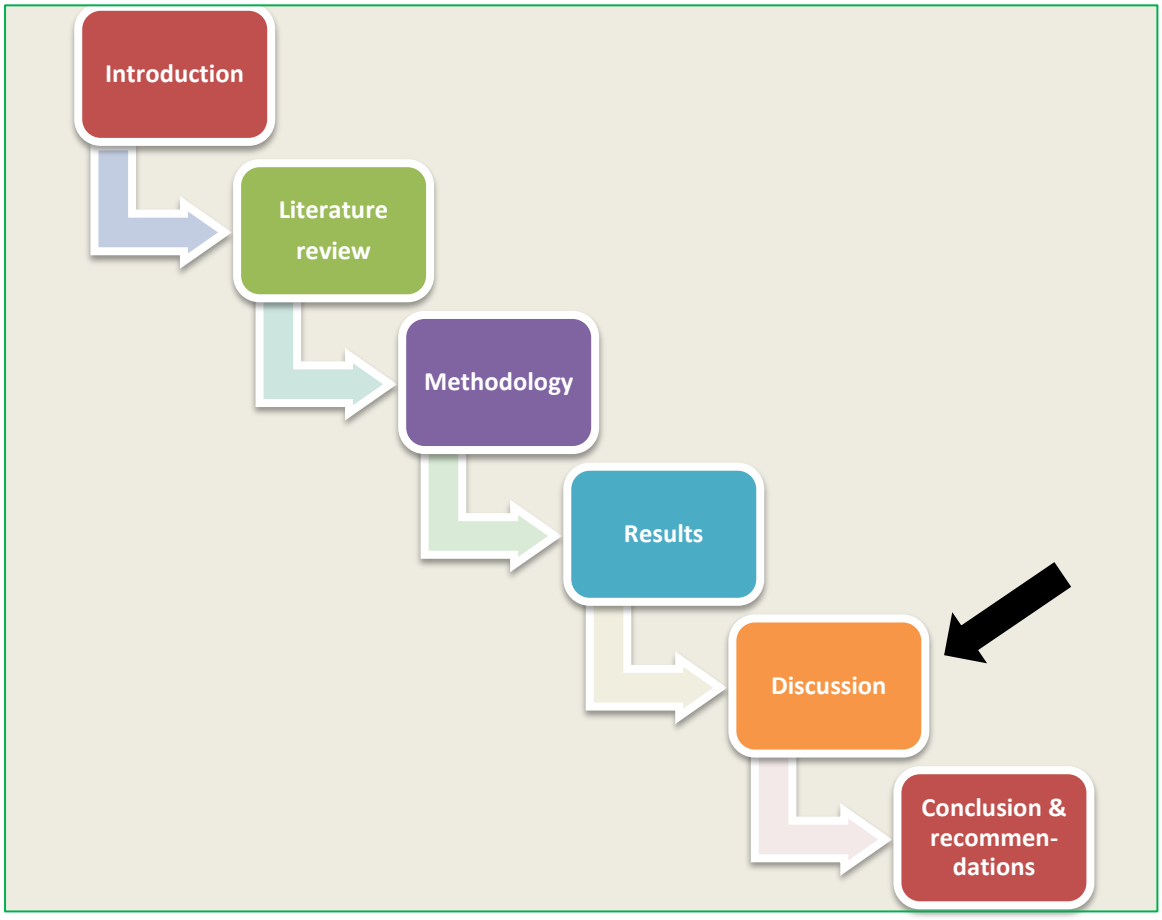

FIGURE 5.1: Development of the study: Discussion

5.2 LIMITATIONS

Although every effort was made to determine the number of adults with T2DM treated at PHC clinics and CHC centres in the Free State before the study was initiated, this information was not available. For this reason the population size was unknown and as a result a representative sample size could not be determined. In an effort to overcome this limitation and improve representation, the researcher included all the CHC centres in the Free State as well as PHC clinics of one district (Mangaung). Patients with T2DM tend to attend CHC centres for follow-up care rather than PHC clinics mainly because medical doctors are often stationed at CHC centres, but not at PHC clinics.

Language was a potential limitation. Since the majority of the participants were black Africans with Sesotho as their first language, the researcher compensated for the language barrier by including Sesotho-speaking fieldworkers. Interviews were thus conducted in Afrikaans, English or Sesotho as preferred by the participant. There were, however, a number of participants who had another language as their home language (e.g. Xhosa) and thus had to choose in which of these three languages they preferred to be interviewed in.

The KAP model that was chosen as theoretical framework of the study comprised Ajzen's theory of planned behaviour. According to this model, knowledge is no guarantee for healthy behaviour, nor is ignorance necessarily the main cause of unhealthy behaviour. Improved knowledge is therefore not sufficient to bring about behaviour change. According to Ajzen *et al*. (2011:101) attitude is a prerequisite for behaviour change and is influenced by different beliefs. In practice, the knowledge component of the questionnaire applied in the present study did not include the aspects of "beliefs" that are suggested in the model, since this tended to result in repetition of similar questions that could have confused the participants, many of whom were illiterate. To overcome this limitation, the researcher linked some of the questions related to knowledge and practice to beliefs that could be applied to the present study, e.g. although the majority of the participants were knowledgeable

about the benefits of physical exercise, few engaged in regular exercise. Possible reasons could be ascribed to previous efforts to engage in exercise, but which were not sustained resulting in the belief that exercise is not a viable option for them.

Finally, the fact that fasting blood glucose or HbA1c levels were not determined in participants meant that it was not possible to determine whether self-management activities were implemented successfully. In view of the high rates of obesity and overweight that were identified (also an indicator of poor compliance), as well as the relatively “healthy” reported practices on food consumption, this information would have been a valuable addition to the study.

5.3 PATIENT PROFILE

In the present study, data was collected from 22 public health facilities in the Free State of which 60% were in urban areas and 40% in rural areas. Two thirds (66%) of the study population were from Mangaung which comprised the urban area. This is in line with the demography of the country which indicates that more than half (55%) of the population reside in urban areas (Statistics South Africa, 2014:3) and thus supports the representation of the sample.

The mean age of participants was 57 years and the mean age of diagnosis 48 years. This concurs with a South African study by Peer *et al*. (2012:4) noting that the prevalence of T2DM increases in people over 45 years, which is the trend in low and middle income countries. In contrast with these findings, the Asian population tend to develop T2DM at a younger age due to a greater tendency for abdominal obesity resulting in insulin resistance (Goh, Rusli & Khalid, 2015:191). The higher incidence of diabetes in the South African Asian population who are overweight, has also been noted in a study by Bradshaw *et al*. (2007:700).

The predominance of females (75%) in the present study was consistent with the findings of Erasmus *et al*. (2012:844) who studied the coloured population in the Western Cape Province, and Tumbo and Kadima, (2013:3), who studied patients with T2DM in North West Province. They attributed the increased risk for females to

develop T2DM to glucose intolerance which is associated with higher visceral fat compared to men (who tend to be more physically active). In a bi-racial study undertaken in America, Nguyen, Xu, Chen, Srinivasan and Berenson (2012:1343) noted that the incidence of T2DM was very prevalent in black middle-aged females.

Black Africans were previously disadvantaged in South Africa, and the majority of them still depend on public health facilities for their health needs (Harris, Goudge, Ataguba, Mcintyre, Nxumalo, Jikwana & Chersich., 2011:S10). The majority (92%) of the participants in the present study spoke an African language at home, which is a reflection of the national distribution where the majority (80.2%) of citizens are black, followed by coloureds (8.8%), whites (8.4%) and Indian (2.5%) (Statistics South Africa, 2014:3). Almost 64% of the participants in the present study spoke Sesotho as a home language, which is in line with the demographics of the Free State province where the majority of the population speak Sesotho (64.2%) followed by Afrikaans (12.7%) (SouthAfrica.info, 2015).

In the present study, only 8.6% of participants had completed high school and only 4% had a tertiary qualification. A further 10% of participants were illiterate, which may be attributed to the inequalities in education in South Africa during *apartheid* (Moodley & Rambiritch, 2007:16c). Similar results were reported in the SANHANES-1(2012) study in South Africa which reported that 8% of the study sample was illiterate (Shisana *et al*., 2013:67).

5.4 WEIGHT STATUS

Worldwide, T2DM is closely associated with overweight and obesity (Xu *et al*., 2010:4). In the present study the combined figure for overweight or obesity was an overwhelming 87% of participants; 92% women and 71% men. These findings concur with other studies undertaken in South Africa amongst different population groups, where women were found to be more overweight and obese than men (Motala, Esterhuizen, Pirie, & Omar, 2011:1785; Peer, Lombard, Steyn, Gwebushe & Levitt, 2014:2; Kruger, Schutte, Walsh, Kruger & Rennie, 2015:1071). The SANHANES-1 study has also reported high rates of overweight and obesity in the

general population, namely 65% for women and 31% for men (Shisana *et al*., 2013:9).

The high prevalence of overweight and obesity in the South African population is of great concern as it hinders the government's vision of "a long and healthy life for all South Africans" due to higher morbidity and mortality rates related to obesity and the associated NCDs (South Africa, Department of Health, 2010:3). A recent survey amongst a black population in Cape Town indicated that the situation is worsening as the rates of overweight and obesity have increased in females younger than 45 years over the past decades (Peer *et al*., 2014:2).

The rapid urbanisation in South Africans over the past 20 years has resulted in a nutrition transition, characterised by a transition from healthier traditional diets to a more Western unhealthy diet and sedentary lifestyle. Contributing reasons include socioeconomic development resulting in higher income and purchasing power. Changes in diet include eating more refined foods and carbohydrates, animal protein, saturated fat, vegetable oils, salt and sugar. This lifestyle pattern is further associated with lower energy expenditure, also contributing to overweight and obesity (Vorster, 2013:34).

5.5 QUALITY OF LIFE

Quality of life is an important outcome measurement for interventions aimed at making lifestyle changes (Goh *et al*., 2015:191). In the present study 70% of participants reported feeling stressed and 54% depressed. In general, studies have found a negative association between depressive symptoms and generic quality of life in patients with T2DM (Hermanns, Kulzer, Krichbaum, Kubiak, & Haak, 2005:6; Schram *et al*. 2009:114). The high incidence of depression (54%) found amongst participants in the present study was higher than that reported in the study by Hermanns *et al*. (2005:6) undertaken in Germany amongst patients with T2DM where 33% of participants reported suffering from depression.

Depression has been identified as one of the most common barriers to self-care activities (Daly *et al*., 2009:288). The high percentage of stress and depression in participants in the present study might be one of the reasons why participants performed poorly in diabetes-related practices (see 5.7.3). Although the causes of depression and stress were not assessed in the present study, it is possible that beliefs of participants, such as perceptions of being alone and unsupported, could have increased the chances of feeling depressed (Goh *et al*., 2015:191; Browne *et al*., 2015:137) and hence affected the patients' favourable or unfavourable evaluation of the behaviour in question. This finding supports Ajzen's TPB that behavioural beliefs affect a person's attitude and the outcome of his/her behaviour (Ajzen *et al*., 2011:102).

In addition to the high rates of depression reported in the present study, 30% of participants indicated that they were ill at the time of the research. Despite this, an average of 90% did not report any problems with general self-care activities. Interestingly, Harris *et al*. (2011:4) noted that black Africans are more prone to report poor health compared to other races.

5.6 HISTORY OF DIABETES DIAGNOSIS

The history of diabetes diagnosis in the present study included aspects that contributed to the participants' diagnosis. The majority of the participants (69% of males and 98% of females) had a WC above the cut-off points of 94 cm and 80 cm respectively, which are associated with an increased risk of developing T2DM in both genders (Wassink *et al*., 2011:935; Erasmus *et al*., 2012:844). It was therefore not surprising that the majority (61%) of participants were diagnosed with T2DM following metabolic-syndrome related symptoms and another 11% with other health-related symptoms. This might be an indication of the poor screening for NCDs in the primary healthcare system, especially in high-risk individuals (Peer *et al.,* 2012:7; Tumbo & Kadima, 2013:4). In the present study only 23.5% of participants were diagnosed following provider-initiated screening. This concurs with studies in the Free State and Western Cape that have shown that T2DM is often not diagnosed (Groenewald *et al*., 2009:502; Erasmus *et al*., 2012:844; Van Zyl *et al*., 2012:3).

Nearly 80% of participants in the present study were on treatment for metabolic syndrome-related illnesses. Furthermore, two thirds were using oral glucose-lowering tablets, 11% were on insulin and 15% on both tablets and insulin. Another 7% of participants were on ART, 5% on asthma medication and 4% on treatment for arthritis. An alarming 13.8% of participants reported that they regularly skipped their medication which could be detrimental to their blood glucose levels. Complex medication regimens can furthermore cause a significant barrier to medication adherence and lead to uncontrolled blood glucose and long-term complications (Huang *et al*., 2007:2482; Kocurek, 2009:82).

5.7 KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO T2DM

It is a common assumption that improvement in KAP would be the answer to the diabetic epidemic. However, researchers agree that even if a positive relationship exists between KAP, it does not always translate to behaviour change (Delamater, 2006:76; Ng *et al*., 2012:727; Gautam, Bhatta & Aryal, 2015:5), which is also supported by Ajzen's TPB (Ajzen *et al*., 2011:101).

Several studies have observed a low level of good knowledge, positive attitudes and healthy practices in patients with T2DM. These findings have been reported in patients with T2DM in the United Arab Emirates (Al-Maskari, El-Sadig, Al-Kaabi, Afandi, Nagelkerke & Yeatts, 2013:7) and Nigeria (Jasper, Ogundunmade, Opara, Akinrolie, Pyiki, & Umar, 2014:3).

5.7.1 Knowledge

The different contexts of studies make it difficult to compare results on knowledge as most studies have used different instruments, included participants from different ethnic or age groups and included participants with varying literacy levels (Jasper *et al*., 2014:3).

In the present study the mean knowledge score was 8.9 out of 21 (42%). The questions related to the classification into food groups were not included in the knowledge score due to the poor responses, which could have been due the participant's low literacy level. Furthermore, only 56% of participants were interviewed in their home language. Almost a third (28%) of the total participants spoke a language other than Afrikaans, English or Sesotho at home namely, Setswana (17%), isiXhosa (9%),isiZulu (2%) and 4% spoke Shona (a Zimbabwean language). These participants chose to be interviewed in Sesotho.

The poor literacy level of participants, as well as their beliefs about T2DM might be factors that contributed to low scores for diabetes-related knowledge (Maina, Ndegwa, Njenga & Muchemi, 2011:17; Parker *et al*., 2012:2; Sweileh, Zyoud, Abu Nab'a, Deleq, Enaia, Nassar & Al-Jabi, 2014:7). Patients with T2DM might have certain beliefs that eventually influence their behaviour or practices. These beliefs do not necessarily depict the level of knowledge of the patient. For example, patients in previous studies, were sometimes in denial about T2DM due to the stigma associated with having the disease, while others referred to their condition as *"the will of God"* (Adams & Carter, 2010:4). Patients with T2DM in Limpopo Province believed that T2DM was the result of being bewitched and they did not acknowledge that T2DM is a chronic condition that cannot be cured. It should be noted that the illiteracy rate in that study was, however, much higher (24%) than in the present study (10%) (Nthangeni, Steyn, Alberts, Steyn, Levitt, Laubscher, Bourne, Dick, & Temple, 2002:331).

Regular monitoring of blood glucose is an important aspect of self-management to delay the onset of complications (Parry *et al*., 2006:97; Deshpande *et al*., 2008:12554). In the present study only half of the participants knew what the normal range of blood glucose was which poses a challenge for self-management. If patients with T2DM are not knowledgeable about blood glucose levels, regular monitoring will be of no value and their risk for complications will increase. Despite this, almost 90% knew the common signs of high blood glucose and two thirds were knowledgeable about complications associated with diabetes. These results concur with studies undertaken amongst patients with T2DM in India (Gulabani *et al*., 2008:205; Gul, 2010:130).

Most participants in the present study were ignorant about food groups, especially vegetables and fruit which were mostly classified as protein. Similar results have been reported by Kwon, Wyatt, Kranick, Islam, Devia, Horowitz and Trinh-Shevrin (2015:s549) in New York City where the relationship between health-related quality of life and fruit and vegetable intake amongst participants from minority groups were studied. Gul (2010:130) also reported that only a few patients with T2DM in his study, undertaken in Pakistan; could correctly answer questions regarding dietary requirement in diabetes. The low level of nutritional knowledge of participants is of concern as healthy eating habits are a pivotal aspect of treatment and being ignorant about food groups, increases the risk of high or low blood glucose levels, resulting in complications in both the short and long term (Vijan *et al*., 2004:35; Jasper *et al*., 2014:3).

In South Africa, starchy foods are part of traditional eating patterns due to their availability and affordability (Vorster, 2013:33). The National Food Based Dietary Guidelines promote the intake of sufficient dietary carbohydrates from minimally processed, traditional and indigenous foods that are rich in starch (Vorster, 2013:28). This recommendation is protective against overweight and should form the basis of all meals.

The SANHANES-1 study reported that 56% of participants in the Free State wrongly believed that *"starchy foods like bread, potatoes and rice make people fat"* (Shisana *et al*., 2013:14). The percentage of participants from other provinces that held this misconception was even higher than in the Free State. These results concur with results from the present study where nearly half (47.5%) of the participants reported *"eating less bread will make me lose weight"*.

Almost all (93%) of the participants agreed that overweight worsens diabetes, despite the high prevalence of overweight and obesity. This finding is also line with Ajzen's TPB that knowledge does not necessarily translate into practice (Ajzen *et al*., 2011:101). Only 30% of the participants reported feeling ill and only 10% reported experiencing problems with general self-care activities. This poor recognition of the consequences of overweight and obesity has been reported in several other studies

in South Africa (Faber & Kruger, 2005:242; Puoane & Hughes, 2005:14). The perception of being healthy whilst being overweight or obese, seems to be a major challenge and might explain the poor practice score identified in this study. This finding supports Ajzen's TPB that attitude and motivation are prerequisites for behaviour change (Ajzen *et al*., 2011:102).

In the present study participants were relatively knowledgeable about glucose lowering medication. Sweileh *et al*. (2014:4) reported similar results in their study amongst patients with T2DM in Palestine. However, beliefs about medication, such as medicines are harmful, influenced their participants' adherence, despite them being knowledgeable about their medication. A study done in Barbados reported that patients did not take their medication when they were asymptomatic, despite counselling given in this regard (Adams & Carter, 2010:5). These authors concluded that patients should be charged for medication to ensure that it is valued. This is in line with Ajzen's TPB that beliefs determine perceived behavioural control, which influences the attitude and intention of the behaviour in question (Ajzen *et al*., 2011:102).

5.7.2 Attitude

In the present study the majority of participants (80%) felt that they would be a different person if they did not have diabetes and 71% felt that diabetes was the worst thing that had ever happened to them. More than half of the participants felt that the proper control of diabetes involves a lot of sacrifice and inconvenience. All of these findings would seem to indicate a relatively negative attitude amongst the participants in the present study toward their condition.

Negative attitudes amongst older participants have been described in other studies (Al-Maskari *et al*., 2013:6; Islam, Chakrabarti, Dirani, Islam, Ormsby, Wahab, Critchley, & Finger, 2014:9). In a study undertaken in Ethiopia amongst patients older than 50 years with T2DM, older participants were found to be less motivated to engage in recommended diabetic practices than younger participants (Feleke, Alemayehu & Adane, 2013:117).

This finding is a cause for concern as the majority of patients with T2DM are in the older age group and, according to Ajzen's TPB, attitude predicts intentions which are generally good predictors of behaviour (Ajzen *et al*., 2011:116). The poor practices in the present study might be attributed to the negative attitude of participants and their poor knowledge of diabetes.

On the more positive side, the majority of participants in the present study (86%) agreed that they have adjusted well to diabetes and 70% of participants agreed that they had someone to talk to about their diabetes. Ajzen's TPB classifies social support under subjective norms that are assumed to guide intentions and behaviour (Ajzen *et al*., 2011:102). Due to the high percentage of social support experienced by the participants in the present study, a better practice score was anticipated. However, the social support may have included other aspects of support such as their doctor or diabetic nurse and not necessarily their spouse or a close friend who supported them emotionally.

5.7.3 Practices

The mean practice score in the present study was 2.2 out of a possible 10. The low average score of the group was mainly due to low levels of physical exercise and poor eating habits. This was however not surprising taking into account the low knowledge level and negative attitude of the participants. These findings were consistent with the findings by Saaddine *et al*. (2006:468) who studied patients with T2DM in the United States.

Ajzen's TPB was supported in the participants' knowledge and practice of physical exercise. The majority (96%) of the participants were knowledgeable about the benefits of physical exercise, while only 30% reported exercising every day during the previous week. The poor practices were also reflected in the high rates of overweight and obesity which could partly be attributed to a lack of physical activity and a sedentary lifestyle (Moodley & Rambiritch, 2007:16a). The results from the present study concur with those of the study by Jasper *et al*. (2014:17) amongst patients with T2DM in Nigeria. Ayele *et al*. (2012:5) further noted that regular

exercise was also the least practiced behaviour in their research amongst patients with T2DM in Ethiopia. The fact that people tend to make use of public transport instead of walking and spend a large percentage of their time watching television, may contribute to sedentary lifestyles. Furthermore, it might be uncomfortable for people who are overweight and obese to engage in physical exercise and they might also be sensitive to negative opinions of people of importance to them, which supports Ajzen's TPB that behaviour is influenced by social support such as that provided by spouses and close friends (Ajzen *et al*., 2011:102).

A certain degree of disagreement existed between the high prevalence of overweight and obesity and the relatively *"healthy"* practices on food consumption as reported. Almost a third of participants reported regular (once a week or more) consumption of refined starches, fatty and high-salt food, 50% ate fruit and 38% ate vegetables every day, and 30% consumed sweetened soft drinks. This finding could be attributed to the high percentage of participants who had previously received nutrition counselling (66%), and knew what they were supposed to eat, perhaps influencing their likelihood of giving the desired answers. Other possible reasons may be the reluctance of overweight and obese patients to change their eating habits, as well as underreporting of food intake, which is a well-recognised challenge in weight management (Hankey, Eley, Leslie, Hunter, & Lean, 2003:341).

5.8 PERCEIVED CARE

In the present study, 90% of participants were satisfied with the diabetes-related services they received at public health facilities. This is in line with a study by Harris *et al*. (2011:14) where 80% of participants reported being treated with respect by health providers in the public sector in South Africa. In contrast, in a study by Parker in the Western Cape amongst patients with chronic diseases of lifestyle, only 16% were satisfied with services received at PHC clinics and CHC centres (Parker, 2008:172).

Dissatisfaction with waiting times was the only negative aspect of care experienced by almost 40% of participants in the present study. This concurs with other studies in

South Africa which highlighted waiting times as a major challenge. In a household survey, undertaken by Harris *et al*. (2011:14), 38% of participants reported that waiting times in public health facilities were unsatisfactory, and Parker (2008:172) reported that 34% of participants waited too long to see a health professional. Adams and Carter (2011:6) warn that long waiting times can hamper access to primary health care due to the possible economic cost to the patient and difficulty in getting permission for time off work.

Nearly 52% of participants in the present study had received nutrition counselling from a professional nurse, 45% from a dietitian and 2% from a doctor. Almost a third of participants had never received counselling. This latter percentage is lower than in the percentage reported by Gul (2010:130) in Pakistan where half of the patients had never received counselling and those that had, had received it from the doctor.

In the present study, the researcher anticipated a higher knowledge score especially with regards to nutrition knowledge, due to the relatively high percentage of participants who reported having received nutrition counselling. Information on the context of the counselling was however not explored. It is possible that only one counselling opportunity had been experienced and that it only touched on a single aspect of care.

According to Mayosi *et al*. (2012:12) the counselling currently given in public health facilities in South Africa is mostly traditional and disease-orientated and it poorly responds to the individual needs of patients. Furthermore, patient priorities and preferences are often in conflict with recommendations on lifestyle changes (Wermelink *et al*., 2014:6), which supports Ajzen's TPB, namely that behavioural beliefs guide attitude and the intention to conduct the required behaviour (Ajzen *et al*., 2011:102).

Studies in South Africa (Parker, 2008:60) and Australia (Hollis, Glaister & Lapsley, 2014:238) have reported that the nutrition knowledge of nurses' and doctors' nutrition knowledge was deficient, resulting in confusing and inconsistent dietary advice to patients. Despite this, the majority of participants in the present study (90%) indicated that they were satisfied with health information and information on

lifestyle changes received from health workers. This may be attributed to people with low literacy not always feeling comfortable communicating with health workers. They might also feel pressurised to *"agree"* with the information given even if they do not fully understand what is being conveyed to them.

5.9 ASSOCIATIONS BETWEEN VARIABLES

In this section the researcher will discuss associations between the following variables:

- KAP;
- KAP and gender;
- KAP and weight status;
- KAP and level of education;
- KAP and nutrition counselling received from a dietitian, nurse and doctor;
- KAP and urban and rural facilities visited; and
- KAP and years of diagnosis.

5.9.1 KAP

In the present study, a statistically significant correlation was found between knowledge and attitudes, indicating that better knowledge about diabetes could be associated with a more positive attitude towards diabetes. Although Ajzen *et al*. (2011:102) stated that knowledge is not always enough to bring about behaviour change and that attitude is often a prerequisite for behaviour change, it seems as if the participants in the present study who were knowledgeable about diabetes tended to have a more positive attitude, despite the fact that their diabetes-related practices were not ideal.

The TPB further assumes that the probability of an individual to engage in specific health behaviour is correlated with the strength of his or her intention to engage in the behaviour, which is determined by subjective norms and perceived behavioural control (Ajzen *et al*., 2011:102). Each of these determinants acts as antecedents and is preceded by beliefs namely behavioural-, normative- and control beliefs. Although

the present study did not determine the different beliefs of the participants with regards to their practices, it is possible that their beliefs could have influenced their behaviour.

In the following sections, the researcher will discuss how aspect such as gender, weight status, level of education, counselling, length of diagnosis and facilities visited were associated with the KAP of participants.

5.9.2 KAP and gender

In the present study males and females did not differ significantly in either their knowledge, attitude or practice scores. Similarly, Kheir *et al*. (2011:189) reported no significant association between KAP and gender in their study amongst Qatari patients with T2DM.

Studies amongst patients with T2DM in the United Arab Emirates and Ethiopia found that men had a higher mean knowledge score than women (Al-Maskari *et al*., 2013:7; Feleke *et al*., 2013:118). They attributed this to the high level of illiteracy amongst females, less self-empowerment and the lower social status of females compared to males. This is in conflict with studies amongst patients with T2DM in South Africa and Nepal amongst patients with T2DM which found a higher pass rate in the female group compared to the male group (Moodley & Rambiritch, 2007:16b; Gautam *et al*., 2015:7).

In a study by Hjelm and Nambozi (2008:438) amongst Ugandan patients with T2DM, it was found that although health-related behaviour between genders was similar, beliefs about health and illness differed. Men were especially concerned about sexual function, whilst women were focused on how to adapt to the situation. Hjelm and Nambozi (2008:439) further stated that men were willing to comply, but affordability of treatment was a challenge. These results support Ajzen's TPB that beliefs guide intention and can predict behaviour (Ajzen *et al*., 2011:102).

5.9.3 KAP and weight status

No associations between KAP and BMI or WC were found in this study sample. Although the study by Ayele *et al*. (2012:5) found similar results, the BMIs of their participants were much lower than those of participants in the present study.

In South Africa, overweight and obesity are major challenges because people do not want to lose weight for fear of being stigmatised as having HIV or AIDS, the perception that *"big is beautiful",* and that being overweight is a sign of well-being and wealth (Puoane & Hughes, 2005:14). Other reasons given for not changing eating habits, were patient's cultural environment and economic situation (Nthangeni *et al*., 2002:330). This is in line with Ajzen's TPB, which states that when an individual does not have a favourable attitude towards a given behaviour and perceives that people of importance to him or her do not want him or her to perform this behaviour, he or she will not have an intention to adopt this behaviour (Ajzen *et al*., 2011:102).

As previously mentioned, the reluctance of overweight and obese patients to change their eating habits and underreporting of food intake, are well-recognised challenges in weight management (Hankey *et al*., 2003:341). In a study amongst health professionals in Scotland, dietitians reported that although obesity and weight management were among their core functions, it is an area that causes considerable professional frustration due to the low success rate (Hankey *et al*., 2003:342).

5.9.4 KAP and education

The various educational groups in the present study differed significantly in terms of their knowledge and attitude scores, but, interestingly, not in their practice scores. These results again support Ajzen's TPB that knowledge is not always sufficient to produce the desired behaviour (Ajzen *et al*., 2011:102). Several authors have noted that low levels of education contribute to the burden of T2DM and that special attention should be given to illiterate patients with T2DM (Al-Maskari *et al*., 2013:7; Agardh, Sidorchuk, Hallqvist, Ljung, Peterson, Moradi & Allebeck, 2011:5).

Currently, patient counselling in public health facilities does not cater for the needs of illiterate patients with T2DM and relies heavily on written material about disease and disease management. In addition, it is often written at a level that the patients cannot understand (Krige & Reid, 2015). In the present study where 42% of participants had either no schooling or very little schooling, the level of the available written material might have been too high for patients with low literacy to understand.

A study undertaken in the United Kingdom amongst patients over 75 years of age with T2DM reported that patients often had problems reading written information due to poor sight (Woodcock & Gillam, 2013:161). Dewalt, Berkman, Sheridan, Lohr and Pignone (2004:1236) reported the results of a systematic review that showed that reading ability is related to knowledge about health and health care, hospitalisation and some chronic disease. People who read at lower levels are generally more likely to have adverse health outcomes, compared to people who read at higher levels.

Patients with low literacy should also not be provided with large amounts of information at one time as it is often overwhelming and makes it difficult for them to understand (Parker, 2008:183). Elliot, Abdulhadi, Al-Maniri, Al-Shafaee and Wahlstrom (2013:5) indicate that patients who do not always understand much of the information given to them by the health worker, often do not have the confidence to ask questions related to the information. This tendency can affect the patients' motivation and attitude to engage in the required behaviour (Parker, 2008:233; Akohoue, Patel, Adkerson & Rothman, 2015:439) which supports Ajzen's TPB (Ajzen *et al*., 2011:102).

Most studies conclude that the level of education affects the knowledge score of participants, but not necessarily the practice score (Ayele *et al*., 2012:5; Jasper *et al*., 2014:3). In agreement with Ajzen's TPB, Maina *et al*. (2011:18) noted that social and cultural beliefs, as well as good health care services, influence practices more than education levels. Feleke *et al*. (2013:118) on the other hand found that scholastically educated patients are more able and prone to modify their lifestyle primarily due to a better income.

Peltzer (2004:30) further notes that educational level was significantly positively associated with nutrition knowledge, but not with choosing healthy everyday foods. This finding further suggests that choosing everyday foods is influenced by other motivational factors. Attitudes and beliefs associated with healthy eating, like the link between diet and disease, perceived benefits and barriers to behaviour change, social support, social norms, motivation and self-efficacy, were identified as possible determinants, which is also in line with Ajzen's TPB.

5.9.5 KAP and counselling

In the present study there was no noteworthy difference between the KAP of patients who received counselling from a dietitian, nurse, doctor or no counselling at all. Counselling by a dietitian is, however recommended by studies done by Parker (2008:213) in the Western Cape as well as Hankey *et al*. (2003:342) in Scotland.

Due to the shortage of dietitians in the Free State, they rotate between hospitals, CHC centres and PHC clinics in a sub-district, resulting in them visiting some facilities only once or twice a month. During these visits they need to counsel all malnourished patients, including mothers with malnourished infants, as well as patients with other communicable and NCDs, leaving limited time for in-depth counselling. Therefore, the uncontrolled and complicated patients with T2DM are often the only ones referred to the dietitians by doctors and nurses.

In PHC clinics and CHC centres, doctors often see between 60 and 80 patients with chronic diseases per day. Because of this doctors often suffer from burn-out and became tired of repeating the same messages to patients all day long. Nurses also counsel as many as 125-150 patients with chronic diseases per day. Similarly, patients may also tire of hearing the same messages and if health professionals do not "practice what they preach" and portray an unhealthy image (are overweight or do not engage in physical exercise), the counselling given might be ineffective (Parker, 2008:230).

5.9.6 KAP and facilities visited

Thirteen facilities taking part in the present study were situated in the urban areas and nine in rural areas. In the present study, the mean KAP scores of patients from different areas did not differ significantly. This finding was unexpected considering that people in rural areas are often considered to be more vulnerable and less likely to have the same level of knowledge and behaviour as patients from urban areas (Abdo & Mohammed, 2010:125; Dookie & Singh, 2012:2). A study in North West on health seeking behaviour, further found that urban and rural groups differed significantly in terms of their socio-economic characteristics, health status, health beliefs, prevalence of non-communicable and infectious diseases, and utilisation of health care (Van der Hoeven, Kruger & Greeff, 2012:8).

The finding of the present study that prevalence of overweight and obesity was as high in rural participants, as in urban participants, seems to indicate that a nutrition transition is present in rural areas, as well as in urban areas in the Free State. Van Zyl *et al*. (2012:6) have alluded to the limited information available on the health status of urban versus rural communities in South Africa. Their study, which was also conducted in the Free State, confirms the high prevalence of risk factors for lifestyle disease in both urban and rural communities in the Free State.

5.9.7 KAP and years of diagnosis

In the present study there was a significant association between practices of participants and years of diagnosis. Participants who had been diagnosed with diabetes more than 10 years prior to the study, had a higher median practice score than participants who had been diagnosed with diabetes within the preceding 10 years. Possible reasons for these differences could be that patients who had diabetes for longer, had been more exposed to counselling. In addition, patients who had the disease for more than 10 years, might have been experiencing complications, which would have encouraged them to visit health facilities for treatment. They were, therefore, more likely to receive counselling and comply with recommendations for lifestyle change.

Similar results are reported by Gautam *et al*. (2015:7), who conducted their study in Nepal. They found that patients with T2DM were more likely to engage in the required practices with increased duration of T2DM. On the other hand, Daly *et al*. (2009:287) report that a third of patients who had been diagnosed with T2DM for an average of ten years had HbA1c levels higher than 7%. Khattab *et al*. (2010:87) supported this finding in their study in Jordan, where longer duration of T2DM was associated with poorer glycaemic control, possibly because of progressive impairment of insulin secretion over time.

This concludes the discussion of the results found in the present study on patients with T2DM in the Free State. In the next chapter the conclusion and recommendations will be given.

CHAPTER 6

Conclusion and recommendations

6.1 INTRODUCTION

This chapter aims to summarise the findings of the study in conclusion that provide answers to the objectives that were set when the study was initiated. Recommendations are made that can be applied in CHC centres and PHC clinics to improve the KAP of adult patients with T2DM in Free State.

Figure 6.1 illustrates the final stage of the research process, namely conclusion and recommendations.

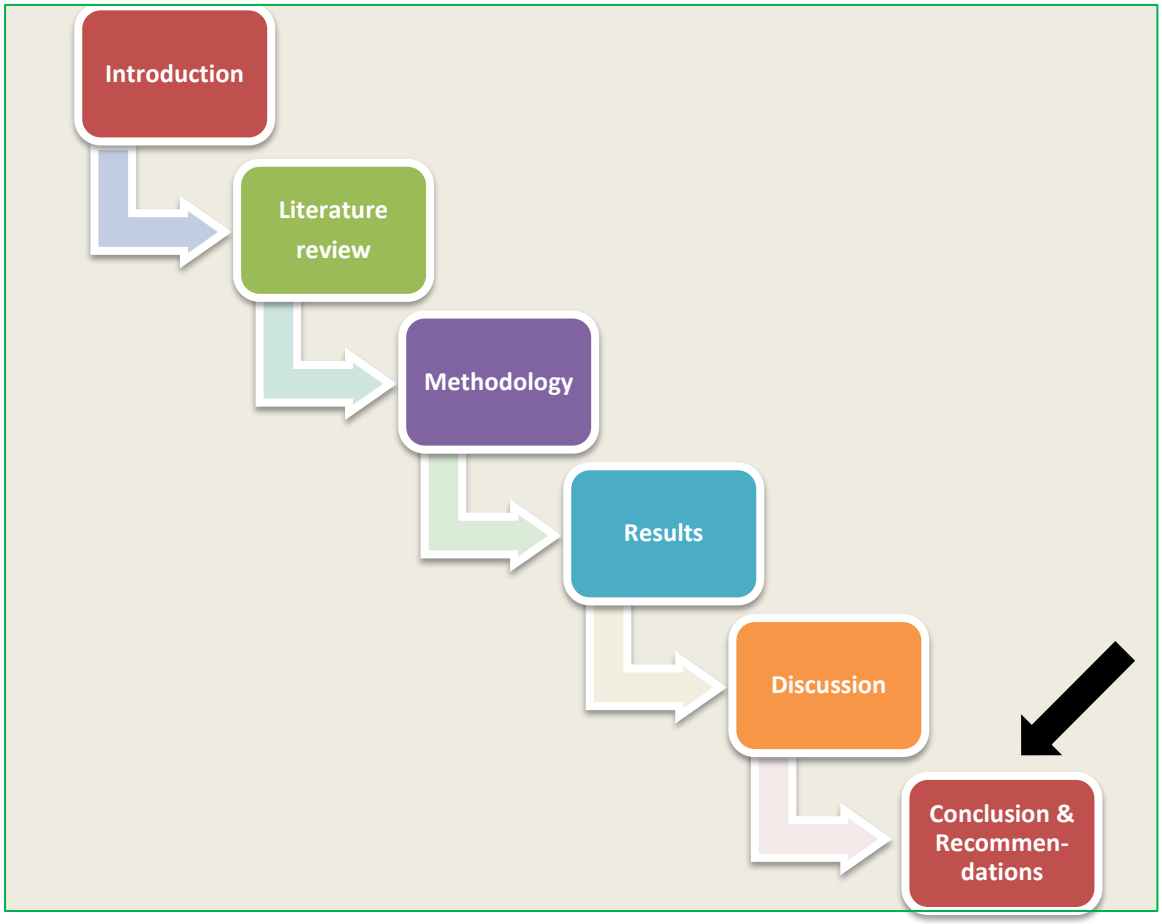

FIGURE 6.1: Development of the study: Conclusion and recommendations

6.2 CONCLUSION

The first objective of this study was to compile a profile of demographic and associated factors, quality of life, and anthropometry of adult patients with T2DM in the Free State public health sector. The conclusion related to the patient profile will be discussed in section 6.2.1.

The second objective was to determine diabetes-related KAP and perceived care of adult patients with T2DM in the Free State public sector, which will be concluded in section 6.2.2.

6.2.1 Patient profile

The majority of the participants in the present study were black women from urban areas, who were overweight and obese. The mean age at diagnosis was 48 years, and the sample presented with relatively high levels of self-reported stress and depression. Ten percent of the participants were illiterate, while 46.7% never progressed past a primary school education.

This patient profile is in line with the scientific literature on T2DM that reports that diabetes is more likely to occur in older persons from disadvantaged backgrounds, undergoing a nutrition transition; which represents a group in which obesity and its comorbidities are reaching epidemic proportions.

6.2.2 KAP and perceived care

Poor knowledge, a negative attitude and poor practices related to diabetes were observed in a very high percentage of the participants included in this study. A statistically significant correlation was found between knowledge and attitudes, indicating that better knowledge about diabetes could be associated with a more positive attitude towards diabetes.

The poor KAP found amongst the participants is distressing as it contributes to the morbidity and mortality of patients. It is, however, a common challenge amongst patients with T2DM and is an indication that patients are not fully equipped or capacitated to manage their condition. The low literacy level of the participants is one of the contributing factors and can be attributed to the inequalities in education in South Africa during *apartheid*.

Although 92% of the women and 71% of the men were either overweight or obese, no significant difference was found between KAP and weight status, gender or area of residence (urban *versus* rural). The high prevalence of overweight, obesity, metabolic syndrome related illnesses and sedentary lifestyle, increase the participant's risk for other chronic diseases as well. The presence of comorbidities, diabetic complications, stress and depression further affects their quality of life.

The "*fast food culture*" and unhealthy Western diet continues to negatively affect the lifestyle of patients with T2DM and facilitating changes in behaviour and lifestyles remain a challenge. The fact that overweight and obesity amongst black Africans are often associated with happiness, health and being treated well by one's spouse, complicated the situation.

KAP between different educational groups differed significantly with more highly educated patients being more likely to have a higher knowledge and attitude score, but not a better practice score. In addition, no significant differences were found between KAP of patients that had received previous counselling by a doctor, nurse or dietitian, and those that had not receive any counselling.

Despite the low literacy level of participants in the present study, there was no significant difference in their practices compared to more literate participants. Although educated patients have the means to cope better with their condition, this finding might indicate that they find self-management activities challenging and that this group should not be neglected when counselling is given in public facilities. In the public sector, there seems to be a need for more focused and appropriately designed health-literacy programmes for patients with chronic diseases. There is not

a *one-size-fits-all* health promotion method for providing counselling to patients and it remains a challenge for health professionals to meet the needs of individual patients.

A significant association between practices and years of diagnosis of participants was found. Participants who have been diagnosed for longer than 10 years, seem to have more experience in the management of their condition and had a better practice score. This can most probably be attributed to more clinic visits, resulting in repeated counselling since the time of diagnosis.

The majority of participants were satisfied with services at PHC clinics and CHC centres in the Free State. Despite the shortage of professional health workers in the public health sector, officials are still treating patients with the necessary respect and dignity. The challenges experienced by the Free State Department of Health with regard to supplies and equipment in facilities, (Volksblad, 2014a; Volksblad, 2014b; Volksblad, 2014c; Volksblad, 2014d) were not apparent to the participants in the present study as they were satisfied with the services.

6.3 RECOMMENDATIONS

Recommendations for the public sector will be summarised in the following section of this chapter and will be divided into recommendations for practice (6.3.1) and recommendations for further research (6.3.2).

6.3.1 Practice

Strengthening the use of a diabetes register for all patients with T2DM attending CHC centres and PHC clinics in the Free State.

Currently there is a register available, but it is not optimally used and the Provincial Health Information System only reports information on newly diagnosed adult patients with T2DM. An optimised information system will give information to managers at strategic level on the health status of the Free State population, and will also inform them on the DOH's progress in reaching the objectives of the NSDA.

These registers should be completed by nurses in facilities and should contain information on blood glucose values, blood pressure and BMI. There should also be an indication whether counselling was given to the patient. Challenges with adherence to medication and lifestyle changes should also be noted, as well as the mental health of the patient.

Nurses in facilities should complete and update the register for all patients with T2DM. A summary of the information should be forwarded to the provincial office on a quarterly basis, where provincial managers should interrogate and use the information to prioritise, plan and evaluate programmes. Feedback and support should be given to PHC and CHC facility managers on a regular basis.

Improve the screening of patients that are at risk of T2DM.

There is a need for an increase in the awareness of diabetes management and its complications in communities. Currently, regular screening for T2DM in public health facilities, especially for high risk cases, is not optimal. A short screening tool should be developed for all patients within a certain age who visits PHC clinics and CHC centres. The tool can be in the form of a tick sheet and should contain information such as age, gender, family history of T2DM, BMI, physical activities and blood pressure. High risk cases should be referred for testing and counselling.

In the present study, the majority (72%) of participants were diagnosed with T2DM following symptoms related to metabolic syndrome, or other health related symptoms.

The risk for developing T2DM increases if one or both parents have, or had, the disease. The prevalence of T2DM increased from 6% in the absence of a family history, to 20% where both parents have, or had, the disease (Xu *et al*., 2010:4). In South Africa, females also have a greater risk of developing T2DM due to glucose intolerance that is associated with high visceral fat, and daughters of patients with T2DM should therefore be cautious about weight gain, especially around the waist.

The high percentage of undiagnosed cases of T2DM demands screening of patients at regular intervals (Wild *et al*., 2004:1049). NCDs are still poorly detected, managed and monitored in the health system in South Africa, resulting in high morbidity and mortality (Mayosi *et al*., 2012:5). Patients are often diagnosed only when they already have complications.

The patient profile in the present study indicated that black females, that are overweight or obese have a high risk. Provider initiated testing for blood glucose should therefore be implemented at public facilities, regardless of the reason of the patient's visit to the facility. Events on health promotion days should also be utilised for this purpose and patients can then be referred to the nearest PHC clinic.

One of the objectives of the PHC re-engineering system is to make a shift from a curative to a more preventative approach (Hughes *et al*., 2006:10); this can be accomplished by improving screening of patients this can be accomplished and expanded community awareness.

The South African Food Based Dietary Guidelines (FBDG) should be used as a common resource for nutrition counselling for all chronic patients especially with regard to the eating of starchy foods (Parker, 2008:315).

In view of the increasing numbers of patients with T2DM more attention should be given to effective and efficient nutrition counselling and lifestyle programmes that focus on the current emerging trend of chronic disease of lifestyle and metabolic syndrome.

Healthy eating remains the most challenging part of a patient's self-management (Daly *et al*., 2009:287) and patients with T2DM do not always follow the meal plan prescribed by the dietitian (Khattab *et al*., 2010:86).

Nurses are in the best position to give information, education and counselling to patients in the public sector and the DOH should ensure that this cadre of health workers are equipped and capacitated for this task. In the present study the majority

of participants received counselling from a nurse, yet nurses are often not trained to give counselling on nutrition related issues and mixed messages are then given to patients, resulting in poor KAP.

Nurses should be trained by dietitians on nutrition and weight loss by using the FBDG. Regular refresher courses should be conducted as part of a structured in-service training programme to ensure that the correct information is given to patients with T2DM and that a diabetic diet which is culturally and economically acceptable to black African patients is promoted (Nthangeni *et al*., 2002:337). Special attention and increased care is required in the elderly and illiterate patients with T2DM.

Develop T2DM support groups at all CHC centres and PHC clinics to improve the normative beliefs of patients with T2DM and their families to improve KAP

The majority of patients with T2DM struggle with self-management activities and need support from their health care provider, family and friends.

Nurses should identify patients with T2DM that have leadership skills to convene a support group in the community where the facility is situated. The group could meet on a weekly basis at the residence of one of the members or at the health facility. Initially the support group will be guided by the professional nurse until the leader is confident to facilitate the group on her/his own.

During these meeting members should share their challenges with one another and possible solutions, or recommendation can be given by other members of the group. Blood glucose monitoring can be done during these sessions and the results and possible solutions can be discussed.

Nurses can be invited once a month to the support group to observe the progress and support the leader. Other role players, such as the dietitian and pharmacist, can also be invited to present educational talks. The physiotherapist can assist the group with recommendations related to physical activity and foot care.

6.3.2 Further Research

T2DM can be prevented and more successfully managed if changes are made in the lifestyles of high-risk individuals. The barriers to sustaining improved lifestyles and successful self-management activities should be further researched, as well as the different beliefs of patients with T2DM that influence their behaviour. This will ensure that the approach to weight management, and other lifestyle changes, are more successful (Hankey *et al*., 2003:342).

T2DM has many contributing factors and interventions should consist of holistic programmes. Wermelink *et al*. (2014:6) reported that patients with T2DM felt that diet recommendations are incompatible with their lifestyle and culture and therefore they did not adhere.

For more effective programmes, the beliefs of the patients should be understood, allowing health professionals to more effectively and efficiently treat their patients.

The findings of the present study encourage an urgent multi-disciplinary lifestyle intervention programme in rural and urban communities in the Free State, to prevent overweight and obesity in families with a history of T2DM, especially focusing on young girls to prevent them becoming overweight later in life. Behavioural, normative and control beliefs should form part of the lifestyle programme to improve the attitude and practices of patients with T2DM.

Assessment of diabetes-related KAP is essential for patients to prevent comorbidities, which may compromise quality of life and increase the burden on the public health care system. Furthermore, assessment of interventions can contribute to developing evidence-based approaches to address the problem of diabetes in resource-poor communities.

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ADDENDUM A: QUESTIONNAIRES - English

ADULT DIABETIC PATIENT QUESTIONNAIRE
18 years and older

Only interviewpatients: That have signed consent
Older than 18 years
Type II Diabetes

For Office use

Instructions - Circle the appropriate number or write your answer in the space provided. ☐☐☐ 1-3 Interview number

1.1 Name of facility …… ☐☐ 4-5

1.2 Date questionnaire is completed …… / ……. / …….. (dd/mm/yy) ☐☐☐☐☐☐ 6-11
d d m m y y

PART I: RESPONDENT PROFILE

Demographic information

2.1. Note respondent's gender

1 Male ☐ 12
2 Female

2.2 How old are you in years?..... ☐☐ 13-14

2.3 What is your home language?

1 Afrikaans ☐ 15
2 English
3 Sotho
4 Tswana
5 Xhosa
6 Zulu
7 Other, specify…….…….. ☐ 16

2.4 What is your highest level of education?

0 No schooling ☐ 17
1 ABET
2 Some primary school
3 Completed primary school
4 Some high school
5 Completed high school
6 Diploma/Degree
7 Other (Specify)…… ☐ 18

Quality of Life

2.5 Do you consider yourself **CURRENTLY** ill?

1 No ***If no, go to 2.7*** ☐ 19
2 Yes

2.6 If yes, what is wrong with you?

…… ☐☐ 20-21
…… ☐☐ 22-23
…… ☐☐ 24-25
…… ☐☐ 26-27
…… ☐☐ 28-29
…… ☐☐ 30-31

In the following section I want to ask about your GENERAL state of health.
Please indicate which statement best describes your own state of health **TODAY.**

2.7 Do you have any problems walking about?

1 Yes
2 No

32

2.8 Do you have problems with selfcare such as dressing and washing?

1 Yes
2 No

33

2.9 Do you have problems with usual activities such as work, study, housework, family or leisure activities?

1 Yes
2 No

34

2.10 Did you have stress or anxiety recently?

1 Yes
2 No
3 Unsure

35

2.11 Have you felt depressed recently?

1 Yes
2 No
3 Unsure

36

History of Diabetes diagnosis

2.12 **How long ago** were you diagnosed with Diabetes?

..... Years

years
37-38

2.13 **How** did it happen that you were diagnosed?

..... 39-40
..... 41-42
..... 43-44
..... 45-46
..... 47-48
..... 49-50

2.14 Indicate which medication/therapy you currently use?

.....
..... 51-52
..... 53-54
..... 55-56
..... 57-58
..... 59-60
..... 61-62
..... 63-64

PART II: KNOWLEDGE REGARDING DIABETES

In the next few questions I will be asking you about your knowledge about diabetes.

3.1 What causes diabetes……

……..		65-66
……..		67-68
……..		69-70
……..		71-72
……..		73-74

3.2 Many people don't know what the normal range of blood glucose is. Do you know ?
What is the normal range?

……	-	75-76

3.3 What do you think are the most common signs of high blood sugar?
Mention as many signs as you want to.

……..		1-2
……..		3-4
……..		5-6
……..		7-8
……..		9-10
……..		11-12
……..		13-14

3.4 What is the most important thing to do when you feel the beginning of low blood sugar?

……..		15-16
……..		17-18
……..		19-20

3.5 What type of health complications are usually associated with diabetes?

……..		21-22
……..		23-24
……..		25-26
……..		27-28
……..		29-30
……..		31-32
……..		33-34

3.6 Many people find terminology like carbohydrates, protein and fat confusing. What about you?
In which group would you place the following items?

	1 Carbohydrate	2 Protein	3 Fat	4 Unsure		
Cooking oil/Fish oil						35
Pap						36
Bread						37
Lentils						38
Baked Beans						39
Chicken feet						40
Organ meat						41
Vegetables						42
Fruit						43
Milk						44
Sardines in Tomato sauce						45

3.7 Indicate whether the following statements are true, false or if you are unsure.

T	F	U	Diabetic medication can cure diabetes	46
T	F	U	Diabetic medication should be taken for life	47
T	F	U	You should stop taking your diabetic medication when you feel sick	48
T	F	U	Poor control of diabetes could result in a greater chance of complications	49
T	F	U	Eating less bread will make me lose weight	50
T	F	U	Salty food will prevent my sugar levels from dropping	51

3.8 People with diabetes should take care of their feet because…

T	F	U	Diabetic medication may cause swelling of the feet	52
T	F	U	Sore feet are common in people with diabetes	53
T	F	U	People with diabetes may have poor circulation of blood in the feet	54

3.9 Is physical work or exercise important for people with diabetes?

1	Yes	55
2	No	
3	Unsure	

3.10 If you do physical work or exercise regularly, it will help with...

Blood sugar control:

1	Yes	56
2	No	
3	Unsure	

3.11 Painful feet

1	Yes	57
2	No	
3	Unsure	

3.12 Weight loss

1	Yes	58
2	No	
3	Unsure	

3.13 The following factors can make diabetes worse:

High blood pressure

1	Yes	59
2	No	
3	Unsure	

3.14 Epilepsy

1	Yes	60
2	No	
3	Unsure	

3.15 Overweight

1	Yes	61
2	No	
3	Unsure	

PART III: ATTITUDE REGARDING DIABETES

4.1 This section consist of 19 statements to see how you feel about diabetes and its effect on your life. There is no "right" or "wrong" answer because everyone has the right to their own opinion. Give your first, natural answer as it occurs to you. There are 3 possible answers.

		I disagree	Neutral	I agree			
1	If I did not have diabetes I think I would be quite a different person	1	2	3	1		1
2	I dislike being referred to as "A DIABETIC"	1	2	3	2		2
3	Diabetes is the worst thing that has ever happened to me…	1	2	3	3		3
4	Most people would find it difficult to adjust to having diabetes	1	2	3	4		4
5	I often feel embarrassed about having diabetes	1	2	3	5		5
6	There is not much I seem to be able to do to control my diabetes	1	2	3	6		6
7	There is little hope of leading a normal life with diabetes	1	2	3	7		7
8	The proper control of diabetes involves a lot of sacrifice and inconvenience	1	2	3	8		8
9	I avoid telling people I have diabetes	1	2	3	9		9
10	Being told you have diabetes is like being sentenced to a lifetime of illness	1	2	3	10		10
11	My diabetic diet spoils my social life	1	2	3	11		11
12	In general, nurses need to be more sympathetic in their treatment of people with diabetes	1	2	3	12		12
13	Having diabetes over a long period changes the personality	1	2	3	13		13
14	I often find it difficult to decide whether I feel sick or well	1	2	3	14		14
15	Diabetes can be controlled	1	2	3	15		15
16	There is really nothing you can do if you have diabetes	1	2	3	16		16
17	There is really no-one I feel I can talk to openly about my diabetes	1	2	3	17		17
18	I believe I have adjusted well to having diabetes	1	2	3	18		18
19	I often think it is unfair that I should have diabetes when other people are so healthy	1	2	3	19		19

PART IV: PRACTICES REGARDING DIABETES

In the next few questions I would like to ask you about practices with regards to diabetes.

5.1 Many people tend to forget taking medication. How often have you forgotten to take your diabetic medication in the last week?

1	Never	20
2	Less than once	
3	Once a week	
4	2-3 times a week	
5	Nearly every day	
6	Every day	

5.2 How often have you done physical work or exercise in the last week?

1	Never ***If never, go to 5.4***	21
2	Less than once	
3	Once a week	
4	2-3 times a week	
5	Nearly every day	
6	Every day	

5.3 On the days when you do physical work or exercise: how long did it last on an average day?

1	less than 10 minutes/day	22
2	10-20 minutes/day	
3	20-30 minutes/day	
4	More than 30 minutes/day	

5.4 How often do you eat refined starch, such as white bread or cake?

1	Never	23
2	Once a month	
3	Nearly once a week	
4	Nearly every day	
5	Every day	
6	Other ……..(specify)	24

5.5 How often do you eat fatty food, like slap chips or vetkoek?

1	Never	25
2	Once a month	
3	Nearly once a week	
4	Nearly every day	
5	Every day	
6	Other……(specify)	26

5.6 How often do you eat food with lots of salt, like russians or poloni or use stock cubes in food preparation?

1	Never	27
2	Once a month	
3	Nearly once a week	
4	Nearly every day	
5	Every day	
6	Other ……(specify)	28

5.7 How often do you eat vegetables?

1	Never	29
2	Once a month	
3	Nearly once a week	
4	Nearly every day	
5	Every day	
6	Other …… (specify)	30

5.8 How often do you eat fruit?

1	Never	31
2	Once a month	
3	Nearly once a week	
4	Nearly every day	
5	Every day	
6	Other …… (specify)	32

5.9 What type of colddrink do you mostly drink? ***If no, go to 5.11***

…… 33

5.10 How often do you drink these colddrinks?

1	Never	34
2	Once a month	
3	2-3 times a month	
4	Weekly	
5	2-3 times a week	
6	Nearly every day	
7	Every day	

5.11 How often have you had an alcoholic drink in the last month?

1	Never	35
2	Once a month	
3	2-3 times a month	
4	Weekly	
5	2-3 times a week	
6	Nearly every day	
7	Every day	

PERCEIVED CARE

In the next few questions I would like to ask you about the care you receive at this facility.

6.1 Do you feel comfortable at this facility?

1	No	36
2	Yes	

6.2 Please rate the DIABETES-RELATED services you receive at this facility in terms of the following

		S	D	NA		
1	Medical care provided	1	2	3		37
2	Complaint procedure	1	2	3	1 Satisfied (S)	38
3	Cleanliness	1	2	3	2 Dissatisfied (D)	39
4	Privacy during examinations	1	2	3	3 Not applicable (NA)	40
5	Confidentiality of records	1	2	3		41
6	Respect shown by most nurses	1	2	3		42
7	Respect shown by most doctors	1	2	3		43
8	Health information about Diabetes	1	2	3		44
9	Information on medication use	1	2	3		45
10	Information on lifestyle changes	1	2	3		46
11	Opportunity to ask questions	1	2	3		47
12	Language used by staff	1	2	3		48
13	Hours facility open	1	2	3		49
14	Waiting time	1	2	3		50

6.3 Have you ever received nutrition counselling?

1	Yes	51
2	No	

6.4 If yes, by whom?

1	Dietitian	52
2	Nurse	
3	Doctor	
4	Other, please specify	53

6.5 BMI: Weight (kg) , kg 65-69

Height (cm) , cm 70-74

6.6 Waist circumference: (cm) , cm 75-79

QUESTIONNAIRES - Afrikaans

VRAELYS VIR VOLWASSE PASIËNTE MET DIABETES
18 jaar en ouer

Voer slegs onderhoud met pasiente | Wat toestemmingsvorm onderteken het | **Vir amptelike gebruik**
Wat ouer is as 18 jaar
Met tipe II diabetes

Instruksies - Omsirkel die gepaste nommer of skryf u antwoord in op die spasie wat voorsien word. [ ][ ][ ] 1-3 Onderhoud nommer

1.1 Naam van fasiliteit: …… [ ][ ] 4-5

1.2 Datum waarop vraelys voltooi is …… / …… / …….. (dd/mm/jj) [ ][ ][ ][ ][ ][ ] 6-11
d d m m j j

DEEL I: PROFIEL VAN RESPONDENT

Demografiese inligting

2.1. Dui die respondent se geslag aan [ ] 12

[1] Manlik
[2] Vroulik

2.2 Hoe oud is u in jare?..... [ ][ ] 13-14

2.3 Wat is u moedertaal? [ ] 15

[1] Afrikaans
[2] Engels
[3] Sotho
[4] Tswana
[5] Xhosa
[6] Zulu
[7] Ander, spesifiseer:…… [ ] 16

2.4 Wat is u hoogste opvoedkundige kwalifikasie? [ ] 17

[0] Geen skool
[1] ABET
[2] `n Bietjie laerskool
[3] Laerskool voltooi
[4] 'n Bietjie hoërskool
[5] Hoërskool voltooi
[6] Diploma
[7] Graad
[8] Ander, spesifiseer …….. [ ] 18

Lewensgehalte

2.5 Beskou u uself **TANS** as siek? [ ] 19

[1] Nee ***Indien "Nee" gaan na 2.7***
[2] Ja

2.6 Indien "Ja", wat makeer u?

…… [ ][ ] 20-21
…… [ ][ ] 22-23
…… [ ][ ] 24-25
…… [ ][ ] 26-27
…… [ ][ ] 28-29
…… [ ][ ] 30-31
……

Die volgende vrae is oor u **ALGEMENE** gesondheid.
Dui aaseblief aan watter stellings die beste u gesondheidstoestand **VANDAG** beskryf.

2.7 Ondervind u probleme om te loop?

1 Ja
2 Nee

32

2.8 Ondervind u probleme met selfsorg soos aantrek en was?

1 Ja
2 Nee

33

2.9 Ondervind u probleme met algemene aktiwiteite soos werk, studeer, huiswerk, familie- of ontspanningsaktiwiteite?

1 Ja
2 Nee

34

2.10 Het u enige stres of angstigheid onlangs ondervind?

1 Ja
2 Nee

35

2.11 Het u onlangs depressief gevoel?

1 Ja
2 Nee
3 Onseker

36

Geskiedenis van diabetes diagnose

2.12 **Hoe lank terug** is u met diabetes gediagnoseer?

.....jaar

jaar
37-38

2.13 Hoe het dit gebeur dat u gediagnoseer is?

.....
.....
.....
.....
.....
.....

39-40
41-42
43-44
45-46
47-48
49-50

2.14 Skryf 'n lys neer van al die medikasie of terapie wat u tans ontvang

.....
.....
.....
.....
.....
.....
.....

51-52
53-54
55-56
57-58
59-60
61-62
63-64

DEEL II: KENNIS OOR DIABETES

In die volgende paar vrae wil ek u vra oor u kennis van diabetes.

3.1 Wat veroorsaak diabetes?

…… 65-66
…… 67-68
…… 69-70
…… 71-72
…… 73-74

3.2 Baie mense weet nie wat die normale bloedsuiker waardes is nie. Weet jy?

…… [ ] - [ ] 75-76

3.3 Wat dink jy is die mees algemene teken van hoe bloedsuiker vlakke?
Noem so veel tekens soos jy wil.

…… 1-2
…… 3-4
…… 5-6
…… 7-8
…… 9-10
…… 11-12
…… 13-14

3.4 Wat is die belangrikste ding om te doen as jy voel jou bloedsuiker raak laag?

…… 15-16
…… 17-18
…… 19-20

3.5 Watter tipe gesondheidskomplikasies word gewoonlik met diabetes geassosieer?

…… 25-26
…… 27-28
…… 29-30
…… 31-32
…… 33-34
…… 35-36
…… 37-38

3.6 Baie mense vind terme soos koolhidrate, proteine en vet verwarrend. Wat van jou?
In watter groep sal jy die volgende items plaas?

	1 Koolhidrate	2 Proteine	3 Vet	4 Onseker	
Kookolie/Visolie					39
Pap					40
Brood					41
Lensies					42
Baked Beans					43
Hoenderpote					44
Orgaanvleis					45
Groente					46
Vrugte					47
Melk					48
Sardyne in tamatiesous					49

3.7	Sê asb of die volgende bewerings waar, vals en of u onseker is.		
	W V O Medikasie vir diabetes kan diabetes genees		50
	W V O Medikasie vir diabetes moet lewenslank geneem word		51
	W V O As jy siek voel moet jy ophou om jou diabetiese medikasie te neem		52
	W V O Swak kontrole van diabetes kan lei na groter kanse vir komplikasies		53
	W V O As ek minder brood eet sal ek gewig verloor		54
	W V O Souterige kos sal verhoed dat my bloedsuiker val		55
3.8	Se asb of die volgende bewerings waar, vals en of u onseker is. Mense met diabetes moet vir hul voete sorg, want …		
	W V O Medikasie vir diabetes kan veroorsaak dat voete swel		56
	W V O Seer voete kom algemeen voor by mense met diabetes		57
	W V O Mense met diabetes kan swak bloedsirkulasie in hul voete ervaar		58
3.9	Is oefening of fisiese werk belangrik vir iemand met diabetes?		
	1 Ja		59
	2 Nee		
	3 Onseker		
3.10	Indien jy gereeld oefen of fisiese werk doen sal dit help met…		
	Bloedsuikerkontrole		
	1 Ja		60
	2 Nee		
	3 Onseker		
3.11	Seer voete		
	1 Ja		61
	2 Nee		
	3 Onseker		
3.12	Gewigsverlies		
	1 Ja		62
	2 Nee		
	3 Onseker		
3.13	Kan die volgende faktore diabetes vererger?		
	Hoë Bloeddruk		
	1 Ja		63
	2 Nee		
	3 Onseker		
3.14	Epilepsie		
	1 Ja		64
	2 Nee		
	3 Onseker		
3.15	Oorgewig		
	1 Ja		65
	2 Nee		
	3 Onseker		

DEEL III: HOUDING OOR DIABETES

4.1 Hierdie afdeling bestaan uit 19 stellings om te sien hoe u oor diabetes voel en die effek daarvan op u lewe. Daar is geen "regte" of "verkeerde" antwoord nie, want elkeen het die reg op sy eie mening. Gee u eerste natuurlike antwoord soos dit by u opkom. Daar is 3 moontlike antwoorde.

		Ek stem nie saam nie	Neutraal	Ek stem saam	
1	Ek dink dat ek heeltemal 'n ander mens sou wees as ek nie diabetes gehad het nie	1	2	3	1
2	Ek hou nie daarvan wanneer daar na my as " 'N DIABEET" verwys word nie	1	2	3	2
3	Diabetes is die slegste ding wat nog ooit met my gebeur het	1	2	3	3
4	Die meeste mense sal dit moeilik vind om by diabetes aan te pas	1	2	3	4
5	Ek voel dikwels verleë daaroor dat ek diabetes het	1	2	3	5
6	Dit lyk asof ek nie veel daaraan kan doen om my diabetes te beheer nie	1	2	3	6
7	Daar is min hoop om 'n normale lewe te lei met diabetes	1	2	3	7
8	Die behoorlike beheer van diabetes behels baie opoffering en ongemak	1	2	3	8
9	Ek probeer dat ander mense nie weet van my diabetes nie	1	2	3	9
10	Om te hoor dat jy diabetes het, is soos 'n lewenslange siekte-vonnis	1	2	3	10
11	My dieet vir diabetes bederf my sosiale lewe	1	2	3	11
12	In die algemeen behoort verpleegkundiges meer simpatiek te wees in hul optrede teenoor mense met diabetes	1	2	3	12
13	Om oor 'n lang periode diabetes te hê, verander 'n mens se persoonlikheid	1	2	3	13
14	Ek ervaar dikwels dat dit moeilik is om te besluit of ek siek of gesond voel	1	2	3	14
15	Diabetes is nie regtig 'n probleem nie, want dit kan beheer word	1	2	3	15
16	Jy kan regtig niks daaraan doen as jy diabetes het nie	1	2	3	16
17	Ek voel dat daar regtig niemand is met wie ek openlik oor my diabetes kan praat nie	1	2	3	17
18	Ek dink ek het daarby aangepas om diabetes te hê	1	2	3	18
19	Ek dink dikwels dat dit onregverdig is ek diabetes moet hê terwyl ander mense so gesond is	1	2	3	19

DEEL IV: PRAKTYKE WAT DIABETES BETREF

In die volgende paar vrae wil ek graag vir u vra oor u praktykte met betrekking tot diabetes.

5.1 Baie mense vergeet soms om hulle medikasie te neem. Hoe gereeld het u in die laaste week vergeet om u medikasie te neem? ☐ 20

1 Nooit
2 Minder as een keer
3 Een keer per week
4 2 – 3 keer per week
5 Omtrent elke dag
6 Elke dag

5.2 Hoeveel keer per week doen u fisiese werk of oefening? ☐ 21

1 Nooit ***Indien nooit, gaan na 5.4***
2 Minder as een keer
3 Een keer per week
4 2 – 3 keer per week
5 Omtrent elke dag
6 Elke dag

5.3 Op die dae wat u fisiese werk of oefeninge gedoen het, hoe lank het dit geduur? ☐ 22

1 Minder as 10 minute per dag
2 10 – 20 minute per dag
3 20 – 30 minute per dag
4 Meer as 30 minute per dag

5.4 Hoe dikwels eet u verfynde stysel soos wit brood of koek? ☐ 23

1 Nooit
2 Een keer per maand
3 Omtrent een keer per maand
4 Omtrent elke dag
5 Elke dag
6 Ander……..(spesifiseer) ☐ 24

5.5 Hoe dikwels eet u vetterige kos soos "slap chips" of vetkoek? ☐ 25

1 Nooit
2 Een keer per maand
3 Omtrent een keer per maand
4 Omtrent elke dag
5 Elke dag
6 Ander……..(spesifiseer) ☐ 26

5.6 Hoe dikwels eet u souterige kos soos "russians" en polonie of gebruik u biefblokkies as jy kos gaarmaak? ☐ 27

1 Nooit
2 Een keer per maand
3 Omtrent een keer per maand
4 Omtrent elke dag
5 Elke dag
6 Ander……..(spesifiseer) ☐ 28

5.7 Hoe gereeld eet u groente?

1	Nooit	29
2	Een keer per maand	
3	Omtrent een keer per maand	
4	Omtrent elke dag	
5	Elke dag	
8	Ander……..(spesifiseer)	30

5.8 Hoe gereeld eet u vrugte?

1	Nooit	31
2	Een keer per maand	
3	Omtrent een keer per maand	
4	Omtrent elke dag	
5	Elke dag	
8	Ander……..(spesifiseer)	32

5.9 Watter tipe koeldrank drink u meeste van die tyd?

…… ***Indien nee, gaan na 5.11*** 33

5.10 Hoe gereeld drink u hierdie koeldrank?

1	Nooit	34
2	Een keer per maand	
3	2 – 3 keer per maand	
4	Weekliks	
5	2 – 3 keer per week	
6	Omtrent elke dag	
7	Elke dag	

5.11 Hoe gereeld het u gedurende die afgelope maand 'n alkoholiese drankie gedrink?

1	Nooit	35
2	Een keer per maand	
3	2 – 3 keer per maand	
4	Weekliks	
5	2 – 3 keer per week	
6	Omtrent elke dag	
7	Elke dag	

PERSEPSIE VAN DIENSTE

In die volgende paar vrae wil ek graag hoor oor die versorging wat u ontvang by die fasiliteit.

6.1 Voel u by hierdie fasiliteit gemaklik en ontspanne?

1	Nee	36
2	Ja	

6.2 Evalueer asb die DIABETES-VERWANTE dienste wat u by hierdie fasiliteit ontvang wat betref die volgende:

		T	N	N/T	
1	Mediese versorging wat voorsien word	1	2	3	37
2	Klagteprosedure	1	2	3	38
3	Sindelikheid	1	2	3	39
4	Privaatheid gedurende ondersoeke	1	2	3	40
5	Vertroulikheid van rekords	1	2	3	41
6	Respek deur meeste verpleegkundiges	1	2	3	42
7	Respek deur meeste dokters getoon	1	2	3	43
8	Gesondheidsinligting oor diabetes	1	2	3	44
9	Inligting oor gebruik van medikasie	1	2	3	45
10	Inligting oor verandering van lewensstyl	1	2	3	46
11	Geleentheid om vrae te vra	1	2	3	47
12	Taal wat deur personeel gebruik word	1	2	3	48
13	Ure wat fasiliteit oop is	1	2	3	49
14	Wagtyd	1	2	3	50

(1) Tevrede (T)
(2) Nie tevrede nie of nie ontevrede nie (N)
(3) Nie van toepassing (N/T)

6.3 Het u ooit enige voedingvoorligting ontvang?

1	Ja	51
2	Nee	

6.4 Indien ja, by wie?

1	Dieetkundige	52
2	Verpleegkundige	
3	Dokter	
4	Ander……(spesifiseer)	53

6.5 BMI: Gewig ☐☐☐,☐ kg 65-69
Lengte ☐☐☐,☐ cm 70-74

6.6 Middelomtrek: ☐☐☐,☐ cm 75-79

QUESTIONNAIRE - Sesotho

DIPOTSO TSA BAKUDI BA LEFU LA TSWEKERE
BA DILEMO TSE 18 LE HO FETA

O botse fela bakudi ba: Tlatsitseng foromo tsa bona
Fetang dilemo tse 18
Mofuta II wa lefu lena la tswekere

Bakeng sa tshebediso ya kantoro

Ditaelo - Etsa sedikadikoe nomorong e nepaheteng kapa ngola karabo ya hao sebakeng se teng ☐☐☐ 1-3 Nomoro ya dipuisano

1.1 Lebitso la sebaka …… ☐☐ 4-5

1.2 Letsatsi leo dipotso di qetuweng ka lona …… / …… / …….. (Let/Kgw/Sel) ☐☐☐☐☐☐ 6-11
Letsats Kgwedi Selemo

KAROLO I: DINTLHA TSA YA ARABANG

Dipalopalo tsa setjhaba

2.1. Hlokomela bong ba motho

1 Motona ☐ 12
2 Motshehadi

2.2 O na le dilemo tse kae?..... ☐☐ 13-14

2.3 O bua leleme le feng?

1 Afrikaans ☐ 15
2 English
3 Sotho
4 Tswana
5 Xhosa
6 Zulu
7 Enngwe, Hlalosa…….. ☐ 16

2.4 Maemo a hao a thuto ke a feng?

0 Ha wa kena sekolo ho hang ☐ 17
1 ABET
2 Ha o sa qeta sekolong sa primary
3 O qetile sekolong sa primary
4 Ha o sa qeta sekolong se phahameng
5 O qetile sekolong se phahameng
6 Dipoloma/Dikgarate
7 Enngwe (Hlalosa)…… ☐ 18

Boleng ba bophelo

2.5 Ana o ipona o le motho a kulang **ha jwale**?

1 Tjhe ***Ha e ba tjhe, e ya 2.7*** ☐ 19
2 Eya

2.6 Ha e ba eya, ho etsahala eng ka wena?

…… ☐☐ 20-21
…… ☐☐ 22-23
…… ☐☐ 24-25
…… ☐☐ 26-27
…… ☐☐ 28-29
…… ☐☐ 30-31

Dipotso tse latelang di mabapi le bophelo ba hao ka **kakaretso**.
Bontsha ke polelo e feng e hlalosang maemo a bophelo ba hao **ha jwale**

2.7 Na o na le bothata ba ho tsamaya ka maoto?

1 Tjhe — 32
2 Eya

2.8 Na o na le bothata ba ho itlhokomela jwaloka ho ikapesa kapa ho itlhapisa?

1 Tjhe — 33
2 Eya

2.9 Na o na le bothata ho phetha mabaka a hao, jwalo ka ho sebetsa, mesebetsi ya ka tlung le e meng?

1 Tjhe — 34
2 Eya

2.10 Na ona Le hotouta kapa mokgathala?

1 Tjhe — 35
2 Eya
3 Ha ke tsebe

2.11 Na o nale kgathello ya maikutlo haufinyana tjena?

1 Tjhe — 36
2 Eya
3 Ha ke tsebe

Nalane ya ho hlahlobuwa ha lefu la tswekere

2.12 Ke neng ha one o fumanwa o na le lefu la tswekere?

dilemo
..... Selemo — 37-38

2.13 Ho tlile jwang hore o hlahlobuwe?

..... — 39-40
..... — 41-42
..... — 43-44
..... — 45-46
..... — 47-48
..... — 49-50

2.14 Nehela ka lenane la tsamaiso le dipheko tseo o disebedisang ha jwale?

..... — 51-52
..... — 53-54
..... — 55-56
..... — 57-58
..... — 59-60
..... — 61-62
..... — 63-64

KAROLO II: TSEBO MABAPI LE LEFU LENA LA TSWEKERE

Dipotso tse latelang di mabapi le tsebo ya hao lefung la tswekere.

3.1 Lefu lena la tswekere le bakwa ke eng?

……	65-66
……	67-68
……	69-70
……	71-72
……	73-74

3.2 Batho ba bangata ha ba tsebe bo emo ba tswekere bo nepahetseng. Na wa bo tseba?
Itekanetseng?

……	- 75-77

3.3 O nahana hore matshwao a tswekere e hodimo ke afeng? Bolela ohle ao o a tsebang

……	1-2
……	3-4
……	5-6
……	7-8
……	9-10
……	11-12
……	13-14

3.4 Ha o qala o utlwa tswekere ha e le tlaase o tlameile o etseng?

……	15-16
……	17-18
……	19-20

3.5 Ke di feng ditlamorao tse amangwang le lefu la tswekere?

……	21-22
……	23-24
……	25-26
……	27-28
……	29-30
……	31-32
……	33-34

3.6 Batho ba bangata ha ba utlwisise phapang pakeng sa carbohydrates, porotheine le marura. Na wa di tseba wena?

	1 Carbohydrates	2 Porotheine	3 Fat	4 Ha ke tsebe	
Cooking oil/Fish oil					35
Papa					36
Bohope					37
Lentils					38
Baked Beans					39
Maotuana a dikgoho					40
Dikahare					41
Meroho					42
Ditholwna					43
Lebese					44
Sardines in Tomato sauce					45

3.7 Bontsha hore na ho tse latelang ke ntlha e feng eo eleng nnete, o sena bonnete, o sa tsebe.

N	F	H	Meriana ya lefu la tswekere e ka fodisa lefu lena	46
N	F	H	Meriana ya lefu la tswekere e na e nkuwa bophelo ba motho kaofela	47
N	F	H	O tlameha ho tlohela ho nka meriana ya hao ya tswekere hao kula	48
N	F	H	Taolo e fokolang ya lefu la tswekere e ka baka mathata	49
N	F	H	Hoja bohope bo bonyane bo etsa hore ke theohe mmeleng	50
N	F	H	Dijo tse letswai di ka thibela hore boemo baka ba lefu la tswekere bo seye fatshe	51

3.8 Ke efeng ya tse latelang eo eleng nnete,esa nepahalang, o sa tsebe.
Batho ba nang le lefu la tswekere ba tlameile ho hlokomela maoto a bona hobane…

N	F	H	Meriana ya lefu la tswekere e ka baka ho ruruha ha maoto	52
N	F	H	Maoto a bohloko a tlwaelehile bathong ba nang le lefu lena	53
N	F	H	Batho ba nang le lefu lena ba na le phallo ya madi e ya fokola maotong	54

3.9 A na boikwetliso bo bohlokwa ho batho Ba nang Le lefu la tswekere?

1	Tjhe	55
2	Eya	
3	Ha ke tsebe	

3.10 Ha o etsa mesebetsi kapa o ikwetlisa Ka makgehlo etla o thusa Ka:

Taolo ya tswekere mading

1	Tjhe	56
2	Eya	
3	Ha ke tsebe	

3.11 Maoto a opang

1	Tjhe	57
2	Eya	
3	Ha ke tsebe	

3.12 Ho lahlehelwa ke boima ba mmele

1	Tjhe	58
2	Eya	
3	Ha ke tsebe	

3.13 Dintlha tse latelang di ka mpefatsa maemo a ka a lefu lena

Kgatello e phahameng ya madi

1	Tjhe	59
2	Eya	
3	Ha ke tsebe	

3.14 Ho idibana

1	Tjhe	60
2	Eya	
3	Ha ke tsebe	

3.15 Botenya/ho nona

1	Tjhe	61
2	Eya	
3	Ha ke tsebe	

KAROLO III: MAITSHWARO MABAPI LE LEFU LENA

4.1 Karolo e na e na le dipolelo 19 ho utlwa maikutlo a hao ka lefu lena le ditlamorao tsa lona bophelong ba hao. Re fe karabo ya hao ya pele, karabo e itlelang ho wena fela. Ho na le dikarabo tse 3.

		Ke a hana ke a latola	Hakena bonnete	Kennete
1	Ha ne ke se na lefu le na nkabe ke le motho e mong	1	2	3
2	Ha ke rate ho bitswa ka hore ke " DIABETIC"	1	2	3
3	Lefu le na ke ntho empa e kileng ya nhlahela bophelong baka…	1	2	3
4	Ho ka ba boima bathong ba bang ha ba fumana hore ba na le lefu la tswekere	1	2	3
5	Ha ngata ke swabela hore ke na le lefu lena	1	2	3
6	Ho bonahala ho se letho leo ke kgonang ho le etsa ho laola lefu lena	1	2	3
7	Tshepo e ya fokola hore motho o tla phela bophelo bo hantle ka lefu lena	1	2	3
8	Taolo e phethahetse ya lefu le na e kenyelleditse mathata le ho etsa diqeto tse ding tse boima	1	2	3
9	Ke a leka ho tsebisa batho hore ke na le lefu lena la tswekere	1	2	3
10	Ho tsebiswa hore o na le lefu le na e ka re o ahlolelwa lefu bophelo ba hao kaofela	1	2	3
11	Phepo e ikgethile ya lefu la tswekere e solafalletsa ho phela ha monate.	1	2	3
12	Ka kakaretso, baoki ba lokela ho ba le kutlwelo bohloko ha ba thusa batho ba nang le lefu lena la tswekere	1	2	3
13	Ho ba le lefu lena nako e telele ho ka fetola botho ba hao	1	2	3
14	Ha ngata ke fumana ho le thata hore a na ke a kula kapa the	1	2	3
15	Lefu le na ha se bothata ha kaalo hobane le ka laolwa	1	2	3
16	Ha ho letho leo o ka leetsang ka nnete ha o na le lefu lena	1	2	3
17	Ha ho motho eo ke utlwang ekare nka bua le yena ka bothata bona ba ka	1	2	3
18	Ke nahana hore jwale ke ya ke tlwaela maemo a ka a lefu lena la tswekere	1	2	3
19	Ha ngata ke ye ke nahane hore ha se hantle ho re nna ke be le lefu lena ha batho ba bang bona ba phela hantle	1	2	3

KAROLO IV: TSAMAISO MABAPI LE LEFU LA TSWEKERE

Dipotsong tse latefang ke rafa ho tseba ka tsela tsa ho phela ka lefu la tswekere.

5.1 Batho ba bangata ba ye ba lebale ho sebedisa meriana ka nepo. Wena o lebetse ha kae ho sebedisa meriana ya hao bekeng e fetileng?

1	Ho hang	☐ 20
2	Ka tlase ho hang	
3	Hangwe bekeng	
4	Makgetlo a 2-3 bekeng	
5	Mohlomong letsatsi le leng le leng	
6	Ka matsatsi oohle	

5.2 Ke Ka makgehlo a makae o e phumana o etsa mesebetsi kapa o ikwetlisa bekeng e fitileng?

1	Ho hang ***Ha e ba tjhe, e ya 5.4***	☐ 21
2	Ka tlase ho hang	
3	Hangwe bekeng	
4	Makgetlo a 2-3 bekeng	
5	Mohlomong letsatsi le leng le leng	
6	Ka matsatsi oohle	

5.3 Ka matsatsi ao o etsang mesebetsi kapa o ikwetlisa o nkile nako e kae tsatsing Leo?

1	bonyane metsotso e 10 ka letsatsi	☐ 22
2	Metsotso e 10-20 ka letsatsi	
3	Metsotso e 20-30 ka letsatsi	
4	Metsotso e fetang 30 ka letsatsi	

5.4 Ke ha kae moo o jang dijo tse nang le carbohydrates se silehileng, jwalo ka bohobe bo bosweu le dikuku?

1	Ho hang	☐ 23
2	Hang ka kgwedi	
3	Ho feta hang fela bekeng	
4	Ho feta hang ka letsatsi	
5	Letsatsi le leng le le leng	
6	Enngwe …… (hlalosa)	☐ 24

5.5 Ke ha kae moo o jang dijo tse nang le mafura jwalo ka di chips le magwenya?

1	Ho hang	☐ 25
2	Hang ka kgwedi	
3	Ho feta hang fela bekeng	
4	Ho feta hang ka letsatsi	
5	Letsatsi le leng le le leng	
6	Enngwe …… (hlalosa)	☐ 26

5.6 Ke ha kae moo o jang dijo tse nang le letswai jwalo ka dirussian, poloni le beef stock?

1	Ho hang	☐ 27
2	Hang ka kgwedi	
3	Ho feta hang fela bekeng	
4	Ho feta hang ka letsatsi	
5	Letsatsi le leng le le leng	
6	Enngwe …… (hlalosa)	☐ 28

5.7	Ke ha kae moo o jang meroho?		
	1 Ho hang		29
	2 Hang ka kgwedi		
	3 Ho feta hang fela bekeng		
	4 Ho feta hang ka letsatsi		
	5 Letsatsi le leng le le leng		
	6 Enngwe …… (hlalosa)		30
5.8	Ke ha kae moo o jang dijo ditholwana?		
	1 Ho hang		31
	2 Hang ka kgwedi		
	3 Ho feta hang fela bekeng		
	4 Ho feta hang ka letsatsi		
	5 Letsatsi le leng le le leng		
	6 Enngwe …… (hlalosa)		32
5.9	Ke Mofuta ofe wa senoma phodi o unwang boholo ba nako?		
	……	***Ha e ba tjhe, eya 5.11***	33
5.10	Ke ha kae kgweding e fetileng moo o ileng wa dino maphodi?		
	1 Ho hang		34
	2 Hang kgweding		
	3 Makgetlo a 2-3 ka kgwedi		
	4 Beke le beke		
	5 Makgetlo a 2-3 ka beke		
	6 Bonyane letsatsi le leng le le leng		
	7 Letsatsi le leng le le leng		
5.11	Ke ha kae kgweding e fetileng moo o ile wa nwa bojwala?		
	1 Ho hang		35
	2 Hang kgweding		
	3 Makgetlo a 2-3 ka kgwedi		
	4 Beke le beke		
	5 Makgetlo a 2-3 ka beke		
	6 Bonyane letsatsi le leng le le leng		
	7 Letsatsi le leng le le leng		

PERCEIVED CARE

Dipotsong tsena tse mmalwa tse latelang, ke tlo o botsa ka ditshebeletso tseo o di fumanang sebakeng sena.

6.1 Na o ikutlwa o phutholohile sebakeng sena sa rona?

1	Tjhe	36
2	Eya	

6.2 Bapisa ditshebeletso tsa lefu la tswekere tseo o difuweng mona sebakeng sena?
Ka tsela e latelang.

		K	H	NA	
1	Thuso e fumanweng	1	2	3	37
2	Tletlebo ya tsamaiso	1	2	3	38
3	Bohlweki	1	2	3	39
4	Sephiri nakong ya hlahlobo	1	2	3	40
5	Ho boloka ditokomane e le pinyane	1	2	3	41
6	Maitshwaro a boholo baooki	1	2	3	42
7	Maitshwaro a boholo dingaka	1	2	3	43
8	Lesedinyana ka lefu lena la tswekere	1	2	3	44
9	Lesedinyana ka tshebediso ya meriana	1	2	3	45
10	Lesedinyana ka boitswaro bophelong	1	2	3	46
11	Monyetla wa ho botsa dipotso	1	2	3	47
12	Leleme le sebediswang ke basebetsi	1	2	3	48
13	Dihora tseo sebaka sena se bulwang ka	1	2	3	49
14	Nako eo o e letang	1	2	3	50

(1) Kgotsofatsa (K)
(2) Ha kgotsofatse (H)
(3) Not applicable (NA)

6.3 Na o kile wa amohela dikeletso tsa phepo le dikgothatso tsa teng?

1	Tjhe	51
2	Eya	

6.4 Ha e le nnete o di utlwile ka mang?

1	Dietitian	52
2	Mooki	
3	Ngaka	
4	Enngwe …… (hlalosa)	53

6.5 BMI: Weight (kg) ,__ kg 65-69
Height (cm) ,__ cm 70-74

6.6 Waist circumference: (cm) ,__ cm 75-79

ADDENDUM B: PATIENT GUIDELINE

Guideline for fieldworkers

1. **Before the interview starts, explain to the patient that the information he or she will be giving will assist in improving the management of patients with Type 2 Diabetes Mellitus and that the questionnaire will take about 30-40 minutes to complete.**
2. **Make sure the patient has signed the Informed Consent form and has received the Information document before you start the interview.**
3. **Make sure that all questions are answered.**
4. **If any problem arises that you are not sure how to handle, please contact Maretha le Roux at 083 680 9661 immediately.**

Instructions: Below in **boldface** type are the questions found in the Adult Diabetic Patient Questionnaire. This is a question-by-question guide.

These instructions are not to be read to the patient. Before interviewing be sure to be thoroughly familiar with this question-by-question guide, so that you understand what each question is asking.

Ensure that the questionnaire has an interview number.

1.1 Write the name of the CHC Centre/PHC clinic or National Hospital

1.2 Write the date questionnaire is completed

PART 1: DEMOGRAPHIC INFORMATION

2.1 Note patients gender: Make a tick in the block indicating MALE or FEMALE

2.2 How old are you in years? Ask the patient what is his or her current age in years.

2.3 What is your home language? Ask the patient which language they are speaking mostly at home. If they speak more than one language, tick both.

2.4 What is your highest level of education? Ask the patient which grade did he or she completed at school. If he or she has completed high school ask whether he or she has any diplomas or degrees. Make a tick in the appropriate block.

QUALITY OF LIFE

2.5 Do you consider yourself currently ill? We would like to know if the patient has any health problems that make him or her feel ill. If there is any problem that the patient mentions, tick YES. Only tick Yes or No. If YES proceed to 2.6, if NO continue to 2.7.

2.6 What is wrong with you? Here we would like to know what the patient think is wrong with him or her. Probe for more information from the patient about his illness and write everything the patient says.

2.7 Do you have any problems walking about? We would like to know if the patient can walk around without any problems, if he has some problems the answer is YES.

2.8 Do you have problems with self-care such as dressing and washing? Here we would like to know it the patient has any problems with dressing or washing himself or herself. If somebody needs to assist the patient, tick YES, if the patient does not need any support at all, tick NO.

2.9 Do you have problems with usual activities such as work, study, housework, family of leisure activities? We would like to know if the patient is still capable of doing these daily activities without any help from somebody else. If the patients cannot do these usual daily activities without any help, tick YES.

2.10 Did you have stress or anxiety recently? Determine here if the patient had any stress or if he or she felt anxious during the past month. If the answer is positive to stress or anxiety, tick YES.

2.11 Have you felt depressed recently? Determine whether the patient felt depressed during the past month. Tick YES if patient indicates that he or she was depressed.

HISTORY OF DIABETES DIAGNOSIS

2.12 How long ago were you diagnosed with Diabetes? Here we would like to know how long the patient has been diabetic. If the patient has been diagnosed long ago, write the number of years in the space provided. If the patient is not sure, try and probe from the patient more or less how long ago he was diagnosed. If the patient was diagnosed only a few months ago, write less than one year in the space.

2.13 How did it happen that you were diagnosed? Ask the patient to tell you about the day when he or she was diagnosed with diabetes. Ask what circumstances led to the diagnosis.

2.14 Indicate which medication/therapy you are currently using. Ask the patient to give you the names of all the chronic medication he or she is currently using. If the patient refers to his or her diabetic medication, ask him or her to indicate whether he or she is using tablets or injecting insulin. This question also includes other chronic medication not applicable for diabetes management e.g. high blood pressure, high cholesterol etc.

PART II KNOWLEDGE RELATED TO DIABETES

Read the introduction sentence to the patient: **Not many people know much about diabetes. In the next few questions I will be asking you about your knowledge about diabetes.**

3.1 What causes diabetes… Here we would like to know if the patient is aware of the causes of diabetes. Ask the patient to give you the causes of diabetes according to his knowledge. Write down everything he or she says. If the patient does not know, write “do not know” in the available space.

3.2 Many people do not know what the normal range of blood glucose is. Do you know? What is the normal range of blood glucose? Here we would like to know if the patient is knowledgeable about the normal range of blood glucose. Write the blood glucose value or the range in the available space.

3.3 What do you think are the most common signs of high blood sugar? Mention as many signs as you want to. Here we would like to know from the patient if he or she knows the common signs of high blood sugar. Write down everything the patient says, whether it is right or wrong. If the patient does not know, write “do not know” in the available space.

3.4 What is the most important thing to do when you feel the beginning of low blood sugar? Here we would like to know if the patient knows what to do when his or her blood sugar is low. Write down all the answers the patient gives. If the patient does not know, write “do not know” in the available space.

3.5 What type of health complications is usually associated with diabetes? Here we would like to know from the patient if he or she knows what the health complications are that are usually associated with diabetes. Write everything the patient says, whether it is right or wrong. If the patient does not know, write “do not know” in the available space.

3.6 Many people find terminology like carbohydrates, protein and fat confusing. What about you? In which group would you place the following items? Name each of the food items and ask the patient if he or she will group them under carbohydrate, protein or fat. If the patient does not know, tick unsure.

3.7 Indicate whether the following statements are true, false of if you are unsure. The patient must indicate for each statement if he or she thinks this statement is true or false. If the patient is not sure about the answer, tick unsure.

- **Diabetic medication can cure diabetes.** In the next few questions we would like to know if the patient is knowledgeable about diabetic medication.
- **Diabetic medication should be taken for life.**
- **You should stop taking your diabetic medication when you feel sick.**
- **Poor control of diabetes could result in a greater chance of complications:** Here we would like to know if the patient is aware of the consequences of poor control of diabetes. Poor control refers to blood sugar levels outside the normal ranges most of the time.
- **Eating less bread will make me lose weight:** Here we would like to know what the patient's understanding is of losing weight.
- **Salty food will prevent my sugar levels from dropping:** Here we would like to know what the patient's understanding is of factors contributing to low blood sugar.

3.8 Indicate whether the following statements are true, false of if you are unsure. Here we would like to know if the patient is aware of the effect of blood sugar on his or her feet. The patient must indicate for each statement if he or she thinks this statement is true or false. If the patient is not sure about the answer, tick unsure. In the next 3 statements we would like to find out if the patient is knowledgeable about complications with regards to his or her feet.

- **Diabetic medication may cause swelling of the feet**
- **Sore feet are common in people with diabetes**
- **People with diabetes may have poor circulation of blood in the feet.**

3.9 Is physical work or exercise important for people with diabetes? Here we would like to know if the patient understands the importance of exercise for diabetics. If the patient thinks physical work or exercise are important, tick YES, if not, NO and if he or she is not sure, UNSURE.

3.10 If you do physical work or exercise regularly, it will help with: Here we would like to know if the patient knows what the benefit of physical exercise is. Indicate for each one of the statements whether the patient says YES, NO or UNSURE and tick in the appropriate block

Blood sugar control

3.11 Painful feet

3.12 Weight loss

3.13 The following factors can make diabetes worse: Here we would like to find out if the patient is aware of other conditions that worsen diabetes. Indicate for each one of the statements whether the patient says YES, NO or UNSURE and tick in the appropriate block

High blood pressure

3.14 Epilepsy

3.15 Overweight

PART III ATTITUDE RELATED TO DIABETES

4.1 In the following 19 statements the patient must indicate how he or she feels about diabetes and how it is affecting his or her life. It is important to stress to the patient that there is no right or wrong answers. Every patient's opinion is important. The patient must answer one of the following: I disagree, I am Neutral or I agree.

1. If I did not have diabetes I think I would be quite a different person: Here we would like to know how the patient feels about his or her diagnosis with diabetes.

2. I dislike being referred to a "DIABETIC": Here we would like to know if the patient feels stigmatized by being a "DIABETIC"

3. Diabetes is the worst thing that has ever happened to me…: We would like to know if the patient's experience of being a diabetic was positive or negative

4. Most people would find it difficult to adjust to having diabetes: Here we would like to know what the experience is of the patient, not only of him or herself, but also in general.

5. I often feel embarrassed about having diabetes: Here we would like to find out if the patient has accepted the fact that he or she has diabetes.

6. There is not much I seem to be able to do to control my diabetes: Here we would like to know if the patient is knowledgeable about the management of diabetes

7. There is little hope of leading a normal life with diabetes: Here we would like to know if the patient is positive about living with diabetes.

8. The proper control of diabetes involves a lot of sacrifice and inconvenience: Here we would like to find out if the patient is struggling with his or her diabetes control.

9. I avoid telling people I have diabetes: Here we would like to know if the patient has accepted his or her diagnosis and if he or she feels ashamed of being a diabetic.

10. Being told you have diabetes is like being sentenced to a lifetime of illness: Here we would like to find out how the patient feels about being a diabetic and if he or she struggles with the management.

11. My diabetic diet spoils my social life: Here we would like to know if the patient feels his or her new diabetic diet is a burden.

12. In general, nurses need to be more sympathetic in their treatment of people with diabetes: Here we would like to find out if the patient received the necessary attention from the health worker that he expected.

13. Having diabetes over a long period changes the personality: Here we would like to find out if the patient feels his or her personality has changed since he or she became diabetic.

14. I often find it difficult to decide whether I feel sick or well: Here we would like to find out if the patient feels sick or well most of the time.

15. Diabetes can be controlled: Here we would like to find out if the patient is confident that diabetes can be controlled.

16. There is really nothing you can do if you have diabetes: Here we would like to find out if the patient is aware that diabetes can be managed and patients with diabetes can live a healthy life.

17. There is really no-one I feel I can talk to openly about my diabetes: Here we would like to know if the patient has emotional support for his condition.

18. I believe I have adjusted well to having diabetes: Here we would like to know whether the patient is positive about being a diabetic.

19. I often think it is unfair that I should have diabetes when other people are so healthy: Here we would like to find out if the patient feels disadvantaged because of his or her diabetes.

PART IV: PRACTICES RELATED TO DIABETES

Read introduction sentence: In the next few questions I would like to ask you about practices with regards to diabetes. Practices meaning the things that you usually do.

5.1 Many people tend to forget taking medication. How often have you forgotten to take your diabetic medication in the last week? Here we would like to find out if the patient forgets to take his or her medicine and how often. Answers ranges from never, less than once, once a week, 2-3 times a week, nearly every day, every day

5.2 How often have you done physical work or exercise, in the last week? Here we would like to know how active the patient is. Answers ranges from never, less than once, once a week, 2-3 times a week, nearly every day, every day. If the patient's answer is "never" go to 5.4

5.3 On the days when you do physical work or exercise: how long did it last on an average day? Here we would like to know for how long did the patient exercise.

5.4 How often do you eat refined starch, such as white bread or cake? Here we would like to know the frequency of eating these specific products.

5.5 How often do you eat fatty food, like slap chips or vetkoek? Here we would like to know the frequency of eating these specific products.

5.6 How often do you eat food with lots of salt, like Russians or poloni or use stock cubes in food preparation? Here we would like to know the frequency of eating these specific products.

5.7 How often do you eat vegetables? Here we would like to know the frequency of eating any type of vegetables.

5.8 How often do you eat fruit? Here we would like to know the frequency of eating any type of fruit.

5.9 What type of colddrink do you mostly drink? Here we would like to know if the patient drinks colddrink, and what type. Write the name of the colddrink in the available space. If the patient does not drink colddrink, go to 5.11.

5.10 How often do you drink these sweet colddrinks? Here we would like to know the frequency of colddrinks including gassy drinks.

5.11 How often have you had an alcoholic drink in the last month? Here we would like to know the frequency of drinking alcohol.

PERCEIVED CARE

Introduction: In the next few questions I would like to ask you about the care you receive at this facility.

6.1 Do you feel comfortable at this facility? Here we would like to know if the patient is treated well at the facility.

6.2 Please rate the DIABETES-RELATED services you receive at this facility. Rate the service according to the following: satisfied, dissatisfied or not applicable.

1. Medical care provided: Ask the patient how he or she feels about the medical care that is provided at this facility.

2. Complaint procedure: Ask the patient if there is a complaint procedure and how he feels about the procedure. If he or she did not have a complaint yet, the answer will probably be "not applicable"

3. Cleanliness: Ask the patient how he or she feels about the cleanliness of the facility

4. Privacy during examinations: Ask the patient how he or she feels about privacy during examinations.

5. Confidentiality of records: Ask the patient if he or she feels their records are confidential.

6. Respect shown by most nurses: Ask the patient if he or she feels respected by most nurses.

7. Respect shown by most doctors: Ask the patient if he or she feels respected by most doctors.

8. Health information about Diabetes: Ask the patient how he or she feels about the health information received at this facility.

9. Information on medication use: Ask the patient how he or she feels about the information received on medication use.

10. Information on lifestyle changes: Ask the patient how he or she feels about the information received on lifestyle changes.

11. Opportunity to ask questions: Ask the patient how he or she feels about the opportunity granted by staff to ask questions.

12. Language used by staff: Ask the patient how he or she feels about the language that the staff use when treating them.

13. Hours facility open: Ask the patient how he feels about the hours the facility is open.

14. Waiting time: Ask the patient how he or she feels about the waiting time at the facility.

6.3 Have you ever received nutrition counselling? Here we would like to know if the patient was referred for nutrition counselling.

6.4 If yes, by whom? Here we would like to know who gave the nutrition counselling, the dietitian, nurse or doctor or anybody else.

Weigh and measure the patient. Take the patient's waist circumference.

THANK THE PATIENT FOR HIS OR HER TIME

ADDENDUM C: APPROVAL FROM ETHICS COMMITTEE

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

Research Division
Internal Post Box G40
☎(051) 4052812
Fax (051) 4444359

E-mail address: StraussHS@ufs.ac.za

Ms H Strauss/hv

2013-04-10

REC Reference nr 230408-011
IRB nr 00006240

DR M REID
SCHOOL OF NURSING
UFS

Dear Dr Reid

ECUFS NR 39/2013
DR M REID **SCHOOL OF NURSING**
PROJECT TITLE: HEALTH DIALOGUE WITH ADULT PATIENTS WITH CHRONIC DISEASES IN THE FREE STATE: TOWARDS A MODEL FOR LOWER AND MIDDLE INCOME COUNTRIES.

- You are hereby kindly informed that the Ethics Committee approved the above project at the meeting held on 9 April 2013.
- Committee guidance documents: Declaration of Helsinki, ICH, GCP and MRC Guidelines on Bio Medical Research. Clinical Trial Guidelines 2000 Department of Health RSA; Ethics in Health Research: Principles Structure and Processes Department of Health RSA 2004; Guidelines for Good Practice in the Conduct of Clinical Trials with Human Participants in South Africa, Second Edition (2006); the Constitution of the Ethics Committee of the Faculty of Health Sciences and the Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines.
- Any amendment, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.
- The Committee must be informed of any serious adverse event and/or termination of the study.
- A progress report should be submitted within one year of approval of long term studies and a final report at completion of both short term and long term studies.
- Kindly refer to the ETOVS/ECUFS reference number in correspondence to the Ethics Committee secretariat.

Yours faithfully

.....
PROF WH KRUGER
CHAIR: ETHICS COMMITTEE

ADDENDUM D: APPROVAL FROM THE FREE STATE DEPARTMENT OF HEALTH

health
Department of
Health
FREE STATE PROVINCE

25 April 2013

Doctor M Reid
Principal Investigator
University of Free State
BLOEMFONTEIN
9300

Dear Dr Reid

SUBJECT: APPROVAL TO CONDUCT RESEARCH ON HEALTH DIALOGUE WITH ADULT PATIENTS WITH CHRONIC DISEASES IN THE FRE STATE TOWARDS A MODEL FOR LOWER AND MIDDLE INCOME COUNTRIES

The above mentioned correspondence bears reference.

Permission is hereby granted for the above – mentioned research on the following conditions:

- Participation should be by informed consent.
- Ascertain that your data collection exercise neither interferes with the day to day running of the health facilities nor the performance of duties by the respondents.
- Confidentiality of information will be ensured and no names will be used.
- The results of the study should be communicated to Head: Health in writing.

Trust you find the above in order.

Kind Regards,

Dr TD MOJI
ACTING HEAD: HEALTH
Date: 25/4/2013

Head : Health
PO Box 227, Bloemfotein, 9300

ADDENDUM E: CONSENT FORM- English

Consent to participate in Research

I have been asked to participate in a research study titled: Diabetes related knowledge, attitude and practices of adults with type 2 diabetes in the Free State, South Africa**.**

I have been informed about the study by ……

My participation in this research is voluntary, and I will not be penalized or lose benefits if I refuse to participate or decide to terminate participation. If I agree to participate, I will be given the participant information sheet, which is a written summary of the research. I understand that I will not receive remuneration for participation in this study and it will not cost me anything.

The research study, including the above information has been verbally described to me. I understand what my involvement in the study means and I voluntarily agree to participate. I have received the Information sheet and understand the content.

…….. …….
Signature of Participant Date

CONSENT FORM - Afrikaans

Toestemming om deel te neem aan Navorsing

Ek is gevra om deel te neem aan 'n navorsingstudie getiteld: Diabetes verwante kennis, houding en praktyke van volwassenes met tipe 2-diabetes in die Vrystaat, **Suid-Afrika.**

Ek is ingelig oor die studie deur .....

My deelname aan hierdie navorsing is vrywillig, en jy sal nie benadeel word of enige voordele verloor as ek weier om deel te neem nie of besluit om my deelname te beëindig nie. As ek toestem om deel te neem, sal ek die inligtingsblad, wat 'n skriftelike opsomming van die navorsing is, ontvang. Ek sal geen vergoeding ontvang vir deelname in hierdie studie nie en dit sal my ook nie geld kos nie.

Die navorsingstudie, insluitende die bogenoemde inligting is mondelings aan my verduidelik. Ek verstaan wat my betrokkenheid in die studie beteken en ek stem vrywillig in om deel te neem

…… ……
Handtekening van deelnemer Datum

CONSENT FORM - Sesotho

TUMELLO EA HO NKA KAROLO LIPHUPUTSONG

Ke kopuoe ho nka karolo liphuputsong ka sehloho sena: TSEBO, BOITŠOARO, LITLOAELO KA LEFU LA TSOEKERE HO BATHO BA BAHOLO FOREISETATA AFORIKA BOROA.

Ke tsebisitsoe ka boithuto ke……..

Ho nka karolo hoa ka liphuputsong tsena ke boithaopo, hap eke tla fumana kotlo kebe ke amohuoe melemo ha ke hana ho nka karolo ka hake khetha ho khaotsa ho nka karolo. Haeba ke lumela ho nka karolo, ke tla fuoa pampiri ea tlhahiso leseling ea ba-nka karolo, eleng kakaretso ea ea liphuputso. Kea utloisisa hore hakena pataloa ho nka karolo boithutong bona le hore ha kena patala letho.

Boithuto ba liphuputso ho kenyeletsa le tlhahiso leseling eka holimo li hlakikisitsoe ka puisano ho ‘na. Ke utloisisa seo ho kena hoa ka boithutong bona ho se bolelang hapeke lumela ka boithaopo ho nka karolo. Ke fumane pampiri ea tlhahiso leseling ebile ke utloisisa tse ngotsoeng.

……..

Tekenop ea motho ea nkang karolo Letsatsi

ADDENDUM F: INFORMATION DOCUMENT- English

INFORMATION DOCUMENT: DIABETIC PATIENTS

Title of research: Diabetes related knowledge, attitude and practices of adults with type 2 diabetes in the Free State, South Africa

Good day
I, Maretha le Roux, am doing research on the knowledge, attitude and practices of diabetic patients. Research is just the process to learn the answer to a question. In this study we want to learn about diabetic practices in the Free State to inform decision makers on what the current situation is and to develop better care for patients.
Invitation to participate: We are asking/inviting you to participate in a research study

What is involved in the study – You will be asked questions by the researcher regarding yourself, what you know, how you feel about and what you do about diabetes. The interview will last about 30 minutes.

There are No Risks involved in participating in the study.

Benefits of being in the study are that your voice will be heard. Your opinions will be put together with others and this information will lead to better future care for patients with diabetes.

The participant will be given pertinent information on the study while involved in theproject and after the results are available.

Participation is voluntary, and refusal to participate will involve no penalty or loss of benefits to which the participant is otherwise entitled; the participant may discontinue participation at any time without penalty or loss of benefits to which the participant is otherwise entitled. No costs will be payable by you as participant and you will also not be paid for your participation in the research.

Confidentiality: Efforts will be made to keep personal information confidential. Results of the group may be presented at conferences and in publications.

Absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law.

Contact details of researcher – for further information
Maretha le Roux Tel: 083 680 9661
Contact details of Research Ethics Committee Secretariat and Chair – for reporting of complaints/problems.

(051) 4052812

P.O. Box/Posbus 339
Bloemfontein 9300
South Africa/Suid-Afrika
T: +27(0)51 401 9111

INFORMATION DOCUMENT- Afrikaans

INLIGTING DOKUMENT: DIABETIESE PASIËNTE

Titel van navorsing: Diabetes verwante kennis, houding en praktyke van volwassenes met tipe 2-diabetes in die Vrystaat, Suid-Afrika.

Goeie dag
Ek, Maretha le Roux, doen navorsing oor die kennis, houding en praktyke van pasiënte met diabetes. Navorsing is die proses om die antwoord op 'n vraag te kry. In hierdie studie wil ons bepaal wat praktyke van pasiënte met diabetes in die Vrystaat behels sodat ons besluitnemers kan inlig oor die huidige situasie en om beter behandeling vir pasiënte te ontwikkel.

Uitnodiging om deel te neem: Ons vra / nooi u om deel te neem aan hierdie navorsingstudie

Wat behels die studie - U sal deur die navorser vrae gevra word aangaande jouself, wat jy weet, hoe jy voel en wat jy doen met betrekking tot diabetes. Die onderhoud sal ongeveer 30 minute duur.

Risiko's – daar is geen risiko verbonde aan deelname aan die studie nie.

Voordele van jou betrokkenheid by die studie is dat jou stem gehoor gaan word. Jou menings sal saam met ander gelig word en hierdie inligting sal lei tot beter behandeling vir pasiënte met diabetes in die toekoms.

Deelnemers sal inligting ontvang oor die studie terwyl dit plaasvind asook nadat die uitslae beskikbaar is.

Deelname is vrywillig, en die weiering om deel te neem, sal geen boete of verlies van voordele waarop die deelnemer geregtig is, behels nie; die deelnemer kan deelname op enige tyd beëindig sonder straf of verlies van voordele waarop hy of sy andersins geregtig is. Geen koste sal verhaal word van die deelnemer, en die deelnemer sal ook nie betaal word vir deelname aan die navorsing.

Vertroulikheid: Pogings sal aangewend word om persoonlike inligting vertroulik te hou. Uitslae van die groep sal slegs op kongresse voorgedra word en gepubliseer word.

Absolute vertroulikheid kan nie gewaarborg word nie. Persoonlike inligting kan openbaar gemaak word as dit deur die wet vereis word.

Kontakbesonderhede van navorser - vir verdere inligting: Maretha le Roux Tel: 083 680 9661

Kontakbesonderhede van Navorsingsetiekkomitee sekretariaat en voorsitter - vir aanmelding van klagtes / probleme: (051) 405 2812

INFORMATION DOCUMENT - Sesotho

TOKOMANE EA TLHAHISO LESELING: BAKULI BA LEFU LA TSOEKERE

Sehloho sa liphuputso: TSEBO, BOITŠOARO, LIKETRSAHALO KA LEFU LA TSOEKERE HO BATHO BA BAHOLO FOREISETATA AFORIKA BOROA.

Lumelang

'Na, Maretha le Roux, ke etsa liphuputso ka tsebo, boitšoro le litloaelo tsa bakuli ba lefu la tsoekere. Liphuputso empa ele methati ea ho ea ho ithuta ho araba potso. Boithutong bona re batla ho ithuta ka liketsahalo tsa lefu la tsoekere ka hara Foreisetata ho tsebisa batho ba etsang liqeto ka se etsahalang le ho qala litšebeletso tse ntlafetseng bakeng sa bakuli.

Memo bakeng sa ho nka karolo: Re u kopa/ mema ho nka karolo boithutong ba liphuputso

Se kenyelelitsoeng ka hara boithuto- u tla botsoa lipotso ke mofuputsi ka uena, seo use tsebang, kamoo u ikutloang le seo use etsang ka lefu la tsoekere. Lipotso li tla nka metsotso e mashome a mararo(30)

Haho likotsi tse kenyelelitsoeng ka hara boithuto

Melemo ea hoba boithutong bona ke hore lentsoe la hau le tla utluoa. Maikutlo a hau a tla beoa 'moho le amang ebe tlhahiso leseling ena etla lebisa ntlafatsong ea litšebeletso ka moso bakeng sa bakuli ba tsoekere.

Thuto ena ho tla nahanoa leho buisana ka eona ka hara boithuto leho kenyeletsoa ka hara tšebetso ka mor'a ho fumanoa ha sephetho.

Ho nka karolo ke boithaopo, ho hana ho nka karolo ha hona kenyeletsa kotlo kapa ho lahleheloa ke melemo eo thuto e e kenyeletsang; thuto eka khaotsa ho nka karolo nako e 'ngoe le e 'ngoe ka ntle ho kotlo kappa ho lahleheloa ke melemo eo thuto e ekabeng e e kenyelelitse. Ha hona litjeo tse tla patloa ho uena ha u nka karolo hape ukeke ua patalloa ho nka karolo liphuputsong.

Lekunutu: matsapa a tla etsoa ho boloka tlhahiso leseling ea motho ele lekunutu. Liphetho li tla phatlalatsoa libokeng leka liphatlalatso.

Ha ho tiisetso ea lekunutu e netefatsoang. Tlhahiso leseling ea motho eka phatlalatsoa haho hlokahala ke lekhotla la molao.

Lintlha ka botlalo ka mofuputsi – bakeng sa tlhahiso leseling

Maretha le Roux mohala: 083 680 9661

Lintlha ka botlalo tsa Molula-setulo le Mongoli oa komiti ea Liphuputso le Boitšoaro – ho tlaleha little-tlebo/mathata.

(051) 4052812 Lebokose la poso 339, Bloemfontein 9300, South Africa

Mohala +27(0) 51 401 9111

ADDENDUM G: CODING OF QUESTIONNAIRES

2.3 What is your home language

7	Shona (Zimbabwean)

2.6	**What is wrong with you**
1	Dizzyness
2	Headache
3	Painful joints/feet /bones
4	Allergy
5	Asthma
6	Tiredness
7	Flu
8	Diabetes
9	Hypertension
10	Hearth problem
11	Prostate problem
12	Itchy vagina
13	Diarrhoea
14	Fell
15	Ear Pain
16	Unclear vision
17	Back Pain
18	Arthiritis
19	Knife wound
20	Constipated
21	Thyroied
22	Painful chest

1	Metabolic syndrome related symptoms
2	Other health related symptoms
3	Not health related symptoms

2.12	**How long ago were you diagnosed**
99	Cannot remember
98	Less than one year
2.13	**How were you diagnosed**
1	Urinate a lot/thirsty/dry mouth
2	Feeling sick/headache/nausea
3	Voluntary testing
4	Could not see properly/blind
5	High blood pressure

1	Presented with Metabolic syndrome related symptoms
2	Presented with other health related symptoms

6	Weight loss
7	Heart problem/chest pain
8	Itchy body
9	Death of family member
10	Pregnancy
11	Diarrhoea/Constipated
12	Prostate problem
13	Abcess in breast
14	Collapsed/Dizzy
15	Itchy vagina
16	Hungry all the time
17	Routine check up
18	After stroke
19	Tired all the time
20	Heart beat fast
21	Went for operation/wound in leg
22	TB
23	Car accident
24	Kidney problem
25	Sweating
26	HIV
27	Tooth ache
28	Asthma
99	Cannot remember

3	Provider initiated screening & testing
4	Death of family member
5	Pregnancy
99	Cannot remember

2.14	**Which medication do you use?**

1	Insulin
2	Diabetic tablets
3	Insulin & tablets
4	Hypertension
5	Cholesterol
6	Asthma
7	ARV
8	Arthiritis
9	Gout
10	None
11	Water pills
12	Epilepsy
13	Hernia
14	Ulcer
15	Mental medication

1	Insulin
2	Diabetic Tablets
3	Insulin & Tablets
4	ARV
5	Epilepsy
6	Asthma
7	Arthiritis
8	None
9	Pain
10	Metabolic syndrome related
11	Psychological
12	Other
13	Diabetes Unspecified

16	Anti-depressant
17	Thyroid
18	B 12
19	Fast pulse
20	Disprin
21	Pain tablets
22	TB
23	Hearth medication

3.1	**What causes diabetes**

99	Do not know
2	Overweight
3	Family history
4	Diet
5	Shock
6	Hypertension
7	Fatty food
8	Too much starch
9	Stress/depression
10	Drink too much Coke
11	Alcohol
12	Wrong lifestyle
13	Pancreas problem
14	Heart
15	Failure of the tubes

1	Family history
2	Lifestyle/diet related
3	Emotional triggers
4	Other medical conditions
99	Do not know

3.2	**What is the normal range?**

99	Do not know
2	4,0-7,0
3	8,5
	6,5
	2,4
	4,5
	5,8
	4,7

1	Correct
2	Incorrect
99	Do not know

3.3	**Common signs of high blood sugar**

99	Do not know
2	Dizzyness

1	Correct

3	Itchy vagina
4	Painful feet/leg
5	Thirsty
6	Sweating
7	Hot flashes
8	Confused
9	Weight loss/change in body shape
10	Loss of appetite
11	Tiredness/weak
12	Headache
13	Blurry vision
14	Loss of memory
15	Stress
16	Nausea
17	Normal
18	Do not feel good
19	Hungry
20	Urinate a lot
21	Short breath
22	Diarrhoea
23	Heart pumps
24	Strong urine
25	Rush

2	Incorrect
99	Do not know

3.4	**When your blood sugar is low**

99	Do not know
2	Drink Coke/juice
3	Eat a sweet/Jam
4	Drink sugar water
5	Go to clinic/doctor
6	Drink water
7	Eat raisins
8	Eat something with salt
9	Nothing
10	Eat Chocolate
11	Drink Diabetic tablets
12	Eat Banana/apple/fruit
13	Drink aloevera
14	Eat Chappies
15	Eat bread

1	Correct
2	Incorrect
3	Almost correct
99	Do not know

16	Eat something green
17	Eat snack

3.5	**Complications with Diabetes**

99	Do not know
1	Stroke
2	Heart attacks
3	Blindness
4	Amputation of legs/sore feet
5	Death
6	Sores
7	Restless legs
8	Kidney problems/failure
9	Eye sight
10	Weight loss
11	Hypertension
12	Body pains
13	Bleeding nose
14	Cancer
15	HIV
16	Gangreen
17	Impotent
18	Asthma
19	Painful teeth
20	Change figure
21	Dizzy
22	Loss of hormones
23	Sickness

1	Death
2	Sickness
3	Correct
4	Incorrect
99	Do not know

5.4	**How often do you eat starch**

6	Once per week

5.5	**How often do you eat fatty food**

6	Once per week

5.6	**How often do you eat salty food**

6	Once per week

5.7	How often do you eat vegetables

6	Once a week
7	When I have money

5.8	How often do you eat fruit

6	Once a week
7	When I have money

5.9	Type of colddrink

99	Do not drink colddrink
2	Tab & other diet colddrinks
3	Coke
4	Lemonade
5	Sprite zero
6	Juice
7	Oros
8	Diet Coke
9	Coke lite
10	Sprite
11	Drink o Pop
12	Wild Island
13	Weigh less juice
14	Sparletta
15	Iron Brew
16	Sodawater
17	Ice tea
18	Flavoured water
19	Fanta
20	Lemon Twist

1	Diet/lite colddrinks
2	Sweetened colddrinks
3	Low sugar colddrinks
99	Do not drink colddrink
4	Unspecified
5	Diluted juice

5.11	How often do you drink alcohol

8	Occasionally

6.1	Feel comfortable at this facility

3	First time at facility

6.4	**Who gave nutrition counselling**

99	Do not know
4	Nurse and Dietitian
5	Counsellors

7.7	**Which method do you prefer?**

5	Counselling from Sister/Doctor
6	Workshops
7	Supportgroup

ADDENDUM H: SCORING OF QUESTIONNAIRES

Knowledge

3.1 Causes of Diabetes:	1 2	Correct
	3 4 99	Incorrect
3.2 What is the normal range of blood sugar	1	Correct
	2 99	Incorrect
3.3 What are the most common signs of high blood sugar	1	Correct
	2 99	Poor
3.4 What should you do when you blood sugar is low	1	Correct
	2 3 99	Incorrect
3.5 Types of health complications usually associated with Diabetes	3	Correct
	1 2 4	Incorrect
3.7 Diabetes Medication can cure Diabetes	False	Correct
	Unsure True	Incorrect
Diabetes medication should be taken for life	True	Correct
	Unsure False	Incorrect
You should stop taking your diabetes medication when you feel sick	False	Correct
	Unsure True	Incorrect
Poor control of diabetes could result in a greater chance of complications	True	Correct
	Unsure False	Incorrect
Eating less bread will make me lose weight	False	Correct
	Unsure True	Incorrect
Salty food will prevent my sugar levels from dropping	False	Correct
	Unsure True	Incorrect
3.8 Diabetic medication may cause swelling of feet	False	Correct
	Unsure True	Incorrect
Sore feet are common in people with diabetes	True	Correct
	Unsure False	Incorrect
People with diabetes may have poor	True	Correct

circulation of blood in the feet	Unsure False	Incorrect
3.9 Physical exercise is important for people with diabetes	Yes	Correct
	Unsure No	Incorrect

Physical work or regular exercise help with:

3.10 Blood sugar control	True	Correct
	Unsure False	Incorrect
3.11 Painful feet	True	Correct
	Unsure False	Incorrect
3.12 Weight loss	True	Correct
	Unsure False	Incorrect

Factors worsening diabetes:

3.13 High blood pressure	True	Correct
	Unsure False	Incorrect
3.14 Epilepsy	True	Correct
	Unsure False	Incorrect
3.15 Overweight	True	Correct
	False Poor	Incorrect

4.1 Attitude

1. If I did not have diabetes I think I would be quite a different person	Disagree	Positive
	Agree	Negative
2. I dislike being referred to as “a diabetic	Disagree	Positive
	Agree	Negative
3. Diabetes is the worst thing that has ever happened to me..	Disagree	Positive
	Agree	Negative
4. Most people would find it difficult to adjust to having diabetes	Disagree	Positive

	Agree	Negative
5. I often feel embarrassed about having diabetes	Disagree	Positive
	Agree	Negative
6. There is not much I seem to be able to do to control my diabetes	Disagree	Positive
	Agree	Negative
7. There is little hope of leading a normal life with diabetes	Disagree	Positive
	Agree	Negative
8. The proper control of diabetes involves a lot of sacrifice and inconvenience	Disagree	Positive
	Agree	Negative
9. I avoid telling people I have diabetes	Disagree	Positive
	Agree	Negative
10. Being told you have diabetes is like being sentenced to a lifetime of illness	Disagree	Positive
	Agree	Negative
11. My diabetic diet spoils my social life	Disagree	Positive
	Agree	Negative
13. Having diabetes over a long period changes the personality	Disagree	Positive
	Agree	Negative
14. I often find it difficult to decide whether I feel sick or well	Disagree	Positive
	Agree	Negative
15. Diabetes can be controlled	Disagree	Negative
	Agree	Positive
16. There is really nothing you can do if you have diabetes	Disagree	Positive
	Agree	Negative
17. There is really no-one I feel I can talk	Disagree	Positive

to openly about my diabetes		
	Agree	Negative
18. I believe I have adjusted well to having diabetes	Disagree Agree	Negative Positive
19. I often think it is unfair that I should have diabetes when other people are so healthy	Disagree	Positive
	Agree	Negative

5. Practice

5.1 Many people tend to forget taking medication. How often have you forgotten	1 2	Good
	3 4 5 6 7 – Not on medication	Poor
5.2 How often have you done physical work or exercise in the last week	1 2	Good
	3 4 5 6	Poor
5.3 On the days when you do physical work or exercise: How long did it last on average	1 2	Good
	3 4	Poor
5.4 How often do you eat refined starch, such as white bread or cake	1 2	Good
	3 4 5 6	Poor
5.5 How often do you eat fatty food like slap chips or vetkoek	1 2	Good
	3 4 5 6	Poor
5.6 How often do you eat food with lots of salt, like russians or poloni or use	1 2	Good

stock cubes in food preparation	3 4 5 6	Poor
5.7 How often do you eat vegetables	4 5	Good
	1 2 3 6 7	Poor
5.8 How often do you eat fruit	4 5	Good
	1 2 3 6 7	Poor
5.9 What type of colddrink do you mostly drink	1 5 99	Good
	2 3 4 Unspecified	Poor
5.11 How often have you had an alcoholic drink in the last month	1 2 3 8	Good
	4 5 6 7	Poor