

UNIVERSITY OF THE WESTERN CAPE

Faculty of Community and Health Sciences

Doctoral Thesis

Title: DESIGNING AND DETERMINING THE EFFECTIVENESS OF A HEALTH PROMOTION PROGRAMME FOR CLIENTS WITH TYPE 2 DIABETES MELLITUS FROM AN URBAN SOUTH AFRICAN COMMUNITY

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ABSTRACT

Diabetes mellitus, an international pandemic, is one of the greatest threats to global public health. It is estimated that 70% of patients with diabetes are living in developing countries. Since the inception of the Primary Health Care approach in South Africa in 2004, the number of patients with diabetes has doubled to an estimated 1.5 million South Africans. The overall aim of the study was to develop, implement and determine the effectiveness of a health promotion intervention for adult clients with type 2 diabetes mellitus from a South African urban community. The overarching design of the study was that of mixed methods, specifically the parallel mixed design. The first phase of the study was to determine the current practices regarding the management of diabetes mellitus and the study sample comprised of three hundred and thirty five adult clients with type 2 diabetes mellitus and eighteen health care professionals of randomly-selected community health centres (CHCs) in the four sub-structures of the Cape Metropolitan District. Data was collected from the adult clients with type 2 diabetes mellitus with structured, self-administered questionnaires and focus group discussions while semi-structured interviews were done with the health care professionals. The second phase of the study aimed to design a health promotion programme and both a review of the literature and a Delphi study were done to develop the proposed programme. The programme comprised of the following: physical exercise (cardio-respiratory and strengthening exercises), healthy eating, stress management and self-management techniques. Thereafter the programme was implemented and its effectiveness was assessed. Permission and ethical clearance were obtained from Senate Research Grants and Study Leave Committee at the University of the Western Cape (UWC), the Western Cape Department of Health and the facility managers of the participating CHCs. The quantitative data analysis of the first phase showed that 54.9% of the clients were obese and 31.1% overweight. In addition, 78.5% were classified as hypertensive and 22.08% as hyperglycaemic (HGT > 11.1 mmol/l). Low physical activity levels (< 600 MET-min/week)

were calculated for 54.0% of the clients and 80.3% had inadequate knowledge of diet and nutrition. Financial constraints, safety in the neighbourhood and services rendered at the CHC were some of the challenges reported by the clients in managing their disease. Health care professionals had a positive attitude towards existing concepts in diabetes care. Poverty, lack of manpower, lack of time, lack of appropriate awareness programmes and clients' non-adherence to non-pharmacological management impede appropriate management of the clients. Several steps, including a review of the literature and a Delphi study were taken to assist in the development of the intervention. Before the implementation, the intervention's acceptability at a primary health care setting was assessed. Significant changes were reported after the six-week intervention ($p \leq 0.05$). These included a significant decrease in weight, BMI, random blood glucose (HGT) and systolic blood pressure ($p = 0.000$). In addition, significant improvement was observed for moderate and total physical activity levels, knowledge of diet and self-efficacy scores for diabetes mellitus. A clinically significant change in the stage of change for both physical activity and diet was observed post-intervention. The findings have shown to be a promising and effective approach to increase knowledge, self-efficacy and self-management strategies needed to curb the burden of this debilitating disease. The intervention has shown a remarkable increase in diabetes knowledge, self-efficacy to manage the disease and the adoption of a healthier lifestyle. The strengths of the present study could justify widespread implementation of the health promotion intervention in primary health care facilities.

DECLARATION

I hereby declare that “**DESIGNING AND DETERMINING THE EFFECTIVENESS OF A HEALTH PROMOTION PROGRAMME FOR CLIENTS WITH TYPE 2 DIABETES MELLITUS FROM AN URBAN SOUTH AFRICAN COMMUNITY**” is my own work, that it has not been submitted, or part of it, for any degree of examination at any other university, and that all sources I have used or quoted have been indicated and acknowledged by means of complete references.

Tania Steyl

Signature.....

November 2013

Witness:.....



.....

Prof JS Phillips (supervisor)

DEDICATION

To my beloved sons, DOUW and DIRK. You have been and are a blessed source of inspiration. If I could give you one thing in life, I would give you the ability to see yourself through my eyes, only then you will realize how special you are to me... I love you with all my heart.



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Immeasurable thanks and appreciation are due to all those who assisted and supported me through this endeavour. I am indebted to my supervisor, Prof. Julie Phillips for her guidance, encouragement and constant support. Words cannot express my appreciation for your knowledge, practical assistance and most of all, your belief in me. You are the most wonderful supportive person and friend I've ever met in my life! Without your compassion, commitment and empathy, I would never have been able to successfully complete this thesis.

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Above all, I am deeply grateful to God who blessed me with the opportunity and strength to further my studies.

We must be the change we want to see – Mahatma Gandhi

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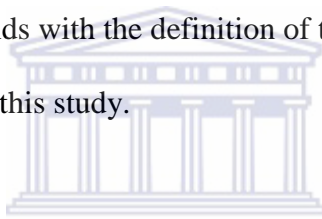
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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

In this chapter the rationale of the study highlights the factors contributing to the growing incidence of type 2 diabetes mellitus which accounts for the high mortality and morbidity of adults in urban settings worldwide. The chapter further documents suggested management guidelines to combat this rampant disease. The purpose of the study is explained and the specific aim and objectives are outlined. Finally the significance of the study demonstrates the need to develop and implement effective health promotion programmes for this fast growing epidemic. The chapter ends with the definition of terms used as well as a summary of the chapters that will follow in this study.



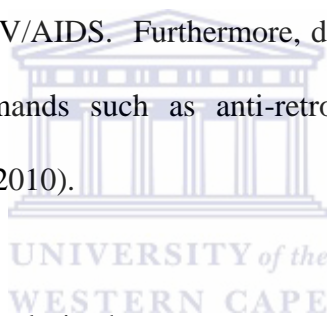
1.2 RATIONALE FOR THE STUDY

Diabetes Mellitus, an international pandemic, is a growing public health concern and its prevalence is escalating exponentially with a high frequency of morbidity, premature mortality, disability, loss of productivity (Steyn, 2007) and socio-economic challenges (Mbanya, Motala, Sobngwi, Assah & Enoru, 2010). Even though the prevalence of infectious diseases such as Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) and tuberculosis is inciting the health economy, diabetes seems to be the world's most ominous disease. Wild et al. (2004) estimated a 115% and 135% increase in diabetes mellitus for the total population and the urban population of Sub-Saharan Africa by 2030, respectively. In 2003, about 65% of people in Sub-Saharan Africa affected with diabetes lived in urban areas, whereas 35% resided in rural communities (IDF, 2003). By the end of 2011, 366 million people suffered with this chronic disease

worldwide. This prevalence is alarming especially in light that of these, an estimated 183 million people were undiagnosed (IDF Diabetes Atlas, 2003). According to the International Diabetes Federation, (IDF) (IDF, 2009) the global number of adults with diabetes will increase by 54%, from 284.6 million in 2010 to 552 million in 2030. The same report (IDF, 2009) proposes that a further 7 million people will develop diabetes each year. The alarming rate at which the disease is growing in developing countries is of great concern, as it is estimated that by the year 2025 about 80% of all new cases of diabetes will occur in developing countries (IDF, 2009; IDF, 2006; Dagogo-Jack, 2006; Wild, Roglic, Green, Sicree & King, 2004). According to Osei (2003), the prevalence of diabetes mellitus in developing countries ranges from 0.5% to 2.5% in rural areas, and 4% to 6% in urban areas. This researcher also notes that aspects such as poverty, ignorance, illiteracy, inadequate resources (finances and specialized health care professionals) contribute to people in developing countries not being diagnosed and managed effectively. Furthermore, health systems in developing countries are orientated towards acute care. These figures are clear confirmation of the emergent extent of diabetes mellitus as one of the foremost public health challenges in the 21st century.

South Africa is ranked the country with the 2nd highest number of people affected with diabetes in African countries (IDF, 2003). The prevalence of diabetes mellitus has increased overwhelmingly in the last two decades and in 2007 an estimated 1.5 million South Africans were diagnosed with diabetes mellitus, a disease that ranks third in South Africa in terms of mortality and morbidity for the general population (Steyn, 2007). The prevalence of the “disease of affluence” in South Africa has increased drastically over the years (Somers, Rusford, Hassan & Erasmus, 2006) due to population growth, ageing populations, dietary changes and sedentary lifestyles, all of which are associated with westernisation and

urbanisation (Mensah, Mokdad, Ford, Narayan, Giles et al., 2004; Wild et al., 2004; Mennen & Mbanya, 2000). However, many societal impediments such as poor education, illiteracy and low socio-economic rank also contributes to the diabetic pandemic (Levitt, 2008; Rabi, Edwards, Southern, Svenson, Sargious et al., 2006). It is alarming if kept in mind that researchers cautioned us that undiagnosed diabetes is not a benign condition (Al Osaimi & Al-Gelban, 2007). The impact of the HIV/AIDS epidemic on the projected prevalence of type 2 diabetes should also be taken into account. Levitt and Bradshaw (2006) estimated that with HIV/AIDS, the number of people with diabetes will increase to 3.4 million in 2010. The rate at which new cases of diabetes mellitus are emerging poses an additional burden on South Africa already stretched to the limit by life-threatening infections such as tuberculosis (TB) and HIV/AIDS. Furthermore, diabetes management costs have to compete with other health demands such as anti-retroviral drugs for HIV/AIDS and tuberculosis treatment (Idemyor, 2010).



Urbanisation plays an important role in the emergence and high prevalence rates of type 2 diabetes mellitus (Holme, Tonstad, Sogaard, Larsen & Haheim, 2007; Godfrey & Julien, 2005, Aspray, Mugusi, Rashid, Whiting, Edward et al., 2000; Mennen and Mbanya, 2000). It is associated with more availability of food, eating of unhealthy fast foods and a less physical active lifestyle. It is speculated that people from rural areas have higher levels of physically activity which facilitate high energy disbursement compared to their urban counterparts. This leads to a four times higher prevalence of obesity amongst urban residents (Aspray et al., 2000). Obesity and physical inactivity is known to contribute to insulin resistance, a critical component in the pathogenesis of type 2 diabetes mellitus (Bennett, 2000). A general trend towards a more sedentary society with the advent of modern electronic equipment and computers as well as more time spent sitting at leisure may be

causative components in the increased trend of the disease, especially for urban settings (Hu et al., 2001). Physical activity has gained much attention for its role in preventing premature disease and disability (Valois, Zullig, Huebner & Drane, 2004), and it became widely recognized as a key health behaviour, associated with reduced morbidity and mortality of chronic diseases of lifestyle such as hypertension and type 2 diabetes (Martinson, O'Connor & Pronk, 2001; Prat, Macera & Wang, 2000) and diabetic complications (Gill & Cooper, 2008; Kriska et al., 2003). In addition, physical activity, has been shown to improve glucose tolerance (WHO, 2003; Boule, Haddad, Kenny, Wells & Sigal, 2001) as well as insulin sensitivity (Irwin et al., 2000), reduce the use of diabetic medication, as well as assisting with weight loss and decreasing hypertension and complications of diabetes mellitus (Willey & Singh, 2003).



Due to the insidious and initially asymptomatic nature of the disease, evidence from across sub-Saharan Africa suggests that clients do not seek early medical attention, resulting in 30% to 80% of cases of type 2 diabetes mellitus being undiagnosed. Researchers furthermore argue that inadequate public awareness and knowledge of symptoms of diabetes may explain the failure of early diagnosis of this dreadful disease (Gunay et al., 2006; Angeles-Llerenas, Carbajal-Sanchez, Allen, Zamora-Munoz & Lazcano-Ponce, 2005). Factors such as late and poor clinic attendance, delayed diagnosis and poor patient education on the management of diabetes could contribute to poor quality care and outcomes (Dagogo-Jack, 2006; Kiawi et al., 2006; Ramaiya, 2005; Amoah, Owusu & Adjei, 2002; Mbanya, Ngogang, Salah, Minkoulou & Balkau, 1997). Although The World Diabetes Foundation (2009) acknowledged type 2 diabetes mellitus to be a major public health problem, many developing countries do not pay much attention to public awareness programmes for diabetes (IDF,

2009). This highlights the need for health promotion strategies to become a public health goal.

Effective management of diabetes starts with early diagnosis and calls for an integrated approach, including the patient, family and the community (Yach, Leeder, Bell, & Kistnasamy, 2005; Tshabalala, 2001). The efficacy of treatment is highly dependent on the individual's ability to manage the disease. Each individual should have their own goals based on their clinical picture, social, psychological, cultural and financial background (Mbanya & Gill, 2004). Diabetes education is the cornerstone of successful diabetes management. Most importantly it empowers patients with knowledge which will enable them to adjust their treatment safely (Moodley & Rambiritch, 2007) and it provides them with skills to self-monitor and acknowledge their susceptibility to various health risks. However, knowledge does not always result in behaviour change and need to be reinforced (McManus, Larry & Gordon, 2006). It is therefore of utmost importance to have proper health promotion programmes in place that will assist people with the adoption and maintenance of healthier lifestyles that would delay the onset of complications. Tshabalala (2001) proposes that diabetes education in South Africa should be considered as an integral and significantly important component of diabetes treatment and management. If diabetes care is to reach the "grassroots", then care needs to be focused at the primary health care (PHC) level, along with efficient administration and education of primary health care staff. Peyrot, Rubin, Lauritzen, Snoek & Matthews et al., (2006) found that most health facilities in sub-Saharan Africa lack health care providers with training in diabetes management, thus compromising the quality of care for patients. This is furthermore confirmed by researchers who reported nurses and doctors to be inadequately trained to provide complex dietary advice to people with diabetes (Beran & Yudkin, 2006).

To this end the Primary Health Care (PHC) approach was implemented in South Africa aiming to improve access to health care services. PHC is the first level of contact within the national health system and is essential health care made universally accessible to individuals and families in the community. According to the Alma-Ata Declaration of 1978, PHC should address the main health problems in the community by providing promotive, preventive, curative and rehabilitative services. Education concerning existing health problems and the methods of preventing and controlling illnesses underpins the comprehensive delivery of primary health care (Fry & Hasler, 1986). The Primary Health Care approach was integrated in the country's National Health Act, 2004 (No. 61 of 2003), and operationalised through the district health service, providing quality primary health care to everyone in a defined geographical area. Since the inception of the PHC approach in the South African national health system, the prevalence of diabetes mellitus has still increased overwhelmingly in the last two decades with an estimated number of diabetics in South Africa in 2003 being 0.84 million (IDF, 2003). This figure has however doubled by 2007 to an estimated 1.5 million South Africans diagnosed with diabetes (Steyn, 2007). This leaves us with the following questions:

- Is the PHC approach failing to curb the increase of type 2 diabetes mellitus with adequate preventative and promotive services?
- Is the PHC approach failing patients diagnosed with type 2 diabetes mellitus in the management of their disease?
- What non-pharmacological health promotion strategy is implemented at the CHCs as part of the management of patients with type 2 diabetes mellitus?

Type 2 diabetes mellitus could be well managed in primary health care settings with properly trained staff and expertise in diabetes, using appropriate treatment protocols if the

government has a strong commitment to make it happen. It is therefore important to determine the extent to which the health care professionals provide patients and their caregivers with adequate information on the management of diabetes and its related complications.

1.3 RESEARCH STATEMENT

Type 2 diabetes mellitus, an incurable chronic disease, requires more than only pharmacological management to prevent hyperglycaemia, ketoacidosis and complications that arise later due to high blood glucose levels. The management of type 2 diabetes mellitus may include oral diabetes medication, a special diet and participation in daily physical activity. It may however be complicated by other external factors such as stress, socio-economic circumstances, other illnesses (Gerstein et al., 2001) and the effectiveness of education/health promotion programmes. As lifestyle change remains the primary strategy for management of type 2 diabetes mellitus, people should be encouraged to take responsibility for their own health. This involves empowering them by increasing their awareness of the risk their current diet and sedentary lifestyle might play in them developing diabetic complications. Effective promotion of lifestyle changes as part of the management of type 2 diabetes mellitus patients at PHC level can assist to control the emergence and costs of diabetes and diabetic complications in South Africa.

1.4 AIM OF THE STUDY

The overall aim of the study is to develop, implement and determine the effectiveness of a health promotion intervention for adult clients with type 2 diabetes mellitus of a South African urban community.

1.5 OBJECTIVES OF THE STUDY

The specific objectives of the study are:

- a) To determine current practice regarding the management of diabetes mellitus (needs analysis):**
 - i. To determine the current practices of health care professionals regarding the management of type 2 diabetes mellitus at PHC level in an urban community in the Western Cape, South Africa.
 - ii. To determine clients with type 2 diabetes mellitus' satisfaction with services received as part of the management of their diabetes at PHC level.
 - iii. To determine clients with type 2 diabetes mellitus' physical activity participation and knowledge of the role of diet in the management of their diabetes.
 - iv. To determine clients with type 2 diabetes mellitus' self-efficacy of their disease.
 - v. To determine clients with type 2 diabetes mellitus' social support from family, friends and the community.

- b) To explore the challenges experienced by health care professionals and clients with type 2 diabetes mellitus regarding the management of the disease.**

- c) To develop a health promotion programme for clients with type 2 diabetes mellitus.**
 - i. To evaluate current practices regarding health promotion for clients with diabetes mellitus through a review of the literature.

- ii. To reach consensus on the content of the developed health promotion programme through a Delphi study.

d) To implement the proposed health promotion programme for clients with type 2 diabetes mellitus at a selected Community Health Centre (CHC).

e) To determine the effectiveness of the proposed programme.

1.6 SIGNIFICANCE OF THE STUDY

Several possible causes for the type 2 diabetes mellitus pandemic have been identified, namely the epidemiological transition, westernisation, unhealthy lifestyles and poor quality care. Promotion strategies remain fundamental in the effort to combat diabetic complications. This underscores the need to empower people to make lifestyle changes. The results of the study could generate information regarding the efficacy of a health promotion programme at PHC level for type 2 diabetes mellitus that may inform policy frameworks to guide public health promotion initiatives in diabetes care and management in South Africa.

1.7 ABBREVIATIONS USED IN THE STUDY

ADA	American Diabetes Association
BMI	Body Mass Index
CDC	Centres for Disease Control and Prevention
CHC	Community Health Centre
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular Disease
DAS	Diabetes Attitude Scale

DoH	Department of Health
DBP	Diastolic Blood Pressure
DKT	Diabetic ketoacidosis
IDF	International Diabetes Federation
HDL	High Density Lipoprotein
HGT	Hemoglobin Glucose Test
HIV/AIDS	Human Immunodeficiency Virus Infection / Acquired Immunodeficiency Syndrome
IDF	International Diabetes Federation
IPAQ	International Physical Activity Questionnaire
LDL	Low Density Lipoprotein
MET	Metabolic Equivalent of Task
MPA	Moderate Physical Activity
MRC	Medical Research Council
NCD	Non-communicable Disease
PAEI	Physical Activity Exit Interview
PHC	Primary Health Care
RBG	Random Blood Glucose
SBP	Systolic Blood Pressure
SEMDSA	Society for Endocrinology, Metabolism and Diabetes of South Africa
SPSS	Statistical Package for Social Sciences
TB	Tuberculosis
UWC	University of the Western Cape
VPA	Vigorous Physical Activity
WHO	World Health Organization

1.8 DEFINITION OF TERMS

The most significant terms used in this study are defined below:

Type 2 diabetes mellitus: a common form of diabetes mellitus that develops especially in adults and most often in obese individuals that is characterised by hyperglycemia resulting from impaired insulin utilisation coupled with the body's inability to compensate with increased insulin production; also called non-insulin-dependent diabetes mellitus (Medical Dictionary).

Chronic diseases of lifestyle: a group of diseases that share similar risk factors because of exposure, over many decades, to unhealthy diets, smoking, lack of exercise, and possibly stress. The major risk factors are high blood pressure, tobacco addiction, high blood cholesterol, diabetes and obesity. These result in various long-term disease processes, culminating in high mortality rates attributable to stroke, heart attack, tobacco- and nutrition-induced cancers, chronic bronchitis, emphysema, renal failure, and many others. Internationally, these diseases are also known as 'non-communicable diseases' (NCDs) (South African Medical Research Council).

Health Care Professional: a person who by education, training, certification, or licensure is qualified to and is engaged in providing health care (Medical Dictionary).

Health promotion: it is a process of enabling people to increase control over and improve their health to reach a state of complete physical, mental, and social well-being (Coulson, Goldstein & Ntuli, 2002).

Sedentary: this is work or activities in which an individual spends a lot of time sitting down or not moving (Hornby, 2000).

Physical activity: any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level that enhances life (CDC, 2011).

Moderate physical activity: activities that take moderate physical effort and make you breathe somewhat harder than normal (IPAQ, 2001).

Vigorous physical activity: activities that take hard physical effort and make you breathe much harder than normal (IPAQ, 2001).



1.9 SUMMARY OF CHAPTERS

Chapter One provides a rationale for the study and highlights the growing incidence of type 2 diabetes mellitus in developing countries and in particular in South Africa. It further highlights the prevalence of type 2 diabetes mellitus globally and in South Africa specifically. Secondly the factors that could contribute to the diabetes pandemic, more specifically the non-genetic modifiable lifestyle factors such as obesity and physical inactivity, are outlined. In addition the Primary Health Care approach and the need for health promotion strategies at PHC level to combat type 2 diabetes mellitus and its complications are highlighted. The rationale, aim, specific objectives and significance of the study are also outlined. The chapter ends with the definition of terms and abbreviations used in this study.

Chapter Two presents a review of relevant literature to understand the current diabetes mellitus pandemic as well as environmental and lifestyle behaviour that could contribute to this disease.

Furthermore, current management strategies at PHC level are discussed and the theoretical framework underpinning health promotion programmes for type 2 diabetes mellitus are explored. In addition, a detailed account of the literature regarding the health promotion strategies in both developed and developing countries are provided. Lastly, an account of international, national and local policies on the management of diabetes mellitus is provided.

Chapter Three considers the methodological issues relevant to the study. It explains the research setting in which the study was based, as well as the study design used in this study. It further includes details regarding the study population and sampling methods for both quantitative and qualitative data. A description of the data collection methods is presented. This includes the instrument used in data collection, data collection procedures and issues of reliability, validity, credibility and trustworthiness. The chapter ends by giving the method of data analysis and showing how ethical issues were addressed.

Chapter Four outlines the results of the baseline quantitative data analysis. An overview of the socio- and bio-demographic information of both individuals with type 2 diabetes mellitus and the health care professionals are presented. Data regarding clients' perceptions of their management, i.e. their satisfaction with health care services, their understanding of their disease, their participation in physical activity, the role of diet and the support received from family and friends are presented. Health care professionals' attitudes toward diabetes and quality of physical activity counseling are presented. Results are summarised and presented in tables.

Chapter Five the results of the content analysis of the focus group discussions and interviews that attempted to explore the challenges experienced by clients with type 2 diabetes mellitus and

health care professionals regarding the management of diabetes mellitus are outlined in this chapter. The emerging themes are illustrated with the use of verbatim quotes.

Chapter Six presents the results of the Delphi study used to reach consensus on the content of the health promotion programme for clients with type 2 diabetes mellitus. The results of the three (3) rounds are outlined in this chapter.

Chapter Seven presents the results of the qualitative analysis of the workshop conducted at the community health care centre where the health promotion programme was implemented.

Chapter Eight describes the implementation of the health promotion programme and the effectiveness thereof.

Chapter Nine presents the integration stage of the study in the form of the discussion. It furthermore provides a summary of the study and draws conclusions based on the findings. Limitations to the study are also outlined. In addition, recommendations based on the main findings of the study are made.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter gives an extensive review of the literature to report the trend and prevalence of type 2 diabetes mellitus globally and in South Africa. The available literature on risk factors for and management of type 2 diabetes mellitus, including health promotion interventions are further reviewed. The specific risk factors reviewed, include physical inactivity and unhealthy eating patterns. A detailed account of health promotion strategies/interventions in both developed and developing countries is provided. In addition, an account of global and national policies and/or guidelines for the disease is presented. The theoretical orientations underpinning health promotion research are also presented.

2.2 OVERVIEW OF TYPE 2 DIABETES MELLITUS EPIDEMIOLOGY: CURRENT TRENDS

Diabetes mellitus, an international pandemic, is one of the greatest threats to global public health (Idemyor, 2010; Al Shafae et al., 2008; Abegunde, Mathers, Adam, Ortegón & Strong, 2007). Type 2 diabetes mellitus accounts for more than 90% of all diabetes cases (Amod, Ascott-Evans, Berg, Blom, Brown et al., 2012). The primarily asymptomatic nature of type 2 diabetes mellitus results in patients only seeking medical attention at a late stage, hence the prevalence of 30 – 85% of cases being undiagnosed. Researchers furthermore argued that inadequate public awareness and knowledge of diabetes symptoms may explain the failure of early diagnosis of this dreadful disease (Gunay et al., 2006; Angeles-Llerenas, Carbajal-Sanchez, Allen, Zamora-Munoz & Lazcano-Ponce, 2005).

The world-wide increase in type 2 diabetes mellitus, the most common type of diabetes, is triggered by, and associated with many factors, including unhealthy diets and sedentary lifestyles that enhance one's susceptibility towards obesity. This increasing prevalence is linked to urbanisation (Wild et al., 2004; Mennen & Mbanya, 2000), as well as associated changes in risk factors such as tobacco smoking, obesity and physical inactivity (Wild et al., 2004). Due to the chronic nature of the disease, type 2 diabetes mellitus have a "serious adverse impact on the life expectancy as well as quality of life" of its sufferers (Mohan, Venkataraman & Pradeepa, 2010, pg.96).

The International Diabetes Federation (2009) predicted an increase of 54% in the prevalence of people living with type 2 diabetes mellitus in 2010 (284.6 million) to 2030 (438.4 million). This is clear evidence of the extent of the pandemic as the report furthermore proposes that 7 million people will develop type 2 diabetes mellitus every year. Although diabetes is ranked the fifth leading cause of death, the scarcity of diabetes-related mortality data world-wide affects the true figures (Roglic, Unwin, Bennet, Mathers, Tuomelehto, Nag, et al., 2005). It is very seldom that diabetes is reported as the cause of death on death certificates (WHO, 2003), as many patients die from cardiovascular and renal complications (Morrish, Wang, Steven, Fuller & Keen, 2001).

The incidence of type 2 diabetes mellitus proved to be uncommon prior to the 1990s. Research has shown that from 1959 to the mid-1980s the prevalence of diabetes was as little as 1.4% in African countries (Rheeder, 2006; Motala, Omar & Pirie, 2003; Motala, 2002).

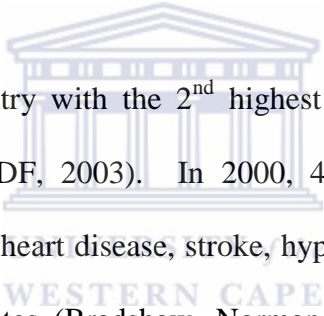
In 2000, the prevalence of diabetes mellitus for all age-groups world-wide was estimated to be 2.8% (Wild et al., 2006) with South Africa at an estimated prevalence of 3.6% in 2001. A mere 7.1 million people living in Africa were diagnosed with diabetes in 2000, a number that

was expecting to escalate to 18.6 million by 2030 (Roglic et al., 2004). King, Aubert and Herman (1998) predicted a 48% increase in the prevalence of type 2 diabetes mellitus between 1995 and 2025 across the globe for developing countries. It was furthermore estimated that by the year 2025, 70 - 90% of patients with type 2 diabetes mellitus will be living in developing countries (IDF 2009; Levitt, 2008; Ghazanfari, Ghofranpouri, Tavafian, Ahmadi & Rajab, 2007; Dagogo-Jack, 2006; Roglic et al., 2005). This remarkable expected increase has been associated with a variety of risk factors ascribed to urbanisation, westernisation and changing lifestyles (Osei, 2003; Motala, 2002; Pradeepa, Deepa & Mohan, 2002).

The prevalence of type 2 diabetes mellitus differs immensely among population groups world-wide as well as among people living in developed and developing countries. According to Idemyor (2010) it is mostly adults 60 years and older that are diagnosed with type 2 diabetes mellitus in developed countries whereas the age group 35 – 64 years are mostly implicated in developing countries (Al Shafae et al., 2008, Roglic et al., 2005). This is of great concern, as people in the latter age group are in their economically productive cycle, hence having huge economic implications for their countries (Narayan, Gregg, Fegot-Campagna, Engelgau & Vinicor, 2000).

The living environment seems to be a major determinant of diabetes in Sub-Saharan Africa, since urban residents have a 1.5 to 4.0 times higher prevalence of diabetes than their rural counterparts. This is attributable to lifestyle changes associated with urbanisation, i.e. changes in dietary habits involving an increase in the consumption of refined sugars, saturated fat and less fibre intake (Mennen & Mbanya, 2000) as well as less physical activity with regard to transportation and work (Sobngwi et al., 2002). The decline in physical

activity in urban residents furthermore drives the emerging prevalence of obesity in urban areas, a well-known risk factor for type 2 diabetes (Aspray et al., 2000). In 2003, about 65% of people in Sub-Saharan Africa affected with diabetes lived in urban areas, whereas 35% resided in rural communities (IDF, 2003). Osei (2003) also reported an incidence rate of 0.5 – 2.5% and 4 – 6% for rural and urban communities respectively. Wild et al. (2004) estimated a 115% and 135% increase in diabetes mellitus for the total population and the urban population of Sub-Saharan Africa by 2030, respectively. Other studies also show a vast difference in urban and rural prevalence in sub-Saharan Africa. In Tanzania and Cameroon a rural-to-urban prevalence ratio of 1.3:4 and 1:2 are reported respectively (Aspray et al., 2000; Mbanya et al., 1997).



South Africa is ranked the country with the 2nd highest number of people affected with diabetes in African countries (IDF, 2003). In 2000, 4.3% of the adult South African population died due to ischaemic heart disease, stroke, hypertension and renal disease, all of which were attributable to diabetes (Bradshaw, Norman, Pieterse & Levitt, 2007). The prevalence of diabetes mellitus has increased overwhelmingly in the last two decades and in 2007 an estimated 1.5 million South Africans were diagnosed with diabetes (Steyn, 2007) while it was estimated that in 2010 four million people in South Africa had diabetes, equating to a prevalence of 4.5% of the general population (IDF Atlas, 2010). The estimated prevalence for urban South Africa is between 8 and 13% (Motala et al., 2003).

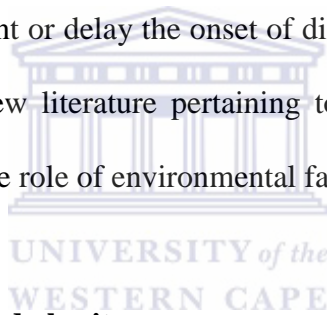
It is alarming if kept in mind that researchers cautioned us that undiagnosed diabetes is not a benign condition (Al Osaimi & Al-Gelban, 2007). The impact of the HIV/AIDS epidemic on the projected prevalence of type 2 diabetes should also be taken into account. Levitt and Bradshaw (2006) estimated that with HIV/AIDS, the number of people with diabetes will

increase to 3.4 million in 2010. The rate at which new cases of diabetes mellitus are emerging poses an additional burden on South Africa already stretched to the limit by life-threatening infections such as tuberculosis (TB) and HIV/AIDS. Furthermore, diabetes management costs have to compete with other health demands such as anti-retroviral drugs for HIV/AIDS and tuberculosis treatment (Idemyor, 2010). This may contribute to delays and/or poor diagnosis of diabetes and/or its management. It is evident that South Africa should not lose sight of the impact and importance of diabetes in the face of the HIV/AIDS epidemic.

From the literature reviewed above, it is evident that diabetes mellitus is on the increase globally. The prevalence of diabetes mellitus differs extensively across the globe and in different population groups. The growing prevalence of diabetes in developing countries, including sub-Saharan Africa, has been attributed to a variety of social, cultural and economic factors coupled with urbanisation and adoption of a westernised lifestyle. The studies reviewed showed that the majority of research done in developed countries were population-based; hence the opportunity to identify undiagnosed cases, a phenomena that is as high as 50% of all diagnosed cases world-wide. It is especially relevant to the African context where non-communicable diseases are seen as of less a priority than infectious diseases. It is evident that more population-based studies are needed in developing countries. Furthermore, current prevalence estimates are a poor pointer to future burden of diabetes due to the continuing increase. The health care burden is also affected by increased longevity of people with diabetes with better management, which means that overall people with diabetes carry a larger burden of complications and need more complex care.

2.3 RISK FACTORS FOR TYPE 2 DIABETES MELLITUS

Mennen and Mbanya (2000) categorized the risk factors into non-modifiable and modifiable risk factors. Non-modifiable risk factors include ethnicity, age and family history while modifiable risk factors comprise of physical inactivity and unhealthy diet; the latter two contributing to obesity. Genetic predisposition is most likely a precursor to type 2 diabetes mellitus, but lifestyle habits play a major role in the development and management of the disease (Serjeantson & Zimmet as cited in Simpson, Shaw & Zimmet, 2003; Zimmet, 2002). Mennen and Mbanya (2000) however argue that modifiable risk factors appear to be foremost determinants for developing diabetic complications in sub-Saharan Africa. Modifiable risk factors however, can be addressed through health promotion and education to increase self-management strategies and prevent or delay the onset of diabetes-related complications. The following section will thus review literature pertaining to modifiable risk factors such as physical inactivity, obesity and the role of environmental factors.



2.3.1 Physical inactivity, diet and obesity

The importance of being physically active cannot be overstated. Physical inactivity, a threatening global public health issue, has been identified as one of the ten leading causes of death worldwide (WHO, 2003). Physical activity is inversely related to the prevalence of type 2 diabetes (Manson et al., 1991 as cited in Abate & Chandalia, 2003) and a well-established risk factor for chronic diseases such as type 2 diabetes mellitus (Meisinger, Lowel, Thorand & Doring, 2005). Physical activity has gained much attention for its role in preventing premature disease and disability (Valois, Zullig, Huebner & Drane, 2004), and it became widely recognized as a key health behaviour, associated with reduced morbidity and mortality of chronic diseases of lifestyle such as hypertension and type 2 diabetes (Martinson et al., 2001; Prat et al., 2000) as well as diabetic complications (Gill & Cooper, 2008; Kriska

et al., 2003; Hu, Stampfer, Solomon, Liu, Colditz, Speizer et al., 2001). Although type 2 diabetes mellitus mostly occur in adulthood, physical activity habits established in childhood and adolescence are usually carried into adult life and play a fundamental role in the prevention the disease (Telema, Yang, Viikari, Wanne & Raitakari, 2005).

Physical inactivity is also concomitant with obesity. In the past 20 years, the rates of obesity have tripled in developing countries due to a westernised lifestyle of decreased physical activity and the consumption of food high in carbohydrates (Hossain, Kavar & Nahas, 2007). These researchers further stated that 90% of type 2 diabetes mellitus is attributable to the upswing in obesity, mostly seen in developing countries. A national cross-sectional study in South Africa by Puoane, Steyn, Bradshaw, Laubscher, Fourie, Lambert et al. (2002) found a higher trend in obesity amongst urban dwellers compared to the rural population.

Both physical inactivity and obesity contributes to insulin resistance, a critical component in the pathogenesis of type 2 diabetes mellitus (Bennett, 2000). According to Ganong (2005) there is a linear relationship between body weight and insulin resistance. Increased body weight, especially visceral fat, contributes to increased insulin resistance which has a negative impact on glucose release from the liver as well as an associated decrease in glucose transport in adipose tissue. Various researchers reported on the role of physical activity in the improvement of glucose tolerance (WHO, 2003; Boule et al., 2001), insulin sensitivity (Kriska, 2003, Irwin et al., 2000), reduction in the use of diabetic medication, as well as it's assistance with weight loss and decreasing hypertension and complications of diabetes mellitus (Willey & Singh, 2003).

Daily diet has an influence on weight, visceral obesity as well as insulin resistance. Increased consumption of carbohydrates and animal fat leads to obesity, a risk factor of type 2 diabetes mellitus and its complications (Hu, van Dam & Liu, 2001; Meyer, Kushi, Jacobs & Folsom, 2001). Mokdad, Bowman, Ford, Vinicor, Marks and Koplan (2001) reported an increased risk of 4.5% for the development of diabetes for each kilogram of weight gained. Furthermore, Liu, Manson, Stampfer, Hu, Giovannucci et al. (2000) and Meyer, Kushi, Jacobs Jr, Slavin, Sellers & Folsom (2000) reported an increased susceptibility to diabetes with reduced fibre intake in a diet. Additionally, the abundance of fast-food enterprises, supersized portions and advertisements for unhealthy, non-nutritious foods can also contribute to an obesity-prone environment.

2.3.2 Environmental factors

The social and environmental context of communities has received increasing attention as critical factors that contribute to the increasing prevalence of obesity and type 2 diabetes globally (Whittemore, D'Eramo-Melkus & Grey, 2004). Epidemiological studies emphasised the role of environmental factors such as poverty, poor education, high unemployment and urbanisation in the occurrence of the disease (Huddle, 1997; Zimmet, 1992). Strong inverse relations have been demonstrated between socio-economic status and the incidence of diabetes. Low income and low levels of education increase the risk of developing diabetes twofold. In addition, diabetes mortality are much higher in low-income groups compared to high-income groups (Howard, Anderson, Russel, Howard & Burke, 2000; Robbins, Vaccarino, Zhang & Kasl, 2001). Furthermore, low-income communities are particularly at risk for crime and violence which indirectly affect health by limiting the opportunity for exercise (Kaplan, Everson & Lynch, 2000).

The vast difference between the rural and urban prevalence of diabetes has been documented by several researchers (Wild et al., 2004; Osei, 2003; Motala, 2002; Pradeepa et al., 2002; Mennen & Mbanya, 2000). Environmental change related to westernisation is a major contributing factor to the diabetes epidemic. Urbanisation plays an important role in the emergence and high prevalence rates of type 2 diabetes mellitus (Holme et al., 2007; Godfrey & Julien, 2005, Aspray et al., 2000; Mennen and Mbanya, 2000). There is a shift from a relatively healthy lifestyle to the urban scenario which is associated with more availability of food, eating of unhealthy fast foods, the so-called “coca-colonisation” and a less physical active lifestyle (Beaglehole & Yach, 2003).

People from rural areas have higher levels of physical activity which facilitate high energy disbursement compared to their urban counterparts (Aspray et al., 2000; O’Dea, 1992). Furthermore, urban residents engaged most of the time in sedentary occupations compared to their rural counterparts. This change in occupational structure causes a large number of people that would normally participate in labour-intensive activities such as farming to now engage in work-related activities that demand less physical activity. They also have easy access to transport and water as well as electrical household equipment. A general proclivity towards a more sedentary society with the advent of modern electronic equipment and computers as well as more time spent sitting at leisure time may contribute further to the already low physical activity levels of urban dwellers (Damayanthi, 2002; Hu et al., 2001; Ramachandran, Snehalatha, Latha, Manoharan & Vijay, 1999).

From the literature reviewed above, it is evident that modifiable risk factors contributing to the diabetes epidemic can be managed appropriately by lifestyle change such as increased physical activity and healthy diet. Insulin-sensitivity is increased with physical activity and

decreased obesity. Sedentary lifestyle should be discouraged and people with diabetes should be encouraged and empowered with knowledge and skills to adopt and maintain a healthy lifestyle.

2.4 MANAGEMENT OF TYPE 2 DIABETES MELLITUS

Effective care and management of diabetes mellitus starts with early diagnosis. This is sometimes hampered due to the high prevalence of undiagnosed or delayed diagnosis of type 2 diabetes mellitus (Bilski, Perz & Kara, 2005). The researchers furthermore observed that the latent onset and slow development of type 2 diabetes mellitus also contribute to this phenomenon, which may result in the development of several complications.

Diabetes is a chronic disease with no cure to date. According to Amod, Ascott-Evans, Berg, Blom & Brown et al. (2012) fewer than 50% of patients with type 2 diabetes mellitus globally meet glycaemic targets, even in developed countries. More disturbingly, less than 10% achieve blood pressure, cholesterol and glycaemic targets despite multifactorial interventions (Gaebe, Lund-Andersen, Parving & Pedersen, 2008). Despite improvement in the management of diabetes in the Western Cape over the past years, a recent audit revealed that only 48% of patients with diabetes had an HbA_{1c} test done the previous years, whilst a mere 35% reached glycaemic control (HbA_{1c} < 7%) (De Vries, 2011). This is of great concern as good glycaemic control is the foundation of the prevention of diabetic complications.

Globally, the cost implications of the management of diabetes mellitus are exorbitant. Arnoldi (2004) conveyed that almost 15% of national budgets are spent on the diagnosis and treatment of people with diabetes in developed countries. The IDF (2006) agreed that

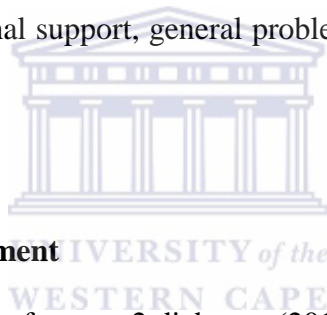
diabetes mellitus, given its chronic nature, the working adults mostly affected and the resources required to manage the disease, is a very costly disease. Financial constraints of affected individuals as well as the health care sector could have a negative influence on the management of the disease.

According to Walker (2007) the main focus of short-term management should be on keeping blood glucose levels in a specific range, therefore preventing hypoglycaemia (low blood sugar levels) or hyperglycaemia (high blood sugar levels) as well as long-term complications due to chronic hyperglycaemia. The long-term aims focus on avoiding hyperglycaemia and ketoacidosis as well as later complications (Gerstein et al., 2001).

The benefits of good glycaemic control were recorded by two major studies, namely the Diabetic Control and Complication Trial (DCCT) conducted in the United States of America and the United Kingdom Prospective Diabetes study completed in 2003. Both studies concluded that glycaemic control is directly related to the development of diabetic complications (Genuth, Eastman, Kahn, Klein, Lachin et al., 2003; Amod et al., 2012). The Society for Endocrine, Metabolism and Diabetes of South Africa (SEMDSA) developed guidelines for the management of patients with diabetes in South Africa, based on the findings of international studies (Amod et al., 2012). Specific guidelines for diagnosis and management of type 2 diabetes mellitus for primary health care (PHC) were developed in 2009 (SEMDSA Guidelines – 2009).

The 2009 SEMDSA Guidelines for diagnosis and management of type 2 diabetes mellitus for the PHC setting emphasise the importance of patient education to improve self-management of the disease. People need to be assisted to take responsibility for their health. Knowledge

about the disease as well as management skills is not enough. Effective management of chronic diseases like diabetes calls for an integrated approach with patient, family and the community taking an active supportive role (Yach et al., 2005). Tshabalala (2001) echoes this feeling and proposes that diabetes education in South Africa should involve people with diabetes, families, health care staff and communities, and should be considered as an integral and significantly important component of diabetes treatment and management. If diabetes care is to reach the “grassroots”, then care needs to be focused at PHC level, along with efficient administration and education of primary health care staff. As DeCoster & George (2005, pg. 699) stated: “Integrating diabetes self-care into daily living demands more than knowledge acquisition and skill mastery; it requires acceptance of the disease, motivation for change, instrumental and emotional support, general problem-solving skills, and control over one’s life – empowerment”.



2.4.1 Pharmacological management

The SEMDSA treatment algorithm for type 2 diabetes, (2012 SEMDSA Guideline, pg S38) is recommended for use at health care facilities in South Africa. It is similar to the IDF Treatment Algorithm for people with type 2 diabetes that was developed and published in December 2011 (IDF, 2012). Of utmost importance is that treatment regimens should be individualised and dynamic (Turner, Cull, Frighi & Holman, 1999). It should take into consideration the degree of hyperglycemia and the specific properties of antihyperglycemic agents, such as effectiveness in lowering blood glucose, the side effects, contra-indications, and presence of diabetic complications and other co-morbidities. Antihyperglycemic monotherapy, usually Metformin, is initiated at diagnosis of the disease. In the face of consistent hyperglycaemia (HbA₁C level \geq 7.0%) while on Metformin, combinations of medication are usually required within three months without waiting for the effect of a

lifestyle intervention (Bloomgarden, Dodis, Viscoli, Holmboe & Inzucchi, 2006; Monnier, Lapinski & Colette, 2003). Timely adjustments should be made to the prescribed regimens to attain target HbA_{1c} within 6 to 12 months. Clients on antihyperglycaemic therapy should also adopt and maintain a healthy lifestyle while taking their medication.

Adherence to pharmacological management however is a major problem in both developed and developing countries. Lack of finances could influence adherence, particularly for people with a low socio-economic status. It was reported that low socio-economic status was significantly associated with erratic use of medication (Kuo, Raji, Markides, Ray, Espino & Goodwin et al., 2003). Nam, Chesla, Stotts, Kroon and Janson (2011) and Lerman (2005) stated that the type of pharmacological regimen could influence the client's adherence to treatment and management protocols. Medicine administered once a day had higher adherence rates than twice-daily regimens (61% vs. 52%) (Dezii, Kawabata & Tran, 2002) while monotherapy regimens demonstrated higher adherence rates than polytherapy regimens (49% vs. 36%) (Dailey, Kim & Lian, 2001). Furthermore, patients taking oral medication had a higher adherence rate than those on insulin injections (86% vs. 73%) (Rajagopalan, Joyce, Smith, Ollendorf & Murray, 2003).

Several studies reported on the strong association between positive attitudes and beliefs and adherence to self-management protocols. Famer, Kinmonth and Sutton (2006) found better adherence outcomes in persons with a positive attitude towards their disease. The researchers further reported a positive link between the intention to take diabetic medication regularly and the patient's belief about the benefits of the medication. People with negative attitudes towards management of their diabetes were more likely not to change their behaviour in order to control their blood glucose levels, especially with regard to the need for transition to

insulin therapy (Larkin, Capasso, Chen, Mahony, Hazard & Cagliero et al., 2008, Davis & Renda, 2006).

2.4.2 Non-pharmacological management

Lifestyle modification (diet and physical activity) is an integral component of diabetes care. It is recommended for people with type 2 diabetes not only to achieve weight loss in overweight individuals but to also independently lower blood glucose levels.

The short-term management of diabetes aims at glycaemic control through careful dietary management and physical exercise. Food selection determines the energy and nutrient content of a diet and affects the metabolic control of clients with diabetes (American Diabetes Association, 2001). In addition, physical activity is associated with clinically significant improvements in glycaemic control and increased cellular insulin sensitivity (Conn, Hafdahl, Mehr, LeMaster, Brown & Nielson, 2007; Thomas, Elliot & Naughton, 2007). Physical activity is one of the key modifiable risk factors for glycaemic control and used alone or in combination with diet, oral anti-diabetic medications, or insulin, is a key component of therapy for type 2 diabetes. In many cases, such initial efforts can substantially restore insulin sensitivity and adequately control the blood glucose levels. However, often oral anti-diabetic drugs are required, and in about 30% of cases insulin injection may be necessary (Gerstein et al., 2001).

Physical activity

Thomas et al. (2006) performed a meta-analysis of fourteen randomised controlled trials comparing exercise against no exercise in 377 people with type 2 diabetes. Exercise trials ranged from 8 weeks to 12 months duration. Compared with controls, the exercise

intervention significantly improved glycaemic control with a decrease in glycated haemoglobin levels of 0.6% (-0.6% HbA1c, 95% CI -0.9 to -0.3; $p < 0.05$). There was also a reduction in visceral adipose tissue with and subcutaneous adipose tissue also decreased. The exercise intervention significantly decreased plasma triglycerides (-0.3 mmol/l, 95% CI -0.5 to -0.02). No significant difference was found in plasma cholesterol or blood pressure. The meta-analysis showed that exercise significantly improved glycaemic control and reduced visceral adipose tissue and plasma triglycerides even without weight loss.

In another a meta-analysis of 27 reports, Snowling and Hopkins (2006) examined the effects of aerobic training, resistance training and combined training in a total of 1 003 people with type 2 diabetes. Exercise duration ranged from five to 10 weeks. With all three exercise modes there was a clear but small reduction in HbA1c. However, the differences between aerobic, resistance, and combined training on HbA1c were trivial. Training for periods longer than 12 weeks produced a reduction of HbA1c of $0.8 \pm 0.3\%$ (mean \pm 90% confidence interval). Benefits were small to moderate in magnitude for other measures of glucose control including fasting glucose, postprandial glucose, insulin sensitivity, and fasting insulin. There was a large effect on insulin sensitivity when exercise modes were combined.

To determine the effects of aerobic training alone, resistance training alone, and combined exercise training on HbA1c in people with type 2 diabetes, Sigal, Kenny, Boule, Wells, Prud'homme and Fortier et al. (2007) conducted a randomised controlled trial which included 251 adults aged 39–70 years from 8 community-based facilities. A sedentary group was also included. A negative result on a stress test or clearance by a cardiologist, and adherence to exercise during a 4-week run-in period, were required before randomisation. Thereafter, exercise training was performed 3 times weekly for 22 weeks. Compared with the control

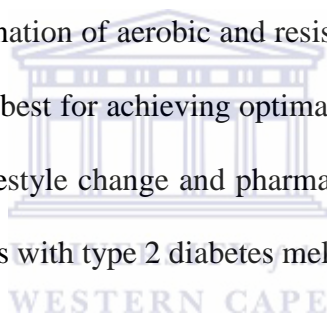
group, the absolute change in HbA1c in the aerobic training group was -0.5% (95% CI, -0.9 to -0.1) and in the resistance training group -0.4% (CI, -0.7 to -0.2). The greatest reduction in HbA1c was observed in the combined exercise training which resulted in an additional change in the HbA1c of -0.5% (CI, -0.8 to -0.1) compared with aerobic training alone and -0.6% (CI, -1.0 to -0.2) compared with resistance training alone. Changes in blood pressure and lipid values were not statistically significantly different among groups.

Diet

Healthy dietary habits also play a major role in glycaemic control of clients with type 2 diabetes. A systematic review by Nield, Moore, Hooper, Cruickshank, Vyas and Whittaker et al. (2007) assessed 36 articles, including 18 randomised controlled trials, of dietary advice given for a total of 1,467 participants with type 2 diabetes. Dietary approaches assessed in this review included low-fat/high-carbohydrate diets, high fat/low-carbohydrate diets, low-calorie (1,000 kcal per day) and very-low-calorie (500 kcal per day) diets and modified fat diets. The studies all measured weight and measures of glycaemic control. Other outcomes which were measured in these studies included mortality, blood pressure, serum cholesterol (including LDL and HDL cholesterol), serum triglycerides, maximal exercise capacity and compliance. No conclusion could be drawn from the studies considering dietary advice alone. However, within the dietary advice versus dietary advice plus exercise category, there were small, yet significant changes seen in mean glycated haemoglobin at six months and twelve months. At six months, dietary advice plus exercise was associated with a statistically significant mean decrease in glycated haemoglobin of 0.9% (95% CI of 0.4 to 1.3), and at twelve months, 1.0% (95% CI of 0.4 to 1.5). The results suggest that adoption of regular exercise is a good way to promote better glycaemic control in patients with type 2 diabetes mellitus.

Daly, Paisey, Paisey, Millward, Eccles, & Williams et al. (2006) randomised 102 obese subjects with poorly controlled type 2 diabetes and examined the effects of carbohydrate restriction compared with a reduced-portion low fat diet over a three month period. Although the low carbohydrate diet achieved a lower mean energy intake compared with the low fat diet, the differences were not significant. Greater weight loss was achieved with the low carbohydrate diet compared with the low fat diet, namely 3.6 kg and 0.9 kg respectively. However, there were no significant changes in HbA1c levels.

The literature reviewed showed that non-pharmacological management is a key factor in good glycaemic control, an aspect central in the prevention or delay of the development of diabetic complications. A combination of aerobic and resistance exercise as well as adhering to a healthy diet proven to be the best for achieving optimal glycaemic control in clients with type 2 diabetes. Adherence to lifestyle change and pharmacological treatment play a pivotal role in the management of patients with type 2 diabetes mellitus.

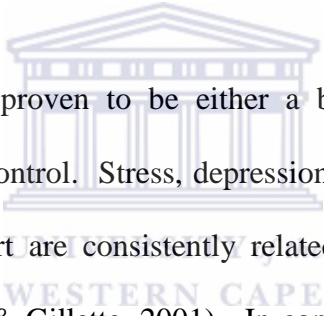


Adherence to treatment

Non-adherence, a characteristic of poor patient self-management could increase mortality and disability as well as health care costs (Horwitz & Horwitz, 1993). The persistence of inadequate glycaemic control could be contributed to both patient and health care provider. Several studies reported that a key element in the effectiveness of health care is the partnership between patients and health care providers (Nam et al., 2011, De Belvis, Pelone, Biasco, Ricciardi & Volpe, 2009, McGill & Felton, 2007).

Patient's attitudes and beliefs, knowledge of the disease, financial resources and social and / or family support have been identified to influence adherence to management protocols (Nam

et al., 2011, Lerman, 2005). Although knowledge about diabetes does not necessarily lead to risk-reducing behaviour and increased confidence to improve diabetes self-management (Heisler, Piette, Spencer, Kieffer & Vijan, 2005), patients with knowledge about the disease are more likely to perform self-management activities and adhere to it (Pace, Ochoa-Vigo, Caliri & Fernandes, 2006, Persell, Keating, Landrum & Landon, 2004), hence preventing the development of complications. Furthermore it was reported that low socio-economic status was significantly associated with missing of clinic appointments due to lack of money for transport (Jerant, Von Friederichs-Fitzwater & Moore, 2005). The researchers also reported that individuals with diabetes also complained that the prescribed healthy food is very expensive.

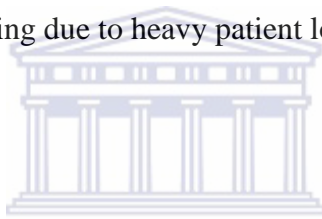


Social and family support was proven to be either a barrier or a supporting factor to adherence as well as glycaemic control. Stress, depression, low self-efficacy and low levels of family and / or social support are consistently related to low levels of diabetes self-management (Glasgow, Toobert & Gillette, 2001). In contrast, Wing and associates (1991) reported that the participation of spouses in a weight loss education programme, had a negative effect for obese men with type 2 diabetes mellitus while obese women with type 2 diabetes mellitus adhered to the programme and accomplished better weight loss.

From the studies reviewed, it is clear that many contributing factors to adherence of care and management revolve around the patient itself. Research however, has proven that the attitudes of health care providers also play a major role in the adherence of patients with diabetes to self-management strategies. Health care providers' attitude toward the seriousness of the disease could influence a patient's adherence to a prescribed regimen

(Pudder & Keller, 2003). Dietrich (1996) found that if the health care provider modulates the seriousness of the disease by diagnosis, the patient also perceived it as not seriousness.

Furthermore, health care provider's lack of knowledge of the latest evidence based guidelines (Brown, Harris, Webster-Bogaert, Wetmore, Faulds & Stewart (2002) as well as the patients' psycho-social well-being (Peyrot et al., 2005) could affect their ability to effectively support these patients and negatively influence their adherence to self-management and care. Poor patient-provider communication was also associated with poor treatment adherence (Ciechanowski, Katon, Russo & Walker, 2001). Although it may be difficult, but possible to change clinicians' communication style, it may not be feasible for clinicians to provide health promotion in their daily work setting due to heavy patient loads and lack of time.



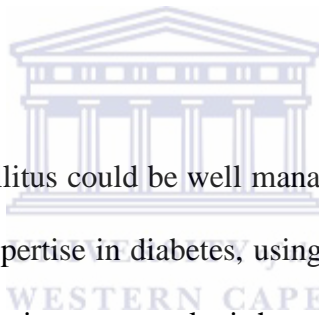
Health care systems

Other confounding factors, for example the orientation of health systems toward acute care as well as key decision makers' paucity of knowledge of the latest evidence and data on the burden of chronic disease also contributes to the problem. Whiting, Hayes and Unwin (2003) argued that health care systems in sub-Saharan Africa face challenges in the delivery of health care. The researchers echoed the concern of Osei (2003) about the priority management of acute, infectious diseases to that of chronic diseases such as diabetes. Kagee, Le Roux & Dick (2007) and Levitt, Zwarenstein, Doepfmer, Bawa, Katzenellenbogen & Bradshaw (1996) also confirmed that communicable disease and the AIDS epidemic as well as government's lack of commitment to non-communicable disease contribute to the poor diabetic services in South Africa. This could negatively impact on the effective management of diabetes as proper care involves different specialities over many years.

The dearth of properly trained personnel is of great concern as Mbanya and Gill (2004) confirm that type 2 diabetes mellitus could be managed effectively at PHC settings with properly trained personnel using appropriate treatment protocols endorsed by government. Most health care facilities in sub-Saharan Africa lack health care providers with training in diabetes management (Peyrot et al., 2006). Not all the PHC facilities in South Africa has specialised or formal organised diabetes health care delivery systems. Therefore insufficiently trained staff often manage patients with diabetes, thus compromising the quality of care of patients (Osei, 2003). Researchers have reported lack of basic skills such as routine blood pressure measurement and education regarding the consequences of defaulting of antihypertensive medication in sub-Saharan Africa (Otim & Nambuya, 1997). The shortage of dieticians in most PHC facilities in the Western Cape is alarming. Medical personnel not specifically trained to give complex dietary advice are then responsible for supervising the diet of patients with diabetes (Beran & Yudkin, 2006). Furthermore, generic dietary information sheet are given to patients. A patient's religious and cultural beliefs, socio-economic circumstances and physical status should be taken into account when developing a tailor-made specific diet for that patient (Watkins et al., 1996). This could contribute significantly to the patient's adherence to the diet.

The efficacy of treatment is highly dependent on the individual's ability to manage the disease. Lifestyle change remains the first line of treatment of type 2 diabetes mellitus in order to prevent complications. Patients are encouraged to modify their lifestyles and acknowledge their susceptibility to the various health risks involved. The role of education and / or health promotion cannot be overstated. It provides information about the disease and its complications, teaches the patient skills required for injecting insulin, self-monitoring of blood glucose levels and proper foot care. Most importantly it empowers patients with

knowledge which will enable them to adjust their treatment safely (Moodley & Rambiritch, 2007; Watkins, Drury & Howell, 1996). However, knowledge does not always result in behaviour change and need to be reinforced (McManus, Larry & Gordon, 2006). It is therefore of utmost importance to have proper health promotion programmes in place that will assist individuals with type 2 diabetes with the adoption and maintenance of healthier lifestyles to delay the onset of complications. A concerning factor revealed by De Vries (2011) is that the percentage of PHC facilities in the Western Cape providing group education to patients with diabetes decreased by 12%. Only 78% of the primary health care facilities in the Western Cape provide didactic talks to groups, sometimes groups of diverse patients in the waiting rooms of the facilities. This raises the concern of the efficacy of such talks.



To conclude: type 2 diabetes mellitus could be well managed in primary health care settings with properly trained staff and expertise in diabetes, using appropriate treatment protocols if the government has a strong commitment to make it happen. Positive outcomes for chronic conditions such as diabetes could only be achieved when patients, their families, multidisciplinary health care teams as well as community partners are equipped, motivated and prepared to work together (WHO, 2002a). Pruitt, Annandale, Epping-Jordan, Khan, Kisa and Kaplow et al. (2002) published a paper on innovative care for chronic conditions and made the following statement:

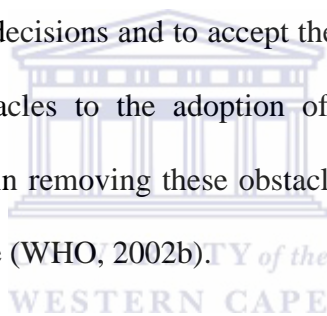
“Patients and their families are the most undervalued assets in the health care system. Their potential to affect outcomes is undeniable and their capabilities should be leveraged fully.....They need motivation to change and maintain daily health behaviours, adhere to long-term therapies, and self-manage their conditions.”

2.5. HEALTH PROMOTION AND NON-COMMUNICABLE DISEASES

Health promotion plays a fundamental role in the management of non-communicable diseases. The Ottawa Charter defines health promotion as the process of enabling people to increase control over, and improve their health (Kickbusch, 2003). It goes beyond health care. According to the Ottawa Charter actions for health promotion include, building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and reorienting health services.

2.5.1 Build healthy public policy

Health promotion puts health on the agenda of policy makers, guiding them to be aware of the health consequences of their decisions and to accept their responsibilities for health. It is of utmost importance that obstacles to the adoption of policies are identified and that appropriate ways are negotiated in removing these obstacles. The aim therefore is to make the healthy choice the easy choice (WHO, 2002b).



2.5.2 Create supportive environments

Our societies are complex and interrelated. Health cannot be separated from the environment and society; being the workplace or home. The intricate link between people and their environment establishes the basis for a socio-ecological approach to health. The impact of the rapidly changing environment in which we live on our health, should be evaluated regularly. The necessary actions should be taken to ensure a positive benefit to the health of the public (WHO, 2002b). We must reach out and take care of each other and our communities.

2.5.3 Strengthen community actions

“Health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities - their ownership and control of their own endeavours and destinies” (WHO, 2002b). Therefore health promotion programmes should be readily available and supported by the community in which it is implemented in.

2.5.4 Develop personal skills

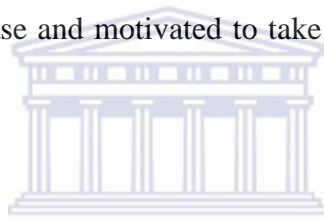
Health promotion supports personal and social development through providing information, education for health, and enhancing life skills. By doing so, people can take more control over their own health and to make choices that is beneficial to health (WHO, 2002b). Empowering people to prepare themselves to cope with all the different stages of a chronic disease such as diabetes mellitus, is crucial. This could facilitate the adoption of a healthy lifestyle to prevent the onset of the disease and /or its complications.

2.5.5 Re-orient health services

The responsibility for health promotion in health services should be communal among individuals, community members, health care professionals, health service establishments and government. “They must work together towards a health care system which contributes to the pursuit of health” (WHO, 2002b). Clinical and curative services provided by health care institutions are not enough anymore. Health institutions should incorporate health promotion in their daily services to individuals. Specific cultural needs should be taken into account when developing and implementing health promotion programmes. Therefore

training and education of health care professionals should emphasise the importance of a holistic approach towards health care; not only treating the symptoms of the disease.

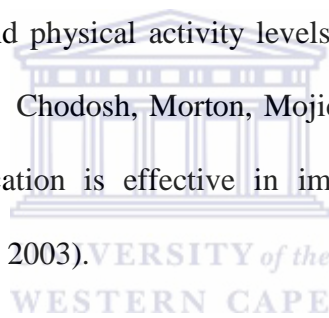
Health promotion is recognised as a crucial element of health development. According to Naidoo & Wills (1998) the educational approach to health promotion is to provide knowledge and information and to develop the necessary skills so that a person can make an informed choice about his/her health behaviour. Health promotion could have a positive effect on the determinants of health, leading to the creation of better health. The ultimate goal is to increase life expectancy by including activities intended to prevent disease, improve health and enhance well-being (Coulson et al., 1998). Clients with diabetes should be empowered with knowledge about their disease and motivated to take control of their lifestyle risks and daily medical management.



2.6 HEALTH PROMOTION INTERVENTIONS *of the* WESTERN CAPE

Concerning the high prevalence of type 2 diabetes mellitus and its associated risks among individuals, there is increasing evidence that the only realistic hope for reducing the solemn consequences of unhealthy lifestyles of people is through health promotion interventions. The primary goal is to empower people with skills to be able to make informed decisions and have maximum control over their health (WHO, 2002a). Therapeutic patient education, namely education designed to help patients and their families to manage their disease, prevent complications and maintain or improve their quality of life, has been recognised in the World Health Organisation's Report as an inimitable component in the management of chronic diseases (WHO, 1998).

Diabetes self-management education (DSME) stresses the close involvement of patients and health care providers. Numerous enterprises provide guidelines for DSME. The International Diabetes Federation has published “International Curriculum for Diabetes Health Professional Education” (IDF, 2008) and “International Standards for Diabetes Education” (IDF, 2009). In addition, the “National Standards for Diabetes Self-management Education” has been developed in America (Funnel, Brown, Childs, Haas, Hosey & Jensen, 2010). Programmes integrating behavioural and psychosocial strategies demonstrated improved outcomes (Skinner, Craddock, Arundel & Graham, 2003, Barlow, Wright, Sheasby, Turner & Hainsworth, 2002). In addition, research showed that culturally and age-appropriate programmes improved outcomes such as knowledge of the disease, physiological measurements (BMI, HbA₁C) and physical activity levels (Anderson, Funnell, Nowankwo, Gillard, Oh & Fitzgerald, 2005, Chodosh, Morton, Mojica, Maglione, Suttorp & Hilton et al., 2005) and that group education is effective in improvement of glycaemic control (Mensing & Norris, 2003, Norris, 2003).



A review of both local and international literature was done to inform the development of the health promotion programme to be implemented. The databases that were searched include EbscoHOST (CINAHL, MEDLINE, PsycARTICLES, ERIC, Academic Search Premier, Health Source: Nursing / Academic Edition, MasterFILE Premier and SocINDEX), Science Direct, SpringerLink, Wiley Interscience, Pubmed and Scopus. Full manuscripts of relevant articles were obtained. Different strategies are used to implement health promotion interventions, namely community-based and institutional / facility-based programmes. An extensive body of literature exists on interventions for the prevention of type 2 diabetes mellitus globally. Several studies were conducted in the past years in developed countries regarding the outcome of interventions for clients with diabetes, as summarised in Table 2.1.

Table 2.1 Summary of health promotion interventions for clients with type 2 diabetes mellitus in developed countries from 2006 to 2013

Author & Date	Title	Aim & Objectives	Population	Intervention	Outcome measures
Collins-McNeil, Edwards, Batch, Benbow, McDougald & Sharpe (2012)	A culturally targeted self-management program for African Americans with type 2 diabetes mellitus	To assess the feasibility of a church-based diabetes self-management education (DSME) intervention	n = 12 <ul style="list-style-type: none"> • Female (10) • Male (2) Age: mean (SD) 55.8 years (9.6)	Duration: 12 weeks 2 hours sessions for 6 weeks, followed by 6 weeks of self-management Sessions included: **healthy eating **being active **monitoring blood glucose **taking medication **reducing risks **stress management	<ul style="list-style-type: none"> • Non-fasting glucose • HbA_{1c} • Total cholesterol • Triglycerides • HDL cholesterol • LDL cholesterol • Blood pressure • Waist circumference • Weight • Body Mass Index • PA days
RESULTS: There were significant increases in medication adherence, healthy eating, and foot care adherence. The intervention had a clinically significant effect on blood lipids and systolic blood pressure and physical activity.					
Hornsten, Stenlund, Lundman & Sandstrom (2008)	Improvements in HbA _{1c} remain after 5 years – a follow up of an educational intervention focusing on patients' personal understandings of type 2 diabetes	To evaluate whether an intervention which focused on patients' personal understanding of their illness was more effective than conventional diabetes care	n = 104 (89 completed) <ul style="list-style-type: none"> • Female (48) • Male (56) Age: mean (SD) <u>Experimental group</u> 63.6 years (9.3) <u>Control group</u> 63.4 years (9.1)	Duration: 9 months 10 educational sessions of 2-hour group sessions <u>Experimental group:</u> Included topics identified by the patients **physical activity **healthy recipes and cooking methods <u>Control group:</u> **Routine diabetes care	<ul style="list-style-type: none"> • Non-fasting glucose • HbA_{1c} • Total cholesterol • Triglycerides • HDL cholesterol • LDL cholesterol • Blood pressure • Body Mass Index

RESULTS: Group sessions focussing on patients' personal understanding of their illness are more effective than conventional diabetes care with regard to glycaemic control.					
Vincent, Pasvogel & Lourdes (2007)	A feasibility study of a culturally tailored diabetes intervention for Mexican Americans	To assess the feasibility and examine the effects of a culturally tailored intervention on outcomes of self-management.	n = 17 <ul style="list-style-type: none"> Female (12) Male (5) Age: mean (SD) 56.0 years (9.3) <u>Experimental group</u> 56.7 years (10.6) <u>Control group</u> 55.25 years (8.2)	Duration: 8 weeks 2 hours sessions per week outcomes measured at baseline, 8 weeks and 12 weeks <u>Experimental group:</u> **pathophysiology of diabetes **complications **treatment modalities **diet **exercise **self- management strategies **stress management **cooking demonstrations <u>Control group:</u> **usual care	<ul style="list-style-type: none"> Blood glucose HbA₁C Weight Height Body Mass Index Diabetes knowledge Self-efficacy
RESULTS: The intervention had a positive clinical and statistical effect on diabetes knowledge, weight and BMI. Although no statistical significant changes in self-efficacy scores, blood glucose and HbA ₁ C, improvements were recorded in the intervention group.					
Adolfsson, Walker-Engstrom, Smide & Wikblad (2007)	Patient education in type 2 diabetes mellitus – a randomized controlled 1-year follow-up study	To evaluate the impact of empowerment group education on patients with type 2 diabetes mellitus' confidence in diabetes knowledge, self-efficacy, satisfaction with daily life, BMI and glycaemic control	n = 88 <ul style="list-style-type: none"> Female (36) Male (52) Age: mean (SD) 62.4 years (8.9) <u>Experimental group</u> 62.4 years (8.9)	Duration: not stated 5 educational sessions of 2 ½ hour per sessions Outcomes measured at baseline and at 5 months <u>Experimental group:</u> **general issues concerning	<ul style="list-style-type: none"> HbA₁C Weight Body Mass Index Satisfaction with daily life Confidence in diabetes knowledge Self-efficacy

			<u>Control group</u> 63.7 years (9.0)	diabetes **treatment **prevention of complications **blood glucose monitoring **diet **physical activity **daily foot care **setting of short term goals **routine diabetes care <u>Control group:</u> **routine diabetes care, including individual counselling	
RESULTS: The intervention had led to significant improvement in knowledge, and no significant differences were found in self-efficacy, satisfaction with daily life, BMI and HbA _{1c} when compared to the control group.					
Baradaran, Knill-Jones, Wallia & Rodgers (2006)	A controlled trial of the effectiveness of a diabetes education programme in a multi-ethnic community in Glasgow	To assess the effectiveness of a culturally appropriate educational intervention in South Asians with type 2 diabetes mellitus	n = 145 (101 completed) • Female (71) • Male (74) Age: mean (SD) <u>Experimental group</u> 57.8 years (12.7) <u>Ethnic Control group</u> 59.2 years (11.3) <u>White Control group</u> 58.0 years (13.8)	Duration: 3 months 3 educational sessions of 1 – 1 ½ hours <u>Experimental group:</u> **pathophysiology and causes of diabetes **short and long term complications of diabetes **blood glucose control **lifestyle change **nutrition **foot care <u>Control group:</u> **routine diabetes care	<ul style="list-style-type: none"> • Knowledge • Attitudes • Practice of diabetes
RESULTS: There was a significant increase in knowledge, attitudes and practice in the intervention group. However, there was no net benefit compared with the control groups.					

Deakin, Cade, Williams & Greenwood (2006)	Structured patient education: the Diabetes X-PERT programme makes a difference UK; community-based	To assess the effectiveness of the X-PERT programme on clinical, lifestyle and psychosocial outcomes	n = 314 <ul style="list-style-type: none"> • Female (162) • Male (152) Age: mean (SD) 61.5 years (10.0) <u>Experimental group</u> 61.3 years (9.7) <u>Control group</u> 61.8 years (11.0)	Duration: 6 weeks 2 hours sessions per week Outcomes measured at baseline, 4 months and 14 months <u>Experimental group:</u> **what is diabetes? **weight management **carbohydrate awareness **supermarket tour **complications and prevention **goal setting each week **patient manual <u>Control group:</u> **routine care **individual appointment with dietician (30 min), nurse (15 min) and doctor (10 min).	<ul style="list-style-type: none"> • HbA₁C • Weight • Height • Body Mass Index • Body fat • Waist size • Blood pressure • Total cholesterol • HDL-cholesterol • LDL-cholesterol • Triglycerides • Diabetes knowledge • Self-efficacy
RESULTS: The intervention had led to improved clinical, lifestyle and psychosocial outcomes. Significant changes in the intervention group compared to the control group were found for HbA ₁ C, weight, BMI and waist size at 14 months.					

Most of the interventions (5/6) used HbA_{1c} as an outcome measure (Collins-McNeil, Edwards, Batch, Benbow, McDougald & Sharpe, 2012; Hornsten, Stenlund, Lundman & Sandstrom, 2008; Vincent, Pasvogel & Lourdes, 2007; Adolfsson, Walker-Engstrom, Smide & Wikblad, 2007 and Deakin, Cade, Williams & Greenwood, 2006) and showed improvement of physiological outcome measures after the intervention. Of the interventions (4/6) that included knowledge of diabetes and self-efficacy as outcome measures (Vincent et al., 2007; Adolfsson et al., 2007; Baradaran, Knill-Jones, Wallia & Rodgers, 2006; Deakin et al., 2006) all showed improvements for these measures.

Some health promotion interventions for type 2 diabetes mellitus have also been done in developing countries, although to a lesser extent. These studies were conducted in Egypt (Abdo & Mohamed, 2010), Taiwan (Chen, Huang, Peng, Guo, Chen, Jong & Lin, 2011; Wattana, Srisuphan, Pothiban & Upchurch, 2007) and Mexico (Gallegos, Ovalle-Berumen & Gomez-Meza, 2006), as summarized in Table 2.2 below. Although all the studies used HbA_{1c} as an outcome measure, in contrast with the studies conducted in the developed context, only one (Cheng et al., 2011) included a range of other physiological outcome measures such as weight, BMI, total cholesterol, blood pressure and other lipids. All of the studies showed a significant improvement of HbA_{1c} after the intervention.

No studies of this nature were found for the African context. The findings of all the studies summarised in the two tables are informative and highlight the need for similar interventions in South Africa, hence the present study aimed to develop, implement and determine the effectiveness of a health promotion intervention for clients with type 2 diabetes mellitus. As observed in the current literature, self-efficacy, knowledge about diabetes and the management of the disease as well as effective metabolic control are lacking for many.

Several reasons could be ascribed to this tendency. Is it due to ineffective counselling of health care providers or could it be because of patients' obliviousness about the disease? The present study focusses not only on addressing the factors influencing clients with type 2 diabetes mellitus' self-management behaviour, but also on the empowerment of the clients through the implementation of a developed health promotion intervention. Results of the current study could be used in an effort to develop recommendations which will enhance the overall delivery of diabetes services at primary health care facilities in South Africa.



Table 2.2 Summary of health promotion interventions for clients with type 2 diabetes mellitus conducted in developing countries from 2006 – 2013.

Author & Date	Title	Aim & Objectives	Population	Intervention	Outcome measures
Abdo & Mohamed (2010)	Effectiveness of a health education program for type 2 diabetes mellitus patients attending Zagazig University Diabetes Clinic, Egypt	To assess the effectiveness of a diabetes health education program on knowledge, attitude and blood sugar	n = 122 <ul style="list-style-type: none"> Female (77) Male (45) Age: median (range) 50 years (41 - 70)	Duration: 3 weeks <ul style="list-style-type: none"> Assessment + education Education session Post-assessment 1 hour session for 2 weeks, including: <ul style="list-style-type: none"> **general knowledge re diabetes **adherence to treatment **exercise program **diet plan **possible complications 	<ul style="list-style-type: none"> HbA₁C Random blood glucose Knowledge Attitudes
<p>RESULTS: A significant improvement was demonstrated in the patients' knowledge of and attitude towards diabetes mellitus as well as random blood glucose and HbA₁C levels of the intervention group.</p>					
Chen, Huang, Peng, Guo, Chen, Jong & Lin (2011)	Effectiveness of a health promotion programme for farmers and fishermen with type 2 diabetes in Taiwan	To evaluate diabetes control and foot self-care after a community-based small group health promotion intervention	n = 323 <ul style="list-style-type: none"> Female (189) Male (134) Age: mean (SD) 68.9 years (9.5)	Duration: 1 year <ul style="list-style-type: none"> Health assessment Health promotion education (12 weeks) <ul style="list-style-type: none"> Telephone counselling and evaluation Each session consists of: <ul style="list-style-type: none"> **diet control **medication compliance 	<ul style="list-style-type: none"> Fasting glucose HbA₁C Total cholesterol Triglycerides LDL cholesterol Blood pressure Weight Body Mass Index Waist circumference Peripheral

				**foot care **mild to moderate physical activity	neurological assessment <ul style="list-style-type: none"> Peripheral vascular assessment Foot self-care capability
RESULTS: Most of the physiological variables and foot self-care capabilities showed statistically significant improvement after the intervention.					
Wattana, Srisuphan, Pothiban & Upchurch (2007)	Effects of a diabetes self-management program on glycemic control, coronary heart disease risk, and quality of life among Thai patients with type 2 diabetes	To compare the HbA ₁ C level, CHD risk, and QOL between diabetic patients receiving a diabetes self-management program and those receiving the usual nursing care	n = 147 <ul style="list-style-type: none"> Female (112) Male (35) Age: mean (SD) 56.8 years (10.2) <u>Experimental group</u> 58.4 years (10.05) <u>Control group</u> 55.14 years (10.22)	Duration: 6 months <u>Experimental group</u> **Education class 120 min **4 group discussions (90min/group) **2 individual home visits (45 min/visit) **patient education manual <u>Control group</u> **physical examination **individual health education (no structured programme)	<ul style="list-style-type: none"> HbA₁C Coronary heart disease risk Quality of Life
RESULTS: The experimental group demonstrated a significant decrease in HbA ₁ C levels, chronic heart disease risk as well as increase in quality of life compared to the control group.					
Gallegos, Ovalle-Berumen & Gomez-Meza (2006)	Metabolic control of adults with type 2 diabetes mellitus through education and counselling	To test the efficacy of a controlled nursing intervention focused on education and counselling to improve metabolic control in adults with type 2 diabetes mellitus	n = 45 <ul style="list-style-type: none"> Female (112) Male (35) Age: mean (SD) 56.8 years (10.2) <u>Experimental group</u>	Duration: 50 weeks Outcomes measured at baseline, 3 months, 6 months, 9 months and 1 year <u>Experimental group</u> **six educational sessions of	<ul style="list-style-type: none"> HbA₁C Body Mass Index Self-care activities Self-care capabilities Psychological adaptation

			<p>58.4 years (10.05)</p> <p><u>Control group</u> 55.14 years (10.22)</p>	<p>90 min</p> <p>**20 individual counselling sessions (30 – 90 min per visit)</p> <p>including: **diabetes and my health **eating habits **exercise **blood sugar levels control **foot care **incorporating diabetes care into my daily life</p> <p><u>Control group</u> **routine monthly visit</p>	<ul style="list-style-type: none"> • Barriers to self-care
<p>RESULTS: A significant decrease in HbA₁C of the intervention group as well as positive effects on all other outcome measures.</p>					

2.7 POLICIES REGARDING TYPE 2 DIABETES MELLITUS

An analysis of international, national and local policies on the management of type 2 diabetes mellitus at PHC level was done. This process was to gain insight into the prescribed management of type 2 diabetes mellitus. Relevant information was captured on a data capture sheet and reviewed by two reviewers to highlight commonalities identified. Bardach (2007) proposes an 8-step framework for the development, selection and assessment of health policies. Another well-known framework, the Stages Heuristic (Brewer & deLeon, 1983) is similar to Bardach's framework in that it also proposes several stages including agenda setting, a formulation stage, an implementation and evaluation stage. The last step in Bardach's framework, and considered by some as 'beyond Bardach' (Weiner, 2005) involves the evaluation of policies. The content analysis of the policies included the following:

1. Did it clearly address diabetes mellitus?
2. Is the policy based on evidence?
3. Is the policy outcome measurable?
4. Is their budget allocations linked to the policy?
5. Are any monitoring and evaluation procedures included in the policy?

Table 2.3 summarised the findings of the analysis of the international policies. It is clearly highlighted that all these policies undoubtedly address diabetes mellitus. All of the policies addressed type 2 diabetes mellitus specifically and the Canadian policy covered type 1 diabetes too. All the policies had clear measurable outcomes, although they differ somewhat with regards to exact numbers per outcome measure. However, what is lacking in all of the reviewed policies is a budget allocation pertaining to each policy. All the policies reviewed, except for the United Kingdom policy, have monitoring and evaluation procedures in place.

Table 2.3 INTERNATIONAL policies regarding diabetes mellitus

Country	Policy name	Clearly address diabetes mellitus	Evidence-based	Measurable outcomes	Budget allocation	Monitoring and Evaluation procedures
International Diabetes Federation	Global guideline for type 2 diabetes, 2012	YES Specifically for type 2 diabetes	YES Members of the Guidelines Group met to hear the synthesis of the evidence for each topic of diabetes care, and to make recommendations	YES Diagnosis of diabetes *Fasting plasma glucose (FPG) ≥ 7.0 mmol/l or *75 g oral glucose tolerance test (OGTT) with FPG ≥ 7.0 mmol/l or 2 hour plasma glucose ≥ 11.1 mmol/l or *HbA1c $\geq 6.5\%$ or *Random plasma glucose ≥ 11.1 mmol/l Physical activity *30-45 minutes on 3-5 days per week, or an accumulation of 150 minutes per week of moderate-intensity aerobic activity and *resistance training three times per week. Blood glucose levels *HbA1c $< 7.0\%$ * pre-prandial fasting levels = 6.5 mmol/l	NO No evidence found in the guideline	YES Draft guideline was sent out for wider consultation to IDF member associations, IDF elected representatives globally and regionally, interested professionals, industry.

				<p>*postprandial self-monitoring level = 9.0 mmol/ℓ</p> <p>Blood pressure *≤ 130/80 mmHg</p> <p>Lipid targets *LDL cholesterol < 2.0 mmol/ℓ *triglyceride < 2.3 mmol/ℓ *HDL cholesterol > 1.0 mmol/ℓ *non-HDL cholesterol < 2.5 mmol/ℓ *LDL cholesterol should be < 1.8 mmol/ℓ in established CVD</p>		
Canada	Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada	<p>YES</p> <p>“These guidelines are intended to enhance diabetes prevention effort in Canada and to reduce the burden of diabetes complications in people living with the disease.” (pg .iv)</p>	<p>YES</p> <p>Developers / committee members attended a workshop in evidence-based methodology.</p> <p>Librarian with expertise in literature reviews performed a comprehensive search of the relevant English-language, published, peer-reviewed literature using validated search strategies.</p> <p>Developers used standardised check lists that highlighted the most important elements of a well-conducted study and determined the level of evidence.</p>	<p>YES: outlined for both type 1 and type 2 diabetes</p> <p>Diagnostic criteria outlined *Fasting plasma glucose ≥ 7.0 mmol/ℓ or *Casual plasma glucose ≥ 11.1 mmol/ℓ</p> <p>Monitoring glycaemic control * HbA_{1c} ≤ 7.0 mmol/ℓ * Fasting plasma glucose 4.0 - 7.0 mmol/ℓ *2hr postprandial plasma glucose 5.0 – 10.0 mmol/ℓ</p> <p>Physical activity guidelines *a minimum of 150 minutes of moderate to vigorous-intensity aerobic exercise per week, spread over at least 3 days with no more than 2 consecutive days without exercise *in addition, resistance exercise 3</p>	<p>NO</p> <p>Cost-benefit analysis not included as the “most effective therapies may not be the most cost-effective ones” (pg. S3)</p> <p>Health care professionals are encouraged to judge independently the value of diagnostic, prognostic and therapeutic recommendations of the 2008 Clinical Practice Guideline</p>	<p>YES</p> <p>A Dissemination and Implementation Committee in place</p>

			Incorporated the evidence into “revised, diagnostic, prognostic and therapeutic recommendations”	<p>times per week</p> <p>Nutrition therapy</p> <ul style="list-style-type: none"> *carbohydrate (45 – 60% of energy) *protein (15 – 20% of energy) *fat (<35% of energy) *salt restricted *vitamins and mineral supplements *alcohol (1-2 units per day) 		
United Kingdom	Type 2 diabetes: national clinical guideline for management in primary and secondary care (update) - 2008	YES Specifically for type 2 diabetes	<p>YES</p> <p>“Prior to the commencement of the guideline development, the scope was subjected to stakeholder consultation in accordance with processes established by the National Institute for Health and Clinical Excellence (NICE).” (pg.7)</p> <p>“The information scientist developed a search strategy for each question.”</p> <p>“...the health economist searched for additional papers providing economic evidence”</p> <p>“...critical appraisal and</p>	<p>YES</p> <p>Glucose control levels</p> <ul style="list-style-type: none"> * HbA1c may be > 6.5 mmol/l * pre-meal self-monitoring levels < 7.0 mmol/ ℓ <p>Blood pressure</p> <ul style="list-style-type: none"> * < 140/80 mmHg 	NO No evidence found in the guideline	NO No evidence found in the guideline

			data extraction. All procedures are fully compliant with the: NICE methodology as detailed in the 'Guideline Development Methods – Information for National Collaborating Centres and Guideline Developers' Manual.' (pg.11)			
Scotland	Management diabetes. A national clinical guideline	YES Specifically for type 2 diabetes	YES “...using a standard methodology based on a systematic review of the evidence.” “Further details about SIGN and the guideline development methodology are contained in SIGN 50: A Guideline Developer’s Handbook.” “The evidence base for this guideline was synthesised in accordance with SIGN methodology.” “A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Information	YES Glucose control levels * HbA1c may be < 7.0 % Blood pressure (BP) *diastolic BP ≤ 80 mmHg *systolic BP <130 mmHg Physical activity *exercise involving aerobic and/or resistance exercise should be performed on a regular basis. Dietary advice *simple caloric restriction *reducing fat intake *consumption of carbohydrates with low glycaemic index *restricting the total amount of dietary carbohydrate (a minimum of 50 g per day).	NO No evidence found in the guideline	YES “The draft guideline was available on the SIGN website for a month to allow all interested parties to comment. Individuals and organisations which participated in the consultation are listed on the SIGN website.” (pg.123) The guideline was also reviewed in draft form by independent expert referees.

			Officer” all (pg.116)			
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Australia	National Evidence Based Guideline for Blood Glucose Control in Type 2 Diabetes	YES Specifically for type 2 diabetes	<p>YES</p> <p>The Expert Advisory Groups (EAGs) for the National Evidence Based Guidelines for Type 2 Diabetes.....</p> <p>*overall technical and content advice and critical comment</p> <p>*input into the development or revision of research questions to guide the literature reviews</p> <p>*guidance on search terms and for the literature review</p> <p>*review of drafts and recommendations at critical points of their development</p> <p>*perspectives on the feasibility and applicability of the guidelines</p> <p>Methods Manual which provides written instructions in identifying the steps and processes to</p>	<p>YES</p> <p>Glucose control levels</p> <p>* HbA1c ≤ 7.0 %</p> <p>* pre-prandial self-monitoring levels = 6-8 mmol/ ℓ</p> <p>*2 h postprandial self-monitoring levels = 6-10 mmol/ ℓ</p>	NO No evidence found in the guideline	<p>YES</p> <p>The guidelines were released for public consultation by Diabetes Australia.</p> <p>The call for submissions was advertised in the national public press and a front page website advertisement was placed on the Diabetes Australia website.</p> <p>The NHMRC also advertised the draft guidelines in their ‘bulletin’.</p> <p>Changes to the guidelines as a result of public consultation and as a result of independent review by the NHMRC were incorporated into the revised final</p>
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			<p>be followed.</p> <p>The provision of a selection of key published resource material relevant to the development of the guidelines (NHMRC tool kit 2000-2003; NHMRC, 2007).</p> <p>Specification and training of research staff on the search process</p>			<p>guidelines</p>
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In addition to the international policies provided and summarised above, national policies were also analysed. These are summarised in table 2.4 below. The 2012 SEMDSA is the important policy guiding diabetes care in South Africa. This policy is largely based on the Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada; hence the similarity in measurable outcomes of the two policies.

A policy is also available for the Western Cape. However, unlike the international and national policies, this one does not address diabetes mellitus specifically, but five (5) conditions, namely cardiovascular disease, chronic obstructive pulmonary disease, diabetes, hypertension and epilepsy. Although this policy was developed within the context of national and provincial policy perspectives, clear measurable outcomes are not stated in the policy.

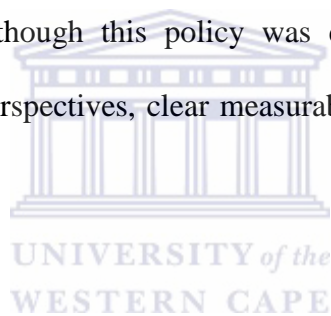


Table 2.4 NATIONAL policy regarding diabetes mellitus

Country	Policy name	Clearly address diabetes mellitus	Evidence-based	Measurable outcomes	Budget allocation	Monitoring and Evaluation procedures
South Africa	The 2012 SEMDSA Guideline for the Management of Type 2 Diabetes	Yes Specifically for type 2 diabetes at primary care level	YES The information presented was interrogated and amendments and additions were suggested. The discussions were evidence based, but where evidence was lacking, a consensus among participants was adopted. The Committee was guided by 'best practice' and not economic analyses. The Steering Committee had to amend / rewrite their sections as per recommendations from the Guideline Meeting. These revised draft documents were then posted on the SEMDSA secure website for further comments from SEMDSA members and the Department of Health.	YES Diagnosis of diabetes *Fasting plasma glucose (FPG) \geq 7.0 mmol/l or * 2 hour plasma glucose \geq 11.1 mmol or *HbA1c \geq 6.5% or *Random plasma glucose \geq 11.1mmol/l Nutritional therapy *carbohydrate (45 – 60% of energy) *protein (15 – 20% of energy) *fat (<35% of energy) *salt (<2.3 gram per day) *vitamins and mineral supplements for selected individuals *alcohol (1-2 units per day) Physical activity *150 minutes of moderate-intensity per week or *75 minutes of vigorous-intensity per week and *resistance exercise 2-3 times per week	NO No evidence found in the guideline	YES Draft document was posted on the SEMDSA secure website for comments by SEMDSA members and the Department of Health

				<p>Glycaemic control</p> <p>Newly diagnosed / no CVD</p> <ul style="list-style-type: none"> * HbA1c \leq 6.5 % * pre-prandial fasting levels = 4.0-7.0 mmol/l * 2 h postprandial self-monitoring levels = 4.4-7.8 mmol/l <p>Majority of patients</p> <ul style="list-style-type: none"> * HbA1c \leq 7.0 % * pre-prandial fasting levels = 4.0-7.0 mmol/l * 2 h postprandial self-monitoring levels = 5.0-10.0 mmol/l <p>Elderly / high risk</p> <ul style="list-style-type: none"> * HbA1c \leq 7.5 % * pre-prandial fasting levels = 4.0-7.0 mmol/l * 2 h postprandial self-monitoring levels < 12.0 mmol/l <p>CVD risk factors</p> <p>Blood pressure</p> <ul style="list-style-type: none"> * <140/80 mmHg <p>Lipid targets</p> <ul style="list-style-type: none"> * total cholesterol < 4.5 mmol/l * LDL cholesterol < 1.8 mmol/l * triglyceride < 1.7 mmol/l * HDL cholesterol <ul style="list-style-type: none"> women > 1.2 mmol/l men > 1.0 mmol/l <p>BMI</p> <ul style="list-style-type: none"> * <25 kg/m² <p>Cigarette smoking = cessation</p>	
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Table 2.5 PROVINSIONAL policy regarding diabetes mellitus

Province in South Africa	Policy name	Clearly address diabetes mellitus	Evidence-based	Measurable outcomes	Budget allocation	Monitoring and Evaluation procedures
Western Cape	Adult Chronic Disease Management Policy	<p>NO</p> <p>It is a strategy for five key conditions</p> <ul style="list-style-type: none"> • CVD • COPD • Diabetes • Hypertension • Epilepsy 	<p>YES</p> <p>The policy has been developed within the context of national and provincial policy perspectives:</p> <ul style="list-style-type: none"> • The Constitution of the RSA (Act 108 of 1996) • National Health Act 2003 • National Strategic Planning • National guidelines for chronic disease management • Medicine and Related Substance (Act 101 of 65) • Healthcare 2010 • Comprehensive Service Plan 	<p>NO</p> <p>No evidence found in the guideline – the management protocols of the districts must be followed.</p>	<p>NO</p> <p>No evidence found in the guideline</p>	<p>YES</p> <p>Integrated Audit Tool for chronic disease management</p> <ul style="list-style-type: none"> • For the facility • For each patient

The section above provided a summary of the policies guiding diabetes mellitus available both internationally and nationally. Policies are an important aspect as seen in the UK's Medical Research Council framework (discussed later in 2.8). Policies / guidelines are intended to guide practice and inform general patterns of care. It is also intended to enhance diabetes prevention efforts and to reduce the burden of diabetes complications in people living with the disease. As stated in the Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada (pg. iv):

“Health care professionals must consider the needs, values and preferences of individual patients, use clinical judgement, and work with available human and healthcare service resources in their settings. It is incumbent upon healthcare professionals to stay current in this rapidly changing field.

2.8 THEORETICAL ORIENTATIONS

Changing or modifying a harmful behaviour is difficult for most people. Behaviour is a multidimensional phenomenon and therefore requires properly planned interventions that take into consideration the innumerable psychosocial processes that are involved in behaviour change. Behaviour change theories provide structures that can be implemented to systematically design an intervention and provide useful ways of evaluating the intervention. Understanding the way new behaviours are commenced and maintained is central for interventions to be successful. As no one theory can address all variables that contribute to a person's behaviour and not all theories are applicable to all situations, components of different theories may be combined to create a personalised programme for a specific target population.

Frost (2008) recognised that most theories address eight components of behaviour change:

- “The person has formed a strong positive intention (or made a commitment) to perform the behavior.
- (There are no) environmental constraints (preventing) the behavior (from occurring).
- The person has the skills necessary to perform the behavior.
- The person believes that the advantages of performing the behavior outweigh the disadvantages (attitude).
- The person perceives more social (normative) pressure to perform the behavior than not to do so.
- The person perceives that performing the behavior is more consistent than inconsistent with his or her own self-image (personal norms, personal standards).
- The person’s emotional reaction to performing the behavior is more positive than negative.
- The person perceives that he or she has the capability to perform the behavior under a number of different circumstances (perceived self-efficacy, perceived behavioral control).”

Theorists consider the first three elements as essential and sufficient for behaviour change to occur, while the remaining five impact the strength and intention of the change.

The most widely used models of health promotion, including behaviour initiation and maintenance are the Health Promotion Model (HPM) (Srof & Velsor-Friedman, 2006), the Health Belief Model (HBM) (Rosenstock, Stretcher & Becker, 1988), the Stages of Change or Transtheoretical Model (Prochaska & Velicer, 1997), and the Socio-Ecological Model (McLeroy, Bibeau, Steckler & Glanz, 1988) and these are briefly described below.

2.8.1 The Health Promotion Model

The Health Promotion Model (HPM) provides a theoretical basis for exploring factors aiding in lifestyle behaviour (Srof & Velsor-Friedman, 2006). The HPM identifies three health behaviour determinants: a) individual characteristics, such as age and gender and experiences that would assist in informing future behaviours, b) behaviour-specific cognitions and affects, e.g. perceived obstacles that prevent action or the perceived benefits of the behaviour and c) situational or interpersonal influences, namely environmental or social elements that influence health-related behaviour.

The HPM categorizes the factors influencing behaviours similar to the Health Belief Model. Modifying factors, cognitive-perceptual factors and variables influencing the likelihood of action, are described. The HPM is more focused on achievement of higher levels of well-being and self-actualisation whereas the HBM is a health protective model (Pender, 1987).

Basic needs must be met before the client pursues to higher levels of self-actualisation. However, cognitive-perceptual factors are the primary motivating mechanisms for acquisition and maintenance of health promoting behaviours. The cognitive-perceptual elements include items such as, importance of health and perceptions of control of health, self-efficacy, and benefits of and barriers to health-promoting behaviours (Pender, 1987). The challenge that one faces when using the Health Promotion Model is that if health is not a priority or highly valued by the client, he or she may be less likely to act and make the necessary changes to lifestyle behaviour.

2.8.2 The Health Belief Model

The Health Belief Model (Figure 2.1) is one of the oldest theories of health education (Rosenstock, Stretcher & Becker, 1988). The researchers reported that the HBM was developed to explain the wide failure of people to participate in programmes to prevent diseases and was later extended to explain behaviour in compliance to the prescribed management regimes for the condition. It argues that behaviour can best be understood if beliefs about health are clear. Janz and Becker (1984) stated that perceived risk, frequently postulated as a necessary prerequisite to behavioural change, is a central construct in the HBM. The HBM hypothesize that individuals will act to protect or promote their health if they believe that: (a) they are susceptible to a condition or problem, (b) the consequences of the condition are severe, (c) the recommended actions to deal with the problem are beneficial, and (d) the benefits of taking action outweigh the costs or barriers.

The HBM is thus a framework for motivating people to take positive decisions regarding their health to avoid negative health consequences. Despite substantial applications of the HBM in research, it has its critics. Haefner and Kirscht (1970) argued that although changing beliefs about health may be enough to change actions; these changes will be inadequate to change behaviours that satisfy an array of causes at the same time. Furthermore, social factors are neglected and one should be careful not to blame the victim as the HBM stresses personal responsibility which may lead people to feel it is their fault if they cannot solve their own problems.

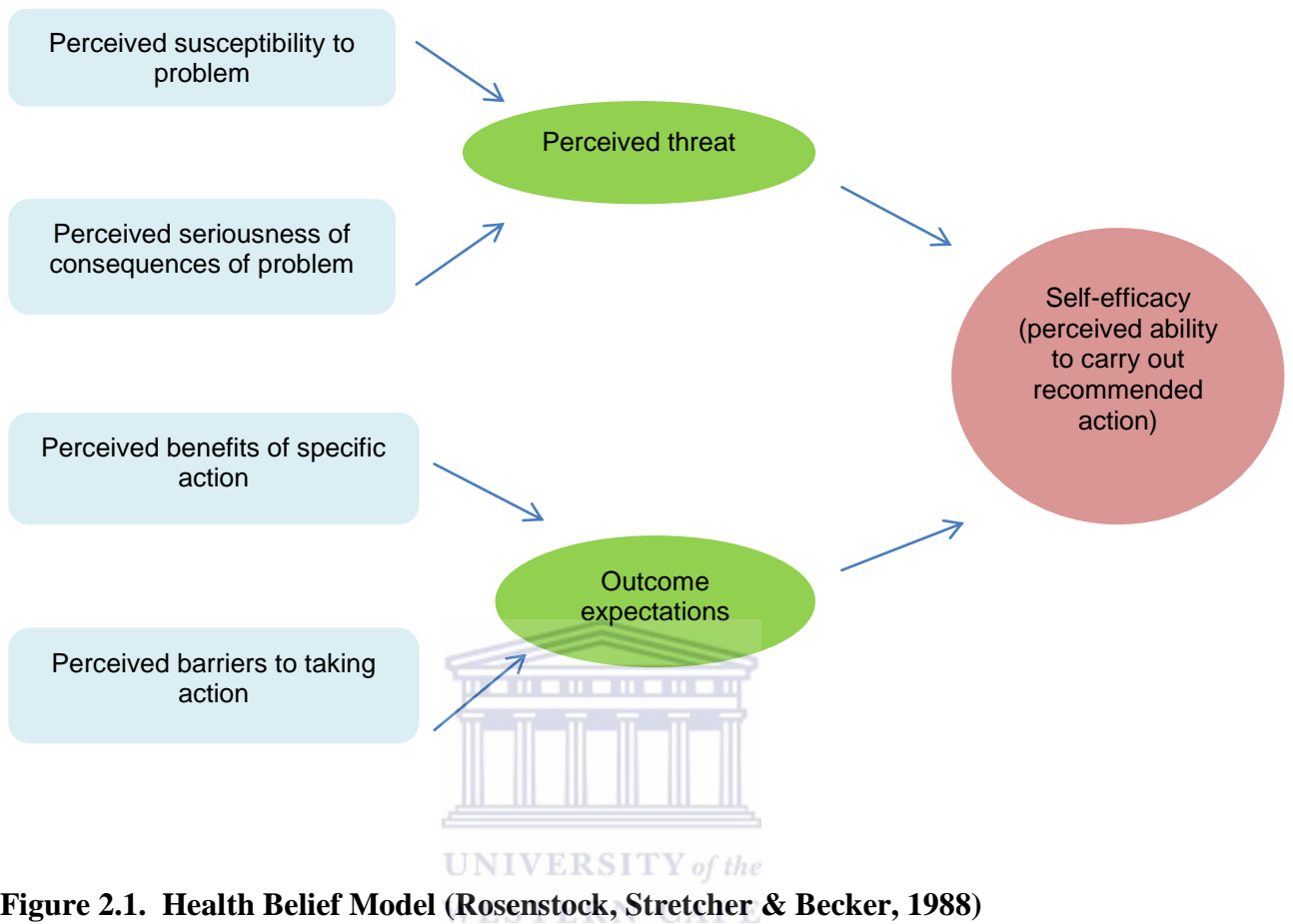


Figure 2.1. Health Belief Model (Rosenstock, Stretcher & Becker, 1988)

2.8.3 Transtheoretical or The Stages of Change Model

The Transtheoretical Model (TTM) (Prochaska & Velicer, 1997) is an integrative, biopsychosocial model designed to describe intentional behaviour change. From the stages perspective, the study of behaviour change is no longer limited to the phase of motivation. The dynamic nature of change is a non-linear process with distinct changes. Processes of change are strategies used to move people between stages. The TTM seeks to include and integrate key constructs from other change theories into a comprehensive theory of change that can be applied to a variety of behaviours, populations and settings. The dynamic nature of change and the importance of the time dimension are underlined in the TTM.

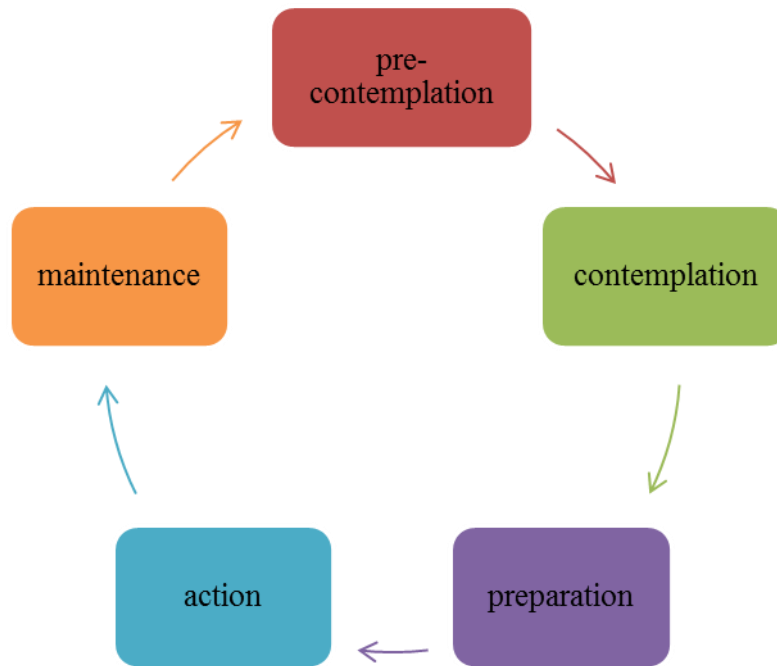
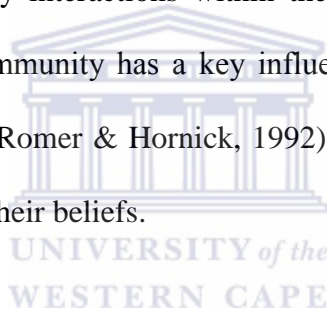


Figure 2.2 The Transtheoretical Model (Proschaska & Velicer, 1997)

The TTM describes how people undergo a process of change in order to bring about a more beneficial behavioural selection (Proschaska & Velicer, 1997). It is a progression through a series of stages. The *pre-contemplation stage* is the stage in which individuals do not show concern about their risky lifestyle and do not intend to do anything about it in the near future (usually quantifies as the next six months). Lack of knowledge and demoralisation has been identified as reasons for individuals to be in this stage. As soon as they realise the pros of changing their behaviour, they will advance to the next stage. The *contemplation stage* is the stage at which individuals acknowledge their risky lifestyle behaviours and intend to do something about it. In this stage individuals weigh the pros and cons of changing their behaviour. In the *preparation stage* the individual made a commitment to make the behaviour change. They believe the benefits of behaviour change will outweigh the costs, but they may not be entirely committed to their plan. The *action stage* involves individual

implementing the necessary change. Finally, the *maintenance stage* involves the individuals attempt to avoid a relapse. Their confidence increases and their temptation to return to unhealthy behaviour decreases.

Both the Health Belief Model and Transtheoretical Model include self-efficacy as part of the respective models. Bandura (1977) defined self-efficacy as a person's estimation of their ability to perform the particular behaviour in a particular situation. It is an important prerequisite for behavioural change. Although both these models describe the individuals' reactions to situations in which they may find themselves as well as the analytical process they go through when attempting to change behaviour, neither of them take into account how the individual can be affected by interactions within the social and family context. The support and beliefs from the community has a key influence on individual's beliefs about their severity and susceptibility (Romer & Hornick, 1992). Change is unlikely to happen if the community not also changes their beliefs.



Some critique regarding the TTM is that this model considers individual health behaviour change in isolation from social and environmental factors. Furthermore TTM interventions usually target people with change potential. Hence the model does not acknowledge that people with lower change potential are often socially or economically disadvantaged. This could lead to further inequities in health promotion (Prochaska, Redding & Evers, 2008).

The TTM has been employed in research regarding behaviour change in older adults (Kirk, MacMillan & Webster, 2010, McNulty, Johnson, Poole & Winkle, 2003). The model has also been applied to older adults in identify gaps in programmes (Lach, Everard, Highstein & Brownson, 2004), for instrument design (Padula, Rossi, Nigg, Lees, Fey-Yensan & Greene et

al., 2003) as well as planning behavioural change interventions (Burbank, Reibe, Padula & Nigg, 2002).

It is imprudent to generalise the social cognitive theories to the South African context, as most of them were developed and evaluated in the United States of America. Bearing in mind South Africa's distinctive cultural heritage, it can be inferred that a model that accounts for culture and context would be most appropriate in South Africa. It is vital for models to address the complexities and interdependencies between socio-economic, cultural, environmental and biological determinants of health (Stokols, 1996).

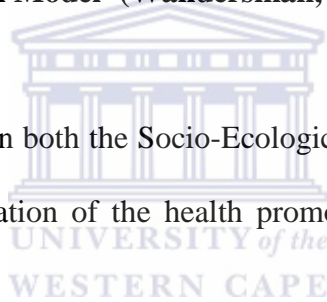
2.8.4 The Social-Ecological Model (SEM)

Theories can assist with the conceptualisation of a problem (McNeil, Kreuter & Subramanian, 2006), and hence this study will draw largely on the Socio-Ecological Model. The framework offers a model for the integration of multiple perspectives into the planning of interventions for behaviour change. Wandersman, Valois, de la Cruz, Adkins and Goodman (1996) concluded that the Social-Ecological Model (SEM) proposes that an individual's behaviour is supported and influenced by numerous systems and groups. SEM explains human behaviour in terms of a dynamic, interwoven relationship that exists between the individual and their environment and suggest that the most effective approach leading to healthy behaviours is a combination of efforts at all the levels of the model, namely individual, interpersonal, organisational, community and public policy (Emmons, 2000, McLeroy et al., 1988) (Figure 2.3).



Figure 2.3 The Socio-Ecological Model (Wandersman, Valois, de la Cruz, Adkins & Goodman, 1996)

The present study had drawn upon both the Socio-Ecological and Transtheoretical Models in the development and implementation of the health promotion intervention for adults with type 2 diabetes mellitus.



2.8.5 United Kingdom Medical Research Council framework

The Medical Research Council (UK) framework for the development of complex interventions will guide the current study (Campbell et al., 2000). This framework has been used successfully internationally and it proposes a stepwise approach. This approach includes the following: developing an understanding of the problem, the intervention and determining the effectiveness of the intervention. According to Campbell et al. (2007), determining the effectiveness of complex interventions can be difficult and time consuming and thus highlight the importance of groundwork to obtain desirable outcomes. These authors further posit that most health service activities could be seen as complex interventions.

According to the MRC framework (Campbell et al., 2000) the following are important in the first phase which covers the understanding of the problem: *disease* (risk factors); *patient* (beliefs, adherence to treatment); *health professionals* (accessibility, prescribing practices, practices in health promotion); *health services* (availability of effective preventive and therapeutic care); *policy* (policies on prevention) and the *social context* (social support). Theories can assist with the conceptualization of a problem (McNeil, Kreuter & Subramanian, 2006), and hence this phase will draw largely on the Socio-Ecological Model.

Designing, describing and implementing an intervention has been suggested to be the most challenging part of the framework (Medical Research Council, 2000). Furthermore, the intervention “must engage the target group and affect pathways amenable to change that are identified as important to the problem”. Lastly, in determining the effectiveness of an intervention, convincing evidence of the effectiveness or lack thereof should be provided. To assist in determining the effectiveness of the health promotion programme, the TTM will largely be drawn upon. Some of the key tasks to be incorporated in this phase includes, the identification of feasible and valid outcome measures, recruitment and retention rates, and sample size calculation.

2.9 SUMMARY OF THE CHAPTER

This chapter reviewed the relevant literature pertaining to the prevalence of diabetes mellitus and its risk factors among adults. Also reviewed were factors that contribute to the diabetes pandemic such unhealthy lifestyle and urbanisation. Moreover, several diabetes self-management programmes and health promotion interventions and approaches to delay or reduce the development of diabetic complications were also reviewed. Policy analysis of

international and national policies / guidelines regarding diabetes was summarised. Lastly, as a point of exit, relevant theoretical frameworks underpinning several health promotion interventions in clients with diabetes were also reviewed. The summary is highlighted below:

- There is a rapid increase in the prevalence of type 2 diabetes mellitus worldwide, with a predicted incidence increase of 54% from 2010 to 2030.
- This increasing prevalence is linked to urbanisation and associated risk factors such as tobacco smoking, obesity and physical inactivity.
- Type 2 diabetes mellitus accounts for more than 90% of all diabetes cases globally.
- In South Africa 4.5% of the general population has diabetes. The estimated prevalence for urban South African is between 8 and 13%.
- The age group mostly implicated in developing countries is in their economically productive cycle, namely 35 – 64 years.
- Lifestyle behaviour change is a key factor in good glycaemic control, an aspect central in the prevention or delay of the development of diabetic complications.
- Lifestyle behaviour change through health promotion interventions, including physical activity (aerobic and resistance exercise) and dietary advice, proof to be more effective in the management of the diabetes mellitus.
- Adhering to pharmacological and non-pharmacological management is influenced by social factors, attitudes and beliefs as well as knowledge of the disease which increase peoples' disposition to diabetic complications.
- The Transtheoretical model has been employed in numerous intervention development and implementation while the Socio-Ecological model address the complexities and interdependencies between socio-economic, cultural, environmental and biological determinants of health.

From this chapter, it is evident that clients with type 2 diabetes mellitus in primary health care facilities of urban areas have more health promotion and self-management empowerment needs than those living in rural settings because of their higher disposition to unhealthy lifestyles and obesity. Moreover, most health promotion interventions that target clients with type 2 diabetes mellitus are designed for and implemented in developed countries; hence not addressing the specific socio-economic and cultural needs of the South African population. The current study is designed to address these two highlighted gaps. The next chapter will therefore describe the methods used to reach the study objectives as outlined in Chapter one.



CHAPTER THREE

METHODOLOGY

3.1. OVERVIEW OF THE CHAPTER

This chapter provides an overview and rationale for the methodological framework used in this study. The research question that guided the study is outlined, followed by a broad description of the research setting. This is followed by a description of the participants and sampling method used in the study. Furthermore, the chapter describes the study design, methods of data collection, and statistical data analysis. In addition, the ethical issues and of the study are explained.

3.2 RESEARCH QUESTION

The overall goal of the study is to develop, implement and determine the effectiveness of a health promotion programme for adult clients with type 2 diabetes mellitus to reduce the factors that are associated with the increased risk of developing complications due to the disease. It is hypothesized that adult clients with type 2 diabetes mellitus that participate in the health promotion programme would have:

- increased knowledge regarding nutrition (the role of correct diet) in the management of their disease,
- increased knowledge regarding the role physical activity can play in the management of their disease,
- increased knowledge regarding risk factors for developing diabetes mellitus complications and
- increased self-efficacy to manage their disease.

3.3 RESEARCH SETTING

The study was conducted in the Cape Metropolitan District of the Western Cape, one of the five (5) district municipalities of the City of Cape Town. The Cape Metropolitan District covers an area of 2 460km² and has a population of 3 740 026 million people. The predominant population group in this district is Coloured (42.4%) and others include Black (38.6%), White (15.7%) and Indian/Asian (1.4%). Afrikaans is the language spoken by most of the population, followed by isiXhosa and English (Census, 2011).

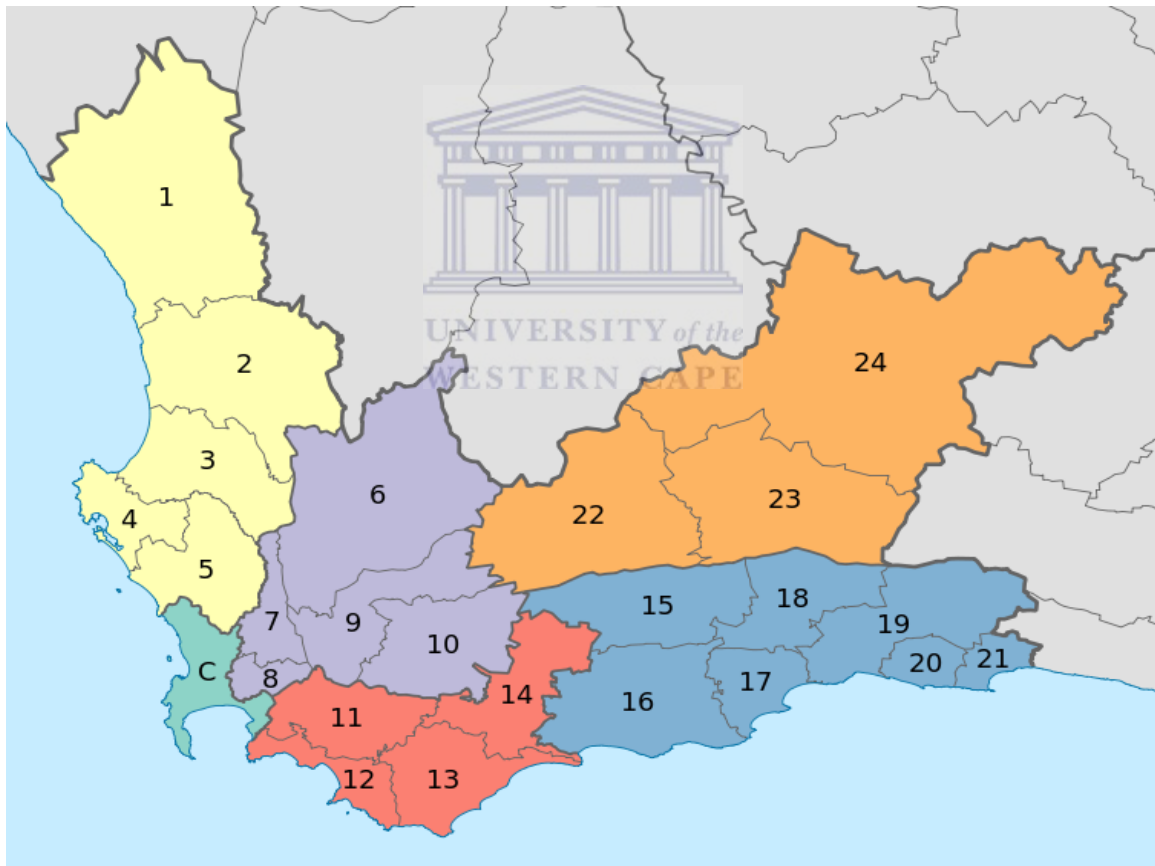


Figure 3.1 Map of the Western Cape district municipalities. ‘C’ represents the Cape Metropolitan District

3.4 STUDY DESIGN

An embedded strategy of mixed methods research, specifically the parallel mixed design was used for this study, utilising both quantitative and qualitative methods for data collection and analysis (Creswell, 2009; Teddlie & Tashakkori, 2009). With this type of design the qualitative and quantitative strands are planned and implemented to answer related aspects of the same overarching research question (Teddlie & Tashakkori, 2009). The researchers furthermore reported that the combination of quantitative and qualitative research methodology is becoming the preferred method to evaluate public health interventions. This is related to the increase in overall strength and comprehensiveness of study findings compared to a single method (Barbour, 2001; Neuman, 2000).

The quantitative approach used self-administered questionnaires (reliability and validity established), to collect data from clients with type 2 diabetes mellitus and health care professionals regarding baseline information. In addition, to determine the effectiveness of the health promotion programme, the quantitative approach and specifically the pre-post design will be employed. The qualitative approach used focus group discussions (FGD) and semi-structured interviews to explore challenges experienced by clients with type 2 diabetes mellitus and health care professionals in the management of the disease within the current PHC system.

3.5 METHODS OF DATA COLLECTION

Data collection for the study was guided by the framework developed by the United Kingdom Medical Research Council (MRC, 2000), as discussed in Chapter 2 and will be described below for each phase of the study.

**3.5.1 PHASE 1: TO DETERMINE CURRENT PRACTICE REGARDING THE
MANAGEMENT OF TYPE 2 DIABETES MELLITUS (NEEDS ANALYSIS)**

The first phase of the study essentially develops an understanding of the problem, i.e. the risk factors of diabetes mellitus; the clients' self-efficacy of the disease; health care professionals' accessibility, their prescribing practices and their health promotion practices; the availability of effective preventive and therapeutic care and lastly the support offered for clients with type 2 diabetes mellitus.

Study population and sampling

Currently the Cape Metropolitan District is divided into four sub-structures, namely the Eastern and Khayelitsha sub-districts, Klipfontein and Mitchells Plain sub-districts, Northern and Tygerberg sub-districts as well as Southern and Western sub-districts. Twenty two (22) Community Health Centres (CHCs) are allocated in the four sub-structures, i.e. Eastern and Khayelitsha sub-districts (3 CHCs), Klipfontein and Mitchells Plain sub-districts (4 CHCs), Northern and Tygerberg, sub-districts (3 CHCs) and Southern and Western sub-districts (12 CHCs) (Western Cape Department of Health, 2010). According to the Western Cape Department of Health (2010), 22 215 of the 40 294 clients currently diagnosed with type 2 diabetes mellitus and managed at PHC level in the Western Cape are from the Cape Metropolitan District. All the CHCs have a specific day on which clients with type 2 diabetes are managed by a professional sister/nurse or doctor. The population therefore consisted of all the clients diagnosed with type 2 diabetes mellitus at the CHCs in the Cape Metropolitan District at the time of data collection.

Stratified random sampling was employed for this study. The strata are the four (4) sub-structures of the Cape Metropolitan District. To ensure equal representation from each sub-

structure, random selection of CHCs was done proportionately. Therefore one (1) CHC was randomly selected from the following three (3) sub-structures: Eastern and Khayelitsha sub-districts, Klipfontein and Mitchells Plain sub-districts, Northern and Tygerberg sub-districts and four (4) CHCs from the Southern and Western sub-districts. Overall, a total of seven (7) CHCs were selected. The Department of Health however, only gave ethical clearance and permission to conduct the study at six (6) of the selected CHCs (11/7/14; Reference number RP59/2011; Appendix 2a and 2b). The other selected CHC was inundated with research projects.

To determine the sample size needed for the quantitative part of the study a power calculation was done. At 95% confidence level, with a confidence interval of 5, 378 clients with type 2 diabetes mellitus had to participate in the study. At each CHC, every 2nd client that visited the participating clinic for management of their disease was approached to partake in the study. Of the 420 clients who were approached to participate in the study, 384 consented and completed the baseline questionnaire for clients with type 2 diabetes mellitus. However, 49 questionnaires were not included in the data analysis as it was incomplete. A response rate of 79.76% ($n = 335/420$) was therefore achieved. The final sample thus consisted of 335 adult clients with type 2 diabetes mellitus representing 119 males (35.5%) and 216 females (64.5%).

All health care professionals that work in the diabetes clinic at the participating CHCs were invited to participate in the study (health professional questionnaire). Each CHC has different health care professionals responsible for their diabetes clinics. Of the 30 health care professionals working in the diabetic clinics at the six (6) participating CHCs approached, 18 consented to participate in the study. Therefore a response rate of 60% ($n = 18/30$) was

achieved. The final sample thus consisted of 18 health care professionals representing 15 females (83.3%) and three (3) males (16.7%) of predominantly (50%) nursing staff. Figure 3.2 provides a summary of the participants of the first phase of the study.

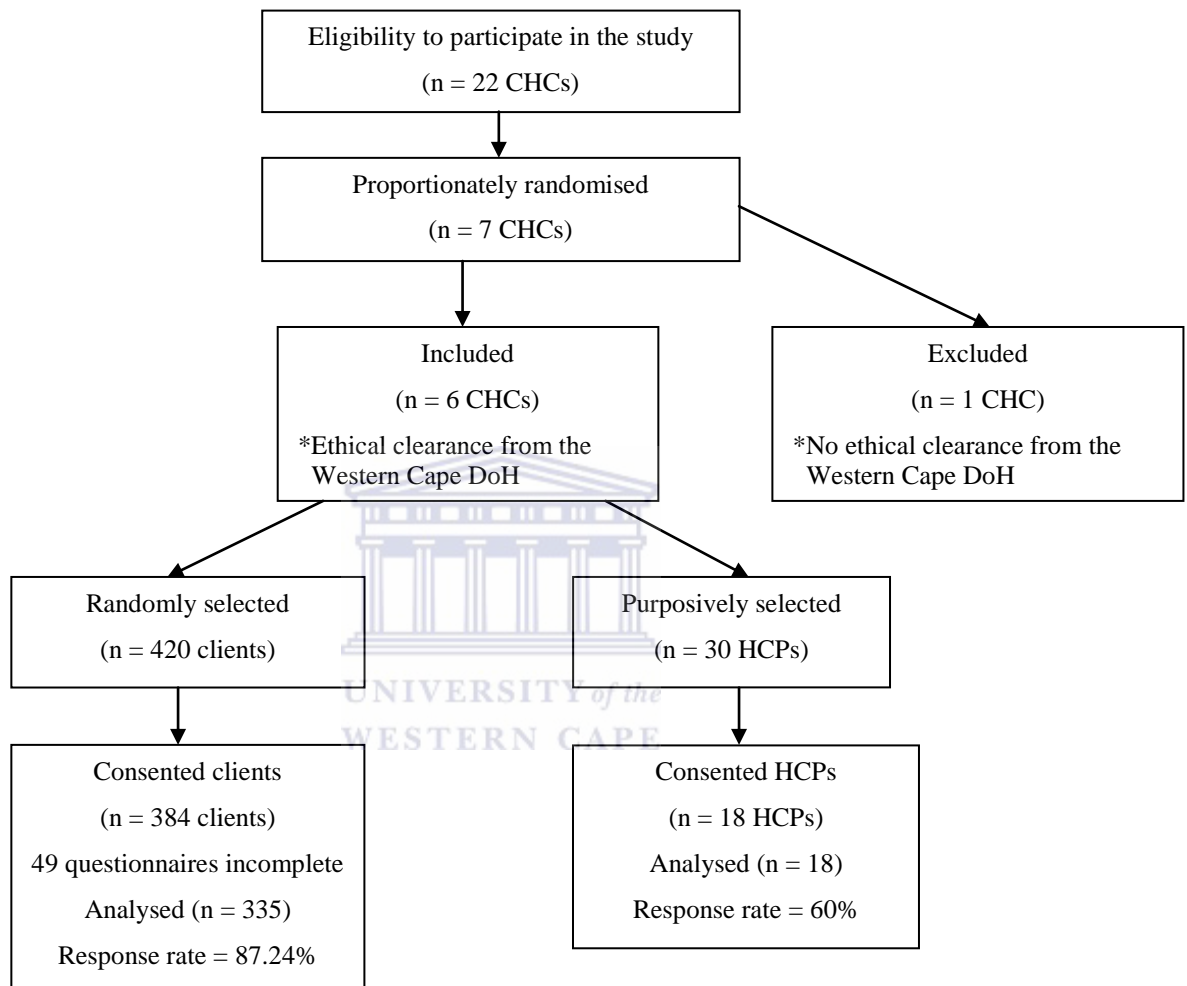


Figure 3.2 Summary of the study participants of Phase 1 (quantitative component)

Research instruments

Self-administered questionnaires were used to collect data for the needs analysis. Both questionnaires (for the clients as well as health care professionals) were developed based on existing scales.

The questionnaire for clients with type 2 diabetes mellitus consisted of several sections and is outlined below (Appendix 6a, 6b and 6c):

(a) Socio-demographic information

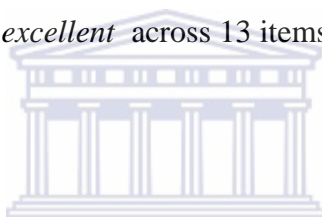
This self-constructed scale measured demographic and socio-economic characteristics of the clients. Age was measured on a continuous scale to assist with analysis and interpretation (i.e. mean age). Categorical variables were used for ethnic origin/race, marital status, highest level of education, where the client lives most of the year, how many people live with the client as well as current employment status. Self-description, rather than any other method, was used for classification of race/ethnicity purposes. The race/ethnicity variable was based on the former government's repealed population Registration Act of 1950 (i.e. African/Black, Coloured, White and Indian/Asian). Anthropometric measurements of weight, height and BMI as well as physiological measurement of blood pressure were obtained in accordance with the American College of Sports Medicine Guidelines for Exercise Prescription and Testing (2000) to ensure uniformity and accuracy.

(b) General health and education/advice received

Four questions were included in this scale, namely self-description of general health (excellent = 1; very good = 2; good = 3; fair = 4; poor = 5), whether a HCP ever told the client to follow an exercise programme, whether a HCP ever told the client to follow a meal plan or diet and whether the client ever received diabetes education. Answers are given on a three-point Likert scale of no = 0; yes = 1 and not sure = 2 for the last three items.

(c) Self-efficacy of type 2 diabetes mellitus

Clients responded to a series of statements/items assessing their understanding of management practices of the disease, adapted from the validated and reliable Diabetes Care Profile (Fitzgerald, Davis, Connell, Hess, Funnell & Hiss, 1996). Items included overall diabetes care, coping with stress, diet for blood sugar control, the role of exercise in diabetes care, medications taken, how to use the results of blood sugar monitoring, how diet, exercise and medication affect blood sugar levels, prevention and treatment of high/low blood sugar, preventions of long-term complications of diabetes, foot care, benefits of improving blood sugar control as well as pregnancy and diabetes. Clients rated each item using a 5-point Likert scale ranging from *poor* to *excellent* across 13 items (1 = poor; 2 = fair; 3 = good; 4 = very good; 5 = excellent).



(d) Satisfaction with quality care received at the CHC

The “Patient survey for Quality of Care scale” (Woodward, Ostbye, Craighead, Gold & Wenghofer, 2000) was used to assess clients’ satisfaction with quality care received. The scale consists of ten (10) items with a 5-point Likert scale ranging from *poor* to *excellent*. An example of items is: “How satisfied are you with the information given (how clear and complete the explanations were) regarding your diabetes?” Higher scores indicate more satisfaction with quality of service received at the CHC. Three questions dichotomized into 0 = no and 1 = yes regarding the CHC/clinic, were included. An open-ended statement for suggestions to improve services at the CHC was also included.

(e) Physical activity participation

The International Physical Activity Questionnaire-Short Form (IPAQ-S) scale is a self

administered questionnaire (Craig, Marshall, Sjöström, Bauman, Booth, Ainsworth et al., 2003) that measures a broad range of domains of physical activity (Craig, Marshall, Sjöström, Bauman, Booth, Ainsworth et al., 2003). The IPAQ-S asks participants to report activities performed for at least 10 minutes during the last 7 days. Respondents are asked to report time spent in physical activity at each of three intensities: vigorous, moderate and walking. Examples of activities that represent each intensity are provided. Frequency (measured in days per week) and duration (time per day) are collected separately for each type of activity. Using the instrument's scoring protocol, total weekly physical activity was estimated by weighting time spent in each activity intensity with its estimated metabolic equivalent (MET) energy expenditure. The IPAQ scoring protocol ascribes the following MET values to walking, moderate intensity activity, and vigorous intensity activity: 3.3 METs, 4.0 METs, and 8.0 METs, respectively. Data collected are reported as a continuous measure and presented as median MET-minutes. A combined total physical activity MET-min/week was computed (the sum of Walking + Moderate + Vigorous MET-min/week). The participants were thereafter classified as either having low (<600 MET-min/week), moderate (≥ 600 <3000 MET-min/week) or high (≥ 3000 MET-min/week) physical activity levels. The sitting question is an additional indicator variable and is not included in the summary score of physical activity.

(f) Nutrition/Diet

Eight (8) multiple choice questions from the validated Michigan Diabetes Research and Training Center's "Brief Diabetes Knowledge Test" was included in this scale (Fitzgerald, Anderson, Funnell, Hiss, Hess, Davis et al., 1998). A total score for each participant was constructed on a continuous scale by adding the number of correct answers ranging from 0 to 8 with higher scores indicating more knowledge of the diabetic diet. The following criteria

for knowledge categories were used: inadequate for $\leq 59\%$, marginal $\geq 60-75\%$ and adequate for $\geq 76\%$ correct answers (Williams, Baker, Parker & Nurss, 1998).

(g) Support from family and friends

This measure from the validated and reliable “Diabetes Care Profile” (Fitzgerald et al., 1996) assessed the support and help the participant receive with aspects of the management of their disease. Items include support to: follow his/her meal plan, to take his/her medicine, to take care of his/her feet, to get enough physical activity, to test his/her blood sugar and to handle his/her feelings about diabetes. A 5-point Likert scale ranging from *strongly disagree* to *strongly agree* were used to rate participants’ perception of support received from family and friends across six (6) items.

The questionnaire for health care professionals consisted of four sections and is outlined below (Appendix 7):

(a) Demographic information

This self-constructed scale measured demographic characteristics of the health care professionals (HCPs). Age was measured on a continuous scale to assist with analysis and interpretation (i.e. mean age). Questions regarding highest level of education, special diabetes training and duration of working in a diabetes clinic were also included.

(b) Management of type 2 diabetes at the CHC

The participants had to indicate whether the facility they work at, follow a prescribed protocol for management of clients with type 2 diabetes mellitus. If yes, they had to specify the specific protocol. Lastly, the participants had to indicate which health care professionals form part of the multidisciplinary team managing clients with type 2 diabetes mellitus.

(c) Diabetes Attitude Survey (DAS-3)

The Diabetes Attitude Survey (DAS-3) is a measure of general diabetes related attitudes. (Anderson, Fitzgerald, Gorenflo & Oh, 1993). Answers are given on a 5-point Likert scale across 33 items. The scale range from *strongly agree* to *strongly disagree*. The health care professionals had to choose the answer they believe is true most of the time or is true for most people. The DAS-3 scoring formulae were used to determine the attitudes of health care professionals in five (5) domains/sub-scales, namely need for special training, seriousness of diabetes mellitus, value of tight control, psychosocial impact of diabetes mellitus and patient autonomy. The mean score of each sub-scale was calculated. Participants were classified into one of two groups, depending on the participant's score on a given sub-scale. Participants with a score more or equal to 3.00 were placed in the positive attitude group whereas participants with a score less than 3.00 were placed in the negative attitude group.

(d) Physical Activity Exit Interview (PAEI)

This scale measured the quality of physical activity counselling content given by health care professionals. It consists of twelve (12) items with options for answers including never = 0%, Seldom \leq 25%, sometimes = 50%, often \geq 75% and always = 100%. For each of the twelve statements, the participants had to choose the best answer they believe is true most of the time (internal consistency, $\alpha = 0.931$).

Reliability and validity

Reliability is the ability of an assessment tool to give the same result if repeated under the same conditions (Bless & Higson-Smith, 2000) while validity is the capacity of the assessment tool to measure what it is intended to measure (Silverman, 2000). Validity is one

of the most important criteria by which a quantitative instruments' adequacy is evaluated (Polit, Beck & Hungler, 2001).

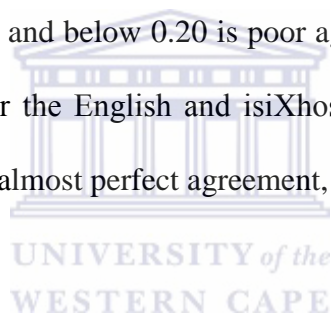
Questionnaire for clients with type 2 diabetes mellitus

To ensure validity of the instrument, the subsections were adapted from previous questionnaires used in similar studies, namely the Diabetes Care Profile and the Brief Diabetes Knowledge Test. Although there are no complete objective methods of assuring the acceptable content coverage of an instrument, certain steps were taken to assure content validity.

A draft of the questionnaire for clients with type 2 diabetes mellitus, with all the sub-scales, was translated into isiXhosa and Afrikaans by independent health care professionals fluent in the respective language. It was then back translated into English by a linguist in Afrikaans and isiXhosa respectively. These questionnaires (English, Afrikaans and isiXhosa versions) were administered to a sub-sample of clients with type 2 diabetes mellitus. This was done to assess the face validity and applicability of all the items for this population, its level of understandability (clarity of the wording) and the time it would take to be completed. The time taken for the clients with type 2 diabetes mellitus to complete the questionnaire ranged from 20 to 30 minutes. A 30 minute focus group discussion followed the completion of the questionnaire to test content validity of the instrument and to see whether it was necessary to rephrase or change any of the questions. The results indicated that the instrument was relevant to the population and was easily used by the clients. Only a few grammatical changes were made. The final questionnaires were send to experts in the field of management of diabetes and chronic diseases of lifestyle. These experts were called on to analyse the

items to see if it adequately represents the hypothetical content universe in the correct proportions.

After the minor grammatical changes were done, the questionnaires were administered to clients in their respective languages (English, Afrikaans and isiXhosa). To test reliability, the same questionnaire was administered two weeks later to the same sub-group of clients. Test-retest reliability was measured using the correlation-coefficient. The results of the statistical analysis are presented in table 3.1 below. According to Nunnally and Bernstein (1994), an ICC of above 0.81 was considered almost perfect agreement; between 0.61 and 0.80 indicates substantial agreement; between 0.41 and 0.60 indicates moderate agreement; between 0.21 and 0.40 indicates fair agreement and below 0.20 is poor agreement. As summarised in table 3.1, all the sub-scales, except for the English and isiXhosa versions of the “knowledge of diet” sub-scale had substantial to almost perfect agreement, indicating good stability.



**Table 3.1 Psychometric description of scales of client questionnaire
(Test-retest reliability / stability)**

Variable	Number of items	Language	Chronbach alpha	95% CI
Health Education and/or Advice	3	English	.762	.382 - .884
		Afrikaans	.739	.370 - .826
		isiXhosa	.718	.312 - .807
Understanding of diabetes mellitus	13	English	.942	.894 - .979
		Afrikaans	.946	.896 - .978
		isiXhosa	.884	.780 - .954
Satisfaction with quality of care	10	English	.741	.492 - .986
		Afrikaans	.874	.759 - .950
		isiXhosa	.704	.432 - .882
IPAQ-S	4	English	.785	.583 - .915
		Afrikaans	.782	.367 - .871
		isiXhosa	.834	.678 - .934
Knowledge of diet	8	English	.699	.420 - .881
		Afrikaans	.729	.434 - .912
		isiXhosa	.693	.415 - .873
Support	6	English	.773	.557 - .911
		Afrikaans	.928	.859 - .972
		IsiXhosa	.907	.818 - .963

Questionnaire for health care professionals

The questionnaire administered for health care professionals was only in English. To ensure validity of the instrument, the subsections were adapted from previous questionnaires used in similar studies, namely the Physical Activity Exit Interview (PAEI) survey and Diabetes Attitude Survey (DAS-3). Although there are no complete objective methods of assuring the acceptable content coverage of an instrument, certain steps were taken to assure content validity.

The questionnaire was administered to a sub-sample of health care professionals. This was done to assess the face validity and applicability of all the items for this population, its level of understandability and the time it would take to be completed. The time taken for the health care professionals to complete the questionnaire ranged from 10 to 15 minutes. A 20 minute focus group discussion followed the completion of the questionnaire to test content validity of the instrument. The results indicated that the instrument was relevant to the population and was easily used by the health care professionals. The final questionnaire was sent to experts in the field of management of diabetes and chronic diseases of lifestyle. These experts were called on to analyse the items to see if it adequately represents the hypothetical content universe in the correct proportions.

The questionnaire was administered to the health care professionals. To test reliability, the same questionnaire was administered two weeks later to the same subgroup of health care professionals. Test-retest reliability was measured using the correlation-coefficient. The results of the statistical analysis are presented in Table 3.2 below. The criteria of Nunnally and Bernstein (1994) were employed to determine the level of agreement of each subscale.

The subscales of the health care professional questionnaire also had substantial to almost perfect agreement, indicating good stability.

Table 3.2 Psychometric description of scales of health care professional questionnaire (Test-retest reliability / stability)

Variable	Number	Chronbach alpha	95% CI
DAS-3	33	.726	.486 - .890
PAEI	12	.931	.868 - .972

Administrative procedure

After ethical clearance was obtained from the Senate Research Grant and Study Leave Committee of the University of the Western Cape (Appendix 1), permission was sought from the Western Cape Department of Health (DoH). Following the clearance from the Western Cape DoH (Appendix 2a & 2b), the facility managers of the approved Community Health Centres were contacted telephonically to arrange for a meeting to communicate the background of the procedure of the study and to arrange for a specific date of data collection. On the day of baseline data collection, written informed consent was sought from all the clients with type 2 diabetes mellitus (Appendix 4a, 4b & 4c). Each participant was taken to a room where the anthropometric measurements and blood pressure were taken in private. The resting heart rate and resting blood pressure were recorded using a calibrated, automatic sphygmomanometer equipped with a pulse-monitoring device in the cuff. The client had to sit for at least 5 minutes prior to testing. The cuff was firmly wrapped around the bare right upper arm of the client that rested at an angle of 45 degrees on a table with the palm facing up. The

start button was pressed and once maximum inflation was reached, the reading for both heart rate and blood pressure were recorded. The blood pressure reading was done twice with a one minute interval. Weight was measured using an electronic digital scale. The clients had to remove their shoes and socks as well as excess clothing. The weight reading was taken twice and the final recorded reading was the average of the two readings taken (in kg). For height, a tape measure was fixed against the wall, 10 cm above ground level. The clients had to remove their shoes, stand feet together and arms by the sides. Their heels, buttocks and upper back were against the wall. The measurement from the floor to the highest point on the head was recorded in centimeters (cm). Thereafter they could complete the rest of the questionnaire in the next-door waiting room of the health care facility.

At the beginning of each session, the researcher informed the participants about the study (Appendix 3a, 3b & 3c) and their right to withdraw from the study at any time. Although the questionnaires had detailed instructions on how to complete it, the researcher also briefly explained how the questionnaire should be filled in.

The consenting health care professionals completed a questionnaire at a time convenient to them (Appendix 7) after they were informed about the study (Appendix 3a). The researcher arranged to collect the completed questionnaire one week later.

Data Analysis

Data for clients with type 2 diabetes mellitus and health care professionals was captured on a 2010 Word Excel spreadsheet and imported into the Statistical Package for the Social Sciences (SPSS) version 21.0 to analyze the data. Descriptive statistics were employed to summarise the baseline demographic data of both the clients with type 2 diabetes mellitus and

health care professionals. Continuous variables such as age, height and weight were expressed as means (SD). Categorical variables such as gender and level of education were expressed as frequencies and percentages. Inferential statistics (cross tabulations) were used to determine the distributions of cases in the various groups. Significant differences were tested for using the Chi-square test (e.g. socio-demographic data and diabetes risk factors) and Independent-Samples t-test (mean scores). Statistical significance was set at an alpha level of 5%.

An open-ended question as part of the “Quality of Care” scale was analysed qualitatively. The main categories of the responses were identified and reported on in Chapter 5.



3.5.2 PHASE 2: TO EXPLORE THE CHALLENGES EXPERIENCED BY HEALTH CARE PROFESSIONALS AND CLIENTS WITH TYPE 2 DIABETES MELLITUS REGARDING THE MANAGEMENT OF THE DISEASE

Study population and sampling

Eight (8) conveniently selected clients with type 2 diabetes mellitus per participating CHC (six randomly selected CHCs in total) that completed the baseline questionnaire were invited to participate in the FGD. Therefore a total of 48 clients were invited. None of the invited participants from one of the CHCs agreed to take part; hence the total of 26 clients was recruited from five (5) CHCs resulting in a response rate of 54.2%. A total of six (6) FGDs were conducted. The allocation per participating CHC is illustrated in figure 3.3 below.

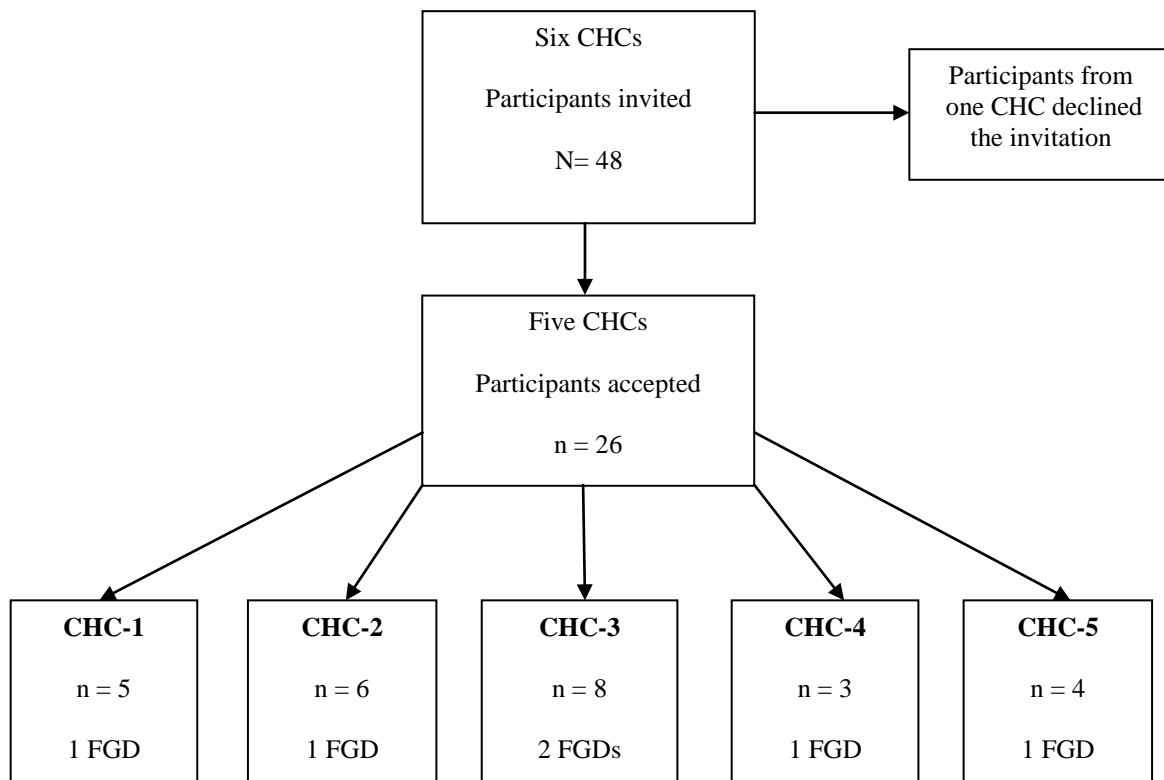


Figure 3.3 Focus group allocation per participating CHC

All eighteen (18) health care professionals that completed the baseline questionnaire were invited to participate in the interviews. Only 6 consented to partake; hence a response rate of 33.3% was obtained.

Administrative procedure

The focus group discussions were done on a day convenient for the invited clients. It was conducted at a venue provided at each participating CHC.

Individual appointments were made with each health care professional that consented to participate in the interview. A time convenient for the health care professional was arranged to do the interview.

Data collection method

Focus group discussions (FGD) were used to explore the challenges experienced by clients with type 2 diabetes in the management of their disease. Focus groups, a commonly employed qualitative data collection method, allow the participants, in interaction with each other, to speak for themselves in the context of their own experience (Bergin, Tally & Hamer, 2003). It has also been identified as a valuable tool in health promotion needs assessment (Tipping, 1998). Each FGD was facilitated by two facilitators, namely the researcher acting as discussion leader/observer and a scribe/recorder. The participants were informed about the aim of the discussions and that everyone must feel free to participate as there is no right or wrong answer. The procedure was explained to the participants and each consented participant completed a focus group discussion binding form (Appendix 5a & 5b). The facilitator guided the discussions to permit and encourage participation from everyone in the language used by the majority of the participants. The decision about language medium was made by the group. The sessions were concluded when each participant said they could not think of anything else to add. Each session lasted between 45 minutes to an hour. The responses were audio-taped and recorded on paper.

Furthermore, semi-structured interviews were used to explore the challenges health professionals experience in managing the clients with type 2 diabetes within the current primary health care system. Each interview was facilitated by two facilitators, namely the researcher acting as the interviewer/observer and a scribe/recorder. Interviews were conducted in English after permission was obtained to record the interviews (Appendix 4d) and took approximately 20 minutes to complete.

Trustworthiness

According to Lincoln and Guba (1985) trustworthiness in qualitative data is measured by its credibility which is determined by the match between assembled realisms of the participants and the data drawn from the participants presented by the researcher. In this study, trustworthiness was enhanced through the strategies detailed below:

1. Credibility (internal validity): During the sessions field notes were compared and discussed (member checking) for their accuracy. Each participant was given a summary of the discussions after the session. Participants were also given time to comment on whether or not they felt the data was interpreted in a manner congruent with their own experiences. Furthermore, the transcribed verbatim draft was given to a colleague, who was not involved in the study for her view. Any matters raised by her were incorporated into the written notes.
2. Transferability (external validity): A detailed description of the target population and setting in which the health promotion programme is intended to be adapted were described. Furthermore, several of the data analysis documents are available and give other researchers the ability to transfer the conclusions of this study to other projects/research.
3. Dependability (reliability): This was achieved by ensuring that the audit trail consisting of the methodology, original transcripts, data analysis documents, field notes and comments from the member checking were transparent so that any researcher that wants to adapt the process in his/her own setting could do so.
4. Confirmability, a measure of how well the findings are supported by the data collected (Lincoln & Guba, 1985). A colleague who was not involved in the study was provided with the verbatim transcripts, analysis and process notes and summaries of the results for her opinion.

Data analysis

Data from the audiotape recordings was transcribed verbatim by an independent person with experience in transcription to produce a manuscript. A comparison was made between notes taken during the FGD and interviews, to verify accuracy. Content analysis was done by extracting meaningful ideas of the participants' opinions (coding into themes). Thereafter the transcripts were read through several times by the researcher to look for emerging themes. Grouping of the themes into broader categories were done in order to fit small categories together. After the derivation of themes, an independent researcher read through the transcripts and generated themes that were then compared to the themes of the researcher.

3.5.3. PHASE 3: TO DEVELOP A HEALTH PROMOTION PROGRAMME FOR CLIENTS WITH TYPE 2 DIABETES MELLITUS

This phase entailed the development of an optimal intervention. According to the United Kingdom MRC framework (MRC, 2000) this is the most challenging part in determining the effectiveness of a programme.

Several steps were taken in the development of a health promotion programme for clients with type 2 diabetes mellitus. Firstly, literature regarding diabetes self-management techniques and different strategies to deliver health promotion programmes were reviewed to gain insight into the best evidence-based practices. The outcome of this was clearly outlined in Chapter 2 under 2.7. Secondly, data was analysed from phase 1 (outlined in Chapter 4) and phase 2 (outlined in Chapter 5) and informed the design phase of the health promotion programme. Key aspects taken into consideration was the knowledge of the clients regarding the disease, their self-efficacy in the management of the disease and their physical activity

participation. Lastly, consensus on the content of the health promotion programme was reached with a Delphi study (methods described below and results outlined in Chapter 6).

Methodology of the Delphi Study

The Delphi study was originally designed to “obtain the most reliable consensus of opinion of a group of experts by a series of intensive questionnaires interspersed with a controlled feedback” (Ludwig & Starr, 2005). The panel of the Delphi technique most often consists of five to 25 members, as the validity of the technique does not depend on the number of participants but rather on the expertise of the panel.

Study population and sampling

Thirty five (35) experts were selected by nomination of people or organisations. Nominators were identified from organisations such as the International Diabetes Federation, WHO and international and local universities. These nominators were asked to provide a list of names of people with expertise in the management of diabetes mellitus who may be willing to participate in the study.

Administrative procedure

The information sheet (Appendix 8), consent form (Appendix 9) and Round 1 of the study (Appendix 10a) were e-mailed to the thirty five (35) experts. Each person was asked to complete the consent form if they are willing to participate in the Delphi study as well as the Round 1 data sheet. The comments from Round 1 were collated and the participants were asked in Round 2 to choose the best answer (*Yes or No*) for each item/statement (Appendix 10b). This process was repeated until consensus was reached regarding the relevance of the information to be included in the health promotion programme, or it became clear that no

consensus is possible. Consensus in this study is defined as agreement by 65% or more of the participants (Ludwig & Starr, 2005). After consensus had been reached about the relevance of the information included in the health promotion programme, the proposed programme was finalised (Appendix 11) and implemented at one CHC. The CHC was randomly selected from the six (6) CHCs that participated in the first phase of the study.

3.5.4 PHASE 4: TO IMPLEMENT THE PROPOSED HEALTH PROMOTION PROGRAMME AT A SELECTED COMMUNITY HEALTH CENTRE

This phase started with the education of health care professionals regarding the implementation of the health promotion programme, in the form of a workshop.

Study population and sampling

All the health care professionals working with clients with type 2 diabetes mellitus at the selected CHC, namely two medical doctors and three nursing sisters were invited to attend a workshop. All accepted and attended the workshop.

Administrative procedure

The facility manager was contacted telephonically to arrange a convenient time and venue for the planned workshop. The key issues that were addressed in the workshop were:

- results of the baseline data;
- the outline and content of the proposed programme;
- strategies for recruitment of participants;
- recommendations or ideas to optimize compliance to the intervention;
- perceived barriers to implementation of the programme;

- administration issues such as venue, specific day and time, duration of each session, and assistance with physiological measurements

Attendants were encouraged to participate fully in the workshop. The results of this phase are presented in chapter 7.

3.5.5 PHASE 5: TO DETERMINE THE EFFECTIVENESS OF THE PROPOSED PROGRAMME

As outlined in the United Kingdom MRC framework (MRC, 2000), some of the key tasks to be incorporated in this phase include the identification of feasible and valid outcome measures, recruitment and retention rates, and sample size calculation. Therefore the proposed health promotion programme was implemented in a pre-test, post-test design.

Study population and sampling

At the workshop for the health care professionals of the CHC where the implementation took place, several suggestions were made for the best way of recruiting the clients with type 2 diabetes mellitus. Due to lack of data of the amount of patients with type 2 diabetes mellitus attending the CHC, an estimated population was calculated based on personal communication with the medical doctors. Each of the doctors sees an average of ten (10) patients with type 2 diabetes mellitus per day at the CHC. Therefore an estimated 400 patients are seen per month at the CHC. The doctors offered to invite every patient they see on a daily basis and keep record of their contact details. Furthermore the facility manager gave permission to draw patient records from the administration section of the CHC for contact details of suitable clients. A period of two weeks was set aside for recruitment of clients to participate in the intervention. A total of 153 clients were identified. However, of the 153 clients identified,

91 could not be reached telephonically due to outdated telephone contact details or telephone numbers not in use anymore. Therefore, 62 patients were invited to partake in the intervention. A total of 37 patients agreed and consented to participate in the implementation phase of the present study. At the start of the intervention, 34 clients attended and started with the intervention.

Outcome measures

The outcome measures that were tested before and after the intervention were determined by the needs analysis (Phase 1) of the study and included the following:

Random blood glucose (mmol/l) was recorded after a nurse did the finger prick test while the client was sitting in a relaxed position.

Resting blood pressure (mmHg) was recorded using a calibrated automatic sphygmamometer after the client was sitting quietly for at least 5 minutes. The procedure followed is described on pg. 87.

Weight (kg) was measured using an electronic digital scale. The procedure followed is described on pg. 88.

Height (m) measurement was taken with a tape measure fixed against the wall, 10 cm above the ground. The procedure followed is described on pg. 88.

BMI (kg/m²) was calculated using the formula $\frac{\text{weight}}{\text{m}^2}$

Knowledge of diet was measured with the validated Michigan Diabetes Research and Training Center's "Brief Diabetes Knowledge Test" (Fitzgerald et al., 1998). A total score was calculated ranging from 0 to 8. This score was then converted into a percentage.

Self-efficacy was measured with the validated and reliable "Diabetes Care Profile" (Fitzgerald et al., 1996). The scale consisted of 13 items and clients rated each item using a

5-point Likert scale ranging from 1 = poor to 5 = excellent. The total score could range from 13 to 65.

Level of physical activity was measured with the IPAQ-S scale (Craig et al., 2003). Clients reported activities performed for at least 10 minutes during the last 7 days. The IPAQ scoring protocol was used to calculate the moderate physical activity and total physical activity MET-min/week and walking MET-min/week.

Stage of change for physical activity and diet. The Transtheoretical Model's (Prochaska & Velicer, 1997) five stages, namely pre-contemplation, contemplation, preparation, action and maintenance were given as options to the clients. The statement/stage that best fit their stage for physical activity and diet respectively at the time of data collection had to be chosen.

Description of intervention and procedure

Prior to the start of the intervention, clients completed a self-administered questionnaire requesting for socio-demographic variables and outcome measures. Physical and physiological measurements were done and recorded on their questionnaires. The intervention was implemented once a week for a total of six (6) weeks. Each session last approximately one hour. The following aspects were covered in the 6 weeks of the intervention: introduction (general information on type 2 diabetes mellitus), benefits of including physical activity, healthy eating, stress management, possible complications of diabetes mellitus and foot care (Appendix 11). At the beginning of each weekly session participants had the opportunity to pose questions related to the previous week's topic. The language of instruction was English. All the sessions were interactive and participants were encouraged to ask questions and to share their experiences. Field notes were taken by an assistant during each implementation session.

Data Analysis

Descriptive statistics were used to characterise the study sample and report the impact of the intervention on the stage of change for physical activity and diet respectively. Differences between pre- and post-test data were compared using paired samples t-tests to evaluate the impact of the intervention on continuous variables, i.e. weight, BMI, HGT, blood pressure, self-efficacy, level of physical activity and diabetes-related knowledge. Where applicable, eta-squared was calculated to report the magnitude of the intervention's effect on outcome measures.

3.6 ETHICAL CONSIDERATIONS

Permission and ethical clearance was obtained from Senate Research Grants and Study Leave Committee at the University of the Western Cape (UWC) (Appendix 1). Further permission was granted from the Western Cape Department of Health (Appendix 2a & 2b) and the facility managers of the participating CHCs. The study was conducted according to ethical practices pertaining to the study of human subjects as specified by the Faculty of Community and Health Sciences Research Ethics Committee of the UWC and the Western Cape Department of Health. The following guidelines were followed:

The purpose of the study was clearly explained by the researcher to the participants, i.e. clients with type 2 diabetes mellitus (Appendix 3a, 3b & 3c) and health care professionals (Appendix 3a). Signed, written informed consent was sought from all clients with type 2 diabetes mellitus (Appendix 4a, 4b & 4c) and health care professionals (Appendix 4a). Participation in the study was voluntary. The participants were informed of their rights to withdraw from the study at any time without any consequences. Participants were treated with respect and dignity. The consent forms, information sheets and questionnaires were available in Afrikaans, English and isiXhosa. Identification codes using numbers were used

on data forms to ensure anonymity. Information obtained from participants is for the study only and was handled with confidentiality. Pseudonyms were used to protect participants' identities when results are published. The researcher collected the questionnaires personally and was responsible of ensuring their storage in a locked and secure place. Information obtained from the focus group discussions was handled with confidentiality. All tapes were destroyed once they had been transcribed and documented according to themes. Clients with type 2 diabetes mellitus partaking in the discussion and health care professionals participating in the interviews signed a form where they undertake not to disclose any information from the focus group discussions (Appendix 5a, 5b & 5c) and interviews (Appendix 4d) respectively. All information will be kept for a minimum of five years whereafter it will be destroyed. Minimal perceived risks were expected in the study. However, if participants were affected by the study and they experience questions to be traumatic, the participants were referred to a counsellor for management. The findings of the study will be made available to the CHC's facility managers and the relevant stakeholders at the Western Cape Department of Health.

3.7 SUMMARY OF THE CHAPTER

Primary health care facilities, specifically Community Health Centres (CHCs) in the Cape Metropolitan district were the setting for the study. Both quantitative and qualitative methods were employed for data collection from health care professionals and clients with type 2 diabetes mellitus and are described in detail in this chapter. Quantitative data was analysed by means of descriptive and inferential statistics to determine clients with type 2 diabetes mellitus' knowledge of diet / nutrition, self-efficacy, physical activity levels as well as satisfaction with the quality of care received at the CHCs and health care professionals'

attitude towards existing concepts in diabetes care as well as their quality of physical activity counselling. Focus group discussions and semi-structured interviews were used to gain insight into challenges that clients with type 2 diabetes mellitus and health care professionals experienced in the management of the disease. The results of the quantitative and qualitative analysis are presented in Chapters 4 and 5. The results of the Delphi study are outlined in Chapter 6 and the results pertaining to the effectiveness of the health promotion programme in Chapter 7.



CHAPTER 4

QUANTITATIVE BASELINE DATA

UNDERSTANDING THE PROBLEM OF TYPE 2 DIABETES MELLITUS

4.1 INTRODUCTION

This chapter contains the results of the statistical analysis that attempted to answer the first objective of the study, i.e. to determine the current practices with regards to the management of diabetes mellitus, to essentially carry out a needs analysis in order to develop an understanding of the problem. The following will be outlined in the chapter: an overview of the socio-demographic profile of the clients with diabetes mellitus; the physical, physiological measurements and health-related variables of these clients; their satisfaction with services; their understanding/self-efficacy of their disease; their participation in physical activity, their knowledge of nutrition/diet and finally the support received by them. In addition, the general diabetes-related attitudes as well as the quality of physical activity counselling of the health care professionals are outlined. The results are summarised in tables where needed.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF CLIENTS WITH TYPE 2 DIABETES MELLITUS

Of the 420 clients who were approached to participate in the study, 384 consented and completed the baseline questionnaire. However, 49 questionnaires were not included in the data analysis as it was incomplete. A response rate of 79.76% ($n = 335/420$) was thus achieved. As shown in Table 4.1, a total of 335 clients with type 2 diabetes mellitus with a mean age of 58.25 years ($SD = 10.58$) from six randomly selected Community Health

Centres (CHCs) participated in this survey, 119 males (35.5%) and 216 females (64.5%). The participants were predominantly (48.4%) from the Coloured population group. The majority of the participants (81.2%) were 50 years and older. Fifty seven percent of the participants were married or have a domestic partner, while almost half of the participants (50.1%) highest level of education is primary school. Participants were asked *where they live most of the year* and more than half (55.5%) reported in their own home or flat, while 39.7% stayed with friends or family. More than one third (37.7%) of the participants were unemployed whilst 33.1% were pensioners.



Table 4.1 Socio-demographic characteristics of clients with type 2 diabetes mellitus**(n=335)**

Characteristics	Total population n (%)	Female n (%)	Male n (%)
Age (Mean = 58.25 years, SD=10.58)			
<40 years	12 (3.6)	9 (4.2)	3 (2.5)
40 – 49 years	51 (15.2)	33 (15.3)	18 (15.1)
50 – 59 years	121 (36.2)	77 (35.6)	44 (37.0)
60 – 69 years	106 (31.6)	67 (31.0)	39 (32.8)
>69 years	45 (13.4)	30 (13.9)	15 (12.6)
Population group			
African	78 (23.3)	55 (25.5)	23 (19.3)
Coloured	162 (48.4)	98 (45.4)	64 (53.8)
White	8 (2.4)	7 (3.2)	1 (0.8)
Indian/Asian	87 (25.9)	56 (25.9)	31 (26.1)
Others	-	-	-
Marital status			
Never married	25 (7.5)	21 (9.7)	4 (3.3)
Married/domestic partner	191 (57.0)	112 (51.9)	79 (66.4)
Separated/divorced	27 (8.0)	25 (11.6)	12 (10.1)
Widowed	82 (24.5)	58 (26.8)	24 (20.2)
Highest level of education			
No schooling	25 (7.5)	21 (9.7)	4 (3.4)
Primary school	168 (50.1)	114 (52.8)	54 (45.4)
Secondary school	140 (41.8)	81 (37.5)	59 (49.6)
Tertiary education	2 (0.6)	-	2 (1.7)
Living			
Own home/flat	186 (55.5)	118 (54.6)	68 (57.2)
At friend/family member	133 (39.7)	88 (40.7)	45 (37.8)
Retirement home	5 (1.5)	2 (1.0)	3 (2.5)
Nursing home	9 (2.7)	7 (3.2)	2 (1.7)
Other	2 (0.6)	1 (0.5)	1 (0.8)
People living with client			
Alone	17 (0.1)	11 (5.1)	6 (5.0)
1 person	12 (3.6)	10 (4.6)	2 (1.7)
2 persons	51 (15.2)	34 (15.7)	17 (14.3)
3 persons	107 (31.9)	66 (30.6)	41 (34.5)
4 persons	70 (20.9)	51 (23.6)	19 (16.0)
5 or more persons	78 (23.3)	44 (20.4)	34 (28.5)
Employment status			
Working full-time	44 (13.1)	19 (8.8)	25 (21.0)
Working part-time	52 (15.5)	40 (18.5)	12 (10.1)
Unemployed	126 (37.7)	82 (38.0)	44 (37.0)
Pensioner	111 (33.1)	74 (34.3)	37 (31.1)
Other	2 (0.6)	1 (0.4)	1 (0.8)

4.3 PHYSICAL AND PHYSIOLOGICAL MEASUREMENTS OF CLIENTS WITH TYPE 2 DIABETES MELLITUS

The physical and physiological measurements of the participants by gender are presented in Table 4.2. The mean weight of the participants was 82.78 kg (SD = 15.62), ranging between 47 kg and 130 kg. The mean body mass index (BMI) of the study sample was 31.29 (SD = 6.07). The CDC (2011) standard weight status categories associated with BMI ranges for adults' guidelines were used to classify the participants into underweight, normal, overweight or obese. Among the 335 participants, 54.9% were classified as obese, 31.1% as overweight and 14.0% as having normal BMI (see Table 4.2 below). A statistically significant association was found for BMI and ethnicity and gender respectively. The number of Coloured participants (42.9%) who were classified as obese was significantly higher than the African/Black (31.5%) and Indian/Asian (24.5%) participants ($\chi^2 = 18.50$, $p = 0.005$). Among the participants classified as obese, the results show that 63.0% of the females and 40.4% of the males were classified as obese, with a strong significant association ($\chi^2 = 20.56$, $p = 0.000$).

The mean systolic and diastolic blood pressure for the study sample was 148.73 (SD = 23.05) and 87.10 (SD = 12.44) respectively. According to the National Institute for Health and Clinical Excellence (2011), NICE clinical guideline 127 for hypertension (clinical SBP > 140 mmHg and DBP > 90 mmHg), 78.5% of the participants were classified as hypertensive, as shown in Table 4.2.

A random blood glucose (RBG) test was done for all the participants. It is a non-fasting test, therefore the higher reference value. According to the American Diabetes Association

(ADA) guidelines (2013), an average adult should have a RBG test result of between 3.9 – 7.8 mmol/ℓ. The participants' HGT readings ranged between 4.2 – 22.1 mmol/ℓ with a mean of 9.55 (SD = 2.99). The mean scores for gender were 9.41 (SD = 2.72) and 9.63 (SD = 3.14) for males and females respectively. More than one fifth (22.08%, n = 74) of the participants had a HGT reading > 11.1 mmol/ℓ. The mean HGT reading of the participants classified as hyperglycaemic was 14.01 mmol/ℓ (SD = 2.82).

Independent-samples t-tests were performed to test whether there was a statistically significant difference in the mean scores of the physical and physiological measurements for male and female participants. As shown in Table 4.2, a significant difference was found in **height** for males (mean = 1.71, SD = 0.07) and females (mean = 1.59, SD = 0.64, t = 15.75, p = 0.000) as well as for **weight** for males (mean = 85.87, SD=15.76) and females (mean=81.08, SD=15.30, t =2.72, p<0.05). Similarly, there was a statistically significant difference in **body mass index** (BMI) for males (mean = 29.54, SD = 5.42) and females (mean = 32.26, SD = 6.20, t = 4.02, p = 0.000) and for **systolic blood pressure** (SBP) for males (mean = 152.87, SD = 23.41) and females (mean = 146.46, SD = 20.97, t = 2.57, p < 0.05). No significant differences were found for the other physical and physiological measurements.

Table 4.2 Physical and physiological measurements of clients with type 2 diabetes mellitus by gender (n=335)

Variable	Total (n=335)	Males (n=119)	Females (n=216)	p-value or 95% CI for difference	
Mean Height (m)	1.63 (0.09)	1.71 (0.07)	1.59 (0.064)	0.000	0.104 – 0.133
Mean Weight (kg)	82.78 (15.62)	85.87(15.76)	81.08(15.30)	0.007	1.320 – 8.268
Mean BMI (kg/m²)	31.29(6.07)	29.54(5.42)	32.26(6.20)	0.000	-4.055 – -1.389
BMI Categories (n,%)					
Normal	47(14.1)	28(23.5)	19(8.8)	0.000	–
Overweight	104(31.0)	43(36.1)	61(28.2)	0.136	–
Obese	184(54.9)	48(40.4)	136(63.0)	0.000	–
Mean SBP* (mmHg)	148.73(23.05)	152.87(23.41)	146.46(20.97)	0.011	1.497 – 11.317
Mean DBP** (mmHg)	87.10(12.44)	88.38(13.02)	86.40(12.09)	0.165	-0.815 – 4.766
Hypertensive*** (n,%)	263(78.5)	98(82.4)	165(76.4)	0.203	–
Mean HGT (mmol/l)	9.55(2.99)	9.41(2.72)	9.63(3.14)	0.532	-0.886 – 0.458
Hyperglycemia (n,%)	74(22.08)	24(20.16)	50(23.15)	0.293	–
Co-morbidities****(n,%)					
Heart disease	77(23.0)	42(35.3)	35(16.2)	0.000	–
High cholesterol levels	100(29.9)	56(47.1)	44(20.4)	0.000	–
Hypertension	289(86.3)	102(85.7)	187(86.6)	0.480	–

*SBP = systolic blood pressure

**DBP = diastolic blood pressure

***based on physical examination

****Co-morbidities were self-reported

4.4 SELF-REPORTED CO-MORBIDITIES OF CLIENTS WITH TYPE 2 DIABETES MELLITUS

The participants were asked to report whether they have been diagnosed with any of the following three (3) co-morbidities: heart disease, cholesterol and/or hypertension. Twenty three percent (n = 77) of the participants reported having heart disease while 29.9% (n = 100) and 86.3% (n = 289) respectively reported having high cholesterol levels and hypertension (see Table 4.2 above). Males (82.4%, n = 98) were significantly more likely to be hypertensive than females (76.4%, n = 165) ($\chi^2 = 17.64$, p = 0.002) and diagnosed with heart disease (35.3% vs 16.2%) ($\chi^2 = 14.39$, p = 0.001).

4.5 GENERAL HEALTH OF CLIENTS WITH TYPE 2 DIABETES MELLITUS

The participants were asked to report on their general health. A 5-point Likert scale was employed to describe their general health, namely *excellent*, *very good*, *good*, *fair* and *poor*. The majority of the participants reported having good (55.2%, n = 185) and fair health (37.9%, n = 127) (see Table 4.3 below). No significant gender difference was found for general health.

Almost all the participants reported that they have received advice to follow an exercise programme (99.1%, n = 332) and a meal plan/diet (98.2%, n = 329). However, only 6.3% (n = 21) of the participants ever received formal diabetes mellitus education (i.e. attended a series of classes or met with an individual or health professional responsible for education with regards to diabetes) (see Table 4.3 below).

Table 4.3 Description of general health and advice/education received by gender (n=335)

Variable	Total (n=335) (n,%)	Male (n=119) (n,%)	Female (n=216) (n,%)
General Health			
Excellent	7(2.1)	1(0.8)	6(2.8)
Very good	10(3.0)	4(3.4)	6(2.8)
Good	185(55.2)	74(62.2)	111(51.4)
Fair	127(37.9)	39(32.8)	88(40.7)
Poor	6(1.8)	1(0.8)	5(2.3)
Advice/Education received			
Told to exercise	332(99.1)	118(99.2)	214(99.1)
Told to follow meal plan	329(98.2)	119(100)	210(97.2)
Formal diabetes education	21(6.3)	7(5.9)	14(6.5)

4.6 PARTICIPANTS' SELF-EFFICACY OF THEIR DISEASE

Clients responded to a series of statements/items assessing their disease, adapted from the validated and reliable Diabetes Care Profile. The participants rated each item using a 5-point Likert scale ranging from *poor* to *excellent* across the 13 items (1 = poor; 2 = fair; 3 = good; 4 = very good; 5 = excellent). The data is presented in Table 4.4 below.

Independent-samples t-test was conducted to compare the mean values of the self-efficacy of the disease for males and females. Females score higher in all the statements than males. For twelve (12) of the statements/items females score significantly higher than males. For overall diabetes care, mean scores indicated a significant difference for males (mean = 2.51, SD =

.502) and females (mean = 2.82, SD = .543, $t = -5.16$, $p = .000$). Diet for blood sugar control as well as the role of exercise in diabetes care were significantly higher for females than males ($p = 0.000$). Females had a significantly higher understanding of the prevention and treatment for both low and high blood sugar as well as the prevention of long-term complications of diabetes ($p < 0.05$). The results also suggest that females have significantly higher understanding of foot care compared to males (see Table 4.4).



Table 4.4 Gender differences in self-efficacy of their disease of clients with type 2 diabetes mellitus (n = 335)

Statement	Total (n=335) Mean (SD)	Male (n=119) Mean (SD)	Female (n=216) Mean (SD)	p-value	95% CI for difference
Overall diabetes care	2.71(.549)	2.51(.502)	2.82(.543)	0.000	-.428 - -.195
Coping with stress	2.04(.506)	1.96(.458)	2.08(.527)	0.036	-.234 - -.008
Diet for blood sugar control	2.86(.495)	2.74(.441)	2.93(.510)	0.000	-.296 - -.086
The role of exercise in diabetes care	2.41(.566)	2.26(.512)	2.50(.579)	0.000	-.355 - -.114
Medications you are taking	2.96(.459)	2.88(.349)	3.00(.506)	0.017	-.205 - -.021
How to use the results of blood sugar	2.81(.545)	2.71(.490)	2.87(.567)	0.015	-.273 - -.030
How diet, exercise and medicines affect blood sugar levels	2.61(.582)	2.50(.535)	2.68(.598)	0.005	-.314 - -.055
Prevention and treatment of high blood sugar	2.88(.509)	2.75(.473)	2.96(.513)	0.000	-.320 - -.101
Prevention and treatment of low blood sugar	2.88(.515)	2.76(.469)	2.95(.526)	0.000	-.308 - -.087
Prevention of long-term complications	2.92(.495)	2.80(.462)	2.99(.501)	0.000	-.299 - -.085
Foot care	3.20(.623)	3.07(.533)	3.27(.657)	0.002	-.336 - -.076
Benefits of improving blood sugar control	2.74(.639)	2.67(.569)	2.78(.673)	0.148	-.249 - .038
Pregnancy and diabetes	1.43(.679)	1.14(.456)	1.58(.730)	0.000	-.568 - -.313

4.7 SATISFACTION WITH QUALITY CARE RECEIVED OF CLIENTS WITH TYPE 2

DIABETES MELLITUS

The Patient survey for Quality of Care scale was used to assess clients' satisfaction with the quality of care received at the Community Health Centre (CHC). The scale consists of ten (10) items with a 5-point Likert scale ranging from *poor* to *excellent* (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent). The data is presented in Table 4.5. Higher scores indicated more satisfaction with the quality of care received.

Independent samples t-test was conducted to compare the mean values of the statements/items for satisfaction with quality care for males and females. Males were more satisfied with the quality of care received than females. No significant gender differences were found on any of the satisfaction with quality of care outcomes.

Responses to the three (3) validity items indicated that only a few clients felt that they were asked to leave the clinic before that felt ready to do so (n=9, 2.7%). More than one tenth (n=42, 12.5%) of the clients stated that they sought medical attention as a result of the services rendered at the CHC, while only five (5, 1.5%) of the participants would not recommend the clinic to family and friends if they are in need of such services.

Table 4.5 Gender differences in the mean satisfaction with the quality care scores of clients with type 2 diabetes mellitus (n = 335)

Statement	Total (n=335) Mean (SD)	Male (n=119) Mean (SD)	Female (n=216) Mean(SD)	p-value	95% CI for difference
Waiting time to get an appointment	2.46(.682)	2.45(.647)	2.47(.701)	.776	-.176 - .131
Waiting time in clinic room to see a health care professional	2.21(.702)	2.22(.613)	2.20(.748)	.798	-.130 - .169
Instructions given by clinic staff to prepare you for the visit	2.09(.751)	2.08(.738)	2.09(.760)	.844	-.186 - .152
Ease of getting information from clinic staff	2.60(.652)	2.66(.601)	2.57(.678)	.190	-.407 - .236
Clear and complete explanations on information given by clinic staff	2.84(.536)	2.87(.486)	2.83(.562)	.599	-.088 - .153
Concern and caring by clinic staff	3.02(.738)	3.10(.706)	2.98(.753)	.157	-.046 - .285
Safety and security of you and belongings	3.08(.722)	3.12(.653)	3.06(.757)	.452	-.100 - .224
Privacy	3.22(.650)	3.27(.578)	3.19(.686)	.287	-.067 - .255
Clarity of instructions upon leaving	2.23(.764)	2.26(.719)	2.21(.788)	.550	-.119 - .224
Overall quality care	2.96(.622)	2.98(.596)	2.94(.637)	.586	-.101 - .179

Participants were further requested to respond to an open-ended question regarding their suggestions about any improvement of services at the CHCs. Only 37 (11.04%) of the 335 participants responded to this question. These responses are analysed qualitatively and the main categories were identified. These categories included staff concerns, concerns of time and communication issues. With regards to **staff concerns**, almost all the clients suggested more staff that needed or should be made available to them in general, especially increased availability of doctors (n = 35, 94.59%), more staff working in the pharmacy of the CHC (n = 13, 35.14%), doctors spending more time with a patient (n = 22, 59.46%) as well as more friendly and helpful nursing/administrative staff (n = 26, 70.27%). Suggestions for **time concerns** included shorter waiting period for an appointment (n = 17, 45.95%) and waiting time at the CHC (n = 21, 56.56%) in general as well as at the pharmacy (n = 33, 89.19%) and longer business hours (n = 16, 43.24%). **Communication issues** should be addressed as follows: more accurate instructions while at the clinic (n = 11, 29.73%) as well as when leaving (n = 19, 51.35%), more feedback and communication from the doctor (n = 31, 83.78%) as well as better telephonic access to information needed (n = 14, 37.83%). See Table 4.6 below.

Table 4.6 Summary to open-ended question: Any suggestions for improvement of services at the CHC (n = 37)

Main Categories	Secondary categories	n(%)
Staff concerns	More staff needed/available in general, especially increased availability of doctors	35(94.59)
	More staff working in the pharmacy of the CHC	13(35.14)
	Doctors spending more time with a patient	22(59.46)
	More friendly and helpful nursing/administrative staff	26(70.27)
Concerns of time	Shorter waiting period for an appointment	17(45.95)
	Shorter waiting time at the CHC in general	21(56.56)
	Shorter waiting time at the pharmacy	33(89.19)
	Longer business hours	16(43.24)
Communication issues	More accurate instructions while at the clinic	11(29.73)
	More accurate instructions when leaving	19(51.35)
	More feedback and communication from the doctor	31(83.78)
	Better telephonic access to information needed	14(37.83)

4.8 PHYSICAL ACTIVITY PARTICIPATION OF CLIENTS WITH TYPE 2 DIABETES MELLITUS

The International Physical Activity Questionnaire-Short Form (IPAQ-S) scale were used to collect data regarding the physical activity participation of the clients in three (3) domains, i.e. vigorous-intensity, moderate-intensity and walking. The Guidelines for Data Processing and Analysis of the IPAQ were used to compute MET-minutes/week for all three domains as well as for the total physical activity score per client. Thereafter the clients were classified as either having low (<600 MET-min/week), moderate ($\geq 600 <3000$ MET-min/week) or high (≥ 3000 MET-min/week) physical activity levels.

Three hundred and twenty two (322) questionnaires were included in the data analysis of the physical activity component of the study. Thirteen questionnaires were excluded due to unreasonably high data (outliers) or duration of physical activity less than 10 minutes. Data is presented in Table 4.7 below. A low participation rate was reported for vigorous-intensity physical activity (VPA) with 97.8% ($n = 315$) of the participants not participating in VPA. More than half ($n = 171$, 53.1%) of the clients did not participate in moderate-intensity physical activity while only one (0.3%) client reported not walking (wheelchair-bound).

Independent-samples t-test was performed to test whether there was a statistically significant difference in the mean scores of the physical activity domains for male and female participants. As shown in Table 4.7, a significant difference was found in moderate-intensity physical activity (MPA) for males (mean = 291.97, SD = 548.94) and females (mean = 193.42, SD = 340.67, $t = 1.99$, $p = 0.048$). Similarly, there was a statistically significant difference for total physical activity scores of male (mean = 870.78, SD = 791.68) and females (mean = 679.43, SD = 626.42, $t = 2.24$, $p = 0.026$). No significant differences were found for the other physical activity domains.

Table 4.7 Gender differences in physical activity participation (MET-minutes/week) of clients with type 2 diabetes mellitus (n=322)

Variable	Total (n=322) Mean (SD)	Male (n=117) Mean (SD)	Female (n=205) Mean (SD)	p value	95% CI of difference
VPA	18.88(155.71)	22.56 (133.64)	16.78(167.28)	0.749	-29.761 – 41.328
MPA	229.23(430.06)	291.97(548.94)	193.42(340.67)	0.048	0.966 – 196.117
WALKING	500.80(430.68)	556.21(458.18)	469.18(404.88)	0.081	-10.837 – 184.888
Total PA	748.96(695.96)	870.78(791.68)	679.43(626.42)	0.026	33.847 – 348.8
SITTING	318.63(106.90)	332.31(110.45)	310.83(104.29)	0.083	-2.813 – 45.770

VPA = vigorous physical activity
MPA = moderate physical activity

Three (3) levels of physical activity were used to classify the participants (n=322) according to their total physical activity MET-min/week scores. Among the 322 participants, more than half (n=174, 54.0%) were classified as having low PA levels (<600MET-min/week), while 44.1% (n=142) and 1.9% (n=6) had moderate ($\geq 600 < 3000$ MET-min/week) and high (≥ 3000 MET-min/week) levels of physical activity respectively.

Gender differences related to physical activity categories as presented in Table 4.8 below. The association between gender and physical activity categories was not significant. A statistically significant association was found for physical activity categories and **BMI** and **age** categories. The number of obese participants who were classified as having low (64.94%) physical activity levels was significantly higher than those classified as having moderate (49.30%) physical activity levels ($\chi^2 = 17.83, p = 0.001$). Similarly, a significantly higher association was found for

participants in the >69 years age group in the low (19.54%) than moderate (1.4%) physical activity category ($\chi^2 = 67.21$, $p = 0.000$). No significant associations were found for physical activity categories and any of the other physical and physiological measurements.

Table 4.8 Gender differences in physical activity categories (n=322)

Variable	Total (n=322) n (%)	Male (n=117) n (%)	Female (n=205) n (%)	p-value
LOW	174(54.0)	56(47.9)	118(57.6)	0.550
MODERATE	142(44.1)	58(49.6)	84(41.0)	0.138
HIGH	6(1.9)	3(2.6)	3(1.5)	0.484

4.9 KNOWLEDGE OF DIET/NUTRITION OF CLIENTS WITH TYPE 2 DIABETES

MELLITUS

Eight (8) multiple choice questions from the validated Michigan Diabetes Research and Training Center's Brief Diabetes Knowledge Test (DKT) were included in this scale. The majority of the participants scored 3/8 (n = 102, 30.4%) and 4/8 (n = 95, 28.4%). The following criteria for knowledge categories were used to classify the participants: inadequate for $\leq 59\%$ correct answers, marginal for $\geq 60-75\%$ correct answers and adequate for $\geq 76\%$ correct answers (Williams et al. 1998). An alarming 80.30% (n=269) of the participants had inadequate knowledge, while 19.40% (n=65) and 0.30% (n=1) had marginal and adequate knowledge of diet/nutrition respectively. Data is presented in Table 4.9 below. No significant difference was found for gender and knowledge categories.

Table 4.9 Gender differences in knowledge categories of diet/nutrition of clients with type 2 diabetes mellitus (n=335)

Knowledge categories	Total (n=335) n (%)	Male (n=119) n (%)	Female (n=216) n (%)
INADEQUATE	269(80.30)	97(81.51)	172(79.62)
MARGINAL	65(19.40)	22(18.49)	43(19.91)
ADEQUATE	1(0.30)	-	1(0.47)

4.10 SUPPORT FROM FAMILY AND FRIENDS OF CLIENTS WITH TYPE 2 DIABETES MELLITUS

The participants were asked to report on the support they receive from family and friends regarding the management of their disease. A 5-point Likert scale was used to describe their experience of support received, namely *strongly disagree*, *somewhat disagree*, *neutral*, *somewhat agree* and *strongly agree* across six (6) statements. The data is presented in Table 4.10 below.

Independent samples t-test was conducted to compare the mean values of the statements for support received from family and friends for males and females. As in the total group, males score higher in all the statements than females. The mean scores for support to follow a meal plan was significantly higher for males (mean = 4.08, SD = .815) than females (mean = 3.20, SD = 1.075, $t(300.9) = 8.39, p = .000$). Similarly, males received significantly higher support to take care of their feet than females ($p = .000$) (see Table 4.11).

Table 4.10 Gender differences in the support received from family and friends of clients with type 2 diabetes mellitus (n = 335)

Statement	Total (n=335) Mean (SD)	Male (n=119) Mean (SD)	Female (n=216) Mean (SD)	p-value	95% CI for difference
MY FAMILY AND FRIENDS HELP AND SUPPORT ME A LOT TO:					
follow my meal plan	3.51(1.075)	4.08(.815)	3.20(1.075)	.000	.671 – 1.082
take my medicine	3.37(1.070)	3.78(.993)	3.14(1.044)	.000	.407 – .869
take care of my feet	3.62(1.010)	4.08(.783)	3.37(1.035)	.000	.507 – .903
get enough physical activity	3.25(.986)	3.61(.912)	3.05(.968)	.000	.354 – .780
test my sugar	3.48(1.029)	3.96(.867)	3.22(1.019)	.000	.528 – .943
handle my feelings about diabetes	3.58(.975)	4.03(.753)	3.34(.998)	.000	.497 – .878

4.11 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF HEALTH CARE

PROFESSIONALS

All health care professionals that work in the diabetes clinic at the participating CHCs were invited to complete the Health Care Professional questionnaire (Appendix 7). Of the 30 health care professionals working in the diabetic clinics at the six (6) participating CHCs and approached, 18 consented to participate in the study. Therefore a response rate of 60% (n = 18/30) was achieved. The final sample thus consisted of 18 health care professionals representing 15 females (83.3%) and three (3) males (16.7%) of which 66.7% were nursing staff (see Table 4.11). Eleven (61.1%) of the participants had special diabetes training while two thirds of the participants (66.6%) work for more than 2 years at the specific CHC.

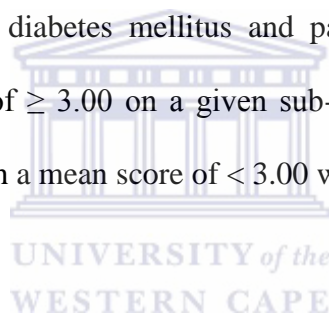
Table 4.11 Socio-demographic characteristics of health care professionals (n=18)

Characteristics	Total population (n=18)	Female (n=15)	Male (n=3)
Age (Mean, SD) years	42.67(10.92)	44.60(10.76)	33.00(6.00)
Gender (n,%)	-	15(83.3)	3(16.7)
Occupation (n,%)			
Nursing staff	12(66.7)	10(66.7)	2(66.7)
Physiotherapist	2(11.1)	2(13.3)	-
Medical doctor	4(22.2)	3(20.0)	1(33.3)
Special diabetes training (n,%)			
Yes	11(61.1)	9(60.0)	2(66.7)
No	7(38.9)	6(40.0)	1(33.3)
Duration working at CHC (n,%)			
<6 months	3(16.7)	2(13.3)	1(33.3)
6 – 12 months	3(16.7)	2(13.3)	1(33.3)
>2years	12(66.6)	11(73.3)	1(33.3)

The HCPs reported the following professions to form part of the multi-disciplinary team: medical doctors, physiotherapists, nursing staff, dieticians, social workers as well as health promotion officers (HPOs). All the participating CHCs follow a pre-scribed diabetes management protocol.

4.12 ATTITUDES TOWARDS DIABETES OF HEALTH CARE PROFESSIONALS

The Diabetes Attitude Survey (DAS-3) was employed to measure the health care professionals' attitudes towards diabetes. The health care professionals had to choose the answer they believe is true most of the time or for most of the people, ranging from *strongly agree* to *strongly disagree* across 33 Likert scale items. The mean score of the five (5) sub-scales, namely the need for special training, seriousness of diabetes mellitus, value of tight control, psychosocial impact of diabetes mellitus and patient autonomy were calculated. Participants with a mean score of ≥ 3.00 on a given sub-scale were placed in the positive attitude group, whereas those with a mean score of < 3.00 were placed in the negative attitude group.



All five (5) of the sub-scales of the DAS-3 exceeded the neutral point of 3, indicating positive attitudes toward existing concepts of diabetes care. 'Need for special training', 'value of tight control' and 'psychosocial impact of diabetes mellitus' scored 4.57(0.314), 4.32(0.237) and 4.17(.261) respectively, indicating even more positive attitudes, as illustrated in Table 4.12. A substantial number of responses for certain sub-scales were *neutral* (=3). The items with the highest neutral scores were: '*...people whose diabetes is treated by just diet do not have to worry about getting many long-term complications*' and '*...the emotional effects of diabetes are pretty small*'.

Table 4.12 Results of DAS-3 of health care professionals (n = 18)

Sub-scale	No of items	Mean(SD)	Range	% Pos	% Neg
Need for special training	5	4.57(0.314)	4.00 – 5.00	100	-
Seriousness of type 2 DM	7	3.64(0.235)	3.29 – 4.14	100	-
Value of tight control	7	4.32(0.237)	4.00 – 4.71	100	-
Psychosocial Impact of DM	6	4.17(.261)	3.67 – 4.67	100	-
Patient autonomy	8	3.50(0.272)	3.13 – 4.13	100	-

4.13 THE QUALITY OF PHYSICAL ACTIVITY COUNSELING CONTENT OF HEALTH CARE PROFESSIONALS

The Physical Activity Exit Interview (PAEI) scale was used to measure the quality of physical activity counselling content of the health care professionals. The participants had to choose the best answer they believe is true most of the time for 12 statements from the following criteria: never = 0%, seldom = $\leq 25\%$, sometimes = 50%, often = $\geq 75\%$ and always = 100%. Results of the PAEI scale (Table 4.13 below) indicates that although most of the health care professionals discuss the topic of physical activity, the benefits thereof as well as giving advice on how to become more physically active (n = 11, 61.1%), most of them seldom (n = 10, 55.6%) or never (n = 2, 11.1%) discuss the difficult situations patients might encounter or have in trying to become more physically active. Most of the health care professionals never (n = 11, 61.1%) or seldom (n = 3, 16.7%) assist the clients with a written plan to become more physical active.

Table 4.13 Results of PAEI scale of health care professionals (n = 18)

Item	Never n (%)	Seldom n(%)	Sometimes n(%)	Often n(%)	Always n(%)
Do you discuss the topic of physical activity with your patient?	-	2(11.1)	3(16.7)	11(61.1)	2(11.1)
Do you advise your patients to become more physically active?	-	1(5.6)	3(16.7)	11(61.1)	3(16.7)
Do you discuss the benefits of physical activity with your patients?	-	3(16.7)	3(16.7)	11(61.1)	1(5.6)
Do you discuss with your patients their past experiences with physical activity?	5(27.8)	6(33.3)	4(22.2)	3(16.7)	-
Do you discuss the difficult situations patients might encounter or problems they might have in trying to become more physically active?	2(11.1)	10(55.6)	6(33.3)	-	-
Do you inform your patients of how FREQUENTLY they should exercise?	-	2(11.1)	5(27.8)	10(55.6)	1(5.6)
Do you inform your patients of how LONG they should exercise?		3(16.7)	5(27.8)	9(50.0)	1(5.6)
Do you inform your patients of how HARD they should exercise?	1(5.6)	5(27.8)	5(27.8)	7(38.9)	-
Do you inform your patients on the TYPE of exercise they should do?	1(5.6)	3(16.7)	6(33.3)	5(27.8)	3(16.7)
Do you and your patient put the plan to become more physically active in writing?	11(61.1)	3(16.7)	4(22.2)	-	-
Do you give any written materials about physical activity or exercise during each day's clinic visit?	4(22.2)	8(44.4)	4(22.2)	2(11.1)	-
Do you state to the patients that you are planning to discuss their physical activity on a future visit?	8(44.4)	7(38.9)	3(16.7)	-	-



4.14 SUMMARY OF THE CHAPTER

The following fundamental results were obtained from the analysis of the quantitative data of the clients with type 2 diabetes mellitus:

1. More than half (54.9%) of the clients with type 2 diabetes mellitus were classified as obese and overweight (31.1%) respectively.
2. Almost eighty percent (78.5%) were classified as hypertensive.
3. Almost one quarter (22.08%) had a HGT reading > 11.1 mmol/l and were therefore classified as hyperglycaemic (mean HGT 14.01, SD = 2.28).
4. Although almost every client received advice to follow an exercise programme (99.1%) and meal plan / diet, only 6.3% attended formal diabetes education sessions.
5. Low physical activity levels (< 600 MET-min/week) were calculated for 54.0% of the study sample while 44.1% have moderate physical activity levels.
6. Females understanding of the management of their disease were significantly better than males.
7. Males were more satisfied than females with the quality of care received at the Community Health Centre (CHC) they attended.
8. The majority (80.3%) of the clients had inadequate knowledge of diet / nutrition ($\leq 59\%$ correct answers).
9. In general, males received more support from their family and friends than females to manage their disease.

Results of the data of the health care professionals revealed the following:

1. The health care professionals had a positive attitude towards existing concepts in diabetes care as all five (5) sub-scales of DAS-3 exceeded the neutral point of 3.

2. Although most of the health care professionals discuss the topic of physical activity, the benefits thereof as well as giving advice on how to become more physically active (61.1%), most of them seldom (55.6%) or never (11.1%) discuss the difficult situations patients might encounter or have in trying to become more physically active.

These results obtained from the analysis and outlined in this chapter were used to assist in the development of the health promotion programme. The next chapter will outline the challenges experienced by both the clients with type 2 diabetes mellitus and the health care professionals in the management of the disease.



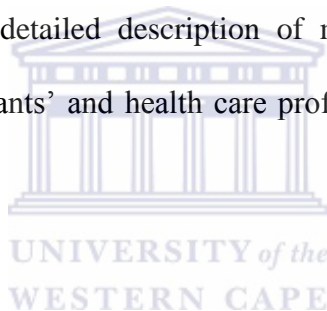
CHAPTER 5

QUALITATIVE BASELINE DATA

UNDERSTANDING THE PROBLEM OF TYPE 2 DIABETES MELLITUS:

5.1 INTRODUCTION

This chapter contains the results of the content analysis of the focus group discussion and semi-structured interviews which attempted to answer the objective of the second phase of the study, namely to explore the challenges experienced by health care professionals and clients with type 2 diabetes mellitus regarding the management of the disease. Focus group discussions with clients with type 2 diabetes mellitus as well as semi-structured interviews with health care professionals (detailed description of methodology in Chapter 3) were employed to explore the participants' and health care professionals' challenges experienced in the management of the disease.



5.2 FOCUS GROUP DISCUSSIONS WITH CLIENTS WITH TYPE 2 DIABETES MELLITUS

Six focus groups were facilitated by the researcher and research assistant. Twenty six (26) clients, 15 females and 11 males with a mean age of 58.92 years (SD = 7.33), agreed to participate. The focus groups took place in a relaxed and convenient setting for all the group members. Each participant was encouraged to effusively participate in the discussions.

5.2.1 Emerging themes

The emerging themes generated from the thematic analysis of the FGDs are outlined below.

- Challenges with a healthy eating plan
- Challenges with physical exercise

- Financial constraints
- Other people's understanding of the disease
- Service received at the Community Health Centre

Verbatim quotes will be used to further exemplify the abovementioned themes.

5.2.1.1 Challenges with a healthy eating plan

The majority of the participants confided that they find it very difficult to follow a healthy eating plan. Living circumstances was one of the reasons mentioned.

“My wife passed away.....I stay on my own and don't cook for myself. It is so easy to just eat bread with something on it.” (Male, 68 years)

“I stay with my daughter and her family. I must eat whatever she cooks”.
(Female, 60 years)

“I stay with my sister and her husband. She cooks all the food he loves. It is usually unhealthy.....He likes fried foods. I don't have a choice, I must eat what I get.”
(Female, 66 years)

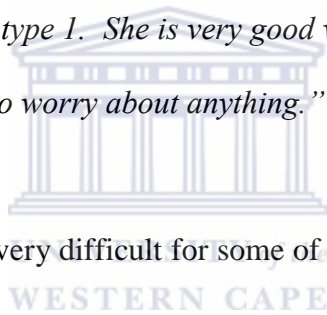
“I can't cook.....I just eat whatever is in the house....usually bread and things like pies” (Male, 57 years)

However, one of the participants, a live-in domestic worker is very grateful for her employers' assistance in maintaining a healthy eating pattern.

“The lady and man (employers) are good people. They make sure that I get all the right food and that I eat regularly during the day. She cooks very healthy and takes me for my check-ups every month.” (Female, 61 years)

A male participant also reported that due to his wife being a type 1 diabetic, they eat regular healthy meals.

“My wife is also diabetic, type 1. She is very good with cooking the right way and the right foods. I don't have to worry about anything.” (Male, 61 years)



Working conditions also make it very difficult for some of the clients to follow a proper meal plan.

“I work on a building site. We don't have regular breaks and I am divorced. So I have to pack my own lunch and snacks. It is so much easier just to buy a pie and chips at the shop.” (Male, 57 years)

“.... To say the least, my boss is very strict and does not allow you to eat while you work. I work in a factory. Even though I have a letter from the hospital to say that I must eat regular small meals, he insists that I 'clock in and out'. Now I lose pay!”
(Female, 56 years)

“I work long hours at a fast food restaurant. There is no time to eat properly.”

(Female, 53 years)

5.2.1.2 Challenges with physical exercise

The clients expressed awareness of the importance of physical activity although some are not engaging in physical activity. Safety in their neighbourhoods was also of great concern to the clients. This was expressed by the majority of the participants in the focus groups. The following quotations illustrate their sentiments.

“I wish there was a place in the community where I could go to exercise..... like the church hall or so. And I don't feel safe to exercise around the house.”

(Female, 63 years)



“I get up early in the morning to go to work and then I get back very late. It is already dark outside. It is really too dangerous to go for a walk then.”

(Male, 60 years)

Participants also stated that lack of time hamper their physical activity participation. This is reflected in the statements below:

“I work full-time in an office and when I get home I must do all my house work myself and cook for the family. I really don't have time to exercise during the week.”

(Female, 47 years)

“I work half-day and then look after my grandchildren in the afternoon. There is no time to do formal exercise.” (Female, 52 years)

A desire for someone else’s involvement in physical activities was expressed by a participant, as illustrated below.

“I know I must exercise. ...I am too scared to walk on my own. No one in the house wants to walk with me. I’ve asked so many times, but they are too busy. It is dangerous where we stay.....lots of gangsters.” (Female, 73 years)

Changing a bad habit was also reported to be a challenge when it comes to exercise.

“I am very lazy...I don’t even like to walk, I actually hate any form of exercise.”
(Male, 69 years)

“I haven’t exercise for all the years. I just don’t like it and I sat a lot for my work. How can you expect me to start now?” (Male, 48 years)

“I am so overweight all the years. I don’t have the energy to exercise. I only do some of my house work. Otherwise I sit all day and watch TV.” (Female, 63 years)

There was a sentiment among the participants that their general feeling of well-being as well as physical disabilities precludes them from exercising.

“...some days I am too tired to get out of bed. I also have a heart problem.”

(Female, 68 years)

“My foot was amputated last year and now I must walk with crutches. My hands get sore and tired when I walk too much.” (Male, 64 years)

5.2.1.3 Financial constraints

Lack of money was reported to be a key challenge in the management of type 2 diabetes mellitus, whether it restrain the clients from buying healthy food or to go to the Community Health Centres for regular check-ups. It is illustrated in the following excerpts below.

“I get a grant. My two grandchildren stay with us. We don’t have money to buy all the right foods like the stuff that you can use in the place of sugar and all the vegetables. The children get a plate of food at school and sometimes we just eat dry bread for days.” (Female, 51 years)

“I only have R450 in a month for groceries. So I buy cheap stuff, not the vegetables that is very expensive” (Female, 59 years)

“My daughter take my grant....so I can’t buy food myself...I have no money.”
(Female, 66 years)

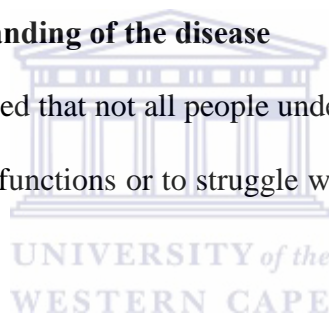
“Healthy food is a lot of money....actually, all foods are expensive. Pap and bread are the cheapest.” (Female, 71 years)

“I must take a taxi to go to the clinic every month. It is too far to walk and I sometimes feel too weak to walk. It is very expensive. I only get a grant and have to pay a lot for rent.” (Male, 68 years)

“My neighbour charges me a lot to take me to the day hospital and fetch me again. I can't get to the taxi rank; it is too far from my house.” (Female, 63 years)

5.2.1.4 Other people's understanding of the disease

A few of the participants mentioned that not all people understand what the disease entails. It causes them not to attend family functions or to struggle with proper self-management of the disease.



“.... To say the least, my boss is very strict and does not allow you to eat while you work. I work in a factory. Even though I have a letter from the hospital to say that I must eat regular small meals, he insists that I ‘clock in and out’. Now I loose pay!”
(Female, 56 years)

“They (the work) get cross when I have to change my shifts to go to the clinic. I can't help, because I do tell them well in advance when my next appointment is. It is them that don't look at it when they draw up the rosters.” (Female, 47 years)

“I can’t help that my clinic appointment is sometimes on the day of deadlines at the work. My boss refuses then that I can go for my appointment. Then I don’t always have medication.” (Male, 60 years)

“I don’t go to any birthday parties anymore. There are only pies and other unhealthy eats and the people look at you in a funny way if you say you can’t eat it.”

(Female, 71 years)

“If I don’t eat the food my daughter-in-law cooks, she thinks I am full of nonsense and gets very angry with me. But it is not what I am supposed to eat.” (Male, 68 years)

One male participant however, praised his wife for all the extra effort she puts in to assist him in managing his diabetes.



“My wife is absolutely wonderful! She read up about the disease when I was diagnosed and goes out of her way to help me eat correctly. She also walks with me around the block every day when the weather allows us to do so.” (Male, 66 years)

Two (2) of the female participants reported that their employers are very accommodating regarding their diabetes.

“They make sure that I get all the right food and that I eat regularly during the day. ...and takes me for my check-ups every month.” (Female, 61 years)

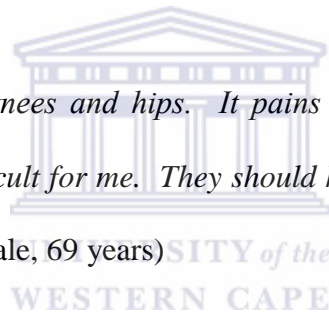
“My work understands that I must go to the clinic at specific times. They still pay me as long as I bring a letter to say that I was there (at the clinic).” (Female, 53 years)

5.2.1.5 Service received at the Community Health Centre

The majority of the participants complained about the service they have received at the Community Health Centre. The long waiting time to see the doctor or sister and to get their medication at the pharmacy is a major problem.

“The long queue at the Pharmacy is very bad. I sometimes wait half a day before I get my medication. And then it is not always the right tablets!” (Female, 54 years)

“I have arthritis in my knees and hips. It pains a lot and standing in those long queues is really very difficult for me. They should have more chairs or specific times that you must come.” (Male, 69 years)



“Waiting to see the doctor or sister is very long. They should get more people to work there.” (Female, 71 years)

“The staff is always in a hurry; so they don’t have a lot of time to spend with you. I don’t get all the information I want as they must help the other people that is waiting outside.” (Male, 68 years)

“There is not enough staff. It is the governments fault. They should employ more people to work at the clinics.” (Female, 51 years)

Two (2) female participants said they do not have a problem with the long waiting time at the CHC.

“I always wait long to see the sister, but I enjoy talking to the people and to sit and read my book.”(Female, 61 years)

“...you have to wait long there (at the CHC)...I just talk to the people around me. It does not help to get cross with the system; it will never change.” (Female, 57 years)

5.3 SEMI-STRUCTURED INTERVIEWS WITH HEALTH CARE PROFESSIONALS

The semi-structured interviews were facilitated by the researcher and research assistant. All the health care professionals that completed the questionnaire (18) were invited to partake in the interviews. Three (3) medical doctors, one (1) sister and two (2) nurses agreed to participate. Of these 5 were females and 1 male with a mean age of 49.83 years (SD= 10.50). The interviews took place at a time convenient for each of the health care professionals. It was conducted in a quiet venue and was audio-recorded. The researcher facilitated the interviews and the research assistant made field notes.

5.3.1 Emerging themes

The emerging themes generated from the thematic analysis of the semi-structured interviews with the health care professionals are outlined below.

- Lack of manpower
- Lack of time
- Lack of awareness programmes

- Clients' non-adherence to non-pharmacological management
- Poverty
- Safety

Verbatim quotes will be used to further exemplify the abovementioned themes.

5.3.1.1 Lack of manpower

All the participants expressed their concerns about the lack of staff at the Community Health Centres. This has a negative impact on the quality of health promotion for instance. See the excerpts below.

“... lack of manpower has a tremendous impact on the effectiveness of the health promotion or education part of the management of type 2 diabetes mellitus....”

(Female doctor, 51 years)



“There is too little staff for the amount of patients that must be seen every day.”

(Female nurse, 53 years)

“We are understaffed....” (Female nurse, 43 years)

“It's difficult to manage so many patients with so little staff....it's a madhouse some days...actually most of the days!” (Male doctor, 28 years)

“It's is impossible to manage the high loads of patients effectively with small staff numbers.” (Female doctor, 58 years)

5.3.1.2 Lack of time

The sentiment of the health care professionals was that due to the high volume of patients per day, not enough time could be spent with each client. This has a negative impact on the quality of care given to the clients.

“There should be enough time to educate patients in groups or individually, if needed.

To be honest....we just don't have enough time.” (Female doctor, 51 years)

“There is really no time....just about enough to briefly educate and give handouts.”

(Female nursing sister, 47 years)

“...don't have enough time to properly educate the patients.”

(Female nurse, 53 years)



“Because of time constraints with each patient, we just briefly touch on the health promotion side of things.” (Female nurse, 43 years)

5.3.1.3 Lack of appropriate awareness programmes

Type 2 diabetes mellitus is a lifestyle disease. All the participants felt that much time and money is spent by government and Department of Health on awareness programmes for tuberculosis and HIV/AIDS, for instance. They are concerned that awareness programmes for type 2 diabetes mellitus is neglected as so many case are still undiagnosed. See statements below.

“...much more must be done by government and Department of Health regarding awareness of the disease (type 2 diabetes mellitus) and prevention strategies for the development of it.” (Female doctor, 51 years)

“...worst of all is...there is so many people no knowing they have the disease. Awareness programmes should be more visible in the communities.”

(Female sister, 47 years)

“... too little media coverage regarding diabetes mellitus in general.”

(Female nurse, 43 years)

“..little emphasise is placed on making people aware of diabetes mellitus...”

(Female doctor, 58 years)



Most of the participants are of the opinion that due to type 2 diabetes mellitus being a lifestyle disease, health promotion and prevention strategies should already start at a young age. The excerpts show their sentiments.

“...risk factors to develop the disease already start many years before diagnosis. Therefore things should be put in place to combat obesity of young people and to encourage them to lead a physically active lifestyle.” (Female doctor, 51 years)

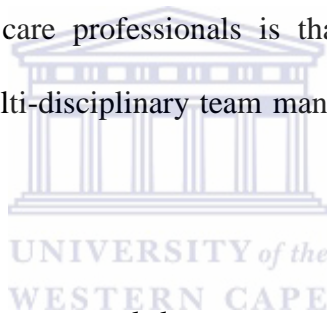
“Health promotion should start at school.” (Female nurse, 53 years)

“...and because it (type 2 diabetes mellitus) is something older people get, youngsters are not familiar with the risk factors for the disease. More health promotion should be done under the younger population.” (Female nurse, 43 years)

“Bad habits like physical inactivity and unhealthy eating are already instilled in young children. Health promoting behaviours should therefore start a very young age.” (Male doctor, 28 years)

“Schools should be targeted.” (Female nursing sister, 47 years)

Another concern of the health care professionals is that experts in the field of health promotion are not part of the multi-disciplinary team managing clients with type 2 diabetes mellitus.



“There is not a physiotherapist and dietician on the days when the diabetes clinics are run. The nursing staff is doing all the health promotion. I mean... what do I know of exercise prescription? I am not the expert!” (Female nursing sister, 47 years)

“The physiotherapist does not form part of the multi-disciplinary team. She is the expert when it comes to lifestyle habits like physical activity. Why is she not part of the team? It does not make sense.” (Male doctor, 28 years)

“There is no dietician employed permanently. Anyone available gives handouts regarding diet and exercise...just generic stuff.” (Female nurse, 53 years)

5.3.1.4 Clients' adherence to non-pharmacological management

Although the clients with type 2 diabetes mellitus get information on healthy eating plans and physical exercise, of great concern is their non-adherence to the information and recommendations made by the health care professionals. It is illustrated by the statements below.

“The patients are very slack when it comes to exercise and eating healthy. They just don't want to make any effort from their side.” (Female doctor, 51 years)

“Ignorance regarding the seriousness of the disease and its complications could influence the patients' attitude to make the necessary lifestyle change.”

(Female nurse, 43 years)



“Some patients are just too lazy to cook proper food and exercise and think that the medication given would do the trick.” (Male doctor, 28 years)

Family structure and cultural beliefs also play an important role in the lifestyle change and adherence thereof.

“It is so much easier to exercise if someone is doing it with you.”

(Female doctor, 58 years)

“Some patients stay with their family and do not have a say in what they eat. They must just eat whatever they are given.” (Female nursing sister, 47 years)

“The family of a patient with type 2 diabetes mellitus should be supportive and encourage the person to lead a healthy lifestyle. This should make it easier for the patient to adhere to the lifestyle change.” (Male doctor, 28 years)

“If they stay with other people, they can’t be fussy or tell those people what they can and can’t eat.” (Female nurse, 53 years)

A few of the health care professionals mentioned that the generic information regarding diet and exercise given to the patients could also contribute to non-adherence to lifestyle change as the patients might feel it is not relevant to them.

“You cannot give the same exercise prescription for a 45 year old and a 65 year old with lots of co-morbidities.” (Female doctor, 51 years)

“Some information in the handouts is maybe not relevant for that specific patient. This could discourage to adhere to the information given”

(Female nurse, 53 years)

“Advice given is generic...definitely not tailor-made for each patient’s needs.”

(Male doctor, 28 years)

5.3.1.5 Poverty

The health care professionals reported that the over-arching challenge in the management of type 2 diabetes mellitus is poverty. Poverty contributes to so many aspects that impede the management of the disease. The quotes below demonstrate their views.

“Most of the patients don’t have the money to buy the machine to test their blood glucose levels at home. They have to rely on symptoms of either hypo- or hyperglycaemia events.” (Female doctor, 51 years)

“Every patient should have a machine to test their sugar.” (Female doctor, 58 years)

“How can we expect people to buy expensive healthy food if they hardly have any money for food? And they must pay others to bring them to the clinic.”

(Female nurse, 53 years)

“Unemployment and poverty plays a huge role in the optimal management of the disease.” (Female nursing sister, 47 years)



5.3.1.6 Safety

The surroundings where the clients of the current study are staying are reported to be dangerous due to gangster activities and dwellers. This makes it very difficult for any person to follow a regular exercise programme, i.e. walking to the shops.

“...not safe for our patients to walk in their neighbourhood.” (Female doctor, 51 years)

“The communities should get involved and provide safe environments for patients to exercise. It is too dangerous for them (patients).” (Female nurse, 43 years)

“Patients tell us it is too dangerous to walk in their community; whether they walk alone or with someone.” (Female nursing sister, 47 years)

5.4 SUMMARY OF THE CHAPTER

Results of the qualitative data help us to understand some of the challenges health care professionals and clients with type 2 diabetes mellitus experience in the management of the disease. These results, the quantitative results (Chapter 4) and the literature review all contributed to the development of the health promotion programme. The next chapter will present the process (Delphi study) that was followed to reach consensus on the health promotion programme, i.e. the content, length and mode of instruction.



CHAPTER 6

THE DELPHI STUDY

6.1 INTRODUCTION

This chapter outlines the procedure that was used to reach consensus on the content, length and mode of instruction of the health promotion intervention for clients with type 2 diabetes mellitus. Results of each round of the Delphi study will be presented systematically.

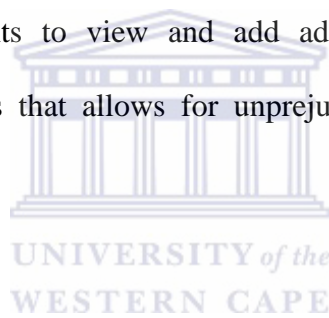
6.2 BACKGROUND

The efficacy of treatment of type 2 diabetes mellitus is highly dependent on the individual's ability to manage the disease. Patients are encouraged to modify their lifestyles and acknowledge their susceptibility to the various health risks involved. Diabetes education is the cornerstone of successful diabetes management. It provides information about the disease and its complications, teaches the patient skills required for injecting insulin as well as the self-monitoring of blood glucose levels. Most importantly it empowers patients with knowledge which will enable them to adjust their treatment safely (Moodley & Rambiritch, 2007). However, knowledge does not always result in behaviour change and need to be reinforced (McManus et al., 2006). It is therefore of utmost importance to have proper health promotion programmes in place that will assist people with the adoption and maintenance of healthier lifestyles that would delay the onset of complications.

The overall aim of the study is to develop, implement and determine the effectiveness of a health promotion intervention for clients with type 2 diabetes mellitus from an urban South African community. The previous chapters outlined the results of the phases that were used to assist in the development of the programme. Prior to the implementation of it, consensus

had to be reached about the content, duration and mode of instruction of the programme with a Delphi study. The process followed will be outlined below.

The Delphi technique, a multi-staged survey, was developed by Dalkey and Helmer (1963) at the Rand Corporation in the 1950s. In the Delphi technique expert opinion (group opinion) is rated more valid than individual opinion (Miller, 2006, as cited in Hsu & Sandford, 2007). The ultimate aim of the Delphi technique is to reach consensus on an imperative issue (McKenna, 1994; Young & Jamieson, 2001). Noticeable characteristics of the Delphi process includes: the ability to provide anonymity to participants, thus excluding the effect of manipulation or intimidation to conform to others' opinion, the controlled feedback process allowing the participants to view and add additional information to previous iterations and statistical analysis that allows for unprejudiced summary of the responses (Dalkey, 1972).



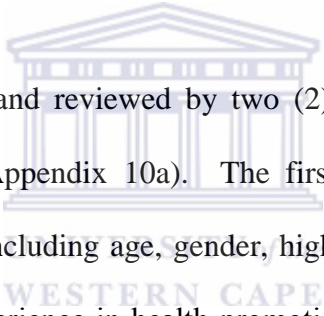
6.3 METHODOLOGY

A three round e-Delphi technique was employed for the current study. Experts in the field of health promotion for chronic diseases of lifestyle (CDL) were approached for their opinion to standardize the content of the intervention.

6.3.1. Procedure

A purposively selected panel of experts was invited to participate in the Delphi study. These experts were nominated by organisations such as IDF, WHO and international and local universities who was requested to provide a list of names of individuals with expertise in the management of diabetes mellitus. The criteria for inclusion were researchers and clinicians involved in CDL research as well as non-pharmacological management of CDL such as type

2 diabetes mellitus, globally. The participants included medical doctors, dieticians, nursing sisters, physiotherapists and distinguished researchers. Invitation to participate in the Delphi study was sent via e-mail to all the identified / nominated individuals. An information sheet (Appendix 8) outlining the purpose of the study and a consent form (Appendix 9) were included. Informed consent was requested via e-mail from thirty eight (38) experts that fit the inclusion criteria to participate in the Delphi study. Sixteen (16) of the invited experts consented to the study. Therefore an initial response rate of 42% was obtained. Various reasons were provided by seven (7) of the experts for not accepting the invitation, namely unavailability due to work commitments, sabbatical/holiday and time constraints. Fifteen (15) of the experts provided no reasons or did not respond to the initial e-mail.



A questionnaire was developed and reviewed by two (2) independent researchers for the applicability of the questions (Appendix 10a). The first section requested demographic information of the participants, including age, gender, highest level of qualification, current profession, number of years' experience in health promotion / non-communicable diseases / diabetes mellitus and their role in the management of diabetes mellitus / non-communicable diseases / health promotion. Three open-ended questions were included in section two:

1. In your opinion, what are the benefits or role of health promotion for individuals with non-communicable disease such as type 2 diabetes mellitus?
2. In your opinion, what is the type of activities or items that should be included in a health promotion programme?
3. In your opinion, what is the best way of implementing a health promotion programme at primary health care level?

Participants returned the questionnaire after 6 weeks and a description of the participants is outlined in Table 6.1. The consented participants had a mean age of 45.56 years (SD = 9.26) and 14.38 (SD = 8.50) years of work experience in health promotion / non-communicable disease / diabetes mellitus, as illustrated in Table 6.1 below.



Table 6.1. Demographic characteristics of Panel of Experts

ID code	Age yrs	Gender	Highest level of Qualification	Current Occupation	Years Experience	Focus in NCD/DM/HP*
1	47	Female	MBCChB	Principal investigator at a Trial Centre	14 years	Medical doctor for patients with DM
2	49	Male	MBCChB Masters in Diabetes	General Practitioner	12 years	Medical doctor and Diabetes Educator
3	45	Female	BCur	Study coordinator at a Trial Centre	6 years	Clinical trials for patients with DM
4	67	Female	Masters in Education	Nurse Educator	30 years	Develop and coordinate programmes for health care professionals re DM care and management
5	45	Female	B-Tech Occupational Health Nursing	Clinical Coordinator	10 years	DM Educator, Clinical Nurse Practitioner and Health Promoter
6	44	Female	PhD in Public Health	Senior Lecturer at an academic institution	13 years	Research in NCDs and Obesity, Interventions for NCDs and Obesity, Lecturer in HP
7	60	Female	PhD	Senior Lecturer at an academic institution	25 years	Research in DM
8	42	Male	PhD	Associate Professor in Department of Kinesiology	10 years	Promotion of health-enhancing Physical Activity

9	44	Female	PhD	Associate Professor at an academic institution	23 years	Teaching health care professionals Member of IDF (Education Consultative Section), Turkish Diabetes Foundation and Foundation of European Nurses in Diabetes
10	53	Female	MCur	Clinical Nurse Practitioner	20 years	Community health promotion programmes and treat patients with diabetes
11	33	Female	MPH	Dietician	6 years	Supervision for dietetic interns. Implementation of dietary requirements for diabetic and CVD patients
12	52	Female	PhD	Senior Lecturer at an academic institution	30 years	Academic health professional for training and supervision of dietetics students
13	34	Female	MSc	Epidemiologist and academic at an academic institution	5 years	Project manager of SLIMMER diabetes prevention project
14	35	Female	MPH	Lecturer at an academic institution	10 years	Dietician: nutritional management of various NCDs in clinical and community settings
15	42	Female	PhD	Lecturer at an academic institution	7 years	Advocacy for development and implementation of appropriate policy on NCDs in Tanzania
16	37	Female	MSc	Physiotherapist	9 years	Educating clients in the community on exercise prescription and prevention of NCDs

*NCD = non-communicable disease

*DM = diabetes mellitus

*HP = health promotion

6.4. FIRST ROUND OF DELPHI STUDY

For the first round of the Delphi, three (3) open-ended questions were posed to the sixteen (16) participants, as outlined on page 147.

The response rate for Round one of the Delphi study was 100% as all sixteen (16) participants completed the survey. A summary of the responses according to the emerging themes for each of the three (3) open-ended questions is presented in table format below. The emerging themes with regards to the benefits of health promotion for individuals with type 2 diabetes mellitus included improvement of knowledge and skills regarding the disease, improvement of self-management and self-efficacy, to mention only a few, and is summarised in Table 6.2. The majority of the experts were of the opinion that health promotion improve knowledge and skills, promote lifestyle change and delay or prevent the development of complications amongst others, as highlighted in table 6.2.

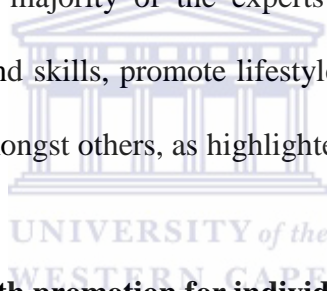


Table 6.2 Benefits / role of health promotion for individuals with type 2 diabetes mellitus (n = 16)

Emerging theme	n (%)
Improve knowledge and skills re: the disease	16 (100)
Improve self-management / control	13 (81.25)
Promote lifestyle change	16 (100)
Improve self-efficacy	14 (87.5)
Delay/prevent development of complications	14 (87.5)
Delay/prevent development of co-morbidities	3 (18.75)
Helps build public policy	2 (12.5)

The type of activities to be included in a health promotion programme identified by the experts included topics such as healthy diets, physical exercise and education regarding signs and symptoms of hypo- and hyperglycaemia, benefits of blood glucose control and foot care amongst others. These are summarised in Table 6.3

Table 6.3 Type of activities to be included in the health promotion programme (n = 16)

Items / Activities	n (%)
Healthy balanced diets	16 (100)
*affordable food	12 (75)
*easy recipes	4 (25)
*cooking methods	11 (68.75)
Physical exercise	16 (100)
*type of exercise	16 (100)
*duration	16 (100)
*frequency	16 (100)
Education re:	16 (100)
*signs and symptoms of hypo-/hyperglycaemia	13 (81.25)
*benefits of blood glucose control	15 (93.75)
*management of stress	8 (50)
*medication	14 (87.5)
*benefits of lifestyle change	16 (100)
*reduction of risk factors	16 (100)
*wound / foot care	14 (87.5)
*information re: support groups	13 (81.25)
*availability of screening programmes	9 (56.25)



With regard to the mode of implementation of a health promotion programme, several suggestions were made. These included individual patient education, patient group talks and community involvement, as summarised in table 6.4

Table 6.4 Best way of implementing the health promotion programme (n = 16)

Suggested items	n (%)
Patient individual education	
*first session only	16 (100)
*all follow-up sessions	2 (12.5)
Patient group talks	
*first session only	-
*all follow-up sessions	14 (87.5)
Community involvement	16(100)
*identification of resources for safe exercise	16 (100)
*screening programmes	11 (68.75)
*talks to family members and friends	13 (81.25)

6.5 SECOND ROUND OF DELPHI STUDY

The intervention programme for the second round was designed based on the emerging themes from the responses of round one of the Delphi study (Appendix 10b). Fourteen (14) participants completed the second round survey, resulting in a response rate of 87.5%. Consensus was set at 70% or more for an item to be included in the health promotion programme (Sumison, 1998; McKenna & Hasson, 2002).

The purpose of the second round was to reach consensus on the content, mode of instruction and length of the health promotion programme. Table 6.5 illustrates the results of Round two of the Delphi study.

All the participants (n = 14, 100%) agreed that the following sections should be included: Physical exercise, healthy eating, stress management, self-management techniques of the disease, possible long-term complications, signs and symptoms of hypo- / hyperglycaemia and general information on support groups. The majority of the participants (n = 10, 71.43%) agreed that the health promotion programme should be implemented for at least six (6) weeks.

Most of the participants felt that the mode of instruction depends on the individual client, but 78.57% (n = 11) of them recommended a one-on-one (individual) session with the first appointment. Thereafter the participants suggested small group meetings (85.71%, n = 12) while ten (71.43%) of the participants agreed to interactive group work. The information on the pamphlets should be basic and should have more pictures than writing to accommodate illiterate clients with type 2 diabetes mellitus.

Consensus was also reached on the components of the physical activity programme. It should include cardio-respiratory exercises (n = 14, 100%) and strengthening exercises (n = 10, 71.43%). More than one third of the participants (n = 5, 35.71%) felt that general stretching should not be included in the exercise component of the programme. For the cardio-respiratory exercises, consensus was reached on the duration per session (20 – 30 minutes; n = 11, 78.57%) as well as the frequency per week (3 – 4 x/week; n = 12, 86.71%). The suggested type of exercise depends on the client's age and general health but could

comprise of long walks, cycling, step climbing and dancing. Ten (71.43%) of the participants agreed that strengthening exercises should be included in the programme. For the strengthening exercises, consensus was also reached on the duration per session (20 – 30 minutes; n = 8, 80%) and frequency per week (3 – 4 x/week, n = 9, 90%).

Consensus was reached on five (5) of the six (6) suggested topics for the healthy eating section of the health promotion programme with food portions, cooking methods, drinks and healthy snacks having a 100% agreement rate while twelve (85.71%) of the participants agreed to inclusion of ‘good’ versus ‘bad’ food options. Some of the participants recommended the following to be included: alcohol use, shopping tips and how to read food labels.

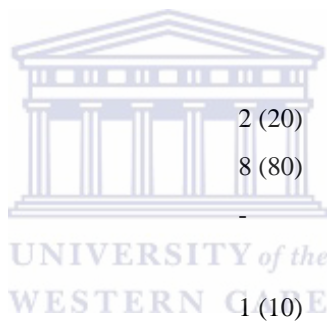
Consensus was also reached on the stress management section of the health promotion programme. All the participants (n = 14, 100%) agreed to inclusion of the identification of symptoms of stress, the effects of stress on blood glucose levels as well as practical management techniques. One participant suggests the inclusion of identification of the causes of stress as well as practical solutions thereof.

Seven (7) of the eight (8) suggested components of the self-management section of the health promotion programme had a 100% agreement. The only item in this section that consensus could not be reached on was ‘wound care’. Some of the participants also suggest the inclusion of practical demonstration.

Table 6.5 Suggestions on the content, mode of instruction and duration of the health promotion programme (n = 14)

Item	n (%)	Opinion
Content of the health promotion (HP) programme		
• Physical exercise	14 (100)	
• Health eating	14 (100)	
• Stress management	14 (100)	
• Self-management techniques of the disease	14 (100)	
• Possible long-term complications	14 (100)	
• Signs and symptoms of hypo- / hyperglycaemia	14 (100)	
• General information on support groups	14 (100)	
Mode of instruction of HP programme		
		Depends on the individual client
• One-on-one	11 (78.57)	For the 1 st appointment
• Classroom-based (small groups)	12 (85.71)	Can meet others in the same situation
• Interactive group work	10 (71.43)	
• Hand outs (pamphlets)	14 (100)	Basic information only
• DVDs or videos in waiting room of CHC	3 (21.43)	
• Posters in waiting room of CHC	13 (92.86)	Pictures rather than writing
The HP programme should be implemented for at least		
		Should run at regular intervals at the CHC
• 4 weeks	2 (14.29)	
• 6 weeks	10 (71.43)	
• 8 weeks	-	
• 12 weeks	2 (14.29)	
The physical exercise component of the HP programme should include		
• Cardio-respiratory exercises	14 (100)	
• Strengthening exercises	10 (71.43)	
• General stretching	9 (64.29)	

Item	n (%) agree	Opinion
For CARDIO-RESPIRATORY exercise		Depends on age and general health: brisk walks, cycling, step climbing,
Duration per session		
• <20 minutes	2 (14.29)	
• 20 – 30 minutes	11 (78.57)	
• >30 minutes	1 (7.14)	
Frequency per week		
• 1-2 x/week	2 (14.29)	
• 3-4 x/week	12 (85.71)	
• >4 x/week	-	
For STRENGTHENING exercises		Could be incorporated in cardio- respiratory exercises
• <20 minutes	2 (20)	
• 20 – 30 minutes	8 (80)	
• >30 minutes	-	
Frequency per week		
• 1-2 x/week	1 (10)	
• 3-4 x/week	9 (90)	
• >4 x/week	-	
The healthy eating section of the HP programme should include		Address alcohol use, shopping tips and how to read food labels
• ‘Good’ vs ‘bad’ food options	12 (85.71)	
• Food portions	14 (100)	
• Cooking methods	14 (100)	
• Easy recipes	9 (64.29)	
• Drinks	14 (100)	
• Healthy snacks	14 (100)	



Item	n (%) agree	Opinion
The stress management section of the HP programme should include		Address causes
• Identify symptoms of stress	14 (100)	
• Effects of stress on blood glucose	14 (100)	
• Practical management techniques:		
➤ Stretching	10 (71.43)	
➤ Deep, relaxed breathing control	14 (100)	
The self-management section of the HP programme should include		Include practical demonstrations for foot care
• The role of diet, exercise and medicine on glucose levels	14 (100)	
• Interpretation of blood glucose results	14 (100)	
• Benefits of blood glucose control	14 (100)	
• Prevention and treatment of:		
➤ High blood sugar	14 (100)	
➤ Low blood sugar	14 (100)	
• Prevention of long-term complications	14 (100)	
• Foot care	14 (100)	
• Wound care	8 (57.14)	

6.6 THIRD ROUND OF DELPHI STUDY

An amended intervention programme was e-mailed to the fourteen (14) participants comprising of all the items that had agreement levels of 65% and higher in round two. The participants had the opportunity to re-consider and alter their initial responses if they wanted to do so. The participants were given a two-week deadline and a reminder was sent out one week before the deadline. An extension of another two weeks was given as the response rate was still low after two weeks. The final response rate was 100% (n = 14). Results are presented in Table 6.6 below.

Consensus was reached on the content as well as mode of instruction of the health promotion programme. The item '*posters in waiting room of CHC*' now only had an agreement of 64.29% (n = 9) and was therefore not included in the final health promotion programme. Twelve of the participants (85.71%) agreed to 6-weeks duration of the programme while the other two participants suggested 4 weeks. The physical exercises should include both cardio-respiratory and strengthening exercises. The duration for each of the physical exercise component should be 20 – 30 minutes, while the frequency should be 3-4 times per week for cardio-respiratory and twice a week for the strengthening component, depending on the ability and general health of the individual. Hundred percent agreement was reached for all the components of the healthy eating section, except for the 'good' versus 'bad' food options (n = 12, 85.71%). The opinions of the participants regarding the inclusion of stretching in the practical management of stress, are unchanged for round three (n = 10, 71.43%).

Table 6.6 Final agreement on the content, mode of instruction and duration of the health promotion programme (n = 14)

Item	n (%) agree	Other opinion/s
Content of the health promotion (HP) programme		
• Physical exercise	14 (100)	
• Health eating	14 (100)	
• Stress management	14 (100)	
• Self-management techniques of the disease	14 (100)	
• Possible long-term complications	14 (100)	
• Signs and symptoms of hypo- / hyperglycaemia	14 (100)	
• General information on support groups	14 (100)	
Mode of instruction of HP programme		
• One-on-one for first visit	13 (92.86)	
• Classroom-based (small groups) for follow ups	14 (100)	
Including the following:		
• Interactive group work	12 (85.71)	
• Hand outs (pamphlets)	14 (100)	
• Posters in waiting room of CHC	9 (64.29)	
The HP programme should be implemented for at least		
• 6 weeks	12 (85.71)	two participants suggested 4 weeks
The physical exercise component of the HP programme should include		
• Cardio-respiratory exercises	14 (100)	
• Strengthening exercises	11 (78.57)	
For CARDIO-RESPIRATORY exercises		
Duration per session		
• 20 – 30 minutes	13 (92.86)	
Frequency per week		
• 3-4 x/week	14 (100)	

Item	n (%)	Other opinion/s
For STRENGTHENING exercises		
Duration per session		
• 20 – 30 minutes	14 (100)	
Frequency per week		
• 3-4 x/week	12 (85.71)	Two participants suggested twice per week
The healthy eating section of the HP programme should include		
• ‘Good’ vs ‘bad’ food options	12 (85.71)	
• Food portions	14 (100)	
• Cooking methods	14 (100)	
• Drinks, including alcohol use	14 (100)	
• Healthy snacks	14 (100)	
• Shopping tips	14 (100)	
• How to read food labels	14(100)	
The stress management section of the HP programme should include		
• Identify symptoms of stress	14 (100)	
• Effects of stress on blood glucose	14 (100)	
• Practical management techniques:		
➤ Stretching	10 (71.43)	
➤ Deep, relaxed breathing control	14 (100)	
The self-management section of the HP programme should include		
• The role of diet, exercise and medicine on glucose levels	14 (100)	
• Interpretation of blood glucose results	14 (100)	
• Benefits of blood glucose control	14 (100)	
• Prevention and treatment of:		
➤ High blood sugar	14 (100)	
➤ Low blood sugar	14 (100)	
• Prevention of long-term complications	14 (100)	
• Foot care, including a demonstration	14 (100)	

6.7 SUMMARY OF THE CHAPTER

The method and results of the Delphi study undertaken to design the health promotion programme was discussed in this chapter. Three rounds were included in the e-Delphi and consensus level was set at 70% or above. Consensus was therefore reached on the following: the duration of the programme should be six (6) weeks, including the following components: physical exercise (cardio-respiratory and strengthening exercises), healthy eating, stress management and self-management techniques. The self-management section should include topics such as the role of diet, exercise and medicine on blood glucose levels, interpretation of blood glucose results, benefits of blood glucose control, prevention and treatment of high and low blood sugar, prevention of long-term complications and foot care. The next chapter will discuss the implementation of the health promotion programme.



CHAPTER 7

CONSENSUS ON THE PROCESS OF IMPLEMENTATION OF THE INTERVENTION

7.1 INTRODUCTION

This chapter summarizes the results of the qualitative analysis of the workshop conducted to answer the fourth objective of the study, i.e. to implement the proposed health promotion programme for clients with type 2 diabetes mellitus at a selected Community Health Centre (CHC). It will therefore report on the outcomes of the workshop for the health care professionals.

The workshop was conducted by the researcher and thesis supervisor. The group consisted of the medical doctors (2) and professional nurses (3) attending to clients with type 2 diabetes mellitus at the selected CHC. All the participants were encouraged to participate fully in the discussions. The workshop started with a presentation of the results of the baseline data by the researcher.

7.2 EMERGING THEMES

Several themes emerged from the discussions during the workshop that are of importance to the implementation of an intervention. These themes were: description of the problem; intervention goals; intervention activities; timeline for the intervention; organisational support and rewards and barriers to intervention participation. Verbatim quotes will be used to further illustrate these themes.

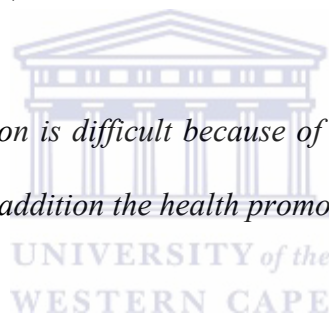
7.2.1. Description of the problem

A clear description of the problem that the intervention wants to address was elucidated in the workshop. This was an important issue so that a meaningful collaboration could be established between the researcher and the health care professionals of the CHC. See the excerpts below.

“This is a very important study. We do not have a health promotion officer that can deal with clients with chronic diseases of lifestyle.” (Nurse, 47 years)

“Health promotion and education activities are our responsibility and that of the nurses.” (Doctor, 31 years)

“Effective health promotion is difficult because of the shortage of staff, lack of time and high patient load. In addition the health promotion pamphlets are all generic.”
(Nurse, 41 years)



7.2.2 Intervention goals

The overall goal and measurable objectives of the intervention was discussed and agreed upon.

Intervention goal: To equip clients with type 2 diabetes mellitus with the knowledge and skills to improve self-management of their disease and delay the onset of diabetic complications.

Measurable objectives: To implement a 6-week intervention among clients with type 2 diabetes mellitus to

- improve knowledge about diabetes
- improve physical activity levels
- improve self-efficacy
- improve physiological variables including weight, BMI, random blood glucose and blood pressure.

7.2.3 Intervention activities

The intervention included six (6) core sessions using an interactive mode of instruction. The issues covered in the sessions included a general introduction, physical activity, healthy eating, stress management, possible diabetic complications and foot care (see Appendix 11).

“I agree with the topics included in the programme.” (Doctor, 28 years)

“It is important to motivate each individual and set goals for each of them.”

(Nurse, 52 years)

“It is very important to teach them proper foot care. They must also be shown how to check their foot pulses, clip their toe nails and how to do a good skin inspection of the legs and feet.” (Nurse, 47 years)

7.2.4 Timeline for the intervention

After consensus was reached on the intervention activities, a discussion followed on how much time should be allocated to each session and when it should be implemented. The excerpts show their sentiments.

“The programme should be done in the morning because some of the patients look after their grandchildren in the afternoon.” (Nurse, 41 years)

“Each session should run for approximately one hour, once a week”. (Doctor, 28 years)

“The day should be one convenient to most of the patients. I reckon a Tuesday or Wednesday morning.” (Nurse, 52 years)

“You must remember to give a letter of attendance to those who might need it for their employers.” (Doctor, 31 years)

It was thus decided to implement the intervention over 6 weeks with one hour sessions, once a week on a day that is suitable for most of the participants.



7.2.5. Organisational support and rewards

For the intervention to be effective, support from the CHC is very important. In addition, the participants of the intervention programme must also have an idea of the benefits of such a programme. The support from the health care professionals was evident.

“We will keep contact details of all the clients with type 2 diabetes mellitus that we see on a daily basis if they agree.” (Doctor, 31 years)

“We will inform them of the intervention and explain the benefits of such a programme.” (Doctor, 31 years)

“You can also go through the records to see if you can contact other patients to invite them to participate. I will get permission from the facility manager so that one of the nurses can assist you with this.” (Doctor, 28 years)

“One of the nurses can also assist you with the blood pressure and blood glucose measurements.” (Doctor, 31 years)

As the support from the CHC was gained, it was felt that it was important to reward the participants for taking part and to ensure sustainability.

“It would be good if you (the researcher) can cover the patients’ transport costs to the clinic each time they come for the intervention. R15 to R20 should be enough.”
(Doctor, 31 years)



Two weeks were thus set aside for the recruitment of clients for the intervention. A venue was assigned and the amount of R20 was agreed on for transportation costs.

7.2.6 Barriers to intervention participation

Several barriers that could influence the chance of individuals to participate in the intervention programme were highlighted.

“A lot of our clients are from underprivileged communities so their transport costs must be covered.” (Nurse, 47 years)

“The time of the programme is very important because the clients have other chores or duties to do.” (Nurse, 41 years)

A thorough plan was prepared and finalised with the facility manager.

7.3 SUMMARY OF THE CHAPTER

This chapter highlighted that individuals in specific settings have specific needs and for the programme to be effective, these needs must be met. The next chapter will present the results of the analysis to determine the effectiveness of the implemented health promotion programme.



CHAPTER 8

IMPLEMENTATION AND EFFECTIVENESS OF THE INTERVENTION

8.1 INTRODUCTION

This chapter contains the results of the quantitative analysis of the intervention implemented to answer the fifth and final objective of the study, i.e. to determine the effectiveness of the proposed health promotion programme. The chapter will therefore report on the changes in outcome measures, including physiological measures, self-efficacy, knowledge of diet and stage of change for physical activity and diet respectively after the implementation of the health promotion programme.

8.2 STUDY SAMPLE FOR THE INTERVENTION

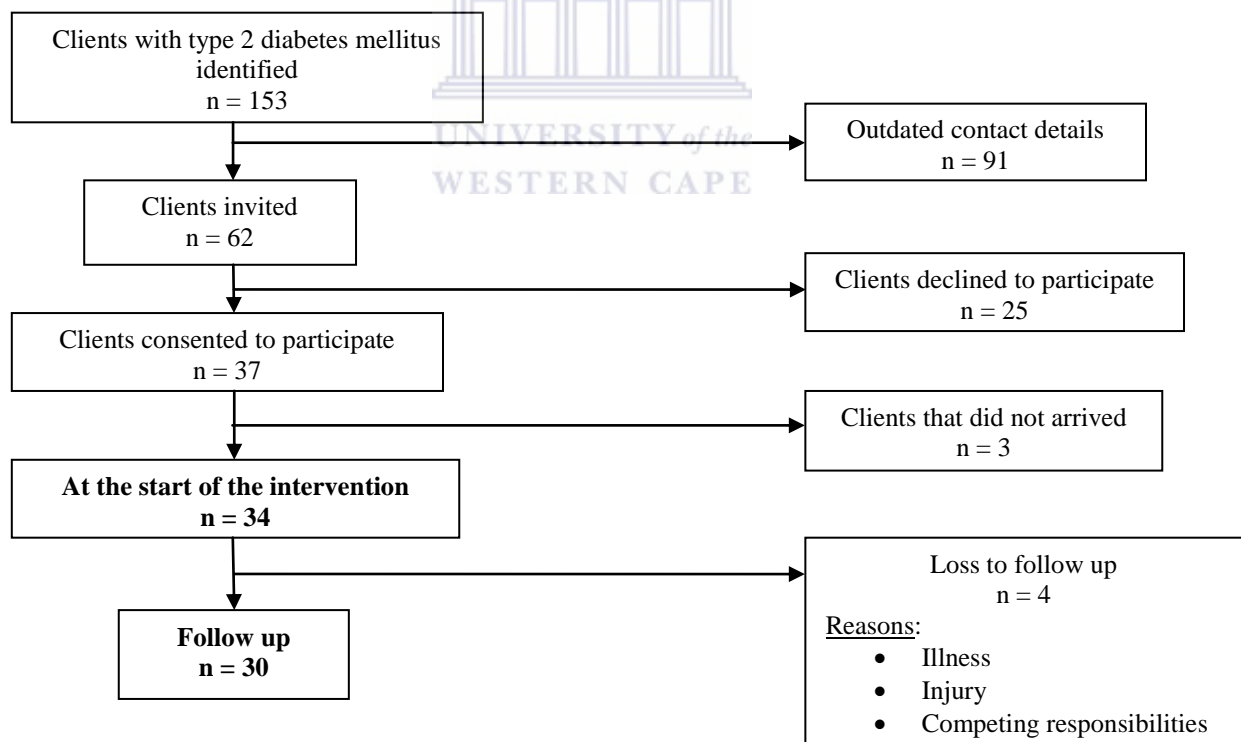


Figure 8.1 Study sample for the intervention

Figure 8.1 summarises the sample for the intervention programme.

8.3 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY SAMPLE

Table 8.1 shows the percentage of participants who completed the pre- and post-intervention surveys. The mean age of the participants pre-intervention were 60.47 years (SD = 11.86) and ranged from 30 to 81 years and for post-intervention it was 59.63 years (SD = 11.94). Almost one third (32.4%) were males and two thirds (67.7%) were females. The participants were predominantly (79.4%) from the Coloured population group. Therefore, ethnicity was not included in any part of the analysis. Sixty five percent of the participants were married or had a domestic partner, while half of the participants' (50.0%) highest level of education was secondary school. More than three quarters (79.4%) of the participants reported to stay in their own home or flat, while 14.7% staying with friends or family. Almost one third (32.4%) of the participants were working whilst 52.9% were pensioners.

While the majority of the participants reported that a health care professional told them to exercise (85.3%) and follow a special diet (88.2%), none of them ever attended diabetes education sessions, i.e. facility- or community-based programmes about diabetes. These characteristics are summarised in Table 8.1

Table 8.1 Socio-demographic characteristics of the clients with type 2 diabetes mellitus pre- and post-intervention

	Pre-intervention (n=34)	Post-intervention (n=30)
	n (%)	n (%)
Age (mean, SD) years	60.47 (11.86)	59.63 (11.94)
<40 years	2 (5.9)	1 (2.9)
40-49 years	5 (14.7)	6 (17.6)
50-59 years	8 (23.5)	6 (17.6)
60-69 years	11 (32.4)	10 (29.4)
>69 years	8 (23.5)	7 (20.6)
Gender		
Male	11 (32.4)	9 (30.0)
Female	23 (67.7)	21 (70.0)
Population group		
Coloured	27 (79.4)	23 (76.7)
Indian/Asian	7 (20.6)	7 (23.3)
Marital status		
Single	12 (35.3)	10 (33.3)
Partner	22 (64.7)	20 (66.7)
Highest level of education		
No schooling	2 (5.9)	1 (3.3)
Primary school	9 (26.5)	8 (26.7)
Secondary school	17 (50.0)	16 (53.3)
Tertiary education	6 (17.6)	5 (16.7)
Living		
Own home/flat	27 (79.4)	24 (80.0)
Home of a friend/family	5 (14.7)	5 (16.7)
Renting	2 (5.9)	1 (3.3)
Employment status		
Working	11 (32.4)	10 (33.3)
Unemployed	5 (14.7)	4 (13.3)
Pensioner	18 (52.9)	16 (53.4)

8.4 INTERVENTION EFFECTS

The outcome measures used included physiological variables such as weight, BMI, HGT and blood pressure, levels of physical activity and knowledge of diet, self-efficacy and stage of change for physical activity and diet respectively.

8.4.1 Effect on physiological outcome measures

Table 8.2 summarises the outcome measures before and after the intervention.

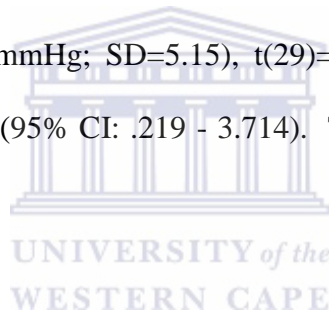
Table 8.2 Intervention effects on physiological variables (n = 30)

Variable	Mean (SD)		t-value	df	p-value	eta squared
	pre-test	post-test				
Weight (kg)	84.13(11.61)	82.70 (10.92)	6.420	29	0.000	0.59
BMI (kg/m²)	30.66 (3.33)	30.15 (3.20)	6.775	29	0.000	0.61
HGT (mmol/l)	8.07 (1.39)	7.57 (1.10)	5.961	29	0.000	0.52
*SBP (mmHg)	140.93 (16.34)	135.00 (12.46)	5.381	29	0.000	0.50
**DBP (mmHg)	90.97 (7.57)	89.00 (5.15)	2.302	29	0.029	0.16

*SBP = systolic blood pressure **DBP = diastolic blood pressure

A paired samples t-test was conducted to evaluate the impact of the intervention on physiological variables such as weight, body mass index (BMI), random blood glucose test (HGT), systolic blood pressure (SBP) and diastolic blood pressure (DBP). There was a statistical significant decrease in **weight** from time 1 (M=84.13 kg; SD=11.61) to time 2 (M=82.70 kg; SD=10.92), $t(29)=6.420$, $p<0.05$ (two-tailed). The mean decrease in weight was 1.433 (95% CI: 0.977 - 1.890). The eta statistic (0.59) indicated a large effect size.

Similarly, a statistical significant decrease was obtained for **BMI** from time 1 (M=30.66 kg/m²; SD=3.33) to time 2 (M=30.15 kg/m²; SD=3.20), $t(29)=6.775$, $p<0.05$ (two-tailed). The mean decrease in BMI was 0.51 (95% CI: 0.357 - .665). The eta statistic (0.61) indicated a large effect size. There was a statistical significant decrease in **HGT** from time 1 (M=8.07 mmol/l; SD=1.39) to time 2 (M=7.57 mmol/l; SD=0.49), $t(29)=5.961$, $p<0.05$ (two-tailed). The mean decrease in HGT was 0.49 (95% CI: .324 - .663). The eta statistic (0.52) indicated a large effect size. A statistical significant decrease was obtained for **systolic blood pressure (SBP)** from time 1 (M=140.93mmHg; SD=16.34) to time 2 (M=135.00 mmHg; SD=12.46), $t(29)=5.381$, $p<0.05$ (two-tailed). The mean decrease in SBP was 5.93 (95% CI: 3.678 - 8.189). The eta statistic (0.50) indicated a large effect size. There was a statistically significant decrease in **diastolic blood pressure (DBP)** from time 1 (M=90.97mmHg; SD=7.57) to time 2 (M=89.00 mmHg; SD=5.15), $t(29)=2.302$, $p<0.05$ (two-tailed). The mean decrease in DBP was 1.97 (95% CI: .219 - 3.714). The eta statistic (0.16) indicated a small effect size.



8.4.2 Effect on level of physical activity and knowledge of diet

In addition to the physiological variables, the effect of the intervention was also assessed for levels of physical activity and knowledge of diet of the participants. These are summarised in Table 8.3 below.

Table 8.3 Intervention effect on physical activity and knowledge of diet (n = 30)

Variable	Mean (SD)		t-value	df	p-value	eta squared
	pre-test	post-test				
*Walking	197.45 (139.70)	233.75 (128.40)	-2.521	29	0.17	0.18
*Moderate PA	247.06 (374.23)	514.00 (385.67)	-6.081	33	0.000	0.53
*Total PA	542.90 (755.33)	773.90 (715.63)	-6.759	29	0.000	0.61
**Diet knowledge	48.75 (15.86)	82.50 (15.95)	-7.724	29	0.000	0.67

*All 3 variables measured in MET-minutes/week **measured in percentage (%)

A paired samples t-test was conducted to evaluate the impact of the intervention on moderate physical activity, walking and total physical activity MET-minutes/week. There was a statistically significant increase in **moderate PA** from time 1 (M=247.06; SD=374.23) to time 2 (M=514.00; SD=385.67), $t(33) = -6.081$, $p < 0.05$ (two-tailed). The mean increase in moderate PA was 266.94 (95% CI: -356.249 to -177.633). The eta statistic (0.53) indicated a large effect size. Similarly, a statistically significant increase was obtained for **total PA** from time 1 (M=542.90; SD=755.333) to time 2 (M=233.75; SD=128.401), $t(29) = -6.759$, $p < 0.05$ (two-tailed). The mean increase in total PA was 231.00 (95% CI: -300.895 to -161.105). The eta statistic (0.61) indicated a large effect size. No statistically significant increase was found for **walking** from time 1 (M=197.45; SD=139.704) to time 2 (M=233.75; SD=128.401), $t(29) = -2.521$, $p = 0.16$. The eta statistic indicated a small effect size. There was a statistically significant increase in **knowledge of diet** from time 1 (M=48.75; SD=15.83) to time 2 (M=82.50; SD=15.95), $t(29) = -7.724$, $p < 0.05$ (two-tailed). The mean increase in knowledge of diet was 43.75 (95% CI: -42.686 to -24.814). The eta statistic (0.67) indicated a large effect size.

8.4.3 Effect on self-efficacy

Self-efficacy was measured using 13 statements from the validated and reliable Diabetes Care Profile (Fitzgerald et al., 1996). Clients rated each item using a 5-point Likert scale ranging from *poor* to *excellent* across the 13 items (1 = poor; 2 = fair; 3 = good; 4 = very good; 5 = excellent). A total score was calculated for the participants, ranging from 13 to 65. A score close to 13 imitate low self-efficacy; close to 30 imitate moderate self-efficacy and closer to 65 imitate excellent self-efficacy.

A paired samples t-test was conducted to evaluate the impact of the intervention on self-efficacy. There was a statistical significant increase in **self-efficacy** from pre-intervention (M=31.20; SD=6.483) to post-intervention (M=41.50; SD=3.721), $t(29) = -11.320$, $p < 0.05$ (two-tailed). The mean increase in self-efficacy was 10.30 (95% CI: -12.161 to -8.439). The eta statistic (0.82) indicated a large effect size, as summarised in Table 8.4.

Table 8.4 Intervention effect on self-efficacy

Variable	Mean (SD)		t-value	df	p-value	eta squared
	pre-test	post-test				
Self-efficacy	32.20 (6.483)	41.50 (3.721)	-11.320	29	0.000	0.82

8.4.4 Effect on stage of change for physical activity and diet

The Transtheoretical Model's (Prochaska & Velicer, 1997) five stages, namely pre-contemplation, contemplation, preparation, action and maintenance were used to assess participants' readiness to adopt a more physically active lifestyle and healthier diet. The

participants had to select the statement/stage that best described their current ‘stage’ for physical activity and diet respectively at the time of data collection.

Table 8.5 Intervention effect on stage of change for physical activity and diet

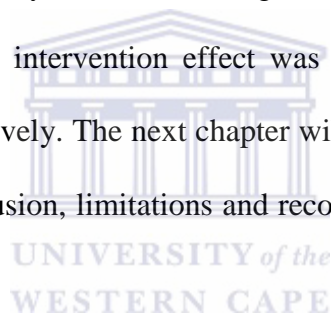
Variable	pre-test (n,%)	post-test (n,%)
<u>PHYSICAL ACTIVITY</u>		
Pre-contemplation	8(26.7)	-
Contemplation	15(50.0)	-
Preparation	3(10.0)	3(10.0)
Action	2(6.7)	25(83.3)
Maintenance	2(6.7)	2(6.7)
<u>DIET</u>		
Pre-contemplation	-	-
Contemplation	9(30.0)	-
Preparation	11(36.7)	-
Action	10(33.3)	30(100)
Maintenance	-	-

A clinically significant change in the stage of change for both physical activity and diet was observed post-intervention. As shown in Table 6.5 above, for physical activity, almost one third of the participants (n=9, 30%) were in the pre-contemplation and contemplation stage, 10% were in the preparation stage, whereas 13.3% (n=4) were in the action and maintenance stage before the intervention. After the implementation of the intervention, none of the participants were in the pre-contemplation and contemplation stage, while the majority of the participants (n=25, 83.3%) moved to the action phase. Similar changes were reported for diet. Pre-intervention, 30% of the participants were in the contemplation stage, while 36.7%

and 33.3% were in the preparation and action stage respectively. After implementation of the intervention, all the participants (n=30, 100%) were in the action stage for diet.

8.5 SUMMARY OF THE CHAPTER

This chapter provided the results of the analysis assessing the effects of the intervention programme. The health promotion intervention for clients with type 2 diabetes mellitus was implemented in an urban community health center (CHC) in the Cape Metropolitan district of the Western Cape and was successfully delivered by the researcher for six (6) weeks. The key findings were the statistically significant change in a number of outcome measures such as weight, BMI, random blood glucose (HGT), systolic blood pressure, moderate physical activity levels, total physical activity levels, knowledge related to diabetes and diet and self-efficacy. In addition, a clinical intervention effect was reported for stage of change for physical activity and diet respectively. The next chapter will provide an overall discussion of the study. In addition, the conclusion, limitations and recommendations of the present study will be outlined.



CHAPTER 9

DISCUSSION, CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

9.1 INTRODUCTION

The main aim of this study was to develop, implement and determine the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban community. This chapter provides an integrated discussion of the different phases outlined in the preceding chapters. As the UK MRC framework was used as a guide for the current study, the discussion will be outlined in the stepwise approach proposed by the framework. This includes a discussion on the understanding of the problem, the development of the intervention and the effectiveness of the intervention.

9.2 AN UNDERSTANDING OF THE PROBLEM

The important aspects to uncover in an attempt to understand the problem of type 2 diabetes mellitus are the risk factors of the disease; patients' beliefs and adherence to treatment; health services; health professionals' prescribing practices; policies on the prevention of the disease, its complications and the social context.

9.2.1 Risk factors for type 2 diabetes mellitus and its complications

The prevalence of the “disease of affluence” in South Africa has increased drastically over the years (Somers et al., 2006) due to population growth, ageing populations, dietary changes and sedentary lifestyles, all of which are associated with westernisation and urbanisation (Mensah et al., 2004; Wild et al., 2004; Mennen & Mbanya, 2000). Recognizing the burden and contributing factors to the increased prevalence of type 2 diabetes mellitus is crucial to health promotion programmes for people living with the disease. Amid the growing concern

of unhealthy lifestyles of clients with type 2 diabetes mellitus and inadequately trained health care professionals at primary health care facilities (Beran & Yudkin, 2006, Peyrot et al., 2006), this study focused on the development and implementation of a health promotion programme for clients with type 2 diabetes mellitus from an urban South African community.

The rising prevalence of diabetes in the urban population could be attributed to the loss of certain protective factors, consequent to modernization. Decreased physical activity and the adoption of a westernised diet contribute to the high prevalence of obesity, one of the major causative factors to poor glycaemic control and the development of diabetic complications, especially in developing countries being the worst affected by the pandemic (Serjeantson & Zimmet as cited in Simpson, Shaw & Zimmet, 2003; Zimmet, 2002). Modifiable risk factors appear to be foremost determinants for developing diabetic complications in Sub-Saharan Africa (Mennen & Mbanya, 2000). In the present study, more than half (54.9%) of the clients with type 2 diabetes mellitus were classified as obese and almost two thirds as overweight (31.1%) respectively. This could have a negative influence on their glycaemic control and should be a pointer to the fact that health promotion programmes cannot only concentrate on one health risk behaviour but multiple health risk behaviours such as physical inactivity and diet.

A substantial number of the participants were classified physically inactive. More than half (54.0%) of the clients with type 2 diabetes mellitus accumulated < 600 MET-min/week of physical activity, therefore considered sedentary. This finding is in contrast to findings of studies reported elsewhere in both international and African countries, in which the prevalence of inactivity were 37.2% (Deshpante, Lovegreen, Baker & Brownson, 2005),

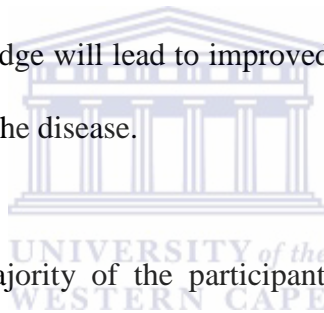
39.7% (Kabanda & Phillips, 2011) and 44% (Morrato, Hill, Wyatt, Ghushchyan & Sullivan, 2007). Results of the present study is in stark contrast to a national study by Nel, Van Rooijen, Van der Westhuizen, Viljoen, Steenkamp and Mamadi (2007) where 26.15% of the participants had low levels of physical activity. A possible contributing factor to the high percentage of sedentary participants in the present study could be whether the clients fully understood the concept of physical activity. Consequently, potentially important sources of physical activity such as habitual activities, even though it is not commonly perceived as exercise, are not taken into account. Furthermore, methods of assessing physical activity differ. Kabanda & Phillips (2011) and Nel et al. (2007) employed the long version of the IPAQ, whereas the IPAQ short version was used in the present study.

Certain challenges with physical exercise were communicated by the clients. The barriers established by qualitative analysis included: safety in the neighbourhood, lack of time, changing a bad habit, general feeling of well-being or health-related conditions and no one to exercise with. These findings replicate previous studies that examined exercise preferences and barriers to physical activity in people with type 2 diabetes mellitus in both the developing and developed context (Ganiyu, Mabuza, Maletse, Govender & Ogunbanjo, 2013; Kahn, Al-Adbul Lateef, Al Aithan, Bu-Khamseen, Ibrahim & Kahn, 2012; Nel et al., 2007; Wanko, Brazier, Young-Rodgers, Dunbar, Boyd & George et al., 2004). People's perception of unsafe neighbourhoods resulted in a broad range of negative effects. It decrease physical activity (Foster & Giles-Corti, 2008), resulting in obesity (Fish, Ettner, Ang & Brown, 2010; Burdette & Hill, 2008) and mental health problems (Baum, Ziersch, Zhang & Osborne, 2009). The number of obese participants who was classified as having low (64.94%) physical activity levels was significantly higher than those classified as having moderate (49.30%) physical activity levels.

The participants in this study are from a socio-economically deprived community; hence the lack of access to safe pathways or parks and the high levels of crime and low safety in their neighbourhood could contribute to their low physical activity levels. Although addressing issues such as neighbourhood safety and gang violence seems like a daunting task, requiring the collaboration between several national and local government departments and community forums, interim solutions, for instance tailored physical activity programmes within the community such as physical activity classes within community halls by lay health educators could be seen as a possible solution to increase physical activity participation in the respective community. This type of intervention will not only provide a safe environment for physical activity but it will also address social support issues, such as the desire to exercise with others and provide opportunities for socialization. Research has shown that multidisciplinary community activity programmes that take language use and acculturation into consideration can be successful in increasing physical activity participation (Abraido, Lanza, Chao & Florez, 2005; Evenson, Sarmiento & Ayala, 2004). Apart from the environmental factors contributing to physical inactivity of the clients, personal factors such as low motivation to change a bad habit are also a major challenge for some of the clients. It is very difficult to change a bad habit if you do not have the motivation and know-how to do so. The clients' inability to set themselves reachable goals and stick to it could further underwrite their sedentary habits.

Both physical inactivity and obesity contributes to insulin resistance, a critical component in the pathogenesis of type 2 diabetes mellitus (Bennett, 2000). According to Ganong (2005) there is a linear relationship between body weight and insulin resistance. Increased body weight, especially visceral fat, contributes to increased insulin resistance which has a

negative impact on glucose release from the liver as well as an associated decrease in glucose transport in adipose tissue. Daily diet has an influence on weight, visceral obesity as well as insulin resistance. Increased consumption of carbohydrates and animal fat leads to obesity, a risk factor of type 2 diabetes mellitus and its complications (Hu et al., 2001; Meyer et al., 2001). Knowledge of the influence of specific food on diabetes management is crucial for good glycaemic control. An alarming 80.30% of the participants had inadequate knowledge of diet and nutrition. Although no specific figures are available from other studies, several researchers reported that poor knowledge of diet and nutrition underwrites poor glycaemic control and the development of diabetic complications (Mokdad et al., 2001; Liu et al., 2000). Poor knowledge with regards to diet and nutrition is therefore a crucial element to address in any health promotion activity or strategy for individuals with diabetes mellitus. It is assumed that improved knowledge will lead to improved glycaemic control and a decrease in complications associated with the disease.



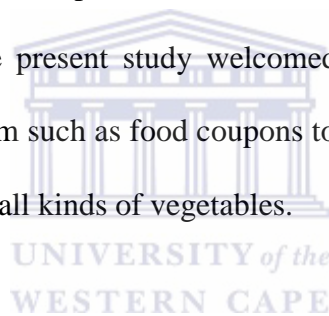
As for physical activity, the majority of the participants reported that they find it very difficult to follow a healthy eating plan. Several reasons were given, i.e. living circumstances, work environment, financial constraints and other people's understanding of the disease. The results of the present study were similar to research from Ganiyu et al. (2013), Kahn et al. (2012) and Misra and Khurana (2008) that also reported the above-mentioned challenges in following a healthy eating plan. In the present study it was evident that the clients did not have the knowledge to substitute unhealthy food with healthier options of more or less the same price. They were of the opinion that all healthy foods are expensive. The above findings emphasize the clients' involvement in unhealthy lifestyle behaviour and strong support for health promotion interventions that do not only promote the adoption and maintenance of a healthy lifestyle but also promote self-management techniques. In addition,

the generic health promotion pamphlets will not be effective to convey all the information needed to adopt and maintain a healthy lifestyle.

9.2.2 Patients' beliefs and adherence to treatment

Complications caused by ineffective management of type 2 diabetes mellitus leads to premature death globally (Diabetes SA, 2008). Self-management is an essential part of diabetes care and Sarkar, Fisher and Schillinger (2006) advocate that self-efficacy, a person's confidence in their ability to perform certain health behaviours, plays a key role in which behaviour they will partake in. In the present study, low levels of self-efficacy were found (mean = 31.56, SD=7.089) with males having significant lower self-efficacy scores (mean = 27.45, SD = 5.260) than females (mean = 33.52, SD = 8.151, $t = -2.245$, $p = .032$). This finding is different to that of Mostert Wentzel, Nel, Van Rooijen, Francis, Gibbs and Hacker et al. (2008) which reported similar levels of self-efficacy for male and female participants. Comparisons should nevertheless be made with caution as these studies differed methodologically. Mostert Wentzel et al. (2008) employed the 8-item IDEALL baseline questionnaire (Coyne & Smith, 1994) and the participants in their study were from diverse ethnicity groups. In addition, the researchers had more or less the same frequency of male (49%) and female (51%) participants in their study. The present study employed the scale from the Diabetes Care Profile (Fitzgerald et al., 1996), participants were predominantly from the Coloured population group and the majority of the participants were female (64.5%). The findings are however a pointer to the fact that health promotion programmes should aim to increase self-efficacy of individuals. This could result in better self-management, improved glycaemic control and the delay in the development of diabetic complications.

Based on the qualitative data, the challenges that clients face in their efforts to adhere to the care and management programme for diabetes can be classified in two groups: challenges related to the individual, i.e. cost of transport, cost of prescribed healthy food and monitoring of blood glucose while challenges related to the health care delivery system included poor organization, long waiting time and queues, unfriendly staff and meager care and management skills of health care professionals. At the individual level, the prime challenge faced by almost all the clients with type 2 diabetes mellitus was the lack of finances for transport and purchasing of healthy prescribed food. The challenge of lack of finance observed in the present study is consistent with observations made by Ganiya et al. (2013) in Botswana and Khan et al. (2012) in the Al Hasa district of Saudi Arabia where financial constraints was reported to play an important role in the quality of self-management of the disease. The participants in the present study welcomed the suggestion that government should employ an incentive system such as food coupons to assist them in purchasing healthy food, i.e. sugar replacements and all kinds of vegetables.

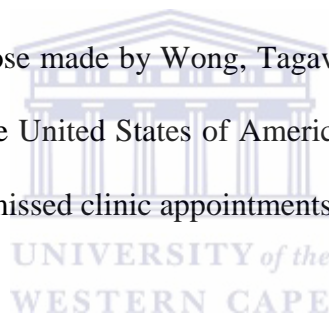


9.2.3 Health services

Regarding diabetes care, a number of challenges related to the healthcare facility were mentioned. Findings from both quantitative and qualitative data in the present study suggest that clients with type 2 diabetes mellitus' are not satisfied with the quality of care received at the primary health care facilities. Aspects in need of attention included: waiting time in the clinic waiting room to see a health care professional, ease of getting information from clinic staff and clarity of instructions upon leaving. Almost all the participants that responded to suggestions for improvement of services at the community health care centers were concerned about the shortage of staff, especially the availability of medical doctors and nursing staff. It was also suggested that doctors spend more time per visit and that more

accurate instructions upon leaving and better feedback regarding results of blood tests are given.

Lack of 'personalised' care on the part of health care professionals may have a longtime impact on the perceptions of patients towards the service delivery. Some of the clients in the present study were unhappy with the short consultation times as well as seldom seeing a medical doctor. These concerns were also found in a study by De-Graft Aikins (2002) in Ghana where the researcher noted that the traditional medical hierarchy has an intimidating effect on the doctor-patient relationship. The long waiting time in the clinic waiting room, sometimes more than two hours, was also stated to be a problem for the clients. Some of them noted that this was a factor in their decision to miss their scheduled appointments. This observation is consistent with those made by Wong, Tagawa, Hsieh, Shapiro, Boscardin and Ettner (2005) in their study in the United States of America where long waiting times at the clinic contributed to subsequent missed clinic appointments.



The health care professionals shared the same sentiments as the clients with regards to lack of manpower and time and reported that the overarching challenge in the management of type 2 diabetes mellitus is poverty. Poverty contributes to so many aspects that impede the management of the disease. Furthermore, lack of appropriate awareness programmes, clients' non-adherence to non-pharmacological management and the fact that experts in the field of health promotion are not part of the multidisciplinary team, made their task very difficult.

Measuring patient satisfaction with health care services has been recognized as an important component in assessing service quality (Phaswana-Mafuya, Davids, & Senekal, et al., 2011;

Ajayi, Olumide & Oyediran, 2005; Andaleeb, 2001). Patient perspectives about the level of care can result in feedback useful for promoting higher quality standards of patient care (Peltzer, 2009). The South African Department of Health's policy on quality in health care (DOH, 2007) reiterates that public services need to respond to clients' requests and expectations. It is of utmost importance that relevant authorities address the shortage of staff at primary health care facilities and oversee the implementation of health promotion programmes at the facilities as well as in the communities. The feedback from patient satisfaction surveys could assist with improved prioritization and allocation of resources and it will also serve as a platform for providing better services to citizens.

9.2.4 Health professionals' prescribing practices

While the world-wide epidemic of type 2 diabetes mellitus poses great challenges on health care providers, evidence suggests that strategies such as tight glycaemic, blood pressure and lipid control are needed to reduce the adverse effects of this debilitating disease (Young, Taylor, Friede, Hollis, Mason & Lee et al., 2005). Most of the patients with diabetes obtain their medical care from primary health care facilities. Algorithms for diabetes care exist, but it may be multifaceted and difficult for health care providers to follow it, given their patient load, time constraints, and diversity of patients seen. Hence the quality of disease management often fails to achieve the predefined standards (Kim & Oh, 2003). Findings from the present study shared the sentiments of Kim and Oh (2003) as the health care professionals reported that due to the high volume of patients per day, not enough time could be spent with each client, hence a negative impact on the quality of care given to the clients. Another concern of the health care professionals was that experts in health promotion are not involved in managing patients with diabetes. This finding replicates a previous study by Ramaiya (2005) which noted that many health care professionals were not knowledgeable

about the nature of the health education they needed to provide to their patients at primary health care facilities in Tanzania. It is thus evident that where a primary health care facility does not have the services of a permanently employed health care promoter, all health care professionals working at such a facility should receive training to do health education.

Health care professionals' beliefs, attitudes and knowledge influence patients' adherence to the prescribed regimen (Puder & Keller, 2003). The researchers also stated that many doctors consider type 2 diabetes mellitus to be a less serious disease. This is of great concern as Dietrich (1996) found that if the doctor downplay the disease at the time of diagnosis, the patient tend to perceive their diabetes as not serious. A study by Larme and associates on the attitudes of primary care providers toward diabetes revealed that most of the providers considered diabetes harder to treat than hypertension, angina, hyperlipidemia and arthritis (Larme & Pugh, 1998). The in-depth interviews of their study further found that the clinicians doubt the efficacy of their treatment and their own abilities to carry it out. Negative attitudes of clinicians may counteract the efficacy of diabetes management as it could influence the patients' empowerment in diabetes self-management (Larme & Pugh, 1998). The findings of the present study are promising and in stark contrast to the above studies as the health care professionals had positive attitudes toward all five subscales of the DAS-3, namely the need for special training, seriousness of diabetes mellitus, value of tight control, psychosocial impact of diabetes mellitus and patient autonomy.

Given the epidemic nature of type 2 diabetes mellitus and the benefits of physical activity in the management of the disease, physical activity should be a key therapeutic strategy for the diabetes care team. However, research has shown the promotion of physical activity in type 2 diabetes mellitus management is generally inadequate. The majority of people with type 2

diabetes mellitus are inactive and attempts to become more active are often met with failure (Kirk, Barnett & Mutrie, 2007). In the present study results of the PAEI scale indicates that although most of the health care professionals (61.1%) discuss the topic of physical activity, the benefits thereof as well as giving advice on how to become more physical active, most of them seldom (55.6%) or never (11.1%) discuss the difficult situations patients might encounter or have in trying to become more physical active. This is a concern as the identification of perceived barriers to physical activity participation and instruction on how to overcome them could considerably enhance adherence to physical activity (Kirk et al., 2007). Another finding of the present study indicates that most of the health care professionals never (61.1%) or seldom (16.7%) assist the clients with a written plan to become more physical active, including setting of achievable goals. Goal setting and self-monitoring of progress are important sources of self-motivation. Kirk et al. (2007) in their study found that setting realistic goals and providing examples of how other individuals with diabetes have changed their physical activity behaviour, increased the patients' self-efficacy, and hence their motivation to commence and adhere to a physical activity programme. The above findings draw the attention to the need for the employment of a specialist in physical activity, a physiotherapist at each primary health care facility. The physiotherapist should form part of the multidisciplinary team that see to clients with type 2 diabetes mellitus and specifically address their physical activity needs. The physiotherapist could also implement a physical activity programme in the community.

9.2.5 Policies on the prevention of type 2 diabetes mellitus and its complications

A detailed review of both international and national policies was completed (Chapter 2). When considering the UK MRC framework, it becomes clear that understanding the policies guiding practice, is an important aspect in attempting to understand the problem. The policy

guiding diabetes care in South Africa (SEMDSA) based on the policy used by the Canadian Diabetes Association, clearly address diabetes mellitus, with clear measurable outcomes. In addition to the diagnostic criteria outlined, physical activity and nutritional therapy guidelines are clearly described in this policy. So the question arises whether the policy is translated into action? On close examination of the policy guiding practice in the Western Cape however, it is concerning to note that the local policy on diabetes care is not including specific measurable outcomes for diagnosis and management of diabetes mellitus, as indicated in the national policy. The implementation of the policies is also questionable. Are adequate measures taken to ensure the implementation of policies? When one consider the low levels of physical activity and poor knowledge with regards to diet and nutrition, the translation of policy into practice becomes questionable.

9.2.6 Social context

Many societal impediments such as poor education, illiteracy and low socioeconomic rank also contributes to the diabetic pandemic (Levitt, 2008; Rabi et al., 2006). Apart from self-efficacy being a key component of effective self-management, previous studies highlighted the role of social support in the management of diabetes. Westaway, Seager, Rheeder and Van Zyl (2005) reported that widowed women experienced more difficulties with diabetes management and care as a consequence of less emotional support while Samuel-Hodge, Headen, Skelly, Ingram, Keyserling and Jackson et al. (2000) argued that a family-centered approach is more effective in diabetes self-care. These findings are echoed by Nagelkerk, Reick and Meengs (2006) and DiMatteo (2004) who have shown that support from a spouse are associated with low levels of depression, higher motivation to adhere to treatment and a greater self-efficacy regarding the treatment regimen. In the present study, males scored significantly higher than females in all the statements regarding support received from family

and friends. This could be a contributing factor to the lower self-efficacy scores of males in the present study, as they could rely too much on their family and friends to assist them in the management of their disease.

9.2.7 Conclusion

The first phase of the study, i.e. to gain an understanding of the problem of diabetes mellitus, drew largely on the Socio-Ecological Model (SEM) (McLeroy et al., 1988) that outlines multiple levels of influences that determines behaviours and emphasizes interdependence of these levels, which interact to influence diabetes care and management strategies. According to Lopez-Class and Jurkowski (2010) the multiple levels include:

- *intrapersonal* factors, such as knowledge, attitudes and skills related to diabetes management;
- *interpersonal* processes such as social support that influence behaviour both positively or negatively;
- *institutional*-level influences such as the health care facilities' impact on health care experiences (policies, clinic hours, waiting time, language use, health care professionals' guidance on self-management)
- *community*-level influences such as location of health care facility, access to healthy food, places to safely engage in physical activity; and
- *public policy*-level which includes policies on a local and national level.

With the SEM as the theoretical and conceptual backdrop to the first phase, it is highlighted that apart from individual factors such as self-efficacy and knowledge, detailed attention must be paid to the role of the social context, i.e. community, institutional and organizational factors' influence on diabetes care and management practices. The implication of these

findings is that the social environment carries both the potential to underpin poor care and management but also carries the potential to ameliorate unhealthy lifestyles and to support the adoption of healthy lifestyle and provision of adequate care and management of the disease. From the perspective of the SEM, the major obstacle to good care and management of diabetes is the lack of health promotion programmes at both community and institutional levels that could empower clients with type 2 diabetes mellitus to take responsibility of their health through proper self-management strategies. It is thus clear that unless health promotion is directed to the entire at-risk audience and the larger communities in which the audience is ingrained, success in changing individuals lifestyle behaviour and effecting sustained behaviour change will be inadequate.

9.3 THE INTERVENTION

According to the United Kingdom MRC framework (MRC, 2000) the development of an intervention is the most challenging part in determining the effectiveness of a programme. It is well known that type 2 diabetes mellitus is caused by more than one behavioural risk factor and that these risk factors co-occur. Most health promotion interventions focus on a single behavioural risk factor at a time. There is thus an unrelenting need for interventions that can effectively address multiple risk factors (Prochaska, Nigg, Spring, Velicer & Prochaska, 2010; Prochaska, Velicer, Nick & Prochaska, 2008; Goldstein, Whitlock & DePeu, 2004).

In response to the concerns regarding the lack of knowledge, poor self-efficacy and unhealthy lifestyle of clients with type 2 diabetes mellitus, a health promotion intervention was developed to address aspects that increased the risk of poor self-management and hence the development of complications in clients with type 2 diabetes mellitus from an urban community. Several steps were taken in the development of a health promotion programme

for clients with type 2 diabetes mellitus. Firstly, literature regarding diabetes self-management techniques and different strategies to deliver health promotion programmes were reviewed to gain insight into the best evidence-based practices. The outcome of this was clearly outlined in Chapter 2 under 2.7. Secondly, data was analysed from phase 1 (outlined in Chapter 4) and phase 2 (outlined in Chapter 5) and informed the design phase of the health promotion programme. Lastly, consensus on the content of the health promotion programme was reached with a Delphi study (outlined in Chapter 6). All the aforementioned phases contribute to the theoretical (preclinical) and modelling (Phase 1) phases of the UK MRC framework (see Figure 9.1), as outlined by Murchie, Hannaford, Wyke, Nicolson and Campbell (2007).

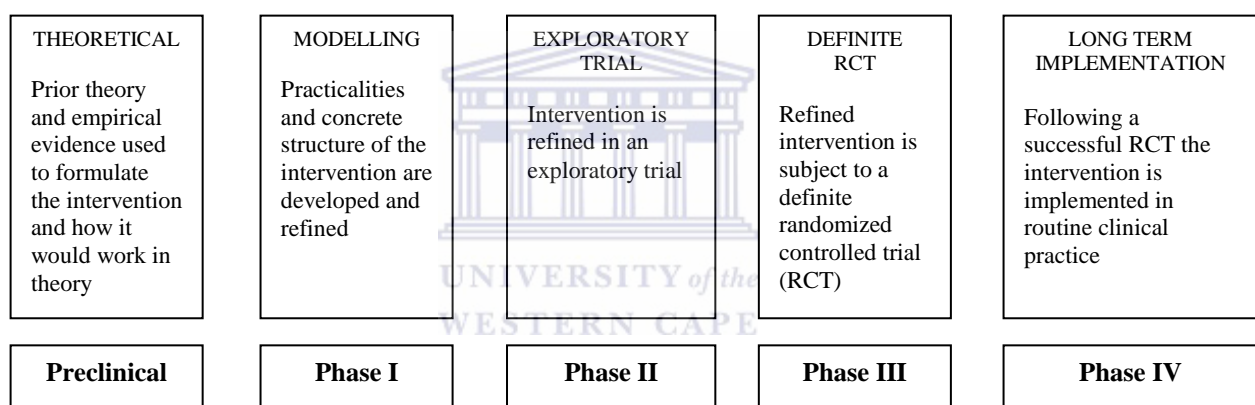


Figure 9.1 The MRC framework for design and evaluation of complex interventions (Murchie et al., 2007)

In addition, the acceptability of the intervention in a primary health care setting was assessed. In real-life settings health interventions are normally delivered by staff members; hence the requirement of feasible and flexible interventions, compatible with the functioning of the health care facility (Jansen, Haveman-Nies, Duijzer, Beek, Hiddink & Feskens, 2013). A workshop was conducted for the health care professionals of the CHC prior to the implementation of the intervention to consider their suggestions regarding the

implementation process and the content of the intervention. Several researchers pointed out that adaptation decisions should be made collectively by both the developers of the intervention and stakeholders in the facility where the intervention will be implemented (Lee, Altschul & Mowbray, 2008; Murchie et al., 2007; McKleroy, Galbraith, Cummings, Jones, Harshbarger & Collins et al., 2006). The present study thus add to the body of knowledge of this process as only a few studies regarding such joint decision making could be found to date (Gray, Allan, Murchie, Browne, Hall & Hubbard et al., 2013; Muchie et al., 2007). The study therefore provided the stakeholders (health care professionals at the selected CHC) with sufficient information to decide whether the intervention can be done and whether it would benefit the anticipated users (Castro & Mylopoulos, 2002). This process assisted with the ‘buy in’ of the health care professionals in the implementation of a health promotion intervention at the CHC.



9.4 EFFECTIVENESS OF THE INTERVENTION

The implementation of the intervention draws upon the second phase of the UK MRC framework, namely the exploratory trial (Murchie et al., 2007). When determining the effectiveness of an intervention, convincing evidence of the effectiveness or the lack thereof should be provided, as reiterated by the UK MRC framework (2000). As indicated earlier in this thesis, the intervention must engage the target group and affect pathways amenable to change. The final phase of the study therefore aimed to objectively determine the effectiveness of a developed health promotion programme for clients with type 2 diabetes mellitus. In addition to the pre-test post-test data, facilitators of the programme kept record of recruitment of clients for the programme, dropout and reasons for dropout as this also formed part of judgement regarding effectiveness of the implemented programme.

Although participation of people from lower socio-economic status is often inhibited by barriers such as lack of transportation, lack of money or child care issues (Cabral, Napoles-Springer, Miike, McMillan, Sison & Wrensch et al., 2003), the retention rate of this study (88.2%) is consistent with other studies from developing countries' retention rates of 80% to 90% (Collins-McNeil, Edwards, Batch, Benbow, MsDougald & Sharpe, 2012; Van Rooijen et al., 2010; Vincent et al., 2007; Brown, Blozis, Kouzekanani, Garcia, Winchell & Hanis, 2005; Lorig, Ritter & Jacquez, 2005). The high retention rate of the present study contribute to the strength of the study.

A primary objective was to evaluate the effectiveness of the health promotion programme on physiological outcome measures, diabetes-related knowledge, levels of physical activity and self-efficacy, which will be discussed below.

9.4.1 Effect on physiological outcome measures

The findings from the present study indicated that the intervention implemented had statistically significant effects on random blood glucose (HGT), weight, BMI and systolic blood pressure. The mean decrease in **blood glucose (HGT)** was 0.49. Similar findings were obtained in a study by Vincent et al. (2007) that reported a mean decrease of 0.46, although the HGT measurement was taken at 12 weeks and not at 6 weeks as in the present study. A smaller mean decrease of 0.3 in HGT was found for the intervention group at four months in a study conducted by Deakin et al. (2006). Although a large effect size was reported after six-weeks implementation, the participants in the present study did not reach the target of <7.0 mmol/l, as recommended by the 2102 SEMDSA guidelines for the management of type 2 diabetes mellitus (mean score of 7.57; SD=1.10). The results is promising as research indicated that even a small change in the blood glucose levels of

patients could lead to a delay in the development of diabetic complications (De Vries, 2011; Walker, 2008).

A statistically significant result was obtained for **systolic blood pressure (SBP)** with a mean decrease of 5.93mmHg (95% CI = 3.678 – 8.189). This finding is in line with a study by Deakin et al. (2006) who reported a mean decrease of 4.9mmHg at four months for the intervention group. Although the finding of the present study is less than the mean change of 9mmHg in a study of Collins-McNeil et al. (2012), a study by Whelton, He, Appel, Cutler, Haves and Kotchen et al., (2002) has shown that in the general population, a reduction in SBP as small as 5mmHg can lead to a 14% reduction in mortality due to stroke, 9% reduction in mortality due to coronary heart disease and a 7% decrease in all-cause mortality.

The mean decrease in **weight and BMI** after six weeks was 1.433kg and 0.51 respectively. These results are consistent with findings from other studies (Vincent et al., 2007; Brown, Garcia, Kouzekanani & Hanis, 2002; Norris, Engelgau & Narayan, 2001), although the duration of the interventions differ. A recent church-based culturally targeted diabetes self-management education intervention by Collins-McNeil (2012) reported minimal change in weight and BMI after the 12-week intervention. Deakin et al. (2006), in their application of the diabetes X-PERT programme, also reported a small weight loss of 0.5kg after four months. The dissimilarity in findings could be attributed to difference in content of the intervention, different teaching styles and motivation of patients to adopt a healthy lifestyle.

9.4.2 Effect on diabetes-related knowledge

As highlighted earlier, limited knowledge about diabetes could lead to unhealthy lifestyles and the development of diabetic complications among clients with type 2 diabetes. In

addition, improved knowledge leads to improved self-efficacy and diabetes self-management. The present study suggests that the health promotion intervention improved diabetes-related knowledge. Thus, with increasing knowledge, the clients have more potential to make the necessary lifestyle change and improve their diabetes self-management (Abdo & Mohamed, 2010; Vincent et al., 2007; Adolfsson et al., 2007).

The intervention was deemed effective for improvement of knowledge. The average score for overall knowledge of diet increased significantly from 48.75% pre-intervention to 82.50% post-intervention. The results of the present study compares well with research conducted in both developed and developing countries, although the increase in the present study was much higher (Van Rooijen et al., 2010; Abdo & Mohamed, 2010; Vincent et al., 2007; Adolfsson et al., 2007; Bardaran et al., 2006). In addition, the effect on the stage of change for diet was clinically significant as two thirds of the participants were in the contemplation and preparation phase before the intervention. All the participants (100%) were in the action phase post-intervention. A possible explanation for the big increase might be the 'Hawthorne effect'. This refers to the effect of being in the study might influenced the clients' behaviour. The participants could have felt the need to create a good impression; hence they became more interested in the topic because the researcher took an interest in them. In addition, the present study was implemented for six (6) weeks only, whereas the duration of the above-mentioned studies ranged between 12 weeks and 9 months. Knowledge about diabetes is foundational for self-management; hence the improvement in knowledge scores had clinical as well as statistical significance.

9.4.3 Effect on levels of physical activity

Physical activity became widely recognized as a key health behaviour, associated with reduced morbidity and mortality of chronic diseases of lifestyle such as hypertension and type 2 diabetes (Martinson et al., 2001; Prat et al., 2000) and diabetic complications (Gill & Cooper, 2008; Kriska et al., 2003). In addition, physical activity, has been shown to improve glucose tolerance (WHO, 2003; Boule et al., 2001) and insulin sensitivity (Irwin et al., 2000), reduce the use of diabetic medication, as well as assisting with weight loss and decreasing hypertension and complications of diabetes mellitus (Willey & Singh, 2003).

There was a statistical significant increase in the moderate and overall physical activity of the participants. The results are promising as a meta-analysis by Thomas et al. (2006) showed that exercise significantly improved glycaemic control and reduced visceral adipose tissue and plasma triglycerides, even without weight loss. Snowling and Hopkins (2006) and Sigal et al. (2007) noted that the greatest reduction in HbA1c was observed when aerobic and strengthening exercises were both included in the intervention. Therefore, the inclusion of aerobic and strengthening exercises in the intervention of the present study. In addition, the effect of the intervention on the stage of change for physical activity was clinical significant as none of the participants were in the pre-contemplation and contemplation stages post-intervention. This finding is promising as research has shown that individuals in the preparation and action phases are more likely to gain health benefits from exercise (Garber, Allsworth, Marcus, Hesser & Lapane, 2008).

9.4.4 Effect on self-efficacy

The substantial role of self-efficacy in behaviour has been emphasized strongly in literature. Bandura (1977) affirms that individuals with self-efficacy are aware of the fact that they can

achieve positive results of behaviour when they apply the right skills. Sarkar et al. (2006) asserted that higher self-efficacy is linked to better glycaemic control and self-management in patients with diabetes. The mean increase in self-efficacy was 10.30 with a pre-intervention mean score of 31.56 (SD = 7.809) and 41.50 (SD = 3.721) after the implementation of the intervention. Findings from the present study is in contrast to that of Sarkar et al. (2006) which reported fair self-efficacy levels in clients with type 2 diabetes mellitus. The finding is consistent with studies by Vincent et al. (2007) and Deakin et al. (2006) that found a significant increase in self-efficacy after implementation of an intervention. The results of the present study is therefore encouraging as research reiterate the importance of self-efficacy as a contributing factor to diabetes self-management and good glycaemic control; hence the delay in the development of diabetic complications.

9.5 CONCLUSION

To conclude the successes of the health promotion intervention, the lessons learnt and the challenges experienced will be outlined.

The prevalence of poor glycaemic control among urban clients with type 2 diabetes mellitus from primary health care facilities is high and many factors associated with these included poor diabetes-related knowledge, low self-efficacy and poor self-management. Thus far, little is being done in primary health care facilities to improve glycaemic control and prevent the development of diabetic complications among the clients and the current study was the first health promotion intervention for type 2 diabetes implemented in a primary health care facility in the Cape Metropolitan district of the Western Cape. To respond to this need, a health promotion programme was developed based on the United Kingdom Medical Research Council framework and implemented by the researcher through interactive educational

sessions which reached a group of 30 clients with type 2 diabetes mellitus. To a large extent the health promotion intervention has shown to be a promising and effective approach to increase knowledge, self-efficacy and self-management strategies needed to curb the burden of this debilitating disease. The intervention has shown a remarkable increase in diabetes knowledge, self-efficacy to manage their disease and the adoption of a healthier lifestyle. The strengths of the present study could justify widespread implementation the health promotion intervention in primary health care facilities. Lessons learned from the present study are summarized below to inform implementation of the intervention in all primary health care facilities in South Africa.

- Firstly, the intervention was well received and supported by the health care professionals of the CHC where it was implemented. The clients were also very positive about the intervention as none of them ever attended structured, interactive educational sessions regarding diabetes. It is important for the clients, their family, the community, health care professionals working at the primary health care facilities and stakeholders of the Department of Health to buy into the programme to assure long-term sustainability.
- Secondly, culturally-specific health promotion interventions are needed to be implemented not only at the health care facilities, but also in the community. This could assure that more people with diabetes are reached. There is need for government to provide funding to implement the programme in the communities.
- Lastly, the results of this study should dispel the use of generic information pamphlets, i.e. regarding diet and exercise for instance. Each client with diabetes should be seen by a dietician and physiotherapist for advice specifically designed for them regarding their diet and physical activity participation respectively. To boost unhealthy behavior in the clients, facility- or community-based health promotion

programmes should be offered to further promote knowledge, self-efficacy and self-management skills.

However, a number of challenges were encountered during the implementation of the intervention which could have affected the outcome of study:

- Firstly, it was very difficult to recruit participants for the implementation of the intervention due to outdated contact details on patient folders. Therefore the recruitment period was prolonged as clients could not be reached telephonically. It is suggested that patient contact details be updated regularly.
- Secondly, the availability of a suitable venue at the CHC was a concern. As no specific venue was allocated for the duration of the implementation of the intervention, the weekly sessions did not start on time.

The relevance of implementing a health promotion intervention in primary health care settings is gaining recognition. The constraints highlighted above could assist the future implementation of the intervention.

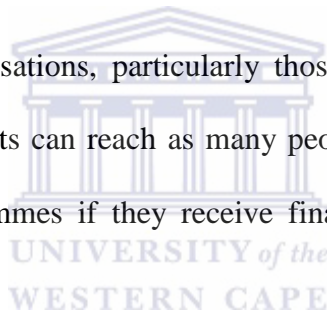
9.6 RECOMMENDATIONS

Based on the lessons learned from this study, the following recommendations are made for various stakeholders involved in health promotion for type 2 diabetes mellitus:

Government

- There is an urgent need for health promotion programmes for clients with type 2 diabetes mellitus at primary health care facilities and communities of urban areas.

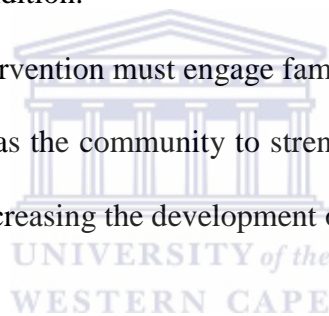
- The current provincial policy for the management of type 2 diabetes mellitus should be reviewed and replicate the national 2012 SEMDSA Guideline for the Management of Type 2 Diabetes policy.
- Clients with type 2 diabetes mellitus from urban areas at risk of developing diabetic complications (clients with poor glycaemic control and co-morbidities) should have access to their own blood glucose monitors to test their blood glucose daily.
- The safety and security in neighbourhoods should be addressed as this could contribute to the limited exercise people are participating in.
- The use of food coupons as incentive for those individuals that efficaciously maintain glycaemic control and their goal weight should be considered in lower socio-economic communities.
- Non-governmental organisations, particularly those working on chronic disease of lifestyle awareness projects can reach as many people in South Africa with diabetic health promotion programmes if they receive financial and administrative support from the government.
- In order to alleviate the current diabetes epidemic in people, proven health promotion interventions must be given increasing attention.



Primary Health Care Facilities

- The existing provincial policy guidelines for the management of type 2 diabetes mellitus in the Western Cape should be reviewed to incorporate aspects from the national policy, as mentioned above. Specific algorithms for the diagnosis and management of type 2 diabetes mellitus should be enforced and implemented in every primary health care facility.

- Facility- and community-based health promotion programmes should be implemented in the communities to enhance self-management skills of clients with type 2 diabetes mellitus.
- Clients should be empowered to take control of their health and prevent the development of diabetic complications.
- To achieve the best results, there must be coordinated activities between the health care facilities and Department of Health (Government) to provide proven services to clients with type 2 diabetes mellitus.
- It is recommended that all primary care facilities should have a specific allocated venue to accommodate for health promotion activities (sessions for small groups) concerning any health condition.
- The health promotion intervention must engage family members of clients with type 2 diabetes mellitus as well as the community to strengthen participation and adherence to management; hence decreasing the development of diabetic complications.



Researchers

- Future research should employ randomized controlled trials (RCT) with a large sample, involving both urban and rural populations.
- The sample for this study was predominantly from one ethnic group. It was therefore difficult to understand lifestyle patterns and management strategies along ethnic differences. Research is needed to better understand the effect of ethnic differences on the relationship between poor glycaemic control and factors that increase the risk of developing diabetic complications among people with type 2 diabetes mellitus.

- Researchers must collaborate with relevant stakeholders (e.g. government, community, NGOs, health care facilities) during the planning and design stage to facilitate effective implementation of the programme.
- The effect of the intervention should be assessed six (6) and 12 months post-intervention to assess adherence.
- Finally, the findings of evaluation should be made available to relevant stakeholder by publishing it in relevant journals and conference presentations.

9.7 LIMITATIONS OF THE STUDY

The findings of the present study should be interpreted in the light of the following limitations:

- Data were based on self-report, thus it is open to desirability bias where participants either over-estimate or under-estimate their true physical activity behaviour for instance. There was however sufficient evidence that such measures are reliable and valid (Craig et al., 2003; Woodward et al., 2000; Fitzgerald et al., 1998; Fitzgerald et al., 1996).
- Data were analyzed cross-sectionally. Consequently the results do not follow a causative model between the variables under investigation. The inferences from this thesis lends little insight to predict, explain or verify the results with regarding the observed correlation between adherence and the trait emotional intelligence.
- Although the baseline data of the study were collected from six (6) randomly selected CHCs in the Cape Metropolitan district of the Western Cape, the implementation phase of the intervention took place at one randomly selected CHC. The sample of the intervention study was relatively homogenous and may not be representative of

the general population of individuals with type 2 diabetes mellitus. Therefore generalization of the findings to other areas is limited.

- The participants for the intervention of the study were selected through non-random sampling technique, which limits any strong interpretation of the results.
- In addition, the sample size for the implementation phase of the study was relatively small and had no control group.
- Lastly, the internal validity of the research constituting the various phases of this thesis is limited to the degree to which confounding variables can be controlled. Many other variables may explain some of the variability between measured levels of knowledge and self-efficacy scores.



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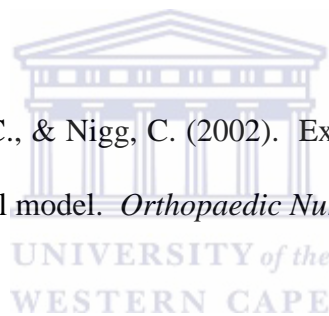
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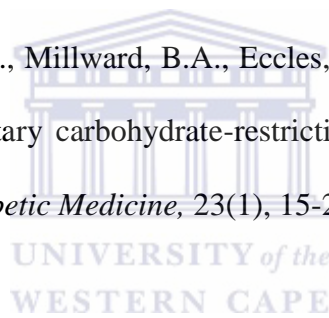
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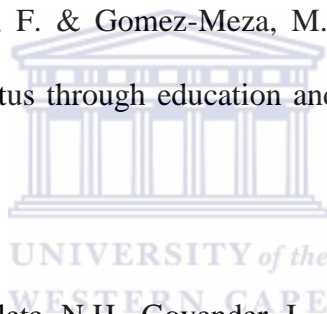
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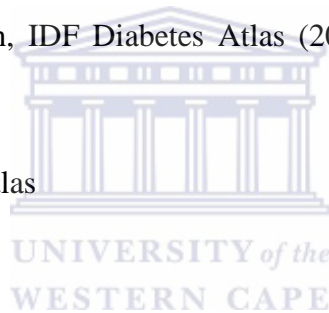
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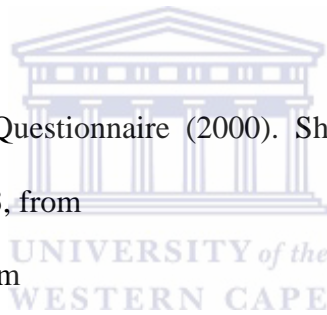
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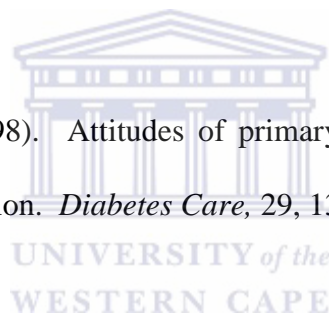
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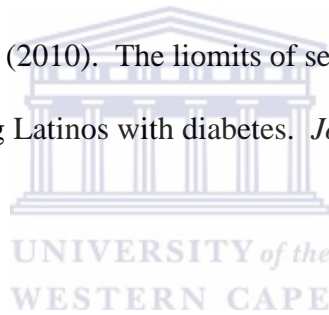
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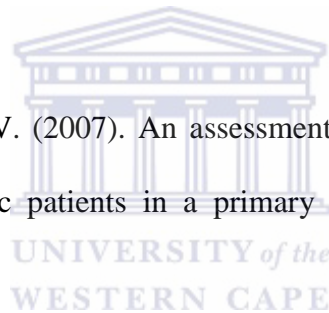
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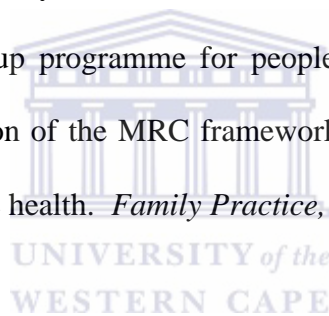
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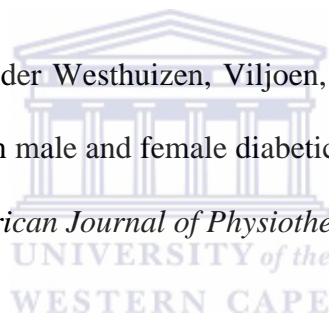
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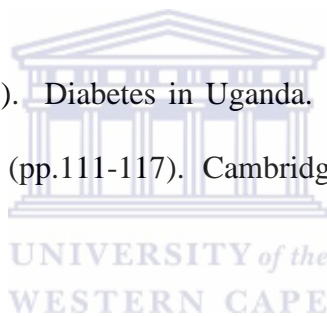
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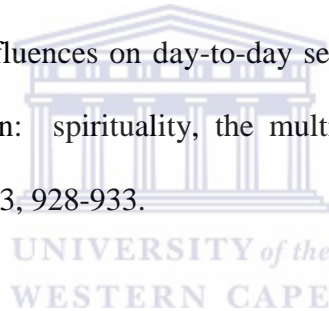
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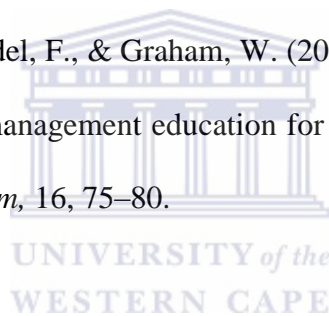
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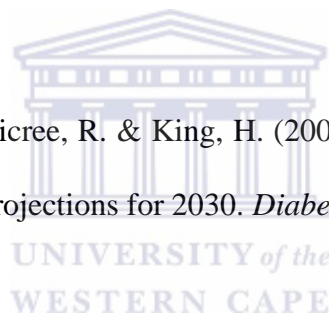
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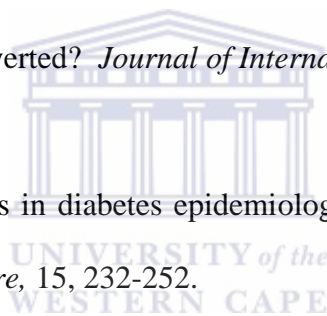
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09 May 2011

To Whom It May Concern

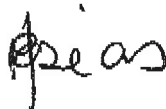
I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and ethics of the following research project by:
Ms T Steyl (Physiotherapy)

Research Project:

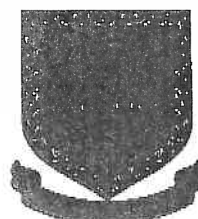
Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus from an urban South African community

Registration no:

11/4/2



*Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape*



**UNIVERSITY of the
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DEPARTMENT of HEALTH

Provincial Government of the Western Cape

COMPONENT

healthres@pgwc.gov.za
tel: +27 21 483 9976; fax: +27 21 483 9895
1st Floor, Deneys Reitz House, 8 Riebeeck Street, Cape Town, 8001
www.capegateway.gov.za

REFERENCE: RP 59/2011
ENQUIRIES: Dr N Peer

University of the Western Cape
Department of Physiotherapy
Private Bag X17
Bellville
7535

For attention: Tania Steyl

Re: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus from an urban South African community.

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research. Please contact the following people to assist you with any further enquiries.

Woodstock	Anette Rayners	(021) 460 9189
Lady Michaelis	Sr E Weavers	(021) 797 8171
Mitchells Plain	Ms Zethu Xapile	(021) 391 5820
Greenpoint	Sr Ada Smith	(021) 421 0288
Khayelitsha Site B	MNotshe	(021) 361 3816/3470

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final report within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (healthres@pgwc.gov.za).
3. The reference number above should be quoted in all future correspondence.

We look forward to hearing from you.

Yours sincerely,

DR T NALEDI

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 14/07/2011

CC DR K GRAMMER

DR G PEREZ

DR J CLAASSEN

DIRECTOR: SOUTHERN/WESTERN

DIRECTOR: EASTERN/KHAYELITSHA

DIRECTOR: KLIPFONTEIN/MITCHELLS PLAIN



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For attention: Tania Steyl

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Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research. Please contact the following people to assist you with any further enquiries.

Kensington CHC

Ms JD Lotegan

(021) 593 1150

Kindly ensure that the following are adhered to:

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3. The reference number above should be quoted in all future correspondence.

We look forward to hearing from you.

Yours sincerely

DR T NALEDI

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 22/09/2011

CC DR K GRAMMER

DIRECTOR: SOUTHERN/WESTERN



UNIVERSITY OF THE WESTERN CAPE

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E-mail: tsteyl@uwc.ac.za

INFORMATION SHEET

Project Title: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

What is this study about?

This is a research project being conducted by TANIA STEYL at the University of the Western Cape. We are inviting you to participate in this research project because you are a stakeholder at Primary Health Care level as a client with type 2 diabetes mellitus, or as a health care professional working at a Primary Health Care facility or as an expert in the field of health promotion. The purpose of this research project is to develop a health promotion programme for clients with type 2 diabetes mellitus that can be implemented at Primary Health Care facilities. The programme will be developed from self-administered questionnaires, focus group discussions, semi-structured interviews, a literature review, policy and document analysis and a Delphi study. The programme will be implemented where after the effectiveness of it will be assessed.

What will I be asked to do if I agree to participate?

You will be asked to:

- complete a **self-administered questionnaire (clients with type 2 diabetes mellitus and health care professionals)**. The clients that partake in the implementation phase of the study will be asked to complete another questionnaire after the implementation of the programme. It will take approximately 30 minutes to complete the questionnaire.
- participate in a **focus group discussion (clients with type 2 diabetes mellitus)** at a time that is convenient for you to explore the challenges experienced by you regarding the management of your disease. The focus group discussion will be tape recorded after informed consent were obtained and should not take longer than 30-45 minutes. All tapes will be destroyed once they have been transcribed and documented according to themes.
- participate in a **semi-structured interview (health care professionals)** at a time that is convenient to you to explore the challenges experienced by health care professionals in the management of clients with type 2 diabetes mellitus at Primary Health Care level. The duration of the interview should be no longer than 30 minutes per interview session.
- participate in **Delphi Study (specific stakeholders and experts)**. You will form part of a panel that will comment on content of the proposed programme as well as the outcomes of each stage of the programme. This information will be e-mailed to you for review and comment on through a series of e-mails. Once consensus has been reached you will be notified in writing and the programme will be finalized.

- participate in determining the effectiveness of the health promotion programme (**health care professionals**). Workshops will be held to educate/inform health care professionals regarding the implementation of the programme. Key issues such as perceived barriers to implementation, the outline and content of the programme as well as the patient booklet on diabetes care/management will be addressed.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality the following steps will be taken:

- **Questionnaires:** are anonymous and will not contain information that may personally identify you. A code will be placed on the survey. Through the use of an identification key, the researcher will be able to link your survey to your identity. Only the researcher will have access to the identification key. To help protect your confidentiality all information gathered will be stored in a locked filing cabinet. No unauthorised party will be able to access the information.
- **Focus group discussions and semi-structures interviews:** The focus group discussion will be tape recorded after informed consent was obtained. A code will be attached to all audio-taped data that will be linked to an identification key only known to the researcher. All tapes will be destroyed once they have been transcribed and documented according to themes. Transcribed data will be stored in a locked filing cabinet. No unauthorised party will be able to access the information.
- **Delphi study:** A code will be attached to each member of the panel. E-mails will be received and opened by the researcher only. The panel of experts will only receive your comments once a code has been attached to it. Your identity will not be disclosed at anytime.

If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

What are the risks of this research?

There are no known risks associated with participating in this research project.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about the specific health promotion needs of clients with type 2 diabetes mellitus. We hope that in future, other people might benefit from this study through improved health promotion strategies implemented at Primary Health Care level to better manage type 2 diabetes mellitus and prevent possible complications.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

Is any assistance available if I am negatively affected by participating in this study?

The researcher will be available for you to contact should you be negatively affected by any aspect of the research at any time and an appropriate course of action will be followed with the support of the researcher.

What if I have questions?

This research is being conducted by TANIA STEYL and the Department of Physiotherapy at the University of the Western Cape. If you have any questions about the research study itself, please contact TANIA STEYL at 021-9592542/9 (w) or 0833068585 or e-mail tsteyl@uwc.ac.za

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Prof. Julie Phillips
Dean of the Faculty of Community and Health Sciences: Prof. Ratie Mpofu
University of the Western Cape
Private Bag X17
Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.



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E-mail: tsteyl@uwc.ac.za

INLIGTINGSBLAD

Projek Titel: Die ontwerp en bepaling van die effektiwiteit van 'n program vir die bevordering van gesondheid vir kliënte met tipe 2 diabetes mellitus van 'n stedelike Suid-Afrikaanse gemeenskap

Waaroor gaan hierdie studie?

Dit is 'n navorsingsprojek deur Tania Steyl by die Universiteit van die Wes-Kaapland. Ons nooi u om deel te neem in hierdie navorsingsprojek, want u is 'n rolspeler op Primêre Gesondheidsorgvlak as 'n kliënt met tipe 2 diabetes mellitus, of as 'n professionele gesondheidsorgwerker van 'n Primêre Gesondheidsorg fasiliteit of as 'n kenner op die gebied van gesondheidsbevordering. Die doel van hierdie navorsingsprojek is om 'n program vir die bevordering van gesondheid vir kliënte met tipe 2 diabetes mellitus wat by Primêre Gesondheidsorg fasiliteite geïmplementeer kan word te ontwikkel. Die program sal van self-geadministreerde vraelyste, fokusgroepbesprekings, semi-gestruktureerde onderhoud, 'n literatuuroorsig, beleid en dokument-analise en 'n Delphi-studie ontwikkel word. Die program sal geïmplementeer word waarna die doeltreffendheid van dit geassesseer sal word.

Wat sal ek gevra word om te doen as ek instem om deel te neem?

U sal gevra word om:

- 'n self-geadministreerde vraelys (**kliënte met tipe 2 diabetes mellitus en gesondheidswerkers**) te voltooi. Die kliënte wat deelneem aan die implementeringsfase van die studie sal gevra word om nog 'n vraelys in te vul na die implementering van die program. Dit sal ongeveer 30 minute neem om die vraelys te voltooi.
- deel te neem aan 'n **fokus groepbespreking (kliënte met tipe 2 diabetes mellitus)** op 'n tyd wat gerieflik is vir u om die uitdagings wat die bestuur van u siekte te verken. Die fokusgroepbespreking sal met 'n bandopnemer opgeneem word na u ingeligte toestemming gegee het en sal nie langer as 30-45 minute neem nie. Alle opnames sal vernietig word nadat dit getranskribeer en volgens temas gedokumenteer is.
- deel te neem aan 'n **semi-gestruktureerde onderhoud (gesondheidsorgwerkers)** op 'n tyd wat u pas om die uitdagings wat u ondervind as professionele gesondheidsorgwerkers in die bestuur van kliënte met tipe 2 diabetes mellitus by Primêre Gesondheidsorg fasiliteite te verken. Die onderhoud behoort nie langer as 30 minute te wees nie.
- deel te neem aan 'n **Delphi Studie (spesifieke belanghebbendes en kundiges)**. U sal deel vorm van 'n paneel wat kommentaar sal lewer oor die inhoud van die voorgestelde program sowel as die uitkomst van elke stadium van die program. Hierdie inligting sal per e-pos aan u gestuur word vir hersiening en kommentaar deur 'n reeks e-posse. U sal skriftelik in kennis getel word wanneer konsensus bereik is, waarna die program gefinaliseer sal word.

• deel te neem in die **bepaling van die doeltreffendheid van die program vir die bevordering van gesondheid (gesondheidsorgwerkers)**. Werkswinkels sal gehou word om professionele gesondheidsorgwerkers met betrekking tot die implementering van die program in te lig / te leer. Belangrike kwessies soos moontlike hindernisse tot die implementering, die uitleg en inhoud van die program sowel as die pasiënt boekie oor diabetes sorg / bestuur sal geadresseer word.

Sal my deelname aan hierdie studie vertroulik wees?

Ons sal ons bes doen om u persoonlike inligting vertroulik te hou. Om u te help om u privaatheid te beskerm sal die volgende stappe geneem word:

• **Vraelyste:** is anoniem en sal nie inligting bevat wat u persoonlik identifiseer nie. 'n Kode sal op die vraelys geplaas word. Deur die gebruik van 'n identifikasie-sleutel, sal die navorser in staat wees om u vraelys met u te verbind. Slegs die navorser sal toegang hê tot die identifikasie sleutel. Om u te help om u privaatheid te beskerm, sal al die inligting wat ingesamel word, gestoor word in 'n liasseerkabinet wat sluit. Geen ongemagtigde persone sal in staat wees om die inligting te bekom nie.

• **Fokus groepbesprekings en semi-gestruktureerde onderhoude:** Die fokus groepbespreking sal opgeneem word na ingeligte toestemming verkry is. 'n Kode sal gegee word aan alle opgeneemde data wat gekoppel kan word aan 'n identifikasie sleutel wat slegs die navorser weet. Alle bandopnames sal vernietig word na dit getranskribeer en volgens tema gedokumenteer is. Getranskribeerde data sal gestoor word in 'n liasseerkabinet wat sluit. Geen ongemagtigde party sal in staat wees om die inligting te bekom nie.

• **Delphi-studie:** 'n kode sal aan elke lid van die paneel gegee word. E-pos sal net deur die navorser ontvang en gelees word. Die paneel kenners sal u kommentaar ontvang nadat 'n kode daaraan toegeken is. U identiteit sal geensins geopenbaar word.

As ons 'n verslag of artikel oor hierdie navorsingsprojek skryf, sal u identiteit tot die maksimum mate moontlik beskerm word.

Wat is die risiko's van hierdie navorsing?

Daar is geen bekende risiko's wat verband hou met die deelname aan hierdie navorsingsprojek.

Wat is die voordele van hierdie navorsing?

Hierdie navorsing is nie bedoel om u persoonlik te help nie, maar die resultate kan die navorser help om meer oor die spesifieke gesondheidsorgbehoefte van kliënte met tipe 2 diabetes mellitus te leer. Ons hoop dat ander mense in die toekoms sal voordeel trek uit die resultate van hierdie studie deur middel van verbeterde gesondheidsbevordering strategieë vir tipe 2 diabetes mellitus en die voorkoming van komplikasies na die implementering van die program by Primêre Gesondheidsorg fasiliteite.

Moet ek aan hierdie navorsing deelneem en kan ek enige tyd ophou?

U deelname aan hierdie navorsing is heeltemal vrywillig. U kan kies om nie deel te neem. As u besluit om deel te neem in hierdie navorsing, kan u enige tyd ophou. As u besluit om nie meer deel te neem aan hierdie studie of as u ophou, sal u nie geenaliseer word of enige voordele waarop u andersins kwalifiseer verloor nie.

Is enige hulp beskikbaar as ek negatief geraak word deur my deelname aan hierdie studie?

U kan die navorser kontak indien u negatief geraak word deur enige aspek van die navorsing. 'n Gepaste plan van aksie sal gevolg word met die ondersteuning van die navorser.

Wat as ek vrae het?

Hierdie navorsing word gedoen deur Tania Steyl en die Departement Fisioterapie van die Universiteit van die Wes-Kaapland. As u enige vrae oor die navorsing self het, kontak asseblief vir Tania Steyl by 021-9592542/9 (w) of 0833068585 of e-pos tsteyl@uwc.ac.za

Indien jy enige vrae het met betrekking tot hierdie studie en u regte as 'n deelnemer of as u enige probleme wat uervaar het met betrekking tot die studie wil aanmeld, kontak asseblief:

Hoof van die Departement: Prof Julie Phillips
Dekaan van die Fakulteit Gemeenskap en Gesondheidswetenskappe: Prof Ratie Mpofo
Universiteit van die Wes-Kaapland
Privaatsak X17
Bellville 7535

Hierdie navorsing is deur die Universiteit van die Wes-Kaapland se Senaat Navorsingskomitee en Etiekkomitee goedgekeur.



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E-mail: tsteyl@uwc.ac.za

INKCUKACHA ZOMTHATHI NXAXHEBA

Isihloko sophando: Uphando malunga nabantu abaphila nesigulo seswekile apha eMzantsi Afrika.

Lungantoni oluphando?

Oluphando luququzelelwe ngu Mrs Tania Steyl kwiYunivesiti yase Ntshona Koloni. Siyakumema ukuba uthabathe inxaxheba kolufundo nanjengomnye wabantu abathe bahlaselwa sisigulo seswekile. Injongo yoluphando kukuphuhlisa inqubo yabantu abaphila nesigulo seswekile. Le nqubo iqulathe imibuzo kwakunye neqela labathathi nxaxheba.

Yintoni elindeleke ukuba ndiyenze xa ndinokuthi ndithabathe inxaxheba?

Ulindeleke ukuba:

Ulindeleke ukuba ugcwalise uphendule imibuzo eyakuthi ibuzwe kuwe, kwaye umthathi nxaxheba kolufundo kulindeleke ukuba aphenyule eminye imibuzo eyakuthi ibuzwe ekupheleni kwenqubo. Lo mibuzo iyakuthabatha imizuzu engama 30 kuphela.

Iqela labathathi nxaxheba abanesigulo seswekile ngelithuba, lixesha lokuba bathethe ngeengxaki abathe bahlangana nazo ngexesha benyanga esisigulo. Iqela labathathi nxaxheba liyakushicilelwa kwaye eloshicilelo kufuneka luthathe imizuzu engama 30 ukuya ku 45 lungagqithisi. Loo macwecwe ayakutshatyalaliswa emva kokuba kuqokelelwe lonke ulwazi.

Ingaba ukuthatha kwam inxaxheba kolufundo luyakuba yimfihlo?

Sizokwenza ngako konke okusemandleni ukugcina iinkcukacha zakho ziyimfihlo, kwaye siyakuthabatha le miqathango ilandelayo:

- **imibuzo:** Ukuncedisana noku, igama lakho nezinye inkcukacha ezibalulekileyo ziyakunikwa amagama afihlakeleyo. Zonke inkcukacha ngalengcombolo iyakubaselugcinweni oluyimfihlo. Igama. Ifani okanye amanani esazisi sakho asisayikuzibhala phantsi kumaphepha lawo sobe siwasebenzisa; sizakupha inani okanye ikhowudi leyo siyakuthi siyibhale phantsi endaweni yegama lakho. Zonke iinkcukacha ziyakugcinwa kwikhabhathi etixiweyo, akuyikuba ngubani na onelungelo lokuvula apho.
- **Uvavanyo lwabathathi nxaxheba:** Iqela labathathi nxaxheba liyakushicilelwa . ikhowudi leyo iyakuncanyathiselwa kuwo onke amacwecwe. Onke amacwecwe ayakutshatyalaliswa xa kugqityiwe ukukhuphela ulwazi olo lufunekayo. Ulwazi olo luyakutixelwa ekhabathini apho kuphela umvavanyi onelungelo lokuvula. Akusayi kuvunyelwa noba ngubani na ukusebenzisa loo macwecwe.

Ukuba kuyenzeka sibhale isiqendu malunga noluphando, iinkcukacha zakho ziyakukhuseleka kangangoko.

Buyintoni ubungozi besisifundo?

Akukho nabunye ubungozi malunga nesisifundo.

Yintoni endiyakuyizuzisa malunga nesisifundo?

Oluphando alwenzelwanga ukuba luncede wena ngalo mzuzu, kodwa ukuncedisana nabaphandi boluhlelo babone kwaye bafunde ngezinto ezidingekayo ekuncedeni abantu abaphila nesisigulo seswekile. Siyathemba ukuba kwixa elizayo abanye abaguli bayakuncedakala ngenxa yophuhliso lwenqubo eliyakwenziwa liziko lezempilo kubaguli beswekile kwaye kukhuselwe ubunzima obungavela.

Kunyazelekile ukuba ndithabathe inxaxheba kwesisifundo/ ndingakwazi ukuyeka uthabatha inxaxheba ukuba andifuni nokuba kunini?

Ukuthabatha inxaxheba kwesisifundo kungothanda kwakho akunyanzelekanga. Ungakhetha ukungathabathi inxaxheba konke- konke. Ukuba ukhethe ukuthabatha inxaxheba kwesisifundo unako ukuyeka nanini na. ukuba ufuna ukuyeka kwaye akukho ncedo ongazi ukulifumana ngenxa yoko.

Ingaba lukhona uncedo endiyakulifumana ukuba kuyenzeka ndingancedakali sesisifundo?

Ewe, ukuba awuncedakalanga sesisifundo uyakuthunyelwa kwiziko labantu abaqeqeshelwe ukusebenza ngabantu abagula sesisigulo sithetha ngaso.

Ukuba ndinemibuzo ndingenza njani?

Olufundo luququzelelwe ngu Mrs Tania Steyl kwiYunivesiti yase Ntshona Koloni Ukuba unayo imibuzo malunga nolufundo okanye uthe wadibana nengxaki malunga nolufundo, nceda udibane nomphathi nqubo wesisifundo kwezi ncukacha zilandelayo

Mrs. Tania Steyl
Physiotherapy Department,
University of the Western Cape
Modderdam Road
Bellville, 7535
Telephone: 021 9592542/9
Email: tsteyl@uwc.ac.za

Ukuba unayo imibuzo malunga nolufundo okanye uthe wadibana nengxaki malunga nolufundo, nceda udibane nomphathi nqubo wesisifundo kwezi ncukacha zilandelayo

Nceda ukhumbule ukuba udibana nomphathi sifundo xa uthe wadibana nengxaki malunga nesisifundo kuphela.

Head of department: Prof. Julie Phillips
Dean of the faculty of Community and health science: Prof. Ratie Mpofo
University of the Western Cape
Private Bag X17
Bellville 7535

Oluphando luququzelwe ngokwasemthethweni ligqiza lophando ne komiti yezo..ethics kwi Yunivesithi yase Ntshona Koloni.





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E-mail: tsteyl@uwc.ac.za

CONSENT FORM

Title of Research Project:

Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature.....

Witness's name.....

Witness's signature.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: Ms T. Steyl

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021) 959- 2542

Email: tsteyl@uwc.ac.za



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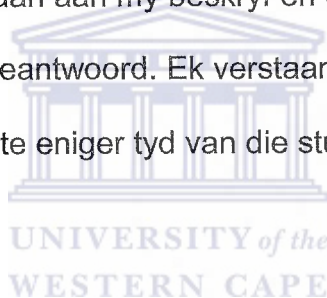
E-mail: tsteyl@uwc.ac.za

TOESTEMMING VORM

Titel van navorsingsprojek:

Die ontwerp en die bepaling van die doeltreffendheid van 'n program vir die bevordering van gesondheid vir kliënte met tipe 2 diabetes mellitus van 'n stedelike Suid-Afrikaanse gemeenskap

Die studie is in die taal wat ek verstaan aan my beskryf en ek stem vrylik en vrywillig in om deel te neem. My vrae oor die studie is beantwoord. Ek verstaan dat my identiteit nie bekend gemaak sal word nie. Ek kan sonder 'n rede te eniger tyd van die studie onttrek en dit sal my geensins negatief raak nie.



Deelnemer se naam

Deelnemer se handtekening

Getuie se naam

Getuie se handtekening

Datum

Indien u enige vrae het met betrekking tot hierdie studie of as u enige probleme wat u ervaar het met betrekking tot die studie wil aanmeld, kan u die studie koördineerder kontak:

Studie Koördineerder se Naam: Me T. Steyl

Universiteit van die Wes-Kaapland

Privaatsak X17, Belville 7535

Telefoon: (021) 959 - 2542

E-pos: tsteyl@uwc.ac.za



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 E-mail: tsteyl@uwc.ac.za

IPHEPHA MVUME LOKUTHABATHA INXAXHEBA

Isihloko sophando: Uphuhliso lwenqubo yasekuhlaleni ukubonisana nabathathi nxaxheba abathe bahlaselwa sisigulo seswekile apha eMzantsi Afrika.

Olufundo lucacisiwe kum ngolwimi endiliqondayo kwaye ndizonyule ngokuthanda khona ukuze ndithathe inxaxheba. Imibuzo yam ebendinayo ngolufundo iphendulekile. Ndiyayiqonda into yokuba inkcukacha zam azisayi kuvezwa nokuba kubani, umzekelo, amagama wam kwakunye nenombholo yesazisi. Ndiyayiqonda into yokuba ndingayeka ukuthatha inxaxheba nangowuphi na umzuzu ngaphandle kokunika isizathu kwaye lonto ayiyi kuphazamisana nonyango lwam.

Igama lomthathi nxaxheba.....

Tyikitya umthathi nxaxheba.....

Igama lengqina.....

Tyikitya ingqina.....

Usuku.....Inyanga.....Unyaka.....



Ukuba unayo imibuzo malunga nolufundo okanye uthe wadibana nengxaki malunga nolufundo, nceda udibane nomphathi nqubo wesisifundo kwezi ncukacha zilandelayo.

Nceda ukhumbule ukuba udibana nomphathi sifundo xa uthe wadibana nengxaki malunga nesisifundo kuphela.

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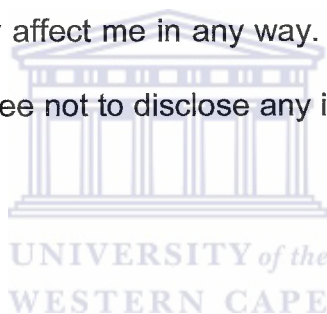
E-mail: tsteyl@uwc.ac.za

CONSENT FORM – Interviews of health care professionals

Title of Research Project:

Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I agree to be audio-taped during my participation in the study. I also agree not to disclose any information that was discussed during the interview.



Participant's name.....

Participant's signature.....

Witness's name.....

Witness's signature.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: Ms TANIA STEYL

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021) 959- 2542

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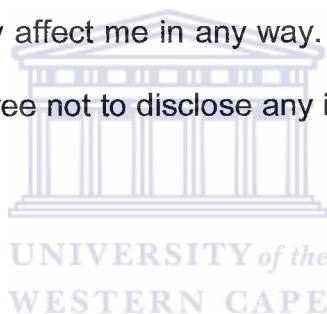
E-mail: tsteyl@uwc.ac.za

FOCUS GROUP CONFIDENTIALITY BINDING FORM

Title of Research Project:

Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I agree to be audio-taped during my participation in the study. I also agree not to disclose any information that was discussed during the group discussion.



Participant's name.....

Participant's signature.....

Witness's name.....

Witness's signature.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: Ms TANIA STEYL

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FOKUSGROEP VERTROUOLIKHEID-BINDINGS VORM

Titel van navorsingsprojek:

Die ontwerp en die bepaling van die doeltreffendheid van 'n program vir die bevordering van gesondheid vir kliënte met diabetes mellitus tipe 2 van 'n stedelike Suid-Afrikaanse gemeenskap

Die studie is in die taal wat ek verstaan aan my beskryf en ek stem vrylik en vrywillig in om deel te neem. My vrae oor die studie is beantwoord. Ek verstaan dat my identiteit nie bekend gemaak sal word nie. Ek kan sonder 'n rede te eniger tyd van die studie onttrek en dit sal my geensins negatief raak nie. Ek stem in tot oudio-opname tydens my deelname aan die studie. Ek sal ook nie enige inligting openbaar maak wat tydens die groepbespreking bespreek is nie.

Deelnemer se naam

Deelnemer se handtekening

Getuie se naam

Getuie se handtekening

Datum

Indien u enige vrae het met betrekking tot hierdie studie of as u enige probleme wat u ervaar het met betrekking tot die studie wil aanmeld, kan u die studie koördineerder kontak:

Studie Koördineerder se Naam: Me T. Steyl

Universiteit van die Wes-Kaapland

Privaatsak X17, Belville 7535

Telefoon: (021) 959 - 2542

E-pos: tsteyl@uwc.ac.za



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E-mail: tsteyl@uwc.ac.za

IPHEPHA MVUME LOKUTHABATHA INXAXHEBA

Isihloko sofundo:

Uphuhliso lwenqubo yasekuhlaleni ukubonisana nabathathi nxaxheba abathe bahlaselwa sisifo seswekile apha eMzantsi Afrika.

Olufundo lucacisiwe kum ngolwimi endiliqondayo kwaye ndizonyule ngokuthanda khona ukuze ndithathe inxaxheba. Imibuzo yam ebendinayo ngolufundo iphendulekile. Ndiyayiqonda into yokuba inkcukaca zam azisayi kuvezwa nokuba kubani, umzekelo, amagama wam kwakunye nenombholo yesazisi. Ndiyayiqonda into yokuba ndingayeka ukuthatha inxaxheba nangowuphi na umzuzu ngaphandle kokunika isizathu kwaye lonto ayiyi kuphazamisana nonyango lwam. Ndiyaninika imvume yokuba ndishicilelwe ngexesha ndithabatha inxaxheba kwaye ndiyavuma ukuba andisayi kubalisa elubala okanye nakubani na malunga ngezinto esithe saxoxa ngazo kolufundo.

Igama lomthabathi nxaxheba.....

Tyikika umthabathi nxaxheba.....

Igama lengqina.....

Tyikika ingqina.....

Usuku

Ukuba unayo imibuzo malunga nolufundo okanye uthe wadibana nengxaki malunga nolufundo, nceda udibane nomphathi nqubo wesisifundo kwezi ncukacha zilandelayo

Igama lomphathi nqubo: Ms TANIA STEYL

University of the Western Cape

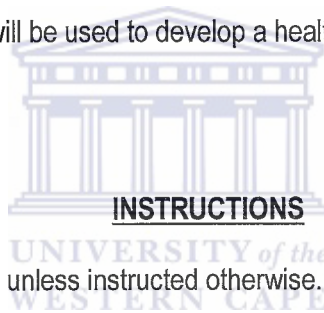
Private Bag X17, Belville 7535

Telephone: (021) 959- 2542

E-mail: tsteyl@uwc.ac.za

Type 2 DIABETES MELLITUS QUESTIONNAIRE

- This questionnaire is about Type 2 diabetes mellitus
- This questionnaire is **completely voluntary**. You may choose not to participate or not to answer any specific question. You may skip any question you are not comfortable in answering.
- This questionnaire is **completely anonymous**. Please make no marks of any kind on the survey which could identify you individually.
- Composite data will be used to develop a health promotion programme.



- Select only one response, unless instructed otherwise.
- Please tick the appropriate answer e.g. ✓ or circle one correct answer where indicated

Thank you very much for your co-operation

THE FOLLOWING QUESTIONS ASK ABOUT YOUR DEMOGRAPHIC CHARACTERISTICS

(Q1 – Q8 to be completed by the researcher or research assistant/s)

Q1. Age: ___ years old

Q2. Weight: _____ kg

Q3. Height: _____ cm

Q4. Body Mass Index: _____ kg/m²

Q5. HGT (reading from folder): _____ mmol/l

Q6. BP: _____ mmHg

Q7. Co-morbidities: (please indicate all applicable to you)

heart disease

cholesterol

hypertension

Q8. Gender:

male

female



Q9. Ethnic origin/race:

African/Black

Coloured

White

Indian/Asian

other (specify) _____

Q10. Marital status:

never married

married / domestic partner

separated / divorced

widowed

Q11. Highest level of education:

no schooling

primary school

secondary school

tertiary education

**THE FOLLOWING QUESTION ASK ABOUT YOUR UNDERSTANDING OF TYPE 2
DIABETES MELLITUS**

Q19. How do you rate your understanding of: (circle one answer for each line)	Poor	Fair	Good	Very Good	Excellent
a) overall diabetes care	1	2	3	4	5
b) coping with stress	1	2	3	4	5
c) diet for blood sugar control	1	2	3	4	5
d) the role of exercise in diabetes care	1	2	3	4	5
e) medications you are taking	1	2	3	4	5
f) how to use the results of blood sugar monitoring	1	2	3	4	5
g) how diet, exercise and medicines affect blood sugar levels	1	2	3	4	5
h) prevention and treatment of high blood sugar	1	2	3	4	5
i) prevention and treatment of low blood sugar	1	2	3	4	5
j) prevention of long-term complications of diabetes	1	2	3	4	5
k) foot care	1	2	3	4	5
l) benefits of improving blood sugar control	1	2	3	4	5
m) pregnancy and diabetes	1	2	3	4	5

THE FOLLOWING QUESTIONS ASK ABOUT HOW SATISFIED YOU ARE WITH THE QUALITY CARE YOU RECEIVE AT THE COMMUNITY HEALTH CENTRE

Q20.	Question	Poor	Fair	Good	Very Good	Excellent
a)	waiting time. How long you had to wait to get an appointment at this clinic	1	2	3	4	5
b)	waiting time. How long you had to wait in the clinic waiting room for your appointment	1	2	3	4	5
c)	instructions. How well the clinic staff prepared you of what to expect at the visit	1	2	3	4	5
d)	ease of getting information. Willingness of clinic staff to answer your questions	1	2	3	4	5
e)	information you were given. How clear and complete the explanations were on any information you were given regarding your diabetes	1	2	3	4	5
f)	concern and caring by clinic staff. respect, friendliness and kindness	1	2	3	4	5
g)	safety and security. The provision for your safety and the security of your belongings	1	2	3	4	5
h)	privacy. How well your privacy was considered, e.g. with results of blood sugar tests, weight etc.	1	2	3	4	5
i)	instructions upon leaving. How clearly and completely you were told what to do at home or until your next visit	1	2	3	4	5
j)	overall quality of care. How you evaluate services you received and the way you were treated	1	2	3	4	5

Q21. Were you told to leave the clinic before you felt ready to do so?

yes

no

Q22. Did you have to visit a doctor or hospital in the days following the services you received at the community health centre (CHC) because your health got worse as a result of the services received at the CHC?

yes

no

Q23. Would you recommend the CHC to a friend or family member if they needed services that it provides?

yes

no

Q24. Any suggestions for improvement of services at the CHC:



THE FOLLOWING QUESTIONS ASK ABOUT YOUR PHYSICAL ACTIVITY PARTICIPATION

In answering the following questions,

- **Vigorous physical activities** refer to activities that take hard physical effort and make you breathe much harder than normal.
- **Moderate physical activities** refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

Q25a. During the last 7 days, on how many days did you do **vigorous physical activities** like heavy lifting, digging, aerobics, or fast bicycling?

Think about *only* those physical activities that you did for at least 10 minutes at a time.

_____ **days per week** →

Q25b. How much time in total did you usually spend on one of those days doing vigorous physical activities?

or _____ **hours** _____ **minutes**

none

Q26a. Again, think *only* about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate physical activities** like carrying light loads, bicycling at a regular pace, or doubles tennis? **Do not include walking.**

_____ **days per week** →

Q26b. How much time in total did you usually spend on one of those days doing moderate physical activities?

or _____ **hours** _____ **minutes**

none



Q27a. During the last 7 days, on how many days did you **walk** for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

_____ **days per week** →

Q27b. How much time in total did you usually spend walking on one of those days?

or _____ **hours** _____ **minutes**

none

The last question is about the time you spent **sitting** on weekdays while at work, at home, while doing course work and during leisure time. This includes time spent sitting at a desk, visiting friends, reading traveling on a bus or sitting or lying down to watch television.

Q28. During the last 7 days, how much time in total did you usually spend **sitting on a week day**?

_____ **hours** _____ **minutes**

THE FOLLOWING QUESTIONS ASK ABOUT YOUR NUTRITION / DIET

Q29. The diabetes diet is:

- the way most South African people eat
- a healthy diet for most people
- too high in starch for most people
- too high in protein for most people

Q30. Which of the following is highest in carbohydrate?

- baked chicken
- gouda cheese
- baked potato
- peanut butter

Q31. Which of the following is highest in fat?

- low fat milk
- orange juice
- mealies
- honey



Q32. Which of the following is a 'free food'?

- any unsweetened food
- any dietetic food
- any food that says 'sugar free' on the label
- any food that has less than 20 calories per serving

Q33. What effect does unsweetened fruit juice have on blood glucose?

- lowers it
- raises it
- has no effect

Q34. Which should not be used to treat low blood glucose?

- 3 hard sweets
- ½ cup of orange juice
- 1 cup diet soft drink
- 1 cup skim milk

Q35. Eating foods lower in fat decreases your risk for:

- nerve disease
- kidney disease
- heart disease
- eye disease

Q36. If you take your morning insulin but skip breakfast your blood glucose level will usually:

- increase
- decrease
- remain the same



THE FOLLOWING QUESTIONS ASK ABOUT SUPPORT FROM FAMILY AND / OR FRIENDS

Q37. My family or friends help and support me a lot:
(circle one answer for each line)

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	Does not Apply
a) follow my meal plan	1	2	3	4	5	n/a
b) take my medicine	1	2	3	4	5	n/a
c) take care of my feet	1	2	3	4	5	n/a
d) get enough physical activity	1	2	3	4	5	n/a
e) test my sugar	1	2	3	4	5	n/a
f) handle my feelings about diabetes	1	2	3	4	5	n/a

**THANK YOU FOR TAKING THE TIME AND THOUGHT TO COMPLETE THIS QUESTIONNAIRE.
I APPRECIATE YOUR PARTICIPATION!**

Tipe 2 DIABETES MELLITUS VRAELYS

- Hierdie vraelys gaan oor Tipe 2 diabetes mellitus.
- Deelname is **heeltemal vrywillig**. U het 'n keuse om nie die vraelys in te vul nie of u kan enige vraag oorslaan as u nie gemaklik voel om dit te beantwoord nie.
- Hierdie vraelys is **heeltemal anoniem**. Moenie enige inskrywings op die vraelys maak wat u kan identifiseer nie.
- Die inligting van die voltooide vraelyste sal gebruik word om 'n gesondheidsprogram vir Tipe 2 diabetes mellitus kliënte te ontwikkel..



- Kies slegs een antwoord, tensy die opdrag anders is.
- Merk asseblief die mees gepaste antwoord bv. of omkring die mees gepaste antwoord waar aangedui.

Baie dankie vir u samewerking

DIE VOLGENDE VRAE IS OOR U DEMOGRAFIESE INLIGTING**(V1 – V8 sal deur die navorser of assistent ingevul word)**

V1. Ouderdom: ___ jaar oud

V2. Gewig: _____ kg

V3. Lengte: _____ cm

V4. Liggaamsgewig Indeks: _____ kg/m²

V5. HGT (lesing in pasiënt leer): _____ mmol/l

V6. BP: _____ mmHg

V7. Bydraende faktore: (merk asb. almal van toepassing op u)

 hartsiekte cholesterol hoë bloeddruk

V8. Geslag:

 manlik vroulik

V9. Etniese oorsprong/Ras:

 Swart Kleurling Blank Indies/Asiaties ander (spesifiseer) _____

V10. Verhoudingstatus:

 ongetroud getroud / woon saam vervreem / geskei weduwee / wewenaar

V11. Hoogste vlak van opvoeding:

 ongeskoold laerskool hoërskool naskoolse opleiding

DIE VOLGENDE VRAE IS OOR U BEGRIP ('understanding') VAN TIPE 2 DIABETES MELLITUS

V19. Hoe klassifiseer u u begrip van: (omkring een antwoord per lyn)	Swak	Gemiddeld	Goed	Baie Goed	Uitstekend
a) diabetes sorg oor die algemeen	1	2	3	4	5
b) die hantering van stres	1	2	3	4	5
c) dieët vir bloedsuiker kontrole	1	2	3	4	5
d) die rol van oefening in diabetes sorg	1	2	3	4	5
e) die medisyne wat u neem	1	2	3	4	5
f) hoe om die resultate van bloedsuiker kontrole te gebruik	1	2	3	4	5
g) hoe dieët, oefening en medisyne bloedsuiker vlakke affekteer	1	2	3	4	5
h) voorkoming en behandeling van hoë bloedsuiker	1	2	3	4	5
i) voorkoming en behandeling van lae bloedsuiker	1	2	3	4	5
j) voorkoming van langtermyn komplikasies van diabetes	1	2	3	4	5
k) voetsorg	1	2	3	4	5
l) voordele van beter bloedsuiker kontrole	1	2	3	4	5
m) swangerskap en diabetes	1	2	3	4	5

**DIE VOLGENDE VRAE VRA OOR HOE TEVREDE U IS MET DIE KWALITET VAN DIE DIENS
WAT U BY DIE GEMEENSKAPS GESONDHEIDSORG KLINIEK ONTVANG**

V20.	Vraag	Swak	Gemiddeld	Goed	Baie Goed	Uitstekend
a)	wagtyd. Hoe lank u moes wag om 'n afspraak by die kliniek te kry	1	2	3	4	5
b)	wagtyd. Hoe lank u in die wagkamer moes wag voor u afspraak	1	2	3	4	5
c)	instruksies. Hoe goed die personeel u voorberei het oor wat om te verwag tydens u besoek	1	2	3	4	5
d)	hoe maklik u inligting bekom. Die personeel se bereidwilligheid om u vrae te beantwoord	1	2	3	4	5
e)	inligting wat u ontvang het. Hoe duidelik en volledig die inligting was wat u ontvang het oor u diabetes	1	2	3	4	5
f)	'omgee' deur die kliniek personeel. respek, vriendelikheid en deernis	1	2	3	4	5
g)	veiligheid. Die voorsiening wat gemaak is vir u en u besittings	1	2	3	4	5
h)	privaatheid. Hoe goed was dit in ag geneem, bv. uitslae van bloedsuiker toetse, gewig ens.	1	2	3	4	5
i)	instruksies toe u klaar is. Hoe duidelik en volledig u gesê is wat om by die huis te doen of tot u volgende afspraak	1	2	3	4	5
j)	algemene kwaliteit van die diens. Hoe sal u die behandeling/diens wat u ontvang het evalueer	1	2	3	4	5

V21. Het hulle vir u gesê om die kliniek te verlaat voordat u gereed was om te gaan?

- ja nee

V22. Moes u 'n ander dokter of hospital besoek nadat u by die gemeenskaps gesondheid kliniek behandel is omdat u gesondheid verswak het as gevolg van die behandeling wat u by die kliniek ontvang het?

- ja nee

V23. Sal u u vriende of familie aanbeveel om die gemeenskaps gesondheid kliniek te besoek as hulle enige behandeling benodig wat deur die kliniek aangebied word?

- ja nee

V24. Enige aanbevelings om dienste by die gemeenskaps gesondheid kliniek te verbeter?



The logo of the University of the Western Cape is centered on the page. It features a classical building facade with six columns and a pediment. Below the building, the text 'UNIVERSITY of the WESTERN CAPE' is written in a serif font. The logo is overlaid on the dashed lines of the response area for question V24.

DIE VOLGENDE VRAE IS OOR U DEELNAME AAN FISIESE AKTIWITEITE (OEFENING)

U moet asb. die volgende in ag neem wanneer u die vrae beantwoord,

- Aggressiewe (harde) fisiese aktiwiteite verwys na aktiwiteite wat baie inspanning vereis en wat u baie moeiliker laat asemhaal as normaalweg.
- Matige fisiese aktiwiteite verwys na aktiwiteite wat matige inspanning verwys en wat u effens moeiliker laat asemhaal as normaalweg.

Q25a. Gedurende die afgelope 7 dae, op hoeveel dae het u **agressiewe (harde) fisiese aktiwiteite** soos swaar goed optel, spitwerk, aerobiese oefening of vinnige fietsry gedoen?

Dink *net* aan die fisiese aktiwiteite wat u vir minstens 10 minute op 'n slag gedoen het.

_____ dae per week →

Q25b. Hoeveel tyd altesaam het u gewoonlik spandeer op een van die dae wat u agressiewe (harde) fisiese aktiwiteite gedoen het?

of _____ ure _____ minute

geen

Q26a. Weereens, dink *net* aan die fisiese aktiwiteite wat u vir minstens 10 minute op 'n slag gedoen het. Gedurende die afgelope 7 dae, op hoeveel dae het u **matige fisiese aktiwiteite** soos die dra van ligte voorwerpe, fietsry teen 'n matige spoed of dubbels tennis gespeel? **Dit sluit nie stap in nie.**

_____ dae per week →

Q26b. Hoeveel tyd altesaam het u gewoonlik spandeer op een van die dae wat u matige fisiese aktiwiteite gedoen het?

of _____ ure _____ minute

geen



Q27a. Gedurende die laaste 7 dae, op hoeveel dae het u minstens vir 10 minute op 'n slag **gestap**? Dit sluit stap by die werk en die huis, stap van plek tot plek, en enige ander stap wat u uitsluitlik gedoen het vir oefening, ontspanning en sport.

_____ dae per week →

Q27b. Hoeveel tyd altesaam het u gewoonlik spandeer om te stap op een van die dae?

of _____ ure _____ minute

geen

Die laaste vraag gaan oor die tyd wat u **sit gedurende die week** by die werk, by die huis, terwyl u 'n kursus gedoen het en gedurende ontspanningstyd. Dit sluit die tyd wat u sit by 'n lessenaar/tafel, besoek aan vriende, lees, terwyl u op die bus ry of as u lê en televisie kyk in.

Q28. Gedurende die laaste 7 dae, hoeveel tyd altesaam het u gewoonlik spandeer om te **sit op 'n weeksdag**?

_____ ure _____ minute

DIE VOLGENDE VRAE IS OOR U VOEDING / DIEËT

V29. Die diabetes dieët is:

- hoe die meeste Suid-Afrikaanse mense eet
- 'n gesonde dieët vir die meeste mense
- te hoog in stysel vir die meeste mense
- te hoog in proteiene vir die meeste mense

V30. Watter van die volgende het die meeste koolhidrate (stysel)?

- gebakte hoender
- gouda kaas
- gebakte aartappel
- grondboontjebotter

V31. Watter van die volgende het die meeste vet?

- laevet melk
- lemoensap
- mielies
- heuning



V32. Watter van die volgende is 'n 'vry voedsel'?

- enige onversoete kos
- enige dieët kos
- enige kos met 'suiker vry' op die etiket
- enige kos wat minder as 20 kalorieë per porsie het

V33. Watter uitwerking het onversoete vrugtesap op bloedsuiker?

- verminder dit
- verhoog dit
- geen uitwerking

V34. Wat moet nie gebruik word om lae bloedsuiker te behandel nie?

- 3 harde lekkers
- ½ koppie vrugtesap
- 1 koppie dieët gaskoeldrank
- 1 koppie vetvrye melk

V35. Laevet kos verminder u risiko vir:

- senuwee siekte
- nier siekte
- hart siekte
- oog siekte

V36. As u u insulien in die oggend geneem het maar nie ontbyt eet nie, sal u bloedsuiker gewoonlik:

- verhoog
- verlaag
- dieselfde bly



DIE VOLGENDE VRAE IS OOR ONDERSTEUNING VAN FAMILIE EN / OF VRIENDE

V37. My familie en vriende help en ondersteun my baie om:
(omkring een antwoord per lyn)

	Stem beslis nie saam nie	Stem nie saam nie	Neutraal	Stem saam	Stem beslis saam	Nie van toepassing nie
a) my eetplan te volg	1	2	3	4	5	nvt
b) my medisyne te neem	1	2	3	4	5	nvt
c) my voete te versorg	1	2	3	4	5	nvt
d) genoeg fisiese aktiwiteit (oefening) te kry	1	2	3	4	5	nvt
e) my bloedsuiker te toets	1	2	3	4	5	nvt
f) my gevoelens oor diabetes te hanteer	1	2	3	4	5	nvt

DANKIE DAT U DIE VRAELYS VOLTOOI HET.
EK WAARDEER U DEELNAME!

ULUHLU LWEMIBUZO LWODIDI LWESIBINI LWESWEKILE (MELLITUS)

- Lemibuzo imalunga nodidi lwesibini lweswekile
- Lemibuzo igqibelelene kwintsebenziswano. Ungakhetha ukungasibandakanyi okanye uphendule imibuzo. Ungaqakatha omnye umbuzo ongakholisekanga kuwuphe ndula.
- Lemibuzo iyimfihlo ngokupheleleyo. Needa ungenzi naluphi na uphawu lohlobo loluhlu olena uzichaze wena.
- Lengqokelela yolwazi izakusetyenziswa ekwenzeni inqubo yokuphila.



- Khetha impendulo ibenye, ngaphandleni uxelelwe ngenye indlela..
- Nceda ukhethe impendulo efanelekileyo umzekelo e.g. okanye wenze isanqa esinye xa kutshiwo.

Enkosi kakhulu ngentsebenziswano yakho

LEMIBUZO ILANDELAYO INGENKCUKACHA ZOKUHLALA

(Q1 – Q8 igqityezelwe ngumpicothi okanye umpicothi mncendise)

Q1. Ubudala: ___ iminyaka

Q2. Ubunzima: _____ kg

Q3. Ubude: _____ cm

Q4. Ubunzima bomzimba: _____ kg/m²

Q5. HGT (funda kubume bakhe): _____ mmol/l

Q6. BP (unyuko lwegazi): _____ mmHg

Q7. Ezinye izifo: (khankanya zonke ezifumaneka kuwe)

isifo sentliziyo

isifo samafutha

ukunyuka kobushushu begazi

Q8. Isini:

ubuduna

ubukhomokazi



Q9. Ubuhlanga:

Abantsundu

Okunye (bhentsisa) _____

Q10. Ubume bomtshato:

awutshatanga

utshatile / isinqamathe

wahlukene

umhlolokazi / umhlolo

Q11. Inkcukacha ngokwemfundo:

awufundanga

isikolo samabanga aphantsi

isikolo samabanga aphezulu

imfundo enomsila

Q12. Uhlalaphi (isigxina)?

- umzi wakho umzi wesihlobo
 kwindawo eqashisayo kumzi wabantu abadala
 okunye (bhentsisa) _ _ _ _ _

Q13. Uhlala nabantu abangaphi?

- uhlala wedwa nababini
 nabathathu nabane
 nabahlanu nangaphezulu nomnye

Q14. Ubume ngokomsebenzi:

- usebenza isiqxina (iyure ezingamashumi amane okanye ngaphezu kweveki)
 awusebenzi
 usebenza ngalomaxesha (ngapantsi kweyure ezingamashumi amane ngeveki)
 ufumana inkam-nkam
 okunye (bhentsisa) _ _ _ _ _



LEMIBUZO ILANDELAYO IBUZA MALUNGA NGEMPILO NEMFUNDO / INGCEBISO OZIFUMENEYO

Q15. Ngokuthatha ingqalelo kudidi lwesibini lweswekile ungasichaza njani isimo sempilo yakho?

- igqwesile intle kakhulu
 intle kholisa
 inkenenkene

Q16. Ingaba ugqirha / umongikazi wakho uyakuxelela ukuba uzilolonge?

- hayi ewe andiqinisekanga

Q17. Ingaba ugqirha / umongikazi wakho uyakuxelela ukuba utye ukutya okunjani?

- hayi ewe andiqinisekanga

Q18. Ingaba wakhe wafundiswa ngesifo seswekile (umzekelo: ucweyo)

- hayi ewe andiqinisekanga

**LEMIBUZO INGOKUPHATHELELENE NOLWAZI MALUNGA NESIFO SESWIKILE
(UDIDI LWESIBINI LWESWEKILE)**

Q19. Ingaba ulubona njani ulwazi lwakho: (yenza isangqa kwimpendulo yomgca ngamnye)	NKENENKENE	KAKUHLE	GQWESILE		
a) Ukushukuxa imiba engesifo seswekile ekuhlaleni	1	2	3	4	5
b) Ukuphathwa kwestress	1	2	3	4	5
c) Ukutya malunga nokunqandwa kwesifo seswekile	1	2	3	4	5
d) Uncedo lokuzildongela isifo seswekile	1	2	3	4	5
e) Amachiza owaselayo	1	2	3	4	5
f) Ukuqonda njani ukunyukelwa yiswekile	1	2	3	4	5
g) Ukutya, ukuzilolonga, amachiza zidlala eyiphi indima kwisifo seswekile	1	2	3	4	5
h) Ukuxilongwa kwesifo seswekile enyukileyo	1	2	3	4	5
i) Ukuxilongwa kwesifo seswekile ehlileyo	1	2	3	4	5
j) Ubuzaza besifo seswekile	1	2	3	4	5
k) Ukunonotshelwa kwenyawo	1	2	3	4	5
l) Isifo seswekile esingenabuzaza	1	2	3	4	5
m) Ukukhulelwa uneswekile	1	2	3	4	5

**LEMIBUZO ILANDELAYO IBUZA MALUNGA NOLWANALISEKO LAKHO
NGENKATHALO OYIFUMANAYO KWIZIKO LWEMPILO EKUHLALANI**

Q20.	Umbuzo	Nkenenkene	Kholisa	Intle	Intle kakhule	Igqwesile
a)	ixesha lokulinda. Kufuneka ulinde kangakanani ukuze uphinde ufumane ixesha lokutyelela kulekliniki	1	2	3	4	5
b)	ixesha lokulinda. Kufuneka ulinde kangakanani kwigumbi lokulinda kulekliniki ukuze uphinde ufumane ixesha lokutyelela	1	2	3	4	5
c)	imiyalelo. Ingaba bebekulungiselele abasebenzi bekliniki okuba ukulindele kutyelelo	1	2	3	4	5
d)	ukungabikho kobunzima ekufumaneni inkcukacha. Ukuzinikela kwabasebenzi bekliniki ekuphenduleni imibuzo yakho.	1	2	3	4	5
e)	inkcukacha ubuzinikiwe. Ingaba bezicacile zigqibekile incazelo kunye nakweyiphi inkcukacha ubuyinikiwe ngokuphathelelene neswekile	1	2	3	4	5
f)	inkathalo kunye nempatho ngabasebenzi bekliniki. Inthlonipho, ububele kunye, nobuntu	1	2	3	4	5
g)	ukhuseleko. Ukubakho kokhuseleko kwizinto zakho	1	2	3	4	5
h)	imfihlelo. Ingaba iyathathelwa inqalelo imfihlelo yakho; e.g. iziphumo zeswekile yegazi kuvavanyo, ubunzima etc.	1	2	3	4	5
i)	imiyalelo ngokuhamba. Ingaba ubuchazelwe ngokucacileyo nangokugqibekileyo owomanukwenze ekhaya okanye mhla uphinda utyelela	1	2	3	4	5
j)	uquka yonke impatho. Ingaba uyihluza njani impatho oyifumeneyo kunye nendlela ubuphetheke ngayo	1	2	3	4	5

Q21. Ingaba ubuxelelwe ukuba uhambe ekliniki phambi kokuba ufuna ukwenza njato?

ewe

hayi

Q22. Bekufuneka utyelele ugqirha okanye isibhendlele ngemini ezilandela impatho oyifumenego kwiziko lwezempilo ekuhlaleni (CHC) ngokuba impilo yakho lye ngokukambi ngenxa yeziphumo zempatho othe wayifumana kwiziko lwezempilo ekuhlaleni (CHC)?

ewe

hayi

Q23. Ungayicebisa iCHC kumhlobo okanye ilungu losapho ukuba lufuna impatho efumanekayo phaya?

ewe

hayi

Q24. Ingaba unayo eminye imibono kwimpucuko yempatho kwisebe lwezempilo ekuhlaleni (CHC):



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LEMIBUZO ILANDELAYO IBUZA MALUNGA NEMIDLALO OKANYE IZINTO OTHATHA KUZO INXAXHEBA

Ekuphenduleni lemibuzo olandelayo,

- Imidlalo ebandakanya amandla ichaza imidlalo ethathe amandla amakhulu iphinde ikwenze uphefumle kunesiqhelo.
- Imilinganiselo yesiqhelo yokuzimisela emidlalweni ichaza imidlalo ethathe imilinganiselo yesiqhelo yokuzimisela kakhulu iphinde ikwenze uphefumle ukwandisa ubunzimo nangaphezulu kunesiqhelo.

Q25a. Ukususela kwintsuku ezisixhenxe zokuqibela, zingaphi intsuku othe wenza ngazo **imidlalo ebandakanya amandla** ezinje ngokuphakamiso ezinto ezinzima, ukugrumba imidlalo yamanzi okanye ukuqhuba ibhayisikili ngamandla?

Cinga malunga nalomidlalo othe wayenza ngaphantsi kwemizuzu elishumi ngexesha.

_____ intsuku ngeveki →

Q25b. Lingakanani ixesha ekugqibeni othi ulisebenzise kwenye yezontsuku usenza imidlalo ebandakanya amandla?

okhanye

_____ iyure _____ imizuzu

ayikho

Q26a. Kwaphindo, cinga malunga nalomidlalo othe wayenza ngaphantsi kwemizuzu elishumi ngexesha? Ukususela kwintsuku zisixhenxe zokugqibela, zingaphi intsuku othe wenza ngazo **imilinganiselo yesiqhelo yokuzimisela** emidlalweni ezinje ngokuphatha umthwalo engekonzima, ukuqhuba ibhayisikili ngokwesiqhelo, okanye intenetya ephindiweyo? **Ungakubandakanyi ukuhamba.**

_____ intsuku ngeveki →

Q26b. Lingakanani ixesha ekugqibeni othi ulisebenzise kwenye yezontsuku usenza imilinganiselo yesiqhelo yokuzimisela emidlalweni?

okhanye

_____ iyure _____ imizuzu

ayikho

Q27a. Ukususela kwintsuku ezisixhenxe zokugqibela, zingaphi intsuku othi **uhambe** ngazo ngaphantsi kwemizuzu elishumi ngexesha? Le iquka ukuhamba emisebenzini kunye nasekhaya, ukuhamba utyelela indawo ngendawo, kunye naluphi uhambo olenzileyo ukuyozimamela uwedwa, imidlalo, ukuzildonga okanye ixesha lakho lokuphumla.

_____ intsuku ngeveki →

Q27b. Lingakanani ixesha ekugqibeni othi ulisebenzise uhamba kwenye yezontsuku?

okhanye

_____ iyure _____ imizuzu

ayikho

Lambuzo nokugqibela umalunga nexesha othi ulisebenzise uhleli **phakathi** evekini usemsebenzini, ekhaya, usenza umsebenzi kunye ukususela ngexesha lakho lokuphumla. Le iquka ixesha alisebenzisileyo uhleli edesikeni, utyelele abanhlobo, ufunda, uhamba nqebhasi okanyuhleli phantsi ubukele umabonakude.

Q28. Ukususela kwintsuku ezisixhenxe zokuqibela, lingakanani ixesha ekugqibeni othi ulisebenzise uhleli **phakathi evekini**?

_____ iyure _____ imizuzu

LEMIBUZO ILANDELAYO IBUZA MALUNGA NENDLELA OTYA NGAYO

Q29. Ukutya okutyayo xa uneswekile:

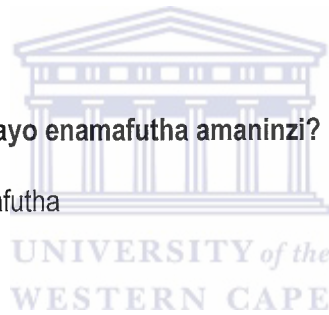
- njengamntu wonke woMzankasi Afrika
- ukutya okusempilweni kunabantu bonke
- iphezulu icarbohydrates kubantu abaninzi
- ukutya okuneprotheyini

Q30. Ngeyipi kwezi zilandelayo enecarbohydrates ezininzi?

- inkukhu eqhotsiweyo
- isonka samasi
- itapile eliqhotsiweyo
- ibhotolo yembotyi

Q31. Ngeyipi kwezi zilandelayo enamafutha amaninzi?

- ubisi olungenamafutha
- ijusi yelamuni
- umbona
- ubusi



Q32. Ngeyipi kwezi zilandelayo ekukutya okulungileyo?

- nakuphi na ukutya
- nakuphi na ukutya okulungileyo
- nakuphi na ukutya okungena swekile
- nakuphi na ukutya (< 20 calories)

Q33. Yintoni igalelo elenziwa sisiselo esingena swekile kwiswekile?

- iyayinciphisa
- iyayongeza
- ayikasonjululwa

Q34. Yintoni engenokusetyenziswa ekunyangeni iswekile eyehlileyo?

- ilekese ezintathu eziqinileyo
- ½ yekomityi yesiselo seziqhamo
- 1 yekomityi yesiselo esihlwahlwazayo
- 1 yekomityi yobisi olungenamafutha

Q35. Ukutya ukutya okungenamafutha kwehlisa unapheko:

- isifo 'nerve'
- isifo samadolo
- isifo sentliziyo
- isifo sendlebe

Q36. Ukuba uthatha inaliti yakusasa kodwa utsibe isidlo sakusasa ubume beswekile yakho iyakusoloko:

- inyukile
- ihlife
- isafana nakuqala



LEMIBUZO ILANDELAYO IBUZA MALUNGA NENKXASO KWIZALAMANE NABAHLBO

Q37. Izalamane zam okanye izihlobo ziyandinceda zindixhase kakhulu:
(yenza isangqa kwimpendulo yomgca ngamnye)

	Andivumelani ngamandla	Iyayandisa ngamandla	Kuyatana	Iyayandisa amandla	Ndivumelana amandla	
a) ukulandela isicwangciso semandikutye	1	2	3	4	5	n/a
b) ukusela amayeza am	1	2	3	4	5	n/a
c) ukulolonga inyawo zam	1	2	3	4	5	n/a
d) ukuzilolonga ngokwaneleyo	1	2	3	4	5	n/a
e) ukuvavanywa kwegazi	1	2	3	4	5	n/a
f) imizwa yam malunga neswekile	1	2	3	4	5	n/a

**ENKOSI NGOKUTHATHA IXESHA NOKUCINGA EKUGQIBENI LEMIBUZO
SIYAYIBULELE INTSEBENZISWANO YAKHO!**

**Type 2 DIABETES MELLITUS QUESTIONNAIRE
for
HEALTH CARE PROFESSIONALS**

- This questionnaire is about the management of Type 2 diabetes mellitus at Primary Healthcare level
- This questionnaire is **completely voluntary**. You may choose not to participate or not to answer any specific question.
- This questionnaire is **completely anonymous**. Please make no marks of any kind on the survey which could identify you individually.



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INSTRUCTIONS

- Select only one response, unless instructed otherwise.
- Please tick the appropriate answer e.g. ✓ or circle one correct answer where indicated

Thank you very much for your co-operation

THE FOLLOWING QUESTIONS ASK ABOUT YOUR DEMOGRAPHIC CHARACTERISTICS

Q1. Age: _____ years old

Q2. Gender:

- male female

Q3. Highest level of education: _____

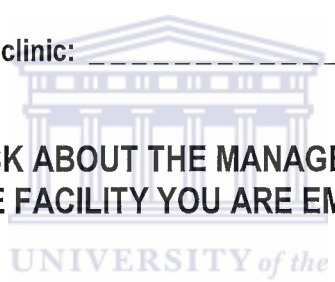
Q4. Special (extra) diabetes management training:

- yes no

If yes, specify _____

Q5. Duration of working in diabetes clinic: _____ (months/years)

THE FOLLOWING QUESTIONS ASK ABOUT THE MANAGEMENT OF TYPE 2 DIABETES MELLITUS AT THE HEALTH CARE FACILITY YOU ARE EMPLOYED AT



Q6. Name of Community Healthcare Centre (CHC) employed at: _____

Q7. Do you follow a prescribed type 2 diabetes mellitus management protocol at your CHC?

- yes no

If yes, specify _____

Q8. Which members of the multidisciplinary health care professional team are involved in the management of patients with type 2 diabetes mellitus at your CHC? (Tick all that is applicable)

- doctor physiotherapist
 sister / nurse dietician

other (specify) _____

DIABETES ATTITUDE SURVEY (DAS3)

Below are some statements about diabetes. Each numbered statement finishes the sentence 'In general, I believe that...' You may believe that a statement is true for one person but not for another person or may be true one time but not be true another time. Mark the answer that you believe is true most of the time or is true for most people. Place a check mark (✓) in the box below the word or phrase that is closest to your opinion about each statement. It is important that you answer every statement.

Note: The term 'health care professionals' in this survey refers to doctors, nurses and dieticians.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
9. ...health care professionals who treat people with diabetes should be trained to communicate well with their patients.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. ...people who do <u>not</u> need to take insulin to treat their diabetes have a pretty mild disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. ...there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. ...diabetes affects almost every part of a diabetic person's life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. ...the important decisions regarding daily diabetes care should be made by the person with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. ...health care professionals should be taught how daily diabetes care affects patients' lives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. ...older people with Type 2 diabetes do not usually get complications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ...keeping the blood sugar close to normal can help to prevent the complications of diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. ...health care professionals should help patients make informed choices about their care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



In general, I believe that:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
30. ...having diabetes changes a person's outlook on life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. ...people who have Type 2 diabetes will probably not get much payoff from tight control of their blood sugars.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. ...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. ...Type 2 diabetes is as serious as Type 1 diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. ...tight control is too much work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. ...what the patient does has more effect on the outcome of diabetes care than anything a health care professional does.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. ...tight control of blood sugar makes sense only for people with Type 1 diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. ...it is frustrating for people with diabetes to take care of their disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. ...people with diabetes have a right to decide how hard they will work to control their blood sugar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. ...people who take diabetes pills should be as concerned about their blood sugar as people who take insulin.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. ...people with diabetes have the right <u>not</u> to take good care of their diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. ...support from family and friends is important in dealing with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



In general, I believe that:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
18. ...it is important for the nurses and dieticians who teach people with diabetes to learn counseling skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. ...people whose diabetes is treated by just a diet do not have to worry about getting many long-term complications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. ...almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. ...the emotional effects of diabetes are pretty small.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. ...people with diabetes should have the final say in setting their blood glucose goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. ...blood sugar testing is not needed for people with Type 2 diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. ...low blood sugar reactions make tight control too risky for most people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. ...health care professionals should learn how to set goals with patients, not just tell them what to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. ...diabetes is hard because you never get a break from it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. ...the person with diabetes is the most important member of the diabetes care team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. ...to do a good job, diabetes educators should learn a lot about being teachers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. ...Type 2 diabetes is a very serious disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



PHYSICAL ACTIVITY EXIT INTERVIEW (PAEI)

The following questionnaire will measure the quality of physical activity counseling content to clients with type 2 diabetes mellitus.

Never = 0% Seldom = ≤ 25% sometimes = 50% often = ≥ 75% always = 100%

42. Do you discuss the topic of physical activity with your patient?
 never seldom sometimes often always
43. Do you advise your patients to become more physically active?
 never seldom sometimes often always
44. Do you discuss the benefits of physical activity with your patients?
 never seldom sometimes often always
45. Do you discuss with your patients their past experiences with physical activity?
 never seldom sometimes often always
46. Do you discuss the difficult situations patients might encounter or problems they might have in trying to become more physically active?
 never seldom sometimes often always
47. Do you inform your patients on how FREQUENTLY they should exercise?
 never seldom sometimes often always
48. Do you inform your patients on how LONG they should exercise?
 never seldom sometimes often always
49. Do you inform your patients on how HARD they should exercise?
 never seldom sometimes often always
50. Do you inform your patients on the TYPE of exercise they should do?
 never seldom sometimes often always
51. Do you and your patient put the plan to become more physically active in writing?
 never seldom sometimes often always
52. Do you give any written materials about physical activity or exercise during each day's clinic visit?
 never seldom sometimes often always
53. Do you state to the patients that you are planning to discuss their physical activity on a future visit?
 never seldom sometimes often always

Thank you very much for your co-operation



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DELPHI STUDY INFORMATION SHEET

Study Title: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

Invitation

You are being invited to take part in a research study conducted by TANIA STEYL (PhD candidate) of the University of the Western Cape. Before you decide it is important for you to understand why the research is being done and what it will involve. Please read the following information carefully. Please ask me if there is anything that is not clear or if you would like more information and please take your time to decide whether you wish to join this study.

What is the purpose of the study?

Type 2 diabetes mellitus, an incurable chronic disease, requires more than only pharmacological management to prevent hyperglycaemia and ketoacidosis as well as complications that arise later due to high blood glucose levels. The management of type 2 diabetes mellitus may include oral diabetes medication, a special diet and participation in daily physical activity. It may however be complicated by other external factors such as stress, socio-economic circumstances, other illnesses as well as the effectiveness of education/health promotion programmes. As lifestyle change remains the primary strategy for management of type 2 diabetes mellitus, people should be encouraged to take responsibility of their own health. This involves empowering them by increasing their awareness of the risk their current diet and sedentary lifestyle might play in them developing diabetic complications. Effective promotion of lifestyle changes as part of the management of type 2 diabetes mellitus patients at the Primary Health Care level can assist to control the emergence and costs of diabetes and diabetic complications in South Africa. Therefore, the overall aim of the study is to develop, implement and determine the effectiveness of a health promotion intervention/programme for adult clients with type 2 diabetes mellitus of a South African urban community.

Why have I been chosen?

You have been asked to participate in this research project because you have been identified as an expert in the field of health promotion and diabetes management. The purpose of this research project is to develop a health promotion programme for clients with type 2 diabetes mellitus that can be implemented at Primary Health Care facilities in South Africa. The programme will be developed based on the results of quantitative data from individuals with diabetes mellitus, focus group discussions held with individuals with diabetes mellitus, semi-structured interviews conducted with health care professionals at participating community health centres, , a literature review, policy and document analysis and a Delphi study. The programme will be implemented where after the effectiveness of it will be assessed.

Do I have to participate?

Participation is voluntary. If you decide to participate you will be given the information sheet to keep and you will be asked to sign a consent form. You are free to withdraw at any time without giving a reason. A decision not to participate or to withdraw at any time, will not affect you in any way.

What will happen to me if I participate?

If you agree to participate in the study you will firstly be asked to complete a consent form and return it via e-mail. This research will be carried out using the Delphi technique consisting of two to three rounds (questionnaires) aimed to achieve consensus. With your permission the questionnaires will be e-mailed to you. Simple and specific instructions will be provided for each questionnaire. The amount of time necessary for completion of each questionnaire will vary with each panellist, but should range between 10- 15 minutes per round. There are no right or wrong answers to the questions. This study is seeking your expert opinion.

The following points are important for you to remember:

- Your participation is entirely voluntary.
- You may decline or withdraw from the study at any time.
- You will remain anonymous to the other participants (or experts) throughout this Delphi study and only the researcher will be able to identify your specific answers.
- All records are confidential. Your name will only be recorded on the consent form; it will not be recorded on any questionnaire. All information will only be available to members of the research team. All information will be destroyed 5 years after the research is complete.
- Any information that you will provide will be confidential and when the results of the study are reported you will not be identifiable in the finding.
- Following the study, information gathered will be sent for publication in professional journals and will also be presented at conferences. All detail of people who participated in the study will be kept anonymous.
- You will only have to complete the consent form once; return of completed Delphi rounds implies your consent to participate.

What if something goes wrong?

I am not aware of any complications or risks that could arise from participating in this study. However, if you decide to participate in the study you will be given written information detailing the names and telephone number to contact should you have any complaints or difficulties with any aspect of the study.

Will my participation in the study be kept confidential?

If you consent to participate in the study, your name will not be disclosed and would not be revealed in any reports or publications resulting from this study. Apart from your consent form, your name will not be recorded on Delphi rounds. Each participant will be allocated an unique code. You will remain anonymous to the other participants (or experts) throughout this Delphi study and only the researcher will be able to identify your specific answers. All information will be destroyed 5 years after the research is complete.

What happens when the research study stops?

The results of this study will be used to develop a health promotion intervention/programme for adult clients with type 2 diabetes mellitus that will be implemented in an urban community health centre (CHC). The effectiveness of the programme will be determined. The findings will also be published in professional journals and/or presented at conferences.

The study has been approved by the the University of the Western Cape's Senate Research Committee and Ethics Committee (11/4/2) and the Department of Health (11/7/14; Reference number RP59/2011).

If you need further information regarding this study you can contact:

TANIA STEYL

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E-mail: tsteyl@uwc.ac.za

DELPHI STUDY CONSENT FORM

Participant identification number:

Title of Research Project:

Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

1	I confirm that I have read and understood the information sheet dated for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	<input type="checkbox"/>
2	I am willing to participate in all the rounds of the Delphi study and the follow-up stage	<input type="checkbox"/>
3	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. However, I understand that the success of this study depends on all participants completing all the Delphi rounds.	<input type="checkbox"/>
4	I understand that I will remain anonymous to the other participants (or experts) throughout this Delphi study and only the researcher will be able to identify my specific answers.	<input type="checkbox"/>
5	I understand that the researcher will hold all information and data collected in a secure and confidential manner.	<input type="checkbox"/>

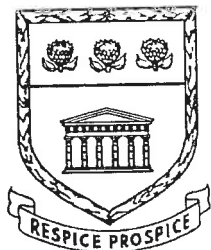
Name of participant

Date

Signature

Not consenting

1	I am NOT willing to participate in this study	<input type="checkbox"/>
---	--	--------------------------



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DELPHI STUDY – Round 1

Participant identification number:

Title of Study: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

Please complete information below if you had chosen to participate in the study (completed the Consent Form)

SOCIO-DEMOGRAPHIC INFORMATION



Age:(years)

Gender: Male Female

Highest level of Qualification:.....

Current profession:

Number of years' experience in health promotion / non-communicable diseases / diabetes mellitus: (years)

Role in management of diabetes mellitus/non communicable diseases/health promotion:
.....

QUESTIONS (Use as much space as needed)

1. In your opinion, what are the benefits or role of health promotion for individuals with non-communicable disease such as type 2 diabetes mellitus?

.....

.....

.....

.....

.....

2. In your opinion, what is the type of activities or items that should be included in a health promotion programme?



.....

.....

.....

.....

.....

3. In your opinion, what is the best way of implementing a health promotion programme at primary health care level?

.....

.....

.....

.....

.....

Thank you for taking time to complete this survey



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DELPHI STUDY – Round 2

Participant identification number:

Title of Study: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

Thank you for your valuable information received from Round 1 of the Delphi study. Please complete information below.

Tick (✓) all the appropriate answer/s.



QUESTIONS

1. The content of the health promotion programme for clients with type 2 diabetes mellitus should include the following:

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- | | | |
|--|------------------------------|-----------------------------|
| • Physical exercise | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Healthy eating | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Stress management | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Self-management of disease | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Possible long-term complications | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Signs and symptoms of hypo- / hyperglycaemia | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • General information on support groups | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Other..... | | |
| | | |
| | | |

2. The mode of instruction of the health promotion programme should be:

- One-on-one Yes No
- Classroom-based (small groups) Yes No
- Interactive group work Yes No
- Hand outs (pamphlets) Yes No
- DVDs or videos in waiting room of CHC Yes No
- Posters in waiting room of CHC Yes No

3. The health promotion programme should be implemented for at least:

(Tick (✓) ONE answer only)



- ⊕ 4 weeks Yes No
- ⊕ 6 weeks Yes No
- ⊕ 8 weeks Yes No
- ⊕ 12 weeks Yes No

⊕ Other

.....
.....

4. The physical exercise component of the health promotion programme should include:

- ⊕ Cardio-respiratory exercises Yes No
- ⊕ Strengthening exercises Yes No
- ⊕ General stretching Yes No

• Other.....
.....
.....

5. Please complete the following for two of the **components of the physical exercise section** of the health promotion programme:

CARDIO-RESPIRATORY EXERCISES

Duration per session

‡ <20 minutes Yes No

‡ 20 – 30 minutes Yes No

‡ >30 minutes Yes No

‡ Other.....

.....

Frequency per week

‡ 1-2 x/week Yes No

‡ 3-4 x/week Yes No

‡ >4 x/week Yes No

‡ Other.....

.....

Type of activities (suggestions)

.....

.....

.....

.....



STRENGTHENING EXERCISES

Duration per session

± <20 minutes Yes No

± 20 – 30 minutes Yes No

± >30 minutes Yes No

± Other.....
.....

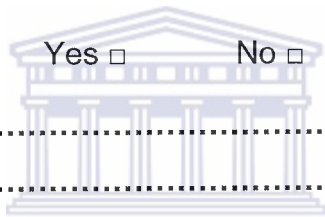
Frequency per week

± 1-2 x/week Yes No

± 3-4 x/week Yes No

± >4 x/week Yes No

± Other.....
.....



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Type of activities (suggestions)

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

6. The healthy eating section of the health promotion programme should include:

- “good” vs “bad” food options Yes No
- Food portions Yes No
- Cooking methods Yes No
- Easy recipes Yes No
- Drinks Yes No
- Healthy snacks Yes No
- Other.....
.....
.....



7. The stress management section of the health promotion programme should include:

- Identify symptoms of stress Yes No
- Effects of stress on glucose levels Yes No
- Practical management techniques:
 - ↳ Stretching Yes No
 - ↳ Deep, relaxed breathing control Yes No
- Other.....
.....
.....

8. The self-management section of the health promotion programme should include:

- The role of diet, exercise and medicine on glucose levels Yes No
- Interpretation of blood glucose results Yes No
- Benefits of blood glucose control Yes No
- Prevention and treatment of:
 - + High blood sugar Yes No
 - + Low blood sugar Yes No
- Prevention of long-term complications Yes No
- Foot care Yes No
- Wound care Yes No

• Other.....
.....
.....



Thank you for taking time to complete this survey

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DELPHI STUDY – Round 3

Participant identification number:

Title of Study: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

Thank you for your valuable information received from Round 1 and 2 of the Delphi study. The opinions from Round 2 are summarised (65% agreement and above). You have a final opportunity to reconsider and alter your initial response or keep it unchanged.

Tick (✓) all the appropriate answer/s.



QUESTIONS

1. The content of the health promotion programme for clients with type 2 diabetes mellitus should include the following:

- | | | |
|--|------------------------------|-----------------------------|
| • Physical exercise | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Healthy eating | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Stress management | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Self-management of disease | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Possible long-term complications | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • Signs and symptoms of hypo- / hyperglycaemia | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| • General information on support groups | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

2. The mode of instruction of the health promotion programme should be:

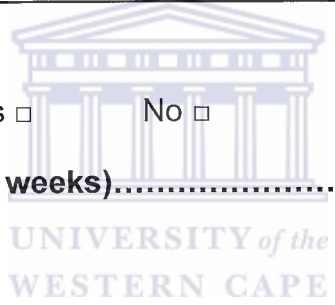
- One-on-one initially Yes No
- Small groups (class-room based) for follow ups Yes No

Including the following:

- Interactive group work Yes No
- Hand outs (pamphlets) Yes No
- Posters in waiting room of CHC Yes No

3. The health promotion programme should be implemented for at least:

- ⚡ 6 weeks Yes No
- ⚡ Other (if you disagree with 6 weeks).....



4. The physical exercise component of the health promotion programme should include:

- ⚡ Cardio-respiratory exercises Yes No
- ⚡ Strengthening exercises Yes No
- Other (if you disagree with above-mentioned components).....
.....
.....

5. Please complete the following for two of the components of the physical exercise section of the health promotion programme:

CARDIO-RESPIRATORY EXERCISES

Duration per session

± 20 – 30 minutes Yes No

± Other (if you disagree with 20 – 30 minutes).....

Frequency per week

± 3-4 x/week Yes No

± Other (if you disagree with 3-4 x/week).....



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STRENGTHENING EXERCISES

Duration per session

± 20 – 30 minutes Yes No

± Other (if you disagree with 20 – 30 minutes).....

Frequency per week

± 3-4 x/week Yes No

± Other (if you disagree with 3-4 x/week).....

6. The **healthy eating section** of the health promotion programme should include:

- “good” vs “bad” food options Yes No
- Food portions Yes No
- Cooking methods Yes No
- Drinks, including alcohol use Yes No
- Healthy snacks Yes No
- Shopping tips Yes No
- How to read food labels Yes No



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7. The **stress management section** of the health promotion programme should include:

- Identify symptoms of stress Yes No
- Effects of stress on glucose levels Yes No
- Practical management techniques:
 - ↓ Stretching Yes No
 - ↓ Deep, relaxed breathing control Yes No

8. The self-management section of the health promotion programme should include:

- The role of diet, exercise and medicine on glucose levels Yes No
- Interpretation of blood glucose results Yes No
- Benefits of blood glucose control Yes No
- Prevention and treatment of:
 - ⚡ High blood sugar Yes No
 - ⚡ Low blood sugar Yes No
- Prevention of long-term complications Yes No
- Foot care Yes No

Thank you for taking time to complete this survey



**HEALTH PROMOTION PROGRAMME
for
Type 2 diabetes mellitus**

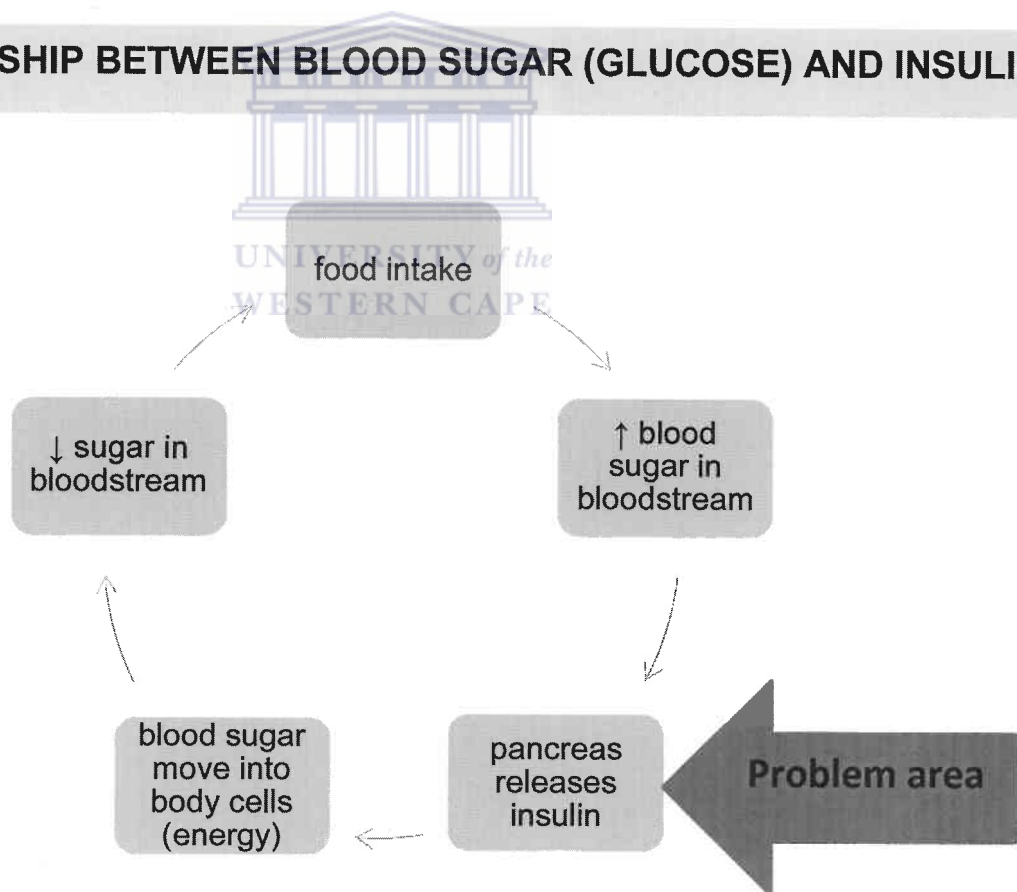
Week 1: INTRODUCTION

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WHAT IS TYPE 2 DIABETES MELLITUS (T2DM)?

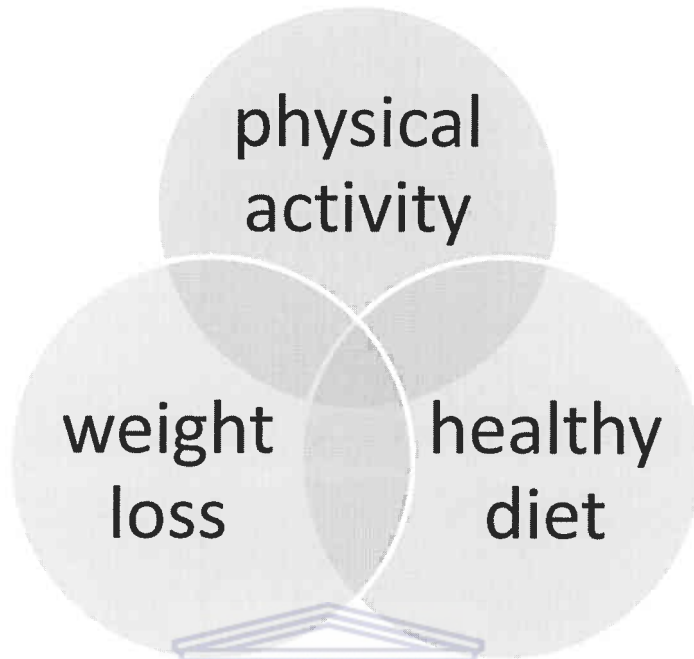
- T2DM is a **chronic condition** that affects the way your body digests sugar (glucose)
- >90% of all cases of diabetes; common in overweight and obese people
- There is too much sugar in the blood due to a **lack of insulin**, a hormone that regulates the movement of sugar into your cells, **or due to insulin not working effectively**
- There is **no cure** for T2DM
- You **can manage** T2DM by **eating well, exercising, maintaining a healthy weight and monitoring your sugar (glucose) levels**
- If diet and exercise don't control your blood sugar, you **may need diabetes medications or insulin therapy**

THE RELATIONSHIP BETWEEN BLOOD SUGAR (GLUCOSE) AND INSULIN



Type 2 diabetes mellitus → build-up of sugar in the blood → complications
damage blood vessels and nerves →

MANAGING TYPE 2 DIABETES MELLITUS



If not able to control blood sugar effectively with lifestyle change

Diabetic medication



Insulin injections


THE IMPORTANCE OF BLOOD SUGAR CONTROL

✦ To prevent diabetic complications

- ✦ Heart disease
- ✦ Stroke
- ✦ Kidney disease
- ✦ Eye problems
- ✦ Diabetic neuropathy (nerve damage)
- ✦ Diabetic foot
- ✦ Skin problems
- ✦ Peripheral vascular disease

NORMAL BLOOD SUGAR VALUES FOR TYPE 2 DIABETES MELLITUS

(SEMDSA guidelines)



Before a meal: 4 – 7 mmol/l

2 hours after a meal: 5 - 8 mmol/l

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REMEMBER, the following can influence blood sugar levels:

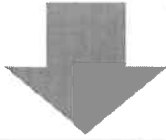
- ✦ Physical activity
- ✦ Food intake
- ✦ Stress
- ✦ Illness

GOOD CONTROL



avoiding very high/low blood sugar levels

MEDICAL EMERGENCY



LOW BLOOD SUGAR LEVELS

(Hypoglycaemia)

Blood sugar < 4 mmol/ℓ

Signs and symptoms

- ✚ Paleness
- ✚ Cold, sweaty skin
- ✚ Difficulty concentrating
- ✚ Shakiness
- ✚ Irritability
- ✚ Staggering gait
- ✚ Tired
- ✚ Excessive hunger
- ✚ Headache
- ✚ Blurred vision / dizziness
- ✚ Stomach pain / nausea
- ✚ Fainting → unconsciousness

Causes

- ✚ More physical exercise than usual
- ✚ Not eating on time
- ✚ Missing or delaying meals
- ✚ Taking too much insulin

Treatment

- ✚ **Seek medical help!**
- ✚ If person is **conscious**, give either:
 - 1 cup regular soft drink
 - ½ cup of orange juice
 - 3-4 hard sweets

HIGH BLOOD SUGAR LEVELS

(Hyperglycaemia)

Blood sugar > 11 mmol/ℓ

Signs and symptoms

- ✚ Frequent, excessive thirsty
- ✚ Frequent, excessive urination
- ✚ Headaches
- ✚ Dry mouth
- ✚ Itchy, dry skin
- ✚ Weak, feeling tired
- ✚ Slow healing of cuts and sores
- ✚ Bad vision
- ✚ Chronic constipation / diarrhoea
- ✚ Diabetic coma (**ketoacidosis**)

Signs and symptoms of ketoacidosis

- Breath smells fruity
- Nausea / vomiting
- Extremely dry mouth
- Shortness of breath

Causes

- ✚ Skipping or forgetting to take insulin or oral medication
- ✚ Eating too much starch
- ✚ Infection
- ✚ Illness
- ✚ Increased stress
- ✚ Vigorous exercise

Treatment

- ✚ **See your doctor !**

ROUTINE DIABETES CARE

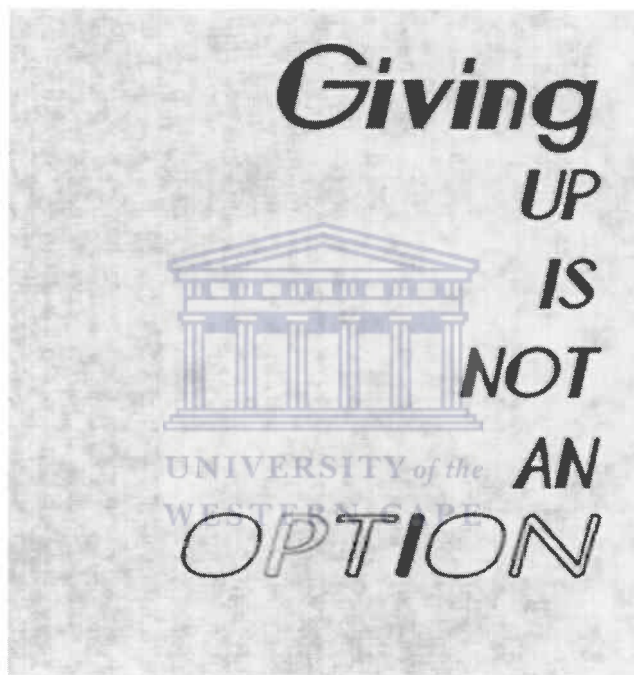
It is important to monitor your diabetes regularly

Recommended tests

Test	When	Target
A1c	twice a year if stable	< 7%
ECG	once a year	normal
Lipogram	once a year	total cholesterol <4.5 mmol/l
Kidney function serum creatinine	once a year	male 44-97 mmol/l female 44-80 mmol/l
Kidney function microalbumin	once a year	negative
Blood pressure	each visit	< 130/80 mmHg
Weight and Body mass index (BMI)	each visit	< 25kg/m ²
Capillary blood sugar	each visit or daily	4 - 7 mmol/l (fasting) 5 - 8 mmol/l (2hrs after meal)

Yearly examination should include:

- ✦ Eye examination
- ✦ Comprehensive foot examination
- ✦ Lower limb reflexes
- ✦ Insulin injection site
- ✦ Dietician / diabetes nurse educator



The onset of diabetes requires you to change your life.

Yet, you are not alone.

There are millions in your shoes.

Through diet, exercise, and disease management,

you can live a healthy life.

**HEALTH PROMOTION PROGRAMME
for
Type 2 diabetes mellitus**

Week 2: PHYSICAL ACTIVITY



PHYSICAL ACTIVITY FOR TYPE 2 DIABETES MELLITUS (T2DM)

- Physical exercise plays an **important role in the management** of T2DM
- Choose an exercise that **fits your lifestyle, interests and physical ability**
- You should be able to **do the exercise regularly and enjoy it**
- It can include '**activities of daily living**', e.g. **stair climbing, gardening, walking to the shops**
- Set **specific goals** for yourself

BENEFITS OF EXERCISE

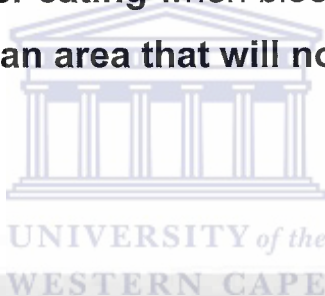
- ✦ ↑ use of blood sugar
- ✦ Burning excess body fat, helping to decrease and control weight
- ✦ ↑ muscle strength
- ✦ Increasing bone density and strength (↓ osteoporosis)
- ✦ ↓ blood pressure
- ✦ Helping to protect against heart and blood vessel disease by ↓ 'bad' LDL cholesterol and ↑ 'good' HDL cholesterol
- ✦ Improving blood circulation and reducing your risk of heart disease and stroke
- ✦ ↑ energy levels
- ✦ ↓ stress and anxiety

RECOMMENDED DOSAGE

- 30 minutes of **moderate** physical activity 5 days a week
- MODERATE = **you can talk while you exercise**
- The 30 minutes can consist of 3 x 10 minutes sessions per day
- Ideally you **should not go 2 days without exercising**

CHECKLIST BEFORE YOU EXERCISE

- ‡ **Test blood sugar levels (if possible) before and after exercise**
 - If low: snack and wait 15 minutes for sugar levels to normalise
 - If high: check for ketones in urine. If positive = NO exercise
- ‡ **Medication or insulin** at hand
- ‡ **Fast-acting snack** in case of low blood sugar (hypoglycaemia)
- ‡ Wear a form of **identification that you are diabetic** (medic-alert bracelet)
- ‡ Wear comfortable **shoes with cotton socks**
- ‡ Eat **starch before exercise**
- ‡ Always **drink water** before, during and after exercise
- ‡ Exercise only **an hour after eating** when blood sugar is at its 'highest'.
- ‡ If **using insulin, inject in an area that will not be exercised** at least an hour before exercising



GUIDELINES TO PREVENT EXERCISE-RELATED LOW BLOOD SUGAR

- ‡ **Check blood sugar** before and after exercise
- ‡ **Avoid late evening exercise**, you should complete your exercise 2 hours before bedtime
- ‡ **Avoid a warm bath or shower directly after exercise.** This will continue to increase your pulse rate and lower your blood sugar
- ‡ **Never exercise on an empty stomach.** Always eat something starchy before you exercise

HOW TO BECOME AN 'ACTIVE EXERCISER'

- Set small, reachable goals
- Choose an exercise that you are comfortable with
- Start slowly and increase your activities gradually
- Plan ahead, have a specific schedule
- Identify a specific time slot per day
- Keep an 'exercise diary'
- Invite a friend or family member to exercise with you
- Exercise when you feel energetic. Remember: **exercise will ↑ your energy**

TYPE OF EXERCISE



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CARDIO- RESPIRATORY

brisk walking

stair climbing

cycling

swimming

STRENGTHENING

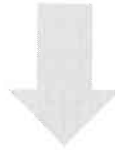
own body
weight

small weights

A SESSION SHOULD INCLUDE

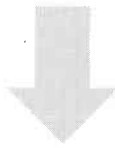
5 minute low-intensity warm-up

(e.g. marching on the spot and gentle stretches)



20 minute cardio-respiratory exercises / strengthening exercises

(e.g. brisk walking / cycling / swimming)



5 minute low-intensity cool-down

(e.g. marching on the spot and gentle stretches)



HOW TO CALCULATE 'MODERATE INTENSITY'

Target training heart rate (TTHR)

50-70% (220 - age)

Talk test

You should be able to talk while you exercise

EXERCISE AND DIABETIC COMPLICATIONS

- You need to be **physical active**, even if you have diabetic complications
- **Not being physically active can lead to other complications** and loss of your ability to do things for yourself

COMPLICATION

PERIPHERAL NEUROPATHY
(damage to the nerves in limbs)

RETINOPATHY
(eye disease)

NEPHROPATHY
(damage to the kidneys)

RECOMMENDED EXERCISE

non-weightbearing exercises
(swimming, cycling, in a chair)
balance exercises

brisk walking or cycling
(avoid bending forward, lifting heavy objects and strengthening exercises of the arms)




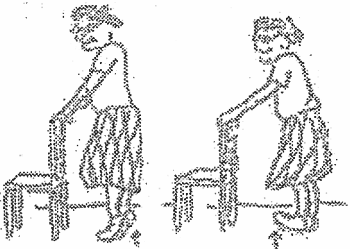
brisk walking or cycling
(monitor blood pressure)

**BEING HEALTHY
AND FIT ISN'T A
FAD OR A TREND.
INSTEAD, IT'S A
lifestyle. ♡**

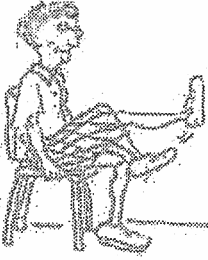

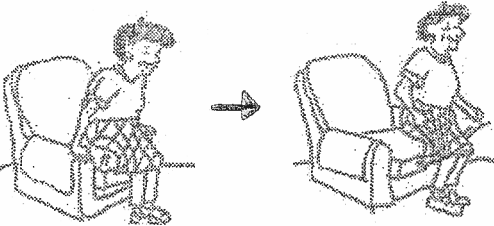

EXAMPLES OF HOME EXERCISES

(Pictures re-used with permission from Prof. T. van Rooijen, University of Pretoria)

Warm-up

<p>Walk / march on the spot</p> <p>Stap / masjeer op die plek</p> <p>20x</p>		<p>Leg swing</p> <p>Been swaaie</p> <p>20x</p>	
<p>Shoulder circles forward and backward</p> <p>Skouer sirkels vorentoe en agtertoe</p> <p>10x</p>		<p>Toe and heel raises</p> <p>Toon en hak oplig</p> <p>30 in each direction 30 in elke rigting</p> <p>5x</p>	

Strengthening

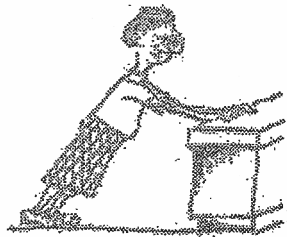
<p>Leg lift</p> <p>Been oplig</p> <p>10x</p>		<p>Bend and straighten knees</p> <p>buig en knieë reguit maak</p> <p>10x</p>	
<p>Hip lifts out of armchair</p> <p>Opstote uit gemakstoel</p> <p>10x</p>		<p>Push – ups against wall</p> <p>Opstote teen muur</p> <p>10x</p>	

<p>Elbow / biceps curls Elmboog / biceps krul 10x</p>	<p>Leg lifts Been oplig 10x elke been</p>
<p>Curl-ups Opsitte 5x</p>	

Stretches

<p>Shoulder stretch (forward) Skouer strek (vorentoe) 3x 30sec</p>	<p>Thigh stretch (front) Dyspier strek (voor) 3x 30sec</p>
<p>Trunk stretch with broom Lyf strek met besem 3x 30sec</p>	<p>Calf stretch Kuitspier strek 3x 30sec</p>
<p>Sideward stretch Sywaarts strek 3x 30sec</p>	<p>Thigh stretch (back) Dyspier strek (agter) 3x 30sec</p>

<p>Shoulder stretch (backwards)</p> <p>Skouer strek (agtertoe)</p> <p>3x 30sec</p>	<p>Forearm stretch</p> <p>Voorarm strek</p> <p>3x 30sec</p>
<p>Ankle stretch</p> <p>Enkel strek</p> <p>3x 30sec</p>	<p>Shake out after stretches</p> <p>Los skud Na strekke</p> <p>20 counts</p>



**HEALTH PROMOTION PROGRAMME
for
Type 2 diabetes mellitus**

Week 3: HEALTHY EATING



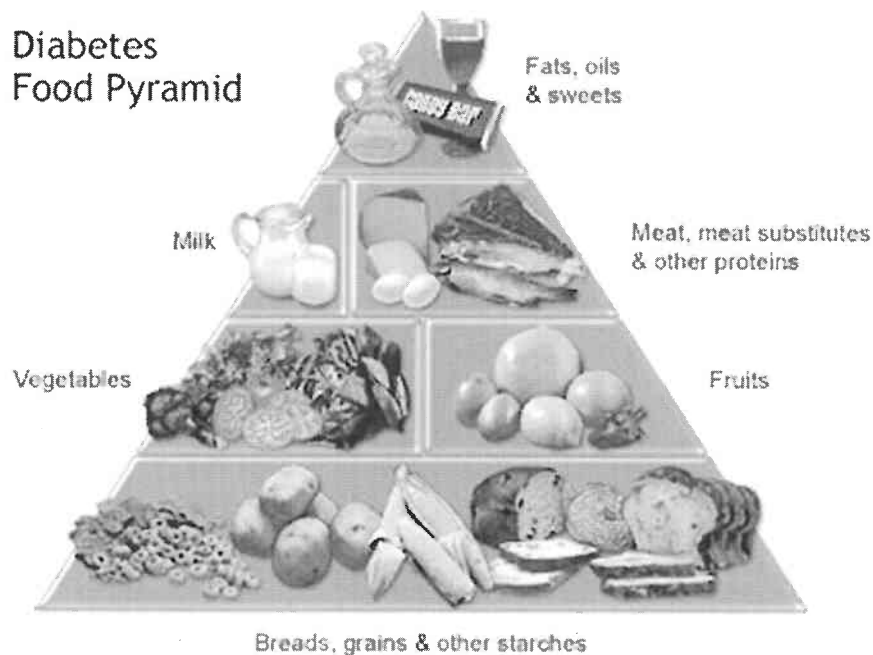
BLOOD GLUCOSE CONTROL THROUGH HEALTHY EATING

- Your diet plays an **important role in the management** of T2DM
- It also assist with weight loss and/or maintaining a healthy weight
- You **MUST** eat **healthy food**
- Regular meals help to **improve your blood sugar levels** and **control your appetite.**
- Eat **at least 3 meals** per day, evenly spaced out through the day
- **NEVER skip a meal**, especially breakfast
- **Restrict** the use of **salt (< 2.5 gram per day)**, rather **use herbs and spices** to flavour food
- **Always eat when taking medication**
- **DO NOT** eat sugar



DIABETES FOOD PYRAMID

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THE ROLE OF CERTAIN FOOD ON BLOOD SUGAR

Carbohydrates = sugar + fiber + starch

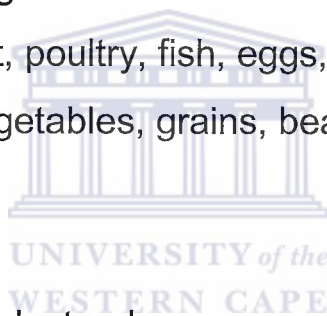
- ↑ in blood sugar which activates insulin release
- by controlling your intake, you can keep your blood sugar on target
- choose **LOW glycemic index (GI)** food (see page 6 – 7)
- **Eat 3 vegetables and 2 fruit per day**

Protein

- Slow down carbohydrates digestion and delay the ↑ in blood sugar
- only a slight ↑ in blood sugar
- **complete protein** = meat, poultry, fish, eggs, cheese, 2% milk
- **incomplete protein** = vegetables, grains, beans

Fat (unsaturated)

- do not ↑ blood sugar; ↓ cholesterol
- it slows down stomach emptying and so ↓ the rate at which blood sugar rises after a meal
- **saturated fats** (fatty meat, chicken skin, full cream milk, cream, cheddar and gouda cheese) and **trans-saturated fats** (butter, hard brick margarines, biscuits, crackers, cookies , pies, boerewors, liver, polony, vienna's, mayonnaise, full cream salad dressing, fried foods) **should be avoided or used sparingly!**
- **'good fats'**: nuts, unsalted peanuts, avocados, olive and vegetable oils, fish in brine or water (pilchards, mackerel, sardines and tuna) **should be eaten in moderation**

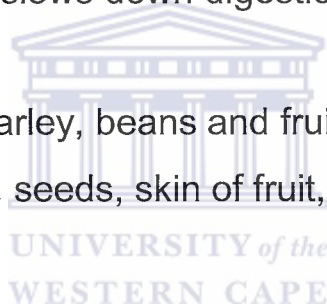


HOW TO ↓ FAT INTAKE?

- ✚ Buy lean meat and mince
- ✚ Remove chicken skin and any visible fat from red meat before cooking
- ✚ Do not deep or shallow fry food: rather steam, boil, bake, grill or microwave food
- ✚ Use fat free or 2% milk products

Fiber (25 – 30 gram per day)

- it is a source of starch, but has little effect on the blood sugar
- it aid in bowel movement, slows down digestion and help with weight loss and blood sugar control
- **SOLUBLE fiber** = oats, barley, beans and fruit (↓ cholesterol)
- **INSOLUBLE fiber** = bran, seeds, skin of fruit, cereal, vegetables (↑ weight loss)



HOW TO ↑ FIBER INTAKE?

- ✚ Add brown lentils to rice, mince and stews
- ✚ Add cooked lentils or soya products to meatballs and fishcakes
- ✚ Add beans to stews, samp and salads

HOW TO READ FOOD LABELS

FOOD ENERGY

KILOJOULES (kJ) or CALORIE (Cal)

1 Cal = +/- 4 kJ

NUTRITION INFORMATION

Serving Size: 30g (2 biscuits) Servings per pack: 42	AVG PER SERVE	AVG PER 100g
ENERGY	447kJ	1490kJ
	107Cal	356Cal
PROTEIN	3.7g	12.4g
FAT- TOTAL	0.4g	1.4g
- SATURATED FAT	0.1g	0.3g
CARBOHYDRATE - TOTAL	20.1g	67g
- SUGARS	1.0g	3.3g
DIETARY FIBRE	3.3g	11.0g
SODIUM	87mg	290mg
POTASSIUM	102mg	340mg
ZINC	1.8mg (15%RDI*)	6.0mg
IRON	3.0mg (25%RDI*)	10.0mg
MAGNESIUM	32mg (10%RDI*)	107mg
THIAMIN (Vitamin B1)	0.55mg (50%RDI*)	1.83mg
RIBOFLAVIN (Vitamin B2)	0.43mg (25%RDI*)	1.4mg
NIACIN (Vitamin B3)	2.5mg (25%RDI*)	8.3mg
FOLATE	100µg (50%RDI**)	333µg

*RDI - Recommended Dietary Intake.

** - 1 serve provides 25% of the folate RDI for women of childbearing age.

Ingredients: Wholegrain wheat (97%), raw sugar, salt, barley malt extract, minerals (zinc gluconate, iron), vitamins (niacin, thiamin, riboflavin, folate).

Contains cereals containing gluten.

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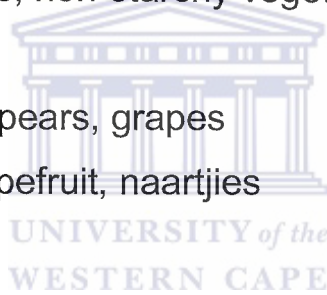
Nutrient (values are per 100 g of food)	Low Go ahead! Eat more often	Moderate Watch out! Eat sometimes	High Too much! Avoid
Fat	Less than 3 g	3 g - 20 g	More than 20 g
Saturated fat	Less than 1.5 g	1.5 g - 5 g	More than 5 g
Sugar	Less than 5 g	5 g - 15 g	More than 15 g
Sodium (salt)	Less than 120 mg	120 mg - 600 mg	More than 600 mg

THE GLYCEMIC INDEX (for carbohydrates)

LOW GI = slow increase in blood sugar

Low GI Foods

- backed beans, sugar beans, lentils, peas
- barley, 'stampkoring'
- dense and heavy brown bread
- tastic rice, brown rice
- sweet potato, corn, carrots, non-starchy vegetables
- whole wheat Pronutro
- deciduous fruits: apples, pears, grapes
- citrus fruits: oranges, grapefruit, naartjies
- yoghurt: low fat and plain



Medium GI

- cooked oats porridge, original Pronutro, All Bran Flakes and any sweetened cereals with milk
- basmati rice, couscous, whole wheat pasta
- baby potatoes, beetroot
- sultanas, raisins, fruit bars
- sugar, raw honey, jam
- fruit juices, soft drinks, Oros

High GI

- white bread, rice cakes, bread rolls, pretzels, popcorn, salty crackers
- mealiemeal porridge, instant oatmeal

- corn flakes, puffed rice, weetbix
- white rice, rice pasta, any white pasta
- flours: wheat, cake, corn, potato, rice
- potatoes, pumpkin
- melons, pineapple
- sports drinks: Energade, Game, Lucozade
- Sweets

FOOD PORTIONS

- **Portion** = the amount of food **you choose** to eat
- **Serving** = the amount of food **recommended by experts**
- A portion should be as close possible to the recommended serving



Wheat / grains (whole wheat if possible): 6-11 servings per day

Examples

Bread

Cooked grains

Dry cereal

One serving equals

1 small slice, 1/2 breadroll

1/3 cup cooked oats, rice, pasta

1/2 cup flakes, weetbix



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Fruits and vegetables: 5 – 9 total servings per day

Examples

Raw fruit

Dried fruit

Juice

Raw vegetables

Cooked vegetables

One serving equals

1/2 cup

1/4 cup

3/4 cup 100% unsweetened
fruit or vegetable juice

1 cup spinach, carrots

1/2 cup broccoli, potatoes,
sweet potatoes

Lean meat and Beans: 2-3 servings per day

Examples	One serving equals
Meat	90 gram cooked beef, lamb, ostrich, chicken, fish = 'deck of cards'
Beans	1/2 cup cooked beans, split peas, barley
Nuts and seeds	2 tablespoons nuts, seeds, peanut butter



Dairy: 2-3 servings of low-fat or no-fat foods

Examples	One serving equals
Cheese	1 thin slice of cheese (30 gram) = 'size of your thumb'
Milk	1 cup of milk, yoghurt

Fat and oil: use sparingly, preferably plant fats

Examples	One serving equals
Fat and oil	1 teaspoon margarine, olive oil

T2DM and 'DRINKS'

- ✚ Avoid any alcohol
- ✚ Water: flavour it with a squeeze of lemon
- ✚ Unsweetened rooibos or green tea (or use saccharine)
- ✚ Unsweetened decaffeinated coffee (or use saccharine)
- ✚ Cold drinks: diet drinks (**1 can of coke = 10 teaspoons of sugar = 150 Cal**)
100% sugar free juice (3/4 cup = 50 Cal): dilute with water
Vegetable juice (1 cup = 50 Cal)
Skim milk (1 cup = 80 Cal)



- Consider having a snack if there are more than 4-5 hours between meals to avoid low blood sugar.
- Snacks should be healthy
 - High in fiber
 - Low in fat
 - None or very little sugar and salt
 - Should have approximately 15 grams of carbohydrate
 - Include some healthy protein

Examples of snacks

- ✚ Cucumber slices with a small piece of low fat cheese
- ✚ 1/2 cup of unsalted peanuts
- ✚ 5 provitas with 2 teaspoons of peanut butter
- ✚ 3 cups of microwavable popcorn (no oil / butter)

- ⊥ ½ cup low fat / plain yoghurt
- ⊥ 1 medium apple + 1 teaspoon of peanut butter
- ⊥ ½ large banana + 1 teaspoon of peanut butter
- ⊥ ½ cup of cottage cheese and 5 provitas
- ⊥ 1 glass of skim milk

EATING OUT

- Choose the healthier options: grilled meat, fish / chicken with vegetables instead of chips
- Avoid creamy sauces with your meat
- Order fruit salad for dessert, rather than a baked pudding
- Eat small portions of food. Take a 'doggy bag' if needed

REDUCE SALT INTAKE


- Use <2.5 gram salt per day
- Avoid bottled products such as chutney, tomato sauce, Worcester sauce, marmite, bovril, oxo, beef and chicken stock
- Avoid canned products such as bully beef, canned soup, canned vegetables
- Avoid products in packets such as instant soups and soya mince
- Avoid salty snack foods such as chips, salted nuts, processed meats, pies and deep fried foods (samosas, spring rolls)



'good' options

- skim milk, 2% milk, low fat yoghurt,
- mozzarella cheese, feta cheese, low fat cream cheese
- lean mince, red meat without visible fat
- dried beans, peas, lentils, peanut butter and soya products
- all kinds of poultry without the skin
- all kinds of white fish, e.g. hake, snoek, kingklip and canned fish in water
- boiled or poached eggs
- wholewheat pasta dishes prepared with tomato or low fat milk and margarin
- whole wheat or brown bread, rye bread, provita, bran muffins
- soft margarine, olive oil, low fat mayonnaise, peanut butter
- diabetic jam, artificial sweetners (saccharine), diet cold drinks, pop corn, unsalted nuts

'bad' options

- 
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- full cream milk and yoghurt, condensed milk, coffee creamers
 - cheddar, gouda, full cream cheese spread and cottage cheese
 - sausage, liver, kidneys, polony, viennas, russians, frankfurters
 - chicken skin, nuggets, patties, giblets
 - prawns, crayfish, mussels, oysters, calamari and canned fish in oil
 - scrambled and baked/fried egg
 - pasta dishes prepared with cream and butter
 - white bread, cakes, tarts, biscuits, 'vetkoek'
 - margarine bricks, butter, cream, coconut, coconut milk, full cream mayonnaise
 - sugar, jam, honey, sweets, chocolate, baked puddings

**HEALTH PROMOTION PROGRAMME
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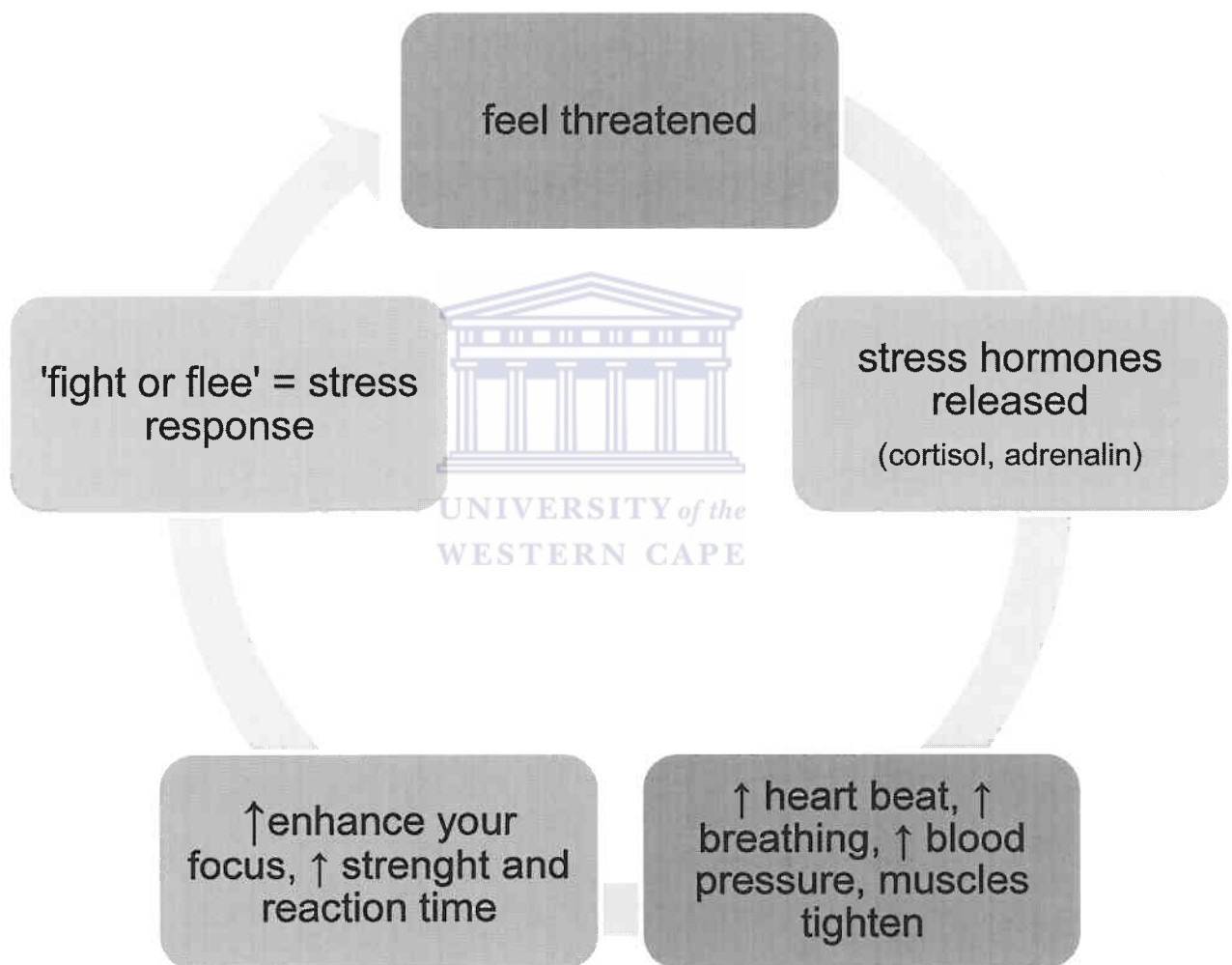
Week 4: STRESS MANAGEMENT



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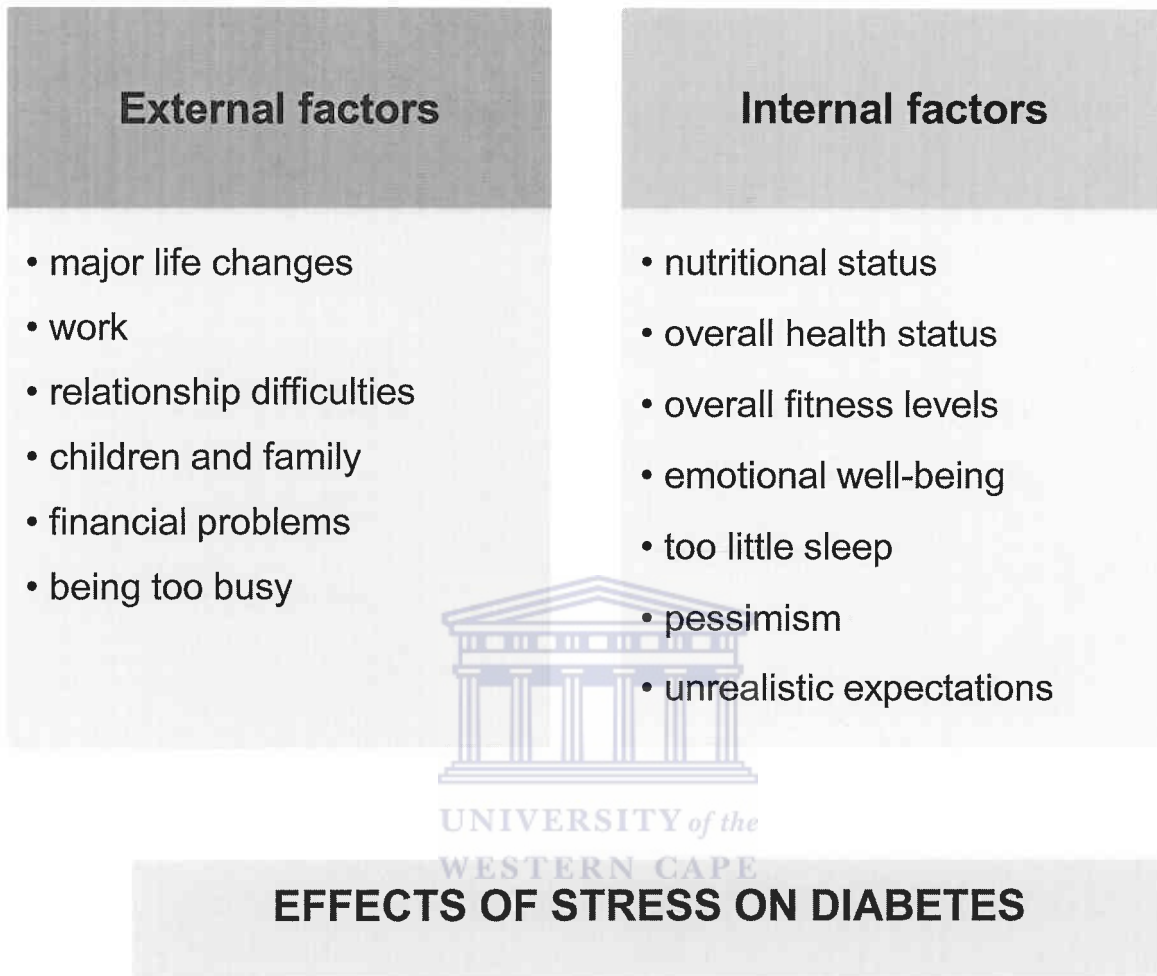
WHAT IS STRESS?

- A normal physical response to things that make you feel threatened or upset you
- For some people it become a way of life



- The **stress response** is your body's way of protecting yourself
- If managed properly, it **could help you to stay focussed, energetic, alert and safe your life**
- But, if not under control, stress can **damage your health, relationships and quality of life**

FACTORS CONTRIBUTING TO STRESS



- In **T2DM** there is already too much sugar in the blood and when you are under stress, your body takes longer to get your blood sugar down to normal
- Stress constantly **triggers the 'fight or flee' / stress response**; resulting in **poor blood sugar control**
- Over a period of time **the body is unable to regulate** the blood sugar levels **efficiently**
- People under stress **may neglect** their health and **management of the disease**
- **Blood sugar stored in the liver and muscle cells** may also be **released**, causing an **even ↑ blood sugar level**

SIGNS AND SYMPTOMS OF TOO MUCH STRESS

EMOTIONAL SYMPTOMS

- moodiness
- short temper
- not able to relax
- feeling overwhelmed
- feeling lonely
- depression
- generally unhappy

PHYSICAL SYMPTOMS

- aches and pains
- nausea
- dizziness
- chest pain
- rapid pulse
- frequent colds
- headaches
- fatigue

BEHAVIOURAL SYMPTOMS

- eating ↑ or ↓
- sleeping ↑ or ↓
- want to be on your own
- neglecting responsibilities
- using alcohol, cigarettes or drugs to relax
- nervous habits (e.g. nail biting)

COGNITIVE SYMPTOMS

- memory problems
- can't concentrate
- negative
- anxious thoughts
- constant worrying



HOW MUCH IS TOO MUCH?

- When it starts to affect your daily life – see symptoms above
- Differs from person to person
- Important to know your 'own limit'
- Seek help!

STRESS MANAGEMENT FOR T2DM

TAKE CHARGE by

- Keeping a **Stress Journal**
- **Identifying the cause** of your stress
- **Accept responsibility** for the role you play in creating and maintaining the stress
- **Changing the stressful situation** when you can
- **Changing your reaction** when you can't change the situation
- **Taking care of yourself** - making time for **rest and relaxation**

Exercise more

- ⚡ to ↓ stress
- ⚡ to reach or maintain a healthy weight
- ⚡ to control blood sugar levels

Eat healthy

- ⚡ help to control blood sugar levels while stressed
- ⚡ give you the energy to deal with stress

Learn stress reduction techniques

- ⚡ breathing exercises and stretches too control how much stress affects you

Build your confidence

- ⚡ have an optimistic attitude
- ⚡ believe in your own ability to get through difficult times
- ⚡ accept every challenges

Get support

- ⚡ Talk to people
- ⚡ Educate yourself regarding situations causing you stress
- ⚡ Join a diabetes support group to share feelings, ideas and get advice



WAYS TO COPE WITH STRESS

- There is no 'one size fits all' solution
- Experiment with different techniques
- Focus on what makes you feel calm and in control

UNHEALTHY WAYS

- smoking
- drinking too much
- overovereating or eating too little
- withdrawal from friends, family and activities
- using pills or drugs to relax
- sleeping too much
- taking out your stress on others
- sleeping too much



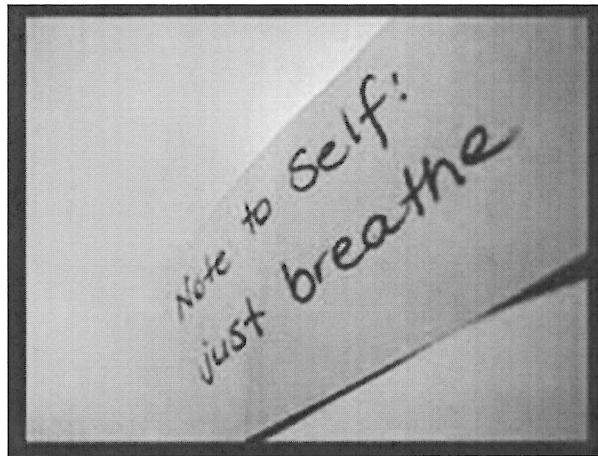
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HEALTHY WAYS

- **AVOID:** learn to say 'no'; people who stress you out; take control of your environment; have a 'to-do list.
- **ALTER:** express your feeling, don't bottle them up; compromise if needed; be more self-confident; manage your time better
- **ADAPT:** look at the bigger picture; adjust your standards; change your attitude; focus on the positive
- **ACCEPT:** don't try to control the uncontrollable; look for the upside; share your feelings; learn to forgive
- **MAKE TIME FOR FUN:** go for a walk; spent ime in nature; call a good friend; take a long bath; play with a pet; read a book; listen to music
- **ADOPT A HEALTHY LIFESTYLE:** exercise reguylarly; eat healthy, reduce caffeine, alcohol and cigarettes, get enough sleep

RELAXATION TECHNIQUES

Deep relaxed 'tummy' breathing



- The more oxygen you get, the less tense and anxious you feel.
- **Sit up straight** with your shoulders relaxed and **back supported** or lay on the floor.
- Put **one hand on your chest and the other on your stomach, just below your navel.**
- **Breathe in through your nose.** The hand on your stomach should rise.
- **Exhale through your mouth,** pushing out as much air as you can **while contracting your abdominal muscles.** The hand on your stomach should move in as you exhale.
- The **breathing rate** should be **slow.**


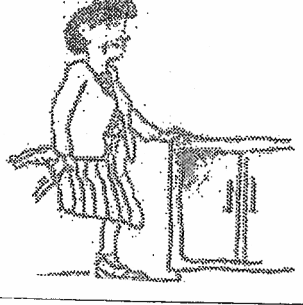
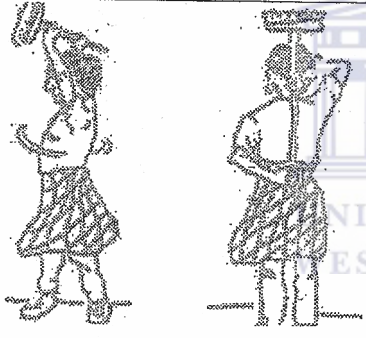
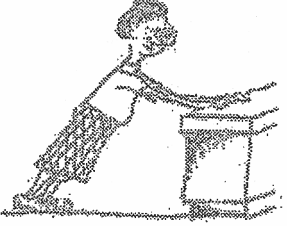

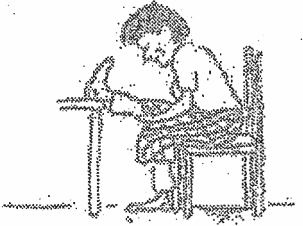
Progressive muscle relaxation

- It makes you aware of muscle tension and helps you to counteract it and relaxes
- You can combine it with relaxed deep breathing.
- **Lay on the floor** or bed.
- **Relax by doing deep relaxed breathing.**
- Start from the feet and work towards the head.
- Right foot: **Focus on what you feel** in your foot. **Slowly tense the muscles** in the right foot and **hold it for 10 seconds.**
- Then **slowly relax** your right foot and **focus on all the tension flowing away** and the way your foot feels now.
- **Relax and take 3 relaxed deep breaths.**
- Do the same sequence with the left foot and other muscle groups.

Possible sequence:

R foot → L foot → R calf → L calf → R thigh → L thigh → hips and buttocks → stomach → chest → back → R arm and hand → L arm and hand → neck and shoulders → face

STRETCHES

<p>Shoulder stretch (forward)</p> <p>Skouer strek (vorentoe)</p> <p>3x 30sec</p> 	<p>Thigh stretch (front)</p> <p>Dyspier strek (voor)</p> <p>3x 30sec</p> 
<p>Trunk stretch with broom</p> <p>Lyf strek met besem</p> <p>3x 30sec</p> 	<p>Calf stretch</p> <p>Kuitspier strek</p> <p>3x 30sec</p> 
<p>Shoulder stretch (backwards)</p> <p>Skouer strek (agtertoe)</p> <p>3x 30sec</p> 	<p>Thigh stretch (back)</p> <p>Dyspier strek (voor)</p> <p>3x 30sec</p> 

- Combine the stretching with deep relaxed breathing.

TIPS FOR RELAXATION

- Do relaxation techniques in a **quiet space** or with **soft, relaxing music**.
- If possible, schedule a **set time to practice** relaxation techniques **each day**.
- **Practice relaxation techniques while you're doing other things**. Try deep breathing while you're doing housework or mowing the lawn.
- **Avoid practicing when you're sleepy**. Do not practice after eating a heavy meal.



**HEALTH PROMOTION PROGRAMME
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Week 5: POSSIBLE COMPLICATIONS



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WHY?

- Diabetes increases your risk for many serious health problems.
- Complications are more common in people with **poor blood sugar control**.
- With the **correct treatment and recommended lifestyle changes**, you can **prevent or delay the onset of complications**.
- Many complications are **inter-related**.
- Other **contributing factors** are:
 - **Smoking**
 - **Obesity**
 - **High blood pressure**
 - **High cholesterol**
 - **Physical inactivity**



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NEUROLOGICAL COMPLICATIONS

PERIPHERAL NEUROPATHY (PN)

- Also known as '**stock-glove syndrome**', as it affects the hands and feet
- **SIGNS and SYMPTOMS:**
 - Tingling or burning sensation
 - 'pins and needles'
 - Pain
 - Numbness
 - Balance problems (if PN in feet)
 - Muscle weakness

AUTONOMIC NEUROPATHY (AN)

- Problems with the **involuntary / autonomic nervous system**, affecting blood pressure, heart rate, perspiration, stomach and bladder function and vision.
- Very **difficult to detect and diagnose** – can lead to **undetected low blood sugar**.

Cardiovascular system

- **SIGNS and SYMPTOMS**

- Dizziness
- ↓ in blood pressure (BP)
- ↑ resting heart rate
- Shortness of breath

- **POSSIBLE COMPLICATIONS**

- *silent heart attack
- *sudden ↓ in BP when getting up

Digestive system

- **SIGNS and SYMPTOMS**

- constipation
- Diarrhea
- Bloating
- Nausea

- **POSSIBLE COMPLICATIONS**

- *delayed stomach emptying

Vision

- **SIGNS and SYMPTOMS**

- Small pupils
- No pupil response to dark / light

- **POSSIBLE COMPLICATIONS**

- *impaired night vision



Urinary system

- **SIGNS and SYMPTOMS**

- Urinary tract infections
- Urinary incontinence
- ↑ or ↓ urination

POSSIBLE COMPLICATIONS

*nephropathy (kidney damage)

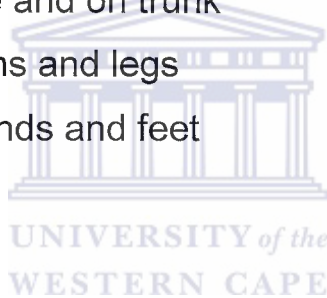
Sudomotor system

- **SIGNS and SYMPTOMS**

- ↑ perspiration in face and on trunk
- ↓ perspiration on arms and legs
- Dry, thick skin on hands and feet

POSSIBLE COMPLICATIONS

*skin rashes and infection

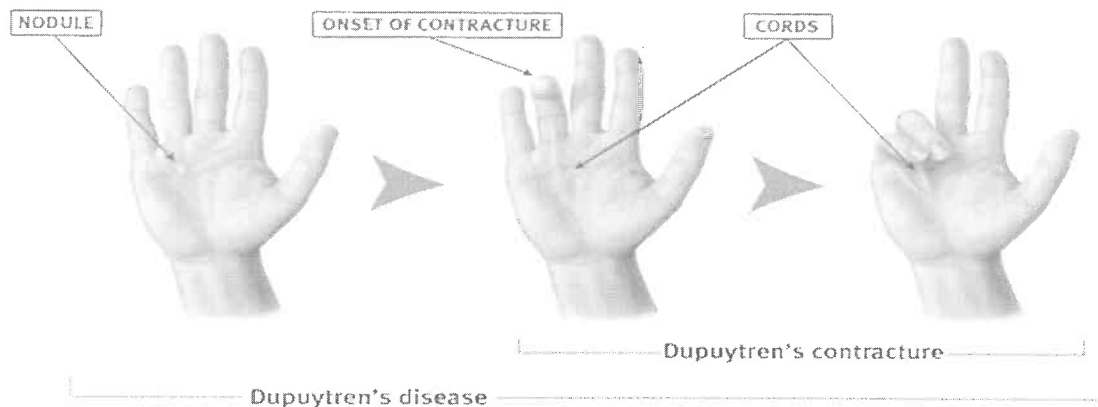


MUSCULOSKELETAL DISORDERS

Frozen shoulder

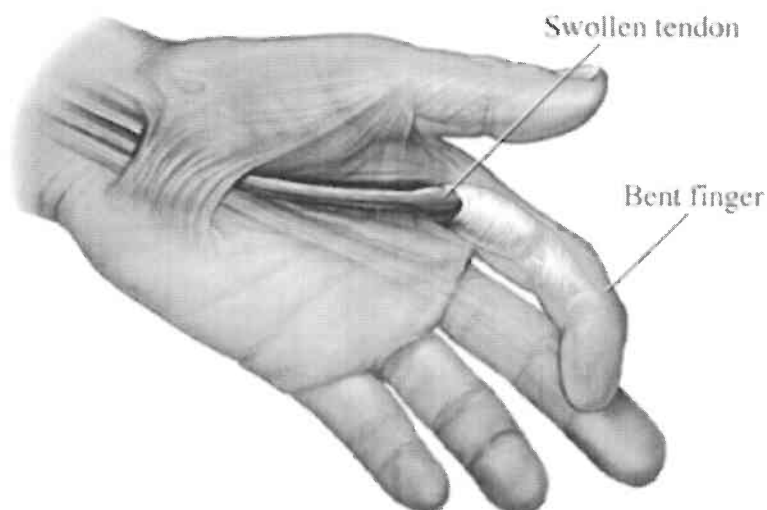
- Severe inflammation of the tendons and ligaments of the shoulder
- Pain, ↓ range of motion in one or both shoulders
- Treated with corticosteroids (be careful – it causes ↑ in blood sugar levels!) and physiotherapy

Dupuytren's contracture



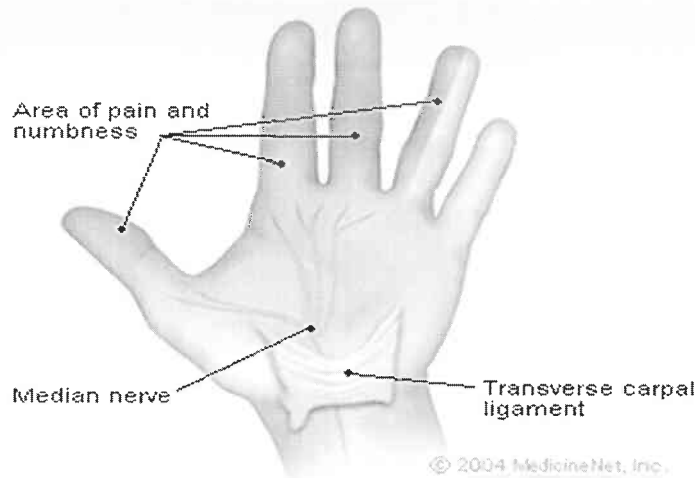
- Tissue under the skin of the palm starts to thicken and shorten
- Fingers affected bends inwards
- Treated with physiotherapy and/or surgery

Trigger finger



- Inflammation of the tendon and tendon sheath
- Pain, stiffness and 'locking' of the index finger
- Treatment with anti-inflammatory medication and/or surgery

Carpal Tunnel Syndrome



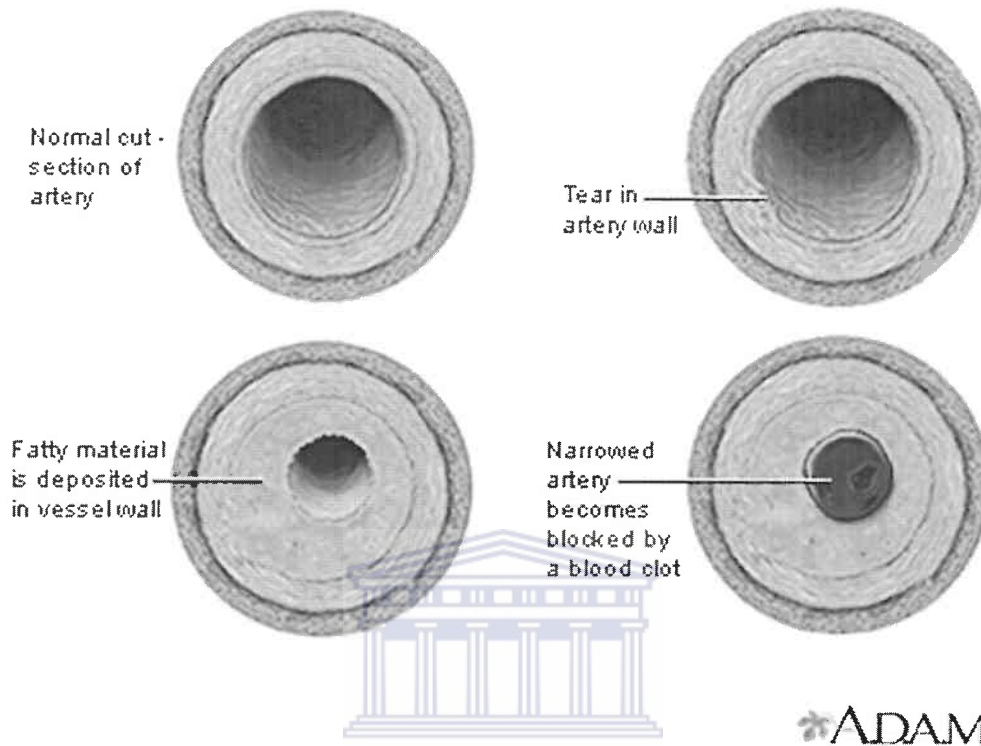
Carpal Tunnel Syndrome

- The nerve is compressed as it runs through the 'tunnel' formed by the ligaments at the wrist.
- Caused by high blood sugar that changes the thickness of the collagen in the ligaments
- Tingling, 'pins and needles' in the 1st three fingers only! (PN = in the whole hand)
- Treated with wrist splints, corticosteroids and sometimes surgery.

CARDIOVASCULAR COMPLICATIONS

- 65% of people with diabetes die from heart disease or stroke.
- NB! to look at the **A = A1C < 7%**
B = blood pressure < 130/80 mmHg
C = cholesterol LDL < 100 mg/dℓ

Atherosclerosis and coronary artery disease (CAD)



- Atherosclerosis = build-up of fat in the arteries that restricts blood flow
- CAD = build-up of fat in the arteries of the heart
- **Signs and symptoms:**
 - Chest pain (angina)
 - Referred pain in left arm or shoulder
 - Chest tightness or pressure
 - Shortness of breath
 - Nausea
 - Perspiration
 - Irregular heart beat
- The problem is that people with autonomic neuropathy may not feel the pain at all, resulting in a 'silent heart attack'.

Congestive heart failure (CHF)

- **Signs and symptoms:**
 - Fluid retention (oedema) in the limbs
 - Shortness of breath
 - Heart palpitations
 - Tiredness

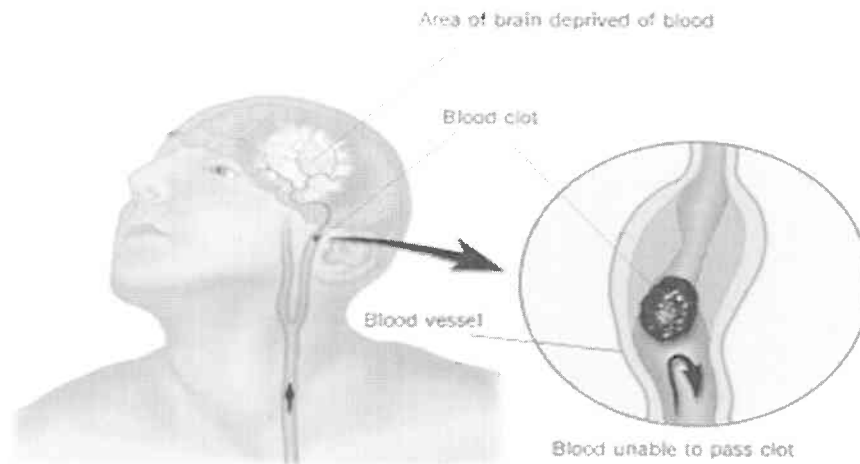
Peripheral vascular disease (PVD)

- Also involves atherosclerosis of the arteries of the legs
- **Signs and symptoms:**
 - Calf and leg pain / cramps, usually when walking
 - Smooth, shiny skin on the shins
 - Numbness in legs and feet
 - A bluish or reddish colour of the legs and/or feet
 - Cold feet and legs
 - Sores on the legs and feet that won't heal
- Treatment: weight loss, cholesterol improvement through diet and medication, exercise, good foot care

Hypertension (HT)

- HT = **high blood pressure** = $\geq 140/90$ mmHg
- Closely linked with coronary artery disease (CAD) and kidney disease
- Aim for BP $< 130/80$ mmHg
- Treatment: weight loss, no smoking, low salt and low fat diet, exercise, medication

Stroke (CVA)



- When an artery that goes to the brain becomes blocked (with fat or a blood clot) and blood flow to the brain is cut off
- **Symptoms** usually comes on suddenly:
 - One-sided weakness or numbness of the arm, face and / or leg
 - Mental confusion
 - Difficulty speaking
 - Dizziness
 - Problems with balance
 - Visual problems
 - Severe headache

VISUAL COMPLICATIONS

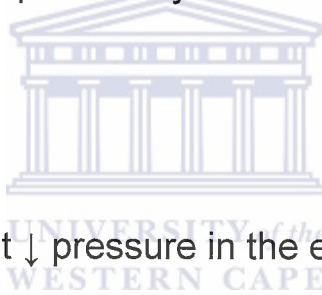
- You should have an eye examination at least once a year
- **Control you blood sugar levels!**
- Stop smoking!
- Lower your blood pressure and A1C (if high)

Retinopathy

- Caused by blockage and / or leaking of the blood vessels that goes to the retina (at the back) of the eye
- **Symptoms:** blurred vision
- Treated by laser to seal the leakage or destroy the abnormal blood vessel completely

Glaucoma

- Caused by pressure build-up in the eye that damage the optic nerve
- **Signs and symptoms:**
 - Loss of side vision
 - Severe headache
- Treated with eye drops that ↓ pressure in the eye or with laser therapy



Cataracts

- People with diabetes develop it normally at a younger age than the general population
- **Signs and symptoms:**
 - Fuzzy / blurred vision
 - Double vision
 - Sensitive to bright light\

DIABETIC KIDNEY DISEASE

- Diabetes is the major cause of chronic renal failure, an irreversible disease
- Caused by **uncontrolled blood sugar** and **high blood pressure**
- **Signs and symptoms:**
 - Protein in urine
 - ↑ blood pressure
 - Frequent urination, especially at night
 - Leg cramps
 - Excessive itching of the skin
 - Nausea and vomiting
 - Weakness
 - Puffiness and swelling around the eyes, hands and feet
- Treatment: includes low protein diet, ↓ high blood pressure



DIGESTIVE PROBLEMS

- **Gastroparesis** = a form of autonomic neuropathy
- Delayed stomach emptying = affects blood sugar control
- Slow digestion of food influence the rate at which insulin works
- **Signs and symptoms:**
 - Nausea
 - Vomiting
 - Abdominal bloating
 - Weight loss
 - Early feeling of fullness
- Treatment includes: adjustment of dosage of insulin, excluding high-fat and high-fiber foods from diet (it slow down digestion), eating smaller, more frequent meals, medication to speed up digestion

SKIN PROBLEMS

- Nerve and small blood vessels damage causes dry skin in people with diabetes
- **Brown, scaly round patches** on the shins – usually heal on their own
- **Raised, red, shiny, itchy spots** on the skin that ruptures – need proper wound care
- **NB! to keep skin hydrated**
- Easy to develop **fungal infections** (between toes, under nails, in armpits) – use baby powder in that areas to keep it dry
- Seek medical advice and start treatment as soon as possible



**HEALTH PROMOTION PROGRAMME
for
Type 2 diabetes mellitus**

Week 6: FOOT CARE



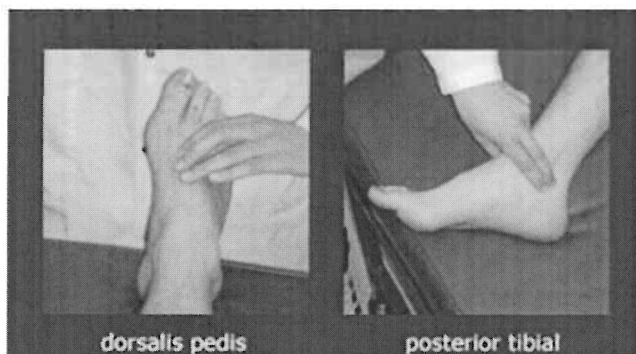
FOOT CARE

- Diabetes can ↓ blood flow to your feet, resulting in less oxygen and nutrients going to the feet.
- This makes it more difficult for sores and cuts to heal.
- Peripheral neuropathy can cause numbness in the feet, resulting in you more likely to develop sores, cuts and infections.



CHECK YOU FEET DAILY

- Feel for a foot pulse



- Check carefully between toes
- If you can't, ask a family member or friend to check for you

- If you find a cut / blister / sore: do not 'pop' the blister; clean the area and bandage it up; change the bandage regularly; if it does not heal within a day or two, seek medical advice.

SIGNS OF INFECTION

- ⊥ Redness
- ⊥ Warm to the touch
- ⊥ Painful to the touch
- ⊥ Pus
- ⊥ Foul-smelling odour

WASH WITH WARM, NOT HOT WATER

- You may not be able to feel the heat if you have peripheral neuropathy.
- Do not soak your feet for too long.
- **Do not soak** at all if you have an open wound or sore.
- **Dry feet thoroughly**, especially between the toes.
- **Avoid hot water bottles** in winter, wear warm socks.

KEEP SOFT, BUT DRY

- High blood sugar levels leads to dry, cracked skin
- Put **lotion on your feet daily**, but keep it dry between the toes.
- Use **baby powder between the toes**.

CLIP WITH CAUTION

- **Cut toenails straight**, not too short. Smooth it with an emery board.
- Don't cut too close to the skin.
- Get assistance if you struggle to do it yourself!

SHOES MUST FIT WELL

- **Never walk barefoot**; not even on the beach or in the water.
- Avoid wearing high heels and open-toe shoes.
- **Comfort** is the buzz word!
- A well-fitted shoe allow space for your toes to move freely (wide enough)
- Wear **thick, seamless cotton socks** or stockings.
- Be careful of tight fitting sock and knee highs.
- Break your shoes in gradually.
- Leather shoes are the best; it stretches to the shape of your feet and allow your feet to breath and not sweat.

SPEAK UP

- Tell your doctor or the sister if you feel a change in your feet's sensation.
- This could prevent further complications

CONTROL YOUR BLOOD SUGAR

- This is the **ultimate in prevention**
- You have to control blood pressure, cholesterol, and stop smoking
- Exercise and eat healthy!

SPECIFIC FOOT PROBLEMS IN DIABETIC PATIENTS

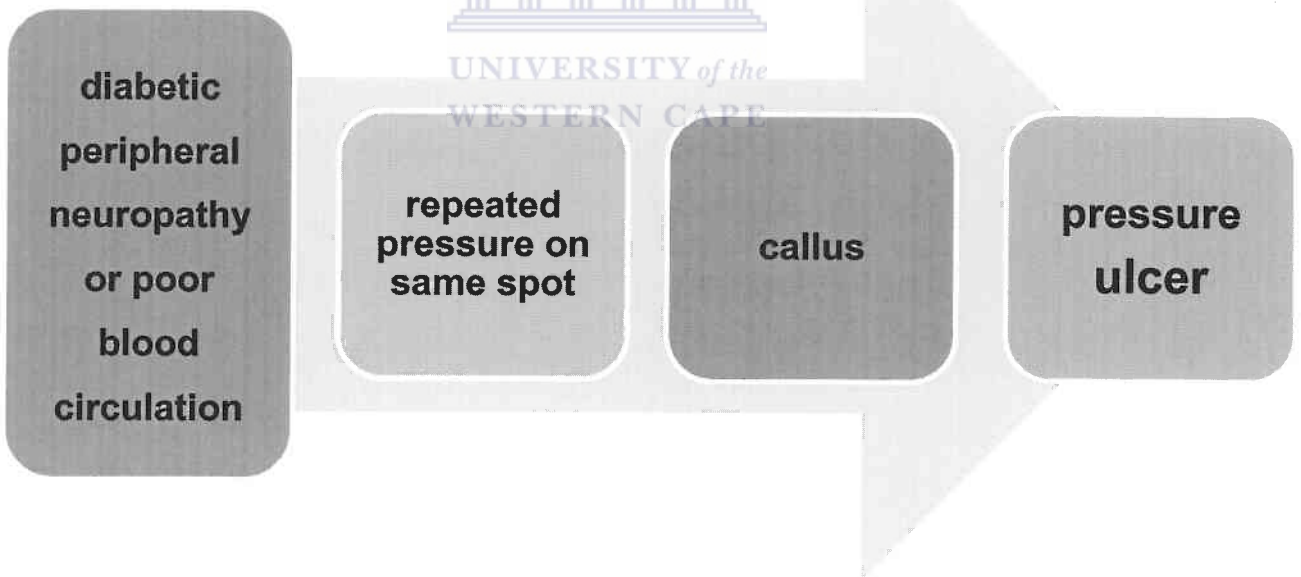
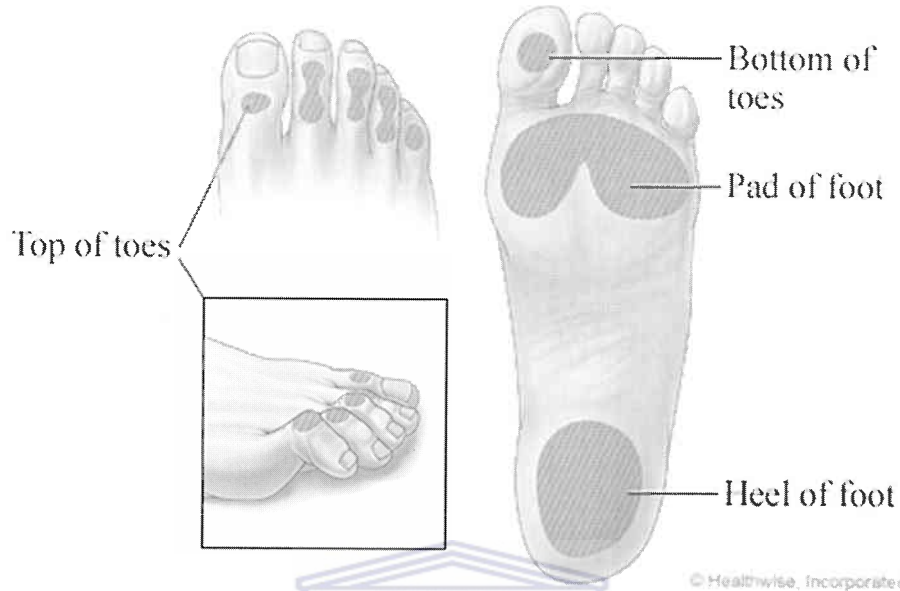
CHARCOT FOOT



[September 2008]. Used with permission of Elsevier. All rights reserved.

- Occurs in a small percentage of people with diabetic peripheral neuropathy.
- Also known as **neuropathic arthropathy**.
- X-rays needed to confirm diagnosis.
- **Signs and symptoms:**
 - Extreme swelling
 - Warm skin
 - Redness
 - Foot pain
 - Deformed shape: hammer toes, collapsed arch
 - Difficulty walking
- **Treatment:**
 - Immobilise in a cast for up to six months!
 - Crutch walking, non-weight bearing or partial weight bearing
 - Orthotics and reconstructive surgery

DIABETIC FOOT ULCERS



- Non-weight bearing exercises
- Keep the feet moving to ↑ blood flow
- Never sit with legs crossed
- **Seek medical help** for treatment of the ulcer!
- If untreated, tissue death / gangrene may set in → amputation



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INFORMATION SHEET – pre-implementation

Project Title: Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

What is this study about?

This is a research project being conducted by TANIA STEYL at the University of the Western Cape. We are inviting you to participate in this research project because you are a client with type 2 diabetes mellitus. The purpose of this research project is to develop a health promotion programme for clients with type 2 diabetes mellitus that can be implemented at Primary Health Care facilities. The programme will be developed from self-administered questionnaires, focus group discussions, semi-structured interviews, a literature review, policy and document analysis and a Delphi study. The programme will be implemented where after the effectiveness of it will be assessed.

What will I be asked to do if I agree to participate?

You will be asked to:

- complete a **self-administered questionnaire before and after the implementation of the health promotion programme**. It will take approximately 20-30 minutes to complete the questionnaire.
- participate in the **implementation of the health promotion programme by attending a one hour interactive lecture / talk per week at the Community Health Centre Workshops, for six consecutive weeks**. It will take place a time convenient for all the consenting participants.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality the following steps will be taken:

- **Questionnaires:** are anonymous and will not contain information that may personally identify you. A code will be placed on the survey. Through the use of an identification key, the researcher will be able to link your survey to your identity. Only the researcher will have access to the identification key. To help protect your confidentiality all information gathered will be stored in a locked filing cabinet. No unauthorised party will be able to access the information.

- **Implementation of the programme:** No information discussed during the interactive talks / lectures will be disclosed.
- **If we write a report or article about this research project, your identity will be protected to the maximum extent possible.**

What are the risks of this research?

There are no known risks associated with participating in this research project.

What are the benefits of this research?

This research is designed to help you personally, and the results may help the investigator learn more about the specific health promotion needs of clients with type 2 diabetes mellitus. We hope that in future, other people might benefit from this study through improved health promotion strategies implemented at Primary Health Care level to better manage type 2 diabetes mellitus and prevent possible complications.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

Is any assistance available if I am negatively affected by participating in this study?

The researcher will be available for you to contact should you be negatively affected by any aspect of the research at any time and an appropriate course of action will be followed with the support of the researcher.

What if I have questions?

This research is being conducted by TANIA STEYL and the Department of Physiotherapy at the University of the Western Cape. If you have any questions about the research study itself, please contact TANIA STEYL at 021-9592542/9 (w) or 0833068585 or e-mail tsteyl@uwc.ac.za

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Prof. Julie Phillips

Dean of the Faculty of Community and Health Sciences: Prof. Jose Frantz

University of the Western Cape

Private Bag X17

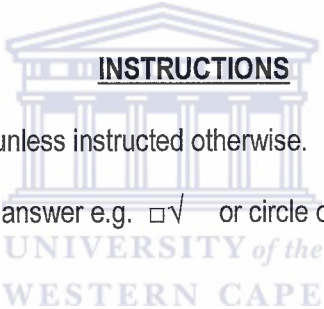
Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.



Type 2 DIABETES MELLITUS QUESTIONNAIRE (pre-post-implementation)

- This questionnaire is about Type 2 diabetes mellitus
- This questionnaire is **completely anonymous**. Please make no marks of any kind on the survey which could identify you individually.

- 
- The logo of the University of the Western Cape is centered on the page. It features a classical building facade with a pediment and columns. The word "INSTRUCTIONS" is written across the pediment. Below the building, the text "UNIVERSITY of the WESTERN CAPE" is displayed in a serif font.
- Select only one response, unless instructed otherwise.
 - Please tick the appropriate answer e.g. or circle one correct answer where indicated

Thank you very much for your co-operation

THE FOLLOWING QUESTIONS ASK ABOUT YOUR DEMOGRAPHIC CHARACTERISTICS

(Q1 – Q8 to be completed by the researcher or research assistant/s)

Q1. Age: ___ years old

Q2. Weight: _____ kg

Q3. Height: _____ cm

Q4. Body Mass Index: _____ kg/m²

Q5. HGT (reading from folder): _____ mmol/l

Q6. BP: _____ mmHg

Q7. Co-morbidities: (please indicate all applicable to you)

heart disease

cholesterol

hypertension

Q8. Gender:

male

female



Q9. Ethnic origin/race:

African/Black

Coloured

White

Indian/Asian

other (specify) _____

Q10. Marital status:

never married

married / domestic partner

separated / divorced

widowed

Q11. Highest level of education:

no schooling

primary school

secondary school

tertiary education

Q12. Where do you live most of the year?

- your own home / flat home of a friend / family member
 retirement home nursing home
 Other (specify) _ _ _ _ _

Q13. How many people live with you?

- I live alone 1 person
 2 persons 3 persons
 4 persons 5 or more persons

Q14. Your current employment status:

- working full-time (40 hours or more a week) unemployed
 working part-time (less than 40 hours a week) pensioner
 other (specify) _ _ _ _ _



**THE FOLLOWING QUESTION ASK ABOUT YOUR UNDERSTANDING OF TYPE 2
DIABETES MELLITUS**

Q15. How do you rate your understanding of: (circle one answer for each line)	Poor	Fair	Good	Very Good	Excellent
a) overall diabetes care	1	2	3	4	5
b) coping with stress	1	2	3	4	5
c) diet for blood sugar control	1	2	3	4	5
d) the role of exercise in diabetes care	1	2	3	4	5
e) medications you are taking	1	2	3	4	5
f) how to use the results of blood sugar monitoring	1	2	3	4	5
g) how diet, exercise and medicines affect blood sugar levels	1	2	3	4	5
h) prevention and treatment of high blood sugar	1	2	3	4	5
i) prevention and treatment of low blood sugar	1	2	3	4	5
j) prevention of long-term complications of diabetes	1	2	3	4	5
k) foot care	1	2	3	4	5
l) benefits of improving blood sugar control	1	2	3	4	5
m) pregnancy and diabetes	1	2	3	4	5

THE FOLLOWING QUESTIONS ASK ABOUT YOUR PHYSICAL ACTIVITY PARTICIPATION

In answering the following questions,

- **Vigorous physical activities** refer to activities that take hard physical effort and make you breathe much harder than normal.
- **Moderate physical activities** refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

Q16. During the last 7 days, on how many days did you do **vigorous physical activities** like heavy lifting, digging, aerobics, or fast bicycling?

Think about *only* those physical activities that you did for at least 10 minutes at a time.

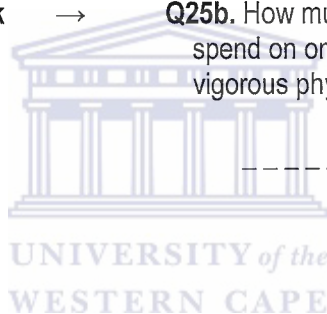
_____ days per week →

Q25b. How much time in total did you usually spend on one of those days doing vigorous physical activities?

or

_____ hours _____ minutes

none



Q17. Again, think *only* about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate physical activities** like carrying light loads, bicycling at a regular pace, or doubles tennis? **Do not include walking.**

_____ days per week →

Q26b. How much time in total did you usually spend on one of those days doing moderate physical activities?

or

_____ hours _____ minutes

none

Q18. During the last 7 days, on how many days did you **walk** for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

_____ days per week →

Q27b. How much time in total did you usually spend walking on one of those days?

or

_____ hours _____ minutes

none

The last question is about the time you spent **sitting** on weekdays while at work, at home, while doing course work and during leisure time. This includes time spent sitting at a desk, visiting friends, reading traveling on a bus or sitting or lying down to watch television.

Q19. During the last 7 days, how much time in total did you usually spend **sitting on a week day?**

_____ hours _____ minutes

THE FOLLOWING QUESTIONS ASK ABOUT YOUR PHYSICAL ACTIVITY STAGE OF CHANGE (SOC)

Q20. Choose the statement that best describes your current status.

- I am not currently participating in physical activity and I am **not thinking of doing so** in the coming 6 months.
- I am not currently participating in physical activity but I **have thought about it.**
- I am not currently participating in physical activity but I **plan to do so** in the next 6 months.
- I am currently participating in physical activity but I **have only been doing so for less than 6 months.**
- I am currently participating in physical activity and I **have been doing so for more than 6 months.**

THE FOLLOWING QUESTIONS ASK ABOUT YOUR NUTRITION / DIET

Q21. The diabetes diet is:

- the way most South African people eat
- a healthy diet for most people
- too high in starch for most people
- too high in protein for most people

Q22. Which of the following is highest in carbohydrate?

- baked chicken
- gouda cheese
- baked potato
- peanut butter

Q23. Which of the following is highest in fat?

- low fat milk
- orange juice
- mealies
- honey

Q24. Which of the following is a 'free food'?

- any unsweetened food
- any dietetic food
- any food that says 'sugar free' on the label
- any food that has less than 20 calories per serving



Q25. What effect does unsweetened fruit juice have on blood glucose?

- lowers it
- raises it
- has no effect

Q26. Which should not be used to treat low blood glucose?

- 3 hard sweets
- ½ cup of orange juice
- 1 cup diet soft drink
- 1 cup skim milk

Q27. Eating foods lower in fat decreases your risk for:

- nerve disease
- kidney disease
- heart disease
- eye disease

Q28. If you take your morning insulin but skip breakfast your blood glucose level will usually:

- increase
- decrease
- remain the same

**THE FOLLOWING QUESTIONS ASK ABOUT YOUR HEALTHY EATING PLAN
STAGE OF CHANGE (SOC)**

Q29. Choose the statement that best describes your current status.

I am not currently following a healthy eating plan and I am **not thinking of doing so** in the coming 6 months.

I am not currently following a healthy eating plan but **I have thought about it.**

I am not currently following a healthy eating plan but **I plan to do so** in the next 6 months.

I am currently following a healthy eating plan but **I have only been doing so for less than 6 months.**

I am currently following a healthy eating plan and **I have been doing so for more than 6 months.**

**THANK YOU FOR TAKING THE TIME AND THOUGHT TO COMPLETE THIS QUESTIONNAIRE.
I APPRECIATE YOUR PARTICIPATION!**



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CONFIDENTIALITY BINDING FORM (Implementation)

Title of Research Project:

Designing and determining the effectiveness of a health promotion programme for clients with type 2 diabetes mellitus of an urban South African community

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I also agree not to disclose any information that was discussed during the implementation of the health promotion programme.

Participant's name.....

Participant's signature.....

Witness's name.....

Witness's signature.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: Ms TANIA STEYL

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021) 959- 2542

Email: tsteyl@uwc.ac.za