A STUDY OF THE KNOWLEDGE, ATTITUDES AND PRACTICE OF LIFESTYLE MODIFICATIONS AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS ATTENDING THE OUTPATIENT DEPARTMENT OF THE NATIONAL DISTRICT HOSPITAL, BLOEMFONTEIN, FREE STATE

DR PAUL IFEANYI PETER

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by

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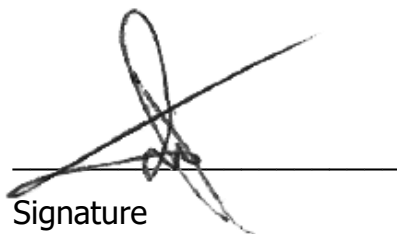Study leader: Prof. WJ Steinberg
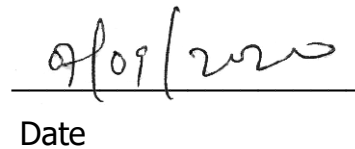Biostatistician: Mr FC Van Rooyen

2020

DECLARATION

I declare that the dissertation hereby submitted is my own independent work and has not previously been submitted by me, or anyone else, for the purpose of a qualification at this or another institution of higher learning.

I furthermore cede the copyright of this dissertation in favour of the University of the Free State.

_____   _____
Signature   Date

DEDICATIONS

I dedicate this work to my lovely wife Felicitas, and my children Ifeanyichukwu, Somtochukwu, Kambilichukwu and Mmelichukwu.

Thank you for all your support!

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

ADA	–	American Diabetes Association
BMI	–	Body Mass Index
DM	–	Diabetes Mellitus
HbA1c	–	Glycated Haemoglobin
IDF	–	International Diabetes Federation
OGTT	–	Oral Glucose Tolerance Test
OPD	–	Outpatient Department
UFS	–	University of the Free State
WHO	–	World Health Organisation

ABSTRACT

Introduction:

Type 2 Diabetes Mellitus (DM), no doubt, constitutes a major public health burden globally with uncontrolled diabetes mellitus often resulting in several short and long-term complications. It may also sometimes result in loss of lives. Therefore, it is of utmost importance that individuals with diabetes mellitus are regularly made aware of the need for optimal glucose control.

Apart from the pharmacological management of Type 2 DM, a healthy lifestyle plays a prominent role in the optimal control of the blood glucose level and prevention of complications but often little is known about the practice of lifestyle modifications among the Type 2 DM patients.

Objectives of the study:

To determine the knowledge, attitude and practice of lifestyle modifications among patients with Type 2 DM attending the outpatient department (OPD) at the National District Hospital, Bloemfontein, Free State.

Methods:

This project was a descriptive study with a cross-sectional component. The study was conducted among patients with Type 2 Diabetes Mellitus attending the outpatient department (OPD), National District Hospital, Bloemfontein, Free State.

A self-administered structured questionnaire was used for the data collection. Information regarding the socio-demographic characteristics of the participants and their anthropometric measurements was obtained.

The participants' knowledge, attitude and practice regarding physical exercise and

healthy diet with regards to lifestyle modification practices among Type 2 diabetes were assessed.

Results:

A total of 149 correctly filled questionnaires were included in the data analysis. Majority of the participants, 104(69.8%) were females, while the mean age of the participants was 47.7 years. Majority of the participants (82.0%) had a varied level of formal education. Only 23.3% of the respondents were employed. Almost half (49.3%) of the respondents have been living with diabetes for more than ten years since diagnosis. Of the respondents, 64.4% were obese, and 23.8% were overweight.

There was decent knowledge of lifestyle modification practices with regards to physical exercise and healthy dietary habits among the respondents. Respondents displayed a good attitude to physical exercise, but more than half had a poor attitude regarding the adjustment of their diet.

Even though the majority of the respondents (94.0%) had a positive attitude to the need for weight control, about two-thirds of the respondents admitted they do not monitor their weight regularly.

Only 63.3% of the respondents engage in physical exercise on a regular basis. The practice of controlled and planned diet was found to be poor among the respondents.

The identified barriers to lifestyle modifications were respondents feeling too heavy to engage in physical exercise, bad weather and financial constraints.

There was no statistically significant association between the gender of the respondents and their attitude to regular physical exercise or dietary modifications. There was also no significant association between the gender of the respondents and their practice of lifestyle modifications.

There was no statistically significant association between the number of years the respondents have been living with diabetes mellitus and their attitude to lifestyle modification practices. There was also no association with their practice of regular exercise or dietary modifications.

There was no significant association between the BMI of the respondents and their practice of regular physical or dietary modifications.

Conclusion:

In conclusion, the study revealed that despite the good knowledge of physical exercise and healthy dietary habits with regards to lifestyle modification among the Type 2 DM patient at the Outpatient Department of the National District Hospital, Bloemfontein, the uptake of these practices is still low.

There is a need to address the poor attitude and poor practice of dietary modification and the sub-optimal engagement in physical exercise among the patients. It is also vital to regularly emphasise to the patient the importance of not only engaging in the lifestyle modification practices but also the need to do it correctly. Proper practices are essential for it to be efficient and bring about the desired purpose, which is the optimal control of blood glucose, by so doing, preventing potential complications associated with uncontrolled diabetes mellitus.

CHAPTER 1:   INTRODUCTION

1.1. BACKGROUND

1.1.1.   Brief overview of diabetes mellitus

1.1.1.1.   Definition

Diabetes mellitus (DM) is described by the World Health Organisation (WHO) as "*a metabolic disorder of multiple aetiology characterised by chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both*" .[1]

The persistent hyperglycaemia over the years results in damages to various vital organs in the body such as the eyes, heart, kidneys blood vessels and the nerves.

1.1.1.2.   Classification

The classification of diabetes mellitus has transitioned through different phases over the years. The current classification is based on the understanding that when a type of diabetes is assigned to a person, the circumstances at the time of diagnosis plays an important role. Many diabetic individuals do not easily fit into a single class. Thus, it is more important to understand the pathogenesis of the hyperglycaemia and treat effectively rather than label the particular type of diabetes.[2]

The different class of diabetes mellitus are Type 1 DM, idiopathic diabetes, Type 2 DM, other specific types, gestational diabetes mellitus.[2]

1.1.1.2.1.   Type 1 Diabetes Mellitus

This group which was previously referred to as Juvenile diabetes or insulin-dependent diabetes mellitus constitute the most common chronic disease in children but can occur at any age. It is said to represent about 5–10% of the people with diabetes with data from high-income countries showing 3–4% increase in the incidence annually.[2,3]

Type 1 DM is most often due to an autoimmune disease that leads to the destruction of the insulin-producing pancreatic beta cells, thus resulting in an absolute deficiency of insulin. People with Type 1 DM, therefore, require life-long insulin treatment. The autoimmune destruction of beta-cells has been reported to have multiple genetic predispositions and may also be related to environmental factors.[2]

There are some other forms of Type 1 DM known as idiopathic diabetes. In this group, most of whom are Africans or Asians, there is no evidence of autoimmunity. These individuals suffer from episodic ketoacidosis. Between episodes, they display varying degrees of insulin deficiency. The need for insulin therapy may come and go.[2]

1.1.1.2.2.   Type 2 Diabetes Mellitus

Type 2 DM was previously referred to as non-insulin-dependent, type 2 diabetes, or adult-onset diabetes. It accounts for 90–95% of people with diabetes with the highest proportion in low-and middle-income countries.[2,4]

It occurs as a result of the individual having insulin resistance or relative insulin deficiency. These group of individuals often do not need insulin treatment to survive. Many of the individuals affected are grossly obese or have truncal obesity. And unlike in Type 1 DM, ketoacidosis seldom occurs spontaneously in Type 2 DM patients.[2]

Type 2 DM involves an interplay of interaction between genetic, environmental and

behavioural risk factors such as physical inactivity and sedentary lifestyle. It has an insidious onset and may remain undiagnosed for years with the individuals being at risk for developing both macrovascular and microvascular complications.[2,5]

Women previously diagnosed with gestational diabetes, and individuals with hypertension or dyslipidaemia are also at higher risk of developing Type 2 DM.

Even though the genetics is not well understood, Type 2 DM is often associated with strong genetic predisposition.[2]

1.1.1.2.3. Other Specific Types

Diabetes mellitus of various known aetiologies are grouped together to form this classification. The following individuals are included: those with genetic defects of beta cells function; persons with insulin action defects; those with diseases of the exocrine pancreas such as cystic fibrosis or pancreatitis; those with pancreatic dysfunction due to infections, drugs or other chemicals; and those with dysfunction associated with other endocrinopathies.[2]

1.1.1.2.4. Gestational Diabetes Mellitus

The diagnosis of gestational diabetes should be made if at any time during the pregnancy the patient is found to have any of the following; the fasting plasma glucose of 5–6.9 mmol/l, a 1–hour post-load plasma glucose of ≥10.0 mmol/l or a 2–hour post-load plasma glucose of 8.5–11.0 mmol/l.[2,6]

1.1.1.3. Diagnostic Criteria

The diagnosis of diabetes mellitus may be made using either the plasma glucose criteria

or the haemoglobin A1c criteria. The plasma glucose criteria include the fasting plasma glucose value and the 2–hour plasma glucose value during a 75 g oral glucose tolerance test (OGTT).[2]

Generally fasting plasma glucose, 2–hour plasma glucose during 75 g OGTT, and A1c are equally appropriate for diagnostic testing. However, it should be noted that the tests do not necessarily detect diabetes in the same individuals.[6,7]

Fasting blood glucose should be greater than 126mg/dl (7.0 mmol/l). Fasting is defined as no calorie intake for at least 8 hours. For a diagnosis using the 2–hour plasma glucose, the value must be 200 mg/dl (11.1 mmol/l) or higher during OGTT. The test should be conducted by using a glucose load consisting of 75 g anhydrous glucose dissolved in water. Patients with typical symptoms of hyperglycaemia or hyperglycaemic crisis, random plasma glucose values of 200 mg/dl (11.1 mmol/l) or higher are diagnostics of diabetes. For a diagnosis using the Haemoglobin A1C, level of 6.5% or higher is diagnostic of diabetes mellitus.[7]

1.1.1.4. Symptomatology

The typical symptoms of diabetes include: often urinating, feeling very thirsty, feeling very hungry, extreme fatigue blurry vision, cuts /bruises that are slow to heal, weight loss despite eating well (Type 1), tingling, pain and/or numbness in the hands and feet. Early detection and treatment are very important as it decreases the risk of developing the complication of diabetes.[7]

1.1.1.5. Complications

Uncontrolled diabetes can result in several short and long-term complications; therefore, individuals with diabetes must be made aware of these possible complications as this

may encourage good diabetes control and a healthy lifestyle.

The short-term complications include hypoglycaemia, hyperosmolar hyperglycaemia non-ketotic syndrome.

The long-term complications develop over the years as a result of the damages to the blood vessels. Damage to the small blood vessels could cause microvascular complications, while damage to the large vessels leads to macrovascular complications.

1.1.1.6. Microvascular Complications

The persistently high plasma glucose over time results in damages to the small blood vessels resulting in their inability to deliver sufficiently. The body organs often affected are the eyes, kidneys and the nervous system causing clinical conditions known as diabetic retinopathy, diabetic nephropathy, and diabetic neuropathy, respectively.

1.1.1.7. Macrovascular Complications

This involves the large blood vessels. Diabetes increases the risk of atherosclerotic plaque formation, which eventually leads to the narrowing of the arterial lumen.

The common macrovascular complications are coronary artery diseases, stroke and peripheral vascular disease.

1.1.2. Problem statement

While working at the Outpatient Department (OPD) of the National District Hospital, the researcher observed that many of the patients attending the OPD have chronic medical conditions such as diabetes mellitus and hypertension.

Many of the individuals with diabetes were often observed to have uncontrolled blood glucose level during their follow-up visits despite the continued optimisation of their pharmacological treatment.

The researcher observed that some of the patients were overweight or obese, and many do not seem to engage in healthy lifestyle activities such as exercising and eating healthy.

There is no doubt that lifestyle modification plays a very prominent role in the management of a patient with diabetes, especially Type 2 DM. It was based on these observations that the researcher decided to conduct a study to explore the knowledge, attitude and practice of lifestyle modification among these patients.

1.1.3. The relevance of the study

Diabetes mellitus and its accompanying complications rank among the top clinical conditions seen in the hospital on a day-to-day basis.

Lifestyle modification is the cornerstone of Type 2 DM control, but often little is known about its practice among the patients.

This researcher is hopeful that this study will give an insight into the level of knowledge, attitude and practice of lifestyle modification with regards to diet and exercise among the Type 2 DM patients attending the OPD at the National District Hospital in Bloemfontein, Free State.

This study may help to identify whether there is need for planning and implementations of interventions to assist with the improvement of the level of awareness of lifestyle modifications and its adoption as part of the management of these patients.

1.1.4. Study setting

The study was conducted at the outpatient department (OPD) of the National District Hospital in Bloemfontein, Free State.

This is a level one public hospital that provides diverse medical services to the residents of Bloemfontein and the neighbouring towns. The outpatient department is involved in the management and follow-up of mostly patients with chronic medical conditions, including Type 2 DM.

The OPD is open from 8 am to 4 pm from Monday to Friday, and an estimated 1500 patients are seen every month. The patient population includes blacks, whites and coloured.

1.2. LITERATURE REVIEW

1.2.1. Epidemiology of Type 2 Diabetes Mellitus

Diabetes mellitus, no doubt, constitutes a significant public health concern. It is estimated that about 9.3% of adults aged 20–79 years, that is 463 million people worldwide currently have diabetes and the number is expected to increase to 700 million in 2045.[8]

Type 2 DM accounts for 90% of all cases of diabetes resulting in huge morbidity and mortality.[8] It was previously termed an emerging epidemic of the 21st century but can now be considered a pandemic with grave implication for the health care systems.

The impact of Type 2 DM in Africa and most other developing countries has reached an alarming rate which is quite worrisome. It is estimated that 79.4% of adults with diabetes mellitus aged 20–79 years currently live in low- and middle-income countries

with 59.7% of people with diabetes still being unaware that they have the disease.[8]

Africa region is also reported to have the highest estimate of diabetes-related deaths under the age of 60 years (73.1%).[8]

In the African region, USD 9.5 billion was spent on diabetes-related healthcare in 2019.[8] Even though this was the second-lowest amount spent on diabetes compared to other IDF regions, it has substantial economic implication in a setting where most African countries healthcare systems are reeling under the weight of additional disease burdens such as malaria, HIV/AIDS and tuberculosis.

South Africa has one of the highest prevalence of diabetes in Africa, with about 4.6 million having the disease and 89,800 deaths attributed to diabetes in 2019. The Africa region is expected to have the highest future increase in the number of people with diabetes with an estimated 47.5% and 142.9% increase 2030 and 2045 respectively.[8]

Urbanisation, the adoption of a westernised diet, reduced physical activity, and the resulting obesity, has been identified as leading factors fuelling the scourge of Type 2 DM. The expectation is that as the population ages and urbanisation continue to increase, the number of adult populations with Type 2 DM will continue to rise.[8–11]

Since most people with diabetes in the developing countries are within the productive age groups, this often results in reduced productivity and high economic burden in terms of healthcare expenditure, lost productivity and foregone economic growth.[12,13]

The optimal management of Type 2 DM usually encompasses adoption and adherence to the combination of prescribed drug therapy, dietary modifications, regular physical exercises and other self-care care activities. This requires having a good knowledge and understanding of the disease. Unfortunately, there is still a low level of awareness of

diabetes, including knowledge of its management among many of the affected patients.

1.2.2. Risk factors of Type 2 Diabetes Mellitus

The risk of developing Type 2 DM increases with an advance in age, lack of physical activity and being overweight or obese. Others are the presence of family history, high blood pressure, ethnic predisposition, impaired glucose tolerance, and history of gestational diabetes.[14]

The development of Type 2 DM is known to have a significant genetic predisposition and studies involving twins have shown that there is a 96% higher concordance rate among monozygotic twins than dizygotic twins.[15,16]

Urbanisation, accompanied by the adoption of a westernised diet has been identified as the leading factors fuelling the increase in Type 2 DM.[8,9]

1.2.2.1. Lifestyle Factors Correlations

Several lifestyle factors play a prominent role in the development of type 2 DM including sedentary lifestyle, physical inactivity, smoking and alcohol consumption.[17–21]

Many studies have reported obesity as the most critical risk factor for type 2 diabetes since it may influence the development of insulin resistance and disease progression.[17,22]

1.2.2.1.1. Diet

Diet plays a vital role in the development of Type 2 diabetes, and it is considered a modifiable risk factor for Type 2 DM.[17] Apart from excessive caloric intake being a major force responsible for the escalating obesity and Type 2 DM epidemic worldwide, the

quality of the diet also has an independent effect.[19,23]

Consumption of a low-fibre diet with a high glycaemic index or total and saturated fat intake is associated with an increased risk of Type 2 DM independent of Body Mass Index (BMI) and other risk factors. Higher linoleic acid intake has the opposite effect – particularly among younger, leaner men.[24,25]

Frequently ingesting processed meat may increase the risk of Type 2 DM.[25] Soft drinks have also been linked with increased risk of Type 2 DM and metabolic syndrome – they are directly linked with BMI.[26–28]

1.2.2.1.2.   Physical Activity

Sedentary behaviours increase the risk of diabetes.

Among sedentary behaviours such as television watching, sitting at work, seated leisure and social activities, watching TV for extended periods is associated with the highest risk. Watching television reduces expended energy and unhealthy eating patterns. This is usually characterised by the consumption of fast foods, snacks, and sugar beverages.[23,29]

When watching television, for each 2–hour/day spent in front of the television was associated with a 14% increase in diabetes risk. In contrast, each 2–hour/ day increment of standing or walking around at home was associated with a 12% reduction in risk. Each 1–hour/day of brisk walking was associated with a 34% reduction in risk.[23,29]

Increased mechanisation and driving have also displaced physical activity over the last century in industrialised nations. This trend is on the increase in the developing countries as well.[23]

1.2.2.1.3.   Alcohol

There is reduced risk of diabetes among light and moderate alcohol consumers with reported 30–40% reduced risk among those consuming 1–2 drinks /day compared with heavy drinkers or abstainers. However, the risk of diabetes among those who consumed three or more drinks /day was like that of abstainers.[23,30]

1.2.2.1.4.   Smoking

Cigarette smoking is considered a modifiable risk factor for Type 2 DM and current smokers are reported to have a 45% increased risk of developing diabetes compared with non-smokers. Smoking is associated with increased risk of truncal obesity or abdominal fat, an established risk factor for insulin resistance and diabetes.[31–33]

1.2.3.   Lifestyle modification in the management of Type 2 Diabetes Mellitus

Lifestyle intervention plays a prominent role in the management of patients with Type 2 DM. Apart from preventing or delaying the progression to Type 2 DM among those at risk, it does reduce the risk of developing complications among those already diagnosed with Type 2 DM.

It also helps with improved efficiency of the pharmacologic intervention – in some cases causing a reduction in the required dosages of the antidiabetic medications.

The proposed lifestyle interventions often include educational support, improvement in diet and level of physical activity.

1.2.3.1.   Educational Support

It is recommended that individuals with DM should partake in diabetes self-management education programmes to acquire the knowledge, skills and abilities essential for diabetes self-care. Also, diabetes self-management support to assist with implementing and sustaining skills and behaviours needed for continuous self-management, from diagnosis and as needed thereafter.[35]

Diabetes self-management education and support should be patient-centred, respectful and responsive to individual's needs, preferences and values. It should help guide clinical decision.[35]

The need for diabetes self-management education and support should be evaluated by the medical care provider at four critical time points: with the diagnosis; annually for assessment of education, nutritional and emotional needs; when new complicating factors arise; and when transition in care occurs.[35]

Diabetes self-management education is associated with increased DM knowledge and self-care behaviours. It is also interconnected with the increased use of primary care and preventive services and less frequent use of acute care and inpatient hospital services.[35–37]

1.2.3.2.   Dietary Intervention

Dietary intervention plays an essential role in the management of Type 2 DM. However, many individuals with diabetes often face the daunting challenge of determining the appropriate food to eat and adhering to a food plan.[35]

More than three-quarters of adults with DM are overweight; even more alarming: nearly half of the individuals with DM are obese.[38,39]

Because of the association between body weight and insulin resistance, weight loss has

long been recommended for adults with diabetes.[40] A simple diabetes meal plan such as healthful food choices or smaller portions may be appropriate for individuals with Type 2 DM.[41]

A variety of eating pattern has also been shown to be modestly effective in managing diabetes: Lower fat, lower carbohydrate pattern, mediterranean, hypertension improving diets (DASH), and plant-based diets.[42]

Previously, certain guidelines advised macronutrient quantity goals, such as the European or Canadian recommendation of 45–60% of total energy as carbohydrate, 10–20% as protein, and less than 35% as fat. The more recent guideline from the American Diabetes Association (ADA) state that there is no ideal percentage of calories from fat, protein, and carbohydrate for all people with diabetes. Macronutrients distribution should be determined from each individual's assessment of current eating pattern, preferences such as tradition, culture, religion economics and metabolic goals.[41]

It is thus crucial that every individual with Type 2 DM receive educational support from a dietitian or trained medical personnel who should also help with the development of a dietary plan for the patient.[41]

1.2.3.3. Physical Exercise

Engaging in regular physical activity is usually encouraged among patients with Type 2 DM as it plays a vital role in the management of blood glucose.

Planned and structured physical activity enhances blood control in Type 2 DM, contributes to weight loss, decreases cardiovascular risk factors, and improves well-being.[43–45]

The challenges related to blood glucose management differ with the type of DM, DM complications, and activity type. Physical activity recommendations should be

personalised to the specific needs of each individual.[43,46]

1.2.3.3.1.   Types of Exercise and Physical Activity

Aerobic Exercise

Aerobic exercises comprise of repetitive movement of all large muscle groups. This includes activities such as walking, cycling, jogging and swimming.[43,47] Aerobic training improves insulin sensitivity and glycaemic control of adults with Type 2 DM, especially when performed at least 150 minutes per week.[48]

Individuals with Type 2 DM should aim at performing aerobic exercise regularly, and each activity bout should ideally last 10 minutes with the goal of exercising at least 30 minutes or more per day, most days of the week.[43,49]

Resistance Exercise Training

Resistance (strength) training includes exercises with free weights, weight machines, bodyweight, or elastic resistance bands.[43]

The health benefits of resistance training include insulin sensitivity, blood pressure, lipid profiles, muscle mass increase, body strength, mental health, physical function, bone mineral density, and cardiovascular health.[43,50]

Resistance exercise increases strength in adults with Type 2 DM by about 50% and improves HbA1c by 0.57%.[48]

Adults with DM should engage in resistance training for two to three sessions per week on non-consecutive days.[43]

For optimal glycaemic control, combined training is superior to either type of training undertaken alone.[51,52] It is thus recommended that adults with Type 2 DM should ideally perform both aerobic and resistance exercise training for optimal glycaemic control and other health outcomes.[43]

Apart from engaging in regular structured exercise, individuals with Type 2 DM should reduce the amount of time spent on daily sedentary behaviours, and prolonged sitting should be interrupted with bouts of light activity every 30 minutes for blood glucose benefits.[43]

Daily exercise is recommended or at least not allowing more than two days to elapse between exercise sessions. Activities should progress in intensity, frequency, and duration to at least 150 minutes per week over time.[43]

1.2.4. Literature review on knowledge, attitudes and practice regarding lifestyle modification among patients with Type 2 Diabetes Mellitus

In view of the strong association between diet, sedentary lifestyle, obesity and development of Type 2 DM, it has been consistently reported that the adoption of lifestyle modification plays a prominent role, not only in the prevention or delay of Type 2 DM but also in the control of the blood glucose in those already diagnosed with diabetes.

However, in as much as lifestyle modification is important to the management of Type 2 DM, the adoption and practice of recommended adjustments are always fraught with challenges, and most of these patients fail to adhere to this crucial component of their management regimen.

Knowledge has been highlighted as the greatest weapon in the fight against diabetes mellitus. Educative information can help people better comprehend the risks associated

with diabetes, and motivate them to seek proper treatment and care, and take care of their diseases.[53]

Unfortunately, the poor level of awareness on diabetes and its management in developing countries still constitute a major challenge, which continues to affect how people access necessary medical care, including lifestyle intervention programs.

In a study done in Iran, only 2% of the respondents had good knowledge of diabetes, and awareness on lifestyle modification regarding weight management was found to be low.[54] This is in contrast to another study in Ethiopia where 77% of the respondents were found to have adequate knowledge of the benefits of exercise and health diet.[55]

A study in South Africa reported 92.1% of the participants had inadequate knowledge regarding the benefits of exercise and weight loss while 73,3% had poor knowledge regarding a healthy diet.[56]

Even when some of these patients are aware or adopt lifestyle modifications, adherence or complying with the recommendations remains a challenge.

Patients with chronic conditions have been reported to have lower adherence rate to treatment when compared to acute cases, and the decline in adherence is often significant after the six months of commencing therapy.[53] This may also be the case with lifestyle adjustments.

A study in India found that 78% of the respondents were aware of the importance of diet control and exercise, but only 68% of these patients follow diet control while only 49% follow on exercise schedule.[57]

In another study in the UAE, 95% of the respondents recognised the importance of physical activity, but only 25% reported an increase in physical activity since diagnosis

of diabetes.[58]

In another South African study, 91.7% of the participants did not exercise regularly, and 8.3% that exercise regularly, 94.4% exercised less than the recommended 30 minutes per day or less than 150minutes per week. Also, 99.1% of them did not follow a controlled and planned diet.[56]

The problem of non-adherence to recommended lifestyle modification among patients with Type 2 DM is very complex and multifactorial in nature.[54]

Some of the factors reported to influence poor adherence include age, duration of disease, lack of communication relationship between the patient and healthcare provider, negative health beliefs and perceptions that are incompatible with the recommendations and socioeconomic factors.[59–61]

Other identified barriers are lack of information, unwillingness, lack of support from spouse or family, poor weather condition, financial problems, lack of exercise partner, poor health, criticism from others, poor self-discipline, lack of time, lack of local exercise facilities, co-existing diseases, distraction by television and tendency to use cars.[62–66]

1.3. METHODOLOGY

1.3.1. Title

Knowledge, Attitude and Practice of lifestyle modifications among patients with Type 2 DM attending the Outpatient Department of the National District Hospital, Bloemfontein, Free State.

1.3.2. Research question

What is the knowledge, attitude and practices regarding lifestyle modifications among patients with Type 2 DM attending the OPD at the National District Hospital, Bloemfontein, Free State?

1.3.3. Aim of the study

The aim of the study was to determine the knowledge, attitude and practice of lifestyle modification among patients with Type 2 DM attending the outpatient department (OPD) at National District Hospital, Bloemfontein, Free State.

1.3.4. Objectives of the study

The objectives of the study were:
To determine the socio-demographic characteristics of the patients with Type 2 DM attending the outpatient department (OPD) at the National District Hospital.

To determine the knowledge, attitude and practice of the lifestyle modification in relation to Type 2 DM with regards to dietary modifications and regular physical exercise.

1.3.5. Study design

This was a descriptive study with a cross-sectional component.

1.3.6. Study setting

The study was conducted at the outpatient department (OPD) of the National District Hospital, Bloemfontein, Free State, Republic of South Africa.

This is a level one public hospital that provides various medical services to the residents of Bloemfontein and the neighbouring towns. The outpatient department is involved with the management and follow-up of mostly patients with chronic medical conditions, including Type 2 DM and hypertension.

1.3.7. Study population

The study population included patients who have Type 2 DM and have been attending the OPD for more than a year.

1.3.8. Study sample

Using the Epi-info tool with a 95% confidence level and 5% degree of error, the required sample size was calculated to be 218.

A systematic sampling method was then used in the selection of the participants. Every second patient with Type 2 DM who satisfied the inclusion criteria and consented to the study was included in the study until the required sample size was completed.

The study period was from March 2019 to June 2019.

1.3.9. Inclusion criteria

Patients with Type 2 DM diagnosed more than a year before were included. Patients also had to be willing and consented to the study. (cf. Appendix C).

1.3.10. Exclusion criteria

Patients who were unable to answer the questionnaire and those who did not give consent to participate in the study were excluded.

1.3.11. Data collection

A structured questionnaire developed based on literature reviews and consultation with my supervisor and biostatistician was used for the data collection. (cf. Appendix A).

The questionnaire was divided into seven sections consisting mostly of closed-ended questions. The first section (A) captured data on the socio-demographic characteristics of the respondents, which included their ages, gender, marital status, educational level, employment status, smoking status and alcohol use. The next section (B) included questions on a number of years since diagnosis of diabetes mellitus among the respondents, their general knowledge of diabetes mellitus, and their current mode of treatment. Questions assessing the knowledge of the participants regarding glycated haemoglobin (HbA1c) was also included in Section C.

Section D of the questionnaire had a total of eight questions which included respondent's personal grading of their knowledge of lifestyle modification practices, sources of information on lifestyle modifications, and assessment of respondents' knowledge of lifestyle modification practices. Section E of the questionnaire captured information on the attitude of the respondents to lifestyle modification practices. A 5–part Likert scale was used in this section to assess the attitude of the respondents to regular physical exercise, adjustment of their diet, and weight control. Questions in section F of the questionnaire assessed the extent of the practice of lifestyle modifications among the respondents. While the last section had questions aimed at identifying the barriers to regular physical exercises and adherence to recommended dietary plan among the

respondents.

It also included the measurements of physical attributes such as the weight and height of the respondents to calculate their body mass index (BMI).

The numbers and percentages of respondents who know the correct answers to the questions were used as the indicators to quantify the level of knowledge with regards to lifestyle modifications practices.

The response of the participants to the 5–point Likert scale was also reported in terms of numbers and percentages to quantify their attitudes to lifestyle modification practices.

The numbers and percentages of the respondents who practised regular physical exercise and controlled planned diet were used as indicators to quantify the practice of lifestyle modifications among the respondents.

The questionnaire was developed in English, and with the help of translators, was translated into Afrikaans and Sesotho to include participants who may not understand English.

1.3.12. Data analysis

The analysis was done by the Department of Biostatistics, using statistical analysis software SAS 9.4.

Descriptive statistics, including the frequency, percentages, means and standard deviation were used to determine the distribution of the variables.

Categorical variables such as gender, marital status, educational level, were summarised by frequency and percentages. Continuous variables such as the age, weight, height

and body mass index (BMI) were summarised by medians, minimum, maximum or percentiles and also described with frequency and percentages.

Differences between groups were evaluated using the appropriate statistical test (Chi-square or Fisher's Exact test) for unpaired data.

Data tabulations, bar charts and pie charts were also used to show some of the study findings.

1.3.13. Reliability and analysis

Reliability is how consistent a measurement is when performed by different observers under the same condition or by the same observer under different conditions while validity is the extent to which a measurement approaches what it is designed to measure. Validity is determined by the accuracy and reliability of a test.[67]

To enhance reliability and validity, the questionnaires were translated from English into Afrikaans and Sesotho by different indigenous speakers of the languages, which were then compared to ensure accuracy in meaning. A pilot study was also conducted by administering ten questionnaires to diabetic patients at the OPD, and questions that were not clear to the patients were identified and amended.

1.3.14. Bias

Bias refers to non-random error leading to a deviation of inferences or result from the truth.

1.3.14.1. Selection Bias

The restriction of the participants to those diagnosed with diabetes mellitus more than 1 year ago may have resulted in selection bias which affects the generalizability of the findings in the study however the use of systematic random sampling of the participants minimises this selection bias.

1.3.14.2. Translation Bias

The translation of the questionnaire from English to Afrikaans and Sesotho may have affected the perception of the intended questions. The use of multiple indigenous speakers of the aforementioned languages was adopted to reduce mistranslation.

1.3.14.3. Systematic Bias

This likelihood of errors in the measurement of the participants' weights was reduced with the use of regularly calibrated weighing scale.

1.3.14.4. Respondent Bias

Some respondents may want to please the researcher with their response or hide their lack of knowledge when answering the questions. The use of an anonymous self-administered questionnaire was used to minimise this.

1.3.15. Ethical considerations

Ethical approval for this study was obtained from the Health Sciences Research Ethics Committee of the University of Free State (UFS-HSD2017/0772). (cf. Appendix D).

Permission to conduct the study was granted by the Free State Department of Health. (cf. Appendix E).

1.4. LAYOUT OF MANUSCRIPT

1.4.1. Report format

This mini-dissertation was prepared to be in the publishable article format (cf. Chapter 2). The article was prepared according to guidelines of the Pan African Medical Journal (PAMJ). (cf. Appendix F).

1.4.2. Schematic layout of this manuscript

Chapter 1
- Background
- Literature review
- Methodology
- Layout of manuscript

Chapter 2
- Journal information
- Publishable article

Chapter 3
- Conclusion
- Limitations
- Recommendations

Figure 1: Schematic layout of this manuscript

1.5. CHAPTER SUMMARY

In Chapter 1 the purpose of the study was discussed. The aim was to determine the knowledge, attitude and practice of Type 2 DM patients towards lifestyle modification. In Chapter 2 the results and discussion will be discussed in a publishable article format.

CHAPTER 2:   PUBLISHABLE ARTICLE

2.1.   JOURNAL INFORMATION

The chosen journal, The Pan African Medical Journal (PAMJ), is a DHET accredited publication.

The journal was founded early in 2008, with offices in Kenya and Cameroon. It is a peer-review, open-access journal with editors and co-editors from the entire continent, but also abroad. The publication languages are English and French.

Articles are indexed in various online databases, including Scopus, Medline and PubMed.

Website address: https://www.panafrican-med-journal.com/

2.2.   PUBLISHABLE ARTICLE

The following article was prepared using the author guidelines of the PAMJ. (cf. Appendix F).

Knowledge, attitude and practice regarding lifestyle modifications among patients with Type 2 Diabetes Mellitus attending the Outpatient Department at a District Hospital in South Africa

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Word count abstract: 246
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Abstract

Introduction: Type 2 Diabetes Mellitus (DM) is a major public health burden globally with uncontrolled DM often resulting in several short- and long-term complications – in many cases, the loss of lives. Unfortunately, health practitioners have little control over the necessary lifestyle modifications practices of patients outside the consultation room. This study aimed to determine the level of knowledge, attitude, and practice of lifestyle modifications among patients with Type 2 DM attending the Outpatient Department (OPD) at the National District Hospital in Bloemfontein, South Africa. Furthermore, we looked at possible barriers experienced by patients.

Methods: using a descriptive study, with a cross-sectional component, patients with previously diagnosed Type 2 DM were requested to participate. Participants' Body Mass Index (BMI) were recorded, and they completed a structured questionnaire to assess knowledge, attitude, and practice regarding lifestyle modification.

Results: a total of 149 questionnaires were collected. Of the respondents, 64.4% were obese, and 23.8% were overweight despite good knowledge of lifestyle modification practices. They displayed a positive attitude towards physical exercise, but less so to adjust their diets. In practice, 63.3% claimed to exercise regularly, but two-thirds irregularly monitor their weight. The practice of a controlled and planned diet was poor. Perceived barriers to lifestyle modifications included feeling too heavy to engage in physical exercise, bad weather, and financial constraints.

Conclusion: despite displaying good knowledge regarding lifestyle modifications, the attitude and practice thereof remain poor. It is essential to regularly re-emphasise to patients why it is crucial to engage in lifestyle modification practices and assess whether they are doing so correctly.

Keywords: diabetes mellitus; Type 2; lifestyle modification; knowledge; attitude; practice; barriers

Introduction

Diabetes Mellitus (DM) is a significant public health concern. An estimated 9.3% of adults between the ages of 20 and 79 years worldwide (about 463 million people) are currently affected by the metabolic disease. Projections estimate that by 2045 the number would have increased to 700 million.[1]

Since most people with DM in the developing countries are within the productive age groups, DM often results in reduced productivity, and high economic burden in terms of healthcare expenditure lost productivity and foregone economic growth.[2]

Type 2 DM constitutes the majority of DM cases, with uncontrolled cases often resulting in several short and long-term complications – in many cases, the loss of lives.[1] Previously this type was referred to as non-insulin-dependent diabetes, Type 2 diabetes, or adult-onset DM.[3,4]

The impact of Type 2 DM in Africa, and most other developing countries, has reached an alarming proportion. A staggering 79.4% of affected adults are thought to live in low- and middle-income countries. Even more troubling is that an estimated 59.7% of people with DM from Africa are still unaware they have this chronic disease. Africa region is also estimated to have the highest number of DM-related deaths under the age of 60 years (73.1%).[1]

Type 2 occurs as a result of the individual having insulin resistance or relative insulin deficiency. These group of individuals often do not need insulin treatment to survive. Many of the individuals affected are grossly obese or have truncal obesity. Unlike Type 1 DM, ketoacidosis seldom occurs spontaneously.[4]

Type 2 DM involves an interplay of interaction between genetic, environmental and behavioural risk factors. Behavioural factors include physical inactivity and a sedentary lifestyle. The disease has an insidious onset and may remain undiagnosed for many years.[4,5]

Uncontrolled DM can result in several short- and long-term complications. The short-term complications include hypoglycaemia, hyperosmolar hyperglycaemia non-ketotic syndrome. The long-term complications develop over the years as a result of the damages to the blood vessels.[6]

Several lifestyle factors play a prominent role in the development of Type 2 DM. These include diet, sedentary lifestyle, smoking and alcohol consumption.[6–8] Lifestyle

modification is the foundation of Type 2 DM control but often little is known about its practice among patients.[9]

More than three out of every four adults with DM are overweight, and nearly half of individuals with DM are obese.[10] The most significant risk factor for Type 2 DM is obesity, since it may influence the development of insulin resistance and disease progression.[7,10] Thus, the diet plays a crucial role in the development of Type 2 DM, and it is considered a modifiable risk factor.[7] Apart from excessive caloric intake, playing a significant role in escalating obesity, the quality of the diet also has an independent effect.[9]

Consumption of low-fibre diet with a high glycaemic index or total and saturated fat intake is associated with an increased risk of Type 2 DM independent of Body Mass Index (BMI) and other risk factors.[11] Regular ingestion of processed meat may increase the risk of Type 2 DM,[11] while soft drinks have also been linked with increased risk of Type 2 DM and metabolic syndrome because they are directly associated with BMI.[12]

Due to the relationship between body weight and insulin resistance, weight loss has been a long-standing recommended strategy for overweight DM patients.[13] Thus, dietary intervention plays an essential role. Still, many individuals with DM often experience the task of finding the appropriate food challenging. Many consider adherence to an ideal food plan an unachievable goal.[14]

A simplified meal planning approach, such as controlling the portions, or even better food choices, may suit Type 2 DM patients better. Unfortunately, these individuals may struggle to remain motivated when their routine and life-long dietary preferences change entirely. Behavioural change is probably the most prominent obstacle health professionals face with these patients.[15]

Sedentary behaviours increase the risk of DM. Even though inactivity and sitting at work and social gatherings could be dangerous, the highest risk is prolonged TV watching. Watching television reduces expended energy and those who spend more time watching TV have unhealthy eating patterns characterised by consumption of snacks, sugar beverages and fast foods.[9,16]

Increased mechanisation and driving have also displaced physical activity over the last century in industrialised nations. This trend is on the increase in developing countries as well.[9]

Exercise, which is a planned, structured physical activity improves blood control in Type 2

DM, diminishes cardiovascular risk factors, assists with weight loss, and promotes well-being.[17–20]

Engaging in regular physical activity is usually encouraged among patients with Type 2 DM as it plays a vital role in the management of blood glucose. Each individual's needs should be considered when planning their physical activity and exercise.[17]

Another modifiable risk factor for Type 2 DM is cigarette smoking. Current smokers have a 45% increased risk of developing DM compared with non-smokers. Smoking is associated with increased risk of truncal obesity or abdominal fat, an established risk factor for insulin resistance and DM.[21,22]

There is a reduced risk of developing DM among light and moderate alcohol consumers with reportedly 30–40% smaller risk of the disorder among those using 1–2 drinks/day compared with heavy drinkers or nondrinkers. However, the risk of DM among those who consumed three or more drinks/day was like that of abstainers.[9,23]

Lifestyle modifications help with improved effectiveness of the pharmacologic intervention. In some cases, the changes lead to a reduction in the required dosages of anti-diabetic medications. The proposed lifestyle interventions often include educational support, improvement in the diet and level of physical activity.[15,18]

However, as much as lifestyle modification is essential to the management of Type 2 DM, the adoption and practice of recommended adjustments are always fraught with challenges, and most of these patients fail to adhere to this critical component of their management regimen.[15,18]

Knowledge is highlighted as the greatest weapon in the fight against DM. Educative information can help people better comprehend the risks associated with DM and motivate them to seek proper treatment and care, and take care of their condition.[20]

Unfortunately, the meagre level of awareness on DM and its management in developing countries still constitute a significant challenge, which continues to affect how people access necessary medical care, including lifestyle intervention programs.[24,25]

In a study done in Iran, only 2% of the respondents had good knowledge of DM, and they found a low awareness of lifestyle modification regarding weight management.[26] In contrast, an Ethiopian study found that 77% of their participants displayed adequate knowledge.[25] A similar study in South Africa reported 92.1% of the respondents had poor knowledge regarding the benefits of exercise and weight loss. Regarding a healthy diet, 73.3% had poor knowledge.[24] These studies found attitude towards Lifestyle

Modifications tends to be positive, especially when knowledge is sufficient.[24–26]

Even with patients being aware of, or even adopting lifestyle modifications, adhering to the recommendations remain a challenge. Patients with chronic conditions have shown to have lower adherence rate to treatment when compared to acute cases, and the decline in adherence is often significant after the six months of commencing therapy.[20] This may also be the case with lifestyle adjustments.

Mumu et al. listed several factors which could contribute to poor adherence: socioeconomic issues, the patient's age, how long the patient lived with the disease, lack of communication with the healthcare provider, negative health beliefs, and unbridgeable views regarding the necessary modifications.[27]

Aim

The aim for this study was to determine the level of knowledge, attitude and practice of lifestyle modification with regards to diet and exercise among the Type 2 DM patients attending the Outpatient Department (OPD) at the National District Hospital in Bloemfontein. Furthermore, we looked at possible barriers experienced by patients.

Methods

Study design

The study design was a descriptive study with a cross-sectional component.

Study setting

The researchers chose the OPD of the National District Hospital, Free State Province in the Republic of South Africa, as the setting for this project.

The setting is a level one public hospital that provides various medical services to the residents of Bloemfontein and neighbouring towns. The OPD mainly manages and follow-up chronic medical conditions patients, which include Type 2 DM and hypertension cases.

Study population and sampling strategy

The study population included patients attending the OPD and who have been diagnosed for Type 2 DM more than a year before.

A systematic sampling method was used in the selection of the participants. Every second consenting patient who satisfied the inclusion criteria was included.

The study period was from March 2019 to June 2019.

Data collection

After a thorough literature review, a structured questionnaire was developed based on the objectives of the study. Respondents' Body Mass Index (BMI) was also calculated and recorded.

The questionnaire was divided into seven sections consisting mostly of closed-ended questions. These sections captured data on the respondent's socio-demographic characteristics, history of the condition, general knowledge about the disease, KAP (knowledge, attitude and practice) of lifestyle modification, and barriers preventing respondents from adapting their lifestyles.

The questionnaire was developed in English but also translated into Sesotho and Afrikaans – the most common languages spoken in the region.

The intended goal was to gather data on 218 patients.

Data analysis

The Department of Biostatistics from the University of the Free State assisted with analysis of the data, making use of the statistical analysis software SAS 9.4.

Pilot study

A pilot study was conducted by administering ten questionnaires to diabetic patients at the OPD. Unclear questions were identified, and the questionnaires were amended.

Ethical considerations

Ethical approval for this study was obtained from the Health Sciences Research Ethics Committee of the University of Free State (UFS-HSD2017/0772). Permission to conduct the study at the district hospital was granted by the Free State Department of Health. Participants were informed about the study, and they signed a consent form before partaking.

Results

Only 150 respondents consented to participate in the project. Unfortunately, another questionnaire was labelled unsuitable for inclusion, and the specific participant's BMI result and responses were excluded. The data from the remaining 149 respondents were captured and analysed.

From the 137 respondents (91.9%) who indicated their age, the mean age was 56. The youngest was 22, and the oldest 81 years of age. (See Figure 1). The gender variable was lopsided, with 69.8% being female. Half the participants (50.0%) were married, 23.9% were single, while 17.5% were widowed, 8.8% were divorced, and 0.7% were cohabiting.

From 139 respondents: 18.0% did not complete primary school; 47.5% completed only primary school; 26.0% completed high school; and, 8.5% had tertiary education.

Only thirty-six respondents (24.3%) were employed, while sixty-three (42.6%) were pensioners, thirty-six (24.3%) were unemployed, twelve (8.1%) were housewives, while one (0.7%) was a student.

Thirty-three (22.2%) respondents stated they are smokers, while thirty-nine (26.3%) frequently used alcohol.

Thirty-eight (25.7%) were diagnosed with DM within 3 years before the study, 21 (14.2%) stated 4–6 years before, 16 (10.8%) 7–9 years earlier, and 73 respondents (49.3%) more than ten years prior.

Regarding the current treatment, eighty-seven respondents (58.8%) were prescribed oral hypoglycaemics only, thirty-seven (25.0%) were on insulin alone, while twenty-two (14.9%) were on both. Two (1.4%) did not specify their treatments.

Body Mass Index

From the measured weight and length, the BMI was calculated. Seventeen respondents (11.64%) had normal BMI, 35 (23.97%) were overweight, while 94 (64.38%) were obese. See Figure 2 for a graphical representation.

Knowledge of Type 2 Diabetes Mellitus

We asked the respondents basic questions about DM. When queried to the cause of DM, 56 respondents (37.6%) knew that the absolute lack of insulin could cause DM, while only 13 (8.7%) realised that inadequate insulin could also lead to the disease. Thirty-nine (26.2%) knew that being overweight could cause DM, and 70 (47.0%) knew that eating unhealthy food could result in DM. Seven thought that drinking too much water could cause DM, but, fortunately, no-one believed witchcraft was to blame.

One question attempted to ascertain whether respondents knew what they could do to improve their sugar levels. Most, 103 (69.1%), stated that eating a healthy diet could improve blood sugar level. Half (n=75, 50.3%) knew that regular exercise could improve blood sugar level, while 53 (35.6%) understood that weight control could be beneficial. A total of 51 (34.2%) believe that the blood sugar level can be only be improved by taking medication.

When asked whether they have ever heard of glycated haemoglobin (HbA1c), 125 (86.2%) stated that they had never heard of it. It follows that 116 respondents (81.1%) admitted not knowing whether the HbA1c can be used to monitor the blood glucose over the preceding three months.

Knowledge of lifestyle modification

We asked respondents to grade their own perceived knowledge of lifestyle modification practices. Six respondents (4.2%) stated they have excellent knowledge, 40 (27.8%) indicated good, 82 (56.9%) said average, and 16 (11.1%) said they consider their knowledge as poor.

When asked who informed them about lifestyle modification practices, 141 respondents (94.6%) indicated their sources of knowledge as mainly healthcare personnel, only 11 (7.4%) from the media, while 5 (3.4%) said their relatives and friends were their sources.

Sixteen respondents (10.7%) indicated that lifestyle modification practices include healthy dietary habits, nine (6.0%) stated regular physical exercise as a form of lifestyle modification practice. In comparison, 130 (87.2%) respondents indicated that lifestyle modification practices included both healthy dietary habits and regular physical exercise.

Ten respondents (6.8%) felt that a diabetic patient should engage in physical exercise less than 15 minutes per day, 17 (11.6%) said it should be less than 30 minutes per day, 90 (61.2%) said at least 30 minutes per day, while 30 (20.4%) indicated that they did not know how long a diabetes patient should exercise.

As summarised in Table 1, most respondents (70.1%) agreed that patients with DM

should eat at least three evenly spaced meals per day. Almost all felt that patients with DM should limit their fat intake (94.6%), that they should limit intake of refined sugar (89.1%), and that low-fat milk is better than full cream (88.2%).

Attitude towards lifestyle modification

As summarised in Table 2, respondents agreed that engaging in physical exercise is important (87.8%) and that controlling your weight is vital (87.0%). But, more than half (53.1%) felt that modifying their diet is not essential.

The practice of lifestyle modification

In Table 3 the actual practice of lifestyle modification was indicated. Most (89.9%) stated they engage in some form of physical exercise. Just more than half said they follow a planned diet, but not many (35.6%) check their weight regularly.

When asked what type of exercise they participate in, most (72.2%) stated they engage in brisk walking, only eight (6.0%) cycle, 16 (12.0%) jog, and 7 (5.3%) engage in sporting activities. Gardening/farming was reported as activity of choice for 15 respondents (11.3%), while the remaining 26 (19.6%) stated they engage in other forms of exercise – including weight lifting.

Most respondents (n=107, 81.7%) stated that they exercise for more than 30 minutes.

The result showed that 83 respondents (63.4%) engage in physical exercise daily, 12 respondents (9.2%) exercise once weekly, 35 respondents (26.7%) at least three times weekly and one respondent (0.8%) once monthly.

In total, 80 respondents (53.6%) reported following a controlled and planned diet, while 62 (41.6%) do not.

When asked how often they follow their dietary recommendation, 6 (7.5%) stated once daily, five (6.3%) more than once daily, eight (10.0%) once weekly, 53 (66.2%) at least thrice weekly, four (5.0%) once monthly, while four (5.0%) did not specify.

From the responses, 52 (35.6%) stated that they monitor their weight regularly, while 94 (64.4%) do not.

Suggested barriers to lifestyle modification

We set out to identify barriers which may prevent Type 2 DM patients from engaging in

lifestyle modification. The respondents were asked to share their opinion on what obstructions may cause them to falter.

Regarding their participation in physical exercise: 61 (40.9%) reported being too heavy; 45 (30.2%) stated bad weather; seven (4.7%) said lack of exercise partners; four (2.7%) claimed criticism from others; 11 (7.4%) said they are too old; four (2.7%) stated the lack of exercise facilities; while eight (5.4%) attributed this to poor health. Other factors included poor vision (0.7%), and work-related issues (0.7%).

Barriers to adherence to recommended dietary plan: three (2.0%) indicated always eating out; 74 (49.7%) reported financial constraints; 20 (13.4%) stated low self-control; 22 (14.8%) claimed situation at home; seven (4.7%) indicated lack of information on the proper diet; one (0.7%) said lack of support at home; while 22 respondents (14.7%) specified other reasons including sitting at home.

Due to the smaller than intended number of respondents, no significant associations could be made between the demographics, BMI and KAP regarding lifestyle modifications.

DISCUSSION

Almost half of the respondents (49.3%) were diagnosed with diabetes for more than ten years before the study. Patients who lived with DM for an extended period, combined with hypertension and poor glycaemic control, tend to experience an onset of microvascular complications.[28] Thus, many of the respondents in this study will benefit from regular screening for DM-related complications.

Majority of the respondents showed poor knowledge regarding the cause of DM. Fortunately, most respondents understood the importance of a healthy diet and regular exercise, even though only some agreed that weight control could improve their blood sugar level.

Knowledge, attitude and practice of lifestyle modification

When respondents were asked to grade their own perceived level of knowledge, more than half (56.9%) considered their knowledge of lifestyle modification practices as average.

An overwhelming majority of the respondents (94.6%) knew about lifestyle modification from healthcare personnel. In the study from Ethiopia, 58.62% reported their source of

information on lifestyle modification to be from healthcare services.[25] This comparison could possibly have highlighted a successful awareness drive in the Free State province. But, in order to make that conclusion, we should have looked at the respondent's actual knowledge.

Majority of the respondents (87.2%) agreed that lifestyle modification practices included both healthy dietary habits and regular physical exercises. A study in Botswana found that only 48.1% of the respondents understood the recommendations regarding lifestyle measures as referring to both healthy dietary habits and exercise.[29]

A decent number of respondents showed knowledge of lifestyle modification practices with regards to duration of physical exercise as 61.2% were aware that Type 2 DM patients should engage in physical exercise for at least 30 minutes per day. This finding contrasts with a study from Sri Lanka, in which most of the participants did not understand this requirement.[30]

Most of the respondents seem to have good knowledge of lifestyle modification practices with regards to healthy dietary habits. As such, most respondents were aware that they should eat at least three evenly spaced meal per day, but also that they should limit their fat and refined sugar intake.

The good knowledge of lifestyle modification practices among the respondents could be explained by the smaller sample size – or perhaps the higher literacy level compared to the participants in the other studies. Several factors are known to influence the level of knowledge: literacy level, training received, availability of information, and the period patients have lived with the disease.[31]

Almost all the respondents displayed a positive attitude towards physical exercise. Unfortunately, it seems they did not share the same enthusiasm for dietary adjustments. Despite this, an overwhelming majority of the respondents (94.0%) in this study showed positivity towards the need for stringent weight control. Unfortunately, this does not seem to carry over to the practice.

Although almost all respondents stated that they engage in exercise – most of whom indicated brisk walking – only 63.3% engaged in regular physical exercise.

More than half stated they were attempting to follow a controlled and planned diet, but the overall practice of dietary modification was found to be poor. This may not come as a surprise, considering that more than half of the respondents showed a poor attitude towards a dietary modification.

In an attempt to discover which factors act as barriers for Type 2 DM patients, the main obstruction seems to be being too overweight. This is hardly surprising considering that two-third of the respondents presented as obese. Ball et al., in their study, reported that feeling 'too fat to exercise' is a common problem among the overweight – particularly among women.[32]

Thirty per cent of the respondents reported lousy weather as a barrier to engaging in physical exercise. The Free State province is known to be very cold during the winter, and quite hot and dry during the summer.

Half of the respondents reported financial constraints to be the reason for non-adherence to recommended dietary plan. This could be due to the respondents being either unemployed or pensioners. Financial constraints may also explain the respondents' earlier reported poor attitude to dietary modification since adjusting their diet might further put a strain on their pockets. Financial difficulties, food insecurity, as well as the cost of appropriate foods, are all well-known barriers to following dietary recommendations.[33]

It was found that even though most of the respondents have a positive attitude to weight control, about two-thirds of the respondents do not monitor their weight regularly.

Despite showing decent knowledge, and even attitude – bar the dietary modification – the actual practice of lifestyle modifications is insufficient. Combined with obese results from the BMI measurement, it seems that adequate knowledge and attitude do not automatically carry over to practice. This could mean that making patients aware of lifestyle modifications may not be enough to motivate them.

Study limitations

The small size of the sample makes it difficult to generalise the findings. Still, we do believe the discussion for a solution to improve compliance is relevant and should be initiated.

Selection-, translation-, and respondent bias may have influenced some of the outcomes.

Conclusion

The findings from this study showed that even though most respondents displayed adequate knowledge of lifestyle modification practices, most had a poor attitude towards making the necessary changes, and few implemented these changes.

The results were especially troublesome with most of the respondents presenting either as obese or overweight.

The barriers stated by the respondents included being too heavy to exercise, financial constraints, poor self-discipline, and even bad weather.

There is a need to address the poor attitude to dietary modification and the sub-optimal engagement in physical exercise among these patients. The importance of correctly engaging in lifestyle modification practices needs to be regularly emphasised by health professionals. Continuous support and motivation are required to improve compliance to reach optimal control of their blood glucose, in doing so, helping prevent potential complications.

Recommendations

Individuals with DM should be encouraged to participate in hospital organised multi-disciplinary DM self-management education programmes. These programmes are beneficial for facilitating the necessary knowledge and skills.

DM patients must be encouraged to share their challenges with regards to lifestyle modification practices.

The importance of healthy dietary habits and regular physical exercise must be continuously emphasised especially to obese or overweight patients. Many of the patients will benefit from brief behavioural change counselling; therefore, the doctors and other healthcare professional attending to these patients must receive training on this essential skill.

Other members of the health team should be included and frequently consulted. Dietitians can assist patients in identifying affordable meal plans. Patients should be promptly referred to a psychologist when they require assistance.

Informational pamphlets on the different lifestyle modification practices should be readily available at clinics.

What is already known on this topic

- Type 2 DM is a major public health burden globally.

- Uncontrolled DM often results in several short- and long-term complications.

- DM patients need to modify their lifestyle to reach optimal control of their blood glucose.

What this study adds

- Patients display adequate knowledge.

- Patients display poor attitude and practice regarding lifestyle modification.

- Continuous reminder and encouragement are required.

Authors' contributions

PIP initiated the study, prepared the proposal, captured and interpreted data, before preparing the manuscript. WJS acted as supervisor, providing guidance and assistance throughout. FCR assisted with proposal development, ethical clearance, data analysis, and manuscript preparation. JB provided administrative, developmental and technical support, and assisted with finalising the manuscript.
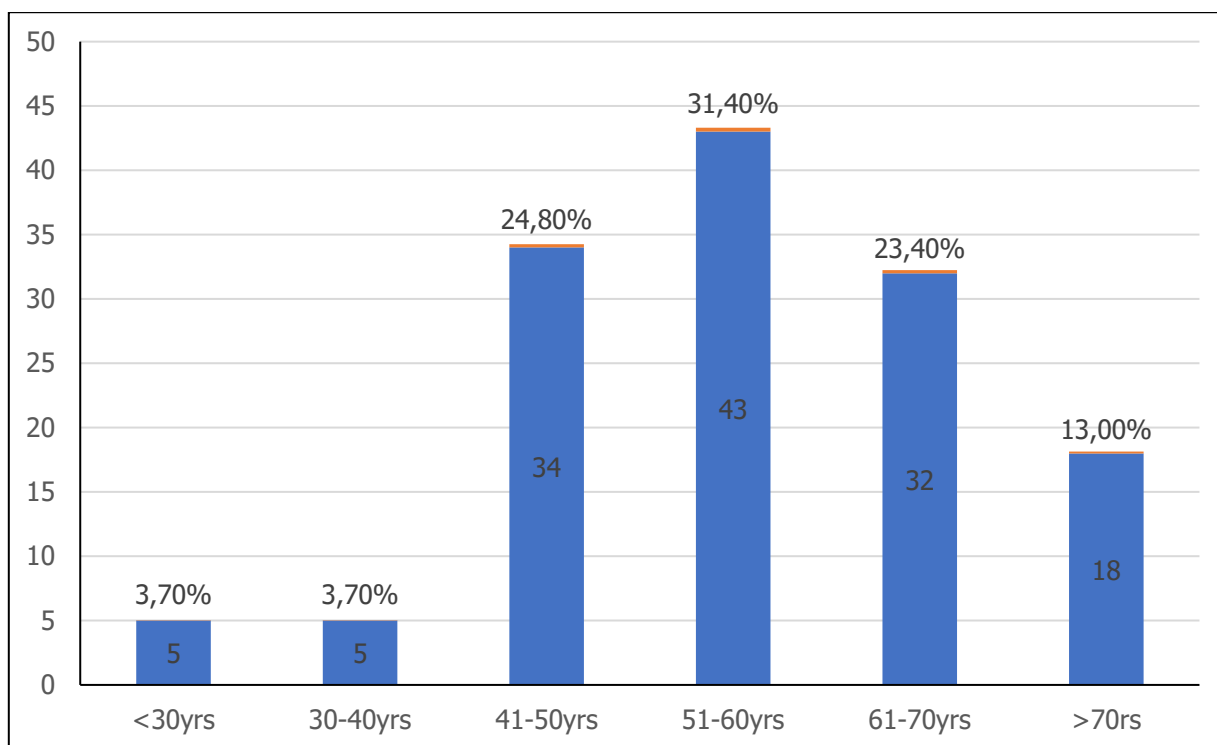
Acknowledgements

Tables and figures

Figure 1: Age distribution of respondents (n=137)
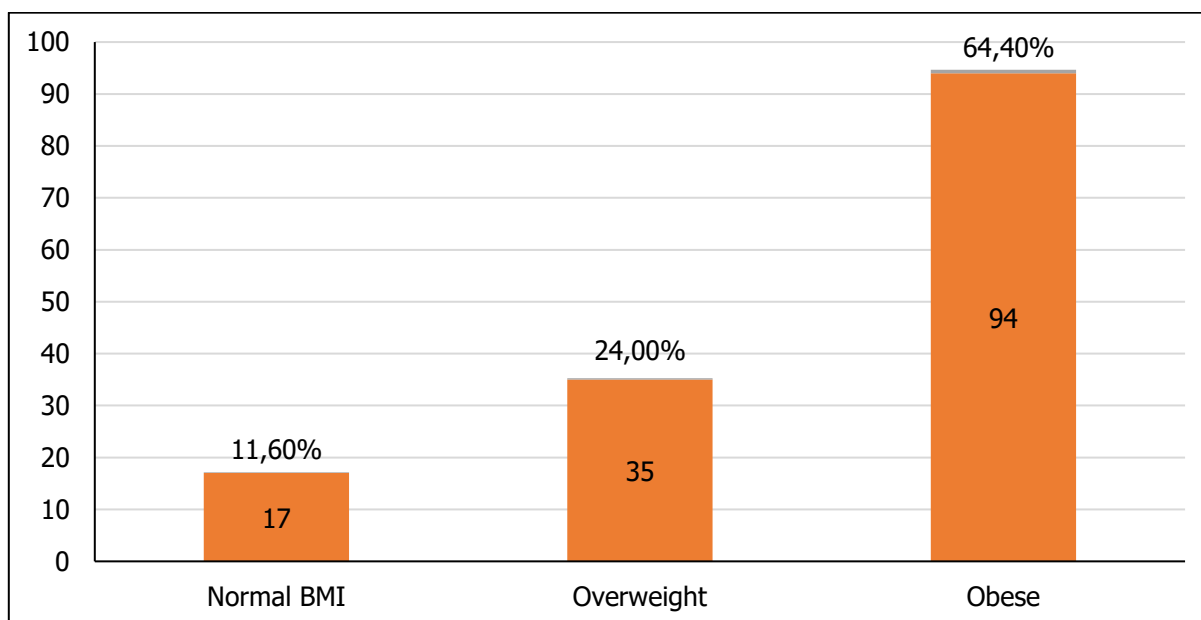
Figure 2: BMI distribution of respondents (n=146)

Table 1: Knowledge of healthy diet

	Agree	Disagree	Not sure
Should eat at least three evenly spaced meals (n=147)	70.1%	15.7%	14.3%
Should limit fat intake (n=147)	94.6%	4.1%	1.4%
Should limit intake of refined sugar (n=147)	89.1%	2.7%	8.2%
Low-fat milk is better than full cream (n=145)	88.2%	6.9%	4.8%

Table 2: Attitude towards the importance of Lifestyle Modification (n=147)

	Strongly disagree	Disagree	Not sure	Agree	Strongly Agree
Physical exercise	1.4%	0.7%	3.4%	87.8%	6.7%
Diet modification	3.4%	53.1%	7.5%	30.6%	5.4%
Weight control	3.4%	0%	2.1%	87.0%	7.5%

Table 3: Practice of Lifestyle Modification

	Yes	No
Engage in physical exercise (n=148)	89.9%	10.1%
Follow a controlled and planned diet (n=142)	56.3%	43.7%
Monitor weight regularly (n=146)	35.6%	64.4%

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CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

3.1. CHAPTER FOREWORD

In Chapter 2 an article was prepared in a publishable format for the Pan African Medical Journal. The article included an abbreviated introduction (and literature study), aim, methodology, results, discussion and conclusion.

In this chapter, concluding remarks and recommendations will be made.

3.2. CONCLUSION

3.2.1. Objectives of the study

The objectives of this project were:

- To determine the socio-demographic characteristics of the patients with Type 2 DM attending the outpatient department (OPD) at the National District Hospital.

- To determine the knowledge, attitude and practice of the lifestyle modification concerning Type 2 DM with regards to dietary modifications and regular physical exercise.

3.2.2. Findings

The findings from this study were:

- The mean age of the respondents was 56, with most respondents being female. Half

of the participants were married, and most completed only primary school.

- Majority of the respondents are either obese or overweight.

- Even though many of the respondents have good knowledge of lifestyle modification practices, there is a poor attitude to dietary modification

- The practice of lifestyle modifications among the respondents is poor.

- Barriers to adoption of lifestyle modification practices included respondents being too heavy to exercise, financial constraints, poor self-discipline and lousy weather.

- There is the need to address the poor attitude to dietary modification and the sub-optimal engagement in physical exercise among the patients.

- There is also the need to regularly re-emphasise to patients the importance of not only engaging in the lifestyle modification practices but also the need to do it correctly. Proper practices are necessary to be efficient to bring about the desired purpose, which is the optimal control of their blood glucose – by so doing, prevention of the potential complications associated with uncontrolled diabetes mellitus.

3.2.3. Limitations of the study

- The small size of the sample makes it difficult to generalise the findings in this study.

- There were few similar studies to compare with on lifestyle modification among Type 2 DM patients.

- Since some of the findings were self-reported by the respondents, it makes this difficult to verify.

- The questions on the knowledge of lifestyle modifications were mostly closed-ended. Thus the patients may have guessed the correct answer. This may affect the true assessment of knowledge among the respondents.

- The findings in this study may be more relevant to family medicine, considering that it was done in a primary healthcare setting.

3.3.   RECOMMENDATIONS

- There is a need to improve the practices of the patients attending the clinic with regards to lifestyle modifications.

- It is recommended that individuals with diabetes should participate in hospital organised multi-disciplinary diabetes self-management education programs to facilitate the knowledge, skills and ability necessary for diabetes self-care.

- Importance of healthy dietary habits and regular physical exercise must be continuously emphasised especially to the obese/overweight patients.

- It is strongly asserted that many of the patients will benefit from brief behavioural change counselling; therefore, the doctors and other healthcare attending to these patients must be trained on this essential skill.

- The dietitians must be regularly consulted to assist the patients in identifying affordable meal plans.

- Patients that may require assistance from the psychologist should be identified and referred promptly.

- Pamphlets with information and instructions on the different lifestyle modification practices can be made and given to the patients attending the clinic.

- Patients must be encouraged to share their challenges with regards to lifestyle modification practices.

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APPENDICES

Appendix A: Questionnaires

Appendix B: Patient information sheet

Appendix C: Consent form

Appendix D: University of Free State Health Sciences Research Ethics Committee
approval letter

Appendix E: Free State Department of Health permission

APPENDIX A: QUESTIONNAIRE

Dear Sir/Ma,

You are hereby invited to participate in this study on the knowledge, attitude and practice of lifestyle modification among patients with Type 2 Diabetes Mellitus.
If you decide to participate, please sign the consent form and complete the questionnaire.

Identification number: _____

SECTION A: SOCIODEMOGRAPHICS
Please tick the appropriate response inside the box.

1. Please indicate your sex.
   - ☐ Male
   - ☐ Female

2. Please write down your age _____

3. Please indicate your marital status.
   - ☐ Single
   - ☐ Married
   - ☐ Divorced
   - ☐ Separated
   - ☐ Widowed
   - ☐ Co-habiting

4. Please indicate what your highest educational level is? _____

5. Please indicate your current employment status
   - ☐ Employed
   - ☐ Unemployed
   - ☐ Pensioner
   - ☐ Housewife
   - ☐ Student

6. Do you currently smoke cigarettes?
   - ☐ Yes
   - ☐ No

7. Do you currently drink alcohol?
   - ☐ Yes
   - ☐ No

SECTION B: GENERAL KNOWLEDGE OF DIABETES MELLITUS
Please tick the appropriate response inside the box.

8. When were you diagnosed with diabetes?
   ☐ 1—3 years ago
   ☐ 4—6 years ago
   ☐ 7—9 years ago
   ☐ 10 years or longer

9. Which of the following may cause diabetes mellitus?
 (Please tick all applicable response)
   ☐ Lack of insulin production in the body
   ☐ Inadequate insulin production in the body
   ☐ Witchcraft
   ☐ Being overweight
   ☐ Drinking too much water
   ☐ Eating unhealthy food such as fast foods

10. What treatment are you currently taking for diabetes?
   ☐ Oral hypoglycaemic
   ☐ Insulin
   ☐ Combination of insulin and oral hypoglycaemic
   ☐ Others, (Please specify) _____

11. How can you improve your blood sugar? Please tick all that is applicable.
   ☐ By eating healthy diet
   ☐ Regular exercise
   ☐ Weight control
   ☐ Only by taking medication

SECTION C: KNOWLEDGE OF HbA1c
12. Are you aware of the term HbA1c (glycated haemoglobin)?
   ☐ Yes
   ☐ No

13. HbA1c monitors the blood glucose over the preceding 3months
   ☐ Yes
   ☐ No
   ☐ I don't know

14. What is the target HbA1c value?
   ☐ Less than 6.5%
   ☐ Between 7% and 10%
   ☐ More than 10%
   ☐ I don't know

15. Do you know your last HbA1c?
☐ Yes
☐ No

SECTION D: KNOWLEDGE OF LIFESTYLE MODIFICATIONS
Please tick the appropriate response inside the box

16. How would you personally grade your knowledge of lifestyle modification practices
recommended for people with diabetes?
☐ Poor
☐ Average
☐ Good
☐ Very good

17. How did you know about lifestyle modification practices?
☐ From Health care personnel (doctors, nurses, dietitian)
☐ The media (newspaper, magazine, television, radio, internet)
☐ Relatives and friends
☐ Others. Please specify

18. Please indicate your understanding of lifestyle modification practices.
(Tick all that is applicable)
☐ Healthy dietary habits
☐ Regular physical exercise
☐ Both healthy dietary habits and regular physical exercise

19. How often should a diabetic patient exercise (tick the appropriate response)
☐ Less than 15minutes per day
☐ Less than 30minutes per day (or less than 150minutes per week)
☐ More than 30minutes per day (or more than 150minutes per week)
☐ I don't know

20. Patients with diabetes should eat at least 3 evenly spaced meals per day.
☐ Yes
☐ No
☐ Not sure

21. Patients with diabetes should limit fat intake in their food?
☐ Yes
☐ No
☐ Not sure

22. Patients with diabetics should always limit their intake of refined sugar
   ☐ Yes
   ☐ No
   ☐ I am not sure

23. Drinking low-fat milk is better than drinking full cream milk?
   ☐ Yes
   ☐ No
   ☐ I am not sure

SECTION E: ATTITUDE TO LIFESTYLE MODIFICATIONS
Please tick the appropriate response in the box

24. People with diabetes should exercise regularly
   ☐ Strongly disagree
   ☐ Disagree
   ☐ Not sure
   ☐ Agree
   ☐ Strongly agree

25. People with diabetes should adjust their diet
   ☐ Strongly disagree
   ☐ Disagree
   ☐ Not sure
   ☐ Agree
   ☐ Strongly agree

26. People with diabetes should control their weight
   ☐ Strongly disagree
   ☐ Disagrees
   ☐ Not sure
   ☐ Agrees
   ☐ Strongly agree

SECTION F: PRACTICE OF LIFESTYLE MODIFICATIONS
Please tick your response in the appropriate box

27. Do you engage in any form of physical exercise as part of lifestyle modification
   ☐ Yes
   ☐ No

If you answered YES, please go to question 28
If you answered NO, please go to question 31

28. In what kind of physical exercises do you participate?
    ☐ Brisk walking
    ☐ Cycling
    ☐ Jogging
    ☐ Sport activities
    ☐ Gardening/farming
    ☐ Others _____

29. What is the usual duration of your physical exercise per session?
    ☐ Less than 10minutes
    ☐ 10−19minutes
    ☐ 20−29minutes
    ☐ 30minutes and above _____

30. How often do you engage in physical exercise?
    ☐ Daily
    ☐ Once weekly
    ☐ At least thrice weekly
    ☐ Once monthly
    ☐ Other_____

31. Do you follow a controlled, planned diet?
    ☐ Yes
    ☐ No

   If you answered YES, please go to question 32
   If you answered NO, please go to question 34.

32. What kind of planned diet do you practice? (You may tick more than one option)
    ☐ High starch and fibre diets
    ☐ Low saturated fat and calorie intake
    ☐ Fruits and vegetables
    ☐ Regulated alcohol intake and smoking cessation
    ☐ Eat more of sugar, carbohydrate and fat meals
    ☐ Eat any kinds of food
    ☐ Other _____

33. How often do you follow your dietary recommendations?
    ☐ More than once daily
    ☐ Only Once daily
    ☐ Once weekly
    ☐ At least thrice weekly
    ☐ Once monthly
    ☐ Other_____

SECTION G: BARRIERS TO ADOPTION OF LIFESTYLE MODIFICATION PRACTICES
Please tick the option(s) that describes your reason for not adopting or practising lifestyle modification practices

34. From the following list, please indicate reason(s) for not engaging in physical exercise
    ☐ Too busy schedule
    ☐ Bad weather
    ☐ Lacking exercise partner
    ☐ Criticism (presence of others makes you uncomfortable)
    ☐ I am too old
    ☐ Lack of exercise facilities
    ☐ Poor health
    ☐ Others _____

35. From the following list, please indicate reason(s) for not adhering to recommended dietary plan
    ☐ I am always eating out
    ☐ Financial constraints (I can't afford the healthy diets)
    ☐ I have poor self-control
    ☐ Situations at home (e.g. we eat from a common pot at home)
    ☐ Lack of information on proper diet
    ☐ Lack of support at home
    ☐ Other(specify) _____

36. Do you monitor your weight regularly?
    ☐ Yes
    ☐ No

ANTHROPOMETRIC MEASUREMENTS
Weight (Kg) = _____
Height (m) = _____

APPENDIX B: PATIENT INFORMATION SHEET

PATIENT INFORMATION SHEET

TITLE OF STUDY: To determine the knowledge, attitude and practice of lifestyle modification among Type 2 Diabetes patients at the outpatient department of the National district hospital.

Dear Participant,

My name is Paul Ifeanyi Peter. I am a medical doctor and MMed (family medicine) student at the University of Free State.

I wish to invite you to participate in the study that I am conducting to determine the knowledge, attitude and practice of lifestyle modification among patients with type 2 diabetes mellitus attending the outpatient department at the National District Hospital.

There is no financial remuneration attached to your participating in this study. Your participation in the study is voluntary, and your refusal to participate will not involve any penalty, punitive measures or loss of benefits which you are entitled to. You are free to discontinue participation in the study at any time without penalty or loss of benefits.

The study will involve answering a questionnaire about your socio-demographic data, knowledge, attitude and practices with regards to lifestyle modifications for the control of blood sugar. There will also be a measurement of your weight, height and calculation of your body mass index (BMI).

The body mass index (BMI) is a person's weight in kilogram (kg) divided by his or her height in meters squared. By using the body mass index, it can be determined if a person is underweight, overweight, obese or has the right weight for his or her height.

If a person's body mass index (BMI) is suggestive of being overweight or obese, this may put the person at the risk of developing different diseases, including Type 2 Diabetes Mellitus. It also makes the control of the blood sugar (glucose) difficult among already diagnosed diabetic patients, therefore, maintaining a healthy body mass index (BMI) is complementary to ensuring the proper management of the Type 2 Diabetes Mellitus.

I will also like to inform you that your name will not be used in the study. This is to ensure confidentiality. You can reach me on this cell phone number ▆▆▆▆▆▆

Thank you

Dr Peter PI

APPENDIX C: INFORMED CONSENT FORM

CONSENT FORM

TITLE OF STUDY: To determine the knowledge, attitude and practice of lifestyle modification among Type 2 Diabetes patients at the outpatient department of the National district hospital.

You are hereby invited to participate in a research study being conducted by Dr Paul Peter from the Department of Family Medicine, University of Free State.

The purpose of the study is to determine the knowledge, attitude and practice of lifestyle modification among patients with Type 2 Diabetes Mellitus.

The findings will reveal how our patients perform with regards to complimenting their treatment with adjustments to their diet and regular physical exercises.

It is a questionnaire-based study which will take you about 20 to 30 minutes to complete. There will also be physical measurements of your weight and height.

There is no cost involved to you, and there is no remuneration for your participation in this research. Your participation is voluntary, and you will not be penalised or lose any benefits if you refuse to participate or decide to terminate participation. Your identity will also be kept confidential.

You have been informed about the study by _____

You may contact Dr PI Peter at the cellphone number ▉▉▉▉▉▉▉ any time you have questions about the research.

You may also contact the Secretariat of the Health Sciences Research Ethics Committee, the University of Free State at the telephone number (051) 4017794/5 if you have questions about your rights as a research subject.

If you agree to participate, you will be given a signed copy of this document as well as the participant information sheet, which is a written summary of the research.
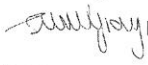

The research study, including the above information, has been verbally described to me.

I understand what my involvement in the study means, and I voluntarily agree to participate.

-----------------------------------   ---------------------------------

Signature of Participant   Date

APPENDIX D: UNIVERSITY OF THE FREE STATE HEALTH SCIENCES RESEARCH ETHICS COMMITTEE APPROVAL LETTER

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

UFS·UV
HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE

Health Sciences Research Ethics Committee

07-Aug-2018

Dear **Dr Paul Peter**

Ethics Clearance: **A STUDY OF THE KNOWLEDGE, ATTITUDES AND PRACTICE OF LIFESTYLE MODIFICATIONS AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS ATTENDING THE OUTPATIENT DEPARTMENT AT THE NATIONAL DISTRICT HOSPITAL, BLOEMFONTEIN, FREE STATE**
Principal Investigator: **Dr Paul Peter**
Department: **Family Medicine (Bloemfontein Campus)**

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is: **UFS-HSD2017/0772**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
IRB 00006240; REC 230408-011; IORG0005187; FWA00012784

APPENDIX E: FREE STATE DEPARTMENT OF HEALTH PERMISSION

health
Department of
Health
FREE STATE PROVINCE

26 July 2018

Dr P Peter
Dept. Of Family Medicine
UFS

Dear Dr P Peter

Subject: A study of the knowledge , attitude and practice of lifestyle modifications among patients with type 2 diabetes mellitus attending the outpatient department at the National District Hospital , Bloemfontein, Free State

- Please ensure that you read the whole document, Permission is hereby granted for the above – mentioned research on the following conditions:

- Participation in the study must be voluntary.

- A written consent by each participant must be obtained.

- Serious Adverse events to be reported to the Free State department of health and/ or termination of the study

- Ascertain that your data collection exercise neither interferes with the day to day running of the National Hospital nor the performance of duties by the respondents or health care workers.

- Confidentiality of information will be ensured and please do not obtain information regarding the identity of the participants.

- **Research results and a complete report should be made available to the Free State Department of Health on completion of the study (a hard copy plus a soft copy).**

- Progress report must be presented not later than one year after approval of the project to the Ethics Committee of the University of Free State and to Free State Department of Health.

- Any amendments, extension or other modifications to the protocol or investigators must be submitted to the Ethics Committee of the Free State and to Free State Department of Health.

- **Conditions stated in your Ethical Approval letter should be adhered to and a final copy of the Ethics Clearance Certificate should be submitted to sebeelats@fshealth.gov.za or lithekom@fsheatlh.gov.za before you commence with the study**

- No financial liability will be placed on the Free State Department of Health

- Please discuss your study with the institution manager/CEOs on commencement for logistical arrangements

- Department of Health to be fully indemnified from any harm that participants and staff experiences in the study

- Researchers will be required to enter in to a formal agreement with the Free State department of health regulating and formalizing the research relationship (document will follow)

- You are encouraged to present your study findings/results at the Free State Provincial health research day

Trust you find the above in order.
Kind Regards

Dr D Motau
HEAD: HEALTH
Date: 27/07/18

Head : Health
PO Box 227, Bloemfotein, 9300
4th Floor, Executive Suite, Bophelo House, cnr Maitland and, Harvey Road, Bloemfotein
Tel: (051) 408 1646 Fax: (051) 408 1556 e-mail:khusemj@fshealth.gov.za@fshealth.gov.za/chikobvup@fshealth.gov.za

www.fs.gov.za

APPENDIX F: PAMJ AUTHOR GUIDELINES

Instructions for authors

1. General

Aim: The PAMJ Clinical Medicine was created to highlight the rich output of clinical practice across Africa. **Scope:** We publish clinical case reports, case series, images, reviews, commentary, opinions and research articles from the broad spectrum of clinical medicine and clinical research.

PAMJ is an online open-access peer-reviewed journal focusing on clinical medicine. Authors are encouraged to submit original research, systematic reviews and short reports from the field of clinical medicine.

Prior to submitting your first article, you should apply for a user name and password. PAMJ offers a user-friendly process for online submission through the PAMJ Manuscript Hut™.

Short reports will include case report, commentary, conference proceedings, editorials, viewpoints, and letter to the editors. Short Communications should be no longer than 1500 words. They must have an abstract and references, but the main body of the text does not have to follow the original research's format. We give privilege to invited reviews and encourage prospective authors of systematic reviews to discuss the project with the editorial office before development.

Manuscripts will be initially screened by an editor for adherence to the journal's instructions or identification of gross deficiencies. At this stage, the corresponding author can be contacted by the editorial office for clarification, or the manuscript can be rejected. Once this initial screening is completed, manuscripts are sent to two-three referees; if appropriate, a statistical reviewer is involved. On average, we will report back to authors within 6 weeks with a first decision. Authors should, however, note that the average duration from submission to publication is roughly 3 months (1 - 6 months). We encourage authors not to contact the editorial office less than 6 weeks after the initial

submission. We discourage and will ignore requests by authors to speed up the publication process for a particular manuscript.

Manuscripts must be submitted by one of the authors of the manuscript, and should not be submitted by anyone on their behalf. The submitting author takes responsibility for the article during submission and peer review.

Languages of publication are **English** and **French**. All manuscripts in French should include an **English translation of the title, abstract and keywords**. Poor English of French do not prevent acceptance provided the paper's content is of high scientific quality; we however strongly encourage authors to have their manuscript reviewed by a fluent English speaker and writer to improve its language contents prior to submission. All accepted manuscripts are copy-edited.

To facilitate rapid publication and to minimise administrative costs, PAMJ accepts only online submission. The submission process is compatible with all the latest browsers. Ensure that javascript is enabled in your browser.

Files can be submitted as a batch. The submission process allows the authors to interrupt it at any time, and continue where they left off at their return on the site.

During submission, you will be asked to provide a cover letter. Use this to explain why your manuscript should be published in the journal and to elaborate on any issues relating to our editorial policies detailed in the instructions for authors.

Assistance with the process of manuscript preparation and submission is available from the customer support team (services@panafrican-med-journal.com). We also provide a collection of links to useful tools and resources for scientific authors, on our resources for authors page.

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2. Submission of a paper

Online submission

PAMJ only accepts online submission. Click here to access the Online Manuscript Submission System. Simple onscreen instructions are provided. If you experience problems with the online submission system, send an e-mail to editor@panafrican-med-journal.com. **Do not send your manuscript to that e-mail address**; it will be ignored.

Conflicts of interest

Will be mentioned in the manuscript as "Authors declared they have no conflicts of interest".

3. Organisation of a full-length research paper.

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Maximum length: 4000 words in the main text (i.e., excluding abstract, references, legends, tables and figures), four tables/figures maximum, and a structured abstract of 250 words plus up to 50 references.

Title page - This page should state: a) The title of the paper (include the study design if appropriate; for example: A versus B in the treatment of C: a randomised controlled trial; X is a risk factor for Y: a case-control study), b) Authors names (full name - no qualification. **Strictly follow this order: First Name, Middle name (if ever), Last Name. E.g., Paul Kevin Akuna**), c) institution(s) of origin, d) Corresponding author plus his/her address, telephone and fax number, e-mail address, e) Word count (for both abstract and the main text)

Abstract - The abstract of the manuscript should not exceed 250 words and must be structured into separate sections: **Background:** the context and purpose of the study; **Methods:** how the study was performed and statistical tests used; **Results:** the main findings; **Conclusion:** brief summary and potential implications. Please minimise the use of abbreviations and do not cite references in the abstract.

Keywords. Up to ten keywords (suitable for Index Medicus listing) should be provided at the end of the abstract.

Abbreviations a list of abbreviations is not accepted. Define abbreviations the first time they are used in the text and use them thereafter. No abbreviations in the abstract except for vary know ones.

Background The background section should be written from the standpoint of researchers without specialist knowledge in that area and must clearly state - and, if helpful, illustrate - the background to the research and its aims. Reports of clinical research should, where appropriate, include a summary of a search of the literature to indicate why this study was necessary and what it aimed to contribute to the field. The section should end with a very brief statement of what is being reported in the article.

Methods Sufficient information should be given to permit repetition of the experimental work. This should include the design of the study, the setting, the type of participants or materials involved, a clear description of all interventions and comparisons, and the type of analysis used, including a power calculation if appropriate.

Results - The results should be stated concisely without discussion and should not normally contain any references. The same data should not be presented in figures and tables. Do not repeat all the data that is set out in the tables or figures in the text; emphasise or summarise only important observations.

Discussion - The Discussion should deal with the interpretation of the results and not recapitulate them. We encourage authors to write their discussion in a structured way, as follows:a) statement of principal findings; b) strengths and weaknesses of the study; c) strengths and weaknesses in relation to other studies; d) discussion of important differences in results; e) meaning of the study; f) unanswered questions and future research.

Conclusion - The conclusion should provide a brief summary of the key findings, potential implications and the way forward.

***What is already known on this topic*:** include a maximum of 03 bullet points on what is already known on this topic.

***What this study adds*:** include a maximum of 03 bullet points on what your study adds.

Acknowledgements - Please acknowledge anyone who contributed towards the study by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include their source(s) of funding. Please also acknowledge anyone who contributed materials essential for the study. The role of a medical writer must be included in the acknowledgements section, including their source(s) of funding. Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements. Please list the source(s) of funding for the study, for each author, and for the manuscript preparation in the acknowledgements section. Authors must describe the role of the funding body, if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

Competing interest - Authors are responsible for recognising and disclosing conflicts of interest that might bias their work. They should acknowledge in the manuscript all financial support for the work and other personal connections. Authors are required to complete a declaration of competing interests. All competing interests that are declared will be listed at the end of published articles. Where an author gives no competing interests, the listing will read 'The author(s) declare that they have no competing interests'. When completing your declaration, please consider the following questions:

Financial competing interests

- In the past five years have you received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication

of this manuscript, either now or in the future? Is such an organisation financing this manuscript (including the article-processing charge)? If so, please specify.

- Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? If so, please specify
- Do you hold or are you currently applying for any patents relating to the content of the manuscript? Have you received reimbursements, fees, funding, or salary from an organisation that holds or has applied for patents relating to the content of the manuscript? If so, please specify.
- Do you have any other financial competing interests? If so, please specify.

Non-financial competing interests

- Are there any non-financial competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other) to declare in relation to this manuscript? If so, please specify.
- If you are unsure as to whether you or one your co-authors, has a competing interest, please discuss it with the editorial office.

Authors' contributions - In order to give appropriate credit to each author of a paper, the individual contributions of authors to the manuscript should be specified in this section. The Uniform Requirements for Manuscripts Submitted to Biomedical Journals (URM) of the International Committee of Medical Journal Editors (ICJME) recommends the following criteria for authorship (Learn more about the URM on Authorship and Contributorship):

- Authorship credit should be based on 1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content, and 3) final approval of the version to be published. Authors should meet conditions 1, 2, and 3.
- When a large, multicenter group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript (3). These individuals should fully meet the criteria for authorship/contributorship defined above, and editors will ask these individuals to complete journal-specific author and conflict-of-interest disclosure forms. When submitting a manuscript authored by a group, the corresponding author should clearly indicate the preferred citation and identify all individual authors as well as the group name. Journals generally list other members of the group in the Acknowledgments. The NLM indexes the group name and the names of individuals the group has identified as being directly responsible for the manuscript; it also lists the names of collaborators if they are listed in Acknowledgments.
- Acquisition of funding, collection of data, or general supervision of the research group alone does not constitute authorship.
- All persons designated as authors should qualify for authorship, and all those who qualify should be listed.

- Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content.

References - References must be numbered consecutively, in square brackets (like this [1], or this [2,3] or even this [4–7]), in the order in which they are cited in the text, followed by any in tables or legends. Reference citations should not appear in titles or headings. Each reference must have an individual reference number. Preferably, limit the number of references to 50. If automatic numbering systems are used, the reference numbers must be finalised, and the bibliography must be fully formatted before submission. We encourage authors to use a recent version of EndNote (version 5 and above) or Reference Manager when formatting their reference list, as this allows references to be automatically extracted. Examples of the PAMJ reference style are shown below. Please take care to follow the reference style precisely; references not in the correct style may be retyped, necessitating tedious proofreading.

We strongly advocate the use of **Zotero**, a free and open-source reference management software which is a very good alternative to expensive software like Reference Manager or EndNote.

Manuscripts not formatted according to the PAMJ style will be returned to the authors. An example is provided below (note the use of the dot after the author list, the title, the journal and the date).

1. Kirikou Thomas, Doe JA, Shaba KV, Kashawa Tuma. A sample of the PAMJ reference style as shown on the journal website. J Hist Fant. 2006; 76(11):204-212
2. Kirikou Thomas, Doe JA, Shaba Kevin, Kashawa TB. Another sample of the PAMJ reference style: as shown on the journal website. J Hist Fant. 2006; 76(12):212-228
3. Kirikou TA, Doe John, Shaba KV, Kashawa TB. Another sample of the PAMJ reference style: as shown on the journal website. J Hist Fant. 2006; 76:212-228

Formatting book references: Use the format below to reference a book

Author of the book. Title of the book. Year of publication. Publisher Location. Publisher name

Example: Fleiss JL. Statistical methods for rates and proportions - 3rd edition. 2003. Hoboken. J Wiley

NB: Note the use of dots to separate the sections of the book reference.

Formatting web references: Use the format below to reference a web page or a web site

Author of the page. Name of the source (if any). Year of data. URL. Date link accessed

Example: SAS Institute. SAS 9. http://support.sas.com/software/index.htm. Accessed 10 April 2005

NB: Note the use of dots to separate the sections of the web reference.

Supplementary material/Appendices (if any) - Submit any supplementary material to the editorial office by e-mail. The editorial office can also decide which material will be published as supplemental material.

Tables (if any) - General instructions for tables.

- Append tables at the end of your manuscript, after the reference section
- Maximum three tables per articles. If more tables are required, it will have to be justified
- Each table should fit on one page. No table overlapping over several pages. So no matter the size of the table, make sure it can comfortably fit on a single page (portrait or landscape)
- Elements inside the table should be contained within cells.

Figures (if any) - General instructions for figures.

- Include a legend for your images inside the main text, after the reference section
- Should be provided as separated files during the manuscript submission. Do not embed images within the main text.
- Major image formats are accepted, excluding BMP. (JPEG, PNG, TIFF)
- Provide high-resolution images, not tiny thumbnails. Image of poor quality will be rejected.
- The size of the uploaded image is limited to 4 MB.

Files must be named with the three-letter file extension appropriate to the file type (eg, .jpeg, .png). You will be asked to provide figure labels during the submission process. (The label is the small comment that usually goes with the figure. Example: **Figure 1:** Prevalence of diabetes in the study population aged 18 years and above. Findings of the TRICARE Diabetes Study, Uganda, 2006.)

If you use excel to generate your graph, avoid 3D, crowded axes, coloured background, strong grid etc.. Use Tahoma font (size ten maximum) for all items in your graphs (Title, legend, axes etc..). Expand your Excel graph to obtain a large image, copy and paste it in Paint (Microsoft Paint), crop any white border and save the image as PNG or JPEG.

Submit this image for your manuscript (don't forget to include the legends for each figure inside the main manuscript)
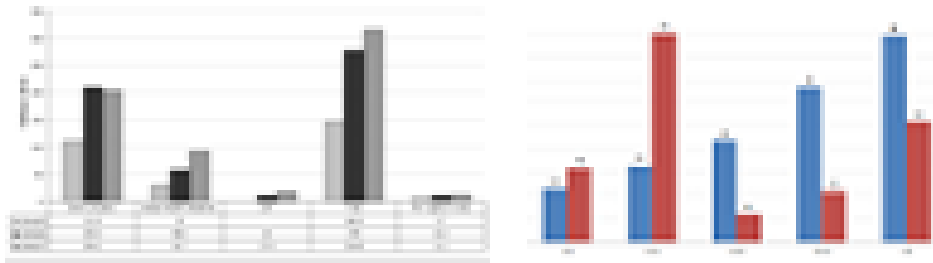
Final notes on manuscripts quality

When finalising your research manuscript, ask yourself the following questions

1. Is your study aims clearly stated and logical?
2. Is the rationale/justification for conducting the study clear?
3. Are the methods described in sufficient detail so that the experiment could be reproduced?
4. Is the study design robust and appropriate to the stated aim?
5. Are the conclusions drawn supported by the data?
6. Is the discussion section critical and comprehensive?
7. Are the references appropriate in number and up-to-date?
8. Are statements supported appropriately by parenthetical citations?