

PATIENT-REPORTED KNOWLEDGE, PERCEPTION AND PRACTICE,
REGARDING DIABETIC SELF-MANAGEMENT SKILLS AND
BEHAVIOURS, IN MOKOPANE PROVINCIAL HOSPITAL

INYANG ODIONG ETUKUDO; MBBCh(UNICAL), DCH(SA)

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STUDENT NUMBER: 0316862A

SUPERVISOR: PROFESSOR IAN COUPER; BA(WITS), MBBCH(WITS), M FAM
MED(MEDUNSA), FCFP(SA)

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DECLARATION

I INYANG ODIONG ETUKUDO declare that this research is my original work. It is being submitted for the degree of Master of Family Medicine (M FAM MED) at the University of the Witwatersrand, Johannesburg.

Part or whole of this report has not been submitted for any other degree at the University of the Witwatersrand or any other university for any purpose. Neither do I intend to do so in the future. All the sources I have used or quoted have been appropriately acknowledged by means of complete referencing.

.....

.....day of2013

DEDICATION

In Memoriam:

ELDER. O.K ETUKUDO. For the years of sacrifice and love. My mentor, pillar and strength.

AND

MRS ENO ETUKUDO. Your love and encouragement brought me this far.

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I wish to express my sincere gratitude to my family, friends, colleagues too numerous to mention who in one way or the other contributed to my success through the programme.

In particular I would like to express my gratitude especially to the following;

- Professor Ian Couper, my supervisor, for his guidance, patience, support, and the encouragement he provided to see me through the programme.
- Mokopane hospital management, for granting me permission to carry out this research
- The Limpopo provincial department of health for giving me permission to conduct the study.
- My husband and partner in the journey, Dr.Owo I Owo for his love and support.
- My children: Enene, Mimi, and King for affording me the joy of motherhood.

INYANG ODIONG ETUKUDO

ABSTRACT

BACKGROUND: Diabetes Mellitus is a chronic metabolic disease that is a global problem. The increasing incidence and prevalence globally is of great concern. This condition is a long-term challenge, which requires behavioural change and adherence to management to maintain glycaemic control. Good knowledge of diabetes influences adequate self-care practices, glycaemic control, and overall diabetes management. Incorrect self-care practices impair the achievement of the desired treatment targets.

AIMS AND OBJECTIVES: This study aimed to determine patient-reported knowledge, perceptions and practice regarding diabetes self-management skills and behaviour through assessing knowledge, reported practice, and perceptions of diabetic self-management among adult patients with diabetes attending the diabetic clinic at Mokopane provincial hospital, and determining the strength of associations between knowledge, reported practice, perception of self-care and glycaemic control.

DESIGN AND METHODS: This was a descriptive cross sectional study using a questionnaire on knowledge, perception and self-management practices. Participants were recruited consecutively until the sample size of 76 was reached. Data was analysed using the statistical software SPSS version 17.0.

RESULTS: There were more females (71%) and most of the participants (39%) were above 60 years of age. The majority of participants (87%) had a HbA1c of >7%, with a mean HbA1c of 10.2%. Diabetic knowledge was poor. A majority of the participants answered less than 50% of the knowledge questions correctly. More than half of the respondents could not answer the diabetes knowledge questions correctly. The proportion of participants, who responded positively to 3 of the 4 questions to assess knowledge and perception of self-care, was in the range of 70-90%. 86% of participants indicated that they had adjusted their diet since being diagnosed with diabetes. 48% of participants reported that they always adhered well to medication. Most of the participants (81%) indicated that they do not smoke. Responses to other questions to assess practice of self-care showed that only 29% of the participants always practiced the self-care activities stated. There was no statistically significant association between knowledge of diabetes, practice, perception of self-care and glycaemic control (HbA1c).

CONCLUSION: General knowledge of diabetes and practice of self-care were inadequate, but perception about diabetes self-care was good. Although many participants had altered their diet, their diabetic control was poor. Poor general knowledge of diabetes, not practicing self-care and poor diabetic control were found in the majority of participants although there was no statistically significant association among these measures.

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CHAPTER 1

INTRODUCTION

1.1 Background

Diabetes Mellitus is a chronic metabolic disease that affects people in all countries. The increasing incidence and prevalence globally is of concern. Despite the considerable progress in treatment of diabetes over the years, it is still among the most common causes of morbidity and mortality worldwide.¹ The prevalence of diabetes worldwide is increasing especially in developing countries with India in the lead.² This disease leads to reduced productivity and quality of life of patients, on a global scale the health care cost is enormous.^{1,3}

As a result of population growth, unhealthy diets, obesity, aging, urbanization and sedentary lifestyles, the prevalence of diabetes is increasing worldwide.¹ In 2010, estimates showed that at least 285 million adults were suffering from diabetes, with a global prevalence rate of 6.4%. These figures were expected to increase to 439 million and 7.7% respectively by 2030.⁴ In 2011, it was estimated that 147 million adults in Africa had diabetes. South Africa had one of the highest numbers of people with diabetes (1.9 million), and about 6.1% of deaths in Africa were attributed to diabetes.⁵ It was also estimated that more than 75% of people with diabetes will reside in developing countries by 2025.⁶ The prevalence of diabetes in South Africa varies with different population groups, age and sex. Among adults 30 years and older, the estimated prevalence in 2000 was 5.5%.³ Estimates of health care expenditure also showed that in 2011, about 2.8 billion USD was spent on health care due to diabetes. This expenditure was expected to rise by 61% by 2030.⁵ With the increased prevalence of diabetes globally especially in Africa where urbanisation and adoption of the western lifestyle is increasing, diabetes is becoming an epidemic.

The chronic nature of this disease and its related complications requires strict monitoring to ensure optimal glycaemic control. This is achievable through affording individuals with diabetes access to comprehensive diabetic care including self-management education.⁷ In order to enhance glycaemic control, individuals with diabetes must engage in lifestyle changes and sufficient self-care practices (exercise, eat healthily, adhere to medication, monitor glucose levels, and have a normal body mass index, foot care, etc.),⁸ therefore

incorrect or no diabetes self-care practices hamper the achievement of desired treatment targets. Thus, it becomes necessary to offer diabetic patients comprehensive medical services incorporating self-management. Diabetic self-management education forms an integral component of a comprehensive diabetic care.⁹ In order to effectively engage in self-care, patients require physical skills, mental ability, as well as being aware of the diverse factors influencing self-care.⁸ In this light, the lack of awareness and poor health practices among diabetic patients have contributed to increased prevalence of the disease complications, yet these are preventable through patients' education and participation in their own care.⁷

To assist patients achieve their optimal levels of glycaemic control calls for the utilization of the right therapy, monitoring, and comprehensive education in diabetes self-management. This implies that patients learn to practice self-care in terms of adhering to drug and lifestyle modifications, diet prescriptions, monitoring their blood glucose, foot care and detection of symptoms. This is secondary prevention because interventions to enhance self-management have the potential to prevent the long-term complications of diabetes.⁷

Medical management of diabetes, without comprehensive self-management education, is incomplete.¹⁰ Self-management itself has also evolved from bits and pieces of instruction by the relevant health care professionals involved in diabetic care to more formal, comprehensive diabetic programmes.¹¹ Assessing patients' knowledge of their condition, perceptions and practice of self-management directly from the patients would be more reliable than inferring this from medical records. These records are often inadequate and may not give a true picture, even though levels of control, which could be a predictor of knowledge, can be inferred from records.

Expectations following improved knowledge of diabetic care, especially from more elaborate comprehensive programmes established over the years, would be one of greater levels of knowledge of the disease, better participation in self-management and positive perception of self-management. Self-care is paramount to the clinical management of diabetic patients, but self-management is intense, time-consuming, and physically demanding.^{10,12} Consequently, health care professionals may be failing to emphasize self-management. Therefore there is a need to investigate the impact of diabetic patients' knowledge, perceptions and practice with regards to self-management behaviours and skills.

1.2 Motivation for the study

Several factors motivated this study. On top of the list is the Mokopane hospital out-patients' department, which has a diabetic clinic that is not well established. This clinic was recently started. It is managed by doctors, nurses and dieticians and there is no formal comprehensive educational programme. Establishing patients' knowledge, self-care practices as well as perception levels of diabetic self-management is necessary in establishing a comprehensive educational programme to suit this population.

Mokopane hospital is also the referral hospital in the Waterberg district of Limpopo province, so it is a strategic focus area that would greatly impact other feeder hospitals and clinics in the district, in terms of improved diabetic care. No study has been done in the province to evaluate patient-reported knowledge, perceptions and practice of diabetic self-management skills and behaviour.

Since studies have shown that there is a positive correlation between knowledge of diabetes (causes, treatment, self-care skills and behaviour etc.) and better clinical and metabolic control.^{23,24,27} Assessing patients' knowledge with a view to institute formal educational programmes if necessary, may go a long way in improving the care of diabetic patients. This assessment was also necessary given the fact that studies done in South Africa showed diabetes knowledge levels to differ in different settings. In Limpopo province, knowledge was reported to be poor,¹³ while studies done in Kwa-Zulu Natal province showed participants to have good diabetes knowledge^{14,15} hence the need to establish the scenario in present study population. Reports from studies done in South Africa has also shown the influence of good diabetes education on the practice of self-care,¹⁵ this served as a further motivating factor to carry out this study to explore this relationship in the chosen study population.

Finally a brief interview, done with a small group of diabetic patients coming for renewal of their diabetic medication in the outpatient department, revealed poor levels of diabetic knowledge. Impressions of how to manage themselves at home also varied considerably. A more elaborate study was necessary to establish the true picture, give better insight and provide possible solutions, especially given the established correlations between knowledge of diabetes (causes, treatment, self-care skills and behaviour) and better clinical and metabolic control.^{2, 23, 24, 27}

Chapter 2

LITERATURE REVIEW

2.1 Introduction

Literature for this study was searched from the following databases and search engines: Pub Med, Cochrane reviews and Google scholar. The keywords used were: “diabetes knowledge”, “diabetes education”, “diabetes self-care” and “self-care perception”.

The literature search was assessed according to global incidence and prevalence of diabetes, diabetes in Africa, diabetes in South Africa, diabetes knowledge, diabetes self-management education, self-care knowledge and practice, perception about self-care and factors influencing self-care.

Specific studies done in Africa were of interest. Few studies were done in South Africa. Related studies done in other parts of the world were also studied specifically regions with high diabetes burden.

2.2 Diabetes knowledge

In South Africa, the consensus based on the limited studies has been that knowledge level varies in different settings. Some studies have shown good levels of diabetes knowledge^{14,15} whilst others show poor knowledge.¹³ A study carried out in the Limpopo province involved assessing patients and family members’ knowledge and views regarding diabetes mellitus and its treatment. It showed varied scores on different aspects of knowledge, and various views regarding treatment.¹³ Alarming, most of the participants could not explain the term diabetes well and 62.5% of the patients as well as family members thought diabetes could be cured. The majority (84.4%) of those respondents never had any formal diabetic education programme

A study done in Nigeria¹⁶ support the findings of the Limpopo report.¹³ Here participants had very poor knowledge of diabetes. Specifically there was poor knowledge of the diabetic diet and blood glucose monitoring. It may be argued that the reason for poor knowledge in this study¹⁶ could possibly be because it was done in a teaching hospital where complicated cases

are referred, which invariably means that individuals with poor control and complications most likely formed a large portion of their sample. These groups possibly had poor knowledge, since knowledge deficits have been associated with poor glycemic control^{23,24,25} The study¹⁶ also found that the longer the duration of diabetes irrespective of educational status, the higher the diabetic knowledge score.

Another study done in Nigeria showed knowledge deficits in many aspects of diabetes.¹⁷ However the majority of the subjects (80.2%) knew what diabetes is, in terms of knowing that it was a “sugar disease”.¹⁷ This knowledge did not relate to understanding as only 14.6% of respondents understood the causes of diabetes, although 79% of the participants in this study were literate. Moreover diabetes generally in layman’s terms is called ‘sugar disease’, in other words they knew only the lay term for diabetes. Supporting literature shows diabetes to also be referred to as “sugar disease” in layman’s terms.¹⁸

In line with this trend of poor diabetic knowledge was a study¹⁹ done among type 2 diabetic patients in Pakistan. Here poor knowledge, attitude and practice scores in most areas of diabetes care were reported. A structured questionnaire containing both open and closed ended questions was used and results showed very poor general knowledge of diabetes with 35.5 %, and 39% (mean percent correct answers) for glycemic control and complications respectively.

In contrast to studies 13,16,19 mentioned so far, where knowledge of diabetes has been shown to be poor, conflicting views on levels of knowledge have been shown by other researchers.^{2, 14,15,20,21} One of such studies² was carried out to evaluate knowledge and self-care practices in diabetic patients and their role in disease management among type 2 diabetics. Participants in this study had good knowledge regarding diabetes. It is however not indicated if these participants had any formal education on their condition. Furthermore this study was conducted in a teaching hospital with large resources.

Knowledge and understanding of diabetes were also found to be good among participants in a study in a research and community service center of a Brazilian University.²⁰ This study cannot be compared with the previously mentioned study as the research center afforded participants multi professional teams including nurses, psychologists and nutritionists. 78% of participants obtained high scores on knowledge about diabetes. They were also attending a diabetes self-care education programme. Good general knowledge of diabetes was also found among participants (93.7%) from a study in eastern Ethiopia.²¹

In South Africa, there have been reports of high levels of diabetic knowledge among diabetic patients. Two studies in particular have shown diabetic patients to have good knowledge of their condition.^{14,15} These studies were carried out in Kwa-Zulu Natal province. In one of these studies,¹⁴ the level of diabetic knowledge among patients in primary care settings was assessed, a convenience sampling method was employed and knowledge was assessed using a modified version of the Michigan diabetes research and training center brief diabetes knowledge test. Their results showed an overall good knowledge with higher knowledge levels among the Indian population (75.9%) than the black population (52.2%). The other study done in South Africa, where knowledge of diabetes was also found to be high was one which assessed level of knowledge, complications and management of diabetes.¹⁵ This study was done in an urban setting. Indians also had the highest (53.8%) level of knowledge compared with other race category. The researchers were of the opinion that the high level of knowledge of participants in this study could be due to the fact that there is easy access to information from the medical facilities where the study was conducted. Also a large proportion of the study population had received some education on diabetes and the different domains of self-care (diet, exercise and adherence to medication).

2.3 Diabetes self-management education

Self-management education for diabetic patients is an on-going process of promoting and enhancing self-care by supporting and improving the knowledge, skills, and competencies required for it. Through self-management education, individuals with diabetes are empowered to actively participate in management of their condition in partnerships with the medical team to reduce complications, improve general health and quality of life.²² Paramount to enhancing the achievement of good clinical results, reducing medical costs, minimizing on healthcare usage, and increasing patient satisfaction, is a well-structured disease management program. These programs contribute to preventing complications, and enhance patients overall health and well-being by offering support and education for patients through guidelines from evidence-based practice.²²

A vital component of a disease management program is patient education on self-management, besides the support from physicians and other healthcare providers. Thus, the holistic management of diabetic patients has many facets. The primary treatment goal for

diabetic patients involves preventing the long and short term complications. This requires adherence to recommended self-care practices.¹¹

Diabetic educational programs have been shown to impact immensely on different aspects of diabetic care. Several studies have shown correlations between structured self-management education and improved clinical and metabolic control of diabetes. One such study in Cairo,²³ showed statistically significant improvement in diabetic knowledge, physical and laboratory findings following a diabetic educational programme. Another nutrition and diabetic education programme was shown to improve self-care practices, and other variables associated with lowered HbA1c amongst older adults of north Georgia, USA.²⁴ Here participants' HbA1c, compliance to medication, diet, glucose testing, and daily foot examination were assessed pre-intervention. Following the programme intervention, all the above mentioned parameters improved remarkably. Some drawbacks concerning this study are that a convenience sample was used and it was carried out on participants with a mean age of 73. With these older age group confounders such as co-morbid conditions, self-efficacy, and health literacy prevail. This factor probably influenced the pre-intervention results, however post-intervention showed statistically significant differences.²⁴ The results of this study would have been better authenticated if there was a matching control group.

One of the goals of a structured self-management educational program is to effect behavioral change in enhancing self-care. This effect was shown by a study in the USA undertaken on older adults, where self-care knowledge, behaviors and metabolic control were assessed pre and post diabetic education intervention, this study also showed similar improvements in self-care behaviors.²⁵ There was however no significant relationship shown between diabetic knowledge and HbA1c.²⁵

Contrary to the above mentioned reports,^{23,24,25} a study done in Turkey to evaluate the effect of patient education on knowledge, self-management behavior and self-efficiency among patients with type 2 diabetes, found that patient education had a limited effect on the knowledge and self-reported self-management behavior in general.²⁶ This intervention was short term and did not include a long term follow up.

The sustainability and long term benefit of self-management education has been questioned. This notion is supported by a meta-analysis of self-management education for adults with type 2 diabetes. The report here showed poor performance on certain self-care practices and knowledge of self-care.²⁷ This analysis also reported an improvement of glycaemic control at

immediate follow up, however this improvement dwindled 3 months after the intervention. Emphasis should rather be placed on a continuous education programme, as behavior evidently learnt requires reinforcement.

There have been suggestions to introduce group-based diabetes self-management education to make up for the limitations of individual education.²⁸ Group-based programs have been shown to be more effective in terms of enhancing diabetes care outcomes, in addition to costing less than individual education. It was also found that self-care activities improved to some extent with group based program relative to individual based programs. This finding was more significant in practices such as physical activity, increasing diabetes knowledge, maintaining healthy body weight, blood glucose monitoring, and nutritional management.²⁹ Greater levels of satisfaction with medical interventions was also reported by individuals on group based programs than those receiving individual education.²⁹

2.4 Diabetes self-care knowledge

General knowledge of diabetes does not necessarily translate to knowledge of diabetic self-care, however knowledge of diabetes self-care is dependent on general knowledge of diabetes.³⁰ Miller and Goldstein³¹ in their study to evaluate patients' knowledge of diabetes self-care, showed participants to have inadequate knowledge. This was particularly significant in participants who had not attended any training programs. In this study even participants who claimed to have attended training programs did not demonstrate adequate knowledge or skills in any of the major areas of self-care (insulin administration, urine testing, diet, foot care and management of hypo or hyperglycemia). Knowledge of foot care was the least (15%), while urine testing knowledge was the highest (50%). Only 40% of the trained insulin dependent patients could not demonstrate competence in a single area of diabetes self-care.³¹

It could be argued that this category of patients (admitted in hospital) already are poorly controlled possibly with complications and will presumably have poor knowledge and practice of self-care. The majority of the participants were in the age range of 51-64 years, the age where associated co-morbid conditions are common.³¹

Opposing results to that shown by Miller and Goldstein³¹ were reported in a facility-based study in diabetic follow-up clinics of three hospitals in Ethiopia.²¹ In this study, diabetes self-

care knowledge was measured using 10 items on physical exercise, diet, medication, and blood glucose measurements. General knowledge of participants on diabetes was also measured, 93.2% of participants had good general knowledge of diabetes and specific knowledge about diabetes self-care. It was however not mentioned if these individuals had any form of education on diabetes, especially on self-management. The findings support the initial notion that knowledge of diabetic self-care is dependent on the general knowledge of diabetes.

In Nigeria, Adibe et al³⁰ carried out a survey on type 2 diabetic patients to assess their knowledge of self-care practices. Their study showed that participants were knowledgeable about diabetic self-care practices and that knowledge of diabetes self-care is dependent on the general knowledge of diabetes. Deficiencies in this study were the small sample size and multi stage sampling technique.

Another study done in Michigan³² where patients' knowledge was compared with national guidelines for diabetes care showed results supporting previously mentioned studies where knowledge of diabetes amongst participants were shown to be good.^{21,30} The guidelines referred to here are the ambulatory care facility section of the guidelines for diabetes care published by the American diabetes association (ADA) and the American association of diabetes educators. In their analysis, two broad categories was established, namely insulin dependent diabetics (diabetes diagnosed prior to age 30, continuous use of insulin since diagnosis, and body weight less than 120% of ideal) and all other patients who were considered to have Type-2 diabetes. The insulin dependent diabetics had an overall knowledge score of 71%, which was higher than the other category.

2.5 Diabetes self-care

Self-care is believed to play an important role in diabetes mellitus management. The relationship between self-care and glycemic control has been extensively studied.^{2,49,35} The practice of self-care requires patient's involvement in self-care routine (blood glucose monitoring, taking of medication, making healthy dietary choices, feet checking, participating in regular physical activity). These activities require active participation which needs to be sustained for better results.¹¹ Literature review shows different reports on the practice of self-

care in different settings and various factors have been shown to influence the practice of self-care.

Mukhopadhyay et al³³ assessed knowledge, attitude and self-reported practice regarding diabetes among patients attending the out-patients' department in a tertiary care hospital in Kolkata, India. This was a cross sectional, observational study where a pre-tested questionnaire was used for assessment. Practice of self-care was assessed by eight questions concerning lifestyle, dietary habits, monitoring of blood glucose, drug compliance, eye examination and foot care. Self-reported practices were assessed for the previous month. Results showed excellent drug compliance in 95.3% of participants and 82.8% had modified their diet. Only 25% had their foot and eye examination done in past one year, regular exercise practice (>five days/week) was poor. Very few participants monitored their blood glucose at home.

In contrast to the above study, Ayele et al²¹ assessed practice over the preceding three days, which is more reliable in terms of recall compared with practice of self-care assessed over the past month prior to time of study by Mukhopadhyay et al.³³ Their results were similar in terms of diet and medication adherence. Only 39.2% of all participants practiced the recommended self-care. Of note in this study was the fact that participants had good general knowledge of diabetes as well as good knowledge of diabetes self-care. Practice of self-care in other domains was poor. Mukhopadhyay et al³³, in contrast, showed participants to have poor general knowledge of diabetes.

In South Africa, practice of self-care was reported to be good by Mashige et al¹⁵. Their study found that participants were involved in lifestyle modifications in the major diabetes self-care domains. Poor self-care practice has been shown by other researchers.^{49, 16}

2.6 Self- care practice and glycemic control

There have been conflicting reports on the interrelationship between the practice of self-care and the glycemic control of diabetes.^{2,49,35} In one of such reports,² better glycemic control among participants who were regularly involved in self-care practices was shown. Here 64% of participants achieved good glycaemic control following a controlled diet ($p=0.04$), regular exercise, ($p=0.04$) and compliance to drugs ($p=0.04$).

One of the limitations of this study however, was that they evaluated glycemic control based on fasting blood sugar. A better way of evaluating control would have been glycosylated haemoglobin. Of note in this study was the finding that knowledge of diabetes among participants was high.

Supporting above mentioned study² is one from Ethiopia.⁴⁹ This was a cross sectional study where a systematic random sampling was employed. Here glycaemic control was also assessed by three successive fasting or random blood sugar tests. This study showed that specific self-care activity was significantly associated with adequate glycaemic control.

Further corroborating the above research is a study done in Jordan to determine factors associated with poor glycaemic control among patients with type 2 diabetes.³⁵ Here they found that poor glycaemic control was associated with longer duration of diabetes, and non-adherence to self-management of diabetes. This particular study is more reliable since glycaemic control was assessed by glycosylated haemoglobin.

2.7 Relationship between knowledge of Diabetes and Practice of Self-care.

Mashige et al¹⁵ established that a linear relationship existed between knowledge of diabetes and practice of self-care. In their study they showed that respondents had adequate knowledge of diabetes with regards to type of diabetes, influence of hereditary and lifestyle on development of diabetes and important risk factors for complications of diabetes. Their study also reported that most of the participants were implementing lifestyle and physical changes in their day to day management of their diabetes. Practice of self-care in this study was not directly assessed but was extrapolated from assessment of management characteristics. This study has limitations; it was carried out in an urban setting, based on information from only 106 participants. This may not necessarily be representative of the general diabetic population.

Results contrary to that of Mashige et al¹⁵ were reported by Ayele et al,²¹ who found an inverse relationship between general knowledge of diabetes, specific knowledge of self-care and practice of self-care was shown. The majority 208 (93.7%) of 425 participants had good general knowledge of diabetes and 207 (93.2%) about diabetes self-care. On the other hand only 87 (39.2%) practiced recommended self-care of their diabetes.

Desalu et al³⁶ reported on just one domain of self-care (foot care). They also showed a linear relationship between poor practice of foot care and poor knowledge of foot care. These findings³⁶ were supported by another researcher⁴⁹ who also illustrated that the level of knowledge about diabetes as well as practices of self-care among respondents were low.

2.8 Perception of Diabetic self-care

Perceptions of self-care in this review were generally positive. Researchers have explored perceptions concerning diabetes self-care by assessing attitude to self-care.^{33, 37, 38}

Mukhopadhyay et al³³ carried out a cross sectional study on perceptions and practices of participants with type 2 diabetes. They aimed to assess the knowledge, attitude and self-reported practices regarding diabetes among patients in an out-patient department. Results of this study showed that 82.8% of respondents had positive attitudes toward dietary modifications, and 60.9% toward regular exercise. Concurrently, compliance to dietary modifications was also high. On the other hand, compliance to exercise was poor (32.8%). Another interesting finding in this study was that despite a positive attitude toward these aspects of self-care, knowledge concerning symptoms and complications of diabetes was poor.

Opposing findings to that of Mukhopadhyay et al.³³ was reported in a cross sectional study³⁷ which sought to assess the level of community awareness of diabetes and how this knowledge influences their attitude and practices in prevention and disease control. This study was not done on specific diabetic patients, but in provinces in Kenya with a high burden of diabetes. General knowledge of diabetes was satisfactory, attitudes toward diabetes were poor, as well as attitude to lifestyle modifications including diet, exercise and health seeking behaviours. Results from this study are more generalizable as a sample of 2000 was drawn from four of the eight provinces, as opposed to 64 participants from Mukhopadhyay et al's study³³. However, generalization would not be appropriate considering the fact that participants were not necessarily all diabetic patients.

In identifying predictors of self-care behaviour among patients with diabetes, the perceptions of patients with diabetes on self-care, perceived susceptibility, severity of diabetes and its complications as well perceived barriers and benefits of self-care, were evaluated.²¹ Here patients with infrequent information provision were less likely to engage in diabetes self-care.

The patients who were more educated, of middle income, had high perceived severity of diabetes and less perceived barriers to self-care were more likely to engage in diabetes self-care.

In line with the above study,²¹ Collins et al³⁸ sought to explore patients' perceptions of diabetes self-care and their coping strategy. They employed a qualitative method, where respondents were classified into three categories based on their diabetes self-care coping strategies, self-care health value and self-care responsibility. They identified that patients' perceptions of their self-care differed along a wide continuum but all categories of patients had differences in self-care responsibilities, coping strategies and health value.

Attitude was considered a predisposition to adopt self-care actions by a group of researchers who saw the need to explore knowledge and attitude of people with diabetes with a background belief that changes in attitude can affect and improve their quality of care.²⁰ Their assumptions were that changes in attitude acquired through education could improve quality of care and reduce health cost for diabetic patients, leading to better outcomes. Based on these assumptions, they carried out their study to verify the knowledge and attitude of people with diabetes attending an educational program. Participants' knowledge was assessed while attending an educational programme on diabetes self-care. Results from this study showed participants had good knowledge and understanding of diabetes, but attitude scores were not comparable to enable them to cope with their condition. They concluded that participant's attitudes did not change despite having good diabetes knowledge. There is a need therefore, to assist participants to channel their knowledge into the practice of day to day self-care activities required for disease control.

2.9 Factors influencing self-care

Identifying factors influencing diabetes self-care or barriers to self-care is presumed to lead to improved health outcomes of diabetic patients. Several factors have been shown to influence self-care. These factors span over a wide range from psychological, physical, educational, economic through to culture, religion and beliefs.^{39, 40, 41}

The association between social support functions and structure, patient activation, diabetes linked emotional distress, self-management, perceived diabetic care and HbA1c levels amongst type 2 diabetes patients was investigated³⁹ Here they used the Patient activation

measure (PAM), which assesses an individual's knowledge, skill, and confidence behaviors for managing one's health and healthcare. Individuals with a measure high on this assessment typically understand the importance of taking a pro-active role in managing their health and have the required ability, skills and confidence to do so. They administered questionnaires to 2572 patients and used regression models to study the links between patient activation, social support, psychosocial challenges, self-management behaviours and HbA1c levels. Their study revealed that high activation scores, less psychosocial problems, more positive evaluations of care and self-management practices that enhance their health such as regular exercising and foot care, were associated with patients who frequently had contact with friends. The relationship between frequent family contact and a more positive evaluations or perceptions of care, was also established by these researchers.

Other health benefits found to be linked to individuals residing with a partner include; reduced incidence of smoking, increased attendance of foot examinations and lower HbA1c levels. Inadequate social support that is unable to provide the required assistance in case of chronic illness contributed to reduced physical activity, increased emotional distress, negative perception of care, unhealthy eating habits, and poor attendance of foot examinations. They concluded that strong social support is significantly linked with health-promoting practices and well-being of type 2 diabetic patients. HbA1c levels were also found to be high for individuals cohabiting with no social support. They recommended that social support be among the considerations in the design of medical interventions and care for type 2 diabetic patients.

Predictors of self-care behaviours among patients with diabetes has been identified.²¹ In this study following a multivariate analysis, they established that diabetic patients with less frequent and inadequate health information were less likely to engage in self-care. They also found that more educated patients and middle-income earners had higher perceptions of diabetes severity and few hindrances or perceived obstacles to self-care and therefore were more likely to participate in self-management.

Culture is an integral component of health-promoting behaviors. The culturally based experience of Iranian diabetic patients regarding the personal and environmental barriers to and facilitating factors for diabetes self-care was explored.⁴⁰ Six focus group interviews were conducted among type 2 diabetic patients. Four main barriers to self-care were identified namely; physical barriers, psychological barriers, educational barriers, and care system

barriers. The physical barriers consisted of physical effects of diabetes, long term health conditions, physical effects of treatment and no symptom cues. Feelings of listlessness and faintness were the most cited physical effects of diabetes that influenced self-care. In line with this, diabetes induced lack of energy was also cited as barrier to exercise. Psychological barriers reported were as follows; health beliefs, cognitive barriers, negative perception of time and stigma. “Gods will” faith and destiny were perceived by some participants to be a determinant of cause or cure of diabetes. Other psychological factors such as depression and a negative attitude was shown to influence self-care activities. Poor knowledge relating to diabetes was also cited as a barrier to self-care by participants. Under social barriers, group pressure, lack of family support, lack of public awareness of diabetes and various difficulties in social systems were identified as social barriers. Inadequacies in health system such as lack of local health services leading to long travels to health care facilities, insufficient health insurance coverage, were barriers raised. Issues relating to cost and culturally incompatible services provided by health care was also cited by participants, in the researchers their views these services did not take into account their cultural predispositions. In their conclusion, the researchers advised that interventions to improve care should be culturally based. By studying the influence of culture, health care providers can develop educational and culturally competent interventions.

Kachaban`s study⁴¹ on diabetes self-care activities analysed factors affecting self-care behaviour of patients being treated at a diabetes clinic. Their report showed statistically significant associations between some socio-demographic variables and self-care behaviours. Older participants and those with fewer household expenses had better self-care behaviours. Participants with shorter duration of illness (less than five years) also had better self-care behaviours.

Adibe et al ³⁰ on the other hand had results contrary to Kachaban`s.⁴¹ Their study showed that older persons with diabetes had less education, worse cognitive functions and more barriers to practicing self-care than the younger age groups. Educational status was also associated with self-care knowledge. This association was only significant up to primary school level. Results showed the association to be different between secondary level and tertiary in terms of knowledge. Participants at secondary level were more knowledgeable than those at tertiary. No statistically significant associations were found between occupation economic status and knowledge of self-care.

2.10 Summary of literature review

In summary diabetes self-management training assists people in dealing with the emotional and physical demands of their disease, given their unique socio-economic and cultural circumstances. Healthcare providers must be active participants in facilitating quality diabetes self-management education and care and to motivate their patients to undertake the demanding daily regimen associated with diabetes care. From the literature reviewed it is evident that diabetes self-care practices improve glycaemic control and reduce diabetic complications. In order to have an effective diabetic self-care management program it must be continuous and needs a formal planned program. It must not be assumed that having good knowledge of diabetes equates to positive perception and attitude to self-care. As shown in this literature review, both variables may be independent of each other. Good general knowledge and understanding of diabetes, being in a caring relationship with a partner, friends and other family members contributes to effective diabetes self-care management knowledge and practice. Physical, educational, and psychological barriers also influence self-care. This has been seen from studies done globally and in varying health care delivery sites including primary, secondary, academic and research facilities.

CHAPTER 3

METHODS

3.1 Aim of study

To determine patient-reported knowledge, perceptions and practice regarding diabetes self-management skills and behaviour of patients suffering from diabetes mellitus in Mokopane hospital, Limpopo province.

3.2 Study objectives

- ❖ To describe the demographic profile of adult patients with diabetes attending the outpatients' clinic of Mokopane hospital.
- ❖ To assess knowledge, reported practice, and perceptions of diabetic self-management among these patients.
- ❖ To determine the strength of associations between knowledge, reported practice, perception of self-care and glycaemic control.

3.3 Study design

This was a cross-sectional study of patients living with diabetes, carried out in the Mokopane provincial hospital out-patients' diabetic clinic, in Mokopane, Limpopo province.

3.4 The Study site

The Mokopane hospital is a regional (provincial) hospital. It is located in Mokopane town, in the Waterberg district of Limpopo province. The hospital is located in a township (Mahwelereng), which has a population of approximately 305,265 people, and serves as a referral hospital for the Waterberg District, catering for 12 clinics and six district hospitals. The hospital has a bed capacity of 255. It is presently semi-departmentalised, with the family medicine department responsible for the casualty and

out-patient department, including the specialised clinics of chronic conditions which include diabetes mellitus.

The diabetic clinic was recently started and is in the process of establishing protocols and guidelines. Doctors, with help from nurses and dieticians run the diabetic clinic. It operates twice a week. On average, the clinic sees about 15-20 diabetic patients per week. The majority of patients are females, black Africans, and low to middle income earners.

3.5 Study population

The study population was all adult patients, 18 years and above, diagnosed with diabetes and registered at the diabetes clinic.

3.6 Sampling method

Epi info (version 6.3) was used to calculate the sample size for this study using a population of 300. With 95% confidence interval, standard error of 0.01, and power of 80%, the sample size was calculated to be 75. Consecutive diabetic patients attending the diabetic clinic were recruited until 76 participants were reached.

Informed consent was obtained. All patients approached agreed to participate. Inclusion criteria were all patients registered in the diabetic clinic register, who were competent to give consent, were willing to participate and were of any gender or race.

3.7 Measuring tool

A researcher-formulated questionnaire was used as a measuring tool. This questionnaire was formulated after the literature review.^{10, 11, 13,14,42,43,54} Particularly, elements from two existing scales were used – SKILLD (spoken knowledge in low literacy in diabetes)⁴² and the revised version of SDCA (Summary of diabetes self-care activity).⁴³ Questions that were relevant to the study and population were used. Rephrased questions were changed to a yes or no answer, instead of more detailed responses.

Some questions were rephrased to suit the context of the participants.

The questionnaire sought information on:

1. Socio-Demographic data

2. General diabetic knowledge
3. Self-care activities
4. Health and disease profile
5. Knowledge and perception of diabetes self-care.

A Yes/No pattern was adopted for the questions on diabetes knowledge.

For the questions on self-care activities, a sometimes/always/mostly/never pattern was used with always being the best expected response. Each question was analysed individually.

The questionnaire was translated into Sepedi and back translated to English to assure validity of the translation.

3.8 Data collection

The researcher worked directly with four research assistants who were trained to collect data, and also assist with interpretation where necessary. Participants were chosen after seeing the doctor at the clinic. As the participants were leaving the consulting room, they were approached to participate. Participants were each then taken into an examination room for privacy during data collection. Here consent was obtained and data collected. Arrangements were made with the nurses and doctor who run the clinic prior to this to ensure there were no delays for the patients. Stickers were attached on patients files after participation to prevent double recruitment. Data collection started on the 10th July 2012 and was completed on 28th August 2012.

The research assistants read out the questions on the questionnaire to the participants. Their answers were ticked on the questionnaire.

The glycosylated haemoglobin level for each participant was obtained from the patient's file. These are usually obtained from the laboratory and entered by the clinic nurses prior to starting the clinic, and is done six monthly. The patients attend the diabetic clinic monthly. The HbA1c result used were the latest results for participants, taken from the clinic record.

3.9 Data analysis

The data collected was captured and subsequently analysed using the statistical package for social sciences (SPSS version 17.0). Descriptive statistics such as frequencies and proportions was used for summarizing data. The Fisher exact test was used to test for the association between diabetic control and knowledge, practice and perception of self-care. Also associations between diabetes control (HbA1c) and demographic parameters were analysed. A p-value of less than 0.05 was considered statistically significant.

3.10 Pilot Study

A pilot study was conducted in Mokopane hospital general out-patients' department among ten diabetic patients who were not registered with the diabetes clinic. Consent was sought from these participants, after explaining what the research was about. The same assistants were used during the pilot study.

The aim of the pilot study was to:

- Evaluate the method of data collection
- Identify questions that needed modification or cancellation
- Estimate time needed to complete the questionnaire

The results of the pilot study, which were not used in the final analysis of the research, were as follows: estimated time to complete the questionnaire ranged from 10 to 15 minutes, no questions needing modification were identified and no translation difficulties were encountered.

3.11 Ethical considerations

The participants recruited for this study were informed of the nature and methodology of the study. The names of the patients were not recorded in the study and confidentiality was strictly maintained. Introduction letter to the participants from the researcher inviting them to participate and stating the reasons for the research was issued to the proposed participants. Participants were required to give informed consent in writing. A written consent form, explained to and understood by the patient, was signed by the participants. Assurance of confidentiality and anonymity was stated in this letter and was maintained throughout the

research. The researcher also made these assurances verbally while addressing the participants. The study was given ethics approval by the human research ethics committee (medical) of the university of the Witwatersrand. Permission to carry out this study was also granted by the Mokopane provincial hospital and the Limpopo department of health.

CHAPTER 4

RESULTS

4.1 Response rate

The response rate was 100% as all patients who were consecutively approached agreed to participate in the study. A total of 76 participants took part in this study.

4.2 Demographic characteristics.

4.2.1 Age distribution

The largest group of these patients (29 or 39%) were aged 60 years and older, followed by those in the age group 40-49 years 16 (or 22%) and 50-59 years 16 (or 22%)

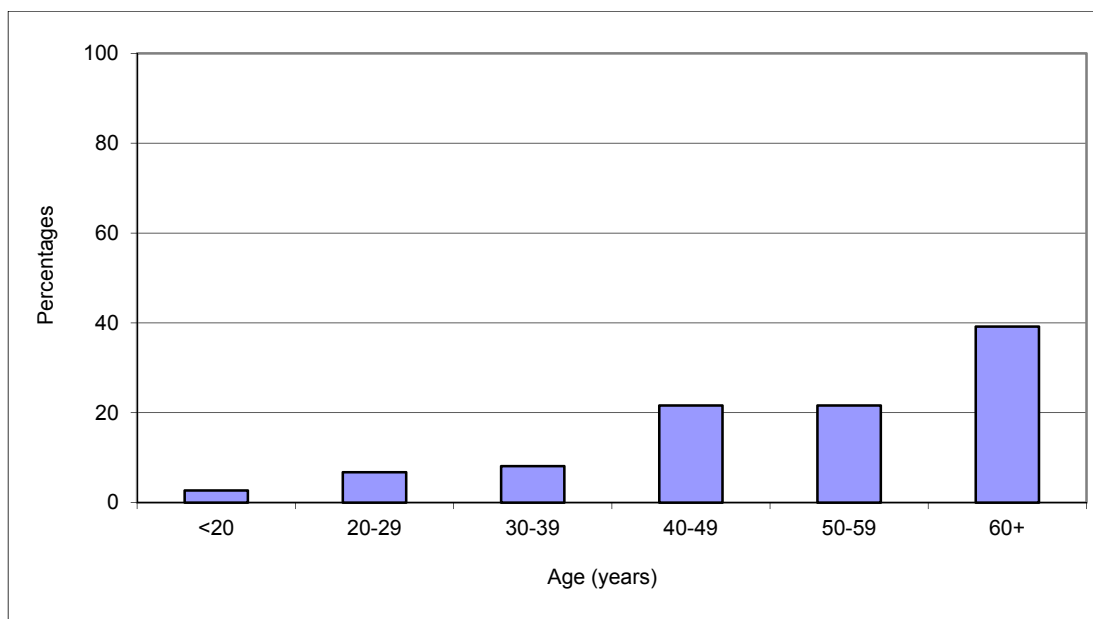


Figure 1: Age distribution.

4.2.2 Gender distribution

There were more female participants 53 (71%) in this study, than males 23 (29%)

4.2.3 Distribution by employment

Thirty of the study participants (40%), reported that they were unemployed, 22

(29%) were employed and 12 (16%) are pensioners (Figure 2). The main source of income reported by the study participants was government grant 38 (51%).

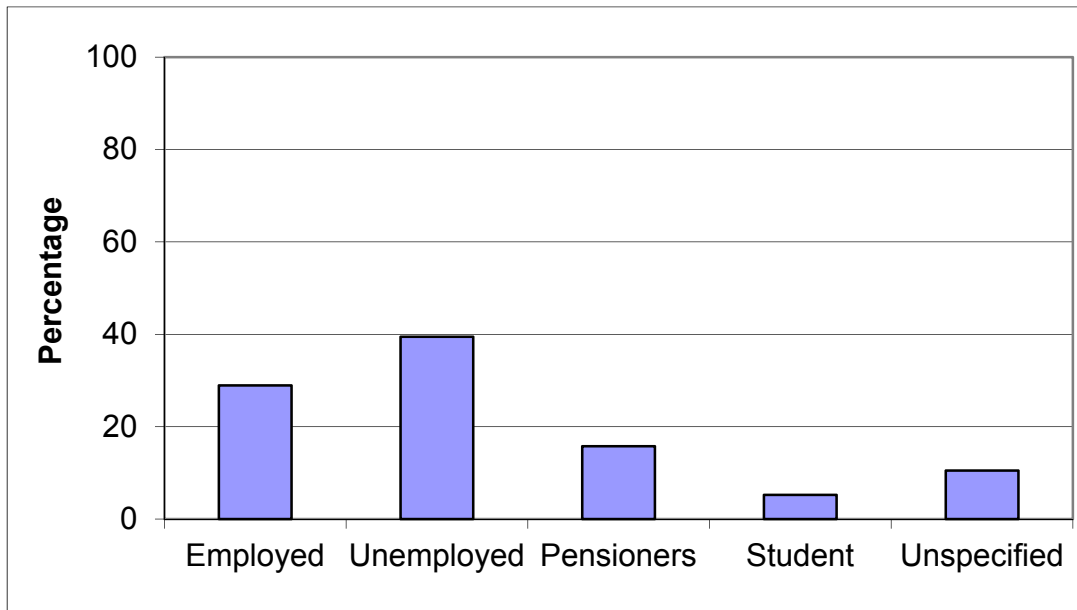


Figure 2: Employment status

4.2.4 Distribution by Family members living with participants

Twenty one (28%) of the participants indicated that they live with their children, 26 (34%) with their spouse (see figure 3). Others in Figure 3 refer to other family members, friends or sharing a house with strangers.

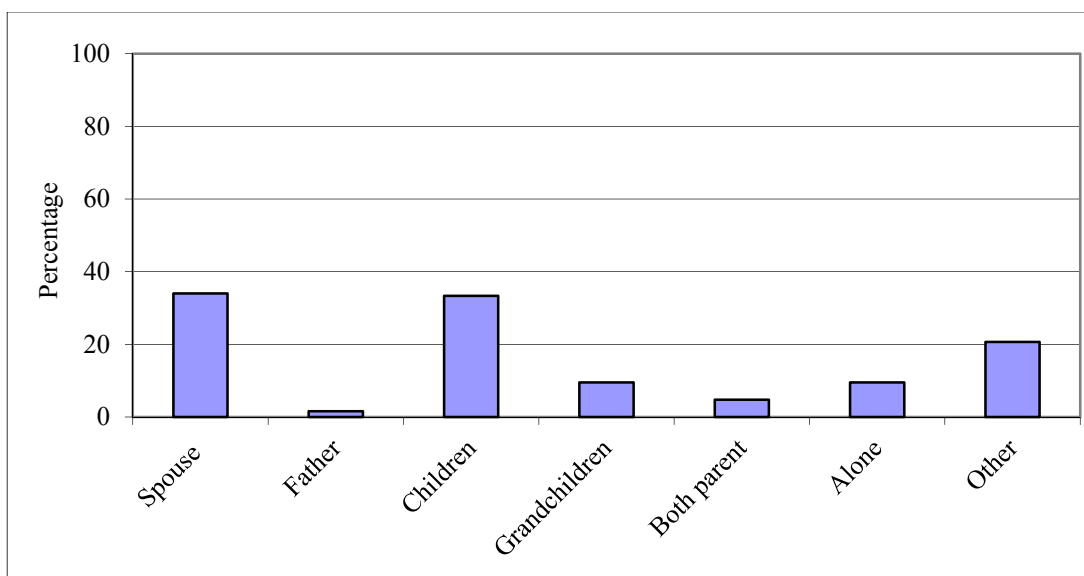


Figure 3: Family members living with participants

4.2.5 Distribution by level of education

Twenty eight (37%) indicated that their highest qualification was primary education, 26 (35%) had secondary education, 18 (24%) had no education and only 3 (4%) had a tertiary education.

4.2.6 Distribution by level of number of years with diabetes

Of all the participants, 33 (43%) indicated that they were diagnosed with diabetes in the past 1-5 years, and 23 (30%) responded that they have had diabetes for 5-10 years, 13 (17%) had diabetes for <6months and 7 (9.2%) for more than 10years.

4.2.7 Distribution by type of diabetes, medication

Fifty nine of the participants (78%) indicated that they are suffering from Type 2 diabetes, 20% of participants indicated that they had type 1 diabetes and 2% were not sure. More than fifty (70%) participants reported that they take pills only to control their diabetes, while 15 (20%) said they use insulin, and 8 (10%) use both pills and injection.

4.2.8 Food preparation

A large proportion of participants (35 or 46%) indicated that they prepare their own food at home: 18 (24%) reported that their food is prepared by children, and 11 (15%) reported that food is prepared by spouse

4.2.9 Distribution by level of HbA1c

A majority of the study participants 66 (87%) had an HbA1c level of more than 7%. The mean HbA1c was 10.2%

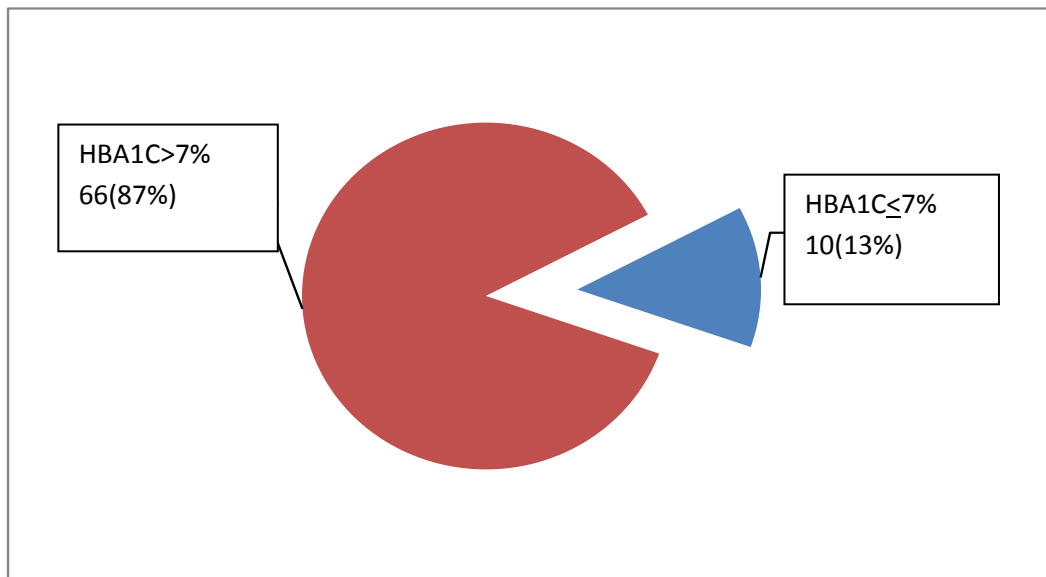


Figure 4: Diabetes control

4.3 Knowledge of diabetes

Knowledge of diabetes was assessed by individually analysing each question.

4.3.1 Questions with multiple correct answers

Question 9. How would you know if your blood sugar was low?

There were five correct options given for this question on diabetes knowledge: Nineteen participants (25%) identified one of the correct options given, 16 (or 21%) could identify only two symptoms, 10 (13%) could identify 3, 9 (11%) identified 4, (or 5%) four of participants identified all the correct options. 18 of participants (23%) were not sure of the answers (see table 1).

Question 11. What would you eat or drink if your blood sugar was low?

Question 11 had four correct options. 40 participants (52.6%) identified only one of the correct options, 12 (15.7%) could identify two, five (6.5%) participants identified three correct options, and two (2.6%) respondents could identify all four correct options (see table 1).

Question 12. Knowledge of the long term complications of diabetes.

Question 12 had 6 correct options. Seventeen participants (22.3%) could identify only one of the correct options, 26 (34.2%) identified 2 of the correct answers, 8(10.5%) identified 3

correct options. 7 (or 9.2%) of participants identified 4 correct answers, 3 (or 3.9%) could identify 5 of the correct options, and 3(or 3.9%) identified all 6 correct options (see table 1).

4.3.2 Knowledge of diabetes. Summary of questions: 9, 11, 12.

The possible options that could be selected for question on symptoms of low blood sugar are listed in Table 1.

Forty seven participants (62%) identified hunger as a symptom of low blood sugar. A large number of participants 37 (48%) were not sure of the normal blood sugar. More than half of the participants, 39 (51%) said they eat sweets if their blood sugar is low. A majority of the participants 60 (78%) knew that blindness is a possible complication of diabetes. Forty eight (64%) participants were not sure when to see an ophthalmologist (See Table1).

Table 1 Knowledge questions

Questions	Options	No	%
Q9. How would you feel if your blood sugar is low?	Hunger	47	62
	Confusion	1	2
	Irritability	15	20
	Dizziness	22	29
	Sweaty	29	38
	Not sure	11	15
Q10. What is a normal blood sugar?	2-4 mmol/l	5	7
	4.1-6 mmol/l	24	32
	6.1-10 mmol/l	9	12
	10.1-12 mmol/l	1	1
	Unsure	37	48
Q11. What should you eat/drink if your blood sugar is low	Juice	14	18
	Orange	5	7
	Sweets	39	51
	Sugar	28	37
	Not sure	18	24
Q12.What are the long-term complications of	Blindness	60	78

diabetes?	Kidney problem	30	39
	Body part cut-off	43	57
	Loss of feeling in parts of your body	28	37
	Poor erection	20	26
	Heart problem	17	22
	Not sure	7	9
Q13. How often should you see an eye doctor?	Yearly	14	18
	2-3 yrs.	10	13
	>3 yrs.	4	5
	Not sure	48	63
Q14. Who else can treat your diabetes?	Traditional/spiritual	36	47

4.4 Knowledge and perception of diabetes self-care

A majority of participants (90%) indicated that the type of food they eat can control blood sugar and 68 (89%) said exercise can help in controlling blood sugar. Fifty four (71%) said feet checking can help in managing diabetes complications, 50(66%) said doctors are the most important person in the management of their diabetes and 21 (27%) of participants indicated that they were the most important person in management of their diabetes (see Table 2).

Table 2 Questions on Knowledge and perception of diabetes self-care

Questions	Options	No	Percentage
Can the type of food you eat control blood sugar?	Yes	66	90
	No	1	2
	Not sure	6	8
Can exercise help in the management of diabetes?	Yes	68	89
	Not sure	8	11
Can checking your feet help in managing diabetes complications?	Yes	54	71
	No	1	2

	Not sure	21	27
Most important person in the management diabetes	Doctor	50	66
	Self	21	27
	Not sure	5	7

4.5. Practice of self-care

Sixty five (86%) of the participants responded that they have adjusted the way they eat since they were diagnosed with diabetes. Only 17 participants (23%) always followed healthy eating habits. Only 9 participants (12%) eat 3 or more servings of fruit and vegetables. Regular exercises were carried out by 13 participants (18%). Only 8 (11%) of participants always test their blood sugar at home (see Table 3).

Twelve (16%) of participants always check their feet for colour change, wounds or cracks. Only 14 (18%) of participants always inspect the inside of their shoes. Twenty two (29%) participants always dry between their toes after washing. Thirty four participants (45%) indicated that they always complied with drug treatment. A majority of participants 63(81%) were not smokers (see Table 3).

Table 3 Questions on Diabetes self-care practices

Question	Options	No	%
Have you adjusted the way you eat since you had diabetes?	Yes	65	86
	No	10	13
	Not sure	1	1
Are you still following the above eating plan?	Always	17	23
	Mostly	19	26
	Sometimes	27	37
	Never	10	14
Do you eat 3 or more servings of fruit/vegetables on most days?	Always	9	12
	Mostly	16	22

	Sometimes	22	30
	Never	26	36
Have you been exercising since diagnosis of your diabetes?	Always	13	18
	Mostly	3	4
	Sometimes	27	36
	Never	31	42
Do you test blood sugar at home?	Always	8	11
	Mostly	10	14
	Sometimes	8	11
	Never	47	64
Do you check your feet for colour change/wound/cracks?	Always	12	16
	Mostly	1	1
	Sometimes	29	39
	Never	32	43
Do you inspect the inside of your shoe?	Always	14	18
	Mostly	2	3
	Sometimes	36	47
	Never	24	32
Do you dry between your toes after washing?	Always	22	29
	Mostly	8	11
	Sometimes	28	37
	Never	18	24
Do you take your pills/injections according to your prescription?	Always	34	45
	Mostly	21	28
	Sometimes	18	24

	Never	2	3
Do you smoke cigarettes?	Yes	13	19
	No	63	81

4.6. Diabetes control in relation to knowledge and perception of self-care

The association between diabetic control as measured by HbA1C and knowledge, as well as that between diabetic control and perception of self-care is illustrated in Table 4. There was no significant difference observed with regard to the patient feelings when his/her blood sugar is low and diabetes control. The knowledge and perception of the patient on blood sugar level were also not related to diabetes control ($p>0.05$).

Table 4 Relationship between diabetes control and knowledge of self-care

Question	Option	HbA1C $\leq 7\%$	HbA1C $> 7\%$	p-value
How would you feel if your blood sugar is low?	Hunger	6(60%)	41(62%)	1.000
	Confusion	0(0%)	1(2%)	1.000
	Irritability	2(20%)	13(20%)	1.000
	Dizziness	3(30%)	19(29%)	1.000
	Sweaty	4(40%)	25(39%)	1.000
	Not sure	3(30%)	8(12%)	1.000
What is a normal blood sugar?	2-4 mmol/l	1(10%)	4(6%)	0.618
	4.1-6 mmol/l	4(40%)	20(30%)	
	6.1-10 mmol/l	0(0%)	9(14%)	
	10.1-12 mmol/l	0(0%)	1(2%)	
	Unsure	5(50%)	32(48%)	
What should you	Juice	3(30%)	11(17%)	0.380

eat/drink if your blood sugar is low	Orange	1(10%)	4(6%)	0.516
	Sweets	8(80%)	31(47%)	0.087
	Sugar	5(50%)	23(35%)	0.484
	Not sure	0(0%)	18(27%)	0.105
What are the long-term complications of diabetes?	Blindness	8(80%)	52(79%)	1.000
	Kidney problem	4(40%)	26(39%)	1.000
	Body part cut-off	8(80%)	35(53%)	0.172
	Loss of feeling	4(40%)	24(36%)	1.000
	Poor erection	1(10%)	19(29%)	0.275
	Heart problem	3(30%)	14(21%)	0.684
	Not sure	0(0%)	7(11%)	0.584
How often should you see an eye doctor?	Yearly	1(10%)	13(19%)	0.427
	2-3 yrs.	0(0%)	10(15%)	
	>3 yrs.	0(0%)	4(6%)	
	Not sure	9(90%)	39(59%)	
Who else can treat diabetes?	Traditional/spiritual	5(50%)	35(53%)	1.000
	Not sure	5(50%)	31(46%)	
Can the type of food you eat control blood sugar?	Yes	10(100%)	56(89%)	0.643
	No	0(0%)	1(2%)	
	Not sure	0(0%)	6(9%)	
Can exercise manage diabetes?	Yes	10(100%)	58(88%)	0.587
	Not sure	0(0%)	8(12%)	
Can feet checking help in managing	Yes	9(90%)	45(68%)	0.362
	No	0(0%)	1(2%)	

diabetes	Not sure	1(10%)	20(30%)	
Who is the most important person in management diabetes?	Doctor	7(70%)	43(65%)	1.000
	Self	3(30%)	18(27%)	
	Not sure	0(0%)	5(8%)	

4.7 Association between diabetes control and selected demographics

There was no statistically significant association between HbA1c levels and age, gender or level of education

Table 5 Relationship between diabetes control and demographic characteristics

	HBA1C $\leq$ 7%	HBA1C $>$ 7%	p-value
Age			
<50	4(44%)	25(38%)	0.731
$\geq$ 50	5(56%)	40(62%)	
Gender			
Male	2(20%)	20(31%)	0.714
Female	8(80%)	45(69%)	
Level of Education			
None	2(22%)	16(23%)	0.472
Primary	4(44%)	24(35%)	
Secondary	2(22%)	26(38%)	
Tertiary	1(11%)	2(3%)	

4.8 Diabetes control in relation to the practice of self-care

The association between diabetes control and patient practice of self-care is shown in Table 6. There was no statistically significant difference with regard to diabetes control and diet adjustment, exercise, foot care, self-monitoring of blood glucose, adherence to medication

and smoking ($p>0.05$). However, a large proportion (22 or 33%) of the participants with HbA1c more than 7 indicated that they dry between their toes after washing.

Table 6 Relationship between diabetes control and self-care practices

		HbA1c $\leq 7\%$	HbA1c $> 7\%$	p-value
Have you adjusted the way you eat since you had diabetes	Yes	10(100%)	55(83%)	0.427
	No	0(0%)	10(15%)	
	Not sure	0(0%)	1(2%)	
Are you still following the above eating plan?	Always	0(0%)	17(27%)	0.067
	Mostly	5(56%)	14(22%)	
	Sometimes	4(44%)	23(36%)	
	Never	0(0%)	10(16%)	
Do you eat 3 or more servings of fruit/vegetables most days?	Always	0(0%)	9(14%)	0.116
	Mostly	4(45%)	12(19%)	
	Sometimes	4(45%)	18(28%)	
	Never	1(10%)	25(39%)	
Have you been exercising since diabetes?	Always	0(0%)	13(20%)	0.266
	Mostly	1(10%)	2(3%)	
	Sometimes	3(33%)	24(37%)	
	Never	5(56%)	26(40%)	
Do you regularly test your blood sugar at home?	Always	0(0%)	8(13%)	0.494
	Mostly	2(22%)	8(13%)	
	Sometimes	0(0%)	8(13%)	
	Never	7(78%)	40(63%)	
Do you check your feet	Always	0(0%)	12(19%)	0.483

for callous, colour change/wound/cracks?	Mostly	0(0%)	1(2%)	
	Sometimes	5(56%)	24(37%)	
	Never	4(44%)	28(43%)	
Do you inspect the inside of your shoe?	Always	0(0%)	14(21%)	0.162
	Mostly	0(0%)	2(3%)	
	Sometimes	8(80%)	28(42%)	
	Never	2(20%)	22(33%)	
Do you dry between your toes after washing?	Always	0(0%)	22(33%)	0.013
	Mostly	0(0%)	8(12%)	
	Sometimes	8(80%)	20(30%)	
	Never	2(20%)	16(24%)	
Do you take your pills/injections according to your prescription?	Always	4(40%)	30(46%)	0.373
	Mostly	5(50%)	16(25%)	
	Sometimes	1(10%)	17(26%)	
	Never	0(0%)	2(3%)	
Do you smoke cigarettes?	Yes	2(25%)	11(18%)	0.639
	No	6(75%)	50(82%)	

CHAPTER 5

DISCUSSION

5.1 Socio-economic characteristics

There were more females than males in this study 53(71%), which is in keeping with other studies on diabetes carried out in South Africa.^{13,14,15} The higher percentage of women in this study could also be attributed to the fact that women generally are more likely to seek medical care than men.⁵³

Most (78%) of the study participants in this study have type 2 diabetes. The majority of participants were in the age group of 60 years and above, this was followed by those in the 50-59 age groups. This finding is consistent with findings from other studies on diabetes done in South Africa^{14, 15} where most study participants were elderly. Type 2 diabetes is the more common type and has a higher prevalence among the elderly.

Only 29% of participants were employed, almost all of these were in low income jobs. This finding may explain their inability to buy glucometers to test blood glucose at home and to eat recommended diet.

A large proportion of participants in this study had attained only primary education or had no formal education. This is in keeping with the fact that in South Africa public hospitals are mostly attended by people from the low socio economic classes who have minimal formal education.⁴⁵ Odilli et al¹⁶ showed interesting results concerning education and knowledge, contrary to Adibe et al.³⁰ Those with no formal education actually had significantly better knowledge than those who attained primary education. Coincidentally this category of participants (no formal education) had the longest duration of diabetes, and this was cited as a possible reason for increased knowledge, as it is expected that they would have acquired more experience and knowledge over the years. This explanation could also have influenced knowledge of participants in the present study as the majority had been diagnosed with diabetes for only about five years.

5.2 HbA1C distribution

HbA1c level was used as a control parameter in this study. Normal HbA1c in this study was taken to be <7% in line with the SEMDSA guidelines¹⁰. Most of the participants in this study (87%) had poorly controlled diabetes. Similar findings have been shown among black South

Africans in private health care facilities where participants were found to have high HbA1c.⁴⁴ Studies done in other parts of Africa^{16,49} corroborate findings from present study in showing diabetic participants to have poor glycemic control. Most of these studies, however, used fasting blood sugar as a measure of glycemic control in contrast to HbA1c, which is a more reliable index to measure control. The high levels of HbA1c in this study are in keeping with the fact that knowledge and practice of self-care were also low, and these variables have been shown to influence glycemic control (HbA1c).^{2, 35, 49}

There was no statistically significant association among the demographic variables (age, gender, level of education) and HbA1c in this study. However Khattab et al³⁵ found that participants with lower levels of education were more likely to have poor glycemic control (higher HbA1c).

5.3 General knowledge of diabetes mellitus

Assessing general knowledge of diabetes among participants was necessary as knowledge of diabetes has been shown to influence knowledge of self-care.³⁰ Also management of diabetes, especially self-management, has been shown to depend strongly on patients' general knowledge of diabetes.¹⁶ In virtually all questions on diabetes knowledge with multiple correct answers asked to assess knowledge of diabetes, more than 50% of participants could either only identify less than half of all the correct options given or were not sure of the answers, and 60% of the participants were only able to identify less than half of each set of the correct answers or were not sure. In addition, for questions with only one correct option, more than half of the respondents could not identify the correct option given. Several studies done both in and out of South Africa have shown results similar (poor general knowledge of diabetes) to that of present study.^{13,14,16,17,19,26,30,36,38} Good knowledge of diabetes is essential for self-care practices and glycaemic control. Thus this deficiency needs to be remedied by diabetes health education activities aimed at improving knowledge at the newly formed diabetes clinic at Mokopane hospital. The patients' general knowledge of diabetes need to be improved as this should impact positively on glycaemic control and thus improve the quality of life for patients suffering from diabetes.

One of these studies with a likely explanation for low levels of knowledge was done in South Africa by Moodley and Rambiritch.¹⁴ The black population in their study had low levels of

knowledge compared to other race categories. In their view, this lack of knowledge is not due to low intelligence, but a lack of understanding of diabetes, as a result of being disadvantaged educationally, health wise and in other spheres during the apartheid era. These privileges like health education received both at school and through the media, were not available to most black people. This affected mostly those above 40 years of age. Coincidentally, most of the participants in the present study fall in this age category.

This view was supported by Kagee⁴⁵ whose analysis attributes the low health literacy among blacks to the educational disadvantages and inequalities experienced during apartheid. Another possible reason could be lack of adequate and continuous information by health care workers mostly in public health care services. The scenario described by Kagee is that of congested health care facilities, under resourced, poorly staffed with overworked health care professionals.⁴⁵ These circumstances do not provide a proper environment for providing continuous and sound diabetes self-management education.

Concerning responses to the question on symptoms of hypoglycemia (how would you feel if your blood sugar is low?) 23% of participants were not sure and only about 5% of participants could identify all symptoms. This finding is supported by Upadhyay et al⁴⁶ whose study showed only 31.5% of participants could answer questions on hypoglycemia correctly. Upadhyay et al⁴⁶, also found similar results with only 10.59% of participants answering correctly on questions concerning hypoglycemia.

A possible explanation for this could be because most participants of this study were type 2 diabetics who are mostly on oral hypoglycemic agents. This category of diabetics do not commonly experience hypoglycemic episodes compared to type 1 diabetic patients. Another reason could be because health care providers probably failed to give this information to participants during consultations, as it generally is assumed that patients taking insulin are more prone to having hypoglycemic episodes relative to those on oral hypoglycemic agents. The implication of this response is grave, considering the fact that hypoglycemia can be fatal, if not recognized and managed appropriately.

Participants' lack of knowledge of the symptoms of hypoglycaemia invariably would influence appropriate action to take when blood sugar is low. This is seen when asked what to eat or drink when their blood sugar is low. Over half of participants could only identify one of the four correct options given. Sweets (51%) and sugar (37%) were the options most chosen by participants. Hailu et al⁴⁹ found in Ethiopia among hospital patients, that a sizeable

number of respondents (70%) had knowledge of the signs and symptoms of hypoglycemia and 68.4% knew appropriate response or measure to take during hypoglycemic events. It is possible that the reason for this high level of knowledge concerning this particular question could be because the participants in that study were getting continuous diabetic education from nurses.⁸

Concerning complications of diabetes, of the six correct options provided, only 10.4% of respondents could identify all six correct options given. These findings are in keeping with Moodley and Rambiritch's study¹⁴ where respondents performed poorly on questions to test their ability to identify the associated co-morbidities in diabetes. An exception was blindness as a complication, 78% of participants could identify this as a complication. Moodley and Rambiritch¹⁴ results were corroborated by Mashige et al¹⁵ who also reported that 66.1% of the participants in their study had knowledge of the visual complications of diabetes. Poor knowledge of the complications of diabetes is worrying considering the fact that most type 2 diabetic patients present late, many already with complications. It is therefore important that all diabetics be educated about the commonest complications of diabetes so as to facilitate early detection and management.

It is not encouraging that only 32% of the participants knew the normal fasting blood sugar level in present study. A possible explanation for this response could be because most of the participants in this study do not conduct home monitoring of their glucose level so are not aware of the expected values. In Mokopane hospital glucometers are not routinely given to all patients, and most patients in this community cannot buy their own glucometers (which requires them to constantly purchase the glucometer strips) due to financial constraints.

The lack of knowledge of normal target glycemic values has many implications for patients with diabetes, as it negatively impacts on overall management. Patients who do not know what target control to achieve may not understand and appreciate why they should be proactive in participating in the management of their condition. Furthermore, normal glycemic levels has been shown to be associated with fewer complications of diabetes.¹⁰ Hyperglycemia is also recognized as a significant risk factor for cardiovascular mortality.⁴⁷

The SEMDSA guidelines¹⁰ recommend eye screening (visual acuity and fundoscopy) to be done at first visit and yearly thereafter. This recommendation is more important because some diabetic patients present with complications on their first visit. It is therefore important that patients are aware of the need for annual eye examinations to avoid visual complications

of diabetes. Unfortunately, participants in this study responded poorly to questions to assess their knowledge on the frequency of eye testing. Few participants (18%) knew they should see an ophthalmologist yearly. Other studies have shown similar results.^{47, 19} Mukhopadhyay et al³³ in support of these findings reported that even though 62.5% of patients in their study recognized eye disease as one of the complications of diabetes, only 25% had gone for an eye examination during the last year. Awareness on how often participants needed to do eye examinations was found to be poor in present study. In South Africa, even though Mashige et al¹⁵ reported that participants had good knowledge of visual complications of diabetes, they were not following recommended practice in terms of regular eye examinations. Regular eye examinations is known to identify early changes of diabetic retinopathy and cataract.¹⁰ Based on this finding we could rightly assume that some participants probably have some degree of diabetic retinopathy, considering the fact that this complication is a process that culminates in blindness.

Participants may not entirely be blamed for this lack of knowledge on eye care, as this finding may reflect to some degree a failure in the part of health care professionals, as they are responsible for creating awareness as well as referring patients to ophthalmologist for their routine eye care. It would have been beneficial to know if participants have ever been seen by an eye doctor or had eye examination, also if they have been informed about eye care.

Culture, tradition and religious beliefs influence patients' views concerning disease.^{18,40,48}. This can be seen with the response to the question on who else could treat diabetes. Many participants responded that traditional doctors or spiritual healers could treat diabetes. This finding is important as it is possible that most of these participants could be consulting this group. It is possible that patients' lack of knowledge and understanding of diabetes in terms of its etiology and patho-physiology, treatment and complications could contribute to this health seeking behavior. Based on this, it is therefore important for health care workers to manage patients in such a way as not to dissuade them from their culture and beliefs, but to dialogue with them on possible ways not to allow their practice interfere with treatment offered at medical facilities. This behavior needs further exploration and possibly to include these healers in the diabetic clinic team.

The report by Mfunda et al⁴⁸ supports the findings in present study, in showing that participants sought traditional and spiritual treatment for diabetes. Prayer, faith and herbal medication are also believed to treat diabetes.^{17,18}

5.4 Knowledge of self-care

Knowledge of self-care in this study was generally good with over half of the participants being able identify three of the four questions to assess knowledge of self-care. Participants were asked about the importance of diet, exercise, foot care and who they thought was the most important person in the management of their diabetes.

It was interesting to note that even though knowledge on self-care was good, participants were not aware that they were the most important people in managing their condition, with only 27% of participants responding correctly. Most participants responded that doctors were the most important people in the management of their diabetes. It is of importance that patients with diabetes understand their importance in managing their condition as the essence of self-care identifies the patient as the most important person in management.¹⁰ This lack of knowledge and confidence needs to be addressed as it impacts greatly on their self-care practice.

5.5 Reported Practice of Self-Care

The practice of self-care is time consuming and requires motivation and support.^{10,11} This statement is reflected in the findings from present study that show an overall inadequacy in most of the diabetes self-care practices explored.

An exception to the above was the very good response to the questions to assess dietary self-care practices. 86% of participants responded that they had adjusted the way they eat since diagnosis. In keeping with this findings are results by other researchers.^{33, 34, 41, 49}

In Mukhopadyays' view³³, the reason for this high response to dietary self-care practice is the influence of dieticians who were involved in motivating participants. In Mokopane hospital dieticians are also involved in diabetes care and they have regular sessions with diabetic patients. This could be the reason for the high response to dietary self-care practices. This is

encouraging, as it indicates that educating patients on their condition specifically diabetic self-care can influence behavior and lifestyle changes.

However only a small proportion of participants always followed this dietary adjustment (23%). 14% of participants never continued this lifestyle change. This could be due to the participants not being able to afford a special diet that is different from that of other family members. It is important to create awareness amongst participants of other more sustainable and affordable ways of adhering to recommended dietary self-care practice such as growing vegetable gardens, eating fruits in season amongst others, this is the task of health care workers and should be done in collaboration with the community teams. Other researchers have reported inadequate dietary self-care practices.^{46, 49}

Unfortunately, participants' inability to always follow recommended dietary practices make diabetic care difficult. The best advice is given by specialists in that field (medical nutritional advice) and this has been shown to delay the onset of diabetes related complications and reduces HbA1c by 1-2% depending on the duration of diabetes.^{2, 10}

It is evident from the present study that participants are not following dietary measures in terms of the required fruit and vegetable intake. The question on the number of servings of fruit and vegetable consumed most days (three or more fruits) revealed that only 12% of the participants always eat three or more servings of fruits and vegetables. 36% of participants reported that they never eat this recommended quantity. The number of fruits and vegetables was reduced from initial five as in the SCDA Scale⁴³ to three because the majority of participants are from rural and semi-rural areas with low economic backgrounds. The researcher assumed they probably would not be able to afford eating five servings of fruits and vegetables.

Mokopane hospital is in the process of starting a comprehensive diabetic care plan, thus whatever knowledge patients previously possessed has been imparted sporadically by the health care staff. The exact dietary adjustments patients have made was not explored, however most of the participants indicated that they had adjusted the way they eat since diagnosis. Thus diabetic patients in this study have a good knowledge of the diet recommendations for diabetics however they do not always follow this eating plan. It is important to create awareness amongst participants of other more sustainable and affordable ways of adhering to recommended dietary self-care practice such as growing vegetable

gardens, eating fruits in season amongst others, this is the task of health care workers and should be done in collaboration with the community teams.

Participants also reported poor practice concerning exercise. Only 18% of participants responded to always following recommended exercise requirements. Several studies have shown poor practice of exercises as it relates to diabetes self-care.^{21, 33, 46, 49}

Ayele et al²¹ reported poor self-care practice on exercise. With the inadequate self-care practices on exercise from this study, achieving glycemic control will be more difficult for participants, as exercise has been shown to impact on glycemic control, reduce cardiovascular risk factors, contribute to weight loss and improve general well-being.^{10,49,51} Hailu et al⁴⁹ on the other hand reported a much higher exercise participation, in their study.

In present study, the mean age of the participants was 54 years. A significant number of participants were above 60 years of age. It is normally expected that this age group tend to have more co-morbid conditions that may limit physical activity, and may possibly be the reason behind this poor self-care activity. Probably the best approach here would be to individualize this aspect of care, to encourage participants to engage in activities according to their personal tolerance. Self-care practice concerning checking of blood glucose at home was also found to be inadequate in this study. It was the self-care practice with the worst response. Other researchers have reported similar findings.^{33,34,46,49} Unfortunately, only patients who have type 1 diabetes or type 2 patients on insulin are given glucometers in Mokopane hospital. As most of the study participants have type 2 diabetes, they do not have glucometers to enable them engage in this self-care activity, also due to their economic status cannot afford to buy glucometers which involves constantly buying the strips used. Home self-monitoring of blood sugar is particularly important in patients on insulin.⁵¹ There has also been controversy on the clinical importance and cost effectiveness of routine self-monitoring of blood glucose by non-insulin treated patients.⁵²

Foot self-care activities were also poor. This result is supported by other studies^{23, 24, 33, 36} which also showed participants to have poor foot care practice. The highest response was drying between the toes after washing, 29% of participants responded to always practicing this self-care. It is possible that this response could be because washing of feet during bath time is part of most participants' daily routine. This inadequate foot care practice could lead to foot ulcers and amputations.¹⁰ It would have been more reliable to have observed this

particular self-care activity rather than depend on reported practice, as participants may demonstrate what they do better.

Reported medication adherence had one of the highest rates of self-care practice. 73% of participants either always or mostly complied with medication use. The reason for this high response could possibly be due to the emphasis placed on medication adherence by the health care teams.

Ayele et al²¹ also reported high adherence to prescribed medication in their study. 78% of participants were found to comply well with prescribed drugs. Other researchers have also reported high adherence to treatment.^{33, 34}

5.6 Association between glycemic control (HbA1c) and knowledge of diabetes

One of the objectives of this study was to determine the strength of association between knowledge of diabetes and control of diabetes using HbA1c. This study showed no statistically significant association between knowledge of diabetes and glycemic control. This is in contrast to other studies where diabetic education and knowledge have been shown to improve glycemic control.^{2,12,34,49,51} Specifically one of such studies by Hailu et al⁴⁹ showed that patients who had knowledge of diabetes were twice likely to have better glycemic control than those who were not as knowledgeable. In support of present study, no relationship was found between knowledge of diabetes and HbA1c by Redmond.²⁴

5.7 Association between knowledge of diabetes and self-care.

Findings from this study support reports by other studies where knowledge of diabetes does not automatically translate to practice of diabetes self-care. Ayele et al²¹ showed participants in their study had good knowledge of diabetes (93.2%), but self-care practices were low (39.2%). The discrepancy among participants in this study may be financially as most cannot afford glucometers, low carbohydrate, and high fiber diets or eat a variety of fruits and vegetables daily. Assessing other factors that may influence the practice of self-care would be constructive as to address these specific reasons.

5.8 Association between self-care and diabetes control

This study showed a statistically significant association between wiping in between toes after washing and glycaemic control (HbA1c). The reason for this isolated association is not really known. Even though this association was found, it may not be meaningful in this context. There was no statistically significant association found between other practices of self-care and HbA1c, though the practice of self-care as well as diabetes control of participants respectively in present study were poor. The trend from other studies also show isolated significant association between selected domains of self-care and glycaemic control ^{34,24} The lack of association between these two variables in present study could be explained from the sample selection in which all patients did not have an equal chance of being selected, meaning the sample was not representative of all patients. Also this being a hospital based study, the study was carried out among hospital patients and diabetic patients in a hospital are usually uncontrolled. Those that are controlled are referred to the clinics.

Knowledge of self-care has been shown to have a positive effect on glycaemic control as well as reduction in general diabetic complications. Specifically education and training of diabetic patients on self-care has been shown to reduce HbA1c levels.⁵⁴ This prompted a need to analyse possible association between these two variables in this study.

This study did not show any statistically significant association between knowledge of self-care and HbA1c. This may be due to the hospital sample and the convenient sampling method as mentioned above.

There was no statistically significant association found in this study between perception of diabetes self-care and glycaemic control (HbA1c). It is assumed that with the right attitude towards diabetes self-care, behavioural changes would promote better participation in self-care. This will lead to better outcomes for patients. Kachaban⁴¹, whose report shows a statistically significant association between level of attitude of participants towards self-care and level of self-care behaviours, supports this notion. Even though this association was not found in this study, the reports established that participants had good perception of diabetes self-care. This possibly may affect behavioural changes toward achieving better diabetic control with a well-established diabetic education programme over time.

5.9 Limitations of this study

Convenient sampling was used and may have led to selection bias as it did not give an equal chance of being selected to all eligible participants. Thus the sample may not be representative of the study population.

The small sample size limits the ability of this study to generalize findings to all patients attending Mokopane hospital and to other geographic sites.

This study was done in a diabetic clinic of a regional hospital and the results may not represent diabetic patients in other settings. It also assessed self-care activities from questionnaires and these may differ from what patients actually practice. However by allowing for confidentiality and anonymity in the questionnaire as opposed to interviews, the researcher tried to minimize this reactivity bias.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions.

The following conclusions were drawn from the findings of this study:

- Knowledge of diabetes, as well as reported self-care practices among participants was generally poor.
- Although participants' self-reported knowledge of aspects of diabetes self-care was good, the poor reported diabetes self-care practices and glycaemic control in the vast majority of participants highlight the challenges of translating knowledge into practice to effect a behavioural change.
- Participants had low knowledge about who else could treat their diabetes apart from doctors.
- Most participants either believed traditional healers can cure diabetes or were not sure.
- Participants' responses on dietary self-care practices since diagnosis of their diabetes were good.
- Participants' socio-demographic characteristics, self-care practices, knowledge of both diabetes and aspects of diabetes self-care do not significantly influence glycaemic control.
- The majority of participants were non-smokers of cigarettes.

6.2 Recommendations

It is recommended that:

A formal diabetic education programme be established to include self-management education to improve patients' control of diabetes. There is a need for this programme despite the lack of association between self-care and diabetes control among these participants as these hospital based patients are those with uncontrolled diabetes and may not have knowledge of alternative dietary choices besides those prescribed in western styled leaflets. Thus even with their low income, they will be provided with information in this education programme on cheaper, locally available dietary choices.

- This programme should aim to make patients understand the causes (aetiology) of diabetes, expected control target values, disease process, acute and chronic complications and how to deal with this when it arises.
- The importance of the patient as the key person in self-management should be stressed upon regularly, since most of the participants in this study thought and expected management from their doctors. An appreciation of their central importance and self-control will assist in self-care practices.
- Traditional healers should be incorporated in the hospital diabetic management program as many participants stated that traditional healers are important in the management of their diabetes.

- Measures should be put in place where participants can regularly check their blood sugar at nearest clinics to their homes. This is important as most of them may not be able to afford glucometers.

Further research should explore if participants had ever received any form of education on diabetes from health care workers. This should include diabetes education, how it was given, frequency and self-care activities like foot care should be observed rather than reported.

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6. What is your main source of income?

Mother		Father		Personal		Grant		Children		Relatives		Others (specify)	
Yes		Yes		Yes		Yes		Yes		Yes		Yes	
No		No		No		No		No		No		No	

7. What was the highest level of education you attained?

None	Primary Completed	Primary not Completed	Secondary Completed	Secondary not Completed	Tertiary

8. Who prepares your food most of the time?

Self	Spouse	Children	Relative (please specify)	Others (specify)

B. Diabetes Knowledge

This part of the questionnaire is to help us understand how much you know about diabetes. Please choose as many answers as you think are correct and feel free to ask for clarification, where you are not clear.

9. How would you feel if your blood sugar is low?

Hunger	Mood swings	Irritability	Confusion	Sweaty	Not sure

10. What is the normal blood sugar?

0-2mmol/l	2-4mmol/l	4-6mmol/l	6-10mmol/l	10-12mmol/l	Not sure

11. What should you eat OR Drink if your blood sugar is low?

Juice	Milk	Sweets	Sugar	Not sure

12. What are the long-term complications of diabetes?

- What are some of the bad things diabetes can do to you, after a long time?

Blindness / problems with eyes and seeing	Kidney damage	Lead to some part of your hands or leg being	Pain/loss of feeling in hands and feet	Poor erection during sex	Heart problem	Not sure

		cut off				

13. How often should you see an Eye Doctor?

Yearly	2-3 Yearly	More than 3 yearly	Not sure

14. Who else apart from Doctors can treat Diabetes?

Traditional doctors	Spiritual healers	Others (specify)

C. SELF- CARE ACTIVITIES

C1.Diet and Exercise

15. Have you adjusted the way you eat since you had diabetes? (Eating less food, more Vegetables, low fat or fat free foods, more fruits, brown bread, no or less sugar, brown mealie meal and rice, etc)

Yes	
No	

16. Are you still following the above eating plan?

always	
Mostly	
Sometimes	
never	

17. Do you eat three or more servings of fruits and vegetables most days?

always	
mostly	
Sometimes	
never	

18. Have you been exercising since you had diabetes (at least 30 mins of physical activity per day)

always	
mostly	
Sometimes	
never	

C.2 Blood Sugar Testing

19. Do you regularly test your blood sugar at home?

always	
mostly	
Sometimes	
never	

C.3 Foot Care

20. Do you check your feet for colour change, wound, cracks, and swellings?

Always	
Mostly	
Sometimes	
Never	

21 Do you inspect the inside of your shoes?

Always	
Mostly	
Sometimes	
Never	

22. Do you dry between your toes after washing?

always	
Mostly	
Sometimes	
Never	

C4. Medication

23. Do you take your pills/injection according to how you were told to do?

always	
Mostly	
Sometimes	
Never	

C5. SMOKING

24. Do you smoke cigarette?

Yes.	No

25. If yes, how many cigarettes do you smoke on an average day?

26. When did you last smoke a cigarette?

More than two years ago, or never smoked	Four to twelve months ago	One to three months ago	Within the last month	Today

C6. HEALTH/ DISEASE PROFILE

27. How long have you had diabetes?

<6 Months	1-5 years	5-10 years	>10 years

28. What type of diabetes do you have?

Type 1	Type 11	Others (Specify)

29. What medication do you take for diabetes?

Pills Only	Injection Only	Pills and Injection	Others (specify)

30. How many tablets are you taking for diabetes?

One	More than one

31. Do you suffer from any other condition for which you are taking treatment?

High blood pressure	Heart disease	Asthma	Epilepsy	Mental disease	Others (please specify)

32. Do you have any disabilities? Please tick appropriately.

Poor vision	Loss of leg, finger, or hand from diabetes	Permanent weakness of a part of your body	Walking with aid	Others (specify)

33. During the past one year, how many times were you admitted for problems related to diabetes?

0	1-2	2-4	4-6	>6

34. Do you require assistance from people in taking care of yourself?

sometimes	Always	Mostly	Never

35. Have you ever received traditional medication for diabetes?

Yes	No

36. Are you still using traditional medication?

Yes	No

D. Perception of diabetes self-care

37. Is the type of food you eat important in controlling blood sugar?

Yes	No	Not sure

38. Do you think exercise is important in managing diabetes?

Yes	No	Not sure

39. Do you think checking your feet EVERY DAY is important in managing diabetes?

Yes	No	Not sure

40. Who is the MOST IMPORTANT person in management of diabetes?

Doctor	Self	Not sure	Others (please specify)

APPENDIX 2: ETHICS CLEARANCE CERTIFICATE



UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
 Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
 R14/49 Dr Inyang Etukudo

CLEARANCE CERTIFICATE**M120534****PROJECT**

Patient-Reported Knowledge, Perception and
 Practice, Regarding Diabetic Self-Management
 Skills and Behaviours, in Mokopane Provincial

Hospital

INVESTIGATORS

Dr Inyang Etukudo.

DEPARTMENT

Department of Family Medicine

DATE CONSIDERED**DECISION OF THE COMMITTEE***

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE**CHAIRPERSON**


 (Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Professor Ian Couper

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

APPENDIX 3: ETHICS CLEARANCE CERTIFICATE.



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

**ETHICS COMMITTEE
CLEARANCE CERTIFICATE
UNIVERSITY OF LIMPOPO
POLOKWANE MANKWENG HOSPITAL
COMPLEX**



PROJECT NUMBER : PMREC – 53/2013

TITLE : Patient – reported knowledge, perception and practice
regarding diabetic self-management skills and
behaviours in Mokopane provincial hospital

RESEARCHER : Dr I Etukudo

ALL PARTICIPANTS : N/A

Supervisor : N/A

DATE CONSIDERED : 27 February 2013

DECISION OF COMMITTEE

- Recommended for approval

DATE : 05 March 2013

PROF A J MBOKAZI
Chairperson of Polokwane Mankweng
Hospital Complex Ethics Committee



NOTE: *The budget for research has to be considered separately. Ethics committee is not providing any funds for projects.*

APPENDIX 4:



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

**DEPARTMENT OF HEALTH & SOCIAL DEVELOPMENT
MOKOPANE PROVINCIAL HOSPITAL**

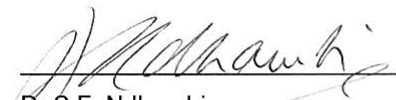
Date : 28th June 2011

TO WHOM IT MAY CONCERN.

POST GRADUATE RESEARCH : DR I.O. ETUKUDO.

TOPIC: PATIENT-REPORTED KNOWLEDGE, PERCEPTION AND PRACTICE
REGARDING DIABETES SELF MANAGEMENT SKILLS AND BEHAVIOUR IN MOKOPANE
HOSPITAL.

1. The above matter has reference.
2. This letter serves to inform whoever it may concern and gives the bearer permission from the Senior Clinical Manager's Office to conduct a research as outlined above.
3. Hoping that this meet with the co-operation of heads of sections.


Dr S.F. Ndhambi
Snr Clinical Manager



Mokopane Provincial Hospital Private Bag X2466 Mokopane,
0600 Tel (+27 15) 483 4000 Fax (+27 15) 483 0545
ndhambisf@dhw.norprov.gov.za



APPENDIX 5: INFORMATION SHEET FOR PARTICIPANTS. PRINCIPAL RESEARCHERS CONTACT DETAILS

Good day,

My name is Dr. Inyang Etukudo. I am a postgraduate student in the family medicine department of the University of the Witwatersrand. I am carrying out a study on diabetes. I will be most grateful if you would consider taking part in this study. It is being carried out as part of postgraduate studies in the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg.

The purpose of this study is to give us an idea of how much you know about diabetes, and how you are involved in taking care of yourself at home.

Other studies, carried out in other countries, and certain parts of South Africa, have shown that, when people with diabetes know more about their condition as well as get involved with taking care of themselves at home as directed, their diabetes will be better controlled. We think that if we find out how much you know about diabetes and how you take care of yourself at home, we may be able to add to what you already know or don't know, as well as identify areas that need improvement or assistance, in order for us to offer the best care possible.

We will be communicating with you through some questions, which will be read to each person, while we tick the answers accordingly. This process will take about 15 minutes of your time. Any information provided by you for this study, will be kept anonymous and confidential. Your names and addresses are not required. Participation in this study is completely voluntary. You may withdraw from it at any time, without having to give a reason. This will not affect our service to you in any way.

TITLE OF RESEARCH:

PATIENT-REPORTED KNOWLEDGE, PERCEPTION AND PRACTICE,
REGARDING DIABETIC SELF-MANAGEMENT SKILLS AND
BEHAVIOURS, IN MOKOPANE PROVINCIAL HOSPITAL

NAME OF RESEARCHER: Dr Inyang Etukudo

WORK ADDRESS: Mokopane Provincial Hospital. Bag X2466 Mokopane

WORK TELEPHONE NO: 0154834000

CELLULAR NO: 0768433340

APPENDIX 6: CONSENT FORM FOR PARTICIPANTS.

TITLE OF RESEARCH:

PATIENT-REPORTED KNOWLEDGE, PERCEPTION AND PRACTICE,
REGARDING DIABETIC SELF-MANAGEMENT SKILLS AND
BEHAVIOURS, IN MOKOPANE PROVINCIALHOSPITAL

I have been fully informed about the research project. I understand the process. I also understand that I am at liberty to withdraw my consent and discontinue participation in the study.

PARTICIPANTS

NAME:

.....

DATE.....

PARTICIPANTS SIGNATURE.....

I have explained the process fully. I have asked if participants understand the procedure, and if there are any questions. I have answered all questions to the best of my ability.

RESEARCHERS NAME.....

DATE.....

RESEARCHER'S SIGNATURE.....

KAROLO 7: DIPOTSISO GO BATSEAKAROLO MO POLEDISANONG

Karolo ye, e mabapi le lena. Leina le bodulo ga di nyakege, fela bolela nnete ka mengwaga ya gago, bong le ba lelapa. Ka kgopelo, kgetha karabo e tee fela moo o sa kgoneng go kgetha karabo go tsea le di pilweng, kgetha tse dingwe mme o tthalose karabo ya gago. Dikarabo tsa lena di tla supiwaga go tswa mo dipotsisong.

.Letsatsi: 2012..... .Nomoro ya motseakarolo.....

.Diteko tsa madi go labella tekanyo ya sukiri mo mading.....

.Motho yo a botsisang dipotso.....

A. TSA BOEMO BJA KA GAE

1. Mengwaga ya gago ka nako ya letsatsi la gago la bofelo la matswalo?

2. Bong

Banna	Basadi

3. O soma kae? (Hlalosa ge o sa shome)-----

4. Polelo ya ka gae?

Sepedi	Sesotho	Setsonga	Sevenda	Sezulu/ Xhosa	English	Afrikaans	Tsedingwe (Hlalosa)

5. O nna le mang?

Mma le Papa	Mma	Mosadi	Monna	Tate	Ke Tee	Ba bang(hlalosa)
Eya		Eya		Eya		
Aowa		Aowa		Aowa		

6. Go na le tshelete e o e humanang?

Mma	Papa	Ya gago	Mphiwa fela	Bana		Meloko	Ye mengwe (hlalosa)
Eya		Eya		Eya		Eya	Eya
Aowa		Aowa		Aowa		Aowa	Aowa

7. Thuto tsa godimo tse o nang le tsona?

Selo	Thuto tsa fase	Ga wa fetsa dithuto tsa fase	Thuto tsa gare	Ga wa fetsa dithuto tsa gare	Thuto tsa godimo

8. O apeela ke mang ka gae ka nako tse ntshi?

Nna	Molekane	Bana	Wa leloko (hlalosa)	Ba bangwe (hlalosa)

B. TSEBO KA BOLWETSI BJA SWIKIRI

Karolo e, e tlare thusa go tseba gore rekwisisa go le kae ka bolwetsi bja swikiri. Ka kgopelo, kgetha dikarabo ka bontshi ka mo o ka kgonago. Mo o sa kwesiseng, botsisa re go thuse.

9. O kwa bjang ge swikiri e le fase?

Tlala	Maikutlo a fetoga	Fela-fela pelo	Hlakahlakana monagano	Kudumela	Ga o tsebe

10. Swikiri e lekanetse ke bokae?

0-2mmol/l	2-4mmol/l	4-6mmol/l	6-10mmol/l	10-12mmol/l	Ga o tsebe

11. Ge swikiri e le fase o swanetse go nwa goba go ja eng?

Juice	Maswi	Malekere	Swikiri	Ga o tsebe

12. Ditlamorago tsa bolwetsi bja swikiri ke dife?

- Tse dingwe tse di ka go diragalelang ka morago ga nako e telele o na le swikiri ke dife?

Bofofu / mathata a mahlo	Dipsio di ka senyega	Karolo ya leoto goba letsogo e ka kgaolwa	Bohloko/go hloka dikwi mo matsogong le maotong	Bonn abo ka ba bokoa	Mathata a pelo	Ga o tsebe

13. O swanela go bona ngaka ya mahlo ga kae?

Ka ngwaga	2-3 ka ngwaga	Go feta ga raroka	Ga o tsebe
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		ngwaga	

14. Ke mang ka ntle le ngaka ya sekgowa yo a ka go thusang ge o ena le bolwetsi bja swikiri?

Ngaka ya setso	Ngaka ya semoya	Ba bang (hlalosa)

C. O ka ithlokomela bjang?

C1.Dijo le go itshidilla

15. Na o amogetse dijo tse o di jang go tloga mola o swrang ke bolwetsi bja swikiri? O ja dijo tse dintshi goba tse nnyane, merogo, makhura, maungo a mantshi, borotheo bjo bo tsotwa, o fokoditse swikiri mo dijong goba o ja dijo tsa go hloka swikiri, bupi bjo bo tsotwa goba reisi e tsotwa?

Eya	
Aowa	

16. Naa o sala morago lenaneo le le lego mo godimo la go ja?

Ka mehla	
Ka nako tsohle	
Nako e nngwe	
Ga ke le salemorago	

17. Afa o ja maung goba merogo ga raro ka matsatsi a mantshi?

Ka mehla	
Ka nako tsohla	
Nako e nngwe	
Ga ke je maung le merogo	

18. Naa o a itshidilla go tloga mola o tsebang gore o na le bolwetsi bja swikiri (selekano sa metsotso e masome tharo ka letsatsi)

Ka mehla	
----------	--

Ka nako e ntshi	
Nako e nngwe	
Ga ke itshidille	

C.2 Diteko tsa madi

19. Afa o dira diteko tsa madi ka gae ka nako tsohle?

Ka mehla	
Nako e nngwe	
Nako e ntshi	
Ga ke dire diteko	

C.3 Hlokomelo ya maoto

20. O hlokomela maoto a gago ge a fetoga mmala, ge a na le dintho, ge a ngwarogile, le ge a ruruga?

Ka mehla	
Ka nako e ntshi	
Ka nako e nngwe	
Ga ke a hlokomele	

21 Naa o hlokomela dieta tsa gago ka mo gare?

Ka mehla	
Ka nako e ntshi	
Ka nako e nngwe	
Ga ke di hlokomele	

22. O phumula mo gare ga menwana ya maoto ge o fetsa go hlapa?

Ka nako tsohle	
Ka nako tse ntshi	

Ka nako enngwe	
Ga ke phumule	

C4. DIHLARE

23. Naa o nwa dipilisi le go hlaba tshwana go ya le kamo o laetswego?

Ka mehla	
Ka nako e ntshi	
Ka nako e nngwe	
Ga ke new le go hlaba	

C5. GO TSUBA

24. Naa o a tsuba?

Eya	Aowa

25. Ge o tsuba, o tsuba disekerete tse kae ka letsatsi?

26. O tsubile la mafelelo neng?

Mengwaga ye e fetago e mebedi e fetilego, goba ga se nke wa tsuba	Dikgwedi tse nne go ya go tse lesome tse di fetilego	Kgwedi e tee goya go tse tharo tse di fetilego	Mo kgweding ye e fetilego	mamothla

C6. TSA MAPHELO / BOLWETSI

27. Ke nako e kae o na le bolwetsi bja swikiri?

Tlase ga kgwedi tse tshela	Ngwaga go ya go mengwaga ye mehlano	Mengwaga ye mehlano go ya go ye lesome	Go feta mengwaga ye lesome
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28. Naa o na le mohuta o fego wa swikiri?

Mohuta wa pele	Mohuta wa bobedi	Mohuta wo mongwe (Hlalosa)

29. Naa o nwa dihlare tse feng?

Dipilisi fela	O hlaba tshwana fela	Dipilisi le tshwana	Tse dingwe (hlalosa)

30. Naa o nwa dipilisi tse kae?

E tee	Go feta e tee

31. O na le bolwetsi bjo bongwe bjo o nwang dihlare tsa bjona?

Madi a magolo	Bolwetsi bja pelo	Go thibana mafahla	Bolwetsi bja go wa	Bolwetsi bja monagano	Malwetsi a mangwe (hlalosa)

32. O na le bogole? Supa mo go lebanego.

Ga o bone ga botse	Tahlegelo ya maoto, menwana goba matsogo	Bokowa mo mmeleng	O sepela ka patla	Tse dingwe (hlalosa)

33. Ngwaga o fetilego o robetse ga kae mo sepetlele ka baka la swikiri?

0	1-2	2-4	4-6	>6

34. O hloka motho yo aka go hlokomelago?

Ka nako e nngwe	Ka nako tsohle	Ka nako e nsthi	Ga ke hloke motho

35. Naa o kile wa hloka dihlare go tswa ngakeng ya setso?

Eya	Aowa

36. Le bkale o sa somisa dihlare tsa setso?

Eya	Aowa

D. Kgopo ya go ihlokomela ge o na le bolwetsi bja swikiri

37. Naa o gopola gore dijo tseo o di jago di thusha go laola bolwetsi bja swikiri?

Eya	Aowa	Ga ke tsebe

38. Naa o gopola gore go itshidulla go thusha go laola bolwetsi bja swikiri?

Eya	Aowa	Ga ke tsebe

39. O gopola gore go lekola maoto a gago tsatsi ka tsatsi go thusa go laola bolwetsi?

Eya	Aowa	Gake tsebe

40. Ke mang yo bohlokwa go laola bolwetsi bja swikiri?

Ngaka	Ka bonna	Ga ke tsebe	Ba bangwe (hlalosa)