Development and Implementation of an Educational Programme to Enhance Health Literacy on Prescribed Medication Instructions among Diabetes Mellitus Patients on Treatment at Ga-Dikgale Village Clinics in Capricorn District, Limpopo Province

By

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THESIS

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DECLARATION

I declare that the DEVELOPMENT AND IMPLEMENTATION OF AN EDUCATIONAL PROGRAMME TO ENHANCE HEALTH LITERACY ON PRESCRIBED MEDICATION INSTRUCTIONS AMONG DIABETES MELLITUS PATIENTS ON TREATMENT AT GA-DIKGALE VILLAGE CLINICS IN CAPRICORN DISTRICT, LIMPOPO PROVINCE (thesis) hereby submitted to the University of Limpopo, for the degree of Doctor of Philosophy in Nursing Science has not previously been submitted by me for a degree at this or any other university; that it my own work in desiogn and in execution, and all the material contained herein have been duly acknowledged.

…… ……

Ngoatle, C (Ms) Date

DEDICATION

This thesis is dedicated to my mother, Masesi Masendizi Malomane, my three sisters namely; Sharon Rose Maphopha, Dorcus Kholofelo Malomane and Reneiloe Malomane for their immeasurable support so that I could press on. Most of all I would like to dedicate this to my lovely daughter Desire Omohau Ngoatle, and the diabetes mellitus patients at Ga-Dikgale village clinics.

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ABSTRACT

Health literacy related to medication use or instructions is crucial to diabetes mellitus patients. The verbal or written instructions are given to diabetes mellitus patients regarding medication use is important to improve patient care, safety, and compliance to treatment. However, the information provided to diabetes mellitus patients regarding medication use is not known as they continue to experience complications.

The study aimed to develop and implement an educational programme, to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province. The objectives of the study were to explore the knowledge, and practices of diabetes mellitus patients on treatment. Thus, to describe the provided information regarding prescribed medication usage contained in the diabetes mellitus medication packaging, medicine leaflets, and prescriptions. Therefore, to also describe the effects of poor health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province.

Data were collected using a mixed-method approach and a mixed-method sampling technique was used to select 18 participants for the qualitative strand. Whereas, there were 137 respondents for the quantitative strand. Tesch's proposed eight steps to analyse the data were adopted to analyse the qualitative data and SSPS version 25 was used for analysing quantitative data.

The results showed the following findings: patients lack knowledge about diabetes as a disease, misinterpret medication instructions, and are non-compliant to the treatment. This non-compliance is intensified by negligence and poor comprehension of medication instructions.

As a result, to help diabetes mellitus patients with compliance with diabetes treatment, ongoing implementation of the educational programme should be instituted. The Limpopo's Department of Health has to offer in-service

education to the health professionals, who dispense medications on the interpretation of medication instructions. The high school curriculum is ought to incorporate health literacy to prescribe medication instructions.

Keywords: Educational programme, Health literacy, Prescribed medication, Instructions, Diabetes mellitus Patients, Treatment.

LIST OF ABBREVIATIONS

BPDM	:	Basic Program Development Model
CEO	:	Chief Executive Officer
CNCDs	:	Chronic Non-Communicable Disease
DM	:	Diabetes Mellitus
DMPs	:	Diabetes Mellitus Patients
DoH	:	Department of Health
HDSS	:	Health and Demographic Surveillance System
IOM	:	Institute of Medicine
NAAL	:	National Assessment of Adult Literacy Survey
NCDs	:	Non-communicable Diseases
NLR	:	Narrative Literature Review
PCSA	:	Pharmacy Council of South Africa
PHC	:	Primary Healthcare
PNs	:	Professional Nurses
REALM	:	Rapid Estimate of Adult Literacy in Medicine
SA	:	South Africa
SEA	:	Sustainable Energy Africa
SPSS	:	Statistical Packaging for Social Science
TOFHLA	:	Test of Functional Health Literacy in Adults
TREC	:	Turfloop Research and Ethics Committee
T2D	:	Type 2 Diabetes Mellitus
UK	:	United Kingdom
US	:	United States
WHO	:	World Health Organisation
WRAT	:	Wide Range Achievement Test

DEFINITION OF KEY CONCEPTS

- **Educational programme**

The educational programme is defined as a programme comprising a set of educational activities or communication formulated, to accomplish pre-planned learning objectives over a continuous period (United Nations Educational Scientific & Cultural Organisation (UNESCO), 2012). In this study, an educational programme shall mean a programme providing health literacy to diabetes mellitus patients about prescribed medication instructions.

- **Health literacy**

Vidgen (2016) defines health literacy as the individual's capability to make thorough health decisions in the context of everyday life; at home, in the community, at the workplace, the healthcare system, the market place, and the political arena. In this study, health literacy shall mean the individuals' ability to comprehend prescribed medication instructions at Ga-Dikgale village clinics.

- **Prescribed medication**

Prescribed medication is defined as the medication ordered by a licensed medical professional, typically the medical doctor (Sfetchu, 2014). This study describes prescribed medication as a medication taken by diabetes mellitus patients at Ga-Dikgale clinics to treat non-communicable diseases.

- **Instructions**

Instructions are defined as detailed information on how something ought to be used or done (Stevenson, 2011). In this study, instructions means that the information provided on the medication leaflets, packaging for diabetes mellitus treatment, and also the information given by Professional Nurses regarding the medication useage.

- **Diabetes mellitus Patients**

Patients are defined as individuals diagnosed with diabetes mellitus awaiting or undergoing medical treatment and care (Berman & Snyder, 2012). In this study, diabetes mellitus patients refers to patients undergoing diabetes mellitus treatment and care at Ga-Dikgale village clinics.

- **Treatment**

Treatment is defined as the management and care of a patient to combat a disease or disorder (OSHA, 2012). In this academic work treatment is described as the prescribed diabetes mellitus medication.

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND

Health literacy related to the use of medication or instructions is crucial to diabetes mellitus patients. The verbal or written instructions are given to diabetes mellitus patients, regarding the use of medication, to improve patient care, safety and compliance to treatment (Krass, Schieback & Dhippayom, 2015; McGovern, Tippu, Hinton, Munro, Whyte & de Lusignan, 2016). Information provided to the patients determines their treatment outcome. Thus, the patients could suffer because of deficiency in knowledge about their prescribed medications (Singh, Singh, Kumar, Bhandari, Kaur & Dureja, 2013) based on the instructions given by the Professional Nurses (PNs).

In the primary Healthcare (PHC) setting, the Professional Nurses (PNs) are responsible for dispensing medications and giving instructions to patients on how to use the treatment. The type of information given to patients, including diabetes mellitus patients regarding medication use, is not known. The PNs are expected to have a dispensing course which is registered with the Pharmacy Council of South Africa (PCSA). However, verbal communication varies with individual healthcare practitioners.

According to De Brincat (2012), non-compliance to medication due to poor health literacy remains a major public health challenge. Hence, it can hinder improvement in patients' conditions causing deterioration in their health. Numerous factors contribute non-compliance to diabetes mellitus treatment including poor health literacy. Where patients fail to comprehend medication instructions irrespective of their general literacy level (Manobharathi, Kalyani, Felix & Arulmani, 2017). Yet, there has been a scarcity of studies that assess instructions given by PNs to diabetes mellitus patients on how to take medications.

Low health literacy level is among the factors that contribute non-compliance to medication and it negatively impacts patients' health status and disease control

(DeMarco & Nystrom, 2010). Patients with low health literacy levels are unable to follow instructions on medications resulting in frequent hospitalisations. De Oliveira and McCarthy (2015) aver that inadequate health literacy has been linked to poor medical information comprehension and poor understanding of discharge instruction, which affects adherence to medication. Low health literacy associated with poor outcomes, involves a higher risk of mortality, poor overall health status among older people, incapability to exhibit taking medications correctly, and inability to interpret labels and health messages (McClintock, Schrauben, Andrews, Aber & Wiebe, 2017).

On the other hand, health literacy is crucial in increasing patients' control over their health, their ability to look for information, and their ability to take responsibility for their health (Vidgen, 2016). Health literacy is critical to the public's health because it can empower patients to learn new information and unlearn outdated ones, to maintain good health and act as informed patients (Hoffman-Goetz, Donelle & Ahmed, 2014).

More than one in three adults in the United States (US) has low health literacy while in Australia about 60% of the population has limited health literacy (Kountz, 2015; McGovern & Smyth, 2011). These people with low health literacy are more likely to make medication errors (Kountz, 2015) and there is also a risk of increased mortality resulting from limited health literacy (McGovern & Smyth, 2011) in this group. Hence, Safeer and Keenaan (2005) and, McGovern and Smyth (2011) avow that insufficient health literacy contributes to poor compliance, uncontrolled chronic disease, poor health knowledge, higher mortality, and escalating health care costs. On the other hand, adequate health literacy among Chines American patients is considerably connected to increased medication knowledge and decreased medication discrepancy (Qin, Chen, Mehta & Kuo, 2015).

Diabetes mellitus patients with insufficient health literacy have poorer glycaemic control and difficulty in controlling the disease than patients with adequate health literacy skills (Safeer & Keenaan, 2005). In South India, inadequate patients' knowledge and lack of awareness about the importance of compliance have been

identified as contributory factors to medication non-adherence (Divya & Nadig, 2015).

Kwa-Zulu Natal (KZN) former Premier, W. Mchunu affirmed that many preventable diseases contribute to undermining the health and quality of life of many individuals in the province due to poor health literacy (Ntuli, 2016). Mchunu's statement concurs with Capoccia, Olegard, and Letassy (2015) who indicated that health literacy is among the factors that contribute to medication compliance. This adherence was also linked with decreased hospitalisation, fewer emergency department visits, and fewer medical costs.

Blackburn, Swidroch, and Lemstra (2013) affirm that many strategies were developed to combat non-adherence in diabetes mellitus patients. However, none of those strategies are effective at reducing medication non-adherence. Hence, Muhammed, Jibril, and Dauda (2016) recommend that patients should be encouraged to comply with their prescribed medications through educational and training programmes with more emphasis on patients' knowledge about diabetes mellitus treatment and compliance. The prescribers i.e. Professional Nurses could be the targets of medication adherence interventions (Blackburn et al, 2013). Since, health literacy is significantly linked to correct responses to patient comprehension of medication guides for non-communicable diseases (DiSantostefano, Beck, Yeakey, Ibrahim & Stempel, 2014).

Conversely, Johnson (2014) affirms that professional nurses have limited knowledge of health literacy and an understanding of the role health literacy plays on patients' health outcomes. However, professional nurses are the ones who are responsible for issuing medications at the Primary Healthcare level.

Yet, Gregory (2016) highlights that for medication to work effectively in the host body, the medication needs to reach a certain level in the bloodstream. Gregory (2016) further expatiate that the medication needs to be taken at specific times such as every morning, to maintain that level in the system. Most importantly, taking a dose earlier could lead to drug levels that are too high, and skipping a dose that could lower the amount of the drug in the body and keep it from working properly.

Therefore, the study sought to develop an educational programme to address the health literacy problems of the patients with diabetes mellitus at Ga-Dikgale village clinics of the Capricorn District, Limpopo Province. The development of the educational programme was guided by the target patients' response to how they interpreted taking their medications and the outcomes thereof. Additionally, to the cited studies above, the study was also inspired by the following studies: Connelly and Turner (2017) indicated that people with poor health literacy skills suffer from difficulties in following abstract instructions such as "take on an empty stomach" and they are unable to identify the time they took the medication. DeMarco and Nystrom (2010) emphasise that patients with low health literacy levels should be identified. Measures to ensure that those patients understand their instructions to medication usage should be instituted. McGovern and Smyth (2011) proclaim that research is needed to determine the relationship between health literacy and chronic disease management.

1.2 PROBLEM STATEMENT

The community of Ga-Dikgale faces adversities with Non-Communicable Diseases (NCDs) burden (Maimela, Alberts, Modjadji, Choma, Dikotope, Ntuli & Van Geertruden, 2016). Seemingly, there is poor control of these diseases. A plethora of studies has been conducted on the contributing factors to the high prevalence of NCDs. Although, there is no published data on the information given to the patients with NCDs regarding their prescribed medication instructions, comprehension in this target population. Diabetes mellitus is one of these NCDs with a prevalence of 4% among the participants in this population (Maimela et al, 2016).

There is a conspicuous problem regarding patients' understanding of medication instructions since the patients' conditions are not stable (Maimela et al, 2016). Whereby, high fasting blood glucose was associated with low health literacy in diabetes mellitus patients. This can illustrate that there is poor medication comprehension among diabetes mellitus patients in this area. Consequently, this can cause bad diabetic complications. Maniema, Veerman, Chola, Tugendhaft, Labadarios, and Hofman (2015) posited that more than 73 000 disability-adjusted life years (DALYs) in 2009, were attributed to type 2 Diabetes mellitus, its sequel, and

diabetes mellitus-related amputations and cases of blindness were estimated at approximately 2 000 and 8 000 respectively.

The problem associated with the literacy level of patients regarding medication instruction comprehension has proven to be emanating. Depending on how the professional nurses give instructions to the patients, and how the instructions are written on the medications themselves. Professional nurses at the primary health care level are trained for medication dispensing courses, therefore, it is expected that when giving the patients medication, instructions should be clear, and easy for the patients to follow.

Therefore, the study sought to determine whether diabetes mellitus patients are given relevant information on how to take their treatment, develop, and implement an educational programme. Thus, to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province.

1.3 THEORETICAL FRAMEWORK

The theoretical framework in this study focuses on two theories i.e. Knowles' Adult Learning Theory and Lewin's Change Theory {Pappas, 2014; Connelly, 2016}. The theories were used to guide the study and as a basis for the development of educational programme towards enhancing health literacy regarding prescribed medication instructions among diabetes mellitus patients on treatment. The detailed theoretical framework for the study is elucidated in chapter two.

1.4 PURPOSE OF THE STUDY

The study aims to develop and implement an educational programme, to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment, at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province.

1.4.1 Objectives of the study

The objectives of the study sought to:

- explore the knowledge and practices of diabetes mellitus patients on treatment at Ga-Dikgale village clinics regarding prescribed medication instructions, in Capricorn District, Limpopo Province;
- describe provided information regarding prescribed medication usage contained in diabetes mellitus medication packaging, medicine leaflets, and prescriptions at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province.
- describe the effects of poor health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province.
- describe a conceptual framework for the development and implementation of an educational programme to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province.
- develop an educational programme to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province.
- implement the educational programme to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province.

1.4.2 Research questions

The following research questions guided the researcher during the study:

- What is the knowledge and practices of diabetes mellitus patients on treatment at Ga-Dikgale village clinics regarding health literacy on prescribed medication instructions, at Capricorn District, Limpopo Province?
- Which information regarding prescribed medication usage is provided in diabetes mellitus medications packaging, medicine leaflets, and prescriptions at Ga-Dikgale village clinics at Capricorn District, Limpopo Province?
- What are the effects of poor health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics at Capricorn District, Limpopo Province?

- What is the conceptual framework for the development and implementation of an educational programme to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province?

- What programme will be developed to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province?
- What programme will be implemented to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province?

1.5 OVERVIEW OF THE RESEARCH METHODOLOGY

A mixed-method, the convergent parallel research design was followed to attain the purpose of the study. The population of the study comprised all the 144 patients diagnosed with diabetes mellitus from 01 January 2015 to 30 November 2018, and the pilot study was conducted at the Ga-Makanye clinic with five (5) participants for both quantitative and qualitative strands. The sampling methods used were purposive in the qualitative strand and simple random sampling in the quantitative strand. The data were collected through one-to-one semi-structured interviews, using an interview guide, a voice recorder, and field notes as the tools for the qualitative strand and a self-administered questionnaire for the quantitative strand. The detailed methodology is discussed in chapter three.

1.6 PARADIGMATIC PERSPECTIVE

A paradigm refers to the basic set of beliefs that shape up the activities and describe the worldview of the researcher (Lincoln, Lynham & Guba, 2011). It is defined as a worldview, a general viewpoint, a way of breaking down the complexity of the real world (Lin, Oxford & Culham, 2016).

1.6.1 Pragmatism

Pragmatism refers to the philosophical perspective, that what works is what is important or valid (Johnson & Christensen, 2012). This paradigm was chosen in this study based on its belief that one method cannot answer the research question or solve a problem but a mixture of methods (Johnson & Christensen, 2012). In this

study, pragmatism was used through implementing the mixed-method research approach.

The elements of pragmatism and are outlined as follows:

(a) Actions cannot be separated from the situations and contexts in which they occur (Morgan, 2014). How diabetes mellitus patients live their lives and carry out medication instructions, is influenced by the situations they find themselves in.

(b) Actions linked to consequences in ways that are open to change (Morgan, 2014). Full understanding of the diabetes diseases including its complications may influence positive behaviour change in diabetes patients.

(c) Actions depend on worldviews which are socially shared sets of beliefs (Morgan, 2014). There are many beliefs around chronic illnesses including diabetes. Diabetes patients often find themselves believing that the disease can be cured.

The basic belief systems that constitute a paradigmatic viewpoint:

- Axiology

Axiology is concerned with the nature of ethics affecting subjects under study (Lin, Oxford & Culham, 2016). This assumption was observed through respecting human rights such as privacy, confidentiality, consent, autonomy, and the ethical protocols of the University of Limpopo.

- Ontology

Ontology is regarded as the nature of the reality which is conducting research based on the participants' life experiences (Lin, Oxford & Culham, 2016). The researcher attained this assumption by exploring, describing the DMPs' knowledge and practices regarding prescribed medication instructions.

- Epistemology

Epistemology refers to the nature of knowledge and the relationship between the knower and that which would be known (Lin, Oxford & Culham, 2016). This assumption was fulfilled with a thorough literature review before the study, to determine what is known about the phenomenon and the knowledge gap.

- Methodology

Methodology encompasses the choosing of the appropriate approach to the systematic inquiry (Lin, Oxford & Culham, 2016). The study adopted mixed method research using a convergent parallel design to fulfil the main purpose of the study.

1.7 SIGNIFICANCE OF THE STUDY

The study will assist in the following areas:

1.7.1 Department of Health

The study has the competence to assist the Limpopo's Department of Health in reducing health costs as diabetes mellitus will be managed through attaining medication half-life and avoiding toxicity or under-medication.

1.7.2 Health research

The study valour to provoke further research on the subject so that evidence-based information to assist diabetes mellitus patients to comprehend medication instructions can be obtained.

1.7.3 Nursing Education

The nursing education has the potency to encourage incorporate health literacy on prescribed medication instructions and the dispensing course in nursing programmes.

1.7.4 The hospitals

The study contributes to reducing the high rate of diabetes mellitus patients' hospitalisation. The fatalities due to diabetes mellitus complications are higher. This is due to poor health literacy-related to medication instructions at the hospitals in the Capricorn District of Limpopo Province.

1.8 CONCLUSION

This chapter discussed an overview of this study. In which the study was introduced and the background information about health literacy was explicated from abroad to a close perspective. The research problem and the theory background were also explained. The aim, research questions, and the objectives of the study also form part of this chapter. The research methodology with the research design, population, sampling, data collection, and analysis was summarised in this chapter. Chapter two provides the literature review and theoretical framework. Chapter three presents the

research methodology. Chapter four presents the presentation, interpretation, and analysis of the findings. Chapter five presents the merging and discussion of the findings. Chapter six discusses the conceptual framework, programme development, and implementation, whereas chapter seven provides the summary, limitations, and recommendations of the study.

1.9 ARRANGEMENT OF CHAPTERS

Chapter 1	Overview of the study
Chapter 2	Literature review and theoretical framework
Chapter 3	Research methodology
Chapter 4	Presentation, interpretation, and analysis of findings
Chapter 5	The Merging and discussions of the findings
Chapter 6	Conceptual framework, programme development, and implementation
Chapter 7	Summary, limitations, and recommendations of the study

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides an in-depth review of literature interrelated to health literacy on prescribed medication instructions among diabetes mellitus patients. A literature review is defined as a written document that presents a reasonably contended incident established on a comprehensive understanding of the recent state of knowledge about a topic of study (Machi & McEvoy, 2016). Literature was reviewed thematically as outlined in du Plooy-Cilliers, Davis, and Bezeidenhout (2014) using the Narrative Literature Review method. The methodology, data sources, search terms, literature parameters, search findings, themes derived from literature, conclusion, and recommendations of the findings are described in this chapter.

2.2 METHODOLOGY

A Narrative Literature Review (NLR) method is adopted to identify, analyse, assess, and interpret the available information interrelated to health literacy on prescribed medication instructions (Coughlan & Cronin, 2017). NLR was selected on the basis that it allows the reviewer to retrieve literature from a variety of sources; the reviewer is not controlled by literature, but rather control the literature of interest and does not review all the available literature; only relevant literature is selected and no crucial report is omitted such that the body of literature is effectively represented in the final review; and even the literature that controverts the study is included to avoid selection bias (Coughlan & Cronin, 2017).

2.2.1 Database searches

Literature is retrieved from the following databases and search engines:

- Electronic databases: Biomed, BMC, PLoS ONE, BMJ Open, Etho Med, Elsevier, Science direct, and SABINET.
- Search engines: Google Scholar, UL E-Libraries, Chrome, and Google books.
- Hand searches: Reference lists from retrieved literature.

2.2.2 Key search terms

The keywords used in literature search were:

- Multiple combinations of: “Health literacy”, “Medication instructions”, “Diabetic medication comprehension”, “Patient’s medication interpretation”, “Prescribed medication”, Medication comprehension”, “Non-compliance”, “Medication Adherence”, “Diabetes complications”, “Contributory factors”, “Poor medication adherence”, “Effects of poor health literacy”, “Poor health literacy”, “Medication non-adherence”.

2.2.3 Parameters

Only publications meeting the following criteria were included in literature:

- English publications that were available by the time of literature.

2.2.4 Findings

The findings of the literature search are summarised as follows:

- Fifty-Three studies, both the quantitative and qualitative methods, and two books were reviewed for the study literature.

2.3 THEMES

The themes of the literature are as follows:

- “Types of health literacy”.
- “Measuring health literacy”.
- “The importance of health literacy”.
- “The implications of health illiteracy and medication non-adherence”.
- “Factors influencing health literacy and medication adherence”.
- “Interventions to improve medication non-adherence”.

2.3.1 Types of Health Literacy

Health literacy is the junction between general literacy, health, and health care, but also can integrate features of the other types of literacies to varying degrees (Johnson, 2014). The concept of health literacy emanated because of the apprehension that individuals need more than just having general literacy skills to be able to manage the complexities of health and health system issues. There is a substantial overlap between general literacy and health literacy. Although there are strong health-specific demands involved in health literacy that differs from those in general literacy (Johnson, 2014). Meaning that having general literacy alone is not sufficient if one has to live a healthy life and to be able to prevent, manage, and control diseases and illnesses.

Therefore, health literacy is divided into three levels namely; basic health literacy, communicative health literacy, and critical health literacy (Vidgen, 2016). These levels are explained in detail below.

Basic/Functional health literacy

Functional health literacy is characterised by adequate fundamental skills in reading and writing to enable someone to function effectively in everyday situations. Therefore, functional health literacy is important to access services and information required to support individual's health, such as reading information about medication on medication labels (Vidgen, 2016). Shirindi, Makhubele, and Fraeyman (2016) assert that inadequate health literacy can result in difficulty in following instructions from a doctor, and taking prescribed medication properly, nonetheless, medical information is well understood when projected slowly, with the use of simple words and avoidance of more information at a time.

Communicative/Interactive health literacy

Interactive health literacy refers to more advanced, cognitive, and literacy skills which, together with social skills, could be utilised to actively participate in everyday activities. These skills are used to extract information and derive meaning from different forms of communication, and to apply new information to changing circumstances (Vidgen, 2016). Vidgen (2016) further elaborates that the interactive health literacy approach improves people's capacity to act independently on

knowledge. Shirindi, Makhubele, and Fraeyman (2016) in their study on barriers to medication adherence among women living in rural areas suffering from hypertension aver that patients indicated that communication with health and social care providers is often inadequate. As a result, it mainly contributes to poor medication adherence. Shirindi et al (2016) further stipulated that patients with inadequate health literacy are less likely to comprehend and take part in disease prevention and health promotion programs. These patients are more likely to be hospitalised more often than those with adequate health literacy.

Mohan, Riley, Boyington, and Kripalani (2012) aver that patients reported having confidence in the capacity to take medications but confirmed a lack of comprehension in understanding medication instructions. Patients further indicated numerous obstacles to effective medication management embedded in poor communication. Hence, patients articulated favouritism for illustrated medication instructions which could address some of the challenges faced by patients.

Critical health literacy

Critical health literacy incorporates advanced cognitive skills, which together with social skills can be applied to critically scrutinise information and to use that information to exercise greater control over life events and situations. Therefore, health literacy moves beyond communication to the development of skills necessary to effect social change to support health (Vidgen, 2016).

From these types of health literacy explanations, Bruselius-Jansen, Bonde, and Christensen (2017) came up with a framework for health literacy as follows:

Table 2.1: Health Literacy Framework

Types of health literacy	Nutbeam's (2000) definitions	Categories of analysis
1. Functional health literacy	An individual capability to seek and comprehend health information.	The capacity to recognise, the formation of physical activity patterns in daily life.
2. Interactive health literacy	An individual capability to put health information into practice to achieve good health outcomes in various daily practices.	The capacity to put to practice the comprehension of how physical activity patterns are made, and to strategise, and exercise a lively everyday lifestyle within the prevailing. conditions.
3. Critical health literacy	Possessing skills to critically evaluate health information and utilise information to achieve maximum control, including addressing structural determinants of health including empowerment skills; capabilities to act to bring change in conditions for ones' health and others.	The capability to relate judgementally to physical activity recommendations, to comprehend the effect of social determinants on physical activity ranks, and to draw on these capabilities to bring change to the prevailing conditions in enhancing the acceptable everyday lifestyle for self and others.

Table 2.1: Health Literacy Framework

According to the framework, an individual ought to have health literacy knowledge and understanding. However, the patient also has to act accordingly to show that

they have health literacy knowledge. Lastly, the individual ought to promote their everyday life and the lives of others by living a healthy lifestyle as recommended to change their current conditions (Bruselius-Jansen et al, 2017). Bruselius-Jansen et al (2017) emphasise that educators can assimilate health literacy development effectively into classroom-based curriculum teaching, with the learners' step counts and related reflections positively persuading learning.

2.3.2 Measuring Health Literacy

There are several instruments developed to measure health literacy. Nonetheless, standardisation has not yet been met on which measure to employ (Snow & Dibner, 2016). Snow and Dibner (2016) elaborate that health literacy measures are used in different ways; Health professionals (Professional Nurses) can utilise these measures to assess a patient's health literacy level at the beginning of a health care consultation. Therefore, researchers require to put forward the necessary skills to improve health literacy, measuring health literacy before or after implementing intervention on the behaviour using health literacy as an independent or control variable.

Sand-Jecklin and Coyle (2014) indicate that a lot of studies proved that a lack of health literacy assessment resulted in healthcare professionals overestimating patients' health literacy skills. They, therefore, only identifying about half the number of patients with poor health literacy. They further indicated that there should be a precise and effective means of assessing patients' health literacy in place to assist nurses and other healthcare team members in recognising the patients who are failing to understand and act on health information and instructions (Sand-Jecklin & Coyle, 2014). Dickens, Lambert, Cromwell, and Piano (2013) agree with Sand-Jecklin and Coyle (2014) by averring that research has documented that nurses overestimate their patients' health literacy. The overestimation of a patient's health literacy by nurses can contribute to the widespread problem of poor health outcomes, hospital readmission rates, and increased costs to the health system.

Sand-Jecklin, Daniels, and Lucke-Wold (2017) in their study about incorporating health literacy screening into the patient's health assessment have documented the

possibility of integrating health literacy screening into the admission database. Thus, for all adults admitted to a large Mid-Atlantic teaching hospital, including patients' characteristics related to health literacy status. The nurses in the study appreciated the screening as acceptable and useful; twenty percent of the screened patients have been found to have low health literacy. These patients with low health literacy had a high number of co-morbidities. They also had a considerably higher hospitalisation rate within thirty days of the admission understudy, even when they are in a controllable age group and number of health conditions. This means that patients with low health literacy are vulnerable to poor disease management even if they are collecting their medications monthly.

2.3.3 The Importance of Health Literacy

Health literacy is essential for prosperous access to care, self-care of chronic conditions, and maintenance of health and wellness; it is also fundamental to healthcare requiring individuals to have a more active role in decision making and management; and the Institute of Medicine (IOM) report that 90 million people, which are almost half the adult population, lack health literacy skills needed to understand and act on health information and health system (Parker & Jacobson, 2012). Misinterpretation of medication instructions on medication labels by diabetes mellitus patients is a medication safety and health literacy concern; it was found that almost half of patients attending primary healthcare misunderstood common dosage instructions on medications container label (Davis, Federman, Bass III, Jackson, Middlebrooks, Paker & Wolf, 2009). Davis et al (2009) further indicated that since diabetic patients are increasing the number of medications they are taking especially the elderly, it is more critical for them to be able to accurately interpret the medication instructions to ensure proper and safe use.

2.3.3.1 The importance of health literacy on diabetes mellitus patients

Health literacy is linked to medication adherence. Patients with low health literacy have been shown to suffer less medication knowledge on how to comply with the medications for their diseases as compared to those patients who have sufficient health literacy (Lee, Yu, You & Son, 2015). In their study Lee et al (2015), postulate that it is confirmed that the role of health literacy is substantial and that it can be an essential indicator impelling medication compliance in patients with diabetes mellitus.

The study, therefore, suggests that health literacy should be enriched to prompt better medication compliance in diabetes mellitus patients. Thus, to also affirm that educational programmes for monitoring and improving public awareness for health literacy should be a major focus of those programmes (Lee, Yu, You & Son, 2015). These programmes should, however, include implementation, evaluation which encompasses feedback from the public and continuous consultation with the health workers for clarity.

Norhafizah, Siti, Riyanti, Balkish, Hamizatul, and Hatta (2012) posit that medication labelling literacy among Malaysian with diabetes, have stated that proper reading on medication labelling is an integral part of the disease, control, and management. The study also indicated that the ability to read the dosage instructions did not always impede the capacity to exhibit a functional understanding of medication prescription usage. People can read because they are literate, but since they are health illiterate, they cannot interpret medication instructions. The study, therefore, recommended that measures to enhance medication labelling literacy among diabetes patients should be made because it is essential for patients to fully understand their medications; unceasing awareness, patients, teaching campaigns, and strategies towards understanding medication labelling need to be carried out (Norhafiza et al, 2012).

2.3.4 The implications of health illiteracy and medication non-adherence

The non-adherence to medication is found to be common worldwide and is said to be one of the prominent public health challenges (Zullig, Gellad, Moaddeb, Crowley, Shrank, Granger, Granger, Trygstad, Liu & Bosworth, 2015). Half of the chronic disease medication is estimated to be taken not as prescribed including diabetes mellitus medications. This non-adherence has been associated with poorer treatment outcomes, the progression of disease symptoms and complications. Koster, Blom, Winters, Hulten, and Bouvy (2014) also found that patients do not always consume their medications as directed. This results in suboptimal quality of the desired outcome regarding prescribed medication therapy and medication-related problems. It was also reported that up to 50% of adults are most likely to misinterpret dosage instructions and warnings included on medication labels, leaflets, and prescriptions. This could be the reason for patients to not use the

medication as prescribed. Koster et al (2014) further declared that the healthcare providers' assumption that patients can read, comprehend, and react adequately to medication instructions provided on medication labels can be unsubstantiated.

Zullig et al (2015) further affirm that non-adherence is also linked to increased health services utilisation and frequent hospitalisation. This was also found in a study conducted by Faria, Zanetti, dos Santos and Teixeira (2009) where the majority of the diabetes mellitus patients demonstrated a knowledgeable discrepancy concerning medication use during disease treatment. This lack of knowledge has the potency to aggravate the health state of people with diabetes mellitus. Subsequently, bring about a momentous increase in direct and indirect health costs. Another study conducted in Sao Paulo, Brazil indicates that deficiency in knowledge on medication use has had a durable influence on the health and quality of life of individuals. Particularly, those who are living with one or more chronic health conditions. The study further documented that the number of hospital admissions and early death has increased nevertheless is somewhat concomitant with knowledge insufficiency (Faria et al, 2009).

Johnson (2014) documented the characteristics of individuals with low health literacy as follow:

- Poor overall health status.
- Higher rates of hospitalisations, death, and longer hospital stay.
- Higher rates of hospital readmissions within three days of discharge.
- Decreased capacity to manage chronic diseases.
- More likely to make errors with medications.
- Seek medical care when they are more ill.
- Have less knowledge of their illness management.

Deficiency in knowledge regarding prescribed medication and medication labels among diabetes patients is a crucial concern (Patel, Khan, Ali, Kazmi, Riaz, Awan & Soratwa, 2013). Basic knowledge related to prescribed medications and medication labels which encompassed things like dosages, duration, timing, indications, interactions, side effects, contraindications, and precautions were the focus of Patel

et al (2013) study. The study established that the majority of the study population had minimal information regarding medications prescribed to them. Therefore, the misunderstanding of medication prescriptions, labels, when the instructions are unclear and unnecessarily difficult occurs. This makes it difficult for the patients to use the medications as desired and consequently leading to non-adherence and possibly poor health outcomes (Patel et al, 2013).

A study also conducted by Souza, Apolinario, Magaldi, Busse, Campora, and Jacob-Fihlo (2014) documented that patients with inadequate functional health literacy presented with significant odds of poor glycaemic control. These findings reinforced the necessity to address poor health literacy in clinical practice (Souza et al, 2014). This study indicates that good glycaemic control in diabetes mellitus patients is compatible with adequate health literacy. Gelaw, Mohammed, Tegegne, Defersha, Fromsa, Tadesse, Gunasekaran, and Ahmed (2014) also support Sousa et al (2014) by reporting that most diabetic patients are presently managed with the most effective available medications. Nonetheless, the results from their study indicate a different outcome where the anticipated blood sugar level could not be controlled and maintained effectively. This outcome was due to poor adherence to the prescribed medication regimen and poor knowledge or practice of efficacious self-management strategies. This takes us back to the importance of instituting health literacy in diabetes mellitus patients.

However, a study conducted by Harris, Bradshaw, Koch, and Whyte (2014) shows that society is faced with an enormous challenge of health professionals', health illiteracy related to medication prescription interpretation. In reality, not only the patients are affected by poor health literacy, but the truth of the matter is that also the fore-front runners of the healthcare system do lack literacy skills too. The extensive within-group disparity in explanation of medication prescription instructions among all groups including physicians was noted. Furthermore, the physicians, nurses, and healthcare users exhibited between-group disparities in their interpretation of prescription instructions. None of the instructions were uniformly interpreted and a reasonable number of patients and nurse interpretations resulted in potentially dangerous schedules of medication administration. The study also revealed that some physicians and nurses did not have an awareness of the

probability of interpretation variability (Harris et al, 2014). The study, therefore, recommended that, since health professionals can have a diverse understanding of similar instructions, awareness, and consequently, the teaching of probable sources of misinterpretation is vital.

2.3.5 Factors influencing health literacy and medication adherence

Research has shown that there are several factors which influence health literacy among individual groups. Frances, Thirumoorphy, and Kwan (2016) aver that poor labelling instructions on medication, packaging, lack of patient teaching on medication use, and disease processes contribute to non-adherence. Where patients do not see the importance of taking their medication as they should because they do not understand.

Nonetheless, a study conducted by Lee, Lee, and Kim (2015) on gender differences in health literacy among Korean adults revealed that Korean women had a significantly higher level of health literacy compared to men in understanding instructions on medication bottles. The study explored gender differences in the level of health literacy and appropriate factors linked with health literacy. The study indicates that the breach between men and women in health literacy is linked to women's greater acquaintance in maneuvering the health care system from the process of dealing with health matters (Lee et al, 2015).

Lee et al (2015) postulate that previous studies reported that most women tend to report a lot of health issues and have greater utilisation of medical services than men. Furthermore, this can be due to the traditional role of caring for sick family members and children. This traditional gender anticipation offers women with more interactions with the healthcare system, providing them additional chances to build their knowledge base, and consequently resulting in increased levels of health literacy than those of men.

In the most recent study, women reported more depressive symptoms of chronic diseases than men (Lee et al, 2015). A question could be raised as to why these women would suffer depressive symptoms while we expect them to be healthy and in control of their diseases. When women are sick, they lack proper care from their

spouses or anyone to care for them, or they could be inappropriately taking their medications.

Observations from previous studies illustrate that individuals with higher socioeconomic status or higher education levels had a better comprehension of prescribed medications and medication labels hence leading to the minor occurrence of adverse medication occasions (Patel et al, 2013). Nonetheless, Pate et al (2013) in their study found out that failure to comprehend and interpret medication prescriptions was prevalent through all educational levels. The study further observed that patients who used many sources of medication information were more informed than those who relied on one information source, for instance, using medication labels only while others used also some internet, books, and leaflets. Among the factors that contributed to non-adherence to prescribed medication in this study was patients' age. It has been identified as a feature in the misapprehension and misinterpretation of prescription medication and medication labels. The study result further supports that, the study in those different aspects of drug use like dosage, duration, and timing is well understood by the younger respondents. Conversely, research affirms that health literacy is a durable predictor of health outcomes than socio-economic status, age, or ethnic background (Johnson, 2014).

Among the factors contributing to non-adherence related to poor health, literacy is the complexity of medication therapy. Gebrehiwat, Jemal, and Dawit (2013) in the study about non-adherence and associated factors among type 2 diabetic patients have found that diabetic patients on complex regimen were three times non-adherent than those with a simple regimen. According to this study, simplifying diabetic medication therapy to at least single or two medications could make it easier for patients to follow. Consequently, non-adherence history of diabetes mellitus patients if poor health literacy is the only problem.

Dunning (2014) reports the following as other contributory factors to non-adherence in diabetes mellitus patients: firstly, poor health literacy coupled with low health numeracy. This is irrespective of whether an individual is generally literate or not. Secondly, deficient or unclear teaching on medication, particularly if the teaching is not personalised for the patient or on each medication. Some patients do not

interpret medication labels and medication information correctly and this is common even when labelling requires minimal reading skills. For example, instructions to take medicine twice daily (which is vague since ‘daily’ means once per day), or every 12 hours means individuals should make further decisions to understand the instructions. “Take medication as directed” is further, more difficult to interpret since the instructions need to be further broken down. Patients are more likely to understand more specific medication administration times such as 08 A.M., 06 P.M. but instituting periods can be useful or suit some individuals better. Using multifaceted medication regimens independently predicts the probability that patients interpret medication instructions, advice, or education incorrectly.

Health professionals are the major role players in disseminating health information and are the first and most precise sources of information in health-related matters. Although they have restricted time with patients during consultations, they fail to issue out information as expected and patients opt for sources with dubious credibility, such as the internet, television, and newspapers, for health information (Caylan, Yayla, Oztora & Dagdeviren, 2017). These defective sources have to lead individuals into making erroneous verdicts about their health. The patients should be taught how to seek credible information sources. There should be ever-ready more specific and detailed health information materials to give out to the patients to reference at home.

Cheng, Huang, Yang, and Lew-Ting (2014) have found that having attained higher educational qualifications together with a family history of diabetes mellitus was significantly concomitant with a better understanding of health teaching and instructions. The study indicated that having sufficient health literacy is not the only factor related to good glycaemic control, rather the effect of adequate health literacy in attaining good glycaemic control can be disguised by patients with a better understanding of health education and instructions (Cheng et al, 2014). Therefore, patients can be health literate, but still, fail to comprehend medication instructions.

Research has also shown that medication non-adherence and treatment ineffectiveness can be negatively influenced by the inability to comprehend medication instructions. The problem is not with patients using medications only but

also dispensing health and medication manufacturers. Most of the generally used medication label instructions are unclear, and misunderstanding takes place also in highly educated patients (Koster et al, 2014). Koster et al (2014) further indicated that a poor understanding of medication instructions or misinterpretations could be a cause for patients not using their medications as prescribed. A misapprehension of medication instructions leads to subprime medication therapy resulting from consuming less than instructed, getting insufficient medication concentrations, or increased risks of adverse effects by overdosing and medication concentration increasing interactions.

Davis et al (2009) agree that although inadequate health literacy hinders patients' understanding of medication instructions. The instructions also could be written not in the clearest and specific manner, however, there is limited evidence supporting the best practices for writing prescription medication instructions to enhance patients' comprehension for proper use of the medication. Davis et al (2009) then recommended that more specific wording should be used on prescription medication instructions to enhance patients' comprehension.

2.3.6 Interventions to improve medication non-adherence

Medication non-adherence is costly and is also a worrisome health issue whereby many health service interventions have provided resolutions to augment medication adherence in precise situations and population groups. According to their study, Zullig et al (2015), have found that these interventions are less effective due to poor implementation. The study further proved that educational interventions exhibit assurance to improve adherence and better clinical outcomes. However, the effort involved in effectively implementing them is the variable making their appropriateness for being considered slightly ambiguous.

The benefits of educational interventions are that they could be carried out by different health professionals such as teachers, health educators, nurses, and others, who are reachable and inexpensive. Educational interventions are easy to use and require low resources that make them efficient than other methods (Zullig et al, 2015). Shrank and Avon (2007) also recommend that there should be an available standard for written drug information serving as a clear and organised

structure to teach patients. Subsequently, because the drug information on labels and inserts is a chief information source for patients but the information is often unreliable, inadequate, difficult for patients to read and understand.

Many studies have been centred on pharmacists as the conveyers of information on the utilisation of medications, but these pharmacists are expensive resources. Therefore, they can be supplemented with other skilled labourers such as certified health educators, social workers, licensed nurse practitioners, or other professionals such as school teachers and home-based carers who can provide similar patient services at a reduced cost (Zullig et al, 2015).

A patient-centred approach has been identified to remedy poor health literacy related to medication non-adherence. Annarumma and Palumbo (2016) in the study about contextualising health literacy to health care organisations. The findings resulted in numerous allegations about health care organisations' ability to disseminate health information properly to individuals suffering from poor health literacy. It could be debated that the health care organisations are poor health literate themselves; health literacy is not incorporated in their mission statement; their strategic plans and organisational programmes they also do not consider health literacy matters. This results in the patients lacking support from the health care organisations to manoeuvre the health system.

This condition creates opportunities for adverse effects on both the quality and appropriateness of care. Although the nurses and other healthcare professional are independently involved in addressing the information needs of patients suffering from poor health literacy skills, their initiatives became less effective when the organisational commitment did not back them up to boost organisational health literacy (Annarumma & Palumbo, 2016).

Most importantly, nurses are the first point of contact with the patients at the health care facilities together with the other health care professionals. They can assist patients with comprehending, recalling, and utilising health information. The nurses can also assist the patients in manoeuvring the complex healthcare system. However, the healthcare team should also know the patients that are vulnerable to poor health literacy so that they could put their interventions into practice (Sand-

Jecklin & Coyle, 2014). Even though patients appear to accept health literacy screening, that does not mean that they are in a state of identifying that they have a problem in understanding health information or instructions include medication instructions on their own if no one asks them directly about such deficiencies related to health literacy (Sand-Jecklin & Coyle, 2014).

Caylan et al (2017) uphold that people can conserve, protect, and promote their health properly only through accessing, understanding, and acting on the basic health information. However, when assessing health literacy, it was discovered that health literacy declines in parallel with decreased socioeconomic and educational levels. Therefore, the health professional should make considerations in determining the health literacy levels of patients with low education and socioeconomic levels and strive to improve their literacy level by intervening according to the results.

Swearingen (2016) also stresses that when assessing diabetic health literacy to combat non-adherence, the nurses or other health professionals should examine the patient's understanding of the disease process, its medical management and clarify information related to diabetes as indicated. The causes of non-adherence such as misinterpretation of instructions should be assessed, where the health practitioner would explain the medication half-life and the idea of a stable blood glucose level, and also evaluate how the patients perceive the effectiveness or ineffectiveness of the treatment (Swearingen, 2016).

A study by Toh, Teo, Kwan, Raaj, Tan, and Tan (2014) about the association between the number of doses per day, the number of medication patient's compliance, and frequency of readmissions. Found out that there is a strong association between patients' readmission frequency and polypharmacy, as well as non-compliance. The study, therefore, recommended that prescriptions should be made in a way that they minimise risks of misconceptions coupled with the use of longer-acting formulations of fixed-dose combinations to minimise readmissions and to achieve substantial cost-savings attributable to non-adherence (Toh et al, 2014).

Faria et al (2009) the study further indicate that the deficiency of knowledge on the rational use of medications is one of the components that were strengthened by educational programmes to control diabetes mellitus. These educational

programmes concerning diabetes mellitus should stress the significance of using medications for appropriate control to reduce administration errors and therefore attaining the benefits anticipated. Nevertheless, Dickens et al (2013) recommend that schools of nursing and healthcare organisations have to undertake the duty of educating their nurses about health literacy, especially targeting medication instructions. The nurses are in the best positions to offer proper education regarding medication instructions if they are health literate on this aspect. This is due to the allegations that low health literacy skills are the only challenge for diabetes mellitus patients and the public at large. The health care professionals could also have low health literacy skills such as a reduced capacity to explain health matters plainly to patients.

The mismatch between a patient's capacity to comprehend and a health professional's communication skills can lead to adverse health outcomes (Dickens et al, 2013). It is, therefore, important for healthcare professionals to possess health literacy skills with good communication skills to combat health illiteracy in diabetes mellitus patients.

Fincham (2013) argues that poor health literacy has inspired the instituting of measures to improve the appropriate utilisation of medications together with subsequent health outcomes. For example, problems with health literacy have proven to be difficult to overcome with medication reconciliation efforts. Measures available within the health professions schools for instance i.e., the profession of pharmacy, and other affiliated health professions need to be improved with the training of future health professionals. The difficulties in accumulating health illiteracy will not subside with more receiving insurance and succeeding provision of care. Measurers focusing on training, implementing changes within our curricula, continuing education efforts for current practitioners, or outreach activities with the community group, patients, and representatives are called to positively impact this public health concern of health illiteracy (Fincham, 2013).

Egbert and Nanna (2009) support Fincham (2013) by stating that there should be awareness of medication non-adherence by integrating health literacy content in nursing and medical school programmes. While continuing to provide in-service

training to health professionals and patients, could assist in combating medication non-adherence.

This awareness has to be known to manufacturers so that they can improve how they write their instructions for consumers as recommended by Koster et al (2014) emphasise that; instructions should be formulated in a clear language, as explicit and comprehensive as possible. The healthcare providers are accountable to clarify backgrounds of instructions verbally during patients consultations or give supplementary written information to ensure that the correct medication use is attained.

According to Faria et al (2009), agree that asserting the information given to the patients concerning the usage of medication should then be clear and precise to control diabetes mellitus. This information should be delivered by qualified health professionals and could inspire diabetes mellitus patients to self-care and adherence to medication therapy. Davis et al (2009) also aver that labels that instruct patients to take medications “Twice daily “or “Every 12 hours” necessitate patients to make extra mental steps to conclude when exactly should they take their medication; for patients with limited literacy, this adds a needless cognitive problem, resulting in poorer comprehension interestingly, identifying specific times each day (e.g., 06 A.M, 07 P.M) for administration was a more easily understood instruction format than stating times per day or hourly intervals. The main aim of all these interventions is to improve comprehension of medication instructions use. Hence Wolf (Sa) insists that “To prevent medication errors; current medication labelling problems which lead to medication errors need to be reviewed, the patient-directed information needs to be improved, and the healthcare provider-patient relationship needs to be strengthened.

Davis et al (2009) further reported that more multifaceted dose regimens demanding patients to take more pills a day were a significant independent predictor of misinterpretation of instructions. However, patients with low literacy did not differ significantly from those with sufficient literacy in interpreting instructions to take one pill a day, or even understanding “Take 2 pills by mouth every day” or “Take 1 pill with breakfast and 1 with supper”.

2.4 THEORETICAL FRAMEWORK

2.4.1 Introduction

This chapter provides an in-depth overview of the study's theoretical framework. Two theories (The adult learning theory and Lewin's change theory) have been used to guide the study and to develop and implement an educational programme to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province.

The theoretical framework is the conceptual starting point and the frame of a research study that incorporates a specific crew of beliefs and ideas that relate to the phenomena of inquiry (du Plooy-Cilliers et al, 2014). The theoretical framework serves as a guide and directive for the study so that it does not move away from the purpose. It served as an aid to avoid faults and conflicting assumptions that could alter the study's results.

2.4.2 Functions of a theoretical framework

du Plooy-Cilliers et al (2014) outlined several functions of a theoretical framework as follows: (1) To describe the theoretical scope of a study; which is, what is and what is not appropriate to a study. (2) It points to the concepts on which the researcher needs to focus on. (3) It provides guiding principles and a definite perspective through which the researcher examines a topic. (4) It helps in recognising the appropriate key variable to include in an investigation of a topic. (5) It guides the researchers on how to collect, analyse, and interpret the research data. (6) It supplies a way with which new concepts and issues to be included in a study could be identified, and (7) it points to the most crucial research questions that need to be answered to improve an understanding of a certain phenomenon.

2.4.3 Theories used in the study

The two theories used in the study are namely, Knowles' Adult Learning Theory and Lewin's Change Theory. Thus, they were used as a framework for the study, and are discussed below.

2.4.3.1 The Adult Learning Theory – Andragogy – of Malcolm Knowles

Knowles' Adult Learning Theory is used as a framework for the study, on the development of an educational programme to enhance health literacy among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province.

Theory Background

According to Knowles, Andragogy is the art and science of adult learning (Pappas, 2014). Thus, Andragogy is a theory of learning explicitly for adult learners who make use of their experience when learning (Anderson-Meger, 2016). Anderson-Meger (2016) further asserts that adults should have self-direction and motivation to learn, without these, adult learners cannot be ready to undertake self-directed learning.

Five assumptions underpin Knowles' adult learning theory

i. *Self-concept*

   Adult learners need to know the reason they have to learn; the adult learners move from being dependent beings to self-directed human beings (Anderson-Meger, 2016; Pappas, 2014). The study explains to the patients the importance of knowing how to take medication as prescribed and encourage them to adhere to prescriptions.

ii. *Adult learner experience*

   Adult learners have personal experiences which are a wealth of knowledge and assist them in their learning experience (Anderson-Meger, 2016; Pappas, 2014). Most patients have experienced the consequences of not following prescribed medication instructions and therefore, the study will build upon that as a positive influence to encourage patients to learn better and the correct way of taking their medication.

iii. *Readiness to learn*

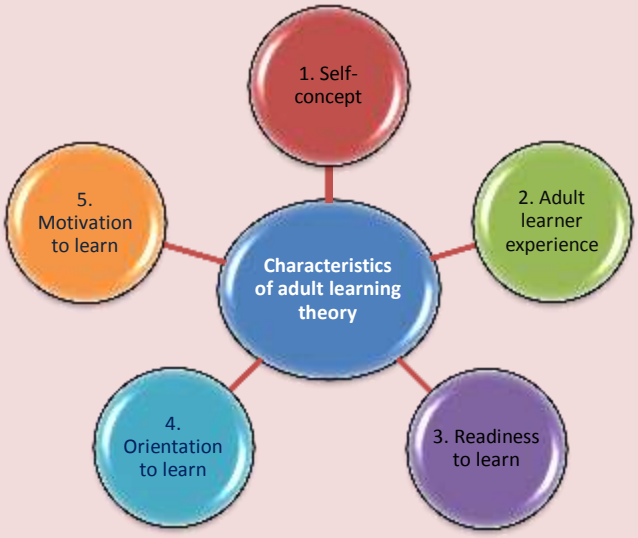
   Adult learners do not just study; rather the learning has to be a direct and practical application to their lives or work (Anderson-Meger, 2016; Pappas, 2014). The study participants are the patients who are on diabetes mellitus treatment, and therefore they have the readiness to study.

iv. *Orientation to learning*

Adult learners' time perspective moves from postponed application of knowledge to instant application and learning becomes problem-centred rather than content-orientated (Knowles, Holton III & Swanson, 2014). The study highlights reasons for poor disease control and the importance of health literacy on prescribed medication instructions to the patients. These encourage the patients to be eager to learn as some have been suffering from poor disease control, because of inadequate health literacy on prescribed medication instructions.

v. Motivation to learn

Adult learners are internally motivated (Knowles et al, 2014). This study addresses the affected patients directly. When the patients identify the significance of health literacy, they are eager to learn rather than, when a secondary source tells them that they should learn about the importance of health literacy.



(Adapted from Pappas: 2014)

Figure 2.1: The Schematic presentation of the five assumptions of Knowles' adult learning theory

2.4.3.2 The Lewin's Change Theory

The study used Lewin's change theory as a framework to enhance health literacy regarding prescribed medication instructions, to improve adherence to diabetes mellitus medications. Lewin change theory refers to change as a process rather than

an event and when embraced, could bring about positive health outcomes in patients with diabetes mellitus (Connelly, 2016). Change is defined as an act or process of making something different (Hornby, 2010) in which the medication dispensers need to adapt, to improve adherence to prescribed medication. The theory comprises of three stages, namely: the unfreezing stage, the change – or transition stage, and the freezing or refreezing stage (Connelly, 2016).

Stage 1: Unfreezing

The preparation for change is marked as the unfreezing stage. This stage involves attaining that change is compulsory and preparing to let go of the present comfort zone (Connelly, 2016). The individuals involved need to feel that change is necessary, then change becomes urgent. Hence that is likely to motivate the individuals to make the change (Connelly, 2016). The medication dispensers need to look at the medication instructions through the patients' eyes; determining whether patients would be able to comprehend the instructions or not with their health literacy level.

The unfreezing stage is characterised by **Force Field Analysis** (FFA). The FFA is about weighing the advantages and disadvantage needed for change. Hence, the advantages should outweigh the disadvantages before deciding to change (Connelly, 2016). According to Connelly (2016), FFA means analysing different factors for making change. This stage involves moving towards motivation for change. Therefore, to attain better health outcomes and reducing health costs, health professionals should review and make the instructions on medications to be more specific and user friendly; this is not easy as people become reluctant, especially, mal-resourced situations but it is essential. The health department plays a major role in improving patients' outcomes, reducing health costs, and preserving lives, for example; training health professionals and other stakeholders like school teachers on how to interpret instructions to the patients and the public.

Stage 2: Change – or Transition

Lewin's change theory refers to change as a transition (Connelly, 2016). The theory defines transition as the innate movement made in response to change. Change is not easy, as individuals should learn about the change or need to be given time to understand and work with the changes (Connelly, 2016). Connelly (2016) indicates that during the transition period, support is vital especially in the form of training, coaching, and expecting mistakes as part of the process. Connelly (2016) further affirms that this stage is the hardest as individuals become hesitant or fearful of the change. Health professionals provide medication instructions to patients should be supported with training or coaching where necessary. As well as the human resources if there is a need. This strengthens the health professionals in having the confidence to give proper information regarding the medication instructions to diabetes patients.

Stage 3: Freezing or Refreezing

The theory prefers calling this stage the freezing stage, whereas many people call it the refreezing stage (Connelly, 2016). Connelly (2016) asserts that this stage involves establishing stability after making a change, and individuals in this stage accept the change, and change is regarded as a norm. However, Lewin's change theory call this stage based on the argument that there is no time to confine to become comfortable with the routines when the change takes place. However, due to the great flexibility demanded by chaotic processes, change is critical (Connelly, 2016). Connelly (2016) compares this stage with ice cream rather with an ice block; the ice cream is freezing and can melt at any second than a rigid ice block, hence, the theory prefers to call this stage the 'freezing' stage. After adopting the better way of explaining medication instructions to patients, health professionals need to not go back to their old ways, but should also maintain the change through continued in-service training of staff members. This can assist in maintaining better health outcomes of patients with NCDs. Figure 2.2 below presents the schematic presentation of the Lewin's change theory.

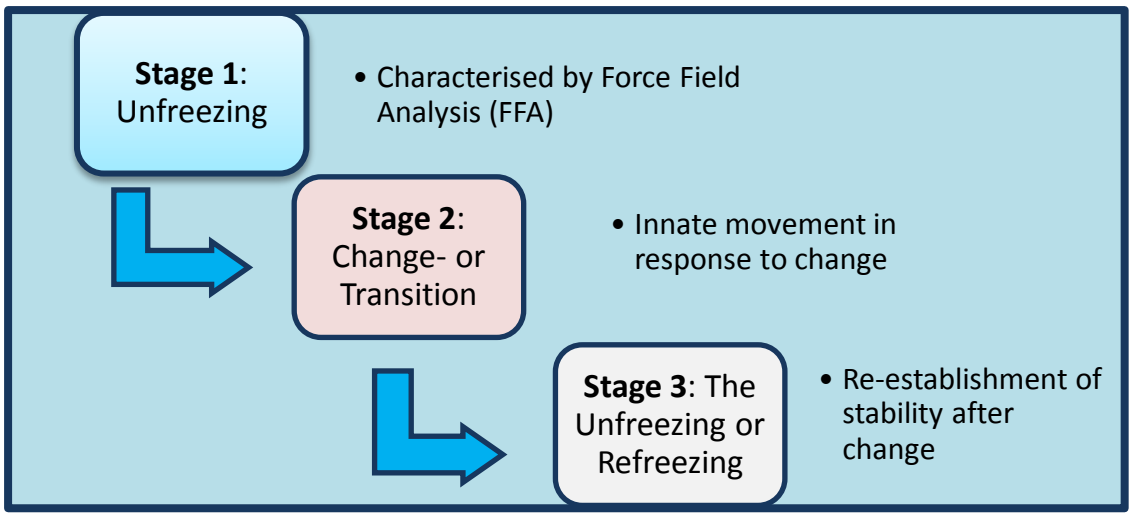


Figure 2.2: The Schematic presentation of the Lewin's Change Theory

2.5 SUMMARY AND RECOMMENDATIONS OF THE LITERATURE

There are minimal studies that have been conducted regarding diabetes patients, how they should carry out the prescribed medication instructions. Therefore, some studies investigated the instructional information contained in medication leaflets, packages, and labels. These studies indicated that the medications' instructions were not clear, are confusing, and could be misinterpreted. Recommendations were therefore made by authors who conducted a study but there seem to be no improvements made on the instructional information. On the other hand, it is crucial also to know how diabetes mellitus patients take their medication, and hence this study seeks to generate more evidence on how diabetes mellitus patients interpret their medication instructions and how they carry them out. More literature is therefore needed on how the patients carry out their prescribed medication instructions and the interpretation thereof as the current studies did not address these issues.

2.6 CONCLUSION

This chapter presented the literature review and the two theories which guided and directed the study. Both the adult learning theory and Lewin's change theory were discussed. The two theories complemented each other to provide the base of the study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter deliberates on how the study was conducted. A comprehensive description of the research procedures, processes, were followed to answer the research questions and to achieve the objectives of the study. The chapter also outlines the significance of the study. Figure 3.1 below presents an overview of the research methodology.

Figure 3.1 presents an overview of the methodology.

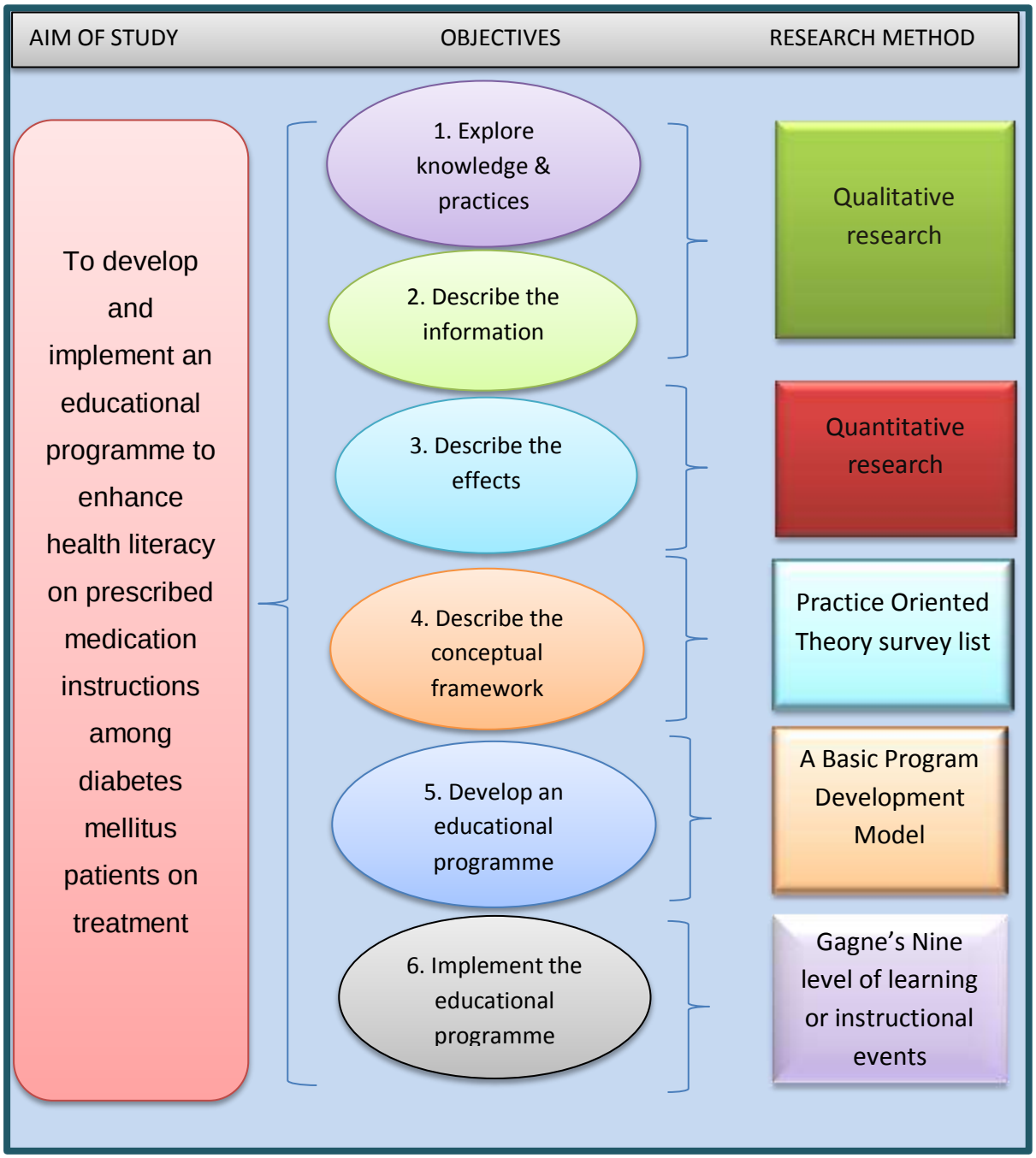


Figure 3.1: The overview of the methodology

3.2 RESEARCH METHOD

The Mixed Methods Research (MMR) guides this study in accomplishing the aim of the study. Mixed Method Research is defined as a method of investigation which encompasses the collection of both qualitative and quantitative data, incorporating the two forms of data, and using separate designs that involve rational expectations

and theoretical frameworks (Creswell, 2014). Plano Clark and Ivankova (2015) explain MMR as a process of integrating quantitative and qualitative methods of collecting and analysing data for a better understanding of a research purpose. The researcher sampled the participants and respondents for the study concurrently. Then, followed the simultaneous collection and analysis of the two sets of data. The results of the sets of two data were then merged to bring consolidated results.

The benefit of mixed methods research is that it provides more evidence for explaining a research problem that both qualitative and quantitative research alone cannot produce (Creswell & Plano Clark, 2018). The researcher wanted to obtain a dense description and quality of the study without deficiencies. The researcher chose the mixed method approach to gather as much information as possible about the health literacy problems encountered by the patients on prescribed medication instructions.

3.2.1 Research design

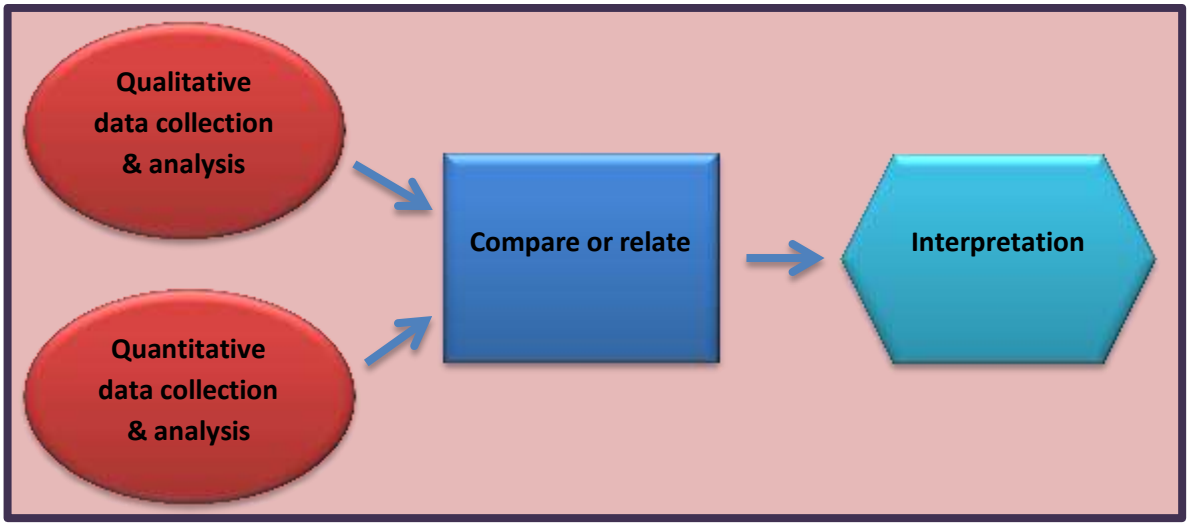
Botma, Greeff, Mulaudzi, and Wright (2016) define research design as a proverbial backbone of the research study, which provides the structure for the research methods and design decisions that should take place to plan the study. A fixed convergent parallel research design was followed in the study to attain the study's objectives. Creswell and Plano Clark (2018) define a fixed convergent parallel design as, a study in which the usage of qualitative and quantitative methods is prearranged, scheduled at the beginning of the research process, and procedures are executed as planned. Watkins and Gioia (2015) explain convergent parallel design as a mixed methods research design where quantitative and qualitative data are collected concurrently. The data collection is followed by the analysis of the two sets of data separately then mixes the qualitative and quantitative data phases by assimilating the results during the interpretation phase. Nonetheless, assimilation could be during analysis of the two sets of data.

Plano Clark and Ivankova (2015) explain that the integration of qualitative and quantitative methods occurs when the analysis of the data in both study components is completed. The qualitative and quantitative results are compared or blended to

find substantiating evidence. Thus, to produce a more complete understanding of the research problem.

The use of a convergent parallel design in the study allowed the researcher to compare or relate the qualitative and quantitative data taking into consideration the strengths of both the methods.

Figure 3.2 summarises the design



(Adopted from Watkins and Gioia, 2015)

Figure 3.2: Schematic representation of the convergent parallel design

3.2.2 Research site

Figure 3.3 shows the Ga-Dikgale village area

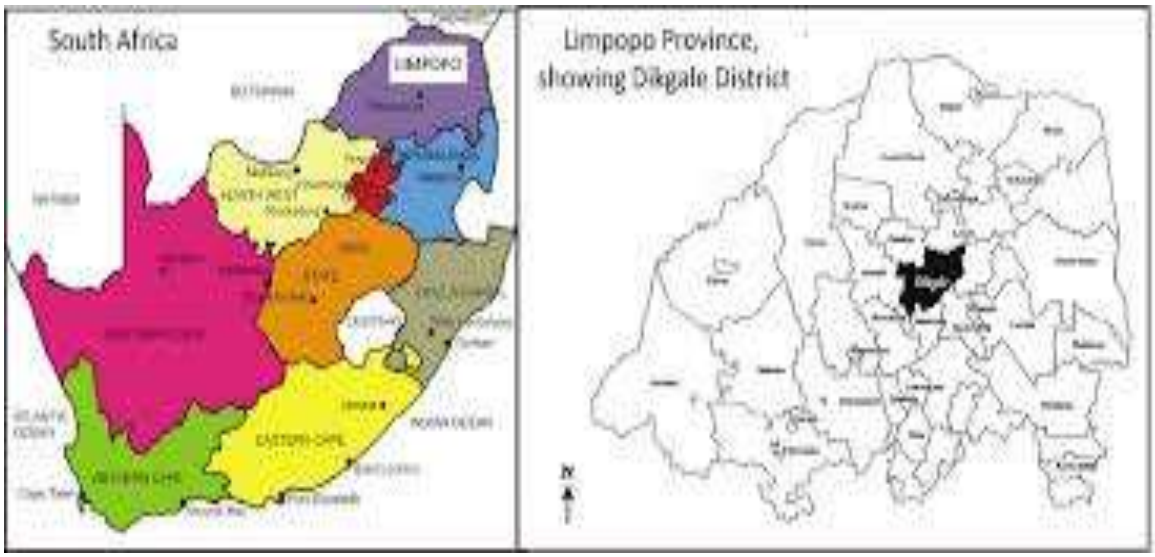


Figure 3.3: The Ga-Dikgale village area

The study was conducted in four clinics (Ga-Dikgale clinic, Seobi-Dikgale clinic, Sebayeng clinic, and Makotopong clinic) situated at Ga-Dikgale village. Ga-Dikgale is an established Health and Demographic Surveillance System (HDSS) which is run by the University of Limpopo. The Ga-Dikgale village has a high prevalence of Non-Communicable Diseases (NCDs) hence it was chosen as the study site.

- **The Limpopo health care structure**

Figure 3.4 below shows, the Limpopo health care structure

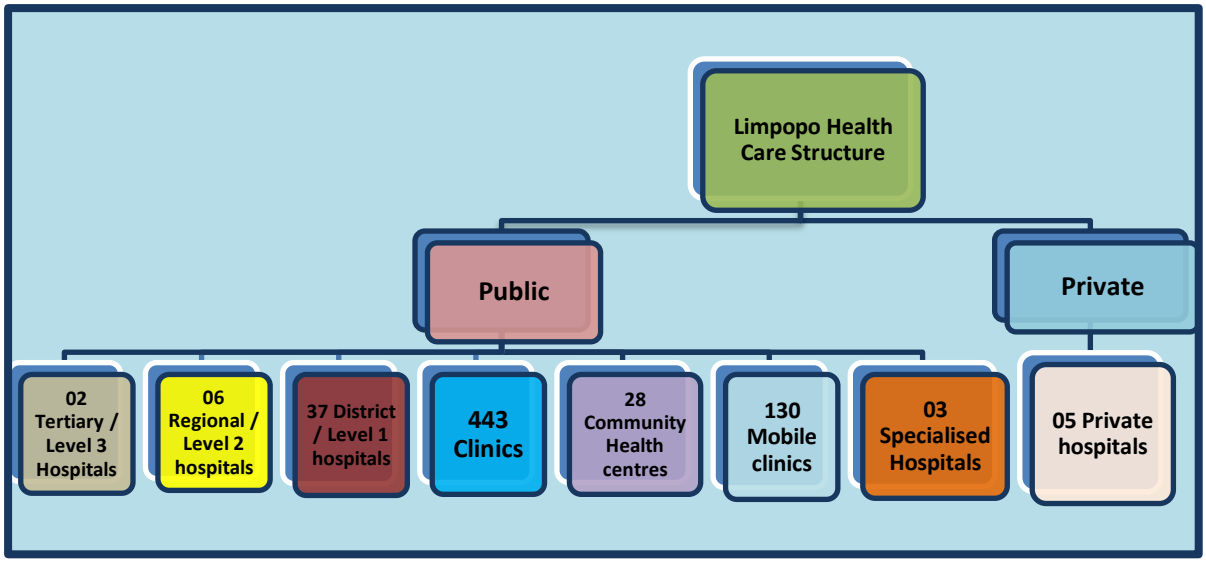


Figure 3.4: The Limpopo health care structure

The health care structure in Limpopo comprises two (02) tertiary hospitals (Mankweng and Polokwane hospitals), six (06) regional hospitals, and thirty-seven (37) district hospitals. There are also 443 clinics, 28 community health centres, 130 mobile services, three (03) specialised hospitals, and five (05) private hospitals. The two tertiary hospitals are in the Capricorn District with two (02) private hospitals, one (01) specialised hospitals, eight (08) district hospitals, three (03) community health centres, 86 clinics and 31 mobile services.

Polokwane hospital is situated on the north side of Polokwane city and Mankweng hospital is situated in Sovenga township 30 km east of Polokwane city. The local clinics around Mankweng refer their patients to Mankweng hospital as there is no District or regional hospitals nearer them.

- **Ga-Dikgale Health and Demographic Surveillance System (HDSS)**

The Ga-Dikgale Health and Demographic Surveillance System (HDSS) was initiated in 1996 and is situated in a rural area of Limpopo Province, South Africa. The HDSS is located about 45 km east of the Polokwane city Limpopo Province. There is a main road to the west of the HDSS area which provides public transport to nearby Mankweng township, where there is a major government hospital. At the centre of the HDSS area, there is a clinic that provides basic out-patient services (Kanjala, Alberts & Burger, 2010).

- **Ga-Dikgale village**

Ga-Dikgale village is located at the Capricorn District with about 36 000 population. The BaPedi people are the ones dominating in this village, and hence the interviews were conducted in Sepedi. There is a significantly high unemployment rate, poor road infrastructure, and poor service delivery in the Ga-Dikgale villages (SEA, 2016). Unemployment leads the people living in this area to living a sedentary lifestyle. Poor road infrastructure and poor service delivery lead to poor transport to access health facilities when needed.

- **University of Limpopo**

The University of Limpopo is situated about 30 km east of the Polokwane city of the Limpopo Province on a farm called Turfloop along the R71 road to Tzaneen. It is also about 20 km from the Ga-Dikgale HDSS area. The HDSS is managed by the University of Limpopo's Faculty of Health Sciences. The University was formed in 2005, 1st January by the merger of the former University of the North and Medical University of South Africa (MEDUNSA).

3.2.3 Population and sampling

The population is defined as the entire collection of participants that are of interest to the researcher (Johnson & Christensen, 2014), whereas, sampling is defined as the process of selecting the subset of the population to represent the accessible population (Botma et al, 2016). The study's accessible population included 144 patients diagnosed with diabetes mellitus from 01 January 2015 to 30 November 2018 who were collecting treatment regularly at Ga-Dikgale, Seobi – Dikgale,

Makotopong, and Sebayeng clinics. Concurrent mixed methods sampling was used to obtain the participants for the study. Concurrent mixed methods sampling is described as the sampling of qualitative and quantitative studies simultaneously. Thus, to triangulate the results from separate quantitative and qualitative components of their research thereby allowing them to confirm, cross-validate, or corroborate findings within a single study (Brown, 2014). The researcher sampled participants and respondents for the study concurrently. When other patients were filling questionnaires, the others who consented for the qualitative study were being interviewed.

Inclusion criteria were based on the following:

For both qualitative and quantitative researches

All diabetes mellitus patients falling under the study population taking treatment at Ga-Dikgale, Seobi-Dikgale, Makotopong, or Sebayeng clinic with the following characteristics:

- Patients who were free from hearing problems so that they will be able to follow verbal instructions,
- Those who were psychologically fit so that they could provide sound information, and
- Those patients who were on treatment for more than a month so that they could provide information with a better experience.

Exclusion criteria were based on the following:

For both Qualitative and Quantitative researches

- Patients who were not physically unfit at the time of data collection so that data production would not be affected.

3.2.4 Qualitative strand

A qualitative research method was followed in this study to explore the knowledge and practices of the diabetes mellitus patients in interpreting prescribed medication instructions at Ga-Dikgale village clinics in Capricorn District, Limpopo Province. Sharan (2009) defines the qualitative research approach as an umbrella term covering a collection of informative techniques which seek to describe, decode, translate, and then come to terms with the meaning, not the frequency of certain or

occurring phenomena in the social world. Bless, Higson-Smith, and Sithole (2013) explain qualitative research as a research approach in which the researcher investigates a problem understudy from the participants' point of view. Furthermore, Botma et al (2016) affirm that qualitative research entails a detailed investigation of qualities, characteristics, or properties of a phenomenon for better comprehension.

3.2.4.1 Sampling method

Non-probability purposive sampling was used to obtain (18) participants who participated in the qualitative research study. Babbie (2013) defines purposive sampling as a type of non-probability sampling in which the participants to be observed are selected based on the researcher's decision, focusing on the most useful. The researcher selected participants who are taking diabetes mellitus medication to provide information on how they take their medication.

3.2.4.2 Pilot study

A pilot study was conducted on five diabetes mellitus patients at the Ga-Makanye clinic to pre-test the interview guide and ensuring that ambiguous questions are rectified before the main study. The individuals who have participated in the pilot study were not included in the main study. The pilot study was able to yield information that revealed that there are problems with how diabetes patients interpret medication instructions. It also assisted the researcher in the areas that needed improvement when conducting interviews. The interview guide was able to yield information that was of interest to the researcher. Ambiguous questions like *"What effects does not know how to take medication have on you or other people"?* were restructured to yield more information.

The findings of the pilot study were as follows:

Five diabetes mellitus patients on treatment consented to participate in the study voluntarily.

- Characteristics of the participants

Table 3.1 below summarises characteristics of the participants

Gender	Years of taking medication	Language
Males = 01 Females = 04	01 = One year 02 = Two years 02 = Three years	01 = English 04 = Sepedi

Table 3.1: The characteristics of the participants

Two themes and five (05) sub-themes emerged from the study. Table 3.2 below summarises themes and subthemes reflecting the findings of the Pilot Study.

Themes	Sub-themes
1. Poor medication instructions comprehension	1.1 Inadequate explanation of instructions 1.2 Poor health outcomes
2. Lack of knowledge related to diabetes mellitus as a disease	2.1 Lack of information related to poor health outcomes 2.2 Lack of knowledge on taking medication correctly 2.3 Medication non-compliance observed

Table 3.2: The themes and sub-themes of the pilot study

Theme1: Poor medication instructions comprehension

The findings revealed that patients with diabetes mellitus do not understand medication instructions. Two sub-themes emerged from this theme namely; inadequate explanations of instructions and poor health outcomes.

Sub-theme 1.1: Inadequate explanation of instructions

The results revealed that there is an inadequate explanation of instructions of medication instructions which left the participants with the responsibility of having to figure out how they should take the medications themselves. This is, however, has placed a burden on the participants as they are health illiterate to interpret the instructions on their own. **This challenge is confirmed by this participant who alleged that**: *"They just write on the medication package that I should take how*

many a day according to their types. Then I have to sit down and divide them that I should take them so and so".

Nonetheless, participants indicated that they were told how to take their medication though some report that they were not told. In support of this view, **one participant said:** *"Myself, I was told to take my medication in the morning before food, in the evening before food also…I mean after food".*

Sub-theme 1.2: Poor health outcomes

The findings revealed that participants suffer poor health outcomes, that are associated with poor management of diabetes mellitus. These poor health outcomes could be prevented if individuals could consume their medications correctly accompanied by lifestyle modification. The study participants reported having poor health outcomes since being diagnosed with diabetes mellitus. **This is evident in the following participants**: *"I want to know the reason why I often faint while having taken my medication that I sometimes do not know that I have fainted".* Another participant asked: *"why is this illness (of diabetes) affects the eyes whereas am just taking the treatment normally, but it still affects the eyes. I am trying to eat whatever they told me to eat; the balanced diet so that I could get well but it affects my eyes badly".* **Yet another participant also added by asking:** *"ke be ke nyaka go tseba gore maoto a, go swa mo a hlolwa ke eng? Gape ke a swa, boshego ei... ga ke robale. Ke go fiša ka tsela e... ntje ke hlwele meriting, a fiša go fiša. Ga a bohloko, ke no swa o kare ke gatile mollo".* **Translation:** I wanted to know the reason why my feet burning. I am burning at night, ei! I do not sleep. Burning this way even though I spend time on the shadows; they are really hot. They are not painful, but I burn like I am standing on fire".

Theme 2: Lack of knowledge related to diabetes mellitus as a disease

study findings portrayed poor awareness of diabetes mellitus, which emerged in the following three sub-themes, namely lack of information related to poor health outcomes, lack of knowledge of the correct way of taking medication, and medication non-compliance observed.

Sub-theme 2.1: Lack of information related to poor health outcomes

The findings revealed a lack of information related to poor health outcomes by participants. Taking medication wrongly is one of the information that participants lack that contribute to poor health outcomes. **This challenge is evident in one participant who said:** *"The dangers are many, it might be an overdose. There are many problems even though I am unable to explain what types".*

Another participant agreed with the findings and said: *"Ke nokwa bare swikiri e ne go hlolela stroke".* **Translation:** "I just heard that it can cause stroke". Yet another participant completely does not know what could befall them and hence said: *"There I do not know but you are going to be badly affected because you do not take medication properly. It is just that I do not know the effect that I could encounter and that is the problem. (The researcher says ok) I just see myself skipping the time that I should be taking medication and take them at the time that favours me".*

Sub-theme 2.2: Lack of knowledge on the correct way of taking medication

The findings revealed a lack of knowledge on the correct way of taking the medication by participants. The participants use their discretion on deciding their best way of taking medication. When asked about how they take their medication, **the participants said:** *"I am taking pills; I am taking them three times a day. I take them at 08h00, 14h00 and around 21h00. I did not know how I should take my medication then my sister's other child is a nurse; after I explained how I take my medications to her she said I am not taking them well. She said I must count; if I took my tablets around 08h00 AM. I can take the next dose at around 14h00 so forth. I should count seven hours".*

In agreement with this encounter, **another participant said,** *"I am taking the first ones at 10h00, then during the day at 13h30 I take the second dose and at 20h00".*

Yet, another participant portrayed a different factor that determines the reason for not taking medication correctly. **The participant said:** *"I am taking my medications twice a day only. There it would be determined by what time was my food ready. I can say at around past 08h00 to 09h00 after eating my food then I take my medication. Then the second dose, I am going to take it at night after watching 'Skeem Saam'. I do not know at what time it is showing on TV, is it minutes after 19H00 or after 20h00 I do not know".*

Sub-theme 2.3: Medication non-compliance observed

The findings have also revealed the observation of medication non-compliance by participants. Some participants are however aware that they are not taking their prescribed medication correctly. **This challenge is evident in the participant who said:** *"By right, I should take my medication once. The big diabetic one I should take it thrice a day, but I cut the one I was supposed to take at 12h00 PM then I only take the pill in the morning and at night because I think it will make me collapse since I am injecting insulin and then I have to also take the pill in the morning, afternoon and at night".*

Agreeing with this finding, **another participant said:** *"I check on my time; on which time suits me. At 10h00 AM is when I am taking my breakfast, 13h30 is when I am taking my lunch and 20h00 is when am [making] supper, and usually go to bed".* **Yet another one also said:** *"With time I am scared to talk because to tell you the truth I am taking the medication in the morning at 08h00 and then in the evening I take it again, but I sometimes forget. I forget, especially the morning one; sometimes I eat my food with the aim of taking my medication thereafter, but you find that I forget and remember around 12h00 pm and that will be the time that I take it. Then in the evening, I skip the time that I usually take the drug to cover up the morning time. I will wait till a bit late thereafter will take the drug".*

3.2.4.3 Data collection method

Data were collected using a semi-structured interview with a guide and document analysis was conducted using a checklist rubric. The data were collected in four clinics of the Ga-Dikgale village as outline under the study site.

Semi-structured interviews

A semi-structured interview is created around a central of standard questions that allow the participants to provide comprehensive information about their knowledge of the study phenomena as guided by Botma, Greeff, Mulaudzi, and Wright (2010). The researcher started the interviews with one clinic until data saturation was reached. Moving to the second clinic, the researcher, entered with an open mind to check if there were unique trends per clinic. The researcher, however, did not find an abundant difference. Data collection continued and was reached with fourteen (14) participants. However, the researcher continued to the last clinic to check if more

data could be generated that varies from the previously obtained. The researcher, therefore, interviewed eighteen (18) participants.

The interviews were conducted in a private room in the clinics until data saturation was reached.

The central question was as follows: **"Could you please share with me about how you take your medication?"**

The researcher was able to ask follow-up questions supplementary to the standard questions were an unanticipated or fascinating answer is provided (Mitchell & Jolley, 2013). An example of a probing question that was asked was: *"Why do you take your medication the way you do?"* This allowed the researcher to be clarified in any statement that was not clearly understood.

A voice recorder was used to record the interviews and the participants were made aware that the interview was recorded. The duration of the interviews was 18hrs 49 minutes. Field notes were taken together with the recording to permit the researcher to code the participants and to note non-verbal cues. Open-ended questions were provided on an interview guide to guide the participants' response and data were collected until saturation was reached (Botma et al, 2010). The researcher also assembled all prescribed medications leaflets, and packages, that are currently used by the diabetes mellitus together with doctors' prescriptions for a review. A checklist to evaluate the documents provided in the study was utilised as a tool for assessing the documents. The advantages of the interviews are highlighted as follows:

- The researcher met with the participants and was able to observe the reactions and the emotions of the participants. It was easy to make follow-ups and statements that were not clear were clarified. Sometimes the researcher would observe that the participants were scared to give full detailed information but probed for more information until they felt comfortable sharing. The participants expressed their views without limitation. Moreover, the participants had a chance of asking for clarity, where they did not understand.

The limitations during the interviews were as follows:

- There are times where the interviews had to be paused, as participants had to see the doctor. This prolonged the data collection duration.

3.2.4.3.1 Preparation phase

The researcher followed the preparatory phase of data collection as outlined by Hennink, Hutter & Bailey (2011). The researcher contacted the district manager, followed by the area managers, and the clinic managers to build rapport. Thus, to explain the participants' involvement in the study. Therefore, the researcher was awarded the opportunity to continue with the study as planned. The planned dates and period of data collection were highlighted. The researcher briefly explained the aim, objectives, and the significance of the study to the nursing managers and provided them with the approval letter from TREC (TREC no.: TREC/373/2017: PG). Permission letters to collect data from Capricorn District Office, for Primary Healthcare and the Limpopo's Province Department of Health provincial office, were also provided to the clinic authorities.

Permission was, therefore, granted by the area managers of the Ga-Dikgale village clinics and the clinic nursing managers. The participants allowed the researcher to continue with the preparations for the interview sessions that were to follow the preparation phase. The researcher identified potential participants and made contact with them at the clinic.

- **Information session**

The information session was conducted a few days before, the day of discussion with participants in the semi-structured interviews, and on the day of the interviews. The researcher outlined issues related to what is expected of the participants during the interviews. The researcher also explained the aim, objectives, and significance of the study together with the central question to be asked as well as the questions in the interview guide (see Appendix 3), during the information session. The researcher confirmed the period interviews were going to take place to the managers in all the clinics.

The researcher explained, the informed consent forms to all participants who agreed to participate in the study. The use of a voice recorder and its purpose were also outlined. The participants were assured of their privacy and the confidentiality of their

information. Which included protecting their identity, and not allowing unauthorised personnel to access their information. The researcher also explained to the participants that they can withdraw from the study at any time if they wish to do so without being ill-treated, but the information they would have given at the time of withdrawal will be utilised for study purposes.

3.2.4.3.2 Interview Phase

- **Conducting the semi-structured Interview**

At the beginning of each interview session, the researcher welcomed the participants with warm greetings. The researcher started with induction, to the participant and assured them that the permission to conduct the interview session had been granted by the involved personnel, and presented them with all the letters which were granted as proof. Thus, the aim, objectives, and significance of the study were explained again. The participant's anonymity was ensured, as names were not used but alphabets instead and recording process were elaborated. The confidentiality of the information was also reinforced. The interview sessions commenced after the participants had signed informed consent forms.

The research environment was conducive for interviews; quiet, relaxed, and well-ventilated venues and had no disruptions, and that liaised with de Vos et al (2012). When saying that, the interview setting should provide privacy, comfort, and is a non-threatening environment that is easily accessible. No barriers were encountered during the interviews; the participants were able to explain how they interpret and consume their medications. The researcher avoided personal questions that would have made the participants feel uncomfortable and therefore hindering the yielding of more data (Hennink et al, 2011).

The researcher was able to gather more information from the semi-structured interviews. Thus, it was on how diabetes mellitus patients interpret prescribed medication instructions at Ga-Dikgale village clinics. All the interview sessions were recorded with the voice recorder which accumulated a lot of information. The researcher also took field notes to complement the voice recorder since the voice recorder could not record the non-verbal communication cues. The interview

sessions highlighted the central question to participants, therefore, the follow-up questions followed as outlined by the interview guide.

The participants were given time to be comfortable when answering the questions and that made them disclose more information. The researcher used the following communication techniques in the interview sessions: listening skills (probing, clarification, summarisation, reflection) and observation.

A good researcher should have good listening skills, which helps to obtain quality information during an interview (Dua & Raworth, 2012). The researcher maintained good listening skills since good listening skills enable the researcher to draw more information from participants. It also gives a good understanding of the problem studied and encourages the participants to talk more when they are being listened to. As a result, the researcher was able to maintain continuous, harmonious interaction with the participants and obtain clarity or meaning of the studied problem.

- ***Probing***

According to Zikmund and Babin (2010), probing is an interview technique that tries to draw deeper to elaborate more explanations from discussions. Probing was done depending on the participants' responses to obtain a greater depth of information as the participants were persuaded to give more information about their experiences. This is after maternal deaths and how they adapted, this was done in line with Rubin and Bellamy (2012) asserting that probing for greater depth is a priority of the interviews. The purpose of probing was to deepen the understanding of the researcher's part by asking comprehensive questions as guided by Flick (2006). The participants were able to elaborate more on how they interpret and consume prescribed medication. Therefore, the researcher maintained a good atmosphere in conversations to keep the participants relaxed while getting more information.

- ***Clarification***

Munden (2006) explains that clarification is used to clear up confusing, vague, or misunderstood information. The researcher used clarification whenever provided statements by the participants were not clear and understandable, and more elaboration was needed. Clarification was also used to check whether the provided information is correct. This was done in line with Cormier, Nurius, and Osborn (2013)

who stated that clarification can be used to make participant's statements explicit and to confirm the accuracy of the researcher's perceptions about the statement. The clarification also helped the researcher to translate what the participants have said to a more familiar language so that it could be more understandable and also helped the participants to restructure their perceptual field as guided by Kadushin and Kadushin (2013).

- ***Summarisation***

Munden (2006) explains summarisation as restating the information as given by the participants. The researcher used summarisation at different points of the interview to structure the interview, assisting with the transition, and to ensure that the data collected is accurate and complete. The participants were also able to add more information, to the information they have provided as data was not sufficient.

- ***Reflection***

This is a process of reflecting on something important that the participants have said to get them to expand on that idea (de Vos et al, 2012). Munden (2006) also defines reflection as repeating a statement that the participant has just said to obtain more specific information. The researcher repeated some information as given by the participants, to confirm what they meant about their statement.

- ***Observation***

Cohen, Manion, and Morrison (2011) define observation as looking and noting systematically at the participants' behaviour. The researcher used observation to interpret and validate participants' non-verbal behaviour. Some participants were reluctant, to tell the truth, about their approach when taking their medication.

3.2.4.3.3 Post Interview Phase

The duration of the semi-structured interviews was 18hrs 49 minutes. The researcher thanked the participants and reminded them about coming back to them should a need arise. The participants agreed and did not have any problem. The researcher assured the participants that arrangements will be made with the clinic managers so that they could get feedback for attending the educational programme.

<u>Document analysis study</u>

Document analysis which involved analysis of diabetes mellitus medication leaflets, medication packages, and doctors' prescriptions were also accomplished (Grove, Gray & Burns, 2015). Document analysis is defined as the investigation of people, events, and systems in-depth, a thorough analysis of authentic written materials (Botma et al, 2016). The document analysis findings were discussed at length in chapter four.

3.2.4.3 Data analysis

Data analysis is the process of making sense of text or image data (Botma et al, 2016). Botma et al (2016) further explain that the process involves preparing data for analysis, moving deeper into understanding the data, representing the data, and making an interpretation of the greater sense of the data. The collected data were transcribed and converted to English before being analysed. The researcher adopted Tesch's eight steps as shown in Table 3.1 to analyse the qualitative data provided by Creswell (2009).

Table 3.3: Tesch's eight steps of qualitative data analysis

Steps	Procedure
1.	Firstly, the researcher listened to the recorded interviews and transcribed the information verbatim. The entire transcripts were then read carefully to obtain a sense of the whole and some ideas were written down.
2.	One interview was selected and read to get the information, writing down thoughts that came to mind. A table was made with all the topics and sub-topics that emerged but there were not grouped. The researcher took another transcript, read it trying to relate it with the first one. Other topics sub-topics emerged and were added to the previous ones.
3.	The researcher then made a list of all the topics. Similar topics were grouped to form themes and sub-themes. The themes and the sub-themes were then named using words that best described all the grouped. Where necessary, the themes were changed into sub-themes and the sub-themes also were rearranged as themes.
4.	The themes were abbreviated as codes, which were written next to the appropriate segments of the transcripts. The researcher prepared this preliminary by organising schemes to see whether new themes and codes emerged. Whenever a new sub-theme emerged, it was added to the appropriate theme.
5.	The researcher came up with the most descriptive wording for the themes and sub-themes. For example, misinterpretation, non-compliance, double dosage. The

	relationship between the themes and subthemes were outlined.
6.	The researcher made a final decision on the naming for each theme and separated the themes and the sub-themes in that manner. The themes were arranged in a manner that outlined the midwives' information from their experiences to adaptation strategies.
7.	The data materials that belonged to each theme were assembled and a preliminary analysis was made. These data materials were further supported by literature of previous studies related to health literacy, diabetes, and medication non-adherence.
8.	The researcher re-coded the existing material. The researcher came up with a summary of the themes and sub-themes, and the data were sent to the independent coder. The researcher and the independent coder's common themes and sub-themes were summarised and discussed in detail in chapter four.

Table 3.3: Tesch's eight steps of qualitative data analysis

3.2.4.5 Measures to ensure Trustworthiness

Fenton and Mazulewicz (2008) expound trustworthiness as supporting the argument that the study's results are worth paying attention to. Bless et al (2013) explain that trustworthiness is the determination of how much trust could be given to the research process and the findings. The researcher has proved that the information provided was true and had not been manipulated through the following criteria were:

Credibility

Credibility is the determination of whether the researcher has established confidence in the accuracy of the results, with the participants, and the circumstances in which the research was undertaken (Botma et al, 2010). It refers to the precision that the researcher interpreted the data, also that supplied the participants (du Plooy-Cilliers, Davis & Bezuidenhout, 2014).

Credibility was ensured through the following: 1. Providing a full description of the data collection and analysis methods used. 2. Prolonged engagement with the participants where the researcher has spent four months in the field collecting data (Shenton, 2004). 3. The researcher also triangulated the data using different data collection methods, that is, document analysis and semi-structured interviews (Goodman & Moule, 2013; du Plooy-Cilliers et al, 2014). 4. The researcher presented the data at conferences and workshops for peer and academic scrutiny (Shenton, 2004). Lastly, the participants were informed that they could withdraw from

participating in the study, so, that they can willingly participate and give honest information (Shenton, 2004).

Dependability

Botma et al (2010), described dependability as considerations of whether the study results are consistent if the inquest was repeated with the same participants and in a similar context. Dependability stresses that the researcher carefully describes or precisely follows a clear and considerate research strategy (Bless et al, 2013). In this study, dependability is ensured, hence, raw data was compiled, the data collection process was followed, analysis products, process notes, and the reflection of the researcher and examination by the supervisors of the study. The sampling method also determines the extent to which the data could be dependable. The researcher extensively explained the sampling method used in the study.

The researcher provided a dense description of the data collection and analysis methods to enable future researchers to repeat the work if not necessarily to gain the same results (Shenton, 2004).

Confirmability

The confirmability is defined as a measure of how well the study's findings are supported by the data collected, concerning the objectivity or neutrality of the data and interpretations (Fenton & Mazulewicz, 2008; Polit & Beck, 2010). Confirmability necessitates that other researchers should be able to produce similar results by following similar research processes in a similar setting (Bless et al, 2013). In this study, confirmability was ensured by providing raw data. The researcher did not put forward any information that was not provided by the participants as part of the data and asserting that it was drawn from the participants. The researcher also ensured this by making available all the data collection products as evidence and the involvement of an independent coder. The researcher also provided a detailed description of the methodology used, to enable the reader to determine the validity of the data. The audit trail was also conducted (Shenton, 2004).

Transferability

Tappen (2011) defines transferability as the extent to which the findings can be applied to other situations and other individuals. du Plooy-Cilliers et al (2014) explain

transferability as the extent to that study results and analysis can be applied beyond an explicit research project. The sampling and the data collection method used in this study permits the decision of the extent of the findings could be transferred to other individuals and other situations (Tappen, 2011). The study was limited to four clinics, involving Diabetes mellitus patients on treatment. However, the researcher exclusively took part in data collection, and it involved 18 participants (Shenton, 2004).

3.3 QUANTITATIVE STRAND

Quantitative research was employed in the study to describe the effects of poor health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in Capricorn District, Limpopo Province. Creswell (2014) explains quantitative research as a method for testing objective ideas by investigating the relationship among variables. Bless et al (2013) describes quantitative research as "a research approach that rests extensively on numbers, or statistics in the analysis and interpretation of findings that are generalised from the sample to the population".

3.3.1 Sampling method

The researcher utilised simple random sampling to select the participants who will participate in the quantitative study. Simple random sampling is defined as a random sampling method where a sample is chosen through a technique in which every member of the population has an equal chance of taking part in the study (Johnson & Christensen, 2014). The sample size in all the four clinics was calculated using Taro Yamane formula outlined by the Department of Sociology and Criminal Justice (2017) and is as follows: $n=N \div 1+N\ (e)^2$, $144 \div 1+144(0.05)^2 = 106$. The *N*= Population size, n= sample size, and *e*= error margin 5%. Therefore, the sample size is 106. The researcher obtained the list of all diabetes mellitus patients on treatment per clinic who met the inclusion criteria to come up with the population. Every patient on the list is selected to participate in the study as the sample size is small. A sample is defined as a portion of the accessible population identified for the study (Botma et al, 2016).

Table 3. Presents the sample size division per clinic:

Name of clinic	No. of respondents	Returned questionnaires
1. Ga-Dikgale	48	46
2. Sebayeng	37	34
3. Seobi-Dikgale	27	25
4. Makotopong	32	32
Total	**144**	**137**

Table 3.4: Presents the sample size division per clinic

3.3.2 Pilot study

A pilot study was conducted on the five respondents with diabetes mellitus at Ga-Makanye clinic to pre-test the questionnaire. The individuals who have participated in the pilot study were included in the main study. The piloting of the study was conducted to check the feasibility of the study and to determine the average time it would take the respondents to fill the questionnaire. Pre-testing the questionnaire ensured that obscure questions are rectified before the main study commence. The researcher was able to rectify the questionnaire for its faults before conducting the main study.

The findings of the pilot study were summarised as follows:

Many vague questions required more than one answer. Some of the questions were not significant for the study. Hence, they were removed from the reconstructed questionnaire. The questions were therefore not easy to be analysed with the SPSS software. The respondents were however able to complete the questionnaire between 20 to 35 minutes.

3.3.3 Data collection method

Quantitative data were collected using self-administered structured questionnaires. Quantitative data collection encompasses gathering of numeric data with the use of questionnaires or observation guides, to obtain primary data from individuals (Hair Jr, Celsi, Money, Samouel & Page, 2011). A structured questionnaire is a formal list of questions formulated in such that the facts will be gathered with a pre-set order (Gupta & Gupta, 2011). The questionnaire is divided into three sections; Section A which is about the Demographic data comprising nine (09) questions, Section B which is about diabetes mellitus medicine instructions health literacy self-assessment tool comprising of eight (08) questions, and Section C which is about the general medicine instructions health literacy knowledge and its effects test which comprised of twenty-five (25) questions. The questionnaire took about 25 to 35 minutes to complete.

3.3.4 Data analysis

The quantitative data analysis took place concurrently with qualitative data analysis. Babbie (2013) defines quantitative data analysis as a statistical presentation and

manipulation of observations to describe and explain the phenomena that the observations reflect. Statistical Packaging for Social Science (SPSS version 25) was used to organise the collected data, to obtain, display descriptive statistics, and to perform inferential statistical tests (Wetcher-Hendricks, 2011). Descriptive statistics is a method that assists researchers to arrange, summarise, and simplify the results obtained from research studies (Gravetter & Forzano, 2012).

3.3.5 Validity and Reliability

The quality of quantitative data was ensured through the following:

- **Validity**

Validity is defined as the degree that measures utilised, accuracy to its intended purpose (Tappen, 2011). Additionally, Goodman and Moule (2013), describe validity as a measure of whether a data collection tool accurately measures what it is supposed to. The researcher constructed the questionnaire in a way that addressed the objectives and answered the research questions. The researcher also conducted a pilot study to pre-test the questionnaire to check if the questionnaire answers the research questions. The research question which was meant to be answered by this questionnaire was not fully answered; the researcher, therefore, reconstructed the questionnaire.

Criterion-related validity – it tests whether an instrument measures what it is intended to measure, by comparing it with another valid measure (Bless et al, 2016). Criterion-related validity was ensured through comparing the questionnaire and interview results about the effects of health literacy on diabetes mellitus patients.

Construct validity – is defined as the extent to which a measure relates to other variables as anticipated within a system of theoretical relationships (Babbie, 2013). Construct validity was ensured through including information about the effects of poor health literacy on prescribed diabetes mellitus medication instructions on the patients.

Content validity – is defined as the extent to which a measure embraces the range of meanings included within a concept (Babbie, 2013). Content validity was ensured

through covering information related to health literacy on prescribed diabetes mellitus medication instructions.

Face validity – it is concerned with how the instrument appears to the respondents (Bless et al, 2013). Face validity was ensured through assuring that the questionnaire is designed in such a way that it fits the needs of the respondents.

- **Reliability**

Tappen (2011), explains reliability as the consistency of a measure or the degree in which a measure produces the same results over time. Reliability in this study is ensured through the participation of patients in different clinics at Ga-Dikgale village and piloting the study to pre-test the questionnaire so that vague questions and statements could be attended to.

3.4 Bias

Bias is defined as a procedure where researchers conducting research influence the results to depict a particular outcome (Shuttleworth, 2009). The researcher can influence the study when sampling the population, constructing the interview guide and a questionnaire, and when conducting interviews. The researcher, therefore, avoided leading questions during interviews, and sampling methods used allowed every participant who had a chance to take part in the study. The researcher also bracketed out preconceived beliefs and ideas during data collection to avoid biasness. Bracketing involves identifying and holding in abeyance preconceived beliefs and opinions about the phenomenon under study (Polit & Beck, 2012). Polit and Beck (2012) supplementary expound that achieving bracketing completely is not easy, but the researcher should strive to bracket out the world and any assumptions to confront the data in pure form. The researcher withholds any ideas and beliefs about the phenomenon during data collection to avoid biasness.

3.5 DATA MANAGEMENT

Data management is defined as a designed structure, method, or strategy for systematising, categorising, and filing research data materials to make the data efficiently retrievable and duplicable (Guest, Namey & Mitchel, 2013). The collected data materials are locked up in the researcher's office, in a cabinet and are only made available for the individuals concerned in the research study. The researcher

made certain that the data materials are not accessible unless an individual gets them from the researcher.

3.6 MERGING AND INTERPRETATION OF RESULTS

The researcher merged the two-research data to check for similarities and discrepancies. The data merged and the results were then interpreted to give an illustration of whether the two data converge, deviate, or are associated. Comparing and relating the two data allowed the researcher to come with a summary of the whole study results to answer the study's purpose.

3.7 RESEARCH METHODOLOGY AND PHASES OF THE STUDY

The following phases highlight how the study was conducted with the methodologies that were followed.

3.7.1 Phase 1: Situational analysis

This phase covered the first three objectives. A mixed method convergent parallel design was employed to accomplish these objectives. The mixed methods allowed the researcher to syndicate both quantitative and qualitative procedures, approaches, also study concepts (Creswell, 2014). The data were collected using both the qualitative and quantitative approaches simultaneously. For qualitative data, the researcher conducted a semi-structured interview with a guide. Thus, also a self-administered questionnaire was used to gather quantitative data. Therefore, the researcher adopted Tesch's eight steps for data analysis to analyse qualitative data, and SPSS version 25 was used for quantitative data analysis.

3.7.2 Phase 2: Development of a conceptual framework

The two phases are the core of objective number four of this study. The Practice Oriented Theory survey list by Dickoff, James, and Wiedenbach (1968) was utilised to describe the conceptual framework for the development of the educational programme. The five assumptions underpinning the Knowles' theory served as a directive for the conceptual framework described from the evolving situational analysis results in phase one (Anderson-Meger, 2016; Pappas, 2014).

3.7.3 Phase 3: Development of an educational programme

Nonetheless, phase three covers objective number five. Where a training programme was developed together, with its guidelines dependent on the situational

analysis results. The analysis in phase one, taking into consideration the conceptual framework in phase two. The development of the training programme is steered by the revised literature related to the study phenomena, as well as the legislative framework that guides the development of the educational programme.

3.7.4 Phase 4: Implementation of the educational programme

Phase four fulfilled objective six of the study.

Implementation

The researcher as the facilitator drew a schedule with dates for implementation of the educational programme. The schedule was made available to the participants and the respective clinic nurse manager.

Figure 3.3 presents the schematic presentation of the phases of the study

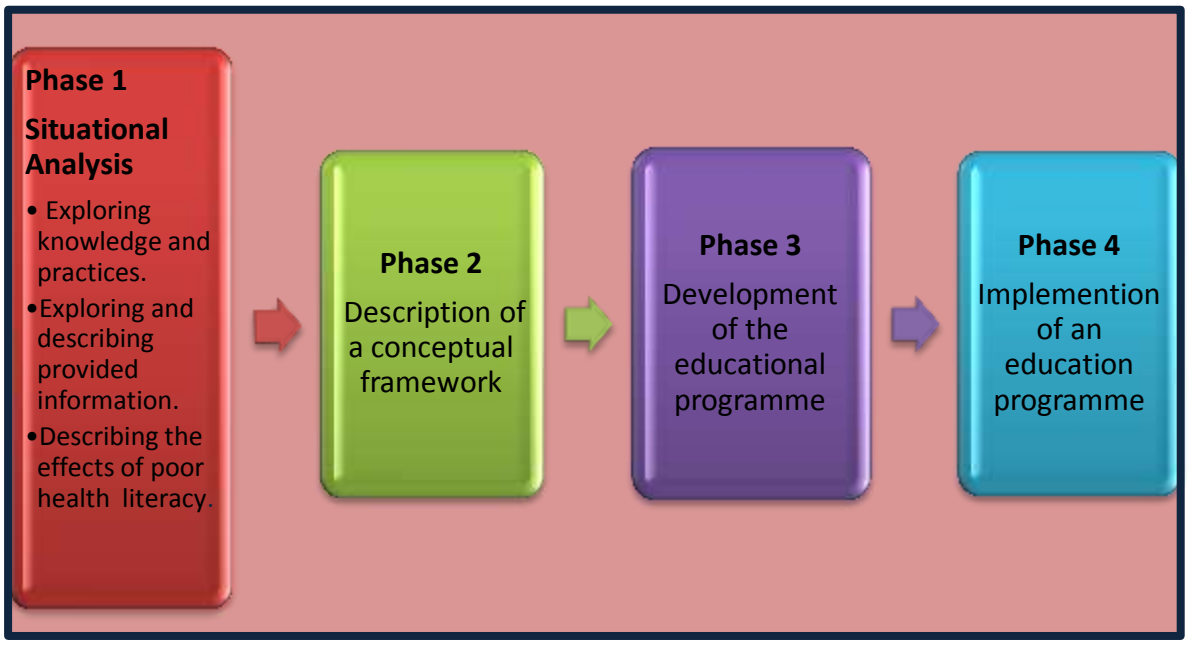


Figure 3.3 Schematic presentations of the phases of the study

3.8 ETHICAL CONSIDERATIONS

The following ethics were adhered to:

- Ethical clearance

The researcher obtained Ethical clearance from Turfloop Research and Ethics Committee (TREC). The TREC number is; TREC/373/2017: PG.

- Permission to conduct the study

The researcher obtained permission to conduct the study from the nurse managers of the respective clinics, the Capricorn health District manager, and the Limpopo's Department of Health. Refer to Appendix 1.

- Anonymity

Thus, anonymity was ensured through guaranteeing that the participants are not identified using their names, but rather the researcher used alphabets as participants' identification so that the participants' responses would not be identified with them. Thus, protecting the participants' identity (Babbie, 2013). Participants were informed that their names will not appear anywhere in the study.

- Confidentiality

The researcher has maintained confidentiality by not disclosing the participants' information overtly. The researcher could not identify, which information belongs to a specific participant, although the alphabets were utilised for concise data of the participants. Thereby protecting the participants' privacy and dignity (Babbie, 2013). The information of the participants was only accessible to authorities directly involved which are the supervisors and the independent coder.

- Informed Consent

The researcher explained to the participants the full description of the study. The purpose and benefits were also outlined. The participants were given a chance to choose whether to participate in the study or not, by signing a consent form. The participants could withdraw from participating in the study if they wish to do so, without being victimised by the researcher (de Vos et al, 2012). However, the information provided upon termination would have been used for the study. Nonetheless, no participant terminated from the study.

- Right to Privacy

Privacy implies that participants' information whether be it the spoken, written, or electronic that could be identified with the participants, should be kept private (Rickard, 2014). In this study, privacy was ensured by making sure that the participants' information is kept private so that no unauthorised person could have

access to the information and identifies it with the participants. Only the researcher and the supervisors can access the information for study purposes.

- Principle of Non-maleficence

The principle of non-maleficence states that the researcher should act in a specific way that will elude unnecessary harm or injury (Carter et al, 2013). In this study, the principle of non-maleficence was ensured through making sure that the participants are settled down in a safe environment, and participants who had to take medications and food before the data collection sessions start were allowed to do so.

3.9 CONCLUSION

This chapter outlined the study's research methodology. The study employed a mixed method research approach. Convergent mixed method research designed was used to attain the study's objectives. The study's piloting results have been outlined. The adjustments that had to be made on the data collection tools were instituted. The phases of the study were also highlighted along with the ethical considerations. Chapter four presents the presentation, interpretation, and discussion of the study findings.

CHAPTER 4

PRESENTATION, INTERPRETATION, AND ANALYSIS OF FINDINGS

4.1 INTRODUCTION

The previous chapter discussed the study methodology; research design and methods which guided the study. An explanation of the study site, population, sampling, the research method, the design, the data collection method used, and data analysis was also covered in the previous chapter. This chapter presents interpretations and discusses research findings, from both the individual semi-structured in-depth interviews conducted with diabetic Mellitus patients and self-administered questionnaires. The qualitative and quantitative data analysis took place separately. Therefore, the data merged and interpreted followed by a discussion of the combined findings.

4.2 DATA ANALYSIS

The data analysis presented in this chapter is for both the qualitative and quantitative strands, and they are discussed separately. However, data analysis took place simultaneously.

4.2.1 Qualitative strand

The qualitative strand analysis is comprised of the semi-structured interviews and document analysis data. The data were analysed using eight (08) steps of Tesch's open coding, qualitative data analysis method, as described by Creswell (2014) as outlined in the research methodology chapter three.

Semi-structured interviews

Data were submitted to an independent coder who also used eight (08) steps of Tesch's open coding method of qualitative data analysis as described by Creswell (2014). The consensus meeting was set between the researcher and the independent coder, to discuss and agree on final themes and sub-themes based on the ones which emerged when analysed independently. Five (05) themes and twenty-six (26) sub-themes emerged from this study.

Characteristics of the participants

The characteristics of the participants are shown in Table 4.1 below.

Name of Clinic	Number of Participants	Gender	
		Females	Males
Makotopong	Five (05)	05	00
Seobi-Dikgale	Eight (08)	07	01
Sebayeng	Three (03)	02	01
Dikgale	Two (02)	02	00
Total	18	16 (89%)	02 (11%)

Table 4.1: Characteristics of the participants

Table 4.1 shows the eighteen (18) participants who consented to participate in the main study. The study was dominated by females with an 89% participation rate. The males form the minority with 11%.

Table 4.2 depicts the final themes and sub-themes which were agreed upon by the researcher and the independent coder which serves as the findings of the study.

Main themes	Sub-themes
1. Analogous explanations of what it means to follow medication instructions by diabetes mellitus patients	1.1 Adherence to medication instruction as directed by health professionals 1.2 Questionable interpretation of adherence to the medication instructions 1.3 Description of the aspects to be considered when following medication instruction 1.4 Lack of adherence to medication instructions viewed as "Digging a grave for self" 1.5 Existence of daily health education sessions in clinics versus acceptance of medication instructions and related health advice as stipulated by nurses 1.6 An explanation that there is a need versus no need for DMP to be assisted with the adherence to medications
2. Challenges experienced by DMP	2.1 Difficulties living with diabetes mellitus co-existing with other body ailments 2.2 Socio-economic status versus adherence to medication 2.3 Misunderstanding of medication instruction and its effect on treatment lifespan 2.4 Lack of specific medication instructions provided by professional nurses 2.5 Lack of specific medication instructions written on medication packages 2.6 Illiterate DMP not catered for in medication instructions
3. Knowledge related to adherence to medication instructions and diabetes mellitus as a disease	3.1 Lack of knowledge related to minor ailments co-existing with diabetes mellitus 3.2 Existence versus lack of knowledge related to the correct name and importance of adherence to the frequency of taking medications 3.3 Knowledge related to the consequences of non-adherence to medication and diet instructions 3.4 Lack of knowledge related to self-management strategies 3.5 Existence versus lack of knowledge related to treatment side effects and complications 3.6 Existence versus lack of knowledge related to missed doses 3.7 Existence versus lack of knowledge related to the interval for a check-up at the clinic
4. Problems related to the conceptualisation of medication instructions	4.1 A poor conceptualisation of medication instructions 4.2 Conceptualisation of diabetic diet and self-management strategies are interpreted differently from one DMP to the other 4.3 Understanding of frequency for taking treatment differs from one DMP to the other
5. Suggestions by DMP concerning the improvement of medication instructions and maintenance of the quality of life	5.1 Request for assistance in following the medication instructions and importance thereof outlined 5.2 The emphasis on following medication instructions should be a priority in the clinics 5.3 Development of self-management strategies by nurses viewed as important to assist DMP in promoting the quality of life 5.4 Health education by nurses have to include all important aspects related to DM

Table 4.2: Themes and sub-themes reflecting health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics

Theme 1: Analogous explanations of what it means to follow medication instructions by diabetes mellitus patients

The study participants displayed an analogous explanation of what it means to follow medication instructions. This theme is supported by six sub-themes outlined in table 4.3 below.

Theme 1	Sub-themes
1. Analogous explanations of what it means to follow medication instructions by diabetes mellitus patients	1.1 Adherence to medication instruction as directed by health professionals 1.2 Questionable interpretation of adherence to medication instructions 1.3 Description of the aspects to be considered when following medication instruction 1.4 Lack of adherence to the medication instructions viewed as "Digging a grave for self" 1.5 Existence of daily health education sessions in clinics versus acceptance of medication instructions and related health advice as stipulated by nurses 1.6 An explanation that there is a need versus no need for DMP to be assisted with the adherence to medications

Table 4.3: Analogous explanations of what it means to follow medication instructions by diabetes mellitus

Sub-theme 1.1: Adherence to medication instruction as directed by health professionals

The findings have revealed that participants adhere to medication instructions as directed by health professionals. **Participant "D" said,** *"I take them the way they said I should take them, i.e., two times, just that way. I would take them that way; in the morning and the evening. Is it that I would check them"?* **Participant "E" gave their version saying:** *"It is just the fact that here at the clinic they said I should take the medication 3 times a day then I chose my times that I am going to take them when I wake up, during the day and in the evening before I sleep".* **Yet Participant "H" said,** *"We are guided by the nurses. The nurses teach us day by day that I should not at any time skip the time that I take the medication, and I should not at any time say I forgot them. Meaning lawfully our medication is taken daily and after meals".*

Sub-theme 1.2: Questionable interpretation of adherence to medication instructions

The study findings have shown that there is a questionable interpretation of adherence to the medications among diabetic patients. The interpretation includes the perception of how often the medication should be taken, the frequency explained is not clear and it differs from all the diabetes mellitus patients. **Participant "U" said,** *"I take my pills three times a day. I take them in the morning at 08h00, then at 13h00, and again at 18h00 in the evening".* **Participant "U" further said that:** *"If they say I should take them four times, I should take them at around past 08h00, then at 11h00 I would take them. At 13h00 then I take the medications again and again at 17h00, then I would the medications again. It would be after taking food as it is time for food, then I would be done".*

Participant "V" gave a different view but do not differ much from the previous participant and said, *"My tablets, I take them at 07h00 am, again at 13h00, then lastly at 19h00".* **Yet Participant "B" said that:** *"My diabetic medication, I am taking them in the morning around 08h00 or 09h00 is late and again at night when I go to sleep. I take them two times a day. "We were told the time when we were given the medications here at the clinic to take them in the morning and the evening".* **Participant "H" also supports the previous participants and said,** "*I eat in the morning at 07h00 and take the tablets, at 14h00 I would eat and take my tablets then in the late afternoon around 16h00 to 17h00 I would eat again and take my tablets".*

Sub-theme 1.3: Description of the aspects to be considered when following medication instruction

The study findings have also revealed certain aspect to be considered when following medication instructions. **Participant "C" highlighted**: *"When I take my first pill I eat first; we do not eat too much food because they said we must eat a fist-size pap and then wait for few minutes and take the medication. And they also said we should drink a lot of water so that the pills may be able to melt when they reach the stomach. Is it they say when the pills reach the stomach, they group themselves and*

sit"? **Participant "H" also said,** *"As I have already said that you give yourself time to say at such and such a time, I would take them even when I visit places, I go with them in my bag. So, when that time arrives, I make sure that I ate something and take my pills so that I would not skip as it is not allowed".* **Participant "M" gave their version saying: "***They said these medications should be taken after meals, so after eating we do take them".* **Lastly, Participant "P" had to say:** "I would take them in the morning and then again in the evening. But, do not take them on an empty stomach; have something to eat then the pill will follow. That is how the doctor would have told, so you follow what the doctor would have told you".

Sub-theme 1.4: Lack of adherence to medication instructions is viewed by DMP as "Digging a grave for self"

The findings have shown that the participants view a lack of adherence to medication as digging a grave for self. **Participant "P" said,** *"The complications of not taking medication properly is that when the disease is going to come back to you, is it you would feel you are healed then feel like stopping the pills, most people stop. So, if they stop the pills; the next thing when the disease attacks again it becomes so hard where they would even fall down. So, it does not want that when you use it then tomorrow say you no longer want the pill. Just continue until, it is your life, just accept yourself that this pill is your life".* **Participant "T" had to say this:** *"If you do not take them on time, they would not be able to control you well in the body because you would not be taking them on time. You might therefore come and say the pills are not working while the pills are working but the problem being you not taking them correctly. We might suffer dizziness and fall and then have problems. Sometimes your body might itch because you are not using your pills properly. So, it is needful that you use your pills correctly; take them well in the morning, during the day and in the evening so that you might live well. So, for me to always be complicated it is because of not taking medication correctly, at correct times".* **Yet Participant "U" alluded that:** *"I mean he would be affected badly because if you are not taking medication correctly you are making the disease to grow such that it would not be controlled. Because if you take them the day you like, you are not safe on the medications. It means you are just taking them because you collected them at the clinic while you are supposed to use them correctly and lawfully".*

Sub-theme 1.5: Existence of daily health education sessions in the clinics versus acceptance of medication instructions and related health advice as stipulated by nurses

The study findings have revealed that there are health education sessions taking place daily at clinics. However, the findings also have shown that the participants accept and follow the medication instructions, and related health advice is given by nurses whereas others do not. **Participant "C" said,** *"Yes, here at the clinic they are teaching us; after having a prayer, they then start teaching us about medication and say today is the day for Diabetes mellitus, tomorrow is for blood pressure, so on and so forth".*

Participant "C" also indicated that they accept the health advice given by nurses

and said, *"Is it each time they teach us about sugar diabetes, I listen. Since I am suffering from it, I want to follow the instructions concerning it".* **Participant "H" further said that:** *"We are guided by the nurses. The nurses teach us day by day that I should not at any time skip the time that I take the medication, and I should not at any time say I forgot them".* **Yet Participant "V" also said,** *"We come here at the clinic; here they tell us that the medications they give us, for diabetes mellitus we should take them three times a day. They teach us how we should take them".*

On the contrary, participants do not follow medication instructions due to different reasons, Participant "D" alluded that: *"We were told that we should take the medication continuously because if we stop, by the time we try them again they might not treat the disease well. But myself now I skipped a month to two because my husband was sick and I and to take care of him".* **Participant "ZZ" mentioned that:** *"I cannot really say I am taking them properly. And yes, the sugar would not be at the required level because I am not taking them properly. Myself I have a machine for testing sugar. So, when I wake up in the morning, I check the sugar and if I find it to be around ke 10.5mmol or 11mmol or around 13mmol there, then, I get discouraged to eat. Because I will eat, and the sugar go a further higher. Then I tell*

myself not to eat until it goes a little bit down then eat later, because I will never take my medication without eating".

Sub-theme 1.6: An explanation that there is a need versus no need for DMP to be assisted with the adherence to the medications

The findings have illustrated that some participants need education on the medication

Instructions, whereas others do not see the need.

Participant "N" indicated that they need assistance and said,

"Assistance like today we met a certain sister who is

assisting us on how to take our medication. So, I feel we need assistance to be reminded of how we should take medications". **Participant "O" is aware that they not taking medication correctly and hence need assistance,** *"Yes, I do need assistance because the way I am taking overdose is not correct".* **Yet Participant "T"**

further said that: *"I am not satisfied. I feel I need assistance on how I should eat and*

how to take medication correctly. I do not have such knowledge, I need it".

On the an obstinate, some participants indicated that they do not need assistance. **Participant "C" has been recorded saying,** *"No, I do not think I need it because our nurses each time we come to collect medication, they give us a health talk about the different diseases and we get educated that people with this kind of disease take their medication like this, those with that disease they take their medication that way, so on and so forth ".*

Participant "V" also said, *"According to me, I do not need it because every day when we collect medications here at the clinic, they teach us how we should take the medication".* **Yet Participant "U" mentioned this:** *"No, I do not need it. I see myself taking the medications correctly, I am satisfied".*

Theme 2: Challenges experienced by diabetes mellitus patients (DMPs)

The participants of this study displayed that they are experiencing challenges related to medication instructions. This theme is supported by six sub-themes outlined in table 4.4 below.

Theme 2	Sub-themes
2. Challenges experienced by DMP	2.1 Difficulties living with diabetes mellitus co-existing with other body ailments 2.2 Socio-economic status versus adherence to medication 2.3 Misunderstanding of medication instruction and its effect on treatment lifespan 2.4 Lack of specific medication instructions provided by professional nurses 2.5 Lack of specific medication instructions written on medication packages 2.6 Illiterate DMP not catered for in medication instructions

Table 4.4: Challenges experienced by diabetes mellitus patients (DMPs)

Sub-theme 2.1: Difficulties in living with diabetes mellitus co-existing with other body ailments

The study findings have revealed that participants have difficulties living with diabetes mellitus while it co-exists with other body ailments. **Participant "B" indicated that:** *"Since I started with this medication, you see these fingers, they just get painful and swollen".* **Participant "D" also had the same problem and said,** *"Hmn…reality is that we want to be made whole even though when you try getting better other pains rise up".* **Yet Participant "ZZ" indicated their frustration in this manner and said,** *"The feet were swelling, and they even changed colour to black for many years until I decided to budget money for specialist. I wish they could stop swelling for good even though they are painful since the other one was once operated, and it is not completely healed, so the other one has to be operated as soon as the other is healed".*

Sub-theme 2.2: Socio-economic status versus adherence to medication

The study findings have shown that socio-economic status of the participants affect adherence to medication. **This is evident in Participant "A" who said**, *"It may be that they say take your medication before you eat but when you have to take the*

medication you find that there is no food, you going to have to wait for the time there is food and you eat and then take the medication, then do you see that the medication would not treat you well? Because one day it would reach 10h00 without you taking the medication while you will be waiting for the food then the medication is going to squeeze that one for 13h00".

Participant "I" supports this sub-theme and indicated that, *"Yes, we do take our diabetic pills but my problem is that I would like to know that there were these diabetic pills that we were using on tea, but we are no longer being given them. I just want to know that since we are no longer given the tablets for tea, then could we go back to using sugar? So, "I do not know whether to go back to using sugar or not because those tea tablets were fighting with sexual affairs and now that is a problem".*

Yet Participant "J" said that: *"Yes, I practice it. Do not you hear me when I say I do not want to lie to say I take them at 08h00 am, I could say I take them after each 08h00 am. So, I want to tell the truth that sometimes instead of taking the medication at 08h00, I take them after 08h00 am whilst I will be busy with my child or I would be cooking. I would say I want to take the medication at 08h00 am but end up taking it at 09h00 am".*

Sub-theme 2.3: Misunderstanding of medication instruction and its effect on the treatment lifespan

Study findings have revealed that participants misunderstand medication instructions and that leads to a negative impact on patients' treatment lifespan.

Participant "M" said, *"The one that is called Metformin, I take it 3 times a day. I take it in the morning at 08h00, during the day at 13h00 and in the evening at 20h00. We just see us drinking them. We are not getting better; when you get heartburn, they say it is the sugar diabetes".* **Participant "O" avows that:** *"The one to be taken three times, I take it at 07h00 am, then at 13h00 and at 19h30. But I do not get better. I have lost a lot of weight; most of the time I lack appetite, I cannot eat but busy taking*

the pills". **Participant "I" also said,** "*Ohh, I also take them after tea time in the morning between 09h00 and 10h00 am, then after lunch around 13h00 to 14h00 and in the evening around 18h00 to 19h00 before I sleep. I am troubled by one thing though, we do take the medications but Hai! they look like they are not working well because the disease just continues. Sometimes you just find yourself walking and you experience cramps or something like that"*.

Sub-theme 2.4: Lack of specific medication instructions provided by professional nurses

The study results have shown that there is a lack of specific medication instructions provided by professional nurses to the participants. **Participant "G" when asked if it was explained to them how to use the medications said,** *"No. They have never explained well to me, but they just said I should take the medication in the morning, during the day, and when I go to sleep".* **Participant "C" also said**, *"Myself, I was told to take my medication in the morning after eating and also at night before I sleep".*

Yet Participant "E" said, *"They said I should take the medication the way they are, but for the times and hours no. They just said in the morning, during the day, and at night".* **And Participant "Y" also added**, *"No, they just say 'You know that you take you medication twice or thrice', so if you are taking them twice it means you will take them in the morning and evening and if it is three times, you will take them in the morning, afternoon and evening but the exact time they do not tell us".* participant "Y" went further to say that it was never explained to them how they should take the treat, **the participant "B" said that:** *"They just write on the papers to say; once a day, three times a day or two times a day".*

Sub-theme 2.5: Lack of specific medication instructions written on medication packages

The study's results have shown that there is a lack of specific medication instructions

written on medication packages. **Participant "I" alluded that,** *"I usually take them after tea in the morning and in the afternoon after eating, then would take another one,*

"No, I just see when they have written on the tablets packages; two times a day". **Participant "M" also said,** *"The one that is called Metformin, I take it 3 times a day. I take it in the morning, during the day and in the evening. Is it because it is written on the packaging".* **Yet Participant "ZZ" with the same view said,** *"Is it they write on the packages that this one you take it twice a day, the other once daily after meals. They do not tell us the time to say that this one you should take it at 06h00, the other at 20h00. They just say take it twice daily meaning in the morning and evening. If it is three times it means is morning, afternoon, and at night when you sleep, but to say what time, no".*

Sub-theme 2.6: Illiterate DMP not catered for in medication instructions

The results have shown that illiterate diabetic patients are not catered for, in medication instructions. **Participant "T" indicated that**: *"I might not know because I cannot read. I only know the white big one. It is the one that I know I take it three times a day. All the others, they have even given me other pills, but I just do not know*

if they are related to diabetes mellitus because I am also suffering from high blood pressure. I have two diseases". **Another participant, Participant "B" indicated that they cannot read English but yet can read the instructions and said,** *"Yes I can, even though I cannot read English. They write the instruction with a pen to say one tablet".* **Yet another one, Participant "M" also said,** *"I do not know. These English things, where would we know them from"?* **While the last one, Participant "T" elaborated,** *"Eish! Coming to the times I do not want to lie because I do not know the time, I have just timed that I take it around 09h00 am. Sometimes I forget and take it at 08h00 am or 09h00 am. The next dose I take at 14h00, I time the phone; if I see it written 1 and 4 (14), then I start to take it then in the evening when Muvhango starts then I take it. Those are the things I use to time my medication times because I cannot read".*

Theme 3: Knowledge related to adherence to medication instructions and diabetes mellitus as a disease

The study participants displayed mixed knowledge related to adherence to medication instructions and diabetes mellitus as a disease. This theme is supported by seven sub-themes outlined in table 4.5 below.

3. Knowledge related to adherence to medication instructions and diabetes mellitus as a disease	3.1 Lack of knowledge related to the minor ailments co-existing with diabetes mellitus 3.2 Existence versus lack of knowledge related to the correct name and importance of adherence to the frequency of taking medications 3.3 Knowledge related to the consequences of the non-adherence to medication and diet instructions 3.4 Lack of knowledge related to self-management strategies 3.5 Existence versus lack of knowledge related to treatment side effects and complications 3.6 Existence versus lack of knowledge related to missed doses 3.7 Existence versus lack of knowledge related to an interval for the check-up at the clinic

Table 4.5: Knowledge related to adherence to medication instructions and diabetes mellitus as a disease

Sub-theme 3.1: Lack of knowledge related to minor ailments co-existing with diabetes mellitus

The study has revealed that there is an existence versus some lack of knowledge related to minor ailments co-existing with diabetes mellitus. **Participant "A" said,** *"My problem is my legs, my body and the waist…they are painful. I do not know what the problem is since I am taking my medication correctly and I do not know what else could help me".* **Another participant, Participant "F" showed concern about the minor ailments she is experiencing and asked,** *"Then when you find that the feet are burning underneath, is it still the sugar diabetes that is causing the burning?"* **Yet another participant, Participant "X" also said,** *"My problem is just my feet; I would like to know what makes them be this way. Sometimes they are painful, and I do not know if it is because of diabetes or not".*

Sub-theme 3.2: Existence versus lack of knowledge related to the correct name and importance of adherence to the frequency of taking medications

The study findings have revealed that some participants have knowledge related to the correct names and importance of adherence to the frequency of taking medications whereas some do not. **Participant "M" said,** *"The one that is called Metformin, I take it 3 times a day. I take it in the morning, during the day and in the evening".* **Whereas on the other hand, Participant "A" on contrary said,** *"No, I do not know its name, but it is the ball pen one".* **Participant "F" has shown to understand the importance of adherence to the frequency of taking medication and said**, *"If you could take medication, let say they said take them three times, but you fail taking them on time that is a problem. Not taking medication on time; medication needs time. You cannot say when you supposed to take medication at 08h00 and you take them at 11h00 am. If you do that, when you come to the sisters for check-up you will find that your things are not changing".* **Even so, Participant "G" when asked if they know what could happen to them if they do not adhere to medication said,** *"I do not know".* **Participant "Y" supporting the previous speaker said,** *"Eish! I do not have the time and I also do not know about it. Sometimes I eat at 08h00 am and then after that I take my medication so, I mean that I do not have exact time for taking medication. I take them at any time; sometimes when I wake up, I go to town, I would eat there at town and when I came back should I remember that I did not take my medication, I immediately take them. So, I do not know if I am taking my medication correctly or what".*

Sub-theme 3.3: Knowledge related to the consequences of non-adherence to medication and diet instructions

The study findings have exposed that the participants have knowledge related to the consequences of non-adherence to medication and diet instructions. **Participant "C"**

indicated that: *"Not taking medications correctly will make one not to be better. The person will always be sick; the blood sugar level will always be high but if one is taking them well, the blood pressure and the blood sugar level would be normal and controlled".* **Another participant, Participant "E" when asked about what could happen if a person does not take medication correctly said,** *"Like if you are not taking medication correctly, it means you are going to be sick and come to the clinic and you will be feeling too hot and irritable and impatient. Then after that, the throat will be dry and the joints will be painful".* **Yet another participant, Participant "W" when asked about the consequences of non-adherence said,** *"If one does not take medications correctly, like me, my joints become weak and I get tired and I cannot do anything at home. The joints become very weak and would even feel dizzy".*

Sub-theme 3.4: Lack of knowledge related to self-management strategies

Study results have exposed that the participants lack knowledge related to self-management strategies. **Participant "I" indicated that:** *"I often hear on the radio saying we should join marathon; I do not know if that is related to diabetes mellitus".* **On the other hand, Participant "P" said,** *"Yes, they do. But we as a patient sometimes go to traditional healers and saying to ourselves that these western medicines are somehow, and trust the traditional ones, not knowing that traditional medicines do not be mix with western medicines. We should use the western medicines as instructed by the doctor".* **Yet another Participant said: "I" when asked if there is an improvement in their diseases said,** *"I just see it the same. The matter is that we sometimes take in alcohol at the celebrations (ka gore re fela re enwa dinotagi mo melatong)".* **Another one also, Participant "O" when asked if she has ever reported her side effects to the doctor responded by saying:** *"No. they gave me those pills for six months, is it after six months we change, so I never have gone back to tell them".*

Sub-theme 3.5: Existence versus lack of knowledge related to treatment side effects and complications

The study findings have revealed that the participants have knowledge related to the treatment side effects and complications, while others do not have. **Participant "B"**

said, *"Since I started this medication, you see these fingers, they just get painful and swollen and I do not know what the problem could be".* **Another participant, Participant "A" indicated that the disease affected him such that she is no longer able to be sexually active and said,** *"This disease no longer allows me to engage in sexual activity with a man".* **Yet Participant "I" had a concern and alluded that:** *"Then point number two you find that those pills are the once creating a problem on the sexual activity at home. Now all these things have stopped the issue of sex and I do not know how that comes about".* **Participant "O" has shown a lack of knowledge about treatment side effect and said,** "*Myself I do not get better. I have lost a lot of weight; most of the time I lack appetite, I cannot eat but busy taking the pills".* **Participant "A" shown to suffer complications too and said,** "I have a problem with my legs. Even my eyes too".

Sub-theme 3.6: Existence versus lack of knowledge related to missed doses

The study has shown that participant's lack of knowledge related to missed doses, whereas others do have. **Participant "G" indicated that:** *"Sometimes we do forget because we are old then you will find that we supposed to take the medication no matter what, but at times you find that you feel better, and then you would just wake up and do your chores and forget the medication. Then by the time you remember taking them, the blood sugar would be high".* **When asked what they do after remembering the participant said'** *"I just take them at that time that I would have remembered. It is just to not leave the medication; you just take them".* **Participant "S" shown a lack of knowledge on what to do when a dose is missed and alluded that:** *"I take one in the morning and one in the evening. If maybe I missed a dose, I do take two".* **Yet another one, Participant "V" also said,** *"According to me if I missed that time, I leave it and wait for the second time that is coming".*

Sub-theme 3.7: Existence versus lack of knowledge related to interval for a check-up at the clinic

A study has revealed that participants do know the interval for a check-up at the clinic, whereas others do not. The study has however shown that some participants do not prioritise the check-up. **This is evident in the Participant "D" who said:** *"We were told that we should take the medication continuously because if we stop,*

by the time we try them again they might not treat the disease well. But myself, now I skipped a month [or] two because my husband was sick, and I had to take care of him". **Another participant, Participant "J" said, "***even my children know[that] if I change [due to the] condition, they would help me very fast, not with something that I should chew because I would not be able to do that. But if they could make me leak some sugar, I could be managed so that I may wake up and they would rush me to the clinic".* **Yet Participant "N" indicated that:** *"I have never met any side effects. I am just taking the medications; I am not feeling dizzy. When they (pills) are finished I come to the clinic and they give me the same medications and I continue[]".*

Theme 4: Problems related to conceptualisation of medication instructions

The study participants showed problems related to conceptualisation of medication instructions. This theme is supported by three sub-themes outlined in table 4.6 below.

Theme 4	Sub-theme
4. Problems related to conceptualisation of medication instructions	4.1 The poor conceptualisation of medication instructions 4.2 Conceptualisation of diabetic diet and self-management strategies are interpreted differently from one DMP to the other 4.3 Understanding of frequency for taking treatment differs from one DMP to the other

Table 4.6: Problems related to conceptualisation of medication instructions

Sub-theme 4.1: Poor conceptualisation of medication instructions

The study has revealed that participants have a poor conceptualisation of medication instructions. **Participant "C" said,** "*If they say take three times a day? (The researcher says yes), it means I take them in the morning, again I during the day and then again in the evening before going to sleep".* **Another one, Participant "H" said,** *"I eat in the morning at 07h00 and take the tablets, at 14h00 I would eat and take my tablets, then in the late afternoon around 16h00 to 17h00. I would eat again and take my tablets".* **Yet another one, Participant "U" indicated that:** *"If they say I should take them four times, I should take them at around past 08h00, then at 11h00 I would take them. At 13h00 then I take the medications again and again at*

17h00, then I would [take] the medications again. It would be after [meals] as it is time for food, then I would be done".

Sub-theme 4.2: Conceptualisation of diabetic diet and self-management strategies are interpreted differently from one DMP to the other

The findings of this study have revealed that the conceptualisation of medication instructions, diabetic diet, and self-management strategies are interpreted differently by each DMP. **Participant "U" indicated that:** *"That is because my blood sugar was not controlled before; I was not taking the medication correctly. So, when they stopped me [on] lots of things; I used to love fatty foods so, I realised that when I consume fatty foods, when I come to the clinic my blood sugar would always be high. Then I stopped the fatty foods and decided to check what would happen if I could take the medications at the times I mentioned".* **Another one, Participant "ZZ" said, "***Sometimes I come to the clinic without eating so that they can check my blood sugar first before. Sometimes it goes down faster because I would not have eaten; I will be shaking, and weak then when they check the blood sugar it will be 5.5 mmol or 5.3mmol, but you will find that I am dizzy, and they will say it is because I did not eat anything. But they are saying even if, my blood sugar is high; I should not skip my meals so that I can take my pills. They say I should not delay taking medication, because when the time for the pill comes the blood sugar will be too much low".*

Sub-theme 4.3: Understanding the frequency of taking treatment differs from one DMP to the other

The findings of this study have exposed that the participants' understanding of the frequency of taking medication differs from one to the other. **Participant "V" said,**

"My tablets, I take them three times a day at 07h00 am, again at 13h00, then lastly at 19h00. I just think that maybe if I take them at those times, I think that is how I would control my blood sugar". **Then Participant "W" said,** *"I would take them at 07h00 am, at 14h00 would take another dose, then again at 22h00. I think according to me I would take them 8 hourly".* **Yet Participant "J" said,** *"In fact, I am supposed to be taking them at 08h00. But because of this womanhood where you find that I am held up because of house chores, I end up taking them at around 09h00 and sometimes*

at 10h00. By this time, I mean I take them in the morning and during the day around 13h00, and in the evening when I sleep just after eating".

Theme 5: Suggestions by DMPs concerning the improvement of medication instructions and maintenance of the quality of life

The study participants made suggestions concerning the improvement of medication instructions and maintenance of the quality of life. This theme is supported by four sub-themes outlined in table 4.7. below.

5. Suggestions by DMP concerning the improvement of medication instructions and maintenance of the quality of life	5.1 Request for assistance in following the medication instructions and importance thereof outlined 5.2 The emphasis on following medication instructions should be a priority in the clinics 5.3 Development of self-management strategies by nurses viewed as important to assist DMP in promoting the quality of life 5.4 Health education by nurses should include all important aspects related to DM

Table 4.7: Suggestions by DMPs concerning the improvement of medication instructions and maintenance of the quality of life

Sub-theme 5.1: Request for assistance in following the medication instructions and importance thereof outlined

The study findings have revealed that the participants need assistance in following medication instructions and to outline the importance thereof. **This is evident in Participant "N", who said:** *"Like today we met a certain sister who is assisting us on how to take our medication. So, I feel we need assistance to be reminded [of] how we should take medications. What I see lacking is not knowing at what time should we take the medications".* **Another participant, Participant "O" indicated that:** *"Yes, I do need assistance because the way I am taking overdose is not correct".* **Participant "T" in support of the previous participants said,** *"I am not satisfied. I feel I need assistance on how I should eat and how to take medication correctly. I do not have such knowledge, I need it".*

Some participants, however, have indicated that they do not need assistance with medication instructions because they believe they are taking medication correctly. **This is evident in Participant "U" who said:** "No, I do not need it. I see myself

taking the medications correctly, I am satisfied". **When asked to share how they take medication they said,** *"For the morning, I eat two slices of bread at around 08h00 and then take the pills. I then rest until past 11h00, we would be eating pap; I would eat a portion of pap equivalent to my fist. Then around 13h00, I would eat a small portion of pap again and take my pill. Again, at around 18h00 when we finish cooking, I would eat and take the third pill".* **This participant is also supported by Participant "F" who said,** *"No, I do not need further assistance. When I have taken my medication, I feel good but if the medication is insufficient in the body, I also feel it that something is lacking in my body".*

Sub-theme 5.2: Emphasis on following medication instructions should be a priority in clinics

The study participants indicated that there should be emphasis made to follow medication instructions by DMP. **Participant "P" indicated that:** "*Ahhhh, you would just teach them about these pills. Teach them, most of them are careless, and some do not understand. It could be what the doctor has told them but find that they did not get it well; a person skipping a day without taking the pill[s], and complete two day[s] without taking [the] pill[s] then when they feel they are becoming a bit dizzy that is when they would run for the pill[s]. So, you should also ask them if their ears could hear properly to make sure that what you are telling them they could get it because some agree without having heard properly due to their problem with their ears. That is what makes people to err".* **Another participant, Participant "E" also said,** *"We could talk about emphasising collecting medications as per appointment and also to take them as directed; not to take [an] overdose or to reduce. Just take them as directed so that you could live well, and the disease would be controlled".* **Yet Participant "J" also supports the previous speaker by saying,** *"I would love you to encourage us on the issue that I was told by my son every day saying mom if you take your medication, always take them at 08h00. If it is 08h00 in the evening, let it be so. So that the pill could make a chain like it should feed one another. It should not break along the way because if you do not take It at the same time it breaks the chain in the body. That is why you find that you do not know what is what sometimes".*

Sub-theme 5.3: Development of self-management strategies by nurses viewed as important to assist DMP in promoting the quality of life

The study findings pointed out that the development of self-management strategies by professional nurses is viewed as crucial to assist DMP to promote quality of life. **This finding was confirmed by the Participant "ZZ" who said:** *"What they* (Nurses) *emphasise to us is that we should take medication after meals. They are emphasising on food because they know that we eat too much pap and some herbs and they are saying diabetes do[es] not want that, and it does not want one to eat hot food. A person can eat four times but in small portions and I usually prefer snacks and too much water".* **Another one, Participant "E" also said,** *"Actually you could emphasise the issue of food. The food is killing us so much. Eating the things that do not build or benefit the body but just for enjoyment, so you could make emphasis on that according to our different diseases. I think that could be better, it could reduce the disease in our bodies".* **Participant "ZZ" further stressed that:** *"Even to emphasise that when patients realise that it is time for medication, they should not wonder around then ending up taking the medication without eating first".*

Sub-theme 5.4: Health education by nurses has to include all important aspects related to DM

The findings of this study have revealed that participants need to be educated about all important aspects related to diabetes mellitus. **Participant "A" said,** *"They should just tell us about this diabetic disease frequently".* **Another participant, Participant "W" supports this and said,** *"Me, I would like that we have our doctors check our diabetes if it is group 1 or group 2 because at this time, we are just taking medications but do not know for what. Do you understand? Maybe I am taking the medication for people with group 1 while I am group 2 or vice versa".* **Another one, Participant "B" indicated that they need to be taught about the times at which medication should be taken and said,** *"You can teach us about the times that one should take the medications".* The participants also indicated that they would love to be taught about the diabetic diet and was recorded in a participant who said, *"Actually you could emphasise the issue of food. The food is killing us so much. Eating the things that do not build or benefit the body but just for enjoyment, so you could make emphasis on that according to our different diseases. I think that could*

be better, it could reduce the disease in our bodies". **Participant "F" shown to lack information on dietic medication and said:** *"I just wanted to know like right now, if I am taking medication correctly, but there is some time where I would be somehow, does that mean the medication needs to be changed or what. Because I do not believe that if I am suffering from sugar diabetes, I should be taking one type of medication for more than 6 months. So, I wanted to know if it becomes a problem after 6 months if I take [the] same medication".*

Teaching about taking food before medication is one of the suggestions brought by the participants. **Participant "Q" said,** *"What is important is to teach them that before they take their pill, they should eat pap, because if you do not eat pap you will never rise. You will forever complain of pains".* **Participant "T" went further to say:** *"I would be happy if you can teach them to know which food to eat; how much should they eat and the time for taking medication. I also need such education so that I may be informed because I do not know".* **Participant "H" indicted that DMP should be taught that the medication for this diseases is lifetime and said,** *"You could teach about taking note that when you are taking medication and you hear from someone saying it is not a problem, if you are taking the medication you just leave them there is no problem, I would be happy if all the people could hold on to the fact that when we have started the medication we should continue till death".*

Document analysis

The Six (06) diabetic medications leaflets, packaging, and the doctor's prescriptions formed part of the document analysis study. The document analysis study ran concurrently with semi-structured interviews. The participants were asked to present their medications and prescriptions when they were interviewed. Some of the medication leaflets were accessed from the clinic pharmacists for a review. A checklist rubric was used to describe the medication instructions provided in the documents. Two themes and five sub-themes emerged from this study.

Table 4.8 presents the themes and sub-themes which emerged from this study.

Themes	Sub-themes
4.1 Medication instructions not clear	4.1.1 Poor explanation of time-frequency 4.1.2 No time interval 4.1.3 Time not specified
4.2 A need for further explanation	4.2.1 No clear depiction on how to carry instructions 4.2.2 Symbols on the packaging need further explanation

Table 4.8: Presents the themes and sub-themes which emerged from this

Theme 4.1: Medication instructions not clear

The study findings have revealed that the medication instructions on the leaflets, packaging, and doctors' prescriptions are not clear. This is evident in the following three sub-themes:

Sub-theme 4.1.1: Poor explanation of time-frequency

The study results have shown that there is a poor explanation of the time-frequency on the documents' medication instructions. One drug is written as, "1mg once daily". Another one is written: "One 500mg tablet 2 to 3 times a day".

Sub-theme 4.1.2: No time interval

The study has discovered that there is no time interval reflected on the doctor's prescription, medication leaflets, and packaging. This is evident in the drug written as, "One 850mg tablet twice a day". Another drug is written: "40 to 80mg daily". Whereas another one is written, "Daily doses over 10mg in 2 divided doses".

Sub-theme 4.1.3: Time not specified

The study results have divulged that there are no specific times for taking medication on diabetic medication instruction documents. One drug is written as, "Doses of 160mg daily in 2 divided doses". Another one is written: "Should be taken the same time every day".

Theme 4.2: A need for further explanation

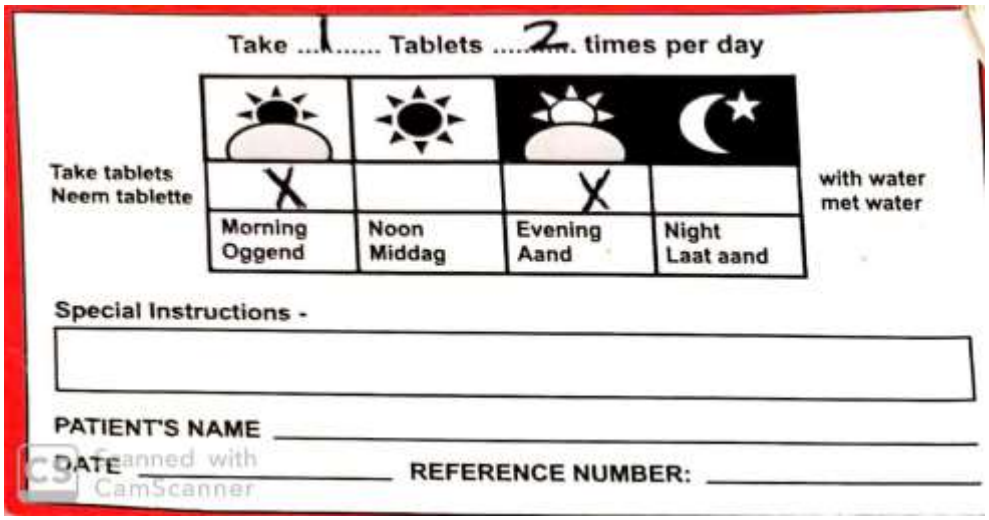
The study findings have disclosed that the medication instructions documents need further explanation for clearer understanding. This is evident in the following sub-themes:

Sub-theme 4.2.1: No clear depiction on how to carry instructions

The study results have revealed that the medication instructions do not give a clear picture of how to carry the instruction provided on the documents. One drug reads thus," Take 1 tablet mane". Another one is written: "Take 10mg in divided doses".

Sub-theme 4.2.2: Symbols on the packaging need further explanation

The study has found out that the symbols used on the medication packaging do not give a clear direction of the times, the medications should be taken.



4.2.2 Quantitative strand

The quantitative data collected through self-administered questionnaires were analysed using SPSS version 25. The total number of respondents was 137. Descriptive statistics and inferential statistics were used to summarise the data and to determine relationships between the variables under study. Data were presented in tables, bar graphs, and pie charts. The data is divided into three sections; section A (A1-A9) = demographic data, section B (B1-B8) = medicine instruction health literacy self-assessment tool, and section C (C1-C25) = general medicine instruction

health literacy knowledge, medicine experience, and its effects test. The respondents had to state whether they Agree, Neutral, Disagree and Do Not Know to direct their responses in Section B and C.

4.2.2.1 Section A: Demographic Data

The demographic data included nine questions and the results are presented as follows:

Table 4.9 reflects the biographic data of the respondents;

INDICATOR	NUMBER OF RESPONDENTS	PERCENTAGE
Age range		
30 – 39 years	4	2.9
40 – 49 years	20	14.6
50 years or above	113	82.5
Total	**137**	**100**
Gender		
Males	44	32
Females	93	68
Total	**137**	**100**
Marital Status		
Single	18	13
Married	74	54
Live with partner	14	10
Widow/er	31	23
Total	**137**	**100**
Highest level of education		
Primary school	45	33
High school	64	47
Higher education	13	09
Did not attend school	15	11
Total	**137**	**100**
Employment status		
Employed	41	30
Unemployed	16	12

Self-employed	16	12
Pensioner	64	47
Total	**137**	**100**

Table 4.9: The biographic data of the respondents

A.1 Age

The respondents' age was grouped into three categories. The study respondents' age ranges were n (30 – 39 years) = 4 (2.9%), n (40 – 49 years) = 20 (14.6%), and n (50 years or above) = 113 (82.5%). Most of the respondents were fifty years and above. The mean is 4.7956 and the range is 2.00. This means that the majority of diabetes patients are older people.

A.2 Gender

The study included both males and females. The study consisted of 44 (32%) males and 93 (68%) females. The mean is 1.6788 and the range is 1.00. Females were considerably more than males. These results mean that women are mostly suffering from diabetes mellitus than men.

A.3 Marital status

Study findings revealed a variety of respondents' marital status. The marital status of the study respondents was as follows: single (n =18) = 13%, married (n =74) = 54%, live with their partner (n=14) = 10%, and widow/widower (n = 31) = 23%. Most of the respondents were married. The range is 4 and the mean is 2.7518. This results denotes that most patients with diabetes mellitus are married.

A.4 Highest level of education

The respondents had varying levels of education. The educational level of the study respondents was as follows: primary school (n=45) = 33%, High school (n=64) = 47%, higher education (n=13) = 9%, and those respondents who did not attend school were (n=15) = 11%. The mean is 1.9854 and the range is 3. This means that majority of the diabetes patients have attended high school.

A.5 Employment status

The respondents were also expected to indicate their employment status. The employment status of the study respondents was as follows: employed (n=41) =

30%, unemployed (n=16) = 12%, self-employed (n=16) = 12%, and pensioners (n=64) = 47%. The mean is 2.7518 and the range is 3. Most of the respondents were pensioners. This means that the majority of diabetes patients are the pensioners.

A. 6 Do you suffer from the following? Tick all that apply

The respondents were asked if they do suffer from the listed NCDs and were supposed to tick all that apply.

Table 4.10 below illustrate the NCDs suffered by the respondents

NCDS		No. of respondents	Percentage
1.	DM	38	27.7
2.	DM & HPT	51	37.2
3.	DM & Respiratory Diseases	2	1.5
4.	DM & HIV/AIDS	4	2.9
5.	DM & Other (Mostly Arthritis)	5	3.6
6.	DM, HPT & Respiratory diseases	2	1.5
7.	DM, HPT & HIV/AIDS	11	8
8.	DM, HPT & Other (Mostly Arthritis)	19	13.9
9.	DM, HPT, Respiratory diseases and HIV/AIDS	1	0.7
10.	DM, HPT, Respiratory diseases and Other	2	1.5
11.	DM, HPT, HIV/AIDS, and Others	2	1.5
TOTAL		137	100

Table 4.10: The NCDs suffered by the respondents

The respondents NCDs profile is as follows:

Diabetes mellitus only (n=38) = 27.7%, diabetes mellitus and hypertension (n=51) = 37.2%, diabetes mellitus and respiratory diseases (n=2) = 1.5%, diabetes mellitus and HIV/AIDS (n=4) = 2.9%, diabetes mellitus, hypertension and respiratory diseases (n=2) = 1.5%, diabetes mellitus, hypertension and HIV/AIDS (n=11) = 8%, diabetes mellitus, hypertension and other conditions (mostly arthritis) n=19 (13.9%), diabetes mellitus, hypertension, respiratory diseases and HIV/AIDS (N=1) =0.7%, diabetes mellitus, hypertension, respiratory diseases and other conditions (n=2) = 1.5%, and diabetes mellitus, hypertension, HIV/AIDS and other conditions (n=2) = 1.5%. most of the respondents suffer from diabetes mellitus with hypertension (n=51) followed by diabetes mellitus alone (n=38). The mean is 81.2701 and the range is

1234. These results mean that most of diabetes patients also suffer from hypertension disease.

A. 7 How many Diabetes Mellitus medications are you taking per day?

Respondents were asked to indicate the number of diabetic medications that they are taking.

Figure 4.1 below reflects the number of diabetic medications taken by the respondents

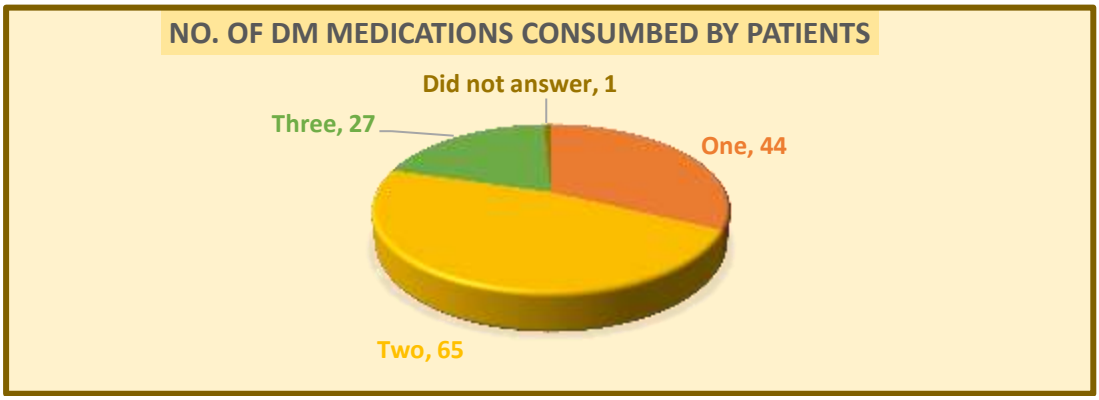


Figure 4.1: No. of all NCDs Medications taken by Patients

The findings revealed that 32% (n=44) of the participants take one diabetic medication, 47% (n=65) take two, 20% (n=27) take three, 0% (n=0) take four and/or above, and 1% (n=01) respondent did not answer this question. Most of the respondents are taking only diabetic medication. The mean is 1.6569 and the ranch is 4. This means that most diabetes patients are taking more than one diabetic tablet at a time.

NB: IF SUFFERING FROM OTHER DISEASES.

A.8 How many medications are you taking in total per day for all diseases?

The respondents were asked to indicate the number of all NCDs they are consuming (including those for diabetes mellitus).

Figure 4.2 below reflects the number of all NCDs medications consumed by the respondents;

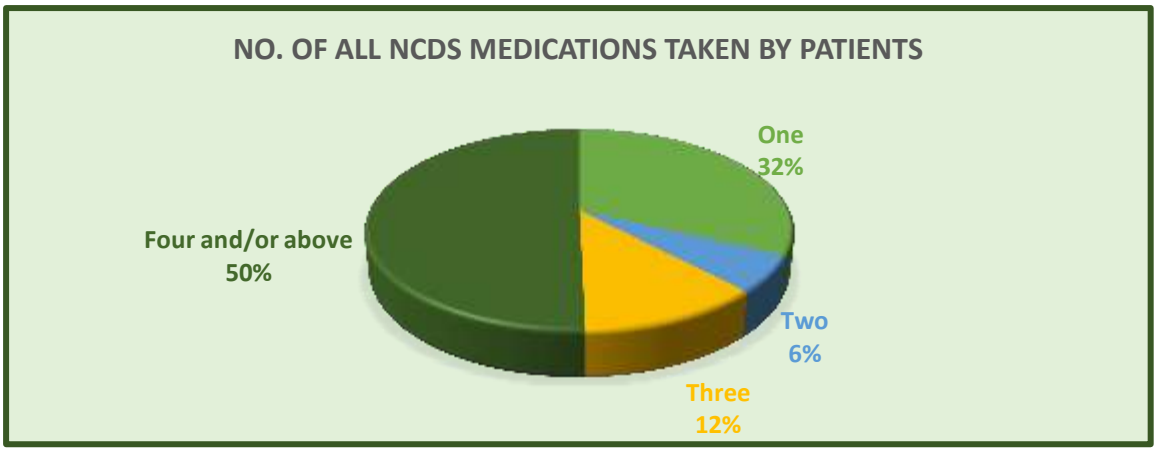


Figure 4.2: No. of all NCDs Medications taken by Patients

The study findings have revealed that 32% (n=44) of the respondents take one NCD medication, 06% (n=8) take two, 12% (n=16) take three, and 50% (n=69) consume four and/or above medications. The study shows that the majority (50%) of the respondents consume four and/or above medication. The mean is 2.8467 and the range is 4. These results denote that majority of the diabetes patients are taking more than three tablets at a time.

A.9 For each medication, do you understand its instructions?

The respondents were asked if they understand all their medication instructions. Figure 4.3 below reflects the respondents' response;

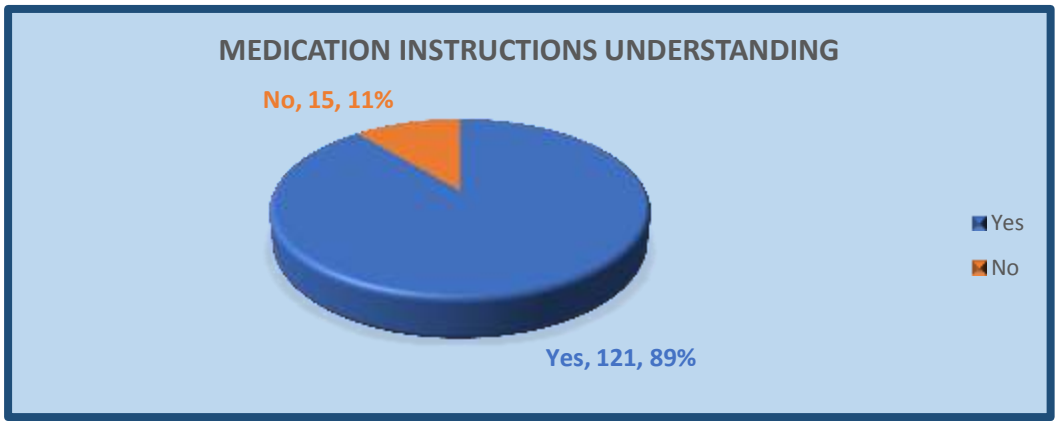


Figure 4.3: Medication Instructions Understanding

Fifteen respondents (11%) indicated that they do no understand the instructions whereas 121 (89%) do understand. These results mean that diabetes patients understand their medication instructions.

4.2.2.2 Section B: Medicine Instruction Health Literacy Self-Assessment Tool

In this section, the respondents were supposed to indicate whether they agree, are neutral, or disagree on the provided statements below. Sometimes the respondents were given an extra option of 'Do not know'. Section B included eight questions presented as follows:

B1 I understand the medication instructions provided by the nurse/doctor.

Figure 4.4 below reflects the respondents' response on understanding medication instructions provided by the nurse/doctor

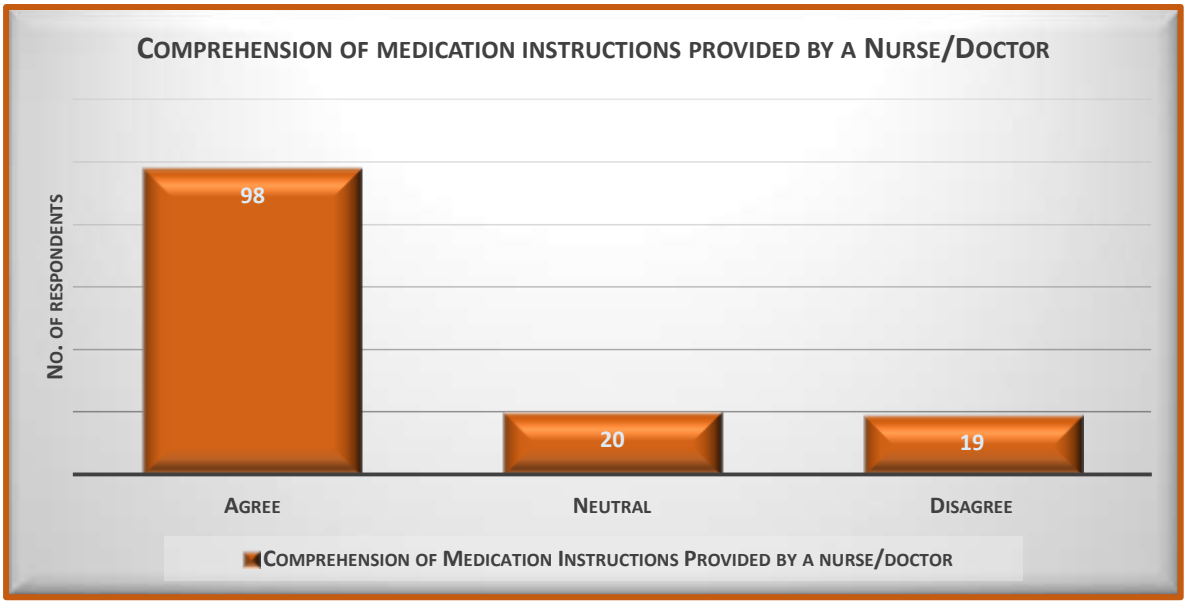


Figure 4.4: Comprehension of medication instructions provided by a Nurse/Doctor

The study findings indicate that 71% (n=98) respondents agree that they understand medication instructions provided a nurse or doctor, whereas 15% (n=20) is neutral, and 14% (n=19) disagree. Most of the respondents (71%) do understand the medication instructions provided by the nurse/doctor. The mean is 1.4234 and the range is 2.00. This means that most of the diabetes patients understand medication instructions provided by a nurse/doctor.

B2 I can Understand the medication instructions provided on leaflets, packaging, and bottles. Figure 4.5 below reflects the respondents' understanding of medication instructions provided on leaflets, packaging, and bottles.

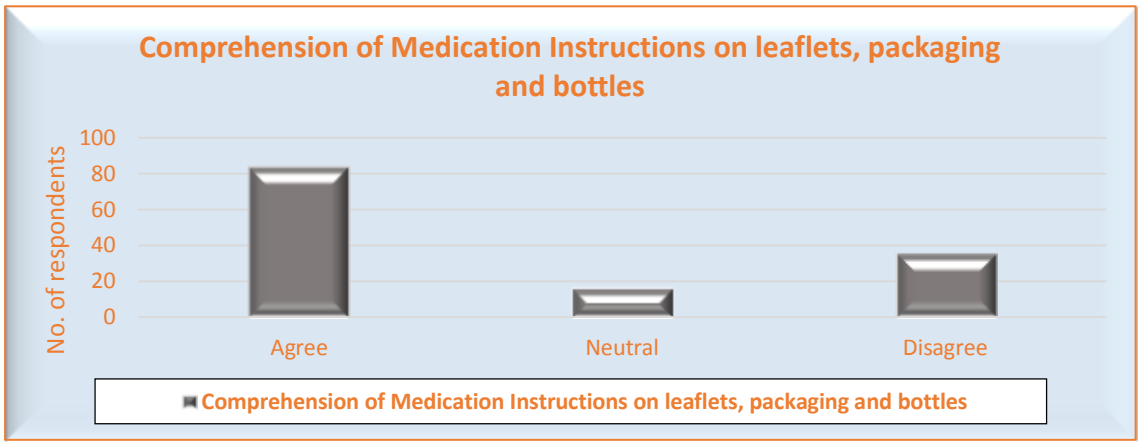


Figure 4.5: Comprehension of Medication Instructions on leaflets, packaging and bottles

The study findings indicated that 61.3% (n=84) respondents agree that they understand the medication instructions on the leaflets, packaging, and bottles. However, 12.4% (n=17) are neutral while 26.3% (n=36) disagrees. The study shows that most of the respondents understand the instructions on the leaflets, packaging, and bottles. The mean is 1.6496 and the range is 2.00. This means that the diabetes patients understand the medication instructions on the leaflets, packaging, and bottles.

B3 I can follow the medicine instructions without health professional help.

Figure 4.6 below reflects the respondents' response to the following their medication without professional help;

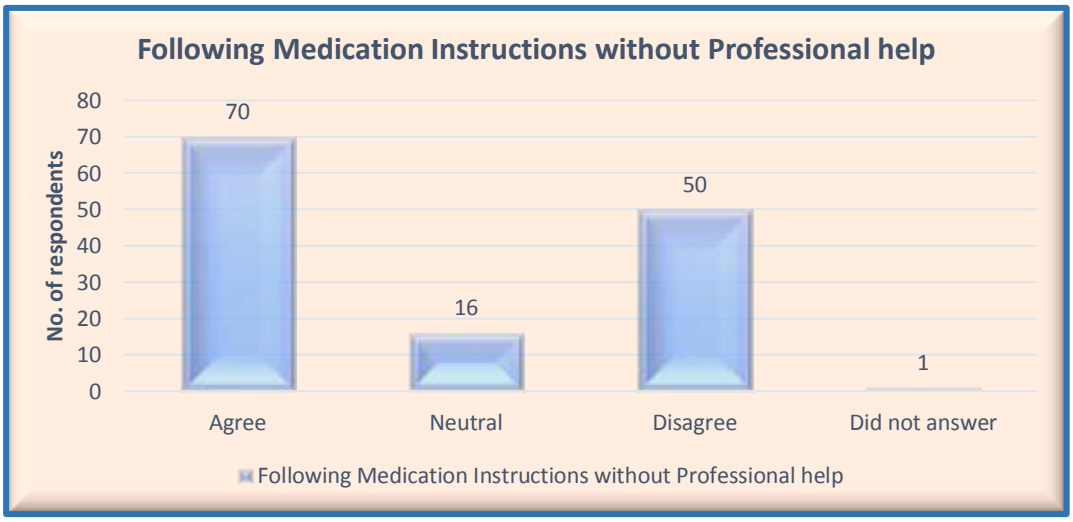


Figure 4.6: Following Medication Instructions without Professional help

The study shows that 51% (n=70) respondents agree that they can follow medication instructions without professional help, whereas 12% (n=16) are neutral and 36% (n=50) disagree. Only one respondent did not answer. The mean is 1.9343 and the range is 2.00. These results mean that most of the diabetes patients can follow medication instructions without professional help.

B4 I can take medication at the correct interval.

Figure 4.7 below reflects the respondents' response to taking medication on the correct interval

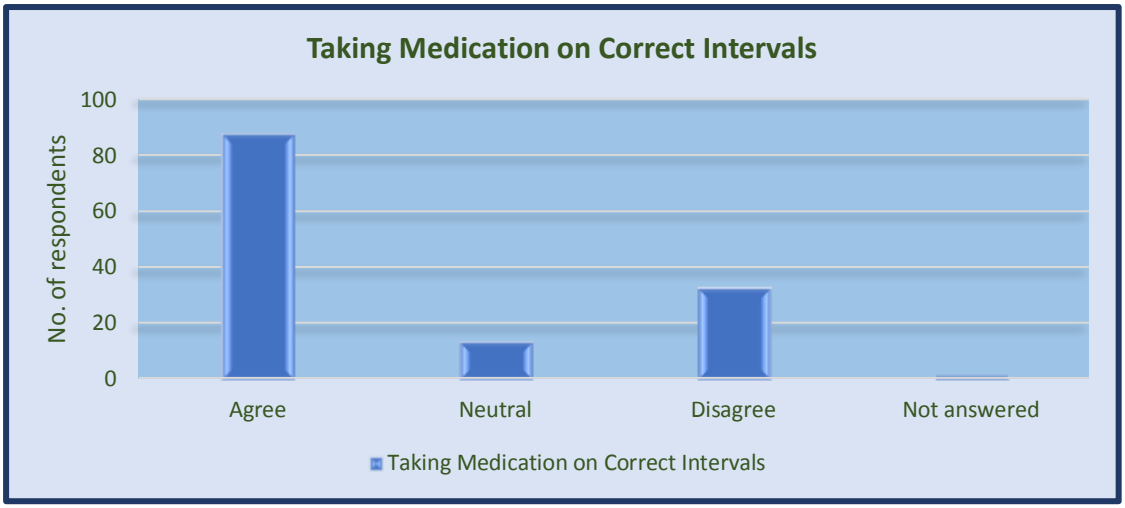


Figure 4.7: Taking Medication on Correct Intervals

This study reveals that 64% (n=88) of respondents agree that they can take medication at the correct intervals whereas 24% (n=33) disagree. On the other hand, 10% (n= 14) of the respondents indicated that they are neutral while 2% (n=2) did not answer. The majority of respondents 64% can take medication at the correct interval. The mean is 1.6277 and the range is 3.00. These results mean that the majority of the diabtes patients can take medication at the correct intervals

B5 I double the medication dose if I missed taking my medication.

Figure 4.8 below reflects the respondents' response to doubling medication dose if missed taking medication

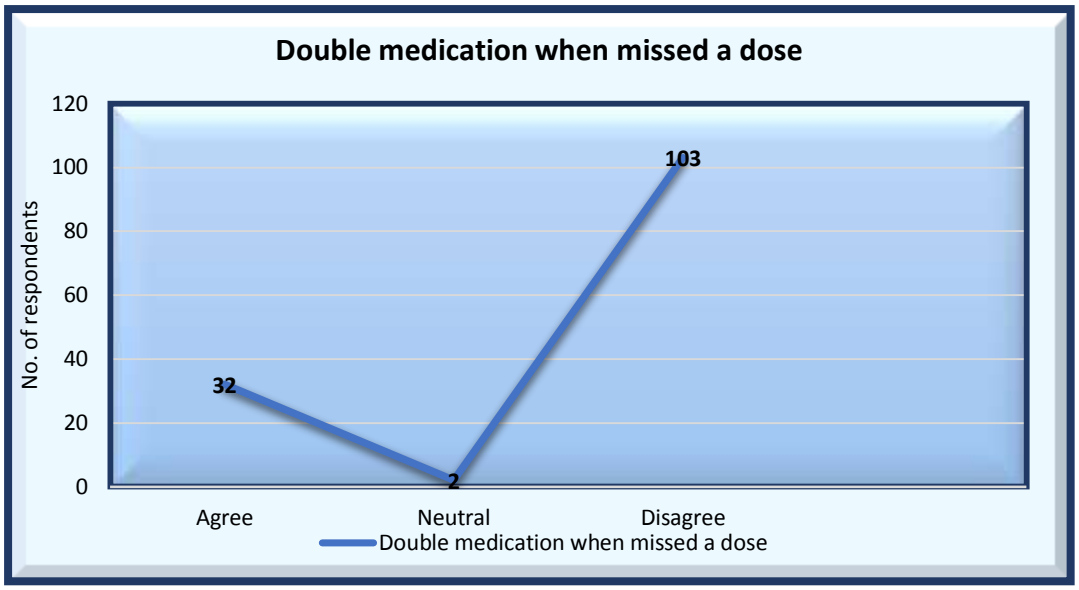


Figure 4.8: Double medication when missed a dose

The study findings show that 23% (n=32) of the respondents agree that they double their medication dose in case they missed one. However, 02% (n=2) were neutral while 75% (n=103) disagrees. Most of the respondents (75%) do not double their medication if they missed a dose. The mean is 2.5182 and the range is 2.00. This means that most of the diabetes patients do not double their medication when they missed a dose.

B6 I can take my medication as instructed

Figure 4.9 below reflects the respondents' response on taking medication as instructed

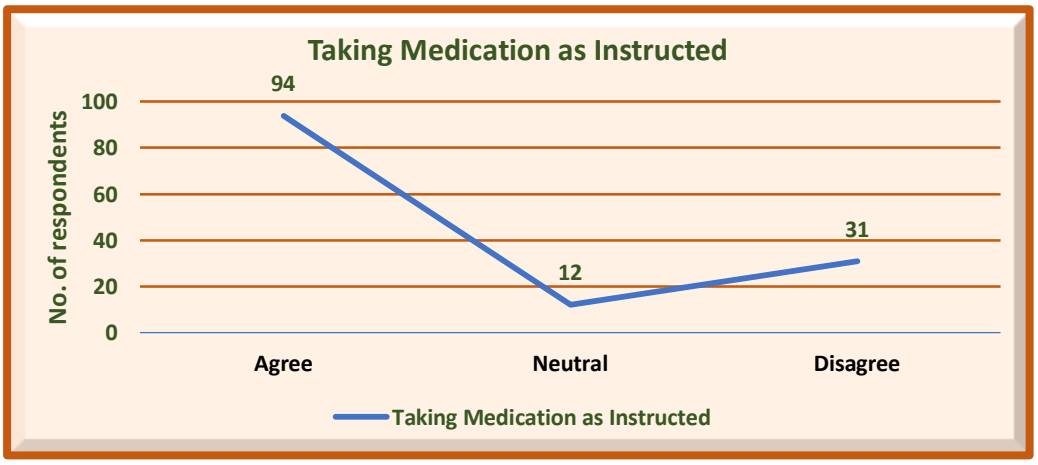


Figure 4.9: Taking Medication as Instructed

The findings revealed that 69% (n=94) of the respondents agree that they are taking medication as instructed. Nevertheless, 23% (n=31) disagree while 09% (n=12) are neutral. Most of the respondents take medication as instructed. The mean is 1.5401 and the range is 2.00. are taking medication as instructed.

B7 I Stop medication if there are no longer symptoms.

Figure 4.10 below reflects the respondents' response regarding stopping their medication when there are no longer symptoms

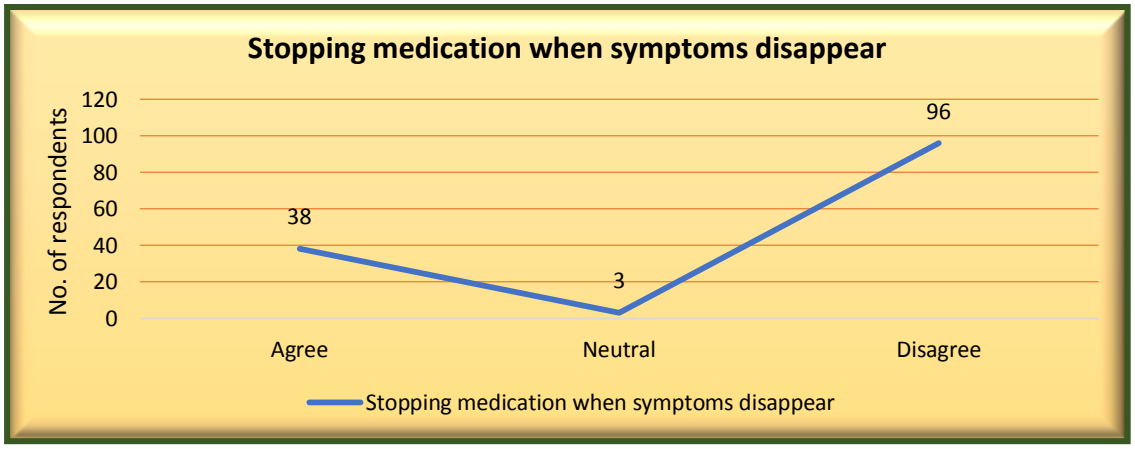


Figure 4.10: Stopping medication when symptoms disappear

The study findings revealed that 28% (n=38) respondents agree that they stop their medication if there are no longer symptoms. However, 02% (n=3) of the respondents are neutral while 70% (n=96) disagree. Most of the respondents (70%) do not stop the medication if there are longer symptoms. The mean is 2.4234 and the range is 2.00. This means that the majority of the diabetes patients do not stop their medications even when they no longer experience diabetes symptoms.

B8 I am aware of the effects of not taking my medication properly.

Figure 4.11 below reflects the respondents' response regarding awareness on the effects due to inadequate medication intake;

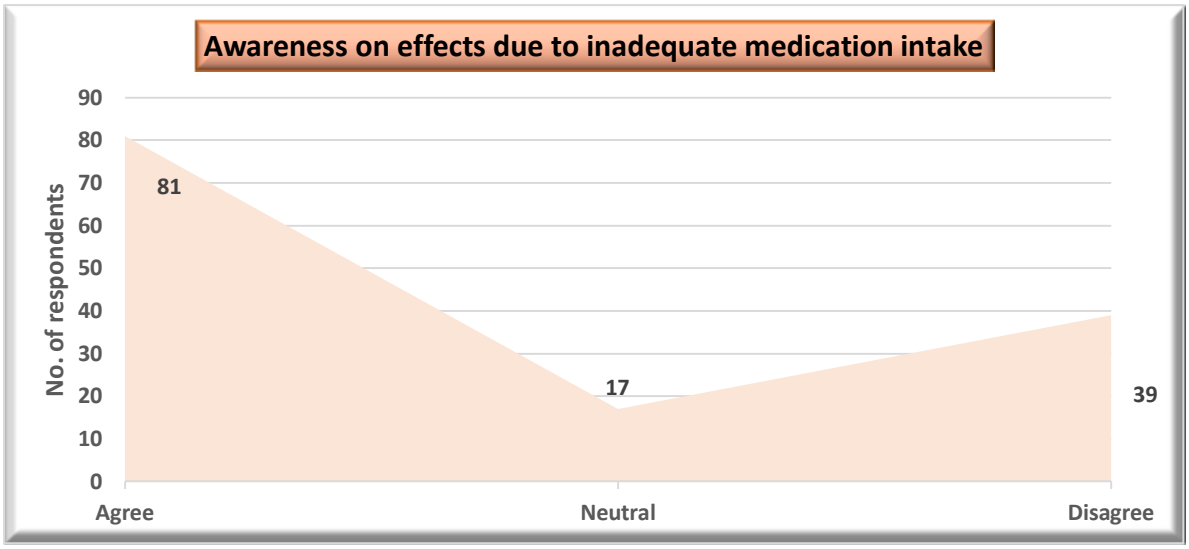


Figure 4.11: Awareness on effects due to inadequate medication intake

The study findings have revealed that 59% (n=81) of the respondents agree that they have an awareness of the effects of not taking medication correctly. Nevertheless, 12% (n=17) is neutral whereas 29% (n=39) disagree that they have awareness of the effects of not taking medication correctly. Most of the respondents are aware of the effects of not taking medication correctly. The mean is 1.6934 and the range is 2.00. These results mean that most of the diabetes patients are aware of the effects of not taking medication correctly

4.2.2.3 Section C: General Medicine Instruction Health Literacy Knowledge, Medicine Experience and Its Effects Test

The respondents were expected to choose whether they agree, disagree or are neutral to the statements provided on the questionnaire. At times they had extra answers like do not know or not applicable. The respondents also had to indicate whether they understand medication instructions relating to time intervals. The last part of the questionnaire required the respondents' practices relating to the management of complications and medication side effects. Section C comprised of 25 questions presented below as follows:

C1 The medication leaflets and packages provide sufficient information for me to understand how I should take the medication.

Figure 4.12 below reflects the respondents' response regarding the medication leaflets and packages provision of enough information to understand how they should take their medication.

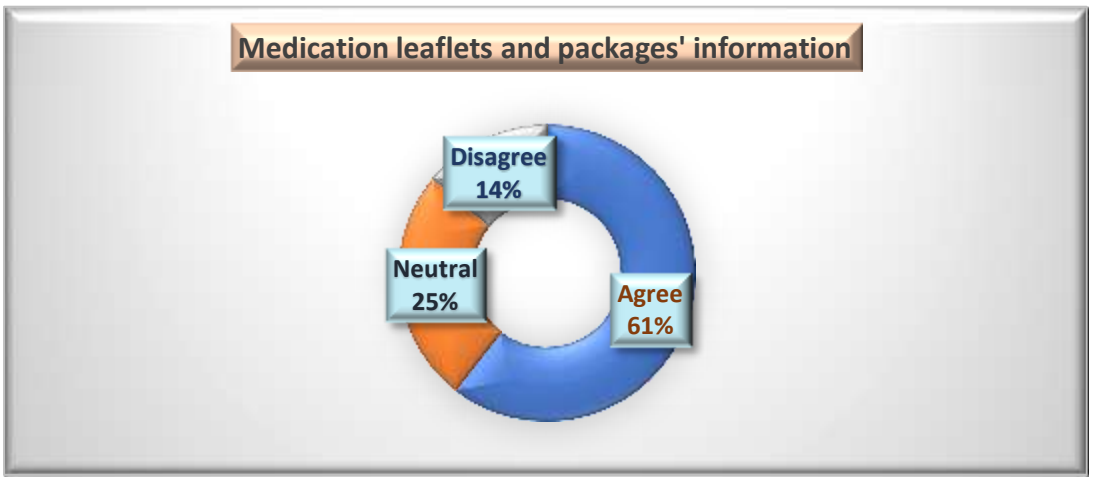


Figure 4.12: Medication leaflets and packages' information

The study findings have revealed that 61% (n=83) respondents agree that the medication leaflets and packages provide information enough for the respondents to understand how to take the medication. However, 25% (n=35) are neutral while 14% (n=19) disagree. Most of the respondents understand how they should take their medication through the information provided on the leaflets and packages. The mean is 1.5328 and the range is 2.00. This means that diabetes patients understand how they should take their medication through the information provided on the leaflets and packages.

C2 The Professional Nurse explained how I should take my medication clearly to me.

Figure 4.13 below reflects the respondents' response regarding the professional nurses' clear explanation on how to take medication;

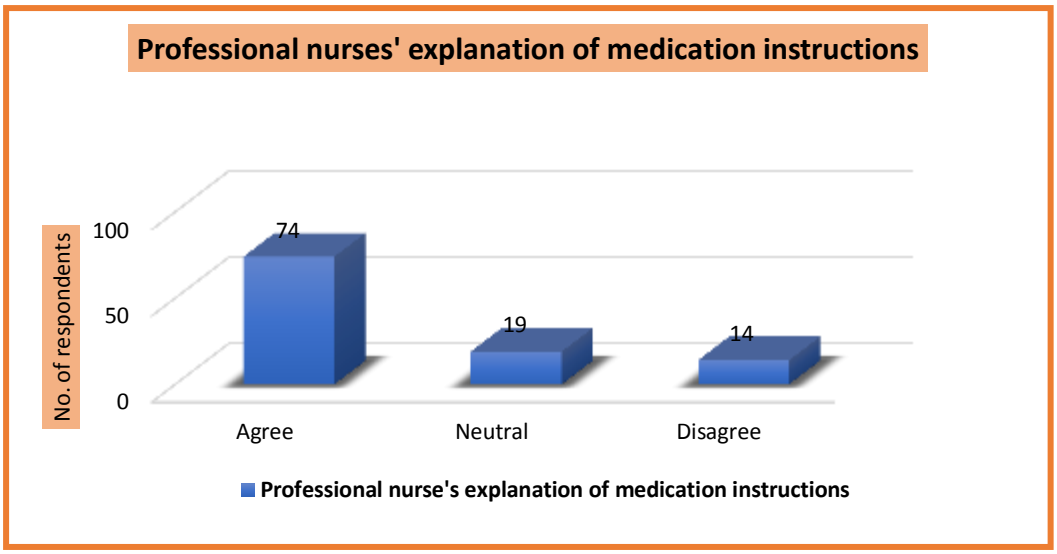


Figure 4.13: Professional nurse's explanation of medication instructions

The findings discovered that 54% (n=74) agree that the professional nurse clearly explained to them how they should take the medication. Still, 14% (n=19) are neutral whereas 32% (n=14) disagree with the 74 respondents. Most of the respondents got a clear explanation of their medication instructions from professional nurses. The mean is 1.7810 and the range is 2.00. This means diabetes patients get a clear explanation of their medication instructions from professional nurses.

C3 My illness has improved since I started with the medication.

Figure 4.14 reflects the respondents' response regarding their illness improvement since they started with the medication;

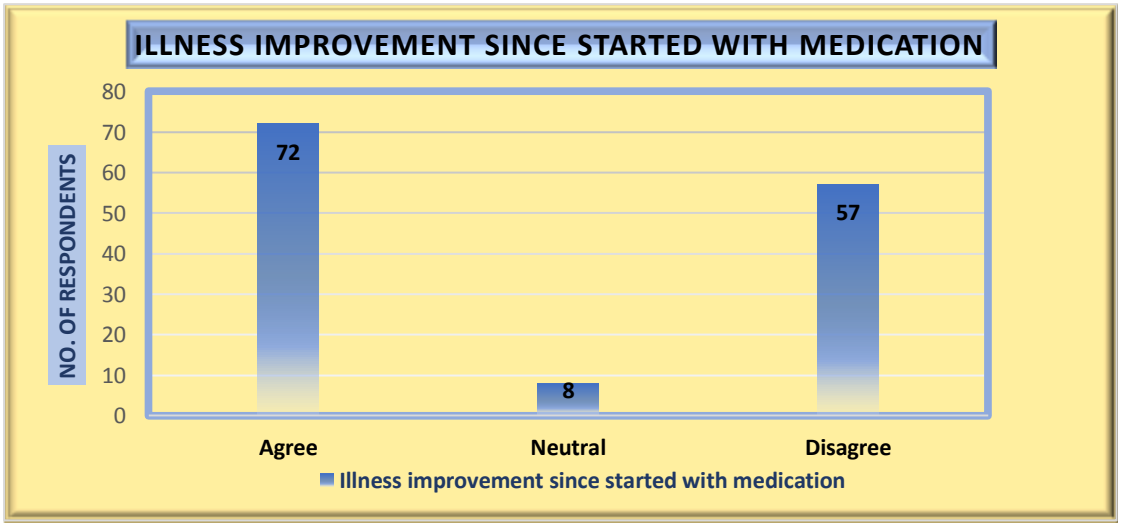


Figure 4.14: Illness improvement since started with medication

The findings show that 52% (n=72) of the respondents their illness has improved since they started with the medication. However, 6% (n=8) are neutral whereas 42% (n=57) disagree. Most of the respondents' illness has improved since starting to consume the medication. The mean is 1.8905 and the range is 2.00. These results mean that most of the diabetes patients' illness has improved since they started with the medication.

C4 My illness has remained the same since I started with the medication.

Figure 4.15 below reflects the respondents' response regarding their illness remaining the same since started with the medication

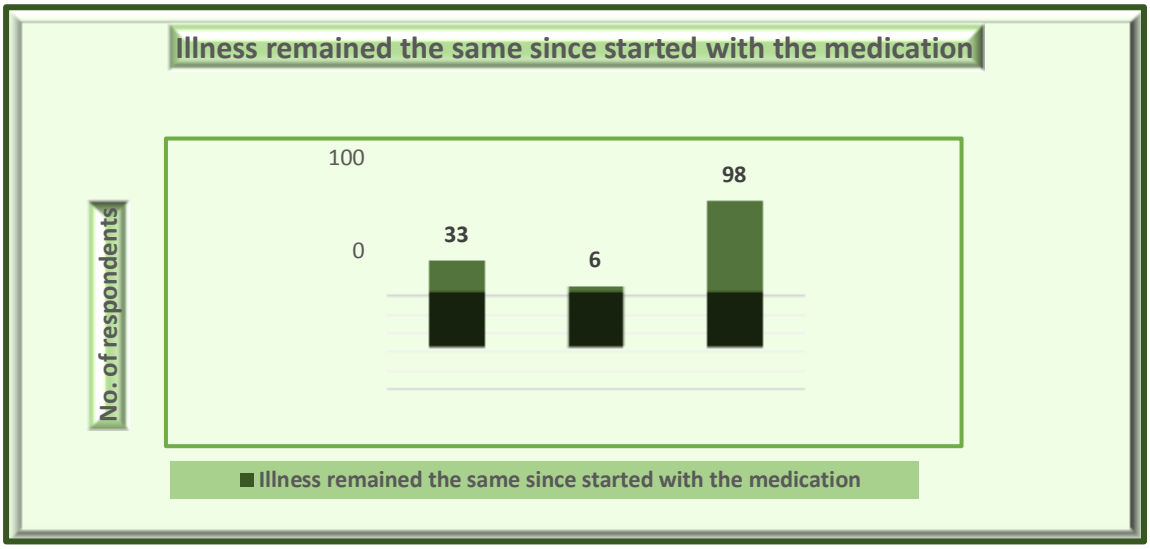


Figure 4.15: Illness remained the same since started with the medication

The study findings show that 24% (n=33) respondents' illness remained the same since they started to consume the medication. Though, 04% (n=06) respondents are neutral and 72% (n=98) disagree. Most of the respondents' illness has not remained the same. The mean 2.4745 and the range is 2.00. These results mean that most of the diabetes patients' illness has not remained since they started with the medication.

C5 My illness is worse since I started with the medication.

Figure 4.16 below reflects the respondents' response regarding the worsening of their illness since started with the medication

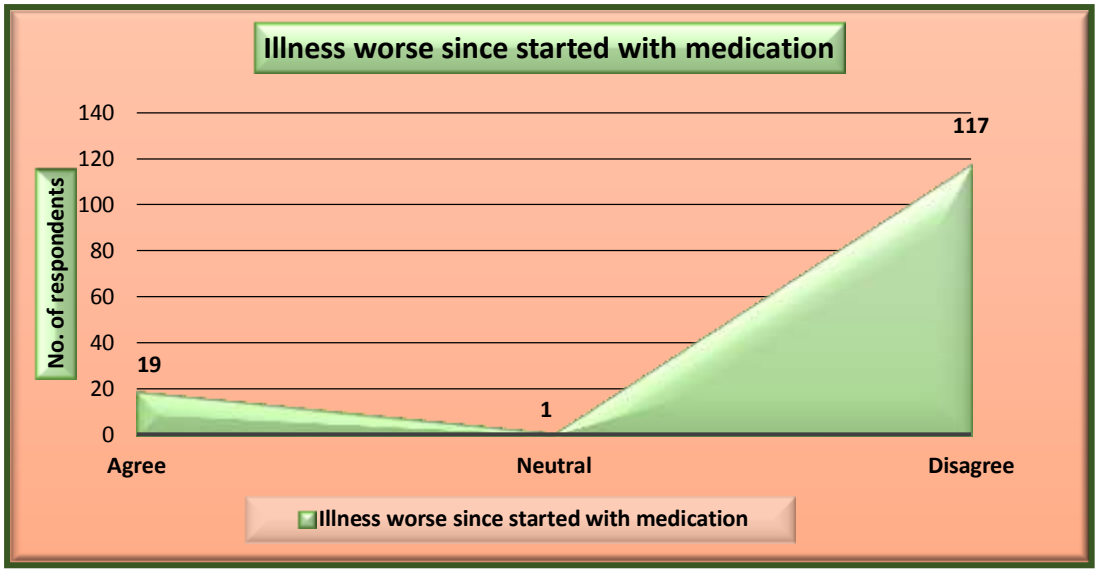
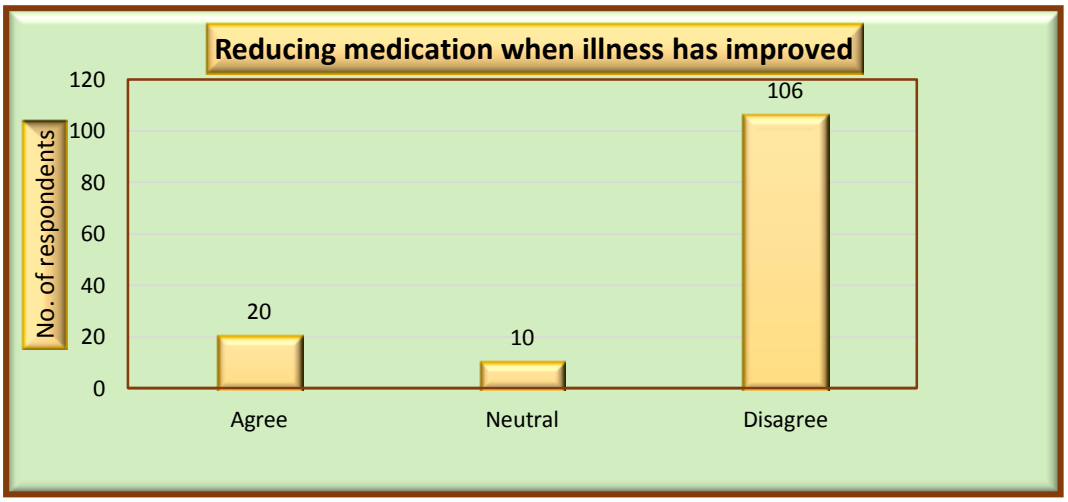


Figure 4.16: Illness worse since started with medication

The study findings indicate that 14% (n=19) of the respondents' illness is worse since starting with the medication. On the other side, 01% (n=1) is neutral while 84% (n=117) disagree. The majority of the respondents' illness is not worse since started with the medication. The mean 2.7153 and the range is 2.00. this means that most of the diabetes patients' illness is not worse since started with the medication.

C6 I can reduce my medication if my illness has improved.

Figure 4.17 below reflects the respondents' response regarding reducing medication



when illness has improved;

Figure 4.17: Reducing medication if illness has improved

The study findings have revealed that 15% (n=20) respondents agree that they reduce medication when their illness has improved. On the other side, 7.3% (n=10) respondents are neutral while 77.4% (n=106) disagree. The majority of the respondents do not reduce medication when their illness is improved. The mean is 2.6423 and the range is 3.00. This means that majority of the diabetes patients do not reduce medication when their illness is improved.

C7 I can stop my medicine if my illness has improved.

Figure 4.18 below reflects the respondents' response regarding stopping the medication if their illness has improved;

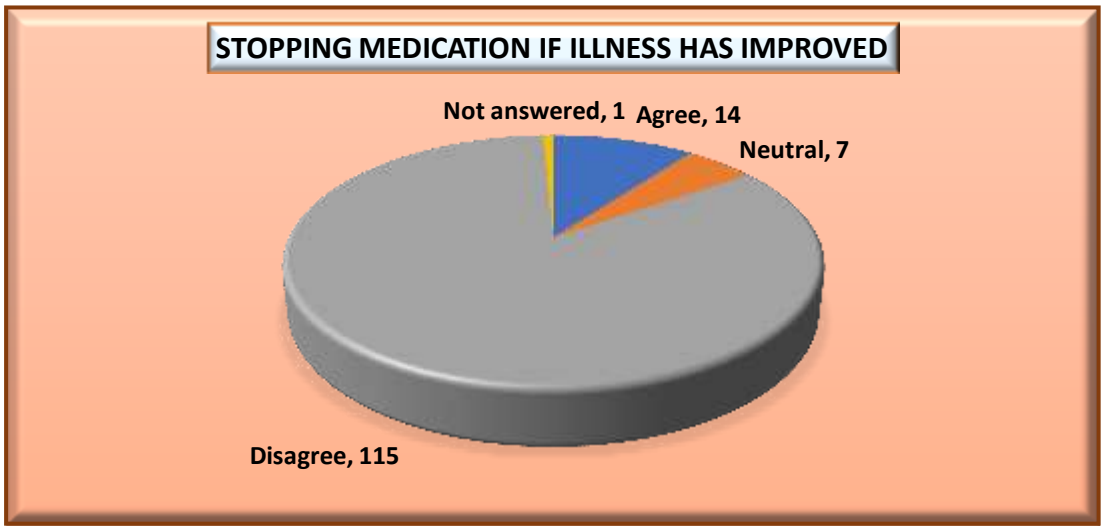


Figure 4.18: Stopping medication if illness has improved

The study results show that 10% (n=14) respondents agree that they would stop the medication if their illness has improved while 84% (n=115) disagree. However, 5% (n=07) are neutral while 01% (n=1) did not answer. Most of the respondents do not want to stop their medication if their illness improves. The mean is 2.7518 and the range is 3.00. This means that most diabetes patients do not want to stop their medication if their illness improves.

C8 Stopping diabetic medication can result in poor consequences.

Figure 4.19 below reflects the respondents' response regarding knowledge about the consequences of stopping diabetic medication

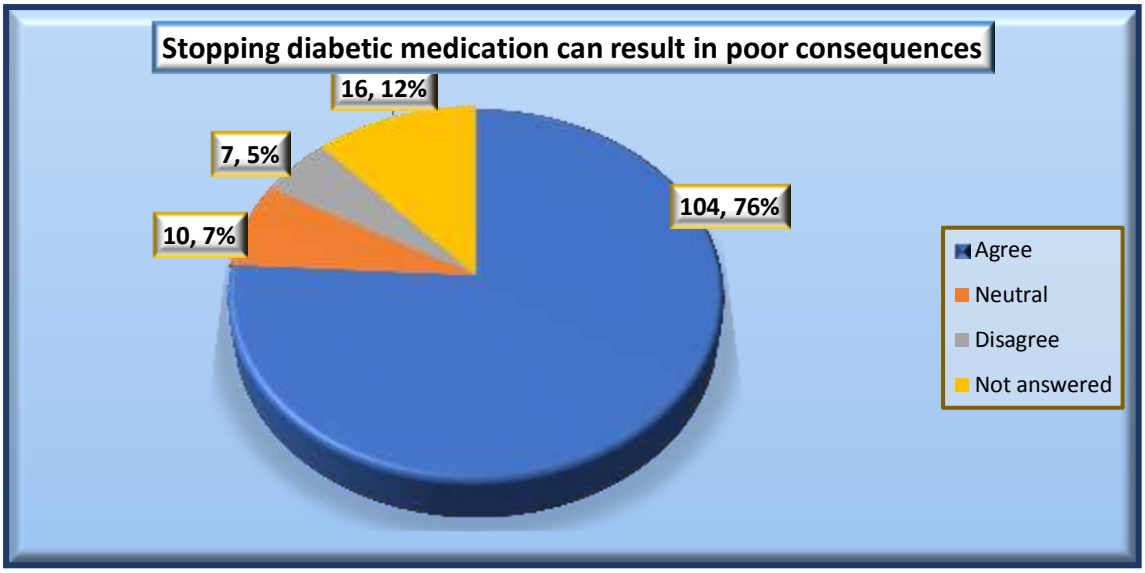


Figure 4.19: Stopping diabetic medication can result in poor consequences

The results demonstrate that 76% (n=104) of the respondents agree that stopping diabetic medication can result in poor consequences whereas 05% (n=7) disagree. On the other hand, 07% (n=10) are neutral while 12% (n=16) do not know. The majority of the respondents (76%) know that stopping diabetic medication can result in poor consequences. The mean is 1.6350 and the range is 3.00. This means that the majority of the diabetes patients know that stopping diabetic medication can result in poor consequences.

C9 I can obtain my chronic medication anywhere I want, if I do not want to go to the clinic.

Figure 4.20 below reflects the respondents' response regarding obtaining chronic medication anywhere if they do not want to go to the clinic;

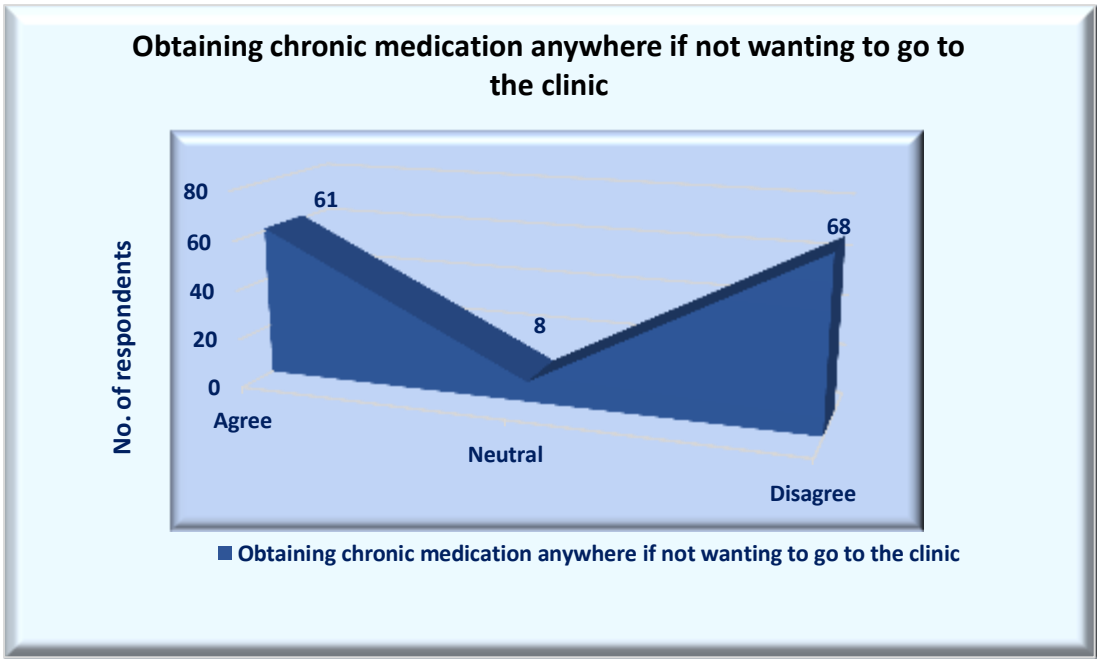


Figure 4.20: Obtaining chronic medication anywhere if not wanting to go to the clinic

The study findings show that 44% (n=66) of the respondents agree that they can obtain chronic medication anywhere they want if they do not want to go to their clinic. However, 06% (n=8) are neutral whereas 50% (n=68) disagree. Most of the respondents cannot obtain chronic medication anywhere they want if they do not want to go to their clinic. The mean is 2.0511 and the range is 2.00. This means that most of the diabetes patients cannot obtain chronic medication anywhere they want if they do not want to go to their clinic.

C10 I can obtain my chronic medication anywhere I want if I know the names and instructions for my medication.

Figure 4.21 below reflects the respondents' response to obtaining chronic medication anywhere they want if they know the names and instructions of the medication

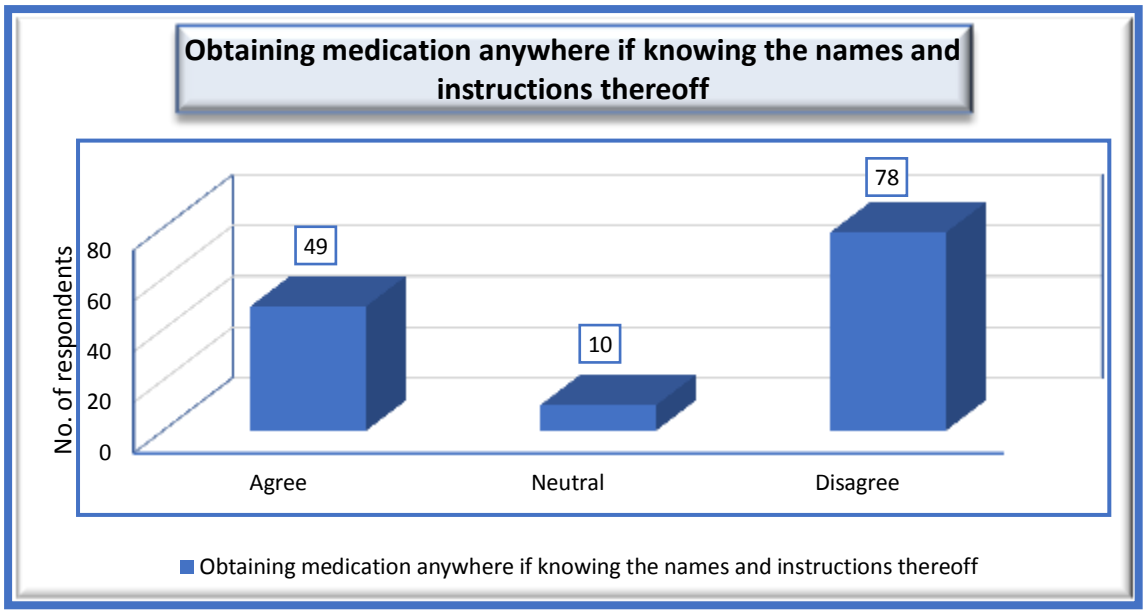


Figure 4.21: Obtaining medication anywhere if knowing the names and instructions thereof

The study findings show that 36% (n=49) of the respondents agree that they can obtain chronic medication anywhere if they know the names and instructions thereof. Nonetheless, 07% (n=10) are neutral while 57% (n=78) disagree. Most of the respondents cannot obtain chronic medication anywhere even if they know the names and instructions thereof. The mean is 2.2117 and the range is 2.00. This means that most of the diabetes patients cannot obtain chronic medication anywhere even if they know the names and instructions thereof.

C11 I get confused by the number of medications I am taking

Figure 4.22 below reflects the respondents' response regarding getting confused by the number of medications they are consuming

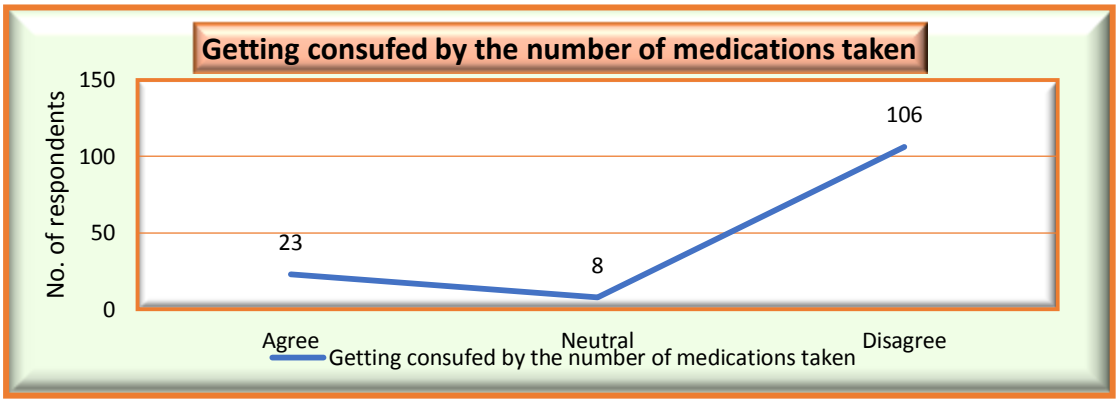


Figure 4.22: Getting consufed by the number of medications taken

The study results reveal that 17% (n=23) of the respondents agree that they get confused by the number of medications they use. On the other hand, 06% (n=8) are neutral whereas 77% (n=106) disagree. Most of the respondents do not get confused by the number of medications they consume. The mean is 2.6058 and the range is 2.00. This means that most of the diabetes patients do not get confused by the number of medications they consume.

C12 'Three times a day' medication instructions mean;

INSTRUCTION	NO. OF RESPONDENTS
Taking medication in the morning, during the day, and sunset	56
Dividing 24hrs by three to get correct time interval for taking medication	04
Taking medication in the morning, during the day, and evening	48
Not sure	26

Table 4.11: Meaning of 'Three time a day' medication instruction

The respondents were expected to choose what they understand by 'Three times a day' medication instruction from the given options as shown in table 4.11 above.
Figure 4.23 below reflects the respondents' response regarding the meaning of 'Three times a day' medication instruction;

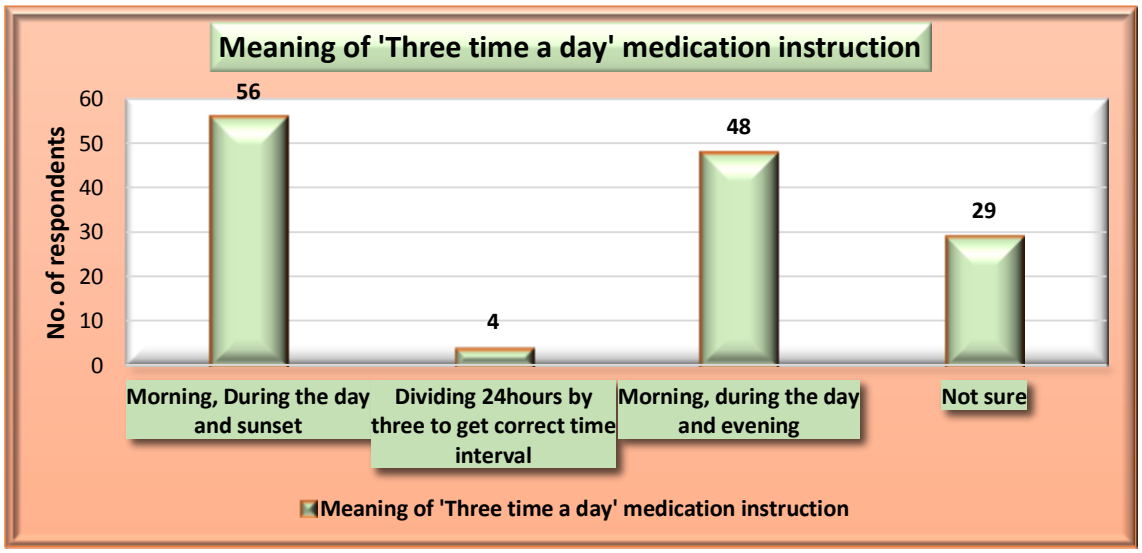


Figure 4.23: Meaning of 'Three time a day' medication instruction

The results show that 41% (n=56) of the respondents interpret 'three times a day' as taking medication in the morning, during the day, and at sunset. Only 03% (n=4) divide 24 hours by three to get the correct time interval. On the other hand, 21% (n=29) are not sure whereas 35% (n=48) indicated that it is taking the medication in the morning, during the day and in the evening. The mean is 2.3650 while the range is 3.00. This means that most of the diabetes patients do not know what three times a day medication instruction mean.

C13 'Four times a day' medication instruction means;

INSTRUCTION	NO. OF RESPONDENTS
Taking medication in the morning, during the day, in the afternoon and sunset	56
Dividing 24hrs by four to get the correct time interval for taking medication	04
Taking medication in the morning, during the day, sunset and evening	48
Not sure	29

Table 4.12: Meaning of 'Twice a day' medication instruction

The respondents were expected to choose what they understand by 'Four times a day' medication instruction from the given options as shown in table 4.12 above. Figure 4.24 below reflects the respondents' response regarding the meaning of 'Four times a day' medication instruction;

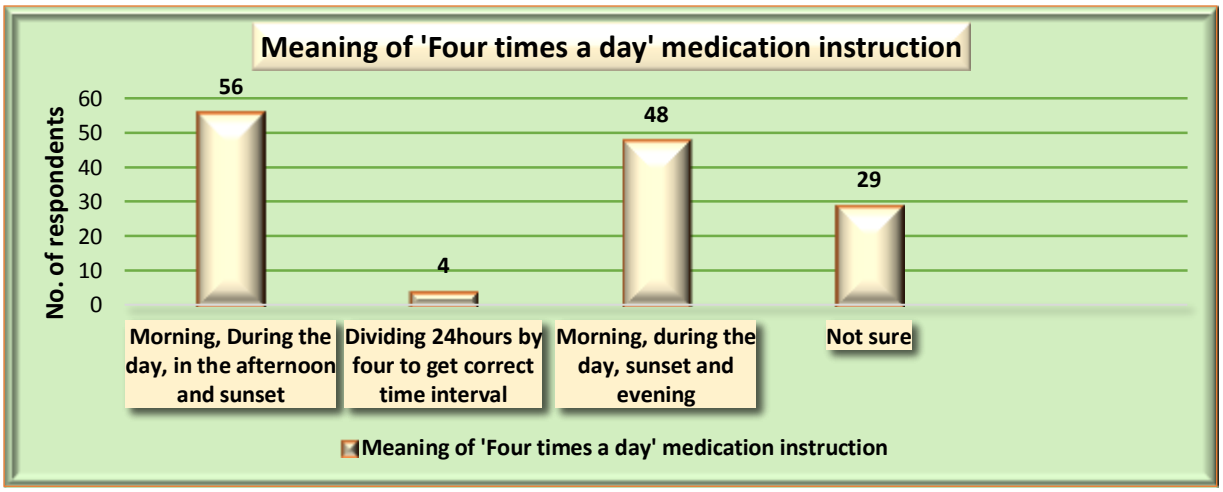


Figure 4.24: Meaning of 'Four time a day' medication instruction

The results show that 53% (n=72) of the respondents interpret ‘four times a day’ as taking medication in the morning, during the day, in the afternoon, and at sunset. Only 01% (n=2) divide 24 hours by four to get the correct time interval. On the other hand, 18% (n=25) are not sure whereas 27% (n=37) indicated that they taking their medication in the morning, during the day, at sunset, and in the evening and 01% (n=1) did not answer. The mean is 2.1314 while the range is 4.00. This means that most of the diabetes patients do not know what four times a day medication instruction mean.

C14 ‘Twice a day’ medication instructions mean;

INSTRUCTION	NO. OF RESPONDENTS
Taking medicine in the morning and sunset	64
Dividing 24hrs by two to get the correct time interval for taking medication	09
Taking medication in the morning and afternoon	46
Not sure	18

Table 4.13: Meaning of 'At night' medication instruction

The respondents were expected to choose what they understand by ‘Twice a day’ medication instruction from the given options as shown in 4.13 above.

Figure 4.25 reflects the respondents’ response regarding the meaning of ‘Twice a day’ medication instruction;

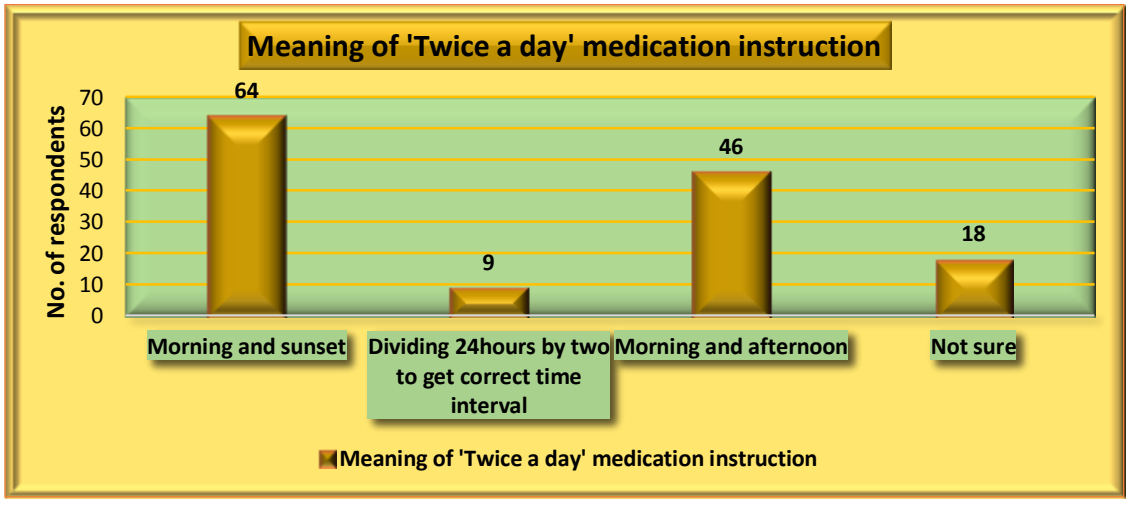


Figure 4.25: Meaning of 'Twice a day' medication instruction

The results show that 47% (n=64) of the respondents interpret 'twice a day' as taking medication in the morning and at sunset. Only 07% (n=9) divide 24 hours by two and get the correct time interval. On the other hand, 13% (n=18) are not sure whereas 37% (n=46) indicated that is taking the medication in the morning, during the day, and in the evening. The mean is 2.1314 while the range is 3.00. This means that most of the diabetes patients do not know what two times a day medication instruction mean.

C15 'At night' medication instructions means;

INSTRUCTION	NO. OF RESPONDENTS
Taking medication any time after sunset	57
Taking medication anytime at night	10
Taking the medication at the same time at night	48
Not sure	22

Table 4.14: Meaning of 'At night' medication instruction

The respondents were expected to choose what they understand by 'At night' medication instruction from the given options as shown in 4.13 above.

Figure 4.26 below reflects the respondents' response regarding the meaning of 'At night' medication instruction

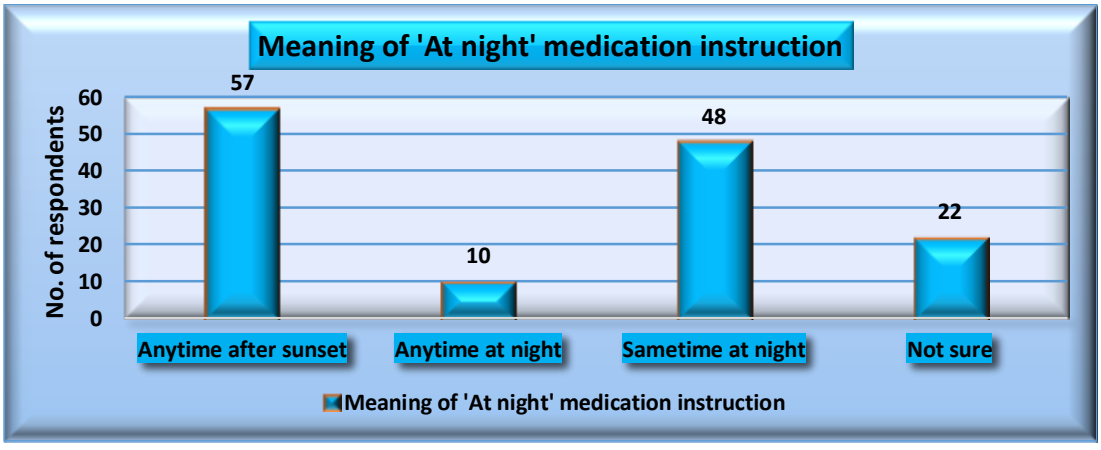


Figure 4.26: Meaning of at night' medication instruction

The findings demonstrate that 42% (n=57) of the respondents interpret ‘at night’ as taking medication any time after sunset whereas 16% (n=22) are not sure. On the other hand, 07% (n=10) indicated that it means anytime at night while 35% (n=48) mention that it means same time at night. The mean is 2.2555 while the range is 3.00. This means that most of the diabetes patients do not know what ‘at night’ medication instruction mean.

C16 ‘Once a day’ medication instructions means;

INSTRUCTION	NO. OF RESPONDENTS
Taking medication in the morning every day	54
Taking the medication at the same time every day	18
Taking medication any time of the day	43
Not sure	22

Table 4.14: Meaning of 'Once a day' medication instruction

The respondents were expected to choose what they understand by ‘Once a day’ medication instruction from the given options as shown in table 4.14 above.

Figure 4.27 below reflects the respondents’ response regarding the meaning of ‘Once a day’ medication instruction

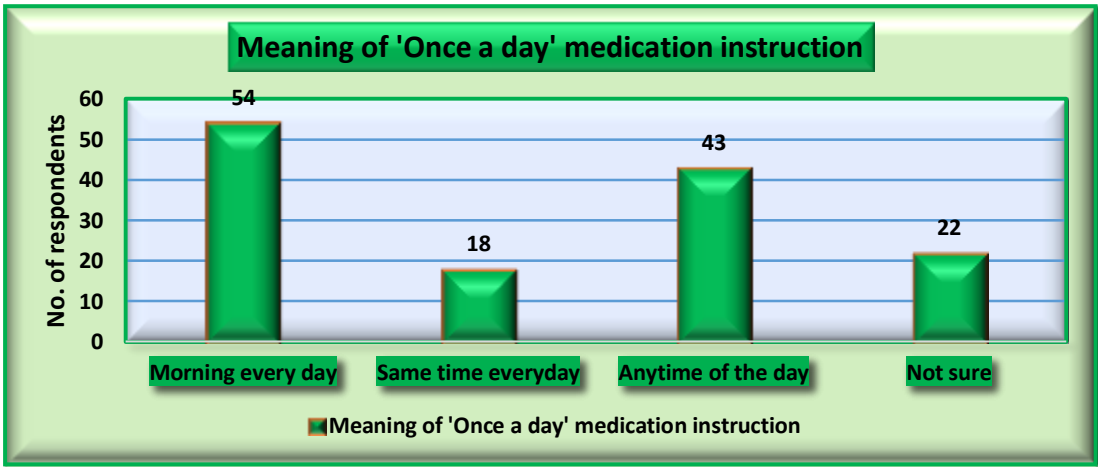


Figure 4.27: Meaning of once a day’ medication instruction

The study findings discovered that 39% (n=54) respondents interpret 'Once a day' medication instruction as 'morning every day' while 16% (n=22) are not sure. However, 13% (n=18) indicated that it means 'same time every day whereas 31% (n=43) say it is any time of the day. The mean is 2.2409 and the range is 3.00. This means that most of the diabetes patients do not know what 'once a day' medication instruction mean.

Question C17 to C23 was about complications of diabetes mellitus. The respondents had to indicate whether they agree, neutral, disagree to having the symptoms given as presented in table 4.15 below. At one point 'Not applicable' was added.

Question number	SYMPTOMS EXPERIENCED	Agree	Neutral	Disagree
C17	Changes in vision	59	8	70
C18	Numbness	60	7	70
C19	Tingling sensation	47	4	86
C20	Burning/pain on the toes or fingers	54	3	80
C21	Erectile dysfunction in men	17	6	34
C22	Poor hearing	18	2	117
C23	A wound that does not heal	7	2	128

Table 4.15: The symptoms given

C17 "Changes in vision"

Figure 4.28 reflects the respondents' response regarding the change in vision;

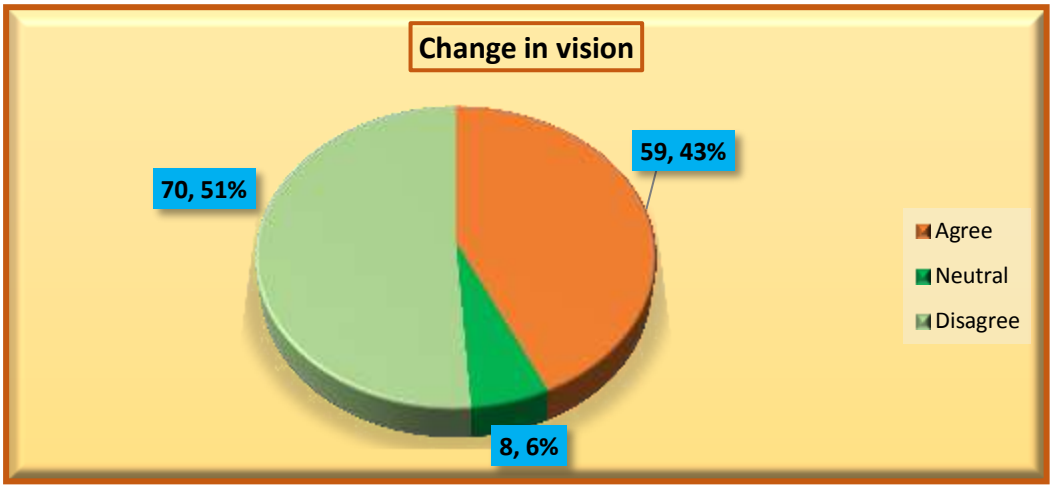


Figure 4.28: Change in vision

The study findings have revealed that 43% (n=59) respondents agree that they have a change in vision. On the other side, 06% (n=08) respondents are neutral while 51% (n=70) disagree. The majority of the respondents do not have a change in vision. The mean is 2.0803 and the range is 2.00. This means that the majority of the diabetes patients do not have a change in vision.

C18 "Numbness"

Figure 4.29 below reflects the respondents' response regarding numbness;

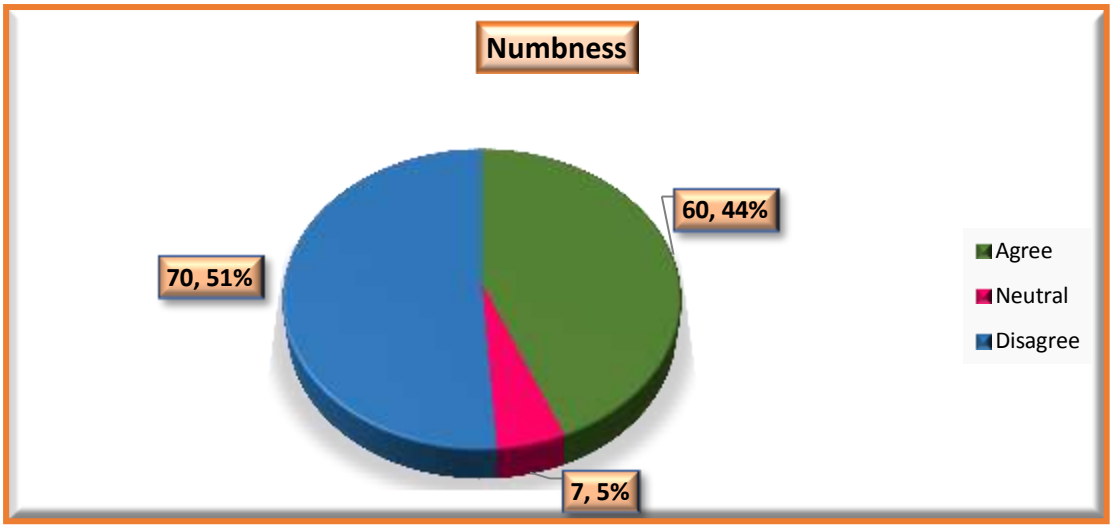


Figure 4.29: Numbness

The findings have revealed that 44% (n=60) respondents agree that they are experiencing numbness. On the other side, 05% (n=07) respondents are neutral while 51% (n=70) disagree. A majority of the respondents do not experience numbness. The mean is 2.0730 and the range is 2.00. This means that the majority of the diabetes patients do not experience numbness.

C19 "Tingling sensation"

Figure 4.31 below reflects the respondents' response regarding tingling sensation;

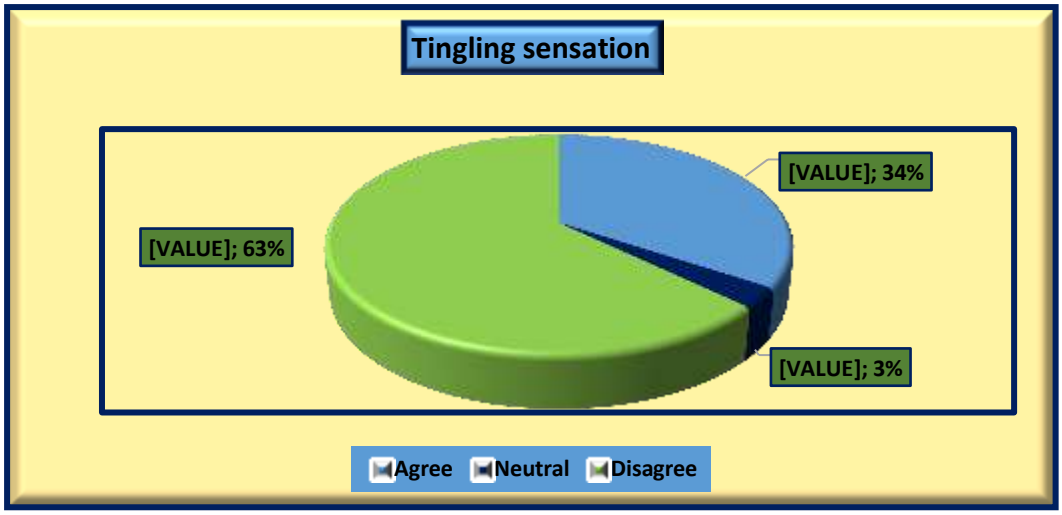


Figure 4.30: Tingling sensation

The study findings have revealed that 34% (n=47) respondents agree that they are experiencing tingling sensation. On the other side, 03% (n=04) respondents are neutral while 63% (n=86) disagree. The majority of the respondents do not experience a tingling sensation. The mean is 2.2847 and the range is 2.00. This means that the majority of the diabetes patients do not experience tingling sensation.

C20 "Burning/pain on the toes or fingers"

Figure 4.31 below reflects the respondents' response regarding burning or pain on the toes or fingers;

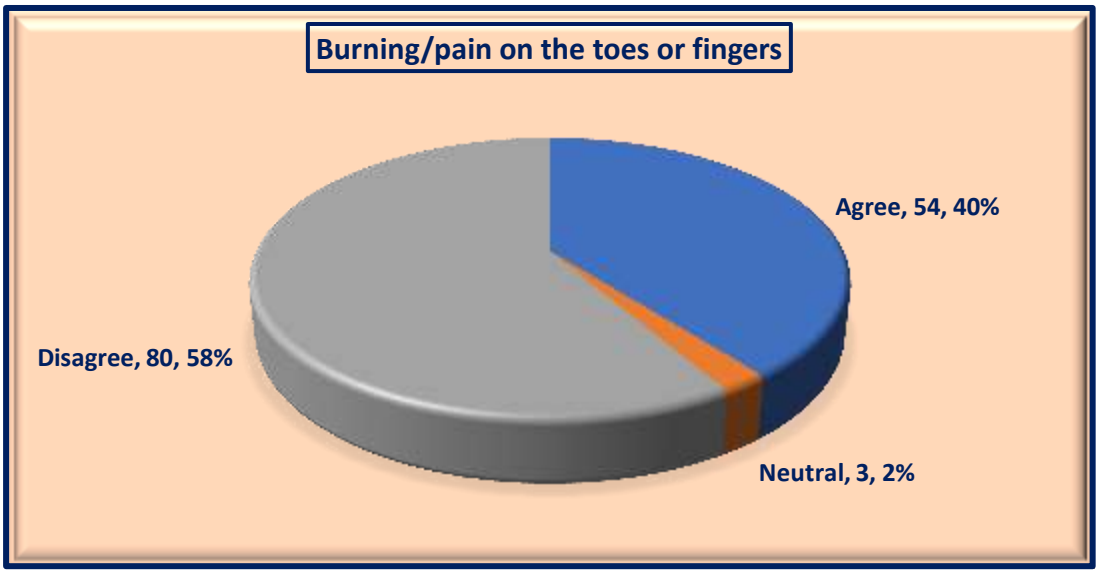


Figure 4.31: Burning/ pain on the toes or fingers

The study findings have revealed that 40% (n=54) of respondents agree that they are experiencing burning or pain on the toes or fingers. On the other side, 03% (n=02) respondents are neutral while 58% (n=80) disagree. The majority of the respondents do not experience burning or pain on the toes or fingers. The mean is 2.1898 and the range is 2.00. This means that the majority of the diabetes patients do not experience burning or pain on the toes or fingers.

C21 "Erectile dysfunction in men"

Figure 4.32 below reflects the respondents' response regarding erectile dysfunction;

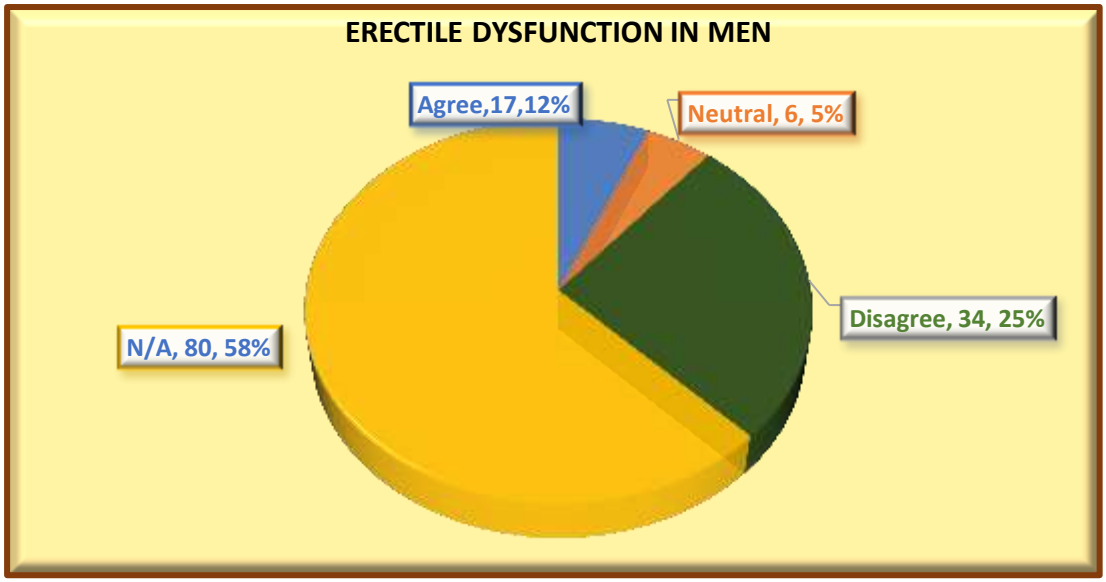


Figure 4.32: Erectile dysfunction in men

The study findings have revealed that 12% (n=17) respondents agree that they are experiencing erectile dysfunction, while 58% (n=80) erectile dysfunction challenges were non-applicable to them as they are females. On the other side, 05% (n=06) respondents were neutral while 25% (n=34) disagree. The majority of the respondents do not experience erectile dysfunction. However, the mean is 3.2920 and the range is 3.00. This means that the majority of the diabetes patients do not experience erectile dysfunction.

C22 "Poor hearing"

Figure 4.33 below reflects the respondents' response regarding poor hearing

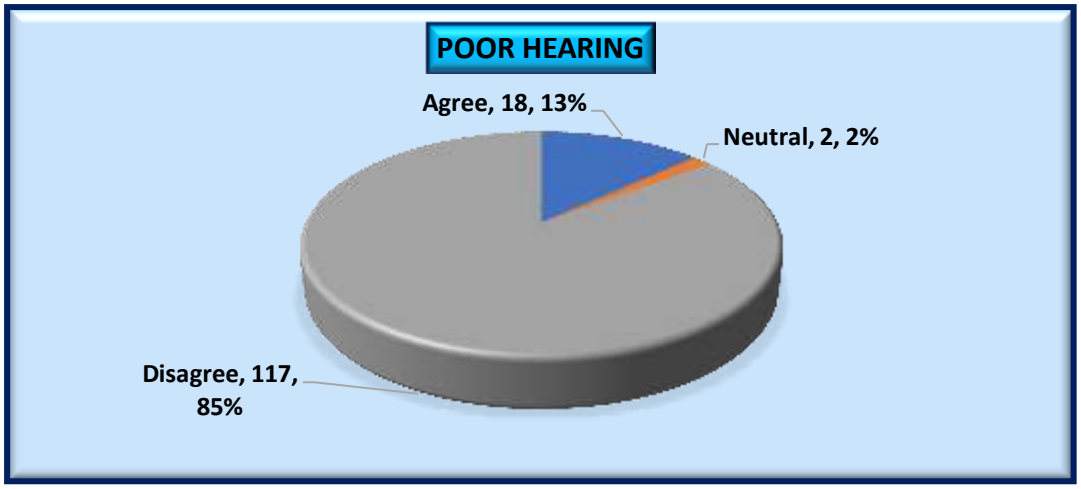


Figure 4.33: Poor hearing

The findings of the study show that 13% (n=18) respondents agree that they have poor hearing. However, 02% (n=02) are neutral whereas 85% (n=117) disagree. Most of the respondents do not have poor hearing. The mean is 2.7226 and the range is 2.00. This means that the majority of the diabetes patients do not experience poor hearing.

C23 "A wound that does not heal"

Figure 4.34 reflects the respondents' response regarding a wound that does not heal;

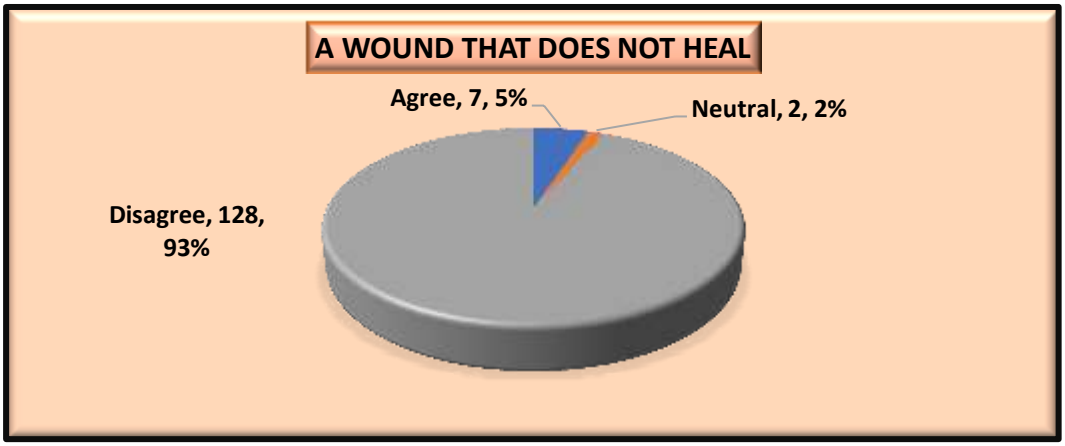


Figure 4.34: A wound that does not heal

The study findings show that 05% (n=07) of the respondents agree that they have a wound that does not heal. On the other hand, 02% (n=02) are neutral while 93%

(n=128) disagree. Many of the respondents do not have a wound that does not heal. The mean is 2.8832 and the range is 2.00. This means that the majority of the diabetes patients do not have a wound that does not heal.

What should you do if you experience the following while taking medication? Select all that apply.

C24 If medication side effects or symptoms increases

Table 4.16 below presents the respondents' choices to medication side effects and symptoms increase as asked in the questionnaire. The respondents were to choose as many choices as they apply.

RESPONSE TO MEDICATION SIDE EFFECTS	CHOICE NO.
Go to other health facilities	1
Return to the same health facility for assistance	2
Seek medication for the symptoms	3
Continue with the medication	4
Stop the medication	5

Table 4.16: Choices to medication side effects

The respondents gave a variety of responses to the options given above. Table 4.17 presents the respondents' response to medication side effects or an increase in symptoms.

Choices to response to medication side effects or increase in symptoms	No. of respondents	Percentage
1	1	**1**
2	28	**20**
4	19	**14**
1 &3	4	**3**
1 & 4	15	**11**
1 & 5	3	**2**
2 & 4	52	**38**
2 & 5	7	**5**
1,3 &4	3	**2**
2,3&4	5	**4**

Total	**137**	**100.0**

Table 4.17: Choices to response to medication side effects or increase in symptoms

This study revealed that 01% (n=1) of the respondents go to other health facilities for assistance, 20% (n=28) return to the health facility for assistance and 14% (n=19) continue with the medication. On the other hand, 03% (n=04) go to other health facilities for assistance and, also seek medication for the symptoms. Eleven percent (n=15) go to other health facilities for assistance and, also continue with the medication. Only 02% (n=03) go to other health facilities for assistance and, also stop the medication. A higher percentage, 38% (n=52) return to the same health facility for assistance and, also continue with the medication. Nevertheless, 05% (n=7) return to the health facility for assistance and, also stop the medication. While 02% (n=03) go to other health facilities for assistance, seek medication for symptoms and, continue with the medication, 04% (n=5) does the same but return to the same health facility than going to others. These results mean that diabetes patients return to the same health facility for assistance when experiencing side effects and, also continue with the medication.

C25 The illness does not improve while you are taking medication?

Table 4.18 below presents the respondents' choices regarding illness not improving while taking medication as asked in the questionnaire. The respondents were to choose as many choices as they apply.

RESPONSE TO MEDICATION SIDE EFFECTS	CHOICE NO.
Go to another health facility	1
Return to the health facility for assistance	2
Seek medication for the symptoms	3
Continue with the medicine	4
Stop the medicine	5

Table 4.18: Response to medication side effects

The respondents gave a variety of responses to the options given above. Table 4.19 presents the respondents' response to illness not improving while taking medication.

Choices to response to illness not improving while taking medication	No. of respondents	Percentage
1	1	**1%**
2	26	**19%**
4	18	**13%**
1 & 4	12	**9%**
1 & 5	3	**2%**
2 & 4	59	**43%**
2 & 5	10	**7%**
1,3 &4	1	**1%**
2 & 3	2	**1%**
2, 3 & 4	5	**4%**
Total	**137**	**100%**

Table 4.19: Choices to response to illness not improving while taking medication

The study findings have revealed that only 01% (n=01) go to other health facilities for assistance while 19% (n=26) return to the same health facility for assistance. While 13% (n=18) continue with the medication only, 09% (n=12) do the same but also go to another health facility for assistance. Only 02% (n=03) go to other health facilities for assistance and, also stop the medication while 07% (n=10) stop the medication but return to the same health facility for assistance. A higher percentage, 43% (n=59) return to the same health facility for assistance and, also continue with the medication. Only 01% (n=01) go to other health facilities for assistance, seek medication for symptoms and, also continue with medication. One percent (n=02) return to the same health facility for assistance and, also seek medication for symptoms while 04% (n=5) do the same but also continue with their medication. These results mean that diabetes patients return to the same health facility for assistance when their illness is not improving and, also continue with the medication.

4.3 CONCLUSION

This chapter has outlined an in-depth analysis, presentation, and interpretation of the results. Both the qualitative and quantitative data were presented and gave a clear

light of the study results. Chapter five presents the merging and the discussion of the findings.

CHAPTER 5

MERGING AND DISCUSSION OF THE FINDINGS

5.1 INTRODUCTION

This chapter displays the merging of the data and the discussion of the major findings. The main objective of the chapter is to provide critical reasoning and presentation of the results to stipulate the foundation of how participants/respondents viewed the concept of medication instructions. Thus, the challenges they come across when following the instructions.

5.2 MERGING OF RESULTS

The presentation of the study findings led to the merging of the results. Table 5.1 below summarise the merging of the two sets of data.

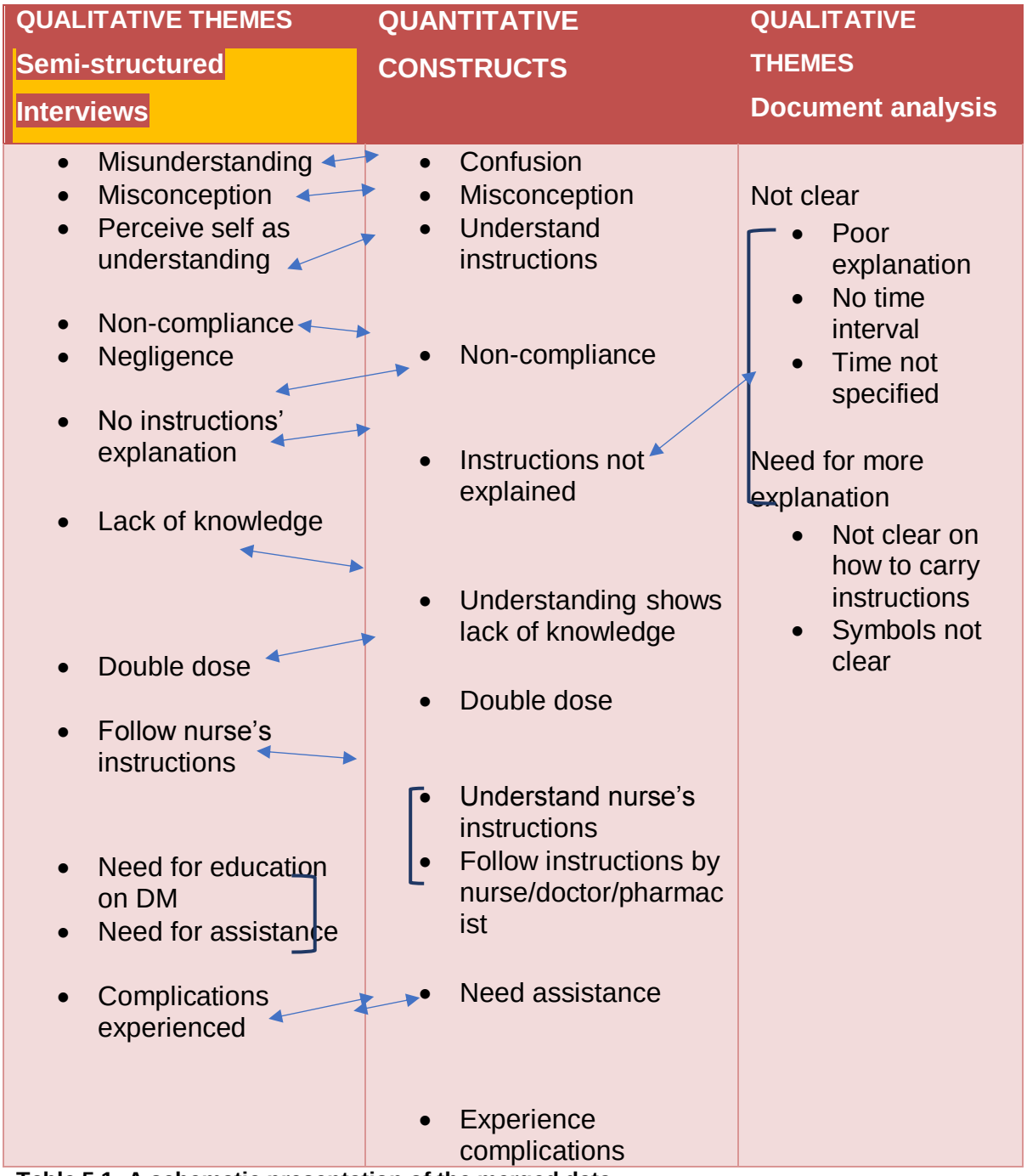


Table 5.1: A schematic presentation of the merged data

5.3 DISCUSSION OF THE FINDINGS

The findings are presented in a narrative format whereby after, the description of the findings is presented. The themes that emerged from the merging of the two sets of data are presented and relevant literature to support the findings is described. The findings of this study are discussed based on the themes and the sub-themes together with the constructs that have emerged during data analysis. These include

the individual semi-structured interviews conducted document analysis and the findings from the questionnaires.

5.3.1 Demographic data

The demographic data of the study participants and respondents are as follow:

5.3.1.1 Age

The respondents of the study were mainly 50 years and above. The total number of respondents was 137; 113 (82%) were 50 years and above. The participants' age prevalence is supported by Kalyani, Golden, and Cefalu (2017) postulates that older participants have a higher prevalence rate of diabetes mellitus compared to the younger age group in the United States. This is because the risk for diabetes mellitus Type 2 is mainly associated with age. However, the results showed that age did not play a role in understanding the medication instructions. The understanding was the same across all age groups.

5.3.1.2 Gender

Females dominated this study. Sixty-eight (68) per cent of females participated in the quantitative study and 89% in the qualitative one. This finding concurs with the findings from Zhang, Ni, and Yu et al (2019) aver that in their study women had a higher prevalence than men. However, Nordström, Hadrévi, and Olsson et al (2016) in their study have found that a higher prevalence of type 2 diabetes in older men than in older women. The study also showed that women understood the medication instructions better than men.

5.3.1.3 Marital Status

The majority of the study's participants were married. Fifty-four (54) per cent of the respondents indicated that they are married. This concurs with a study by Ramezankhani, Azizi, and Hadaegh (2019), who have found that widowed women had a lower risk of T2D. However, a study by Cornelis, Chiuve, and Glymour et al (2014) has pointed out that not being married, especially widowhood, was associated with an increased risk for T2D in men. This study results have shown that marital status did not influence patients' comprehension to medication instructions.

5.3.1.4 Educational Level

Most of the patients (47%) attended school up to high school whereas 11% did not attend school at all. AbuALreesh and Alburikan (2019) in their study have found that low health literacy was linked to the low education level of the patients. Alburikan, AbuALreesh, and Alenazi, (2018) also proclaim that the degree of misinterpretation significantly deteriorated for patients with low education levels. Therefore, basic literacy does play a role in understanding health literacy. However, the study revealed that educational background did not play a role in understanding the medication instructions.

5.3.1.5 Employment Status

The majority of the patients (47%) were pensioners while 30% were employed. Only 30% of the patients are unemployed and that can have an impact on their diabetes management. In their study, Naser et al (2019) have found that patients' employment status has been linked to patients' behaviour. This is due to the negative association of unemployment and patients' health outcome (Naser et al, 2019). The study results showed that employment status did not influence medication instructions comprehension.

5.3.1.6 Other Diseases

Many of the patients (37%) were suffering from diabetes mellitus and hypertension. However, 13.9% were suffering from DM, HPT, and other conditions mostly arthritis. These findings are comparable with Karaoui et al (2018) study findings where approximately 60% of the sample had concurrent chronic diseases such as hypertension, hypercholesterolemia, cardiovascular diseases, and pulmonary diseases. Iglay et al (2016) also support this finding by saying that managing diabetes is complicated, since diabetes does not frequently occur in seclusion. This was due to that about 90% of their study participants having two comorbidities concurring with diabetes type 2. The study findings however revealed no difference in comprehension of medication instructions between patients who suffered diabetes only and those who suffer from other diseases.

5.3.1.7 Number of Diabetes Mellitus Medications Consumed by Patient

Many patients (47%) were taking only two (02) medications 20% were taking three (03). This finding was different from the findings of Agarwal, Jadhav, and Deshmukh (2014) were the average number of diabetes medication was 1:4. However, similar to the finding ALHreashy and Mobierek (2014) have found that the majority of their study participants were consuming two (02) or more drugs. ALHreashy and Mobierek (2014) further declared that polypharmacy is a feature in diabetes care. Nonetheless, the study has revealed that the number of medications the patients consumed did not influence comprehension of medication instructions.

5.3.1.8 Number of all NCDs Medications taken by Patient

Many of the patients (50%) were using four (04) medications and above while only 32% were using one. Taking many drugs can have an impact on adherence issues. These results are like Indu, Adhikari, and Maisnam (2018) study results were polypharmacy level was high and therefore increasing the pill burden for diabetes patients with comorbidities. Polypharmacy also promotes the likelihood of a drug to drug, and drug to food interaction. In this study, the average number of drugs was 4.7 per prescription while the range was 2 to 9 (Indu, Adhikari, and Maisnam et.al., 2018). Similarly to the number of diabetic drugs patients consume, the study has revealed that the number of all NCDs medications the patients consumed did not influence comprehension of medication instructions.

5.3.2 Major findings

The study findings have shown that diabetes mellitus patients have misconceptions and misunderstanding of the prescribed medication instructions. The instructions were said to be not clear, lack time specification, and time interval. Similar findings were reported by Terefe and Chanie (2014) indicating medication instruction on the packages was not sufficient; just morning, day, or evening. Thus, the exact time interval and duration of treatment are not specified in the treatment. When patients interpret the instructions wrongly, they are likely prone to taking the medication in the wrong way. That can result in drug toxicity or underdose.

The symbols on the medication packages are not clear and instructions can be confusing. Another study by Jeetu and Girish (2010) affirmed doctors should clarify medication instructions to patients and if they fail to do so, the pharmacists should do so when dispensing. If the doctor and the pharmacist fail, the last option would be the medication packages and accompanying print materials like the container on the label, package inserts, and medication guides. However, these print materials are long, complex, and written in the medical language that can be difficult for patients to understand, and use irrespective of their literacy level (Jeetu & Girish, 2010). The symbols on the medication packages have to be easy to comprehend for patients to understand, by further explaining to the patient. Consequently, the symbols can be written more clearly by supplementing them with exact times.

Diabetic patients perceived themselves as understanding instruction. This is however contrary compared to how the patients carried out instructions. The patients' explanation of how they carry medication instructions shows that they do not understand the instructions. Cecilia Health (2020) supports the findings by saying that diabetes patients had incorrect perceptions of medication, where the patients do not fully understand the medication instructions. Cecilia Health (2020) further expanded that understanding the instructions means taking medication correctly, which includes taking a correct dosage, at the right frequency, being persistent, and consistent with taking medication. The fact that patients perceive themselves as understanding the instructions make them be settled that there is nothing wrong. Giving patients a clearer explanation of the instructions could shed more light on their insight.

The findings have also revealed non-compliance with the prescribed medications. This was sometimes coupled with negligence in some patients. Where one patient indicated that they sometimes drink too much alcohol and do not take their medications when in that situation. Aminde et al (2019) in their study have also found that more half of their participants were non-compliant to their diabetic medication. The participants' non-compliance was also linked to patients not giving attention to their health where a double increase in non-compliance was related to alcohol use

(Aminde et al, 2019). Patients were none compliant because they were not aware that they are taking medication wrongly. However, some patients are aware that their lifestyle is not right but still opted to continue with it. Being non-compliant could be the reason why many of the patients suffer complications.

Non-compliance has let some of the patients to experience rapid complications. Experiencing complications was also coupled with medication side effects. Corresponding findings support these findings indicating that non-compliant patients suffered side effects compared to compliant patients (Manobharathi et al, 2017). Alike findings were also reported by Abejew, Belay, and Kerie (2015) where hypertension, visual disturbance, and neuropathy as common chronic complications were reported by their participants. Likewise, long-term and short-term complications such as hypo- and hyper-glycemic episodes, blurry vision, neuropathy, foot ulcers, and loss of vision have been reported in a study by Karaoui, Deeb, Nasser, and Hallit (2018).

Patients in this study, therefore, lacked knowledge of the disease process, its complications, and their medication side effects. Similar results were noticed in Limaye et al (2016) study reported that diabetic patients did not know the meaning of diabetes, its risk factors, symptoms, complications, and preventive measure. Chavan et al (2015) have also supported these findings saying that patients in their study had poor knowledge regarding diabetes mellitus. Suffering from diabetes and not understanding its process can be dangerous. It is therefore crucial for diabetes patients to be taught about the diseases and their effects on the body as it progresses.

The study findings indicated that DM patients follow nurses' instructions although that was not adequate. The explanation was not specific rather was general. Hence, the patients said the explanation was poor. Comparable findings were reported by Terefe and Chanie (2014) were patients indicated that they were not informed about medication duration. This is important for compliance issues since diabetic medication is for a lifetime. Jeetu and Girish (2010) in their study have also

documented that many health literacy studies showed that physicians, do not explain health, and treatment information in a way that patients understand. Jeetu and Girish (2010) further stressed that health professionals often miss the opportunities to offer patients information on how to self-administer their medications. Following incorrect or rather incomplete instruction is similar to being non-compliant. Professional nurses need to give a full explanation of the meditation instruction for patients to fully comply and avoid complications as possible.

The study has also revealed that patients' lack of knowledge about the prescribed medications and diabetes as a disease, could lead to some of the patients doubling doses when a dose was missed. Matching results have been found in a study by Moosa, Bezuidenhout, Meyer, and Godman (2019) asserting that patients did not know how the medication controls the disease and was also not aware of the possible side effects thereof. Moosa et al (2019) also indicate that most patients did not know what to do when they have missed a dose, while others would just double the dose.

The study findings showed that patients need assistance on how to carry medication instructions. In their study, Terefe and Chanie (2014) indicated that misunderstanding of medication instructions could be reduced by health care professionals through improving clarification and understanding of labelling on prescribed medications. Patients also indicated that they need education on the following:

The patients wanted to be taught about the disease, its process, and complications. In support of these patients, Morello and Hirsch (2017) claim that health literacy together with patients' knowledge of the disease plays a significant role in whether the patient will adhere to the treatment regimen or not. Moosa et al (2019) also emphasise that healthcare managers ought to consider instigating programmes that will better patients' knowledge about the management of their diseases as part of the general initiatives within South Africa. These programmes are to improve the

management of chronic diseases including DM in the public sector (Moosa et al, 2019).

Patients also wanted to know how diabetic medications work. Morello and Hirsch (2017) again aver that knowing diabetes mellitus and how its treatment works can determine patients' adherence. Some patients were aware that for them to accomplish a complete adherence, they should adhere to the diabetes diet, and therefore would like to be taught about it. Asif (2014) in support of these results says that diet is an integral part of diabetes patient's management; therefore, the healthcare provider and the patient should understand the basic dietary needs of the patient. Ouyang (2017) also asserts that nurses should inspire patients to understand the importance of diet to aid in diabetes management, for a better quality of life.

Lastly, patients indicated that need information on their medication side effects. Saqib et al (2018) stress that knowledge about medication's possible side effects is important to the patients for early recognition and management.

5.4 CONCLUSION

This chapter has outlined the merged data and presented its discussion. Understanding medication instructions and diabetes as a whole, also its complications aid in the management. However, it is a problem for patients. The patients have made recommendations to be assisted in understanding the disease and its management. Therefore, chapter six discusses the conceptual framework, programme development, and its implementation.

CHAPTER 6

CONCEPTUAL FRAMEWORK, PROGRAMME DEVELOPMENT, AND IMPLEMENTATION

6.1 INTRODUCTION

This chapter focuses on the conceptual framework development and implementation of an educational programme, to enhance health literacy on prescribed medication instructions for diabetes mellitus patients on treatment. A conceptual framework was used to describe how the programme is developed and implemented on diabetes mellitus patients to enhance their health literacy, on prescribed medication instructions. The programme is developed based on findings and patients' recommendations in chapter five. The programme addresses diabetes as a whole because for the patients to adhere to medication instructions they need to understand their disease condition first.

6.2 CONCEPTUAL FRAMEWORK

The researcher used a conceptual framework to design the pathway for achieving the study purpose. The conceptual framework is the researcher's understanding of the connectivity between ideas under study (Regoniel, 2015). It is the researcher's 'mind map' in undertaking a study and it guides in fulfilling the study objectives (Regoniel, 2015). The researcher assembled all the concepts used in the programme development, implementation, and made illustrations on how they relate and connect.

6.2.1 Methodology

The study employed the Practice Oriented Theory survey list by Dickoff, James, and Wiedenbach (1968). Thus, to describe the conceptual framework for the development of the educational programme. The components of the survey list include; Agent, Recipient, Context, Procedure, Dynamics, and Terminus (Dickoff et al, 1968). Figure 6.1 illustrates the components of the survey list and the descriptions thereof.

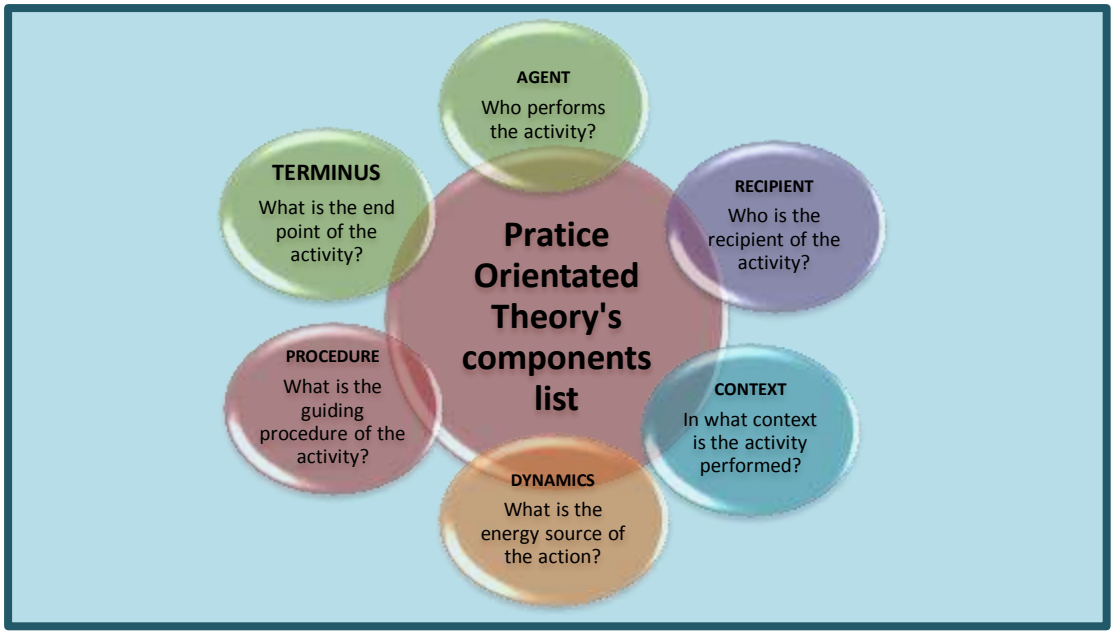


Figure 6.1: Components of the survey list adapted from Dickoff et al (1968)

The six questions reflected in Figure 6.1 guided the development of the programme and have been answered as follows:

1. Agent – Researcher/Facilitator/PHC PN (Primary Healthcare Professional Nurse)

The agent is the programme facilitator, who is the researcher in this study.

2. Recipient – Diabetes Mellitus Patients

The recipients are diabetes mellitus patients on the prescribed diabetes medication, whose education on interpreting DM medication instructions, and DM as a disease is meant for.

3. Context – Ga-Dikgale village Clinics

The programme will run at all the four Ga-Dikgale village clinics where needs analysis was conducted.

4. Dynamic – DMPs challenges and educational needs

The DMPs challenges with interpreting medication instructions and living with DM, and the suggested education during needs analysis.

5. Procedure – Educational Programme Development and Implementation

The procedure includes all the processes and steps followed in developing and implementing the programme.

6. Terminus – Developed and implemented programme and health literate DMPs

The endpoint of this programme is the developed and implemented programme and its impact on DMPs who attended it.

Figure 6.2 below illustrates the conceptual framework mind map of the educational programme.

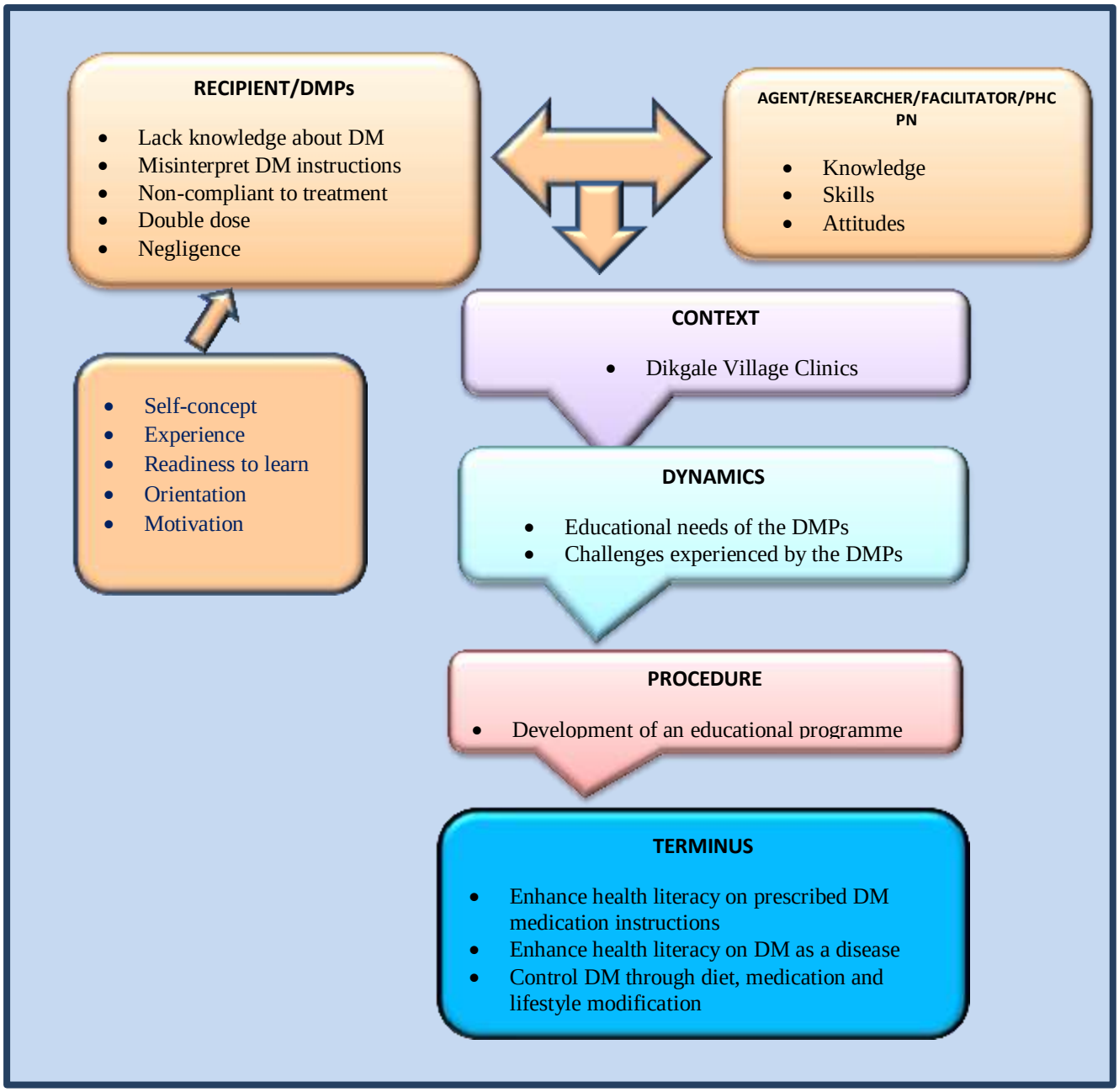


Figure 6.2: Conceptual framework for DMPs educational programme

The conceptual framework is broken into six parts for a clearer explanation as follows:

Agent

The agent is the first aspect of the survey list and is the major role player in performing the activity (Dickoff et al, 1968). The agent is the researcher in this study, plays the role of programme developer, and implementation (as a facilitator). However, once the programme is introduced, the agent would be the professional nurses at the clinics.The agent needs to have certain qualities (Figure 6.2.1) to be able to carry out the mentioned responsibilities which are outlined as follows:

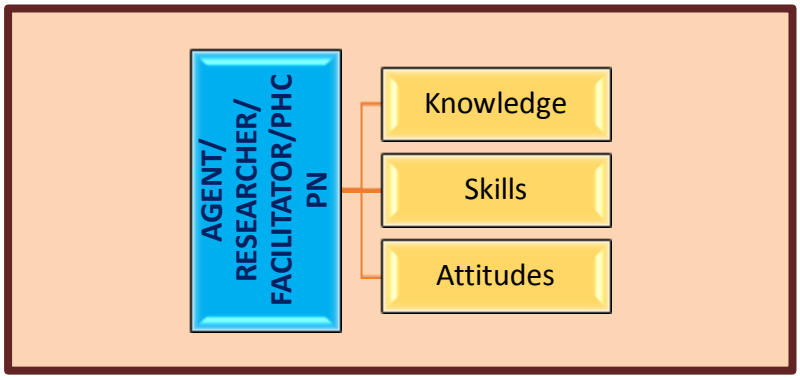


Figure 6.2.1: Qualities of the Agent

Knowledge

Knowledge refers to the evidence-based information and skills acquired through experience or education (Jain, 2020). Knowledge is concerned with the theoretical or practical understanding of a subject, and being competent in it (Jain, 2020; Tichnor-Wagner, Parkhouse, Glazier & Cain, 2019). Scuderi (2020) refers to a combination of facts and ideas that are acquired through study, research, investigation, observation, or experience. The agent as a researcher has scientific knowledge and skills used to acquire research data about the knowledge and practices of diabetes patients on interpreting prescribed medication instructions. The outcome of the research findings helped the agent as a facilitator, to identify educational needs or gaps among the DM patients. The DMPs outlined the educational needs and challenges regarding tracking their medication instructions and living with Diabetes mellitus.

The educational needs were as follows: 1. Assistance in following medication instructions and the importance thereof, 2. Development of self-management

strategies by nurses on improving the quality of life, 3. Health education includes all important aspects related to DM, 4. The treatment side effects, and 5. The misconception that was related to DM and its management. **The DMPs' challenges were recorded as follows:** 1. Difficulty living with DM co-existing with other body ailments. 2. Socio-economic status versus adherence to medication. 3. Lack of specific medication instruction provided by the nurses and medication packaging. and 4. Illiterate DMPs not catered for in medication instructions. Therefore, there was a need for educational programme development. The need analysis assisted the agent in the development of an educational programme that could enhance health literacy among diabetes mellitus patients.

The agent as a professional nurse and nurse educator had the appropriate knowledge about diabetes mellitus and its management. The knowledge assisted the agent to select proper content to include in the programme. The agent also had the facilitation knowledge necessary for planning, designing, and implementation of the programme. Having good background knowledge of the recipient assisted the agent in delivering the programme.

Skills

In addition to knowing, the agent should apply the knowledge in a practical situation (Tichnor-Wagner et al, 2019). Skills refer to the ability to apply knowledge to specific situations, and it is developed through practice (Boulet, 2015). Therefore, knowledge is theoretical whereas the skill is practical (Boulet, 2015). The agent possesses good interpersonal skills which assisted in building a proper interpersonal relationship with the recipients and the nursing staff at Ga-Dikgale village clinics. The agent's interpersonal skills enabled group cohesion since the agent used lay mans' language that was easy for recipients to understand. The following interpersonal skills were used: 1. The agent's confidence aided in delivering the lessons effectively. 2. The communication skills assisted effective communication with the DMPs using both verbal and non-verbal cues. 3. The use of good listening skills helped in answering the DMPs questions and providing clarity that was needed (Lee, 2018). The recipients, therefore, were able to participate effectively during programme implementation.

Attitudes

An attitude refers to a set of emotions, beliefs, and behaviours toward an object, person, thing, or event (Cherry, 2020). Attitudes are often the result of experience or upbringing and can have a greater influence on behaviour (Cherry, 2020). Therefore, the quality and degree of the programme achievement are determined primarily by the agent's (facilitator) competence, attitude, and motivation (Yevale, 2018). The agent portrayed a good relationship with the recipients and the nursing staff. Transparency (the agent explained to the recipients and the nursing staff how the programme is going to be implanted including the duration). Honesty (the objectives of the programme were highlighted and covered as promised and that no harm will be inflicted on the recipients). Dedication and commitment (the recipient conducted and completed the programme implementation as planned). The agent portrayed patience with the recipients when delivering the programme and was always respectful to them. The agent had to wait for those recipients who had to attend to other crucial matters during the course and therefore the researcher would give them 5 - 10 minutes breaks. The agent as a facilitator addressed the recipients as; mommy, granny, grandpa, etc. The recipients were free to make follow-ups and ask clarity seeking questions.

The agent, thus, was able to provide education and support to the DMPs using the knowledge, skills, and attitudes guided by the drawn programme. The DMPs were furnished with information regarding: What is Diabetes mellitus? Types of DM, Common symptoms, Disease process and complications, Diabetes mellitus treatment, Prevention, Diabetes danger signs, Interpretation of prescribed medication instructions, and Insulin injection sites. Diabetes and diabetes mellitus management taking advantage of the qualities above.

The recipient

The recipient is the person receiving the activity provided by the agent (Dickoff et al, 1968). The recipients of this study were diabetes mellitus patients, on treatment from Ga-Dikgale village clinics. The agent interacted with the recipient during the need analysis stage which the data collection period. The agent gathered information

about the recipients' knowledge and practices related to DM prescribed medication instructions interpretation. Figure 6.2.2. below illustrates the recipient of the programme in this study.

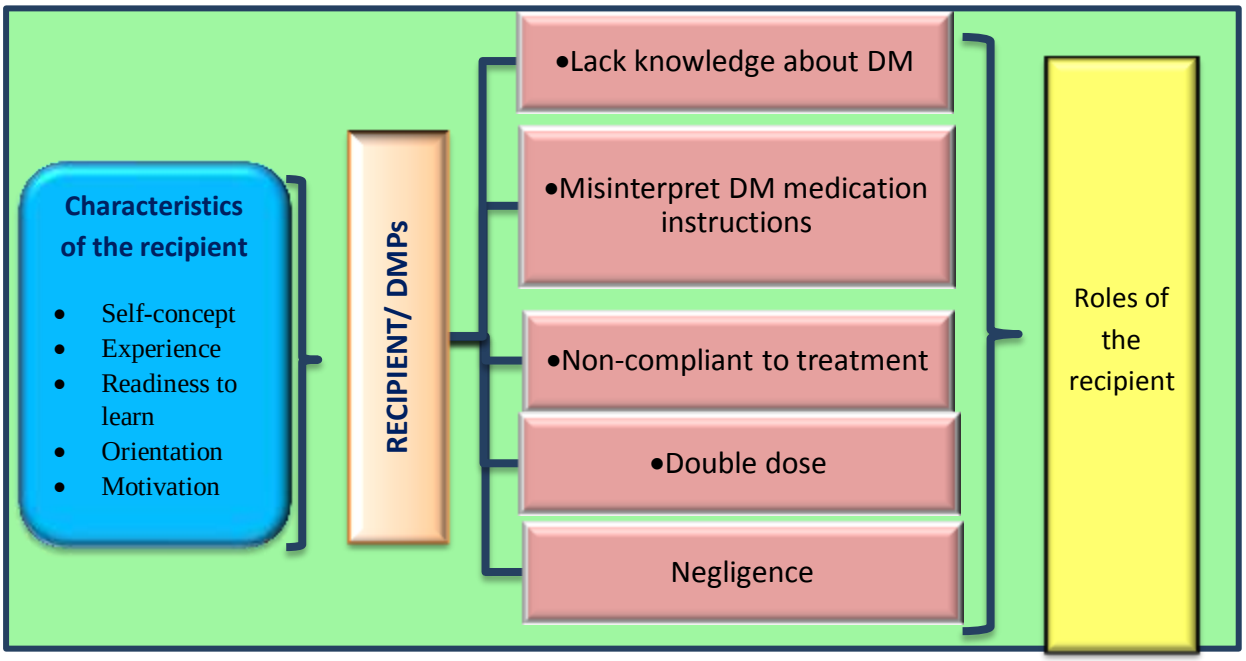


Figure 6.2.2: The attributes of the recipient

The need analysis

The following needs were identified during needs analysis and were classified according to Skills, Knowledge, Attitudes, and Values (SKAVs).

Skills

Managing diabetes requires that an individual should have certain skills to be able to control the disease. Lack of knowledge about DM and misinterpreting medication instructions were among those that were lacking skills in DMPs.

1. *Lack of knowledge about DM*

The study results have shown that the DMPs lack information about diabetes; they lack self-management strategies, its types, how is it managed, its complications, and minor ailments co-existing with DM. Thus, the lack of knowledge made the DMPs to manage their diabetes poorly and experience complications.

2. *Misinterpret DM medication instructions*

The study results showed that the DMPs do not understand their prescribed medication instructions. They (DMPs), therefore, indicated that they need assistance with the interpretation on the medication instructions

Knowledge

Knowledge about diabetes mellitus is crucial to diabetes mellitus patients. However, that is lacking among most of the DMPs.

Double medication dose

The DMPs in this study reported doubling their medication dose, when a dose was skipped. This showed a lack of information about diabetes medication and diabetes as a whole. Hence, it is critical that the development of the educational programme.

Value

How people value diabetes disease determines how they respond to their treatment.

Non-compliant to treatment

Most of the DMPs were non-compliant to treatment due to different reasons outlined in chapter four of this study. Misconception and interpretation of the prescribed medication instructions by the DMPs made them non-compliant to medication and treatment. Delaying eating, taking medication late, and eating large potions were among some of the habits displayed by the DMPs. Non-compliance let the DMPs to experience some of the danger signs of DM.

Attitude

The DMPs' attitude towards diabetes and its management plays a major role in controlling the disease. A negative attitude has been found among some of the DMPs as follows:

Negligence

Lack of knowledge about DM and non-compliance were also coupled with negligence of the DMPs. The DMPs reported that they would go partying and drink a lot of alcohol and that made them forget to take their prescribed medication. The same DMPs experienced diabetes complications.

Therefore, a need analysis guided the agent in compiling the content for this programme.

Roles of the recipient

The recipients played a major role during the need assessment by participating in interviews. The recipients answered the semi-structured questions which assisted in identifying the programme needs. The role of the recipient during the data collection period was to provide information on how they are living with diabetes and how they are taking their diabetes medication as instructed by the health professionals who prescribed and issued the medications. The results of the need analysis were lack of knowledge about DM, misinterpretation of DM medication instruction, non-compliance, double dosage, and negligence. This necessitated the agent to develop an educational programme to address the said results.

The characteristics of the recipient

The recipient is expected to portray certain attributes which enable him or her to learn. Knowles Adult Learning Theory is used as a basis for the development of the programme, considering its benefits to the recipients. The theory has been discussed fully in chapter two of this study. The five assumptions (namely; Self-concept, Adult learner experience, Readiness to learn, Orientation to learn, and Motivation to learn) underpinning this theory served as a guide when developing the programme (Pappas, 2014). The recipients had to have these qualities which assisted them in retaining knowledge.

Five assumptions underpin Knowles' adult learning theory

i. Self-concept

The DMPs' as adult learners have to understand the reason why they have to learn. The DMPs were aware that they were the major role player in controlling their disease and preserving their lives. That awareness, therefore, made them apprehend that they need education about DM and how to manage it. The agent was able to facilitate the programme with easier ones since the recipients knew they were diabetic and lacked more information about DM.

ii. Adult learner experience

The DMPs had personal experiences that assisted them in learning (Anderson-Meger, 2016; Pappas, 2014). Most of the DMPs have experienced the consequences of not following the prescribed medication instructions. They (DMPs)

have indicated that their condition is not getting better and therefore needed to know the reason for that. The agent, therefore, was constructing upon those experiences as a positive influence; to encourage the DMPs to learn the correct way of taking medication. The correct way of taking medication includes adhering to the medication frequency and lifestyle modification for people living with DM disease.

iii. Readiness to learn

Adult learners do not study in a void. Learning has to have a direct and practical application in their lives (Anderson-Meger, 2016; Pappas, 2014). During need analysis, the study has identified that DMPs lack information about DM and its management, including the proper way of taking medication. The DMPs also suggested that they are taught about these needs. Therefore, the DMPs were ready to be taught about their challenges. The DMPs came earlier than the appointed time, some having notes pads to take notes.

iv. Orientation to learning

The DMPs as adult learners needed to learn information that could be applied to their situation as their learning is problem-centred (Knowles, Holton III & Swanson, 2014). The suggestions made by the DMPs were education about diabetes as a disease, its management, complications, types, and how to take medication. The programme developed was centred around enhancing health literacy based on the needs of these DMPs.

v. Motivation to learn

The DMPs were internally motivated because they were directly affected, as they indicated that they need assistance with managing the disease during needs analysis (Knowles et al, 2014). The challenges faced by these DMPs such as; difficulty living with DM, socio-economic status versus adherence to treatment, lack of specific medication instructions provided by the professional nurse, and medication packaging moved them to be eager to learn. Thus, the facilitation of the programme became smooth.

The context

The context refers to the location where the activity is taking place (Dickoff et al, 1968). The context of this was Ga-Dikgale village clinics in the Capricorn District of

Limpopo Province, South Africa. This is where the data were collected among DMPs who were on treatment. Figure 6.2.3 below presents the context of the educational programme and its framework.

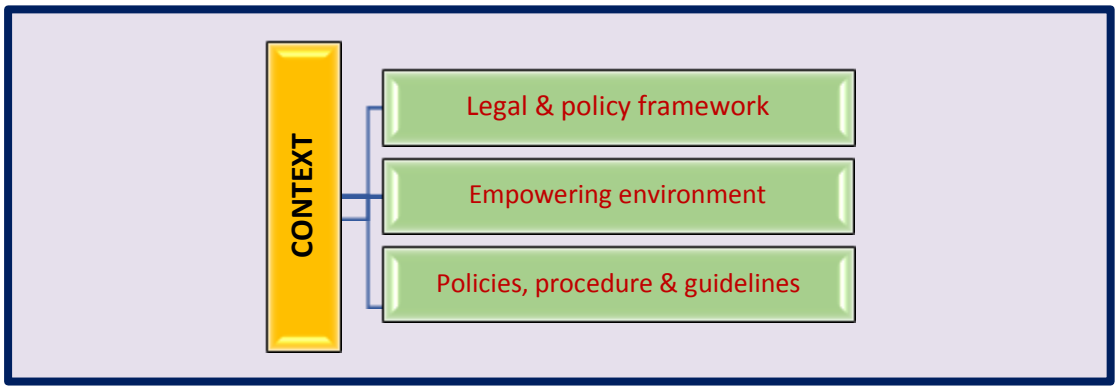


Figure 6.2.3: The context of the educational programme

Legal and policy framework
The agent made the recipients aware of the following:

The Bill of rights Chapter 2 of the constitution of the Republic of South Africa.
According to the Constitution of the Republic of South Africa Chapter 2: Bill of Rights, Section 27, subsection (1); everyone has the right to have access to (a) health care services, including reproductive health care. (2) The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights. For this study, this right implies that the DMPs have the right to access health care services which include health education regarding their disease and its management. This right further implies that the government should take responsibility for achieving this right and conducting needs analysis, programme development, and implementation by Health professionals is one of the means for fulfilling this right.

Batho Pele Principles:

1. Consultation – the agent interacted with the DMPs during the interviews and listened to their needs and challenges. This consultation aimed to reach out to the DMPs and find out about their needs (DoH, 2020). These needs analysis assisted in the development of an educational programme which addresses the needs identified.

2. Access – the agent made sure that the DMPs access the services entitled to them in the form of identifying their needs, developed and implemented a programme which addressed those needs (DoH, 2020).
3. Information – the agent made the recipient aware that they have the right to information about their conditions (DoH, 2020). The agent, therefore, provided a better explanation of the DM disease, its management and treatment, and the interpretation of prescribed medication instructions.

SANC Regulation, No. R2598 amended by No. R260

According to SANC Regulation No. R2598 amended by No. R260 section 2 a professional nurse shall:

(a) Execute a programme of treatment or medication prescribed by a registered person for a patient. The agent as a professional nurse, nurse educator and researcher developed an educational programme to assist DMPs patients to take their prescribed medication correctly. The agent further implemented the programme in the form of a workshop to make sure that the prescribed medication is taken as expected by the DMPs.
(b) Diagnose a health need and prescribe, provide and execute a nursing regiment to meet the need of a patient or group of patients or, where necessary, by referral to a registered person. The agent conducted needs analysis through interviews and gave the recipients education based on those needs.

Providing this information to the recipients encouraged a trusting relationship between them and the agent.

Empowering environment

The healthcare facilities are regulated by the DoH Limpopo at the provincial and district levels. The provincial health executive gets power from the National Health Promotional Policy in promoting the health of the people in Limpopo Province. The National Health Policy has key strategies for health promotion interventions (DoH, 2015). 1. Informal education and communication strategy, that include; identifying information education, communication needs, conducting education dissemination on how to use materials and tools (DoH, 2015). 2. Community mobilisation which

includes; establishing and maintaining health promotion, community-based support groups like diabetes support groups, physical activity support groups (DoH, 2015).

The agent, therefore, provided proof of approval to conduct the study at the healthcare facilities with the recipients. This assured the recipients to be free in participating in the programme development. Developing and implementing the educational programme was part of the fulfilment of the National Health Promotional Policy to improve the lives of the DMPs.

Policies, procedure, and guidelines

The agent made the recipients aware of the policies, procedures, and guidelines available at the PHC level for managing DM. These policies, procedures, and guidelines formed part of the programme development and implementation.

1. Policies

The DMPs were briefed about the National Programme for Control and Management of Diabetes Type 2 at Primary level policy. The policy emphasises instituting the following: (1) Teaching of Survival skills which includes diabetes education about self-monitoring, recognition of hyperglycaemia, symptoms, and prevention of hypoglycaemia. (2) Health promotion includes a good diet, physical activity, awareness of complications, and self-pollution, e.g., smoking and alcohol drinking. (3) Counselling about disease acceptance/lifelong therapy, the value of compliance, and the reassurance of continuity of care. (4) Knowledge and management that includes diagnosing DM, recognition of symptoms, glycaemia targets, what to do in response to abnormal blood glucose (DoH, 1998).

The National Programme for Control and Management of Diabetes Type 2 at Primary level policy and the following procedures and guidelines cover all the information needed to be addressed in the programme as per DMPs the needs.

2. Procedures and Guidelines

The following protocols and guidelines were communicated to the recipients:

2.1 Diabetic Footcare Guideline for Primary Healthcare Professionals – provides information on how DMPs foot should be cared for.

2.2 Management of Type 2 Diabetes Mellitus 2017 – explain step – by – step management of T2D.

2.3 Diabetic Keto-Acidosis protocol (DKA) – outlines management of DKA.

2.4 Protocol for the use of Oral Hypoglycaemic Agents in Type 1 and Type 2 Diabetes – provides information on the different oral hypoglycaemic agents and how they should be used.

Dynamics

The dynamics are the motivating factors for an activity to take place (Dickoff et al, 1968). The results of the study served as motivating factors for the development of an educational programme, to enhance health literacy on prescribed medication instructions. The educational needs outlined by the DMPs and the challenges are the driving forces for the programme need. Figure 6.2.4 presents the dynamics of educational programme development.

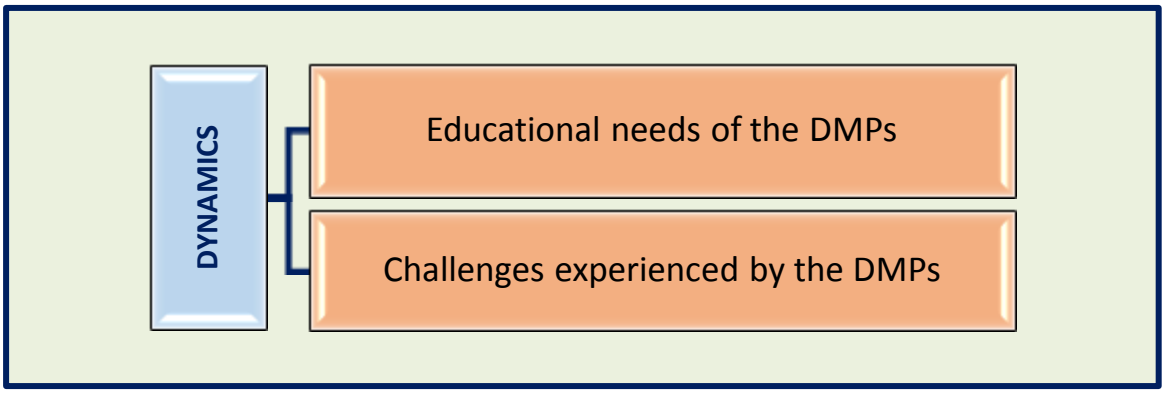


Figure 6.2.4: The dynamics of the educational programme

Educational needs of the DMPs

The DMPs indicated that they need education on DM diabetes as a disease, types of DM, and its management including interpretation of medication instructions. The programme was developed in such a way that it covers the educational needs of the DMPs and other related aspects that the researcher picked up during the interview session which includes comorbidities and body ailments co-existing with diabetes. The following topics were covered in the programme; what is diabetes mellitus? Types of DM, causes/ risk factors, clinical manifestations, preventions of DM, management, and treatment including diet, lifestyle modification, medication, explanation of medication instructions, and complications. For the programme to be efficient, it had to address the needs of the DMPs.

Challenges experienced by the DMPs

The DMPs outlined the challenges they faced concerning living with DM and its management. The challenges faced by these DMPs are enormous and needed health professional intervention. DMPs are expected to manage and control their disease. However, it is difficult for them as they do not understand the DM, its process, complications, and management. The DMPs are therefore negligent, taking medication twice if they missed a dose, and experience complications. The medication instructions were also reported as being a problem. The DMPs indicated that the instructions on the medication packaging and leaflets were not clear as compared to how they should take them. Document analysis was conducted to check if the instructional information on those documents including the doctor's prescriptions were easy for patients to comprehend. The documents were not as clear as they should for patients to follow. They (documents) showed the following: 1. Poor explanation of time-frequency, 2. No time interval, 3. Time not specified, 4. No clear depiction of how to carry instructions, and 5. Symbols on the packaging needed further explanation. Therefore, the challenges encountered by the DMPs documented in this study stirred the agent to develop the educational programme.

The Procedure

The procedure is the guiding protocol for the activity (Dickoff et al, 1968). This is the step by step guide for achieving the goal of the programme. The procedure followed the Basic Program Development Model (BPDM) to develop the educational programme (Franz, Garst & Gagnon, 2015; Dewald, 2018). The BPDM described the construction of the following: learning outcomes, subject content, assessment and teaching strategies, resource materials, and the trainer. Contextual Learning (CL) approach helped the DMPs to retain the content, and connecting the content learned with real-life situations that they experience (Davtyan, 2014).

The content learned included the information needed to be reflected by the themes of the study. The content covered the following: (1) Basic DM information, (2) DM treatment (3) Interpretation of DM medication instructions (Figure 6.2.5).

Figure 6.2.5 below illustrates the procedure to follow in developing the educational programme.

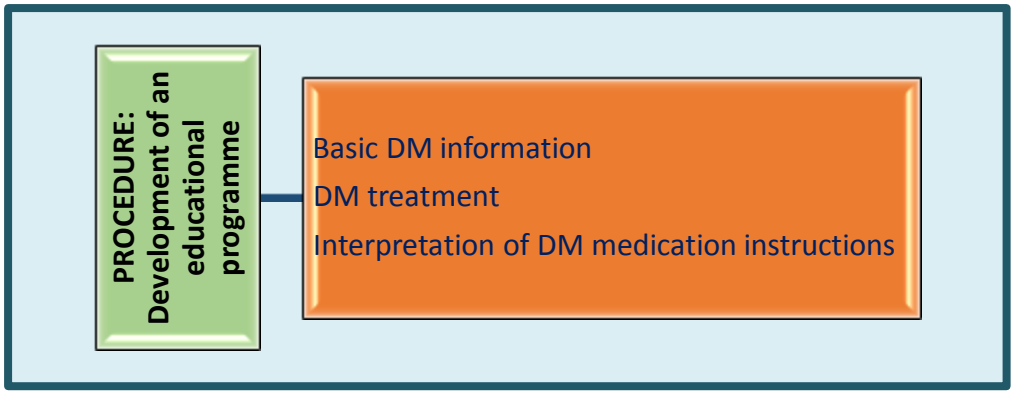


Figure 6.2.5: The procedure of the educational programme

The procedure for the educational programme.

The procedure for developing the educational programme was guided by the results of the situational analysis in Phase 1 of the study. The agent followed the BPDM concepts in developing the programme. The aim was to cover the content suggested by the DPMs relating to DM and its management. A workshop was planned based on the learning outcomes and goals of the programme to be met. The specific learning outcomes were as follows, 1. Explain diabetes mellitus and its types (SLO1), 2. Identify the common symptoms and comorbidities and body ailments co-existing with diabetes (SLO2). 3. Outline the risk factor/or causes (SLO3). 4. Describe the disease process and complications (SLO4). 5. Discuss Diabetes Mellitus Treatment and Management (SLO5), and explain the prescribed medication instructions (SLO6).

The agent used different instructional methods (andragogy) that were best for enhancing learning among the DMPs and retain the information. The agent facilitated the programme using the inherent qualities as a professional nurse (caring attitude), nurse educator (a good listener and observer), and a researcher (investigator and analyser).

The Terminus

The terminus is the endpoint of an activity (Dickoff et al, 1968). This is the anticipated outcome of the agent for a planned procedure. The terminus is a report of whether the implemented procedure's goals have been met or not. For this study, the terminus is the developed and implemented programme and the health literacy gained by the DMPs who attended the programme. The DMPs indicated that they

need to be capacitated on the DM disease and its management, including interpretation of medication instructions. Therefore, the educational programme aimed to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics, in Limpopo Province. Figure 6.2.6 below presents the terminus of the educational programme.

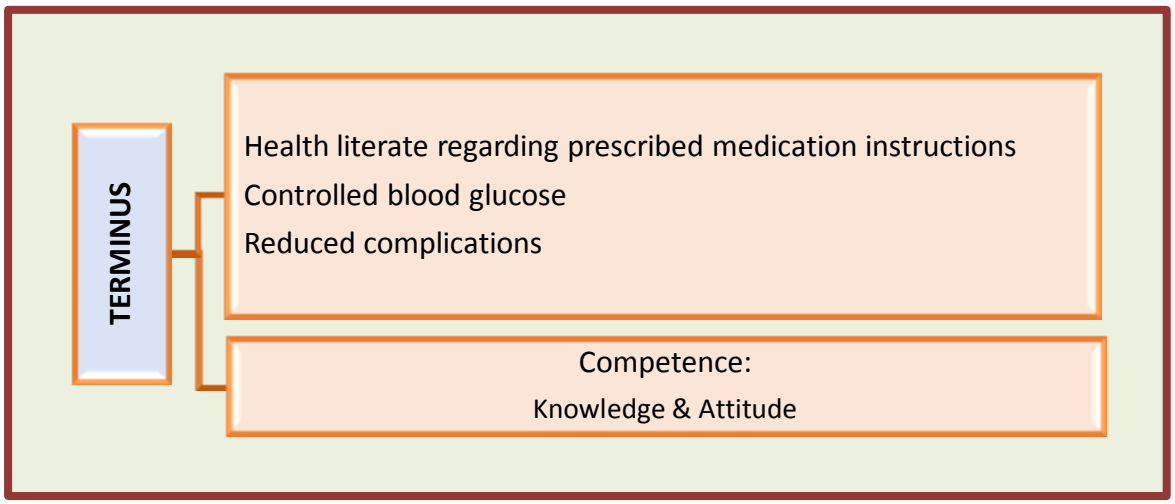


Figure 6.2.6: The terminus of the educational programme

The terminus of the educational programme

The terminus of this programme is the competent DMPs who know about their disease and its management. The programme empowered the DMPs and encouraged them to have a positive attitude towards the diseases for proper management and treatment compliance. Competent means the DMPs being health literate, will interpret medication instructions correctly and implement, will maintain blood glucose within the normal range, and reduce complications by complying with the treatment regimen and lifestyle modification.

6.3 PROGRAMME DEVELOPMENT

This programme is a non-credit short course for diabetes patients to enhance their health literacy on prescribed medication instructions. The purpose of this programme is to provide educational support to diabetes mellitus patients and enhance their health literacy on prescribed medication instructions.

6.3.1 Methodology

A Basic Program Development Model (BPDM) was used to develop the educational programme (Franz, Garst & Gagnon, 2015; Dewald, 2018). The BPDM has four

main components that are, Planning, Design, Implementation, and Evaluation/Measure (Franz, Garst & Gagnon, 2015; Dewald, 2018). The programme development was also informed by the South African Qualifications Authority (SAQA). Figure 6.3 below presents the schematic presentation of the Basic Program Development Model.

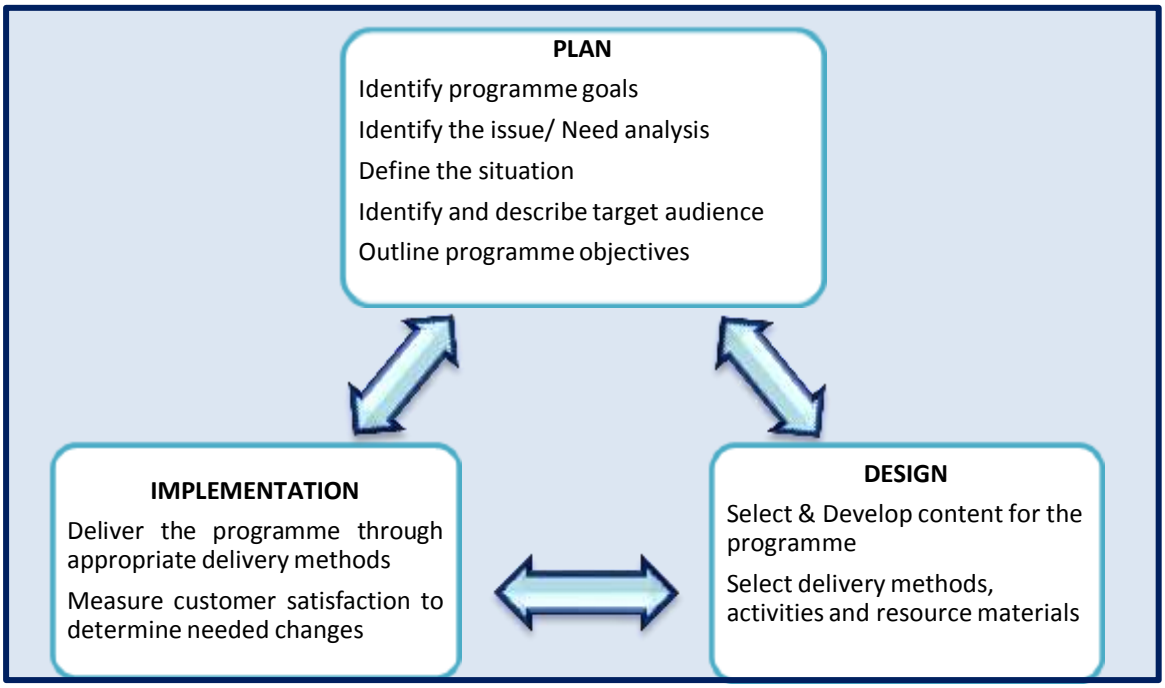


Figure 6.3: Schematic presentation pf the BPDM. (Adopted from: [Franz, Garst & Gagnon, 2015; Dewald, 2018])

Plan

The first step of the BPDM is Plan or planning which was covered in Phase 1. The results (need analysis) of phase 1 in chapter four and five, guided the design and development of the educational programme in Phase 2. The programme goal was identified as the 'Development and implementation of an educational programme to enhance health literacy on diabetes mellitus and its management. The situation was defined in chapter five of the study, under the discussion of the findings. The target audience is the DMPs and the programme objectives are outlined in the programme.

The second step is Design (Phase 2). The third stage is Implementation which is covered in Phase 3. Phase 2 and 3 were covered in this chapter.

Design

The design stage includes the selection and development of the content, delivery mode, activities, and resource materials. The content for the programme is outlined in appendix six attached to the appendices of the study. The activities are outlined in the programme below. The resource materials include the use of pamphlets as handouts to the patients and a poster to enhance learning.

A poster

It is a tool that enables visualisation in the classroom to promote learning (Manarin, 2016). The poster was used during the implementation period for the benefits listed below. See appendix seven.

The benefit of using a poster is that it promotes learning as follows:

1. It affords learners a chance on visual learning with a lecture (Manarin, 2016).
2. It encourages and inspires learners to learn,
3. It stimulates learners' interest in the topic under study,
4. It illustrates a concept effectively since it uses a combination of text and images, with different styles,
5. It guides the teacher on how to use the poster since it is designed as a flow-chart,
6. It gives directions for hands-on instructions, and
7. Provides suggestions for additional instructional activities (Osa & Musser, 2004).

A pamphlet

A pamphlet is described as a small leaflet or booklet containing information on a single subject (Wiley, 2019). The facilitator used pamphlets (Appendices 6) as take-home packages for the attendees to serve as a reminder and referral document in managing DM. The pamphlets were further translated into the patients' vernacular being Sepedi. The benefits of the pamphlets are outlined below as follows:

1. A pamphlet provides less information and is more focused – limited to a single topic,
2. It informs readers of a specific subject effectively,

3. Pamphlets are mostly used to spread awareness than selling to the reader directly (Wiley, 2019).
4. Pamphlets inform and educate the patients by transferring proper scientific knowledge into lay terms,
5. They assist patients to find solutions to their problems, to cope and modify health-related risks and behaviours, to conform to recommendations of health care professionals (Kanj, 2008).

The programme

Programme Title

A CONTEXT-SPECIFIC COURSE TO ENHANCE HEALTH LITERACY ON PRESCRIBED MEDICATION INSTRUCTIONS AMONG DIABETES MELLITUS PATIENTS ON TREATMENT AT GA-DIKGALE VILLAGE CLINICS.

A. COURSE COMPONENT

This course has specific outcomes which cover the aspects that DMPs should achieve, to enhance their health literacy regarding diabetes and its management at Ga-Dikgale village clinics. The course entails six study units covering the definition of diabetes mellitus, types of diabetes, causes/or risk factors, clinical manifestations, prevention, treatment and management, complications, comorbidities, body ailments co-existing with DM, and interpretation of medication instructions. Participants will be asked questions related to the content studied to evaluate the outcomes.

Course: A Context-Specific Course to Enhance Health Literacy on Prescribed Medication Instructions Among Diabetes Mellitus Patients on Treatment at Ga-Dikgale village Clinics.	**Contact hours:** 08 **No credits**
Contact sessions for the course	**Venue:** Ga-Dikgale village clinics
7. Sessions	Each session will last for one day and will include interactive facilitation.
Pre-requisites Learning assumed to be in place	The pre-requisite for this course: 7. Basic knowledge about diabetes 8. Healthy eating
Co-requisites Units of learning to contribute during the course	The co-requisite for this course: 9. Basic literacy skills 10. Communicate in Sepedi or English 11. DMP on treatment
Course facilitator	Ngoatle Charity (PhD student)
Teaching strategies	Lecturer and discussions
Assessment strategies	**During the course:** Learners will be asked questions related to the content discussed. **At the end of the course:** Learners will be asked questions related to all content learned.
Resource materials	**Resource materials include:** • A poster • Pamphlets

Purpose of the course	The purpose of this course is to capacitate diabetes mellitus patients with knowledge about diabetes and its treatment and management, including interpretation of the prescribed medication instructions to enhance their health literacy.

Critical cross-field outcomes

Learners will be able to:

a) Explain diabetes in their own words
b) Identify and solve complications manifestations on diabetes mellitus
c) Organise and manage themselves to achieve course objectives
d) Communicate effectively during the course
e) Collaborate effectively during the course
f) Gather and assess information about DM

Course outline: Upon completion of this course, the DMPs should be able to achieve the following Specific Learning Outcomes (SLO1 to 6):

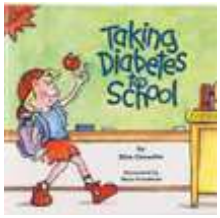
1. Explain diabetes mellitus and its types (SLO1).
2. Identify the common symptoms and comorbidities and body ailments co-existing with diabetes (SLO2).
3. Outline the risk factor/or causes (SLO3).
4. Describe the disease process and complications (SLO4).
5. Discuss Diabetes Mellitus Treatment and Management (SLO5).
6. Explain the prescribed medication instructions (SLO6).

SPECIFIC LEARNING OUTCOME 1: Explain diabetes mellitus and its types	1.1 Lear

ning outcomes

At the end of this session, the participant should be able to:

- Explain diabetes mellitus in their own words; and
- Explain the two types of diabetes mellitus.



FACILITATION BY THE FACILITATOR

SPECIFIC LEARNING OUTCOME 2:	Identify the common symptoms and comorbidities or body ailments co-existing with diabetes

2.1 Learning outcomes

At the end of this session, the participant should be able to:

- Outline the common symptoms of DM;
- State the comorbidities co-existing with diabetes; and
- Identify the body ailments co-existing with diabetes.

FACILITATION BY THE FACILITATOR

SPECIFIC LEARNING OUTCOME 3: Outline the risk factor/or causes

3.1 Learning outcomes

At the end of this session, the participant should be able to:

- Identify the causes/risk factors for developing DM;

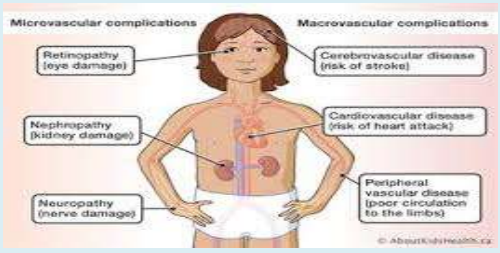
FACILITATION BY THE FACILITATOR

SPECIFIC LEARNING OUTCOME 4: Describe the disease process and complications

4.1 Learning outcomes

At the end of this session, the participant should be able to:

- Describe the DM disease process; and
- Outline the complications of DM.



FACILITATION BY THE FACILITATOR

SPECIFIC LEARNING OUTCOME 5: Discuss Diabetes Mellitus Treatment and Management

5.1 Learning outcomes

At the end of this session, the participant should be able to:

- Explain the types of diabetes medications;
- Describe the Lifestyle modification for DM patients;
- Explain the diabetic diet; and
- Explain the benefits of exercise suitable for DM patients.

ACTIVITY 5.1 – Role Play

Three sets of two participants each will demonstrate how to give health advice to a newly diagnosed DM patient about the following:

- ✓ 2 for Lifestyle modification
- ✓ 2 for Diabetic diet
- ✓ 2 for Benefits of exercise suitable for DM

One participant must be a nurse while the other, a patient. The rest of the participants will be the judge for the role play

FACILITATION BY THE FACILITATOR

SPECIFIC LEARNING OUTCOME 6: Explain the prescribed medication instructions

6.1 Learning outcomes

At the end of this session, the participant should be able to:

- Explain prescribed medication instructions.

ACTIVITY 6.1: Brainstorming

Participants will be divided into five groups to discuss medications instructions interpretation as follows:

Group 1 = take 2 tablets once a day

Group 2 = take 1 tablet at night

Group 3 = take 1 tablet 2 times a day

Group 4 = take 2 tablets 3 times a day

Group 5 = take 1 tablet 4 times a day

Each group will select one person from the group to present the group findings.

FACILITATION BY THE FACILITATOR

6.4 PROGRAMME IMPLEMENTATION

The original plan for implementing the programme was to conduct an eight (08) hour workshop in all the four clinics at Ga-Dikgale villages where data were collected. However, given the COVID-19 pandemic national regulation the plan was adjusted to suit the situation. The researcher as a facilitator, therefore, made arrangements with the DMPs for phone teaching. All the four clinics were represented and the total number of DMPs who consented for participation were a total of 14. The education sessions were voice recorded to serve as proof for implementation. **Table 6.1** shows the characteristics of the participants.

Table 6.1: Characteristics of DMPs participated in the programme

Name of Clinic	Gender		Total
	Male	Female	
1. Makotopong	0	04	**04**
2. Sebayeng	01	03	**04**
3. Seobi-Dikgale	01	02	**03**
4. Dikgale	0	03	**03**
Total	**02**	**12**	**14**

Table 6.1: Characteristics of DMPs

Table 6.1 presents the characteristics of the DMPs who participated in the programme implementation. Fourteen (14) DMPs comprising of two males and 12 females participated in the phone teaching sessions. The table also shows the distribution of the DMPs per clinic. The study was mostly dominated by female participants.

6.4.1 Methodology

The agent as a facilitator followed Gagne's Nine Levels of learning or instructional events (Gagne, 1985). The instructional events assisted the DMPs to learn smoothly and retain information. The facilitator was able to identify the learning problem where participants were not following. Nine instructional events were used as follows:

1. Gain attention (Reception) – the facilitator briefed the DMPs about the need for the teaching at the beginning of the session to gain their attention and cooperation.
2. Identify objectives (Expectancy) the objectives of the session were outlined at the beginning of the session and the DMPs were also reminded about them during the lessons.
3. Recall prior learning (Retrieval) – the DMPs were asked to share what they know about the topic under study to minimise lack of interest.
4. Present stimulus (Selective perception) – the facilitator provided information based on individual needs.
5. Guide learning (Semantic encoding) – the DMPs were asked to share personal information related to the topic under study.
6. Elicit performance (Responding) – the facilitator allowed the DMPs to demonstrate the information learned and were ready to move to the next topic.
7. Provide feedback (Reinforcement) – the facilitator always gave the DMPs feedback about how they were answering.
8. Assess performance (Retrieval) – the DMPs were continually assessed through being asked to repeat what was said.
9. Enhance retention/transfer (Generalisation) - the facilitator used a summary of important facts to assist DMPs in retaining the information.

6.4.2 The process

The facilitator explained the plan for the implementation of the programme with the clinic managers telephonically to obtain permission to conduct the teachings. The facilitator obtained verbal permission from the clinic managers, they also provided the list of DMPs and their contact details. The DMPs were firstly contacted telephonically to make arrangements for the facilitation and they were also briefed about the proceedings of the educational programme.

6.4.3 Delivering the programme

The facilitator provided the teaching telephonically based on individual needs. The teachings were more of a question and answer mode. The DMPs were asked to share what they know about the topic of discussion and the facilitator would add and

or provide clarity. The programme was delivered in the language of preference of the DMPs. The sessions lasted from 35 minutes 09 seconds to 01hour 20 minutes. The DMPs were allowed to ask questions during the session when they did not understand and also at the end. The DMPs were also asked to give the facilitator feedback about the session and how they feel.

6.4.4 Evaluation of the educational programme

The evaluation of the educational programme was incorporated at the end of each session with the DMPs. Each DMP was asked to share their feelings after being taught. The DMPs were also asked to rate the facilitator's performance in their teaching.

The **Kirkpatrick Evaluation Model** was used to evaluate each teaching session with the DMPs (Kirkpatrick, Kirkpatrick & Kirkpatrick, 2013). The model defines the four levels of evaluation as follows:

(a) Level 1 – Reaction

This level measures the degree to which the DMPs' teaching sessions experience was satisfactory (Kirkpatrick, Kirkpatrick & Kirkpatrick, 2013). The facilitator as an agent asked the DMPs to share how they felt about the whole teaching session.

The DMPs' reaction was positive and felt that the teaching was relevant. **Participant 14** responded thus: *"I have gained a lot of information about the things I was not aware of. Especially, on the issue of medication instructions because we [were] just consume them. As long as it is morning and we have taken the pill, we just happy that in the morning we consumed and [in] the evening [we do] the same. But the way you explained it shows indeed that we should read the instructions with understanding".* **When asked to rate the session out of 10 participant number 14 said that** *"Ijo ijo ijo, I have learned so much. [am I] allowed to give you 10? You have taught me a lot of things. [Researcher]* The facilitator said that you can give any number. *Okay, let me give you nine (09)".*

Participant 13 also said, *"I am educated; I have learned a lot of things which I was not aware of. Now I can excel in taking care of this diabetes disease……I am feeling so happy and excited to know about my condition".* **When asked to rate the session out of 10 participants 13 said that** *"I would rate you 09/10 because everything you were saying to me, I was able to grab it. I was understanding like you were not teaching me a lot of information. You were giving me time in-between and asking me if I had questions. Like you were giving me time to absorb the information you were teaching like when you were moving from one topic to another you were giving me time to rest and I was understanding. Again, you were giving me questions to see if I was understanding, so I could say you did your best".*

(b) Level 2 – Learning

Level 2 measures the degree to which the DMPs attained the desired knowledge, skills, and attitudes as a result of the teaching (Kirkpatrick, Kirkpatrick & Kirkpatrick, 2013). It determines whether the teaching objectives were achieved. The teaching objectives were met and were recorded in **Participant 13 saying that:** *"Now I know that there are two types of diabetes, I feel enriched with the information that you have given me".* **Participant 09 also indicated,** *"We thank you for the information, maybe the reason the blood sugar was always elevated is [that] we were not taking the medication at the correct time. I am so happy; a lot of things will change".* **Participant 12 also added by saying**, *"Now there is much information that I did not know about this diabetes, even the types I did not understand them, to be honest. [However], now I know that there are two types, I know how I should take my pills. I do not just say I took them, but I should consume them at the right time so that I could live better".*

(c) Level 3 – Behaviour

It measures the degree to which DMPs' behaviours change as a result of the education provided (Kirkpatrick, Kirkpatrick & Kirkpatrick, 2013). It implies that the DMPs apply the knowledge and skills learned from the teaching session

to their lives. The DMPs in this programme were determined to change their way of living with diabetes. **This is evident in participant 06 saying,** *"Now I feel ready to face this disease. Things are going to change; those that are fixable we going to fix".* **Participant 08 also said,** *"We happy, we will also go to the clinic to collect those pamphlets you talked about so that we can read and learn more".*

(d) Level 4 – Results

Level 4 pursues to ascertain the concrete outcomes of the teaching session such as improving the quality of life, controlled blood glucose, and reduction on diabetes complications (Kirkpatrick, Kirkpatrick & Kirkpatrick, 2013). The tangible outcome of the programme implementation could not be determined at this stage, because the participants had to be given time to put the knowledge and skills gained into practice.

6.5 CONCLUSION

This chapter outlined the structure and development of the educational programme for diabetes patients. This chapter has also shown success in attaining the main aim of the study, which was to develop and implement an educational programme. The programme implementation evaluation results provided positive feedback for conducting the whole study.

CHAPTER 7

SUMMARY, LIMITATIONS, AND RECOMMENDATIONS OF THE STUDY

7.1 INTRODUCTION

This chapter presents a summary, limitations, and recommendations of the study. The study background and its intended purpose are encapsulated in this chapter. Additionally, the limitations of the study outline the challenges faced by the researcher when conducting the study. Lastly, the recommendations were tabled based on the findings.

7.2 SUMMARY

The summary outlines the order of events followed in this research from the beginning to the end. The events are outlined thus:

7.2.1 Purpose of the study

The major purpose of the study was to develop and implement an educational programme, to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment, at Ga-Dikgale village clinics in Capricorn District, Limpopo Province. This purpose was attained primarily through exploring, describing the knowledge and practices of diabetes mellitus patients on treatment. Thus, also describing provided information regarding prescribed medication usage contained in diabetes mellitus medication, packaging, medicine leaflets, and prescriptions using a mixed method research approach.

The researcher used a convergent parallel design where one-to-one semi-structured interviews were conducted to collect qualitative data and a self-administered questionnaire was used to collect quantitative data. A conceptual framework together with the educational programme was developed based on the merged findings of the study. The programme was implemented and evaluated successfully.

7.2.2 Completion of the phases of the study

The researcher has successfully carried out all the phases of the study. Phase one of this study was the situational analysis to explore the knowledge and practices of

diabetes mellitus patients on treatment. Describe provided information regarding prescribed medication usage contained in the diabetes mellitus medication packaging, medicine leaflets, and prescriptions. Describe the effects of poor health literacy on prescribed medication instructions among diabetes mellitus patients on treatment.

The researcher used one to one semi-structured interviews with an interview guide, checklist rubric, and self-administered questionnaires to collect data from Mellitus patients on treatment, at Ga-Dikgale village clinics in Capricorn District, Limpopo Province. The researcher used a voice recorder to capture all the information provided in the interviews. Field notes were also taken to capture non-verbal cues.
The recorded information was transcribed verbatim, translated into the English language, and analysed using Tesch's' open coding method for qualitative data analysis where five themes and sub-themes were developed and presented narratively with supporting literature. SPSS version 25 was used for quantitative data analysis.

Trustworthiness was ensured through credibility, conformability, dependability, and transferability and they were also discussed in chapter three. The findings of the study have revealed that diabetes patients lack information about the disease, its management, interpretation of medication instructions, and medication instruction documents are not clear.

The conceptual framework for the development and implementation of the educational programme was developed during phase two. The development of the educational programme then followed in phase three. Lastly, phase four wrapped up the process of implementing the developed programme.

7.3 LIMITATIONS OF THE STUDY

The study was conducted in four clinics at Ga-Dikgale village in the Capricorn District of Limpopo Province among diabetes mellitus patients on treatment. The study therefore cannot be generalised in other diabetes mellitus patients in other settings.

However, given the methodologies used, the findings can stimulate further research in other settings to bring a better understanding of the phenomenon in this study.

Furthermore, the original plan for fulfilling the last phase of the study was through conducting an eight (08)-hour workshop at the clinics. Therefore, given the COVID-19 pandemic, the plan had to be adjusted to promote the safety of both the patients and the facilitator. Therefore, the implementation phase was done through telephone teaching.

7.4 RECOMMENDATIONS

The study recommends the following based on the findings that emerged:

7.4.1 The results

Unclear and confusing medication instructions

- Medication instructions need to state the exact times that the patients should take their medications. This can be reflected in the doctor's prescription, the medication leaflets, and the medication packages. Additionally, the medication packages should be reviewed, and symbols should include the exact time and symbol; e.g., sunrise = 06h00, full sun = 12h00 or 14h00, sunset = 18h00, moon = 22h00 or 00h00. Health literacy should also be incorporated in the high school curriculum so that the learners can educate other people at home and consequently resulting in a health-literate society who can be able to take their medications correctly when the need arises.
- The healthcare professionals who are responsible for dispensing medication have to provide an in-depth explanation of medication instruction to patients for easier comprehension. The explanation has to include the exact times on which the medications should be consumed.

Lack of information about diabetes as a disease, its process, management, and complications

- Continuous monthly, teachings, and workshops should be conducted to teach diabetes patients about their disease and management at a primary health care level.

7.4.2 Department of Health

The Department of Health in Limpopo Province have to conduct workshops to healthcare professionals responsible for dispensing medications on interpreting medication instructions.

7.4.3 Health research

Other studies encompassing how healthcare professionals disperse information on medication instructions should be conducted in the future.

7.4.4 Nursing education

The nursing education should incorporate health literacy on prescribed medication instructions interpretation, and the dispensing course in nursing programmes.

7.4.5 Department of Education

The Department of Education should incorporate health literacy on the prescribed medication instructions interpretation in the high school curriculum so that the learners can teach and support the elders at home.

7.5 CONCLUSION

In this chapter, the study process, events were summarised and recommendations for the study were made. The study to explored the knowledge and practices of diabetes mellitus patients on treatment, described provided information regarding prescribed medication usage contained in the diabetes mellitus medication packaging, medicine leaflets, and prescriptions, described the effects of poor health literacy on prescribed medication instructions among diabetes mellitus patients on treatment. A conceptual framework was then developed which guided the development and implementation of the educational programme. The programme was implemented successfully.

The recommendations that were made contribute toward an enormous impact on the lives of diabetes patients if instituted. The whole process of conducting the study was a success although the study has its limitations.

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LIST OF APPENDICES

Appendix 1a: Letters requesting permission to conduct research

University of Limpopo (School of Health Care sciences)

Department of Nursing

Private Bag X1106

Sovenga

0727

…… 2017

The Nurse Manager

Dikgale Clinic

Dikgale

0721

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT GA-DIKGALE VILLAGE CLINICS.

Dear Sir/Madam

I (UL student) hereby request to be granted a permission to collect research information on the following topic: Development and implementation of an educational programme to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province. Information will be collected from patients diagnosed with diabetes mellitus with the following characteristics:

- The patients should be free from hearing problems so that they will be able to follow verbal instructions,

- Should be psychologically fit so that they could provide sound information, and
- Should be on treatment for more than a month so that they could provide information with a better experience.

The study has been approved by the University of Limpopo and the Department of Health Limpopo province. The study may contribute towards reducing the high rate of patients' hospitalisation and bring about a healthy society, through leading a healthy life and complying with medications in the Capricorn district, Limpopo province.

Researcher's Signature:…… Date:……..…2017 Cell number:……..

University of Limpopo (School of Health Care sciences)

Department of Nursing

Private Bag X1106

Sovenga

0727

…… 2017

Limpopo Department of Health

Research and Ethics Committee

Private Bag X908

POLOKWANE

0700

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT GA-DIKGALE VILLAGE CLINICS.

Dear sir/Madam

I (UL student) hereby request to be granted a permission to collect research information on the following topic: Development and implementation of an educational programme to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province. Information will be collected from patients diagnosed with diabetes mellitus with the following characteristics:

- The patients should be free from hearing problems so that they will be able to follow verbal instructions,
- Should be psychologically fit so that they could provide sound information, and

- Should be on treatment for more than a month so that they could provide information with a better experience.

The study has been approved by the University of Limpopo and the Department of Health Limpopo province. The study may contribute towards reducing the high rate of patients' hospitalisation and bring about a healthy society, through leading a healthy life and complying with medications in the Capricorn district, Limpopo province.

Researcher's Signature:…… Date:……..…2017

Cell number:……..

Appendix 1b: APPROVAL FROM LIMPOPO DEPARTMENT OF HEALTH

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

Enquiries: Stols M.L (015 293 6169) Ref:4/2/2

Ngoatle C (LP 2017 11 016)
Department of Nursing
University of Limpopo
Private Bag X1106
Sovenga
0727

Greetings,

RE: **Development and Implementation of an Educational Programme to Enhance Health Literacy on Prescribed Medication Instructions among Diabetes Mellitus Patients on Treatment at Ga-Dikgale Village Clinics in Capricorn District, Limpopo Province**

The above matter refers.

1. Permission to conduct the above mentioned study is hereby granted.
2. Kindly be informed that:-
   - Research must be loaded on the NHRD site (http://nhrd.hst.org.za) by the researcher.
   - Further arrangement should be made with the targeted institutions, after consultation with the District Executive Manager.
   - In the course of your study there should be no action that disrupts the services.
   - After completion of the study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   - The above approval is valid for a 3 year period.
   - If the proposal has been amended, a new approval should be sought from the Department of Health.
   - Kindly note, that the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated.

Head of Department

24/01/2018
Date

18 College Street, Polokwane, 0700. Private Bag X9302, POLOKWANE, 0700
Tel: (015) 293 6000, Fax: (015) 293 6211/40 Website: http://www.limpopo.gov.za

Appendix 1c: DISTRICT APPROVAL

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH: CAPRICORN DISTRICT

REF : 5.5/3/1/2

ENQ : Hlatshwayo MM

TEL : 015 290 9154/9096

FROM : DISTRICT EXECUTIVE MANAGER

TO : Ngoatle C
Nursing Department
University of Limpopo
Private Bag x1106
sovenga
0727

SUBJECT : PERMISSION TO CONDUCT STUDY ON THE DEVELOPMENT AND IMPLEMENTATION OF AN EDUCATIONAL PROGRAMME TO ENHANCE HEALTH LITERACY ON PRESCRIBED MEDICATION INSTRUCTIONS AMONG DIABETES MELLITUS PATIENTS ON TREATMENT.

The above matter refers:-

1. Permission to conduct the above study is hereby granted.
2. Kindly be informed that:
   - In the course of your consultation there should be no action that disrupts the services.
   - After completion of the research, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   - Kindly note that the Department can withdraw the approval at any time.
3. Your cooperation will be highly appreciated.

DISTRICT EXECUTIVE MANAGER

2018-02-05
DATE

1

Appendix 2: TREC APPROVAL

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 4029, Fax: (015) 268 2306, Email:Abdul.Maluleke@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE CLEARANCE CERTIFICATE

MEETING:	**02 November 2017**
PROJECT NUMBER:	**TREC/373/2017: PG**
PROJECT:	
Title:	Development and implementation of an educational programme to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale Village Clinics in Capricorn District, Limpopo Province
Researcher:	C Ngoatle
Supervisor:	Prof TM Mothiba
Co-Supervisor:	Prof MJ Themane
School:	School of Health Care Sciences
Degree:	PhD in Nursing Science

PROF TAB MASHEGO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) **The budget for the research will be considered separately from the protocol.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

Appendix 2a: CONSENT FORM (ENGLISH VERSION)

UNIVERSITY OF LIMPOPO CONSENT FORM

Statement concerning participation in a clinical research project*.

Name of project/study

Development and implementation of an educational programme to enhance health literacy on prescribed medication instructions among diabetes mellitus patients on treatment at Ga-Dikgale village clinics in the Capricorn District, Limpopo Province

Information box:

Thank you for approving to participate in this study. My name is **Charity Ngoatle**, I am a researcher from the university of Limpopo. The aim of this study is to investigate health literacy problems related to medication instructions among diabetes mellitus patients at Ga-Dikgale village clinics of the Capricorn district, Limpopo Province. The study is non-invasive, and do not involve any manner of harm anticipated. The objectives are to explore and describe the knowledge and practices of patients on prescribed medication instructions. Participation in this study is completely voluntary and that you may withdraw from it at any time and without victimisation.

Should you have any queries, kindly contact:

C Ngoatle (015 297 1114)

I have read the information and heard the aims and the objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and the objectives of the study are clear to me. I have not been pressurized to participate in any way.

I understand that participation in this clinical trial/study/project is completely voluntary and that I may withdraw from it at any time and without supplying reasons. I know that this study/project has been approved by the Research and Ethics Committee, University of Limpopo and the Limpopo Department of Health. I am fully aware that the results of this study/project will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in this study/project.

…… ……

Name of participant signature

…… …… ……

Place Date Witness

……

Statement by the researcher

I provided verbal and/or written information regarding this study/project. I agree to answer any future questions regarding the study/project to the best of my ability.

I will adhere to the approved protocol.

…… …… ……..

Name of researcher Signature Date

Appendix 2b: CONSENT FORM (SEPEDI VERSION)

UNIVERSITY OF LIMPOPO SEPEDI CONSENT FORM

Setatamente mabapi le go tšea karolo ka go Protšeke ya Dinyakišišo tša Teko ya Klinikhale *.

Leina la Protšeke / Dinyakišišo / Teko*

Go hloma le go phethagatša thuto ya go godiša tsebo ya tša maphelo malebana le tshedimošho ka fao meriyana e swanetšego go nwewa/go šomishwa ka gona ke balwetši ba dinaga tša Ga-Dikgale, tikologong ya Kheprikone, Porobeseng ya Limpopo.

Ke badile/ke kwele ka ga tshedimošo mabapi le maikemišetšo le morero wa dinyakišišo tšeo di šišintšwego gomme ka fiwa nako yeo e lekanego gore ke naganišiše ka ga taba ye. Ke tloga ke kwešiša maikemišetšo le morero wa dinyakišišo tše gabotse. Ga se ka gapeletšwa go kgatha tema ka tsela efe goba efe. Ke a kwešiša gore go kgatha tema Protšekeng/Dinyakišišong tše ke ga boithaopo gomme nka tlogela go kgatha tema nakong efe goba efe ntle le gore ke fiwe tshwaro empe.

Se ka se be le khuetšo efe goba efe go kalafo yaka ya ka mehla ya maemo a ka. Ke a tseba gore Teko/Protšeke/Dinyakišišo tše di dumeletšwe ke Turfloop Research and Ethics Committee (TCREC), Kgoro ya tša maphelo ya Limpopo, moetapele wa kgoro ya maphelo tikologong ya kheprikone. Ke tseba gabotse gore dipoelo tša Teko/Dinyakišišo/ Protšeke tše di tla dirišetšwa merero ya saense gomme di ka phatlalatšwa. Ke dumelelana le se, ge fela bosephiri bja ka bo ka tiišetšwa.

Mo ke fa tumelelo ya go kgatha tema Tekong/Dinyakišišong/ Protšekeng

. ..... ……..

Leina la molwetši/ moithaopi Mosaeno wa molwetši goba mohlokomedi.

....

Lefelo. Letšatšikgwedi. Tlhatse

Setatamente ka Monyakišiši

Ke fana ka tshedimošo ka molomo le/goba yeo e ngwadilwego mabapi le Teko/Dinyakišišo/ Protšeke ye.

Ke dumela go araba dipotšišo dife goba dife tša ka moso mabapi le Teko/Dinyakišišo/ / Protšeke ka bokgoni ka moo nka kgonago ka gona.

Ke tla latela melao yeo e dumeletšwego.

.... ……. ……..……

Leina la Monyakišiši Mosaeno Letšatšikgwedi Lefelo

Appendix 3. INTERVIEW GUIDE

Introduction

- The researcher will greet the participant,
- Then introduces herself,
- Explain her purpose of coming to the institution,
- Outline the purpose, duration, ethical considerations and the significance of the study to the participant and what is expected of the participant during the interview.
- The purpose of the voice recorder will also be explained to the participant.
- The participant will be given a chance to sign a consent form if s/he agrees to participate in the study.

The interview questions

Central Question

"Could you please share with me about how you take your medication?"

Probing questions

- Why do you to take your medication the way you do?/ how did you come about taking the medication the way you do?
- How can one be affected if not taking medication correctly?
- If you are told to take medication at a certain time (e.g., Two/Three times a day), what do you do?
- Where you told how to take your medication? If Yes, elaborate.
- Do you think you need assistance on how to take medication? Why do you think so?
- If I was to do a programme to help people understand how medication is taken, what would you like me to include in the programme?

Appendix 4a. QUESTIONNAIRE

Questionnaire

Medicine Instruction Health Literacy Tool

ID | | | |

Name of Clinic: _____

Instruction: Read carefully and answer ALL questions. Please tick the appropriate answer with a tick **(√) or** a cross **(×)** where applicable.

SECTION A: DEMOGRAPHIC DATA

A.1 Age

Less than 20 years	1
20 – 29 years	2
31 – 39 years	3
40 – 49 years	4
50 years above	5

A.2 Gender

Male	1
Female	2

A.3 Marital status

Single	1
Married	2
Divorced	3
Living with partner	4
Widow (widower)	5

A.4 Highest level of education

Primary school	1
High school	2
Tertiary education	3
None	4

A.5 Employment status

Employed	1
Not employed	2
Self-employed	3
Pensioner	4

A. 6 Do you suffer from the following? Tick all that apply.

High blood pressure	1
Diabetes mellitus	2
Respiratory problems	3

HIV/AIDS	4
None	5
Other	6

A. 7 How many *Diabetes Mellitus* **medications are you taking per day?**

One	1
Two	2
Three	3
Four or above	4

NB: ***IF SUFFERING FROM OTHER DISEASES,***

A.8 How many medications are you taking in total per day for all diseases?

One	1
Two	2
Three	3
Four or above	4

A.9 For each medication, do you understand its instructions?

Yes	1
No	2

SECTION B: MEDICINE INSTRUCTION HEALTH LITERACY SELF ASSESSMENT TOOL

Instruction: Please choose the appropriate response to each statement.

		Agree	Neutral	Disagree
B1	I understand the medicine instructions provided by the nurse/doctor	1	2	3
B2	I can Understand the medicine instructions provided on the medicine leaflets, packaging and bottles	1	2	3
B3	I can follow the medicine instructions without health professional help	1	2	3
B4	I can take medication on correct interval	1	2	3
B5	I double the medicine dose if I missed taking my medicine	1	2	3
B6	I can take my medicine as instructed	1	2	3
B7	I Stop medicine if there are no longer symptoms	1	2	3
B8	I am aware of the effects of not taking my medication properly	1	2	3

SECTION C: GENERAL MEDICINE INSTRUCTION HEALTH LITERACY KNOWLEDGE AND ITS EFFECTS TEST

Instructions: Please choose **ONE** appropriate response to each statement.

		Agree	Neutral	Disagree
C1	The medicine leaflets and packages provide sufficient information for me to understand how I should take the medication	1	2	3
C2	The Professional Nurse explained how I should take my medication clearly to me	1	2	3
C3	My illness has improved since I started with the medication	1	2	3
C4	My illness has remained the same since I started with the medication.	1	2	3
C5	My illness is worse since I started with the medication	1	2	3
C6	I can reduce my medicine if my illness has improved	1	2	3
C7	I can stop my medicine if my illness has improved			
C8	Stopping diabetic medication can result in poor consequences	1	2	3
C9	I can obtain my chronic medicine anywhere I want if I do not want to go to the clinic	1	2	3
C10	I can obtain my chronic medicine anywhere I want if I know the names and instructions for my medicine	1	2	3
C11	I get confused by the number of medication I am taking	1	2	3

C12 'Three times a day' medicine instructions mean;

Taking medicine in the morning, during the day, and sunset	1
Dividing 24hrs by three to get correct time interval for taking medicine	2
Taking medicine in the morning, during the day, and evening	3
Not sure	4

C**13 '**Four times a day' medicine instruction means;

Taking medicine in the morning, during the day, in the afternoon and sunset	1
Dividing 24hrs by four to get correct time interval for taking medicine	2
Taking medicine in the morning, during the day, sunset and evening	3
Not sure	4

C14 ‘Twice a day’ medicine instructions mean;

Taking medicine in the morning and sunset	1
Dividing 24hrs by two to get correct time interval for taking medicine	2
Taking medicine in the morning and afternoon	3
Not sure	4

C15 ‘At night’ medicine instructions mean;

Taking medicine any time after sunset	1
Taking medicine anytime at night	2
Taking medicine at the same time at night	3
Not sure	4

C16 ‘Once a day’ medicine instructions means;

Taking medicine in the morning every day	1
Taking medicine at the same time everyday	2
Taking medicine anytime of the day	3
Not sure	4

Please tick the appropriate answer. Are you experiencing the following?

		Agree	Neutral	Disagree
C17	Changes in vision	1	2	3
C18	Numbness	1	2	3
C19	Tingling sensation	1	2	3
C20	Burning / pain on the toes or fingers	1	2	3
C21	Erectile dysfunction in men	1	2	3
C22	Poor hearing	1	2	3
C23	A wound that do not heal	1	2	3

What should you do if you experience the following while taking medication? Select all that apply.

C24 If medicine side effects or symptoms increases

Go to other health facility	1
Return to the health facility for assistance	2
Seek medication for the symptoms	3
Continue with the medicine	4
Stop the medicine	5

C25 The illness does not improve while you are taking treatment?

Go to other health facility	1
Return to the health facility for assistance	2
Seek medication for the symptoms	3
Continue with the medicine	4
Stop the medicine	5

Appendix 4b. LETLAKALA POTŠIŠO

Thlahlobo ya tsebo ya tša maphelo mabapile ditaelo tša tšhomišo ya meriyana

ID | | | |

Leina la Kliniki: _____

Ditaelo: Araba dipotšišo ka **MOKA**. Swaya ka **(√)** goba ka **(×)** ka sekgobeng sa maleba.

KAROLO YA A: TŠA BOWENA

A.1 Mengwaga

ka tlase ga 20	1
Ye 20 – 29	2
Ye 30 – 39	3
Ye 40 – 49	4
Ka godimo ga 50	5

A.2 Bong

Monna	1
Mosadi	2

A.3 Tša lenyalo

Ga se ke nyallwe/le	1
Ke nyetšwe/tše	2
Mohladi/diwa	3
Ke dula le molekane	4
Mohlolo (mohlologadi)	5

A.4 Tša dithuto

Sekolo sa tlase	1
Sekolo sa godimo	2
Dithuto tša kholetše/ Unibesithi	3
Ga se ke tsene sekolo	4

A.5 Tša mošomo

Ke ya šoma	1
Ga ke some	2
Ke ya itšhoma	3
Motšofe	4

A. 6 A ekaba o nale malwetji a latelago? Kgetha kamoka ka mo go swanetjego.

Madi a magolo	1
Bolwetji bja swikiri	2

Bolwetji bja mafahla	3
HIV/AIDS	4
Ga gona	5
A mangwe	6

A. 7 A na o šomoša meriyana e me kae ya *bolwetji bja swikiri* **ka letšatši?**

Tee	1
Pedi	2
Tharo	3
Nne/go feta	4

NB: ***GA E BA O NALE MALWETJI A MANGWE,***

A.8 E ka ba o šomoša meriyana e me kae kamoka, ka letšatši?

Tee	1
Pedi	2
Tharo	3
Nne/go feta	4

A.9 Go moriyana o mongwe le o mongwe, a e kaba o kwešiša ditaelo tja yona tja tšshomišo?

Ee	1
Aowa	2

KAROLO YA B: THLAHLOBO YA TSEBO YA TŠA MAPHELO MABAPILE BOITEKOLO KA TŠHOMIŠO YA MERIYANA

Taelo: Kgetha karabo ya maleba go setatamente se sengwe le se sengwe.

		Ke a dumela	Magareng	Ga ke dumele
B1	Ke kgona go kwešiša ditaelo tša tšhomišo ya meriyana tšeo ke di fiwago ke mooki/ngaka	1	2	3
B2	Ke kgona go kwešiša ditaelo tša tšhomišo ya meriyana tšeo di gwadilwego diphuthelwaneng, mabotlelo le dipampiring tša meriyana	1	2	3
B3	Ke kgona go latela ditaelo tša tšhomišo ya meriyana tšeo di gwadilwego diphuthelwaneng, mabotlelo le dipampiring tša meriyana	1	2	3
B4	Ke kgona go nwa meriyana ka dinako tšago šielana ka maleba	1	2	3
B5	Ke tšea meriayana ga bedi ge ke fetile ke gonwa meriyana ka nako	1	2	3
B6	Ke kgona gonwa meriyana ka fao ke laetšwego ka gona	1	2	3

B7	Ke emiša go nwa/šomiša meriyana ge dika tša bolwetši di sesa bonala	1	2	3
B8	Ke nale temogo ya ditla morago tša go se nwe/tšeye meriyana ka tsela ya maleba	1	2	3

KAROLO YA C: TEKO YA TSEBO KA TŠA MAPHELO MABAPILE DITAELO KAKARETŠO TŠA MERIYANA LE DITLA MOGARO TŠA YONA

Taelo: Kgetha karabo ya maleba go setatamente se sengwe le se sengwe.

		Ke a dumela	Magareng	Ga ke dumele
C1	Dipampiri le diphuthelwa tša meriyana di abelana ka tshedimušo eo e lekanego gore ke kwešiše ka fao ke swanetšego go šomiša meriayana ka gona.	1	2	3
C2	Mooki o nhlaloseditše botse ka fao ke swanetšego go šomiša meriyana yaka ka gona.	1	2	3
C3	Bolwetši bja ka bo kaonafetše mola ke thomilego go šomiša meriyana.	1	2	3
C4	Bolwetši bja ka ga se bo fetoge go tloga mola ke thomilego go šomiša meriyana.	1	2	3
C5	Bolwetši bja ka bo godile kudu go tloga mola ke thomilego go šomiša meriyana.	1	2	3
C6	Nkano fokotša meriyana yaka ge bolwetši bjaka bo kaonafetše.	1	2	3
C7	Nkano tlogela meriyana yaka ge bolwetši bjaka bo kaonafetše.			
C8	Go tlogela meriyana go ka tlisa ditlamorago ke šoro	1	2	3
C9	Nka humana meriyana ya bolwetši bja ka bja go se fole go go ngwe le go go ngwe mo ke ratago ge ke sa nyake go ya kliniking	1	2	3
C10	Nka humana meriyana ya bolwetši bja ka bja go se fole go go ngwe le go go ngwe mo ke ratago ge ke tseba maina le ditaelo tša go šomiša meriyana ya ka	1	2	3
C11	Ke hlakahlantšhwa ke nomoro ya meriyana yeo ke e šomišago	1	2	3

C12 ‘Ga Raro ka letšatši’ taelo e ra gore;

Go nwal/tšea meriyana mesong, mosegare, le ge letšatši le dikela	1
Go aroganya diiri tše masomenne ka tharo go humana dinako tša maleba tša nwal/tšea meriyana	2
Go nwal/tšea meriyana mesong, mosegare, le bošego	3
Ga ke ne bonnete	4

C**13** ‘Ga Nne ka letšatši’ taelo e ra gore;

Go nwal/tšea meriyana mesong, mosegare, mathapama, le ge letšatši le dikela	1
Go aroganya diiri tše masomenne ka Nne go humana dinako tša maleba tša nwal/tšea meriyana	2
Go nwal/tšea meriyana mesong, mosegare, ge letšatši le dikela, le bošego	3
Ga ke ne bonnete	4

C14 ‘Ga Bedi ka letšatši’ taelo e ra gore;

Go nwal/tšea meriyana mesong le ge letšatši le dikela	1
Go aroganya diiri tše masomenne ka Pedi go humana dinako tša maleba tša nwal/tšea meriyana	2
Go nwal/tšea meriyana mesong le bošego	3
Ga ke ne bonnete	4

C15 ‘Bošego’ taelo e ra gore;

Go nwal/tšea meriyana ka morago ga ge letšatši le seno dikela	1
Go nwal/tšea meriyana bošego	2
Go nwal/tšea meriyana bošego ka nako e nngwe le e nngwe	3
Ga ke ne bonnete	4

C16 ‘Ga Tee ka letšatši’ taelo e ra gore;

Go nwal/tšea meriyana mesong ka mehla	1
Go nwal/tšea meriyana ga tee ka letšatši ka nako e swanang ka mehla	2
Go nwal/tšea meriyana ga tee ka letšatši ka nako e nngwe le e nngwe	3
Ga ke ne bonnete	4

Kgetha karabo eo e nepagetšego. E kaba o hlagela ke tje di latelago?

		Ke a dumela	Magareng	Ga ke dumele
C17	Phetogo mabapile ka fao ke bonago	1	2	3
C18	Go hwa bogasho	1	2	3
C19	Go ngwayanywayega	1	2	3
C20	Go fiša/ bohloko mo menwaneng ya maoto le matsogo	1	2	3
C21	Bonna gabo tsoge	1	2	3

C22	Ga ke kwe botse	1	2	3
C23	Ntho yago se fole	1	2	3

A na o swanetše o dire eng ge o itemogela tše latelago? Kgetha ka moka tšeo di nepagetšego.

C24 Ge ditla morago tja meriyana goba dika tja bolwetji di oketjega

Ke ya lefilong le fapanego la go go aba ditirelo tša maphelo	1
Ke boela fao go abjago ditirelo tša maphelo go humana thušo	2
Ke ihweletša meriyana ya go alafa dika tša bolwet ši	3
Ke tšwela pele le meriyana	4
Ke emiša ka meriayana	5

C25 Bolwetši gabo kaonafale mola o e nwa/tšea meriyana

Ke ya lefilong le fapanego la go go aba ditirelo tša maphelo	1
Ke boela fao go abjago ditirelo tša maphelo go humana thušo	2
Ke ihweletša meriyana ya go alafa dika tša bolwet ši	3
Ke tšwela pele le meriyana	4
Ke emiša ka meriayana	5

Appendix 5: CHECKLIST FOR DOCUMENT ANALYSIS

ID			

A: Information about prescribed medication instruction

Tick appropriate answer with a cross (X)

A1	The Instruction is clear on how many times should the medication be taken	**Yes**		**No**		
		1		**2**		
A2	The instruction explain at how much time interval should the medication taken	**1**		**2**		
A3	The instruction indicate the times at which the medication should be taken	**1**		**2**		
A4	The instructions are clear and not confusing	**1**		**2**		
A5	The patients would not need further explanation on the instructions	**1**		**2**		
A6	The instructions give a clear picture of how the medication should be taken	**1**		**2**		
A7	The Instruction is clear on how many times should the medication be taken	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
		1	**2**	**3**	**4**	**5**
A8	The instruction explain at how much time interval should the medication taken	**1**	**2**	**3**	**4**	**5**
A9	The instruction indicate the times at which the medication	**1**	**2**	**3**	**4**	**5**

	should be taken					
A10	The instructions are clear and not confusing	**1**	**2**	**3**	**4**	**5**
A11	The patients would not need further explanation on the instructions	**1**	**2**	**3**	**4**	**5**
A12	The instructions give a clear picture of how the medication should be taken	**1**	**2**	**3**	**4**	**5**

B: Instructions as reflected on the leaflets

Select all that apply with a cross (X)

The instruction indicates the following:

B1	Morning, midday, afternoon, evening	**1**
B2	Before meals, with meals, after meals	2
B3	Once a day	3
B4	Twice a day	4
B5	Thrice a day	5
B6	Four times a day	6
B7	Every four hours	7
B8	Every six hours	8
B9	Every eight hours	9
B10	Every twelve hours	10
B11	Every 24 hours	11

C: Instruction as reflected on the medication packaging

Select all that apply with a cross (X)

The instruction indicates the following:

C1	Morning, midday, afternoon, evening	1
C2	Before sunrise, sunrise, full sun, sunset, after sunset, moon	2
C3	Before meals, with meals, after meals	3
C4	Once a day	4
C5	Twice a day	5
C6	Thrice a day	6
C7	Four times a day	7
C8	Every four hours	8
C9	Every six hours	9
C10	Every eight hours	10
C11	Every twelve hours	11
C12	Every 24 hours	12

Appendix 6: PAMPHLETS

Pamphlet 1a: ENHANCING HEALTH LITERACY ON DIABETES MELLITUS

8. Interpretation of Diabetes Mellitus medication instructions

Area	If on your medication it is written	It means
Before or after	Before food or meal	Take your medication, then you can have your food immediately or 30 minutes before food
	After food or meals	Eat your food first then after that you can take your medication.
Daily	Take 1 tablet daily	Since a day has 24 hours; therefore, divide 24 hours by 1 = 24. So, you are going to take your medication at the same time every day. E.g., if you choose 07h00 am, that should be your everyday time.
At night	Take 1 tablet at night	It is the same as above, but you choose a night-time. E.g., 19h00.
In the morning	Take 1 tablet mane or in the morning.	Same as the above but you choose a morning time. Any time before 12h00 noon. E.g., 07h00 am.
2x a day	Take 1 tablet two times a day (BD).	You divide 24 hours by 2 = 12 hours. For every 12 hours you should take your medication. E.g., if you choose 07h00 in the morning, the next 12 hours will be at 19h00 in the evening
3x a day	Take 1 tablet three times a day (TDS).	You divide 24 hours by 3 = 08 hours. For every 08 hours you need to take your medication. E.g., if you take the first dose/pill at 06h00 am, 14h00, & 22h00.
4x a day	Take 1 tablet 4 times a day.	You divide 24 hours by four = 06 hours. For every 06 hours you need to take your medication. i.e., 06h00, 12h00 pm, 18h00 & 00h00 am.

Enhancing Health Literacy

on

Diabetes Mellitus

Contact Numbers

083 878 0152 / 082 695 0734

NATIONAL INSTITUTE FOR THE HUMANITIES AND SOCIAL SCIENCES

Compiled By

Charity Ngoatle

1. What is diabetes?

Diabetes mellitus is a group of diseases that affect the way the body uses blood sugar called glucose (Castro, 2020).

It also known as sugar diabetes. It has **two types**; Type 1 which can develop anytime during childhood or adolescence, and Type 2 which is commonly associated with aging, mostly develop in people 40 years and above (Castro, 2020).

2. Common symptoms are: Increased thirst, Frequent urination, Extreme hunger, Unexplained weight loss, Fatigue, Irritability, Blurred vision, Slow-healing sores, Frequent Infections and Vaginal infections in women (Castro, 2020).

3. Causes or risk factors

There is no known cause of diabetes, however, the following factors may increase the risk for **type 1 diabetes:**

Family history. Your risk increases if a parent or sibling has type 1 diabetes.

Environmental factors. Conditions such as exposure to a viral illness.

The presence of damaging immune system cells (autoantibodies).

Geography/ Location. Certain countries have higher rates of type 1 diabetes (Castro, 2020).

Type 2 – factors increasing the risk includes:

Weight. More fatty tissue causes the body to be resistant to insulin.

Inactivity. Lack of exercise increases the risk for Type 2 Diabetes.

Family history. Your risk increases if a parent or sibling has type 2 diabetes.

Race. Some races including black people are at higher risk.

Age. Diabetes type 2 risk increases with age.

Gestational diabetes. The risk of developing prediabetes and type 2 diabetes increases if one developed gestational diabetes when pregnant.

Polycystic ovary syndrome. Women having polycystic ovary syndrome; a common condition characterized by irregular menstrual periods, excess hair growth and obesity, increases the risk of diabetes.

High blood pressure. Having high blood pressure associated with an increased risk of type 2 diabetes.

Abnormal cholesterol and triglyceride levels. Having low levels of high-density lipoprotein (HDL) increases the risk of type 2 diabetes. Having high levels of triglycerides increases the risk of type 2 diabetes (Castro, 2020).

4. Disease process and complications

As the disease progresses it causes damage to some organs in the body resulting in the following complications:

Cardiovascular diseases e.g., stroke, heart attack, chest pains, narrow arteries.
Nerve damage (Neuropathy) signs - tingling sensation, numbness, burning or pain that usually starts at the tips of the toes or fingers and slowly spreads upward.

Kidney damage (Nephropathy) – kidney failure.
Eye damage (Retinopathy) – Blindness, glaucoma, cataracts.
Foot damage – may lead to leg amputation.
Skin conditions – Fungal and bacterial infections.
Hearing impairment – is more common.

Depression (Castro, 2020).

5. Diabetes danger signs

Many factors can affect your blood sugar, the following problems may arise and require instant care:

- **High blood sugar (hyperglycaemia).**
- **Increased ketones in urine (diabetic ketoacidosis).**
- **Hyperglycaemic hyperosmolar nonketotic syndrome.**
- **Low blood sugar (hypoglycaemia).**

6. Prevention

- ***Eat healthy foods.*** Choose foods lower in fat and calories and higher in fiber.
- ***Get more physical activity.*** Aim for 30 minutes of moderate physical activity a day.
- ***Lose excess weight.***

7. Other diseases co-existing with Diabetes mellitus

Hypertension, hyperlipidaemia, chronic heart diseases, chronic kidney disease, asthma, epilepsy, cancer, arthritis, peripheral vascular disease, osteoporosis, depression, chronic obstructive pulmonary diseases, HIV/AIDS and obesity (Nowakowska, 2019)

Pamphlet 1b: ENHANCING HEALTH LITERACY ON DIABETES MELLITUS (SEPEDI VERSION)

8. Thlalosho ya ditaelo tja meriyana ya bolwetji bja swikiri

Lefelo	Ge eba e ngwadilwe mo dihlareng	E ra gore
Pele le morago	Pele ga dijo	Tjea dihlare tja gago ke moka o kgone o ija dijo tja gago ka morago ga metsotso ye 30
	Ka morago ga dijo	ija dijo pele ka morago o kgone o enwa dihlare tja gago
Ka letjatji	Tjea pilisi e tee ka letjatji	Ka ge letjatji le nale diiri tje 24; Ka fao arola diiri tjeo tje 24 ka 1 = 24. Bjale o tlile go nwa dihlare tja gago ka nako e tee letjatji le lengwe le le lengwe mohlalao., ge o kgetha 07h00, e swanetje goba nako ya gago ya tjatji ka tjatji.
Bosego	Tjea pilisi e tee bosego	E swana le ya ka godimo, eupsa o kgetha nako ya bosego mohlala., 19h00.
Mesong	Tjea pilisi e tee bosego goba mesong	Go swana le ya ka godimo eupsa o kgetha nako ya mesong. Nako ye nngwe le ye nngwe pele ga 12h00 mosegare. Mohlala.,07h00 am.
Ga bedi ka letsatsi	Tjea pilisi e tee ga bedii ka letjatsj (BD).	Arola di iriri tje 24 ka pedi. Ka morago ga diriri tje 12 o swanetje go nwa dihlare tja gago Mohlala., Ge o kgetha 07h00 mesong, di iri the 12 tjeo di latelago e tlabe ele 19h00 ya mathapama.
Ga raro ka letjatji	Tjea pilisi e tee ga raro ka letjatji(TDS).	Arola diiri tje 24 hours Ka 3 = diiri the 08. Mohlala, o ka tjea dipilisi ka 06h00 , 14h00, le 22h00.
Ga nne ka letjatji	Tjea pilisi e tee ga nne ka letjatji	Arola diiri tje 24 hours ka 4= 06 .Enwa dipilisimorago ga diiri the 06. Mohlala ., 06h00, 12h00, 18h00 & 00h00 .

KOKETJO YA TSEBO YA TJA MAPHELO MABAPI LE BOLWETJI BJA SWIKIRI

(Diabetes Mellitus)

Contact Numbers

083 878 0152 / 082 695 0734

NATIONAL INSTITUTE FOR THE HUMANITIES AND SOCIAL SCIENCES

Compiled By

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1. Naa taebithisi ke eng?

Taebithisi melithase ke sehlopha sa malwetji ao a amago ka tsela yeo mmele o somisago sukiri yeo e bitjwago glucose (Castro, 2020).

E tsebega kudu ka bolwetji bja sukiri . E nale mehuta ye mebedi; Mohuta wa mathomo o ka thoma nako ye nngwe le ye nngwe ge o sale ngwana goba o setse o tjwele mahlalagading , mohuta wa bobedi o bapetjwa kudu le go gola, bjona bo iponagatja kudu go batho bao ba nago le mengwaga ye 40 le go feta (Castro, 2020).

2. Dika tjeo di tlwaegilego ke . Go nyonwa kudu, Go hlapologa kgafetjakgafetja, Go swara ke tlala kudu, Go fokotjega ga mmele ka mokgwa wo o ka se hlaloswego, Go lapa kudu, Go se bone gabotse, Go fola ga ditho tjeo di tjeago nako,go tsenwa ke malwetji kgafetjafetja le malwetjana a setho sa mosadi sa go hlapologa (Castro, 2020).

3. Ditlhotlo tsa kotsi

Ga go seo se tsebjago gore bolwetji bjo bo hlola ke eng, le ge gole bjalo, dintlha tjeo di latelago di ka oketsa kotsi ya mohuta wa mathomo wa taebithisi

Mohuta wa bobedi – ditlhotlo tjeo di oketjago kotsi di akaretja:

Go fokotjega ga mmele. Goba le makhura a mantsi go ka hlola mmele gore o ganane le inisuline.

Go felela ke matjato. Go se itshudulle go ka go bea kotsing ya mohuta wa bobedi wa taebithisi.

Histori ya lapa. O ka ba kotsing ge eba motswadi goba ngwaneno o nale mohuta wa bobedi wa taebithisi.

Morafe. Merafe ye mengwe go akaretjwa le mmala o moso o ka bea batho kotsing ye kgolo kudu.

Mengwaga. Mohuta wa bobedi wa taebithisis o o ka bea motho kotsing ka ge a gola.

Taebithisi nakong yage o le mmeleng. Kotsi ya go tjwetja mohuta wa bobedi wa taebethisi ge motho a thoma go bontsha taebethisi yeo e go tsenago ge o le mmeleng.

Seemo sa go ama go lekana ga di homoune. Basadi bao ba nago le seemo sa go ama go lekalekana ga dihomoune, seemo seo se swantshwago ka lehlapologo la basadi leo le sa tlwaelegago, meriri ya go gola le go tlelwa ke mmele o montsi, iGo oketsa dikotsi tsa taebithisi.

Madi a magolo. Go ba le madi a magolo go sepelelana le koketsego ya kotsi ya go ka tsenwa ke bolwetsi bja mohuta wa bobedi wa taebithisi.

Abnormal cholesterol and triglyceride levels. Goba le maemo a tlase a high-density lipoprotein (HDL) go oketsa dikotsi tja mohuta wa bobedi wa taebethisi. Goba le maemo a godimo a triglycerides go oketsa dikotsi tsa mohuta wa bobedi wa taebethisi l (Castro, 2020).

4. Tshepediso ya bolwetji le ditlhakahlakanyo

Ka ge bolwetsi bo gola ebile bo tswela pele e hlola go senyega ga ditho tse dingwe tsa mmele gomme ya tlisa tseo di latelago:

Malwetji a pelo, bjalo ka setorouko, go betha ke pelo, go kwa bohloko mo kgareng le ditshika
Go senyega ga ditshika (Neuropathy) - Go kwa bohloko, go tsitsipana, go fisa goba chesa kapa bohloko bjo bogolo bjo bo thomago dintlhaneng tsa menwana
Tshenyo ya mahlo (Retinopathy) – Bofofu, glaucoma, cataracts.
Tshenyo ya maoto– e ka lebiswa go go ripswa ga leeto.
Dipeelano tja letlalo – diphetetjo tja Fungal le bacteria.
Bothata bja gokwa-- e bonagala kudu.

Kgatelelo ya monagano (Castro, 2020).

5. Dika tje kotsi tja Taebithisi

Go nale dilo tje ntsi tjeo di ka amago madi a gago, mathata ao a latelagoa ka tjwelela gomme a nyaka tlhokomelo ya ka pela:

- **Sukiri ya godimo (hyperglycaemia).**
- **Diketone tsa mohlapo di rotoshitjwe (diabetic ketoacidosis).**
- **Sukiri ya tlase (hypoglycaemia).**

6. Thibelo

- ***Iya dijo tja phepo***
- ***Itshudulle kgafetja***
- ***Fokotja mmele***

7. Malwetje a mangwe a kgnago bo phela le bolwetji bja swikiri

Madi a magolo, makhura a mantji madiing, malwetji a: pelo, dipshio , mafahla, gowa, kankere, marapo, ditjoini, mashika a madi, kgatelelo ya monagano, maswafo, HIV/AIDS le mmele o mo ntji (Nowakowska, 2019).

Pamphlet 2a: MANAGEMENT AND TREATMENT FOR DIABETES MELLITUS

Fibre

- Eat mostly soluble fibre because it lowers blood sugar
- Eat enough vegetables and fruits
- Eat whole fruit rather than 100% juice, and eat apple with its skin
- (Segal, Robinson & Smith, 2019).

Example of a healthy eating plate;

(Adapted from: NIDDK, 2020)

3. **Insulin injection sides**

Insulin is injected into the fat layer under the skin (Morris, 2017). The figure on the right shows the insulin injection sites.

NB: Have an alarm in your phone with all the times recorded for you to take your medication. Have a snack and water next to your bed to avoid non-adherence. E.g., you came have an apple, slice of bread, a banana etc., as a snack.

Management and Treatment

For

DIABETES MELLITUS

Contact Numbers

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NATIONAL INSTITUTE FOR THE HUMANITIES AND SOCIAL SCIENCES

Compiled By

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Diabetes Mellitus Treatment

Diabetes treatment includes both medication and lifestyle modification. Lifestyle modification includes healthy eating, exercises and stress management.

1. Types of Diabetes Medications

The medication is divided into oral (pills) and injectables (insulin injection).

2. Lifestyle Modification

A diabetic patient should follow a healthy eating pattern, be physically active and manage stress.

- Diabetes patients should be committed to manage their diabetes.
- You need to choose healthy foods and maintain healthy weight – a mere lose in body weight makes a difference.
- Make sure that physical activity becomes part of your daily routine.
- Identify yourself by wearing a bracelet.
- Have a yearly schedule for physical and regular eye examination.
- Always pay attention to the feet.
- Keep blood pressure and cholesterol under control.
- Take care of the teeth.
- Limit alcohol intake.
- Take stress seriously – learn stress managing techniques that work for you (Castro, 2020).

2.1 Physical activity

Physical activity is an important part of managing your blood glucose level and staying healthy (NIDDK, 2020). Exercise for at least 30 minutes or more. Start slowly and increase gradually if you were not exercising (Castro, 2020). Being active has many health benefits.

Benefits of Physical activity

- It lowers blood glucose levels,
- It lowers blood pressure,
- It improves blood flow,
- It burns extra calories so you can keep your weight down if needed,
- It enhances your mood,
- It can prevent falls and improve memory in older adults, and
- It can help you sleep better (NIDDK, 2020).
- It lowers blood sugar level by moving sugar into the cells, and
- It increases sensitivity to insulin (Castro, 2020).

2.2 Diet

Goals for diet

- To prevent wide fluctuations in blood sugar levels throughout the day
- To restore blood sugar and lipid levels to normal
- To maintain blood sugar and lipid levels to normal
- To attain and maintain desirable body weight

Principles of diet

Eat a balanced diet throughout the day

- ◊ Eat three times per day
- ◊ Eat consistent amount of carbohydrates and calories at different mealtime
- ◊ Take a snack between meals to prevent insulin reaction/being hungry
- ◊ (Segal, Robinson & Smith, 2019).

Carbohydrates

- ◊ Eat mostly complex starches (pap, pasta, rice, brown bread etc)
- ◊ Should occupy half part of a medium plate or a cup size

(Segal, Robinson & Smith, 2019).

Protein

Substitute animal protein with vegetable one

- ◊ Eat soya beans, nuts, pumpkins seeds, etc
- ◊ Should occupy half quarter of the plate

(Segal, Robinson & Smith, 2019).

Fat

Reduce fat intake because fat interferes with insulin absorption.

- ◊ Use low fat milk or fat free, lite margarine, small amount of low cholesterol oil for cooking, eat lean meat, discard chicken skin, take out excess fat in meat, avoid deep frying.
- ◊ Should occupy about a quarter of the plate
- ◊ Avoid fastfoods and processed meats

(Segal, Robinson & Smith, 2019).

Pamphlet 2b: MANAGEMENT AND TREATMENT FOR DIABETES MELLITUS (SEPEDI VERSION)

Fibre

- Ija dijo tjeo di lego bolete dinago le fibre ka lebaka la gore di theosa maemo a swikiri fase
- Ija dienywa le merogo kudu
- Ija seenya ka moka go nale gore o new tjusi ya100% , o be o je le apola le matlakala a yona
- (Segal, Robinson & Smith, 2019).

Mohlala wa poleiti ya go ja dijo tja phepo;

(Adapted from: NIDDK, 2020)

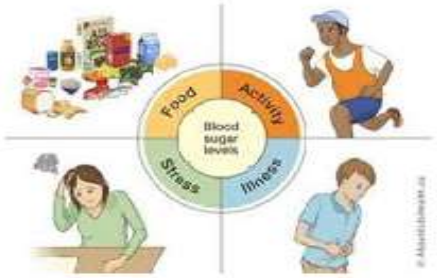
3. **Go hlabelwa ga tshwaana ka mahlakoring**

Inisuline e hlabelwa lekhureng letlase ga letlalo (Morris, 2017). Seswantsho saka thoko se bontsha go hlabelwa ga inisuline

NB: Eba le Alamo ka gare ga sellathekeng sa gago le direkhote ka dinako tjohle. Gape gore o tseye dihlare tja gago botse, dula o nale meetse le sejonyana kgauswi go efoga go swara ke tlala kudu. Mohlala, apola, panana, selae sa borotho bjalo bjalo.

Taolo le kalafi ya bolwetji bjwa sukiri

(DIABETES MELLITUS)



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Kalafo ya Bolwetsi bjwa sukiri

Go alafiwa ga bolwetji bjwa sukiri go akaretja dihlare le go itshwara gabotse ga motho. Go fetlo ditsela tjeo o phelago ka tjona go akaretja go ja dijo tjeo di loketsego mmele wa gago , go itshudulla le go laola kgatelelo ya monagano.

1. Mehuta ya dihlare tja taebithisiTypes of Diabetes Medications

Dihlare di arotjwe ka go tja ka ganong (dipilisi) le ditshwaana (insulin injection)

2. Diphetolo tja mokgwa wa bophelo

Balwetji ba taebithisi ba swanetje go latela lenaneo la go ja dijo tja phepo, ba be le matjato ebile ba kgone le go laola kgatelelo ya monagano.

- Balwetsi ba taebithisi ba swanetje go ikemisetja go ka laola taebithisiDiabetes .
- O swanetje go kgetha go ja dijo tja phepo le go ela hloko mmele wa gago go fokotjega go go nnyane ga mmele go dira phapano.
- Netefatja gore go itshudula kgafetjakgafetja go ba setlwaedi mesongwaneng ya gago ya tjatji ka tjatji.
- Iponagatje ka go apara poreiselete mo letsogong.
- Eba le nako ya ngwaga ka ngwaga go netefatja gore wa itshudulla ebile o hlahlobjwa mahlo.
- Tjea sedi ka mehla go maoto a gago.
- Laola maemo a gago a madi a magolo le kholestorole.

2.1 Go itshudulla

Go itshudulla ke karolo ye bohlokwa ya go laola sukiri ya madi le go dula o phelegile(NIDDK, 2020). Itshudulle tekano yeo e ka bago metsotso ye 30 minutes le go feta. Thoma ga nnyane ke moka o kgone o oketja ge eba o be o sa itshudulle(Castro, 2020). Goba le matjato go thusa ka mekgwa ye mentsi.

Dipoelo tja go itshudulla

- E theosa maemo makhura le swikiri.
- E kaonafatja kelelo ya madi,
- E fisa dikhalori gore o kgone go theosa mmele wa gago ge go nyakega.
- E kaonafatja seemo sa gago ,
- E ka thibela go wa le go kaonafatja go lahlegelwa ke monagano go batho bao ba tjofetjego
- E thusa le gore o robale bokaone (NIDDK, 2020).
- E theosa maemo a gago a swikiri ka go isa swikiri ka gare ga disele tja madi,
- E oketja go kwa kudu go inisuline(Castro, 2020).

2.2 Phepo

Maikemisetso a phepo

- Go efoga diphetogophetogo tse ntsi mo mading a motho wa swikiri letjatjing
- Go tsosholosa madi a swikiri le go a bea maemong
- Go laola maemo a moltho wa go lwala ke swikiri
- Go swarelela le go laola go ba le mmele wo montshi

Dokokwane tsa phepo

Ija dijo tsa phepo mo letsatsing ka moka

- ◊ Ija ga raro ka letsatsi
- ◊ Ija dijo tsa dikhabohaeteretse le khalori ka dinako tsa go fapana tsa dijo
- ◊ Tsea seneke magareng ganako ya dijo go efoga go swara ke tlala goba go fetoga ga inisuline
- ◊ (Segal, Robinson & Smith, 2019).

Dikhabohaeterete

- ◊ Netefatsa go ja dijo tsa setatshe bjalo ka (bogobe,makaroni,rase,borotho bjo boporaone bjalo bjalo)
- ◊ O swanetse go ja fela seripa sa poroto ya dijo goba ya komiki

(Segal, Robinson & Smith, 2019).

Porotheine

Go kaone gore o hwetse diphoroteni tsa merogo go nale gore o hwetse tsa diphoofolo

- ◊ Ija dinawa,dikoko,dithotse tsa lefodi bjalo bjalo
- ◊ Poleiti e swanetse goba le dijo tseo e kabago seripa sa yona

(Segal, Robinson & Smith, 2019).

Makhura

Fokotsa go ja makhura ka lebaka la gore makhura a hlakahlanya go hupega ga inisuline.

- ◊ Somisa maswi ao asenago le makhura a mantis goba ao asenago le makhura, matsarini ao a senago le makhura a mantis,lite margarine, makhura a go apea a swanetse goba le kholestorole ya fase ija

Appendix 7: A POSTER

Improving Health Literacy on Diabetes Mellitus

1. What is Diabetes?

Diabetes mellitus is a group of diseases that affect the way the body uses blood sugar called glucose (Castro, 2020).

It also known as sugar diabetes; it is a disease whereby the body cells are unable to utilise the sugar in the blood for body functioning. It has two types; **Type 1** which can develop anytime during childhood or adolescence, and **Type 2** which is commonly associated with aging, mostly develop in people 40 years and above (Castro, 2020).

2. Common Symptoms

Common Symptoms are: Increased thirst, Frequent urination, Extreme hunger, Unexplained weight loss, Fatigue, Irritability, Blurred vision, Slow-healing sores, Frequent infections and Vaginal infections in women (Castro, 2020)

3. Causes or Risk Factors

There is no known cause of diabetes, however, the following factors may increase the risk for type 1 diabetes:

- ☐ Family history.
- ☐ Environmental factors.
- ☐ The presence of damaging immune system cells (autoantibodies).
- ☐ Geography/ Location.

Type 2 – factors increasing the risk include:

- ☐ Weight, Inactivity.
- ☐ Family history, Race, Age.
- ☐ Gestational diabetes.
- ☐ Polycystic ovary syndrome.
- ☐ High blood pressure.
- ☐ Abnormal cholesterol and triglyceride levels.

5. Disease Process and Complications

As the disease progresses it causes damage to some organs in the body resulting in the following complications:

- ☐ Cardiovascular diseases e.g., stroke, heart attack, chest pains, narrow arteries.
- ☐ Nerve damage (Neuropathy) signs - tingling sensation; numbness, burning or pain that usually starts at the tips of the toes or fingers and slowly spreads upward.
- ☐ Kidney damage (Nephropathy) – kidney failure.
- ☐ Eye damage (Retinopathy) – Blindness, glaucoma, cataracts.
- ☐ Foot damage – may lead to leg amputation.
- ☐ Skin conditions – Fungal and bacterial infections.
- ☐ Hearing impairment – is more common.
- ☐ Depression (Castro, 2020).

9. Diabetes Mellitus Treatment

Types of Diabetes Medications

The medication is divided into oral (pills) and injectables (insulin injection).

Lifestyle Modification

A diabetic patient should follow a healthy eating pattern, be physically active and manage stress.

- ☐ Diabetes patients should be committed to manage their diabetes.
- ☐ You need to choose healthy foods and maintain healthy weight – a mere lose in body weight makes a difference.
- ☐ Make sure that physical activity becomes part of your daily routine.
- ☐ Identify yourself by wearing a bracelet.
- ☐ Have a yearly schedule for physical and regular eye examination.
- ☐ Always pay attention to the feet.
- ☐ Keep blood pressure and cholesterol under control.
- ☐ Take care of the teeth.
- ☐ Limit alcohol intake.
- ☐ Take stress seriously – learn stress managing techniques that work for you (Castro, 2020).

Benefits of Physical activity

- ☐ It lowers blood glucose levels,
- ☐ It lowers blood pressure,
- ☐ It improves blood flow,
- ☐ It burns extra calories so you can keep your weight down if needed,
- ☐ It enhances your mood,
- ☐ It can prevent falls and improve memory in older adults, and
- ☐ It can help you sleep better (NIDDK, 2020).
- ☐ It lowers blood sugar level by moving sugar into the cells, and
- ☐ It increases sensitivity to insulin (Castro, 2020).

Diet

Goals for diet

- ☐ To prevent wide fluctuations in blood sugar levels throughout the day.
- ☐ To restore blood sugar and lipid levels to normal.
- ☐ To maintain blood sugar and lipid levels to normal
- ☐ To attain and maintain desirable body weight

Principles of diet

Eat a balanced diet throughout the day

- ☐ Eat three times per day
- ☐ Eat consistent amount of carbohydrates and calories at different mealtime
- ☐ Take a snack between meals to prevent insulin reaction/being hungry

(Segal, Robinson & Smith, 2019).

Carbohydrates

- ☐ Eat mostly complex starches (pap, pasta, rice, brown bread etc)
- ☐ Should occupy half part of a medium plate or a cup size

(Segal, Robinson & Smith, 2019).

Protein

- ☐ Substitute animal protein with vegetable one
- ☐ Eat soya beans, nuts, pumpkins seeds, etc
- ☐ Should occupy half quarter of the plate

(Segal, Robinson & Smith, 2019).

Fat

- ☐ Reduce fat intake because fat interferes with insulin absorption.
- ☐ Use low fat milk or fat free, lite margarine, small amount of low cholesterol oil for cooking, eat lean meat, discard chicken skin, take out excess fat in meat, avoid deep frying.
- ☐ Should occupy about a quarter of the plate
- ☐ Avoid fast foods and processed meats

(Segal, Robinson & Smith, 2019).

Fibre

- ☐ Eat mostly soluble fibre because it lowers blood sugar
- ☐ Eat enough vegetables and fruits
- ☐ Eat whole fruit rather than 100% juice, and eat apple with its skin

(Segal, Robinson & Smith, 2019).

4. Diabetes Danger Signs

Many factors can affect your blood sugar, the following problems may arise and require instant care:

- ☐ **High blood sugar (hyperglycaemia).**
- ☐ **Increased ketones in urine (diabetic ketoacidosis).**
- ☐ **Hyperglycaemic hyperosmolar nonketotic syndrome.**
- ☐ **Low blood sugar (hypoglycaemia).**

6. Prevention

- ☐ Eat healthy foods.
- ☐ Get more physical activity.
- ☐ Lose excess weight.

7. Other diseases (Comorbidities) co-existing with Diabetes mellitus

Hypertension, hyperlipidaemia, chronic heart diseases, chronic kidney disease, asthma, epilepsy, cancer, arthritis, peripheral vascular disease, osteoporosis, depression, chronic obstructive pulmonary diseases, HIV/AIDS and obesity (Nowakowska, 2019)

9. Interpretation of Diabetes Mellitus Medication Instructions

For diabetes patients to adhere to medication instructions, the instructions should be illustrated in a simple way. Most of the diabetic medications are taken daily, twice or thrice a day. However, all the possible instructions will be explained in this programme

Area	If on your medication it is written	It means
Before or after	Before food or meal	Take your medication, then you can have your food immediately or 30 minutes before food
	After food or meals	Eat your food first then after that you can take your medication.
Daily	Take 1 tablet daily	Since a day has 24 hours, therefore, divide 24 hours by 1 = 24. So, you are going to take your medication at the same time every day. E.g., If you choose 07h00 am, that should be your time daily.
At night	Take 1 tablet at night	It is the same as above, but you choose a night -time. E.g., 19h00.
In the morning	Take 1 tablet mane or in the morning.	Same as the above but you choose a morning time. Any time before 12h00 noon. E.g., 07h00 am.
2x a day	Take 1 tablet two times a day (BD).	You divide 24 hours by 2 = 12 hours. For every 12 hours you should take your medication. E.g., If you choose 07h00 in the morning, the next 12 hours will be at 19h00 in the evening
3x a day	Take 1 tablet three times a day (TDS).	You divide 24 hours by 3 = 08 hours. For every 08 hours you need to take your medication. E.g., if you take the first dose/pill at 06h00 am, 14h00, & 22h00.
4x a day	Take 1 tablet 4 times a day.	You divide 24 hours by four = 06 hours. For every 06 hours you need to take your medication. i.e., 06h00, 12h00 pm, 18h00 & 00h00 am.

10. Insulin injection sides

Insulin is injected into the fat layer under the skin (Morris, 2017). The figure above shows the insulin injection sites.

Note that

Have an alarm in your phone with all the times recorded for you to take your medication. Have a snack and water next to your bed to avoid non-adherence. E.g. you can have an apple, slice of bread, a banana etc. as a snack.

Compiled by: - Ngxatie Charity Contact Number: - 083 678 0152 Email: - charityngxatie@ymail.com

Appendix 8: INDEPENDENT CODER CERTIFIFCATE

Qualitative data analysis

Doctor of Philosophy in Nursing Science

Mrs C Ngoatle

THIS IS TO CERTIFY THAT:

Professor Maria Sonto Maputle has co-coded the following qualitative data:

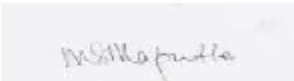
Semi-structured interviews

For the study:

DEVELOPMENT AND IMPLEMENTATION OF AN EDUCATIONAL PROGRAMME TO ENHANCE HEALTH LITERACY ON PRESCRIBED MEDICATION INSTRUCTIONS AMONG DIABETES MELLITUS PATIENTS ON TREATMENT AT GA-DIKGALE VILLAGE CLINICS IN CAPRICORN DISTRICT, LIMPOPO PROVINCE

I declare that the candidate and I have reached consensus on the major themes reflected by the data. I further declare that adequate data saturation was achieved as evidenced by repeating themes.

Prof MS Maputle



MS Maputle (PhD)

APPENDIX 9: EXAMPLE OF ONE-TO-ONE SEMI-STRUCTURED INTERVIEW

Date: 06/12/2018

Duration = 15 min 16 sec

Researcher: “Greetings Granny, how are you”?

Participant U: “I am well and how are you”?

Researcher: “I am well. My name is Charity Ngoatle; I am a student at University of Limpopo, I am also a Professional Nurse. I am doing research on diabetes mellitus. I am looking at how people with diabetes mellitus take their medication, so that if they are not taking their medication correctly, we will be able to assist them. We are doing this because we have realised that people with diabetes mellitus suffer from poor health outcomes and others end up dying while taking medication. I also want to develop a programme to assist diabetes mellitus patients on the correct way of taking medication. Our conversation is not going to be long; it might take about twenty minutes or more, or even less than that. Proceeding further with the study, the study has been approved that the Limpopo Department of Health, The Capricorn Health District Manager, the University of Limpopo and the managers of this clinic. As I have already explained, participation in this study is voluntary. If you agree to take part you are going to have to sign for me a consent form. Should you wish to withdraw during the interview, you are free to do so but the information you would have provided will be used for the interest of the study. I am going to use this voice recorder to record our conversation since I cannot write down everything that we will be saying and also to serve as evidence that this information is from participants. This information is going to be known by us only and your name is not going to appear in this study so that such that there will not be an association between you and your information. I am going to call you are “U”. Do you agree to continue with the interview”?

Participant U: “Yes”.

Researcher: “Could you kindly share with me on how you take diabetes medication”?

Participant U: “I take my pills three times a day. I take them in the morning, then at 13h00, and again at 18h00 in the evening because I eat a small portion of pap. I no longer eat potatoes because they have starch. Even rice, I no longer eat it that much because it requires me to eat a lot while I am not supposed to so, I just eat a small portion of pap and take my pills”.

Researcher: “If I heard you well, you said you are taking your pills three times a day; in the morning, during the day and in the evening *(the participant says yes*). So, if we consider the times, at which times are taking the pills”?

Participant U: “For the morning, I eat two slices of bread at around 08h00 and then take the pills. I then rest until past 11h00, we would be eating pap; I would eat a portion of pap equivalent to my fist. Then around 13h00, I would eat a small portion of pap again and take my pill”.

Researcher: “Then would that be all”?

Participant U: “Again at around 18h00 when we finish cooking, I would eat and take the third pill”.

Researcher: “Oh. So, how come you are taking your medication the way you do”?

Participant U: “That is because my blood sugar was not controlled before; I was not taking the medication correctly. So, when they stopped me these lots of things; I used to love fatty foods so, I realised that when I consume fatty foods, when I come to the clinic my blood sugar would always be high. Then I stopped the fatty foods and decided to check what would happen if I could take the medications at the times I mentioned”.

Researcher: “If I may ask, you are saying what is the reason for taking medications the way you do”?

Participant U: “My blood sugar was not controllable. I was eating too much and eating the foods I was not supposed to eat so, after I was then told how I should eat. I was even referred to the dietician who told me not to eat potatoes, and to eat fruits

e.t.c and said I would my blood sugar would be controlled. And truly, I followed those instructions and I could even feel better in my body".

Researcher: "Alright. What could happen to a person if they do not know how to take medication correctly"?

Participant U: "He would be affected badly".

Researcher: "Badly how"?

Participant U: "I mean he would be affected badly because if you are not taking medication correctly you are making the disease to grow such that it would not be controlled. Because if you take them the day you like, you are not safe on the medications. It means you are just taking them because you collected them at the clinic while you are supposed to use them correctly and lawfully".

Researcher: "Ee, I would like you to expand on the 'badly' part; badly how"?

Participant U: "He might be continually sick. You understand? That would be that he would be sick frequently and would not be right. So, taking the medication correctly would make them to be well".

Researcher: "Alright. If you were told to take medication twice a day, how would you take them"?

Participant U: "When they say I should take medication twice a day, I should take them twice because you would be taking them three times and now they reduce them to two times a day. It will depend on how you feel when you take them twice a day. Let me just say, if they said I should take medication twice a day, I should take them at around 09h00 am, I should know that if I took them around 09h00 am I should again take them at 18h00".

Researcher: "Okay. Let me say maybe they say to that you take them four times a day, how are you going to take them"?

Participant U: "If they say I should take them four times, I should take them at around past 08h00, then at 11h00 I would take them. At 13h00 then I take the medications

again and again at 17h00, then I would the medications again. It would be after taking food as it is time for food, then I would be done".

Researcher: "You would have taken them four times"?

Participant U: "I would have taken them four times thought I do not know if I would have missed other hours".

Researcher: "Okay. Have you ever been told how you should take medication"?

Participant U: "Yes, they did".

Researcher: "How did they say you should take your medication"?

Participant U: "Just the way I explained to you that I take them at past 08h00 am and eat two slices of bread. I would come and eat pap at around 11h00 am, at around 13h00 they said I should take my medication until you would take them again in the evening around 18h00".

Researcher: "Okay. Do you think you need assistance with the way of taking medication"?

Participant U: "Assistance for taking medication"?

Researcher: "Yes"?

Participant U: "No, I do not need it. I see myself taking the medications correctly, I am satisfied".

Researcher: "Okay. If I was to do a programme to teach diabetic patients on the correct way of taking medication, what would you want me to include in that programme"?

Participant U: "I think if you could just encourage taking of medication or come up with your way like now I say I take medication at 08h00 am, then you could say that is still too early, we would just follow as you would suggest".

Researcher: "If I was to summarise your statement, you are saying we should stress the times or what are you saying? Could you expand that"?

Participant U: “I mean if you want to reduce the times or maybe let me say I take them in the morning, but you suggest other ways”.

Researcher: “Could you give an example”?

Participant U: “Is it am saying I take the medications at around 08h00 then you could suggest that we take them around 09h00. Then you would also check if at 13h00 would still suit us”.

Researcher: “Do you think there is a problem that needs to be addressed concerning taking of medication”?

Participant U: “The problem is just to teach them that medication should be followed. One should take care of their treatment and check if they are taking their medication correctly. They should take note that they do not miss taking their medication”.

Researcher: “Okay. Is there something you would like to add or ask me related to the conversation we had”?

Participant U: “I would like to know as to what happens if you do not take the diabetic medications”?

Researcher: “Alright. Do not you have another thing you would like to ask”?

Participant U: “No, I do not have anything, I am satisfied”.

Researcher: “Here at the clinic have not they explained to you what would happen if you do not take your diabetic pills”?

Participant U: “They said I would die”.

Researcher: “So, according to you, do you think that is not the truth”?

Participant U: “It is true”.

Researcher: “So, according to your question, what is it that you would like to know”?

Participant U: “I wanted to know about this sugar diabetes that, if I do not take the pills, is it true I would die”?

Researcher: “It true. Are you satisfied now”?

Participant U: “Yes”.

Researcher: “I thank you for your time madam. But should I need further clarity after I am gone would you allow me to come back and interview you”?

Participant U: “Yes, you can come. It is not a problem”.

Researcher: “Thank you mommy”.

Participant U: “Thank you”.

APPENDIX 10: EXAMPLE OF PHONE CALL EDUCATION

DATE: 04/07/2020

DURATION: 37 minutes 05 seconds

Facilitator: Hello

Attendee: Hello

Facilitator: How are you?

Attendee: I am and you?

Facilitator: I am well. You are speaking to Charity; I am a PhD student from the university of Limpopo and also a professional nurse. I once came to your clinic to do a research about diabetes. I am however not sure if you still remember me?

Attendee: Ahh! This voice I can recognise but I just cannot relate who is it for.

Facilitator: Okay, maybe as we proceed you will remember because I understand that there is a lot of people who come to your clinic for researches.

Attendee: Yes

Facilitator: So as I promised that I will call you so that I could teach you about the diabetes, this is the reason for my call now. My research findings have shown that diabetes patients lack knowledge about this diseases and how they should live it and take their medication correctly so that they could live well. So do you still allow me to teach you?

Attendee: Yes, I do.

Facilitator: If you were to explain diabetes, what type of a disease can you say it is?

Attendee: Most of the times at the clinic they tell us that diabetes is a disease wherein blood sugar levels are always high, it can no longer be controlled. So, for it to be controlled we must take the pills they give us.

Facilitator: Alright, so you are on pills?

Attendee: Yes, I am on pills.

Facilitator: Alright, diabetes is a disease where there is high blood sugar in the blood vessels and the body is not using it. Our body needs sugar to work, to give us energy, to talk. When we are talking like this, we need sugar.

Attendee: Oh, we are using that sugar?

Facilitator: Yes, we are using sugar. So, the body of a person with diabetes has too much sugar in the blood vessels, it builds up in the blood vessels; the body cannot use it. That is why when they check it, they find it in high levels.

Attendee: Okay, I understand.

Facilitator: So, did you know that diabetes has types?

Attendee: I once heard about it, but I do not understand it well. They taught us but we are old, so it is difficult to grasp.

Facilitator: I am here to educate you, so you can have information about your disease. Do you understand?

Attendee: Yes.

Facilitator: Also. if you get confused one day, these numbers you can save them and call me to enquire.

Attendee: I will do so. So that I can be able to live better.

Facilitator: Yes. Let us go back so that I can tell you about the types. There are two types of diabetes, type 1 and type 2. Type 1 can affect younger people whereas type 2 affect people when they get older. Type 1 can start when you are young, so you grow with it. The other one, type 2 starts when you are older. Normally, they say it is associated with aging.

Attendee: Ohh, type 2?

Facilitator: Yes type 2. And people from the age of 40 upwards are at risk

Attendee: Okay, alright.

Facilitator: Do you understand?

Attendee: Yes, I understand.

Facilitator: Yes, then there are signs which indicate that a person has diabetes, do you know them?

Attendee: They tell us sometimes at the clinic that if you feel like you are weak or have vision problem it shows that the sugar levels are not alright.

Facilitator: Okay, that is true sir.

Attendee: Yes

Facilitator: Others you can see if your mouth gets dry or constantly hungry or peeing excessively.

Attendee: Yes, I see it sometimes.

Facilitator: Yes, or if you have a wound that does not heal.

Attendee: Oh! a wound?

Facilitator: Do you understand?

Attendee: Yes, I understand you.

Facilitator: Also, sometimes a person can lose weight without knowing what's the cause.

Attendee: Because of diabetes?

Facilitator: Yes, because of diabetes.

Attendee: Okay,

Facilitator: So, I want us to talk about the risks factors that can lead to a person to have diabetes or the causes of diabetes. Do you know any?

Attendee: They always tell us at the clinic, the only one I remember is if you are always eating and not exercising. So, you should work a bit, because the body does not want you to just eat and sit.

Facilitator: Yes, that is it.

Attendee: Also, us older people if you have high blood pressure, you can also have diabetes.

Facilitator: Yes, that is true.

Attendee: Yes

Facilitator: Yes, so I wanted to teach you about the cause but differentiating them by the types of diabetes.

Attendee: Okay,

Facilitator: So, the type 1 diabetes is a disease wherein it cannot be prevented. You will hear because of how it is caused that it cannot be prevented. If there is someone in the family that have diabetes, you are at risk of having it.

Attendee: Oh, Okay,

Facilitator: And you know you do not choose a family to be born into.

Attendee: Yes, we do not choose

Facilitator: So, you can see that you cannot prevent it?

Attendee: Yes, that one you cannot prevent it.

Facilitator: Yes. Then there are other things we call environmental factors. For example, if where you are staying you are exposed to viruses. Like now we have a virus called corona, we cannot prevent it.

Attendee: No, that one is dangerous, we cannot prevent it.

Facilitator: You understand it? Even diseases caused by viruses can lead you to have type 1 diabetes. Because these viruses attack our immune cells.

Attendee: Immune cells?

Facilitator: Yes

Attendee: Okay,

Facilitator: Another one is if you have that the immune cells themselves are fighting each other.

Attendee: They fight each other?

Facilitator: Yes

Attendee: Oh, I did not know that one.

Facilitator: It is called autoantibodies; you find that your system that fights disease-causing agents its fighting itself.

Attendee: Okay,

Facilitator: Yes, so it kills that cells which works to clear sugar in the blood.

Attendee: Oh

Facilitator: You see it?

Attendee: Yes, I understand you.

Facilitator: So, if they check you and find that you have autoantibodies, you are at risk of having type 1 diabetes.

Attendee: Oh

Facilitator: and you cannot prevent it.

Attendee: no, you cannot prevent it

Facilitator: Yes, the other one is the place you are living. Many places like India has many people with type 1 diabetes.

Attendee: Okay,

Facilitator: So, if you are staying in India can you see that you will be at risk?

Attendee: Yes, you will be at risk.

Facilitator: Yes, did you understand me sir about the causes of type 1 diabetes?

Attendee: Yes, I understand, I grasped them. You cannot prevent them.

Facilitator: Yes, indeed sir. So, going to type 2 most of them can be prevented,

Attendee: Oh, you can prevent them?

Facilitator: Yes, you spoke about when a person just eats and does not exercise. So, if you eat well and exercise you can prevent it.

Attendee: Yes, that is right.

Facilitator: Yes sir. Also, if you have a big body, you have body fat. If you do not exercise you will get fat.

Attendee: Yes

Facilitator: Yes, if you eat a lot and eat unhealthy food, you get fats into your body. And the fat prevents the body from using the sugar in the blood. So, the sugar just stays in the blood.

Attendee: Okay, I understand.

Facilitator: Yes. The other one is that if your relatives at home have type 2 diabetes, you cannot prevent it. But if you eat well and exercise, you can control it or delay it so that you do not have diabetes earlier. You see it right?

Attendee: Yes, I see it.

Facilitator: Other causes you have talked about, another one is if you are aging. As long as you are aging you are at risk or if you have fats or cholesterol, you are at risk

Attendee: Okay, I understand

Facilitator: Which factors did I say causes type 2 diabetes, can you name two or three?

Attendee: if you eat and do not exercise, if you do not exercise body fats build up and then the sugar accumulates in the fat. Another one is if you have a huge body. You also talked about if in the family there is someone with diabetes, then you are at risk. But if I eat well and exercise, you can delay it

Facilitator: Yes, that is it. I am thankful that you are listening to me sir

Attendee: Yes, we have to listen so we can live well

Facilitator: and if you have questions do not be afraid to stop me and ask as we continue

Attendee: Okay, I will ask

Facilitator: Okay. Another one is if the disease progresses you may have harmful consequences

Attendee: Oh consequences?

Facilitator: Yes, these consequences, I do not know they have told you about them

Attendee: No, I never heard about consequences.

Facilitator: There are complications

Attendee: Oh

Facilitator: You do not know any complications about the disease?

Attendee: No, I would be lying. But I heard that it can affect your kidneys and Yes.

Facilitator: Yes, that is true.

Attendee: So, a person might lose their eyesight?

Facilitator: Yes, a person can go blind, or misfunction of kidneys.

Attendee: Okay,

Facilitator: or foot damage, they can cut off that person's foot.

Attendee: Oh because of the wound that does not heal?

Facilitator: Yes, if the wound does not heal.

Attendee: ok

Facilitator: or stoke or lose the sensation. If you touch a hot stuff and fell nothing.

Attendee: ok

Facilitator: Yes, you lose sensation, or become numb, you understand it?

Attendee: Yes, I understand.

Facilitator: also, you can lose hearing or have depression, do you understand me?

Attendee: Yes, I do.

Facilitator: I said someone could lose their hearing or have a stroke or kidney dysfunction or get depressed. Do you hear me?

Attendee: Yes, if things are like that can I find help, or what must I do.

Facilitator: I will explain it to you in the next session. Because we said that there is no cure for this disease, how do we survive with it so that we live for longer. The reason why we are teaching you about the disease, so that you can live well, take medication so that you do not have complications. The reason is that we do not want you to get to the complications.

Attendee: Ok I understand.

Facilitator: Therefore, we treat this disease with medication, live a healthy lifestyle or modify your lifestyle.

Attendee: Okay

Facilitator: Which medication do you use?

Attendee: They call it metformin.

Facilitator: Oh, so you take pills not injection?

Attendee: No, I do not use injections.

Facilitator: Oh, we have pills and injections. So, you use pills?

Attendee: Yes

Facilitator: Therefore, you manage the disease with medication, eat healthy, exercise frequently and manage your stress. We do not want you to have stress sir.

Attendee: Okay

Facilitator: You should avoid things that may trigger stress.

Attendee: So, I should stay far from them?

Facilitator: Yes, stay away. You must be determined to control this disease. If you are not determined, you will complain when they say do not eat sweets or cakes, they eat in their homes.

Attendee: Yes, that is true.

Facilitator: You must commit yourself to live with the disease in a good way. How do you do it? By eating healthy, exercise so you do not gain weight. Exercising is not only going in the streets and jogging. You can also sweep the yard. If you are tired you seat down and stretch your legs and arms for about 30 minutes. Do you understand?

Attendee: Yes. So, how many times must I eat during the day?

Facilitator: I will tell you how to eat. I am still talking about this important one to modify your lifestyle. You should go each year to the hospital so that they can check your eyesight, check your heart, if you have high blood pressure or cholesterol. Because we talked about it if you do not take care of your legs, they could cut them.

Attendee: So, I must always wear shoes?

Facilitator: Yes, wear soft shoes, cut your nails they must not be pointy. Wear socks do not touch the ground without shoes. Make sure your shoes do not have anything that can prick you, because your wounds may take time to heal. You understand?

Attendee: Yes, I do.

Facilitator: If you drink alcohol, you should reduce it.

Attendee: Okay,

Facilitator: Alcohol is similar to stress; they cause an increase in sugar levels.

Attendee: Okay, I hear you.

Facilitator: I wanted to tell you the benefits of exercise. Why are we telling you to exercise at the clinic, we are not punishing you. They know that if you exercise you will benefit. When you exercise your body absorbs the sugar.

Attendee: Oh, it starts to absorb it?

Facilitator: Yes, and the sugar levels decrease, blood pressure also decreases. Blood flows well and you lose weight. Then you sleep well, always be happy and you do not easily forget things. What did I say?

Attendee: About exercising?

Facilitator: Yes,

Attendee: Exercising lowers high blood pressure and then you sleep well without problems. And you lose weight.

Facilitator: Because sugar levels decreases.

Attendee: Yes

Facilitator: I hear that you are listening to me. There are types of foods you should consume when you have diabetes. You asked me how many times you should eat?

Attendee: Yes, in a day.

Facilitator: You should eat 3 times

Attendee: 3 times?

Facilitator: 3 times a day. In-between your meals, there should be snacks, not like chips. We are talking about apples, fruits with low sugar and biscuits for diabetic

people. You can eat a slice of bread, spread with peanut butter along with tea without sugar. You understand it?

Attendee: Yes, I do

Facilitator: We want you to eat healthy because we do not want your sugar levels to fluctuate during the day, going up and down. We want it to always be at normal range therefore your sugar and blood levels become better, also your weight. You understand it?

Attendee: Yes, it means that if we eat well, the sugar levels can be controlled?

Facilitator: Yes, that is it.

Attendee: Okay

Facilitator: Yes sir, that is why they say you should eat a balanced diet. Do you know what is a diabetes diet?

Attendee: They tell us all time that we should not eat too much pap. We should not eat pap and potatoes; we should mix with meat or veggies.

Facilitator: Yes, the meat should not be fatty. You do not cook it with oil. We do not fry the meat. If it is chicken, you remove the fats. You cook it with water, or you grill it. You understand?

Attendee: Yes, I understand

Facilitator: These things that I am teaching you about are many, you cannot grasp them all at once. I am just giving you the background. When you go to the clinic, you will find pamphlets, the nurses will give them to you when you get your medication. They have all the information we were talking about.

Attendee: Oh, I understand

Facilitator: You should take them and read them. Where you do not understand, keep my number and then call me I would not make you pay. It is free, if you want information about diabetes, ask me. I will help you where I can. If I cannot, I will refer you.

Attendee: I will do so because we all want to live.

Facilitator: Yes sir. There are things called danger signs of diabetes. These ones are when you already have diabetes. They are not like the risk factors. These are things you should watch out for if you already have diabetes. These things you need to look at because they are dangerous. Your sugar levels can be go higher;

Attendee: Okay,

Facilitator: The reason maybe; You may be sick, or you have eaten those food they said you should not eat. You understand?

Attendee: Yes

Facilitator: or you did not take your pills, the sugars levels could increase. So how do you see that it has increase? If your lips get dry, if you cannot see well, become weak or get thirsty

Attendee: Okay,

Facilitator: have you ever seen such things?

Attendee: Yes, sometimes I feel my lips get dry.

Facilitator: if that happens, what was the cause? What did you eat? not sick? You should drink lots of water.

Attendee: Oh, we should drink lots water?

Facilitator: Yes, drink lots of water because the sugar is high. If you drink lots of water, it dilutes the sugar.

Attendee: Oh

Facilitator: Another thing, there are things called ketones. You might not understand them or know them because they see it when they check urine.

Attendee: Those are health professionals' things.

Facilitator: Yes, however, there is a way you can check if you have ketones. You will see it if you start to have a sweet odour from your mouth.

Attendee: In the mouth?

Facilitator: Yes, it is a quick sign of ketones. Or if you lose your appetite, get nauseous and tired.

Attendee: Oh

Facilitator: But the easy one is if you smell of sugar. Then you know quickly that you should go to the clinic.

Attendee: Oh, you need to rush to the clinic?

Facilitator: You have to rush to the clinic or your nearest doctor.

Attendee: Ok

Facilitator: Then you explain to them that you have diabetes and you feel this way. They will check you.

Attendee: And get help?

Facilitator: Yes, you will get help. Another one is if you see if the sugar level is low. Maybe you took many pills, or you did not eat.

Attendee: or I did not eat?

Facilitator: Yes. If you did not eat or your sugar is low. You will realise that you get confused.

Attendee: I get confused?

Facilitator: you get confused or get sleepy. Or hungry

Attendee: Okay,

Facilitator: These signs shows you that your sugar level is low. And if your still in your right mind or have not lost consciousness. You can drink juice, it has sugar.

Attendee: Yes

Facilitator: You can drink small amount of juice. Or mix sugar and water fast and drink. These signs are dangerous. You see their important where they say a diabetic patient should wear a bracelet to show that they are diabetic? That bracelet, if you get confused people can realise that you have diabetes. Did you understand me sir?

Attendee: Yes, I get you. So that they can help me

Facilitator: Yes, people can help you

Attendee: ok

Facilitator: Then I want us to talk about the instructions they write on your medication or they tell you.

Attendee: Yes

Facilitator: If they instruct you To take your medication a certain way, what do they mean. Sometimes the nurses at the clinic get tired, lines are long. Sometimes they cannot sit down with you and explain. Do you see how much time we spend talking?

Attendee: It is a long time

Facilitator: It is long sir. Imagine if a nurse has to teach each patient this way. You see that it would not be possible

Attendee: it would not be possible, we are many

Facilitator: Yes, you are many. So, there are explanations where you might not understand. I wanted to explain it to you. In case you do not know because other people know, they have explained it to them. While others do not understand. How many times do you take your pills?

Attendee: I take one in a day

Facilitator: Oh, once a day. What time do you take them?

Attendee: Sometimes around 9 or 10

Facilitator: Alright sir. The way you are taking it, it is not correct. You just hear that you must take it once a day and you think as long as I have taken it once it is correct.

Attendee: Yes

Facilitator: Actually, you should know that a day has 24 hours, if they say drink once you divide 24 by 1. So, it means every 24 hours you should take your pill.

Attendee: Oh Okay,

Facilitator: If you took it at 09h00 am, when will 24 hours end?

Attendee: At 09h00 am the following day.

Facilitator: Yes, 09h00 the following day. So, if you do not take it at 09h00, instead you take it at 10h00 or 11h00 what will happen in your body?

Attendee: It means I am killing myself.

Facilitator: Yes, but you did not know. It means that it is past 09h00, the medication wears off you need another one. But you do not drink, you leave the body without medication. Then what will happen to the sugar?

Attendee: It will increase.

Facilitator: It will increase sir.

Attendee: Yes

Facilitator: That is why they say you should follow the directions.

Attendee: Yes

Facilitator: And it is not different to when they say drink twice or three times. It means you dive 24 hours by 2 or 3. Depending on how they instructed you.

Attendee: Yes

Facilitator: You count that if I drank once, how many hours are left. Do you see it?

Attendee: Yes, I see it

Facilitator: Do you understand it

Attendee: Yes, I do mam. If they tell you to drink once a day, we just say as long as we took it.

Facilitator: as long as you took it sir, you did not know.

Attendee: Today I found the knowledge that I should take them at the same time.

Facilitator: Yes, so these things you do not do them on purpose. It Is like those foods; you are not doing it on purpose. However, they end up causing those consequences we talked about.

Attendee: Yes

Facilitator: but if you know, you eat well, exercise and take your medication well. Your body responds well then you see you will live longer.

Attendee: Yes, I see that I will live longer.

Facilitator: Do you have any questions?

Attendee: If a person does not know, it can be dangerous.

Facilitator: Indeed, if you do not know there could be trouble.

Attendee: Yes

Facilitator: Do you have any questions?

Attendee: The one about ketones. If I smell the sugar odour that same time should I rush to the clinic?

Facilitator: Yes, you should rush to the clinic.

Attendee: Okay,

Facilitator: but you should not leave alone, because we do not want you to faint on the way. If there is someone there at home who can accompany or there is a car or your neighbours can rush you to the clinic. So that you do not faint on the way, we do not know what might happen.

Attendee: Yes, on the way

Facilitator: alright. How do you feel now that I have taught you?

Attendee: Oh, now there are several things that I was not aware of about diabetes. Even the types I did not know. Now I know that there are two types. I know how I should take pills; I should ensure that I take them at the right time so I can live well.

Facilitator: Yes, that is true sir. If you were to rate me how much would you give me out of ten? Based on the way we talked?

Attendee: Because this information is important and it ensure survival. I would give you a 9 because now I know going forward how to live and if I encounter problems, I have your numbers.

Facilitator: Yes

Attendee: I can call you as you told me you would not charge me.

Facilitator: Yes, it is true. I would not charge you sir.

Attendee: Okay,

Facilitator: I thank you

Attendee: am I the thankful one

Facilitator: Take care of the grandkids and yourself. It Is cold do not burn yourselves. Also be aware of corona.

Attendee: Oh, that one we are afraid of. We are always here at home.

Facilitator: Thank you sir

Attendee: Yes, thank you

APPENDIX 11: EDITING CERTIFICATE

RIGHTMOVE MULTIMEDIA

11 August 2020

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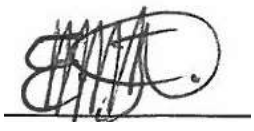
To whom it may concern,

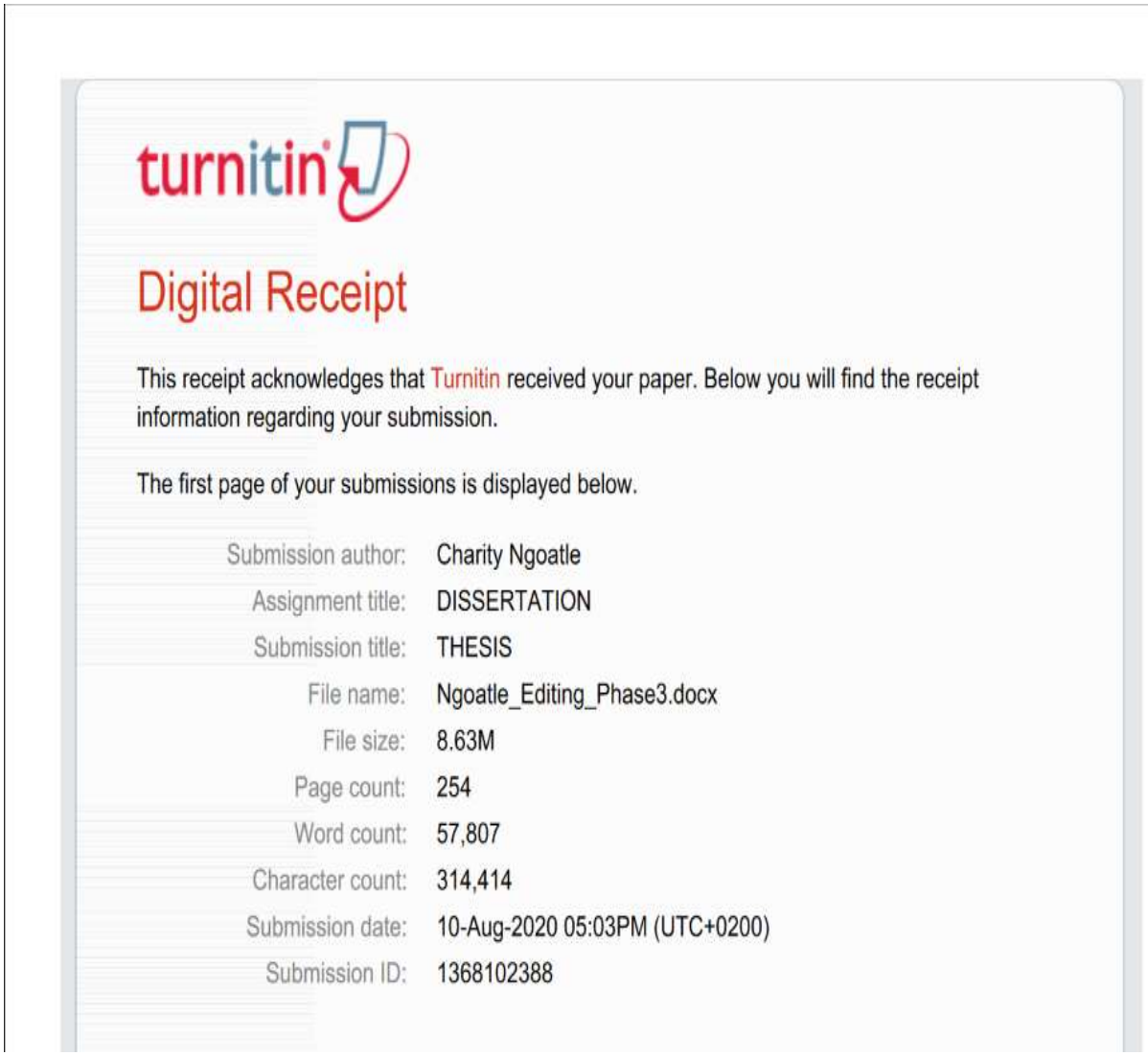
This document certifies that the Thesis was professionally edited for:
Mrs. C Ngoatle

This editing certificate is meant to acknowledge that we, Mrs. K. L Malatji, and Dr. E. J Malatji professional Editors under a registered company RightMove Multimedia, have meticulously edited the Thesis of Mrs. C. Ngoatle Doctor of Philosophy at the University of Limpopo, Titled: "DEVELOPMENT AND IMPLEMENTATION OF AN EDUCATIONAL PROGRAMME TO ENHANCE HEALTH LITERACY ON PRESCRIBED MEDICATION INSTRUCTIONS AMONG DIABETES MELLITUS PATIENTS ON TREATMENT AT GA-DIKGALE VILLAGE CLINICS IN CAPRICORN DISTRICT, LIMPOPO PROVINCE."
Thus, I confirm that the readability of this work in question is of a high standard.

Sincerely, Mrs. K. L Malatji & Dr. E.J Malatji



APPENDIX 12: TURNITIN REPORT



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