

**Primary health care nurses' knowledge, self-  
efficacy and performance of diabetes self-  
management support in the OR Tambo  
District, Eastern Cape**

**Zandile K. Landu**

Thesis presented in partial fulfilment of the requirements for the  
degree of Master of Nursing Science  
in the Faculty of Medicine and Health Sciences  
Stellenbosch University



**Supervisor:** Dr T. Crowley

April 2022

## DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

**Date: April 2022**

## ABSTRACT

**Background:** Diabetes cases are increasing in the Eastern Cape Province. In 2019, approximately 16 430 people were living with diabetes in the province. This province has the third highest diabetes-related deaths in South Africa. People living with diabetes are at high risk of developing respiratory infections. Well-structured, effective self-management programmes may assist persons living with diabetes to take control of their illness and improve their health outcomes. Patients living with diabetes are primarily managed and supported by nurses in primary health care settings; therefore, primary health care nurses require adequate diabetes knowledge and self-efficacy to provide self-management support. However, nurses' knowledge, self-efficacy and performance of self-management support have not yet been investigated in this context.

**Aim:** This study aimed to evaluate the knowledge, self-efficacy, and performance of primary health care nurses of diabetes self-management support.

**Methods:** A quantitative descriptive and correlational design was used. Data was collected over two months in primary health care facilities and community health centres in King Sabatha Dalindyebo sub-district, OR Tambo District. A self-reporting questionnaire containing three sections to measure primary care nurses' diabetes knowledge, self-efficacy and performance of self-management support, was used to collect data. A total of 100 registered nurses participated in the study. Data was entered in the Statistical Programme for the Social Sciences (SPSS) version 27, analysed with the assistance of a statistician and reported by descriptive and inferential statistics. Ethical approval was obtained from the Health Research Ethics Committee of Stellenbosch University. Permission was obtained from the Eastern Cape Department of Health Ethics committee and the OR Tambo District manager. Participants provided individual informed consent.

**Results:** Participants' diabetes knowledge mean scores were high (mean of 11.9, SD 1.8, out of 14). Participants had the highest frequency of correct responses in the items related to normal fasting blood glucose levels (95%; n=95) and management of an unresponsive patient (96%, n=96). Items related to the causes of hyperglycaemia (45%, n=45) and the action to take if a needle is contaminated (77%, n=77) had the lowest frequency of correct responses. Participants had higher scores for the self-management support self-efficacy scale (mean 18.91, SD 3.2 out of 24), compared to the performance of self-management support scale (mean 17.81, SD 3.3 out of 24). Knowledge was not associated with self-efficacy or performance, but self-efficacy

was positively correlated with performance ( $r = 0.78$ ,  $p < 0.01$ ). Nurses with a qualification in primary care nursing had significantly higher diabetes knowledge scores ( $p=0.03$ ), and experience as a nurse was positively correlated with the performance of self-management support ( $r = 0.21$ ,  $p = 0.05$ ).

**Conclusion:** Nurses in OR Tambo District had generally high levels of knowledge, self-efficacy and performance of diabetes self-management support. Although scores were high, diabetes knowledge and self-efficacy did not translate into the performance of self-management support in practice, indicating that nurses need training and supportive chronic care systems to implement self-management support. Implementation of a structured self-management programme is recommended.

**Key words:** Diabetes mellitus, diabetes self-management education, diabetes self-management support, self-efficacy, self-management.

## OPSOMMING

**Agtergrond:** Die aantal persone met diabetes mellitus is aan die styg in die Oos-Kaap provinsie. In 2019 was daar omtrent 16 430 mense wat met hierdie siekte geleef het in die provinsie. Die Oos- Kaap provinsie het die derde hoogste getallesyfer van diabetes verwante sterftes in Suid Afrika. Goed gestruktureerde, effektiewe self-bestuur programme kan hierdie persone help om beheer te neem oor hulle siekte en om hulle algehele gesondheidsuitkomst te verbeter. Pasiënte wat met diabetes leef maak staat op verpleegkundiges om hulle te ondersteun. Dus benodig primêre gesondheidsorg verpleegkundiges genoegsame kennis en selfdoeltreffendheid om ondersteuning vir hierdie pasiënte te kan bied. In hierdie konteks was verpleegsters se kennis, selfdoeltreffendheid en ondersteuningsvermoë in die proses van pasiënte se selfbestuur nog nie ondersoek nie.

**Doel:** Hierdie studie is gemik daarop om die kennis, selfdoeltreffendheid en ondersteuningsvermoë van primêre gesondheidsorg verpleegkundiges in diabetes self-bestuur ondersteuning. Te ondersoek en te evalueer.

**Metodes:** 'n Kwantitatiewe studie metode en korrelasie ontwerp was gebruik. Data was oor 'n tydperk van twee maande in primêre gesondheidsklinieke en gemeenskapsgeondheidsentrums in King Sabatha Dalindyebo se sub-distrik, OR Tambo, versamel. 'n Selfrapporterende vraelys met drie afdelings om primêre gesondheidsorg verpleegkundiges se diabetes kennis, selfdoeltreffendheid en ondersteuningsvermoë in die proses van pasiënte se selfbestuur te meet, was gebruik om data te kollekteer. 'n Totaal van 100 geregistreerde verpleegkundiges het deelgeneem aan hierdie studie. Die versamelde data was vasgelê in die Statistiese Program vir die Sosiale Wetenskappe (SPSW) weergawe 27, geanaliseer met die hulp van 'n statistikus en gerapporteer deur beskrywende en inferensiële statistieke. Etiese goedkeuring was verkry deur die Gesondheids Navorsing Etiek Komitee van Stellenbosch Universiteit. Toestemming was verder verkry deur die Oos- Kaapse Departement van Gesondheid se Etiek Komitee, asook deur die OR Tambo streeksbestuurder. Deelnemers het ingeligte toestemming gegee.

**Resultate:** Deelnemers se gemiddelde diabetes kennistellings was hoog ('n gemiddelde telling van 11.9, SD 1.8 uit 14). Deelnemers het die hoogste frekwensie antwoorde korrek gehad in die vrae verwant aan normale bloedglukosevlakke (95%; n=95) en behandeling van pasiënte wat nie reageer nie (96%; n=96). Vrae verwant aan die oorsake van hiperglukemie (45%; n=45) en die proses wat gevolg moet word wanneer naalde besmet is (77%; n=77), het die laagste

frekwensie van korrekte antwoorde gehad. Deelnemers het hoër tellings gehad vir die selfbestuur ondersteuning selfdoeltreffendheid skaal (gemiddeld 18.91, SD 3.2 uit 24), in vergelyking met selfbestuur ondersteuning skaal (gemiddeld 17.81, SD 3.3 uit 24). Kennis was nie geassosieer met self-bestuur self-doeltreffendheid of selfbestuur ondersteuning nie, maar self-bestuur self- doeltreffendheid was wel positief geassosieer met self-bestuur ondersteuning ( $r = 0.78$ ,  $p < 0.01$ ).

Verpleegkundiges met 'n kwalifikasie in primêre gesondheid verpleegkunde het aansienlik meer kennis oor diabetes gehad ( $p=0.03$ ); meer verplegingservaring was geassosieer met hoër vlakke van self-bestuur ondersteuning ( $r = 0.21$ ,  $p = 0.05$ ).

**Slotsom:** Verpleegkundiges in die OR Tambo Distrik het algeheel gewys dat hulle hoër vlakke van kennis, selfdoeltreffendheid en ondersteuning in die proses van pasiënte se selfbestuur besit. Al was die tellings hoog, het die resultate steeds gewys dat verpleegkundiges opleiding en ondersteunende kroniese siekte gesondheidsorgstelsels benodig om selfbestuur ondersteuning te implementeer. Die implementering van 'n gestruktureerde selfbestuur program word aanbeveel.

**Sleutelwoorde:** Diabetes mellitus, diabetes self-bestuur opvoeding, diabetes self- bestuur ondersteuning, selfdoeltreffendheid, self-bestuur.

## **ACKNOWLEDGEMENTS**

I would like to express my sincere thanks to:

- The study participants, King Sabatha Dalindyebo facilities who participated.
- My husband Tembeleni and my children Luminathi, Onothando and Solule.
- My supervisor Dr Talitha Crowley.

## TABLE OF CONTENTS

<b>Declaration .....</b>	<b>ii</b>
<b>Abstract .....</b>	<b>iii</b>
<b>Opsomming .....</b>	<b>v</b>
<b>Acknowledgements .....</b>	<b>vii</b>
<b>List of Tables .....</b>	<b>xii</b>
<b>List of Figures.....</b>	<b>xiii</b>
<b>List of appendices .....</b>	<b>xiv</b>
<b>Abbreviations.....</b>	<b>xv</b>
<b>Chapter 1: Foundation of the study .....</b>	<b>1</b>
1.1 Introduction .....	1
1.2 Rationale .....	1
1.3 Research framework .....	3
1.3.1 Self-management support.....	3
1.3.2 Short-term outcomes .....	4
1.3.3 Long-term outcomes .....	4
1.4 Problem statement .....	5
1.5 Research question.....	5
1.6 Hypothesis .....	5
1.7 Research aim .....	5
1.8 Research objectives .....	5
1.9 Research methodology.....	6
1.9.1 Research design.....	6
1.9.2 Study setting .....	6
1.9.3 Population and sampling.....	6
1.9.4 Instrumentation .....	6
1.9.5 Pilot test.....	6
1.9.6 Data collection .....	7
1.9.7 Data analysis .....	7
1.10 Ethical considerations.....	7
1.10.1 Justice .....	7
1.10.2 Respect for persons.....	7
1.10.3 Beneficence .....	8
1.11 Definitions .....	8
1.12 Duration of the study .....	9

1.13	Chapter outline .....	9
1.14	Significance of the study.....	10
1.15	Conclusion .....	10
<b>Chapter 2: Literature review .....</b>		<b>11</b>
2.1	Introduction .....	11
2.2	Selecting and reviewing the literature .....	11
2.3	Epidemiology of diabetes globally and in South Africa.....	11
2.4	Approaches to chronic disease management .....	12
2.5	Self-management support for persons living with diabetes .....	14
2.5.1	Self-management .....	14
2.5.2	Self-management support.....	15
2.5.3	Guidelines for improving self-management support .....	15
2.5.4	Self-management education .....	16
2.5.5	Efficacy of self-management programmes .....	17
2.6	Self-management programmes internationally.....	18
2.7	Diabetes self-management programmes in Africa .....	18
2.8	The role of nurses in providing self-management support .....	20
2.9	Competencies needed to provide self-management support and current evidence on such competences .....	21
2.10	Conclusion .....	22
<b>Chapter 3: Research methodology.....</b>		<b>23</b>
3.1	Introduction .....	23
3.2	Aim and objectives .....	23
3.3	Study setting.....	23
3.4	Research design .....	24
3.5	Population and sampling .....	25
3.5.1	Inclusion criteria.....	26
3.5.2	Exclusion criteria.....	26
3.6	Participant recruitment.....	26
3.7	Data collection instrument .....	27
3.8	Pilot test .....	28
3.9	Validity and reliability .....	29
3.9.1	Validity.....	30
3.9.2	Reliability .....	30

3.10	Data collection.....	32
3.11	Data analysis.....	33
3.11.1	Descriptive statistics .....	33
3.11.2	Inferential statistics .....	34
3.12	Summary.....	34
<b>Chapter 4:</b>	<b>Results.....</b>	<b>36</b>
4.1	Introduction .....	36
4.2	Section A: Demographic data .....	36
4.2.1	Gender (n=100) .....	37
4.2.2	Job title (n=99).....	37
4.2.3	Highest qualification (n=98) .....	37
4.2.4	Post graduate diploma in primary health care (n=98).....	37
4.2.5	Last time worked with people living with diabetes (n=98).....	37
4.2.6	Age of participants (n=86).....	38
4.2.7	Years of working experience as a professional nurse (n=92).....	38
4.3	Section B: Diabetes knowledge .....	39
4.4	Section C: Self-efficacy and performance in diabetes self-management.....	41
4.4.1	Assess.....	43
4.4.2	Advise.....	44
4.4.3	Agree.....	44
4.4.4	Assist.....	44
4.4.5	Arrange.....	45
4.4.6	Partnership .....	45
4.5	Relationship between knowledge, self-management support self-efficacy and self-management support performance .....	46
4.6	Relationship between demographic variables and knowledge, self-management support self-efficacy and self-management support performance .....	47
4.6.1	Demographic variables and diabetes knowledge .....	47
4.6.2	Demographic variables and self-management self-efficacy .....	48
4.6.3	Demographic variables and self-management performance .....	49
4.7	Conclusion .....	50
<b>Chapter 5:</b>	<b>Discussion, conclusion and recommendations.....</b>	<b>51</b>
5.1	Introduction .....	51
5.2	Discussion.....	51

5.2.1	Objective 1: Assess diabetes self-management knowledge of nurses .....	51
5.2.2	Objective 2: to determine nurses' perceived capacity (self-efficacy) to perform diabetes self-management support.....	53
5.2.3	Objective 3: to determine nurses' behaviour of performing self-management support .....	54
5.2.4	Objective 4: to determine the association between nurses' knowledge, self- efficacy, and the performance of diabetes self-management support.....	56
5.2.5	Objective 5: identifying demographical factors that influence nurses' diabetes self-management knowledge, self-efficacy, and performance .....	57
5.3	Conclusion .....	58
5.4	Limitations of the study.....	58
5.5	Recommendations.....	58
5.5.1	Practice recommendations .....	58
5.5.2	Recommendations for further research.....	59
5.6	Conclusion .....	59
<b>References .....</b>		<b>60</b>
<b>Appendices .....</b>		<b>71</b>

## LIST OF TABLES

Table 3.1: Reliability of the Data Collection Instruments .....	31
Table 3.2: Data Collection Dates .....	32
Table 4.1: Demographic Data of Participants (nominal or ordinal level variables) .....	36
Table 4.2: Descriptive Statistics Continuous Demographic Variables.....	39
Table 4.3: Frequency of Correct Knowledge Responses .....	40
Table 4.4: Self-Efficacy and Performance of Self-Management Mean Scores .....	42
Table 4.5: Total Scores for Self-efficacy and Performance (Sub-scales: Assess, Advise, Agree, Assist, Arrange, & Partnership) .....	46
Table 4.6: Correlations between Knowledge, Self-management Support Self-efficacy and Performance.....	47

## LIST OF FIGURES

Figure 1.1: Research Framework.....	4
Figure 2.1: The Chronic Care Model .....	13
Figure 2.2: The 5 A approach .....	16
Figure 3.1: OR Tambo District Map.....	24
Figure 4.1: Histogram of Participants' Age .....	38
Figure 4.2: Histogram of Years' Experience as a Professional Nurse .....	39
Figure 4.3: Knowledge Score Percentage Histogram.....	41
Figure 4.4: Box and Whisker Plot of Knowledge Score across Category of PHC Qualification.....	48
Figure 4.5: Box and Whisker Plot of Self-efficacy and when the Participant Last Provided Assistance to a Person Living with Diabetes.....	49
Figure 4.6: Box and Whisker Plot of Performance and Highest Qualification .....	50

## LIST OF APPENDICES

Appendix 1: Participant information and consent form .....	71
Appendix 2: Diabetes self-management support questionnaire..	<b>Error! Bookmark not defined.</b>
Appendix 3: Section 3: Self-efficacy and Performance in Self-Management Support.....	79
Appendix 4: Ethics approval.....	86
Appendix 5: Approval letter .....	89
Appendix 6: Editor's certificate .....	91
Appendix 7: Formatting certificate.....	92

## ABBREVIATIONS

APC/PAC	Adult Primary Care guide
BP	Blood Pressure
CCM	Chronic Care Model
CDC	Centre for Disease Control
CDIA	Chronic Disease Initiative for Africa
CHC	Community Health Centre
CHWs	Community Health Workers
CCMDD	Central Chronic Medication Dispensation and Distribution
DBKT	Diabetes Basic Knowledge Test
DSM	Diabetes Self-Management
DSME	Diabetes Self-Management Education
DSMS	Diabetes Self-Management Support
ICC	Intraclass correlation coefficient
IDF	International Diabetes Federation
IINDIAGO	INtervention for DIAbetes risk after GestatiOnal diabetes
KSD	King Sabatha Dalindyebo
HbA1c	Haemoglobin A1c
HREC	Health Research Ethics Committee
NCDs	Non-Communicable Diseases
PHC	Primary Health Care
RFI	Relative Fit Indices
RMSEA	Root Means Square Error of Approximation
SD	Standard Deviation
SEDMSA	Society for Endocrinology Metabolism and Diabetes of South Africa
SM	Self-Management
SMART2D	Self-Management Approach and Reciprocal Transfer for Type-2Diabetes
SME	Self-Management Education
SMS	Self-Management Support
SMRS	Standardised Root Mean Square Residual
SOP	Standard Operating Procedure
SEPSS	Self-Efficacy and Performance in Self-management Support
SPSS	Statistical Package for the Social Sciences

WBOTs	Ward-Based Outreach Teams
WHO	World Health Organization
WMS	World Medical Association

## CHAPTER 1: FOUNDATION OF THE STUDY

### 1.1 INTRODUCTION

Diabetes incidence is on the rise globally and is a concern as mortality related to it is also increasing. It is defined as a metabolic disorder characterized by increased blood sugar levels (hyperglycemia) and metabolic disturbances of carbohydrates, fat, and protein, which result from defects in insulin secretion, action, or both (The Society for Endocrinology Metabolism and Diabetes of South Africa (SEMDSA), Type 2 Diabetes Guideline, 2017:12). In 2019, approximately 4.6 million people were living with diabetes in South Africa (International Diabetes Federation (IDF), 2019:65).

This high number of people living with diabetes compels countries including South Africa to come up with strategies to reduce the disease burden. Self-management is one of the strategies adopted by many countries. Grady and Gough (2014:2) define self-management as an ongoing process where individuals are actively involved daily with the management of their chronic condition. Currently, there is no formal structured diabetes self-management programme in South Africa; however, the Department of Health is in the process of introducing a self-management programme called the 'Assistive Self-Management Programme' (South Africa, 2020:5). This programme defines 'assistive self-management' as a process where activated and informed patients take full accountability for their own health and it is also the main objective of the programme. Ward-based outreach teams (WBOTs) will support and capacitate patients and communities to take ownership of their health (South Africa Department of Health (b), 2020:5).

To provide diabetes self-management education and oversee community health workers (CHWs), professional nurses in primary health care (PHC) need knowledge of diabetes and its management as well as teaching and counselling skills (Hollis, Glaister & Lapsley, 2014:236). However, nurses are seldom trained to provide self-management education (Hollis *et al.*, 2014:236). An investigation into PHC nurses' knowledge, self-efficacy, and performance of diabetes self-management support may highlight the gaps to inform training, which is critical for the success of the Assistive Self-Management Programme.

### 1.2 RATIONALE

The mortality rate due to diabetes was estimated to be 366 200 in Africa and 89 800 in South Africa (IDF, 2019:65). The IDF predicts that the number of diabetic cases will increase by 51% to over 700 million by 2025. In the OR Tambo District, the number of people who were living

with diabetes in 2017 was estimated to be around 5395 (Eastern Cape Department of Health (b), 2018-21: 28). These high numbers pose major public health and socio-economic challenges. A quarter of South Africans are unemployed, and the medical costs related to diabetes management have the potential of affecting the country's economy (SEMDSA, 2017: 10). Effective strategies like diabetes self-management education (DSME) and support (DSMS) are vital in reducing this disease burden. In a systematic review conducted in developed countries, DSMS has been shown to improve glycemic control and reduce complications (Chrvala, Sherr & Lipman, 2016:938).

In a study conducted in Cape Town, South Africa, patients living with diabetes had some difficulties concerning self-management (Murphy, Chuma, Mathews, Levitt, & Steyn, 2015:7). These difficulties included lack of psychological support, social support and inadequate education in terms of the disease itself from health care workers. This shows that patients living with diabetes need assistance from health workers, who are knowledgeable about the concept of self-management and diabetes.

Shifting of duties in PHC is an acceptable strategy to reduce the workload of doctors, cost of care, and improve quality and efficiency (Maier & Aiken, 2016:2). Nurses are the key role players in the provision of PHC and are involved in direct care and management of patients with chronic illnesses like diabetes, therefore they must have the necessary skills to support patients living with diabetes.

These self-management support skills include sound diabetes knowledge, communication, leadership, counselling and education (Uğur, Demir & Akbal, 2015:4). Patients require motivation to adapt to a new lifestyle as well as in-depth education about diabetes, disease management, including diet changes, exercise, medication, and long-term complications of diabetes, as well as how to deal with psychosocial issues that develop when living with diabetes (Uğur, Demir & Akbal, 2015:2).

A study was conducted in 2014 (Catsicas & Sciences, 2014: 56) in South Africa to assess the level of knowledge of health workers on nutrition and diabetes self-management (DSM). The results showed that nurses' general knowledge of diabetes self-management and nutrition was inadequate. Various factors were identified that influenced knowledge, which included the age and experience of participants, work allocation, and employment status (Catsicas & Sciences, 2014: 56). In an Australian study conducted by Hollis *et al.* (2014:237) in 2014, the results also showed that nutrition and medication knowledge were inadequate amongst nurses.

Nurses can only provide support to patients living with diabetes if they have the knowledge, confidence and skills required. However, a study conducted in Turkey, showed that nurses had limited expertise or did not trust their knowledge to perform self-management support (Uğur, Demir & Akbal, 2015:2). This, therefore, shows the importance of research to assess the degree of skill in PHC nurses, in particular regarding the provision of DSMS.

### **1.3 RESEARCH FRAMEWORK**

Self-management support is an educational intervention for patients with a chronic illness like diabetes. It is a holistic approach, focusing on conserving or enhancing health and a patient's self-management and goal achievement (Massimi, De Vito, Brufola, Corsaro, Marzuillo, Migliara, Rega, Ricciardi, Villari & Damiani, 2017:22).

For the DSMS programme to be successful, nurses need to be self-efficient. Self-efficiency refers to a person's confidence in the capability to accomplish a specific behaviour in a situation (Duprez, Van Hooft, Dwarswaard, van Staa, Van Hecke & Strating, 2016:1383).

Other skills that are necessary for nurses to be deemed competent in self-management support include diabetes self-management knowledge, teaching, and counselling skills (Ryan & Sawin, 2009:10). When nurses have these skills, they are able to provide self-management support to patients which in turn improves the self-management skills of patients.

Improved self-management skills lead to better short and long-term patient outcomes. Short-term outcomes include lifestyle changes. Long-term outcomes are related to improved health and treatment outcomes such as a reduction in Haemoglobin A1c (HbA1c). HbA1c is a blood test used to monitor glucose control and adherence over the previous few months. The normal levels of the HbA1c are 7%. When it is above 7%, it indicates uncontrolled diabetes (South African National Department of Health (a), 2020:134). Each of these components will be discussed further.

#### **1.3.1 Self-management support**

Self-management support focuses on improving patients' knowledge and beliefs, self-regulation abilities, and access to resources. Patients are taught self-regulation skills by nurses. Self-regulation requires one to set treatment goals and be able to monitor blood glucose levels, make decisions, and take action (Sawin, 2017:172). Patients also need skills to manage emergencies such as hypo/hyperglycaemia and what to do at home when such events happen. In addition, dietary adjustments are also necessary for controlling glucose levels (South African National Department of Health (a), 2020:133).

Patients should be provided with psychological help to better manage diabetes. Furthermore, patients living with diabetes must be able to control their emotions; therefore, psychological interventions may be needed to give them the skills (Sawin, 2017:172). In addition, resources available for the identified communities that could help improve blood sugar levels of patients should be identified. Once patients receive support from nurses and have access to these resources, there will be short-term/ proximal outcomes.

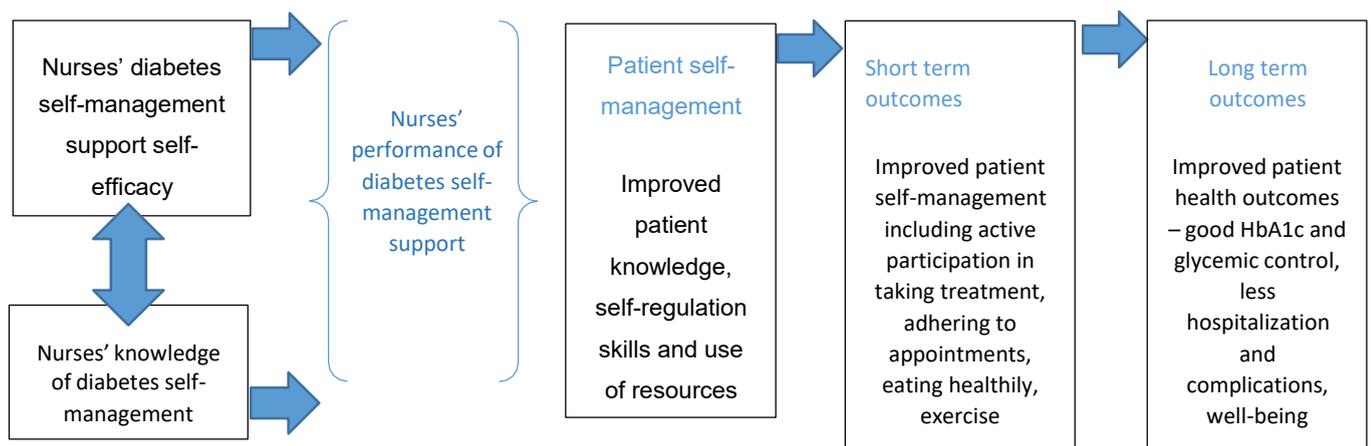
### 1.3.2 Short-term outcomes

Short-term outcomes are short-term outcomes of the DSMS programme. These outcomes are achieved because the programme allows patients to engage in self-management behaviour (Ryan & Sawin, 2009:10). This behaviour includes adherence to clinic appointments and treatment. Furthermore, patients must adopt a healthy eating lifestyle, consequently giving rise to long-term outcomes.

### 1.3.3 Long-term outcomes

Long-term outcomes also known as distal outcomes, lead to improved patient self-management over a long time. This happens through continuous active participation of patients on the programme; thus, their overall health improves. Patient HbA1c levels will be within normal ranges, hospitalisation will be reduced, diabetes complications will also be reduced, and the patient will feel well (Ryan & Sawin, 2009:10).

As illustrated in Figure 1.1, self-efficacy and knowledge of diabetes improves the ability of the nurse to provide or perform self-management support to patients; this in turn improves patients' self-management skills, leading to better short- and long term outcomes.



**Figure 1.1: Research Framework**

Source: Adapted from Ryan and Sawin (2009)

#### **1.4 PROBLEM STATEMENT**

In the OR Tambo District health plan, non-communicable diseases (NCDs) were reported to be the number one cause of mortality in the age group 65+ in 2017. The mortality rate related to diabetes in this age group was higher compared to the younger group. Approximately 5395 people in OR Tambo District were living with diabetes in 2017 (OR Tambo District Health Plan, n.d.:28). Currently, there is no data to evaluate the number of uncontrolled diabetes cases.

Evidence of PHC nurses' knowledge, self-efficacy, and performance of self-management support is needed to evaluate current practices and required training in diabetes self-management support, and to make recommendations for the Assistive Self-Management Programme.

#### **1.5 RESEARCH QUESTION**

Do PHC nurses in OR Tambo District have adequate knowledge and self-efficacy to perform diabetes self-management support?

#### **1.6 HYPOTHESIS**

Primary health care nurses' knowledge and self-efficacy is associated with the performance of diabetes self-management support.

#### **1.7 RESEARCH AIM**

This study aims to evaluate the knowledge, self-efficacy, and performance of primary health care nurses of diabetes self-management support in OR Tambo District, Eastern Cape.

#### **1.8 RESEARCH OBJECTIVES**

Objectives of the study are:

- To assess the diabetes self-management knowledge of nurses.
- To determine nurses' perceived capacity (self-efficacy) to perform diabetes self-management support.
- To determine nurses' performance of self-management support (the behaviour of performing self-management support).
- To determine the association between nurses' knowledge, self-efficacy, and the performance of diabetes self-management support.
- To identify demographic factors that influence nurses' diabetes self-management knowledge, self-efficacy, and performance.

## **1.9 RESEARCH METHODOLOGY**

A brief overview of the research method, including the design, sampling, data collection and analysis, are provided, with a detailed discussion following in Chapter 3. The ethical principles followed during the data collection including COVID-19 precautionary measures, are discussed in more detail, with application in Chapter 3.

### **1.9.1 Research design**

A simple correlational design was used to investigate the associations between nurses' diabetes knowledge and self-management support self-efficacy and performance. The design was chosen since it allows for investigating the relationships between variables in the absence of an intervention (Gray, Grove & Sutherland, 2017:411).

### **1.9.2 Study setting**

The study was conducted in PHC clinics and community health centres (CHCs) in King Sabatha Dalindyebo (KSD) sub-district in the OR Tambo District, which provide services for non-communicable diseases like diabetes and communicable diseases like TB and HIV. KSD covers peri-urban and deep rural areas and has a population of 509 363 people.

### **1.9.3 Population and sampling**

Professional nurses working in a PHC setting were the target group. There are 167 professional nurses working in KSD, excluding the night staff and maternity staff. One hundred (n=100) nurses were conveniently sampled to participate in this study.

### **1.9.4 Instrumentation**

One questionnaire comprising three sections was used. These sections included: 1) Participant demographic information; 2) Diabetes Basic Knowledge Test (DBKT) adapted from the modified version of the "Diabetes Knowledge Test" by Sandra Scheiderich that was revised for use in 2007 by Sally Gerard (*in* Ledbetter, 2011:52), and 3) the Self-Efficacy and Performance in Self-management Support (SEPSS) instrument (Duprez *et al.*, 2016). The questionnaire was administered in English as it is the official language of written communication that is accepted in clinical facilities in OR Tambo District.

### **1.9.5 Pilot test**

A pilot test was done with 16 nurses (n=16) who attended a diabetes management workshop. The researcher asked for permission from the non-communicable disease manager to conduct the pilot test, and it was granted. Out of the 16 nurses, 14 participated and only eight participants answered all the questions. Data was not included in the main study for analysis.

### **1.9.6 Data collection**

Data was collected in KSD PHC facilities and CHCs. An information session was arranged with the facility managers. During the information session, nurses who were interested to participate were given consent forms to sign. Questionnaires were then handed out and participants were given space to complete the questionnaire, but the researcher and research assistant were on site to answer any questions participants had.

### **1.9.7 Data analysis**

Data was entered into the Statistical Package for the Social Sciences (SPSS) version 27 by the researcher and a quality check undertaken. A statistician from Stellenbosch University assisted with the analysis and interpretation of results. Data are reported by descriptive and inferential statistics.

## **1.10 ETHICAL CONSIDERATIONS**

Ethics approval was obtained from Health Research Ethics Committee at Stellenbosch University, reference number#: S20/12/349 (Appendix 4). Permission was obtained from the Eastern Cape Department of Health Ethics committee, reference number, EC\_20204\_003. Permission to conduct the research in OR Tambo District was obtained from the district manager.

Three ethical principles of **justice**, **respect for persons**, and **beneficence**, published by the World Medical Association (WMA) in 1964 after the Declaration of Helsinki, which was first published in 1964 and amended in 2013, were applied (Doenges & Dik, 2019:np).

### **1.10.1 Justice**

Participants were not coerced to participate; they were given a choice of whether they wanted to be part of the study or not. In addition, participants were informed that they could withdraw from the study at any given point. A thorough explanation of the study, its aims and objectives were given to participants to ensure they understood everything clearly before signing the consent form.

### **1.10.2 Respect for persons**

Participants were advised not to write their names or facility name on the questionnaires to ensure anonymity. In addition, consent forms were kept separate from the questionnaires. A unique identifier was assigned to each questionnaire and data was entered in a password protected computer to limit unauthorised access. Only the researcher entered the questionnaires into SPSS, and the research assistant assisted in verifying if data was correctly entered.

### 1.10.3 Beneficence

To ensure privacy and for participants to feel comfortable and free when completing the questionnaire, the researcher and assistant waited outside. No completed questionnaires were left lying around. The researcher collected them immediately once completed and kept them safe with her. This was done to ensure that no-one had access to the questionnaire; in particular, the manager, and to ensure complete confidentiality and to avoid harm to participants.

The researcher and research assistant did their best to minimise the risk of contracting COVID-19, especially amongst participants. Standard precautions were followed. These included maintaining social distance, wearing of a mask, using hand sanitizer, and minimising the time spent with participants.

Participants were compensated for their time and inconvenience with bottled water as a token of appreciation. Data was collected outside busy times in the clinic to avoid compromising services.

Completed questionnaires were entered into SPSS and saved in a password protected folder in the researcher's computer. After they were captured and data was analyzed with the assistance of the statistician, all original documents were shredded.

The questionnaires were written in English and simplified so that everyone understood the questions asked in the questionnaire. To ensure fairness and include all eligible participants, professional nurses who were not able to attend the information session were visited on different days.

## 1.11 DEFINITIONS

**Diabetes knowledge:** In this study diabetes knowledge is understanding the physiological aspects of the disease, pharmacodynamics, tests to monitor glucose control and lifestyle changes (diet and exercise) that improve diabetes control (South African National Department of Health (c), 2014:11). Diabetes knowledge was measured using the adapted Diabetes Basic Knowledge tool (Ledbetter, 2011:1).

**Diabetes mellitus:** (diabetes) is a metabolic condition caused by abnormalities in insulin secretion, insulin action, or both. It is characterised by persistent hyperglycaemia and problems in carbohydrate, lipid, and protein metabolism (Republic of South Africa health department (c), 2014:11).

**Self-efficacy:** is the level of confidence required for one to do a specific task to the best of their ability. In this study, self-efficacy for self-management support refers to being confident in your ability to manage diabetes and is measured by a high self-efficiency score in SEPSS instrument (Hailu, Moen & Hjortdahl, 2019:1).

**Self-management:** is defined as an ongoing process where individuals are actively involved daily with the management of their chronic condition (Grady & Gough, 2014:2).

**Diabetes self-management education:** is an ongoing process of fostering the awareness, experience, and capacity required for self-management in people living with diabetes (Haas, Maryniuk, Beck, Cox, Edwards, Fisher, *et al.*, 2014:2).

**Diabetes self-management support (DSMS):** is defined as assisting people with a chronic illness like diabetes in learning the skills they need to enhance their confidence, as well as providing necessary equipment and resources and maintaining regular communication with members of the health-care team to address issues and celebrate accomplishments (Ryan & Sawin, 2009:6). In this study, the performance of diabetes self-management support is measured by the self-performance scale of the SEPSS instrument (Duprez *et al.*, 2016:1).

**A Primary health care nurse** is a person who is qualified and competent to practice comprehensive nursing autonomously in the manner and to the level prescribed, as well as to assume duty and accountability for such practice (Republic of South Africa (d), 2005). Primary health care nurses in this study includes nurses who have a diploma / degree in nursing and nurses who have a postgraduate diploma in Clinical Nursing Science, Health Assessment, Treatment and Care (Republic of South Africa (a), Government Notice R48, 1982).

## 1.12 DURATION OF THE STUDY

Ethics approval was obtained from the University of Stellenbosch Health Research Ethics Committee (HREC) on 31 March 2021. Permission from the Eastern Cape Health Department Ethics Committee to conduct the research in Eastern Cape was obtained on the 12<sup>th</sup> of April 2021 and from the District Manager in OR Tambo District on the 7<sup>th</sup> of May 2021.

Data was collected from 1<sup>st</sup> July 2021 to the 27<sup>th</sup> of August 2021. Data analysis was done between September 2021 and November 2021. The thesis was handed in for examination in December 2021.

## 1.13 CHAPTER OUTLINE

**Chapter 1: Foundation of the study**

The chapter introduces the research topic, aim, and objectives of the study. The research methodology is described briefly.

## **Chapter 2: Literature review**

Literature related to self-management education and support is reviewed and discussed, including self-management programmes globally.

## **Chapter 3: Research methodology**

The research methodology, including the design, sampling, data collection and analysis, followed during the data collection are discussed in detail.

## **Chapter 4: Results**

Study results are presented in three sections, using frequency tables and distributions, and inferential statistics on associations between dependent and independent variables.

## **Chapter 5: Discussion, conclusions and recommendations**

The research results are discussed with reference to the study aim, objectives, and findings of prior studies on diabetes self-management support. Study limitations are highlighted. Lastly, the study's scientific evidence is used to draw conclusions and recommendations.

### **1.14 SIGNIFICANCE OF THE STUDY**

Assessing PHC nurses' knowledge, self-efficacy, and performance of diabetes self-management support is vital as it assists in identifying gaps that may inform the training of health professionals in the self-management programme in OR Tambo District and other similar settings. In addition to this, the results may assist in the implementation of the Assistive Self-management Programme.

### **1.15 CONCLUSION**

Diabetes-self management education and support are widely used in other countries and have proved to be effective. Currently there is no self-management programme in South Africa and few studies are conducted on this concept. PHC nurses' knowledge, self-efficacy and performance in self-management in OR Tambo District was assessed using a quantitative correlational research design. Nurses who are knowledgeable about diabetes self-management support and apply it, can assist patients living with diabetes to improve their clinical outcomes, leading to better quality of life and increased life expectancy.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 INTRODUCTION

Diseases of lifestyle choices like diabetes are on the rise in the Eastern Cape. In 2018/19, the total number of people newly diagnosed with diabetes was 16 430. Costs related to hospital admissions to manage complications such as renal failure put a financial strain on the health department (Eastern Cape Health Department Annual Performance Plan, 2020/21 annual performance:40). Furthermore, people living with diabetes are at high risk for respiratory infection (Coetzee, Taljaard, Hugo, Conradie, Conradie-Smit & Dave, 2020:761). With the outbreak of COVID-19, people living with diabetes are at risk of developing more severe infections, in particular those with uncontrolled disease (Coetzee *et al.*, 2020:761). A well-structured effective self-management programme has been found to be helpful in most developed countries in improving glycaemic control (Hailu, Moen & Hjortdahl, 2019:2).

This literature review will demonstrate scientific evidence on diabetes self-management programmes across the globe. At the onset of this chapter, the epidemiology of diabetes internationally and in South Africa are discussed. Approaches to chronic disease management programmes are then described followed by self-management support and education, self-management programmes internationally and in Africa, the role of nurses in self-management programmes, and competencies needed to provide self-management support.

### 2.2 SELECTING AND REVIEWING THE LITERATURE

A narrative review of literature on diabetes and self-management was conducted using PubMed, EBSCO host, and Google Scholar databases. Search terms used were diabetes self-management, self-management support, self-management education, and global epidemiology of diabetes. Relevant articles were selected and included in the synthesis of the literature. Articles were included if they had information on international and local diabetes self-management. Articles selected were published between 2011 and 2021. Grey literature included were South African guidelines and conference publications, the Eastern Cape Department of Health's Annual Performance Plan, and OR Tambo District Health Plan. Approximately 189 articles were screened, and 36 articles were selected.

### 2.3 EPIDEMIOLOGY OF DIABETES GLOBALLY AND IN SOUTH AFRICA

Approximately 463 million people are living with diabetes in the world (IDF, 2019:4). In Africa, it was estimated that 19 million people were living with diabetes in 2019, and 4.6 million in South Africa (IDF, 2019:65). The number of people living with diabetes in OR Tambo District,

Eastern Cape, was estimated to be 5395 (3.9%) in 2017. People newly diagnosed with diabetes were estimated to be 4430 in OR Tambo District in 2018/19 and in King Sabatha Dalindyebo (a sub-district in OR Tambo) the number was 1240 (1.5%). The IDF (2019) further estimates that diabetes prevalence will increase by 51% to over 700 million globally by 2045. Africa is also faced with the challenge of a high number of undiagnosed people with diabetes. In 2019, the number of people with undiagnosed diabetes was estimated to be around 11.6 million (IDF, 2019:65).

In 2019, the number of people who died of diabetes was estimated to be 36 6200 in Africa and 89 800 in South Africa (IDF, 2019:65). Diabetes was the fifth highest cause of years of life lost in South Africa in 2017, accounting for 4.0% of all deaths. It progressed from eighth to fifth place between 2010 and 2017. The Eastern Cape Province in South Africa has the third highest diabetes-related deaths in the country (Neethling, Groenewald, Bradshaw, Day, & Laubscher, 2020:251). In OR Tambo District, the diabetes mortality rate was 3.3% amongst females in the age group 25-64, 6.6% amongst females in the age 65+, and 4.6% amongst males 65 years and older in 2016 (OR Tambo District Health Plan, 2016: 28).

To assist people living with diabetes, reduce costs related to diabetes management and mortality rates, most countries have introduced self-management programmes, an approach to chronic disease management.

## **2.4 APPROACHES TO CHRONIC DISEASE MANAGEMENT**

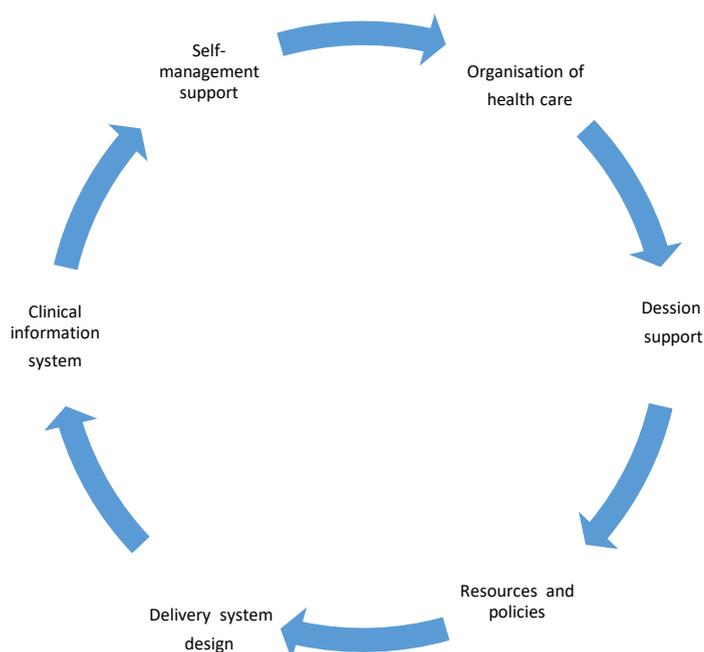
The Centre for Disease Control (CDC) defines a chronic disease as a condition that lasts for a year or more, that necessitates ongoing medical care. Chronic diseases of lifestyle are mostly caused by poor lifestyle choices such as smoking, physical inactivity, obesity, and poor nutrition (high fat and salt, fewer vegetables and fruits) but can be hereditary (Center for disease control, 2019: np). Chronic diseases require long-term care, supervision, and close monitoring by health care providers. Various approaches are used to manage chronic diseases, such as care pathways, case management, coordinated care, and the Chronic Care Model (Nolte, Knai & Saltma, 2014:5).

Care pathways, also called integrated care, stipulate crucial steps in patient care and describe expected clinical outcomes (Nolte, Knai & Saltma 2014:5). The main goal is to improve the quality of healthcare, and collaboration among health professionals, efficiency, and patient satisfaction (Rosique, 2021:np).

Case management is a comprehensive programme that keeps track of a person with a complex medical problem. Treatment plans are created that are customised to meet the individual needs of the patient (Nolte, Knai & Saltma, 2014:5).

Coordinated care is also used to meet the patient's needs. It entails the development of therapeutic strategies that integrate medical and social services. The primary goal is to improve the health outcomes of vulnerable older people and those with varied and complex needs (Nolte, Knai, & Saltma, 2014:10).

Wagner developed the Chronic Care Model (CCM) in the early 1990s as a paradigm for improving the quality of chronic care (Reynolds, Dennis, Hasan, Slewa, Chen, Tian, Bobba & Zwar, 2018:2). This model is integrative and is designed to help people living with chronic illnesses like diabetes manage their health. It also directs the preparation and implementation of chronic healthcare services. Society and the healthcare system are the two realms of this approach. In addition to these, there are six components, which include organisation of health care, decision support, resources and policies, delivery system design, clinical information systems, and self-management support (Barr, Robinson, Marin-Link, Underhill, Dotts, Ravensdale & Salivaras, 2003:74). Figure 2.1 below depicts the Chronic Care Model.



**Figure 2.1: The Chronic Care Model**

**Source:** Wagner (1998:2-4)

These components are based on the premise that an effective chronic care programme requires systematized health care organization with a clear vision, priorities, and leadership. Furthermore, health systems should have well-developed mechanisms and incentives for implementing reforms in the healthcare system. Clinical information systems aid in the development of disease registries, monitoring systems, and reminders, as well as to provide performance feedback. Policies and guidelines backed up with provider knowledge, reminders, and further details on contact and interaction between generalists and specialists are crucial in the management of chronic illnesses (Barr *et al.*, 2003:76).

The CCM is used as a guide in developing diabetes self-management programmes. The CCM has proven to be effective in improving health outcomes in people living with diabetes. It also improves healthcare practices related to disease management (Davy, Bleasel, Liu, Tchan, Ponniah & Brown, 2015: 5).

The World Health Assembly decided in 2013 to set global goals and one of them was to halt the rise in diabetes and obesity (World Health Organisation (WHO), 2014:16). As a result, many countries implemented self-management programmes as a strategy to reduce the burden of disease due to diabetes. These programmes are focused on providing self-management support.

## **2.5 SELF-MANAGEMENT SUPPORT FOR PERSONS LIVING WITH DIABETES**

### **2.5.1 Self-management**

Self-management (SM) is regarded as a promising approach to improve patient clinical outcomes (Registered Nurses Association of Ontario clinical practice guideline, 2010:19). Grady and Gough, (2014:2) define self-management as an ongoing process where individuals are actively involved daily with the management of their chronic condition.

Self-management can be a process that requires skills such as problem-solving, decision-making, self-regulation and self-monitoring. If a person is supported to improve these skills, it leads to better self-management behaviours such as exercise, medication use, etcetera, which eventually leads to better health outcomes (Grady & Gough, 2014:8).

Self-management has good psychological effects as it reduces the burden of living with a chronic illness because patients receive continuous support from health care providers. In addition to this, patients are closely monitored, and signs and symptoms of the disease are managed. However, to maintain an optimum level of self-management, patients living with

diabetes must make good lifestyle choices. These choices include dietary control, regular exercise, correct use of medication both oral and injectable, and self-monitoring of blood glucose levels (O'Brien, van Rooyen & Ricks, 2020:4). Other positive aspects include self-efficacy to perform self-management behaviours, leading to good health outcomes.

The self-management process involves six management skills which include: problem-solving, decision-making, resource utilization, formation of patient-provider relationship, development of an action plan, and self-tailoring (Lorig, Halsted & Holman, 2003:2).

### **2.5.2 Self-management support**

To maintain behaviour that assists in improving glycaemic levels, patients need ongoing diabetes self-management support from nurses. Beck, Greenwood, Blanton, Bollinger, Butcher and Condon, (2019:52) define ongoing support as resources that help patients to sustain ongoing skills, knowledge, and behavioural changes needed to manage a condition. Self-management support is one of the four essential components within the health care system in the CCM. In the CCM, self-management support focuses on aiding people in developing the skills they need to boost their confidence, as well as providing required equipment and resources and maintaining regular communication with members of the health care team to resolve concerns and celebrate achievements (Ryan & Sawin, 2009:6).

The main aim of self-management support (SMS) is to help patients become knowledgeable about diabetes and to take an active role in the management of their condition. Also, SMS promotes behavioural change rather than compliance with the caregivers' advice (Registered Nurses' Association of Ontario clinical practice guideline, 2010:20).

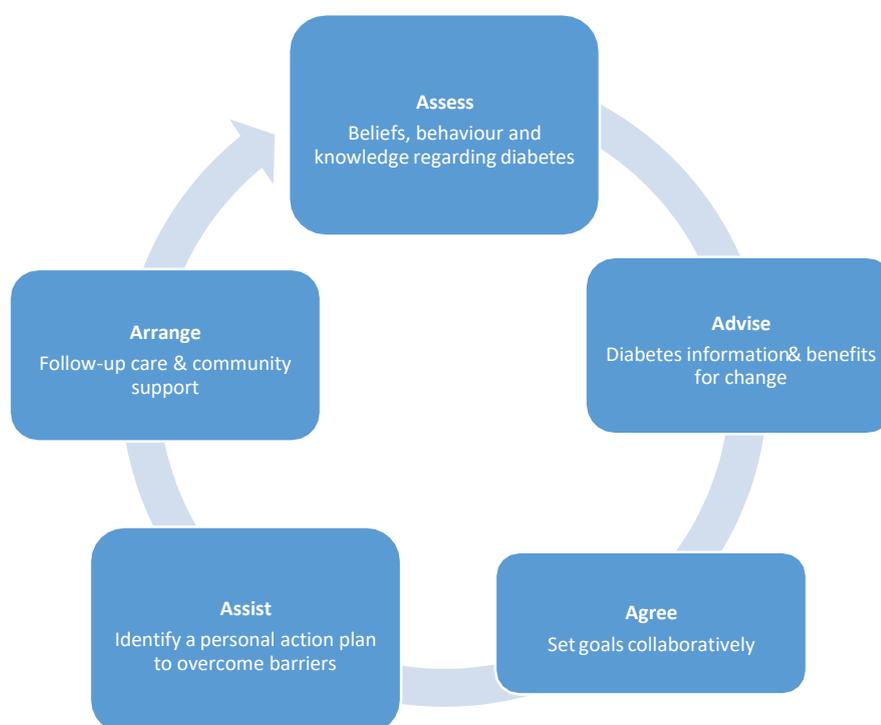
Self-management support encompasses collaborative decision-making and education. The collaborative decision-making aspect promotes patient-provider relations. Both the provider and the patient identify issues and priorities, set goals, develop treatment plans, and resolve issues as they arise (Registered Nurses' Association of Ontario clinical practice guideline, 2010:20).

### **2.5.3 Guidelines for improving self-management support**

When assisting clients with a chronic condition, the "5 A's" approach of assess, advise, agree, assist, and arrange is used to include different self-management support strategies to help improve patient outcomes. Glasgow adopted this approach which came highly recommended by the United States of America Preventive Services Task Force in the early 2000s. This approach is patient centered as it stresses patient beliefs, history, situation, and preferences throughout each of the five activities (Glasgow, 2010:747).

In the **'assess'** component, nurses establish a relationship with the patient. This is followed by a psychological assessment and a thorough assessment of the patient's readiness for change. An agenda for appointments is then drafted which may include clinical data reviews, feedback from the patients about their experiences with the programme and challenges encountered, developing action plans, and issuing medication, and patient education (Duprez *et al.*, 2016:2). In the **'advise'** phase, information about the disease is provided. The **'agree'** phase necessitates collaborative goal-setting skills, in which the nurse and patient must agree on the objectives to pursue, informed by previous beneficial experiences. The next phase is the **'assist'** phase where nurses use their skills to help patients modify their regular activities, which may involve encouraging them to seek professional assistance. The **'arrange'** phase is about setting up follow-up care.

Importantly, plans must be created to assess progress toward achieving goals (Duprez *et al.*, 2016:2). The 5 As approach is represented in Figure 2.2.



**Figure 2.2: The 5 A approach**

**Source:** Glasgow (2010:747).

#### 2.5.4 Self-management education

Education is a prerequisite for informed decision-making – and subsequently for selfmanagement (Udlis, 2011:5-6). DSME is therefore a critical component in self-management support as described in the previous section. The term DSME is often used in

diabetes self-management literature as patient education is the foundation of self-management programmes. Diabetes self-management education is an ongoing process of fostering the awareness, experience, and capacity required for self-management in people with diabetes. This process is driven by evidence-based criteria and integrates the needs, aspirations, and life experiences of the individual with diabetes or prediabetes (Haas, *et al.*, 2014:2).

According to Hollis, Glaister and Lapsley (2014:235), self-management education (SME) focuses on equipping those living with chronic illness with skills to manage the disease better and live a healthier life. General health education differs from SME as SME includes comprehensive education about a disease itself, treatment, and cure as well as skills for promotive health (Hollis, Glaister & Lapsley, 2014:235).

The main aims of DSME are to improve glycaemic control, reduce diabetes complications, and optimize general wellbeing and optimise quality of life. It also promotes psychosocial adjustment through self-beliefs, coping skills, problem-solving, and goal setting (Hollis, Glaister & Lapsley, 2014:235).

In self-management education, patients are encouraged to identify issues to be covered and educators teach them skills to solve these. This improves the confidence of patients in managing their disease and produces better clinical outcomes (Registered Nurses' Association of Ontario clinical practice guideline, 2010:24).

DSME can be delivered using various methods, including individual education, group education, remotely, by telephone, and/or online, and also by combining both individual and group education (Chrvala, Sherr & Lipman, 2016:9).

### **2.5.5 Efficacy of self-management programmes**

Diabetes self-management programmes have proven to be effective in improving health outcomes. A systematic review to assess the effectiveness of self-management (DSM) programmes that included 14 studies and 8514 participants showed improvement in blood glucose control, reduction in weight and blood pressure as well as decreased distress related to living with diabetes in patients on self-management programmes (Vas, Devi, Vidyasagar, Acharya, Rau, George, Jose & Nayak, 2017:2).

There is also evidence that self-management programmes are effective in the African context. In Ethiopia, a study was conducted to assess the effects of DSM on glycaemic control. The study enrolled 116 participants and followed them up over nine months. The DSM programme

included six education sessions enhanced by descriptive photos, handbooks, and leaflets that were adjusted to local conditions. The results showed a drop in HbA1c in participants, and blood pressure (BP). In addition to this a reduction in macrovascular and microvascular complications was noticed (Hailu, Moen & Hjortdahl, 2019:7).

## **2.6 SELF-MANAGEMENT PROGRAMMES INTERNATIONALLY**

Diabetes self-management programmes are well structured and effective in most developed countries. Each country has its own method of providing self-management support. In the United States of America, the programme is structured according to ten standards. These standards are designed to assist individuals who provide diabetes self-management education and support to provide quality evidence-based care. The standards are not formulated from a specific approach, but commonalities among effective self-management education approaches were identified to inform the standards (Haas *et al.*, 2014:144).

Three meta-analyses and systematic reviews (Chrvala, Sherr & Lipman, 2016:936; Azami, Soh, Sazlina, Salmiah, Aazami, Mozafari & Tanghinejad, 2018:9; Massimi *et al.*, 2017:1) were conducted to review the effect of DSM and support on glycaemic control, all showed that nurse-led self-management support interventions were effective to reduce HbA1c levels and improving BP measurements.

In China, DSM programmes are well-established and implemented. This country has the largest number of diabetics in the world, accounting for one-third of the global diabetes population (Liu, Wu, Wang, Li, Yang, Ge, Du & Wang, 2018:1). A study was conducted in 2019 to assess whether the DSM programme that uses simulation education and case management improved glycaemic control in people living with diabetes. A case manager followed up on participants on a DSM programme and simulation education comprised educational materials. Both methods equipped patients with skills and knowledge to manage diabetes. At the end of the study, significant improvements in HbA1c and self-management were seen (Ji, Chen, Huang, Li, Shi & Zhou, 2018:5).

## **2.7 DIABETES SELF-MANAGEMENT PROGRAMMES IN AFRICA**

In the African continent, DSM programmes are not as effective and structured as in developed countries. According to Stephani, Opoku and Beran (2018:1), self-management in sub-Saharan Africa is poor and a serious threat to the health of individuals living with diabetes. In South Africa, there is no formal DSM programme; however, there is a programme that will be launched soon called the Assistive Self-management Programme. In this programme, a Ward

Based Primary Healthcare Outreach team will assist patients and communities to self-manage (South Africa Health Department (b), 2020:5).

Results of a study conducted in Uganda showed that health care services were not easily accessible as patients living with diabetes only seek medical assistance when complications start. In health care facilities, the quality of care is compromised due to a shortage of qualified medical personnel, and DSMS is not prioritized (Absetz, Van Olmen, Guwatudde, Puoane, Alvesson & Delobelle, 2020:3).

Even though South Africa does not have a standardized, formally implemented DSM, research has been conducted to identify concerns that could stymie planned programme implementation. One of these studies was conducted in Port Elizabeth (Gqeberha) to describe the experiences of diabetes nurse educators in facilitating diabetes self-management in people living with diabetes. Participants reported that some people considered living with diabetes a tremendous burden, and they may doubt their ability to self-manage. In addition, physical and other medical conditions may affect the ability of the individual to reach the highest degree of self-management possible (O'Brien, van Rooyen & Ricks, 2020:4-5).

In another study conducted in Cape Town, Western Cape, the main challenges faced by people living with diabetes to self-manage were related to financial constraints, prolonged waiting times in health centres, and limited care and management skills of health care workers (Steyl, 2017:9).

In South Africa, research on self-management is also carried out by organizations such as the chronic disease initiative for Africa (CDIA). This organization acts as a regional center for designing and testing chronic disease prevention and treatment models. It has expanded to other countries in Africa as well. Research projects by CDIA include Integrated INtervention for DIAbetes risk after GestatiOnal diabetes (IINDIAGO), and Self-Management Approach and Reciprocal Transfer for Type-2Diabetes (SMART2D) (Levitt, 2019: 3). CCM theory underpins the SMART2D project. This project aims to transfer knowledge of evidence-based self-management support to socio-economically vulnerable communities in Africa through multicentered studies. Under the SMART2D initiative, research was conducted in three countries: South Africa, Sweden, and Uganda. Lack of trained personnel, accurate guidelines, and commitment to self-management were all found to be factors that affected the quality of care given to people living with diabetes (Absetz *et al.*, 2020:27).

## 2.8 THE ROLE OF NURSES IN PROVIDING SELF-MANAGEMENT SUPPORT

Nurses play an important role in chronic disease management, from when the patient is diagnosed, to treatment plan development, and monitoring of the patient's progress. They are also expected to consider how coping with a chronic illness affects patients' everyday lives. In addition to this, nurses go beyond patient care in health facilities, but their scope extends to the communities as well. The relationship nurses have with patients is built on trust as they spend most of their time with them (Alleyne, Hancock & Hughes, 2011:330).

In providing self-management support, nurses partner with patients and assist them to implement self-care activities. Self-care differs from self-management in that it focuses on actions that healthy people do at home to prevent illness, whereas self-management activities are carried out by persons who have chronic illnesses to better manage them (Grady & Gough, 2014:2). Nurses take a patient-centered, and holistic approach in their practice. Patients are encouraged and motivated to monitor their disease and to seek solutions on their own, taking note of the resources available to them (van Hooft, Dwarswaard, Jedeloo, Bal & van Staa, 2015:28).

Four perspectives on a nurse's role in self-management support were identified by van Hooft *et al.* (2015:28). These include the coach, the clinician, the gatekeeper, and the educator. The coach is concerned with the patient's everyday activities, while clinician nurses are concerned with medication adherence. The gatekeeper's viewpoint is based on the premise that the aim of self-management support is to lower healthcare costs. Lastly, the educator nurse teaches patients about how to manage their disease (van Hooft *et al.*, 2015:28). This shows that nurses can have multiple roles in self-management support.

In South Africa, approximately 84% of the population do not have medical insurance and make use of the public sector for health care. Primary care services in the public sector are typically staffed solely by nurses and are supported by doctors in CHC's. In remote areas, health care services are provided by mobile clinics which are also nurse-led (Mash, Fairall, Adejayan, Ikpefan, Kumari, Mathee, Okun & Yogolelo, 2012:2).

Diabetes self-management education is mostly provided by professional nurses and a few non-health professionals. Patients are educated in the waiting area or during a consultation. This method of delivering DSME is clouded by many challenges which include time constraints on the provider side, lack of privacy, and noise levels (Dube, Van den Broucke, Kalweit & Housiaux, 2015:181).

Nurses play an important role in diabetes self-management education and support, as such they must have certain competencies.

## **2.9 COMPETENCIES NEEDED TO PROVIDE SELF-MANAGEMENT SUPPORT AND CURRENT EVIDENCE ON SUCH COMPETENCES**

A competency is defined as knowledge, skills, and behaviours needed by healthcare workers to execute their duties (Segen's Medical Dictionary, 2012). For nurses to be competent in providing diabetes self-management education and support, they need to be specially trained and educated on self-management. In their training, counselling skills and teaching skills must be included as these aspects influence the effectiveness of the programme (Hollis *et al.*, 2014:235). Nurses also need to be knowledgeable about diabetes and its management. In addition, nurses must be able to assess people's needs, be able to facilitate shared decision-making, and respect people's autonomy (van Hooft, Becqué, Dwarswaard, Van Staa & Bal, 2018:156).

Diabetes knowledge, a fundamental aspect in provision of self-management, has been found to be insufficient in most studies conducted (Ledbetter, 2011:30). This was also supported by Hollis, Glaister and Lapsley (2014:1) in a study conducted to review practice nurses' knowledge to provide diabetes self-management education. To the researchers' knowledge, there are no diabetes knowledge studies conducted in South Africa.

Self-efficacy to provide self-management support amongst nurses is key in diabetes self-management education and support. Hailu, Moen and Hjortdahl (2019:1) describe self-efficacy as the level of confidence required for one to do a specific task to the best of one's ability. In order for nurses in OR Tambo District to be able to provide self-management support in patients living with diabetes, they must have confidence and self-efficacy. A study conducted by Hollis, Glaister and Lapsley (2014:4) showed that nurses' self-efficacy was relatively low due to knowledge deficiencies in diabetes. No studies on nurses' self-management support self-efficacy have been conducted in the South African context.

A good training background on self-management in nurses is vital; however, the approach to teach self-management in nursing colleges and universities in the Netherlands was found to be insufficient (van Hooft *et al.*, 2018:152). Even nurses in clinical practice are seldom trained on DSM (Hollis *et al.*, 2014:235). No evidence could be found of whether patient self-management support education is included in the undergraduate or postgraduate programme in South Africa.

Duprez *et al.* (2016) developed and validated a tool to measure nurses' performance and their perceived capacity to perform self-management support for chronic conditions. The tool is based on the 5 A model and will be explained in more detail in chapter 3. To the best knowledge of the researcher, this is the only known tool to measure nurses' self-management competencies. Provision of diabetes self-management support has not yet been measured in the South-African context.

## **2.10 CONCLUSION**

Diabetes self-management support is internationally recognized as a core component of chronic care. Studies conducted in most countries showed that DSM programmes are effective in improving clinical outcomes in patients living with diabetes. However, there is no research available on PHC nurses' self-management self-efficacy and performance in the South African context as the primary providers of DSM. The next chapter will highlight steps taken to collect data in PHC nurses in OR Tambo district.

## **CHAPTER 3: RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

In the previous chapter, an in-depth review of literature on diabetes self-management was done. This chapter includes a detailed description of the research methodology, including the design, sampling, data collection and analysis. The ethical principles followed are described as well as the COVID-19 precautionary measures followed.

### **3.2 AIM AND OBJECTIVES**

The study aimed to evaluate the knowledge, self-efficacy, and performance of PHC nurses in diabetes self-management support in OR Tambo District, Eastern Cape.

The following were the objectives of the study:

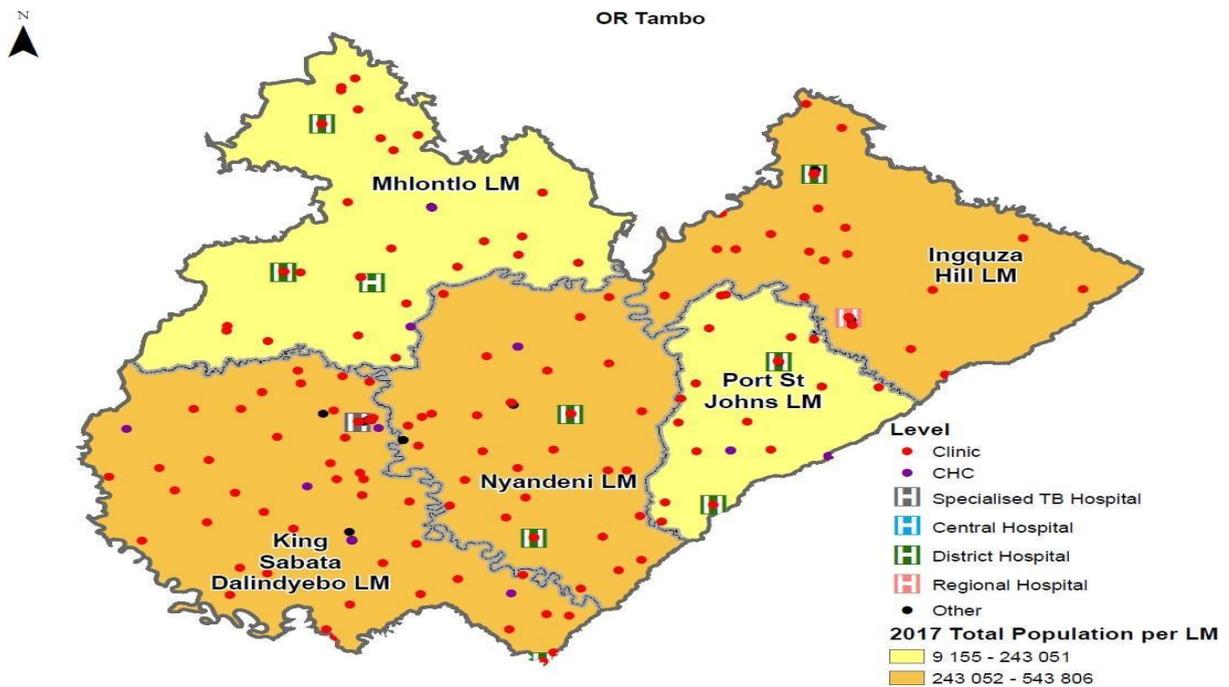
- To assess the diabetes self-management knowledge of nurses.
- To determine nurses' perceived capacity (self-efficacy) to perform diabetes self-management support.
- To determine nurse's performance of self-management support (the behaviour of performing self-management support).
- To determine the association between nurses' knowledge, self-efficacy, and the performance of diabetes self-management support.
- To identify demographic factors that influence nurses' diabetes self-management knowledge, self-efficacy, and performance.

### **3.3 STUDY SETTING**

The study was conducted in PHC facilities in KSD, a sub-district of the OR Tambo District. PHC facilities provide acute care, rehabilitative care and chronic care which includes communicable diseases like the Human Immunodeficiency Virus (HIV) and Tuberculosis as well as non-communicable diseases like diabetes, hypertension, and cardiovascular diseases. Doctors visit PHC facilities at least once a week. Patients are screened and diagnosed by nurses for diabetes and other non-communicable diseases. Diabetes care which includes treatment review, adjustment if needed and taking of blood samples is provided by nurses according to set guidelines (South African National Department of Health (a), 2020:133). Patients living with diabetes are referred to a doctor once in six months, when they start to develop complications or when they are not responding well to treatment.

The study region covers peri-urban and deep rural areas and communities. KSD is the biggest sub-district in OR Tambo District with an aggregated population of 509 363 people and has 49 PHC facilities and five CHC's (Eastern Cape Department of Health, OR Tambo District health plan (b), 2018-22: 28).

Figure 3.1 below depicts the study area.



**Figure 3.1: OR Tambo District Map**

*Source: O.R Tambo District Health Plan (2019-2022)*

### 3.4 RESEARCH DESIGN

The study used a quantitative correlational design to evaluate PHC nurses' knowledge, self-efficacy, and performance in diabetes self-management. Correlational research aims to establish the direction and the strength of relationships between, or among, variables (Gray, Grove, & Sutherland, 2017:209). In this study, a simple correlational design was followed to determine the relationships between self-management knowledge, self-efficacy and performance in diabetes self-management support in a single sample of participants at one point in time. The design was selected because it does not require any form of treatment or intervention. By adopting this approach, the researcher gained new insight since there are no studies in South Africa focused on PHC nurses' knowledge, self-efficacy, and performance in diabetes self-management support. This design allowed the researcher to describe the nurses'

self-management support performance and determine if their knowledge or self-efficacy is associated with it, to make training recommendations.

### **3.5 POPULATION AND SAMPLING**

The term "population" refers to a specific group of people who share common characteristics and are the focus of the study, while a sample refers to a chosen group of people or components (Gray, Grove & Sutherland, 2017:617). Professional nurses employed in KSD PHC and CHC facilities were the target group. CHC are PHC facilities that operate 24 hours a day, while PHC facilities are only opened for eight hours Monday to Friday. They were selected because of the integrated service delivery model of care in the primary care setting. According to this model, professional nurses must be able to provide chronic care services and should be able to provide self-management support to patients in their care (Republic of South Africa (e), Integrated clinical services management). According to the OR Tambo Persal (online salary payments) system, there are a total number of 312 professional nurses in KSD working in PHC.

The target population for this study was professional nurses rendering primary care services at departments and during times most patients access services (n=167). The target population therefore excluded maternity staff and night duty staff.

A statistician was contacted, and the sample size was determined as follows: a sample size of 100 from a population of 167 produces a two-sided 95% confidence interval with a precision (half-width) of 0.06 when the actual proportion is near 0.5 (Gray, Grove & Sutherland, 2017:203).

Due to the relatively small population, the researcher decided to approach all the potential participants who met the inclusion criteria for the study. However, due to logistical constraints of accessing all the participants, convenience sampling was the most feasible. Convenience sampling was therefore used to select available participants in the PHC clinics and CHC facilities. In a convenience sampling method, subjects are included because they are easily available (Gray, Grove & Sutherland, 2017:640). Biases in this method are common and, in this study, participants not on duty on the day data was collected could be easily left out. To avoid this, facilities were visited more than once so that everyone had an opportunity to participate.

Out of the 167 potential participants, the researcher was able to approach 143 participants, of which 125 met the inclusion criteria for the study and 106 consented to participate in the study. Participants not included were operational managers and WBOT's professional nurses.

WBOT's professional nurses were not available, since they were placed in roving teams around KSD vaccinating the communities and therefore not present on the days the researcher visited the facilities for data collection. Of the participants who agreed to complete the questionnaires (n=106), all 106 questionnaires were received back. Two operational managers completed questionnaires without declaring upfront that they were operational managers, and four questionnaires were incomplete (left questionnaire sections out); thus only 100 questionnaires were captured. The final sample size was 100 participants (60% of the target population), after the researcher made several attempts to visit the study sites.

### **3.5.1 Inclusion criteria**

Burns and Grove (2011:295) describe the inclusion criteria as the characteristics that a research subject or element must have to be included as a participant in a study. Professional nurses registered with the South African Nursing Council and who are working in PHC facilities in the KSD sub-district OR Tambo were included in the study.

### **3.5.2 Exclusion criteria**

Community service nurses were excluded because they are still being mentored and are not yet licensed as practicing nurses with the South African Nursing Council. Maternity staff and night duty staff were not included. Operational managers were also excluded as they do not work with patients living with diabetes on a day-to-day basis. Due to time constraints, nurses who were not present on days of data collection were also excluded.

## **3.6 PARTICIPANT RECRUITMENT**

To recruit participants, the researcher and research assistant booked an appointment with the facility manager of each of the PHC facilities for an information session to explain the study to all professional nurses. This was done to avoid disturbing the facility operations and to use the most convenient time. The researcher and assistant also communicated with participants to confirm if the time given by the facility manager was convenient to them.

The research assistant is a sub-district trainer, who has an honours degree in clinical nursing science. She was knowledgeable about the research process including data collection and was orientated by the researcher on the questionnaires and data collection process.

Before conducting information sessions at the clinic, the researcher, research assistant and participants were screened for signs and symptoms of COVID-19. During the information and data collection sessions, risk mitigation strategies such as social distancing, and wearing a mask were implemented. The researcher, research assistant and participants also adhered to

the national infection control and prevention guidelines to minimise the risk of spreading COVID-19 amongst the participants and the research team (Republic of South Africa (b), 2020:28).

Approval from the Stellenbosch University HREC, the Eastern Cape Department of Health as well as OR Tambo District were shown to participants and the facility managers.

The researcher visited some facilities more than once due to the workload and busy schedules of the participants at these facilities.

### **3.7 DATA COLLECTION INSTRUMENT**

One questionnaire comprising three sections was used (Appendix 1 to 3). These sections included: 1) Participant demographic information; 2) Diabetes Basic Knowledge Test (DBKT) adapted from the modified version of the “Diabetes Knowledge Test” by Sandra Scheiderich that was revised for use in 2007 by Sally Gerard (Ledbetter, 2011:52), and 3) the SEPSS instrument (Duprez, *et al*, 2016). The questionnaire was administered in English as it is the official language of written communication that is accepted in clinical facilities in OR Tambo District.

The demographic questions (Section 1) provided data on the participants and a description of the sample to compare it with the demographic profile of nurses in the district, and to identify demographic factors that influence nurses’ diabetes self-management knowledge, self-efficacy and performance. This section comprised seven questions, which included questions such as the experience and clinical exposure in diabetes management, education level, age, and gender.

Section 2 was used to assess diabetes knowledge using the DBKT tool. The instrument is easily available online. It was adapted to suit the South African setting. Clinical guidelines for the management of Diabetes in South Africa were used to adapt the questionnaire (Republic of South Africa (c), 2014:17-27). The original DBKT has 52 multiple-choice questions; of those, 23 multiple-choice questions were selected which focused on Type 1 and 2 Diabetes mellitus aetiology, management of the disease, effects of insulin including physiological action and storage. This tool also covers uncontrolled diabetes risk factors, regular blood sugar ranges, management of diabetes emergencies, nutrition, and exercise (Ledbetter,2011:55-61). Participants were given the questionnaire and responses were coded in SPSS as 0 = incorrect, 1 = I don’t know and 2 = correct since no literature on the original coding of the multiple-choice questions could be found in the published articles.

Section 3 of the questionnaire focused on chronic illness self-management support self-efficacy and the performance of self-management support. The SEPSS tool was utilised because it is the only available tool to measure nurses' performance of self-management support and their level of self-efficacy in providing self-management support (Duprez *et al.*, 2018:12).

Written permission to utilise the SEPSS tool was obtained from the author Veerle Duprez. The SEPSS tool is a self-reporting instrument with 36 items that measure self-efficacy and performance concerning self-management support using a Likert scale. The SEPSS tool has six sub-scales, namely, assess, advise, agree, assist, arrange, and partnership. Each sub-scale has six questions that assess self-efficacy and six questions that assess the performance of support.

The 'assess' sub-scale focuses on the nurses' ability to assess the experience of a patient living with diabetes. For the 'advise' sub-scale, questions are aimed at providing patients with information about diabetes. The 'agree' sub-scale includes co-developing an individual care plan with the patient. Then, the 'assist' sub-scale involves supporting the patient to solve problems that occur as a result of their illness. Next, the 'arrange' sub-scale includes arranging follow-up care for the patient. Lastly, the 'partnership' sub-scale focuses on competencies that support self-management, such as empathy towards the patient and acknowledgment of the patient's culture by the nurse. The question wording was adapted to replace 'chronic condition' with 'diabetes' throughout.

Scoring of the SEPSS instrument required that participants rate both self-efficacy and performance on the same set of items. Scores range from 0 to 4 for the sub-scales and from 0 to 24 at a total scale level. Higher scores on the SEPSS instrument reflect a higher level of self-efficacy and performance of SMS.

### **3.8 PILOT TEST**

Gray, Grove and Sutherland (2017:1311) define a pilot as a smaller-sample version of a planned study carried out using a similar population. The purpose is to see if the planned study will be effective or work out as planned. A pilot test was done with 16 nurses (n=16) who attended a diabetes management workshop in the district. The researcher asked for permission to conduct the pilot test from the non-communicable disease Manager, and it was granted.

Questionnaires were handed out to all participants who agreed to take part before the workshop commenced to ensure the legitimacy of the knowledge questions. The purpose of the pilot test was to see if questions were clear and understandable. Both the researcher and research assistant were present during the pilot test to answer any questions and obtain feedback from participants. Out of the 16 nurses, 14 participated and only 8 participants answered all the questions. After one hour had passed, participants were asked to return the questionnaires to avoid disrupting the workshop programme. During the feedback session, participants verbalised that the knowledge questions were too long, and the SPSS instrument was confusing, thus they took longer to complete the questionnaire. The researcher gave a clear explanation of the instrument and how one should answer.

Completed questionnaires from the pilot test were reviewed by the researcher to assess whether the questions were adequately responded to, and if there were missing values that could indicate that a participant did not clearly understand the questions. Once reviewed, the answered questionnaires were captured, and the dataset was forwarded to the supervisor.

The pilot study answers for all three questionnaires were evaluated and the Cronbach alpha scores were calculated. Scores for the SEPSS were as follows:

- Self-efficacy scale as a whole – alpha 0.38; Assess sub-scale: 0.58; Advise: 0.66; Agree: 0.57; Assist: 0.68; Arrange: 0.28; Partnership: 0.36.
- Self-management performance scale as a whole – alpha 0.91; Assess sub-scale: 0.74; Advise: 0.74; Agree: 0.88; Assist: 0.81; Arrange: 0.85; Partnership: 0.49.

After discussion with the supervisor, the SEPSS scales and items were kept as is since it was an established scale and the performance scale had good reliability. Reliability was re-evaluated in the main study sample. However, a decision was made to reduce the number of knowledge questions to 14. Questions left covered diabetes knowledge, pathophysiology, management of diabetes, management of diabetes emergencies and storage of insulin.

### **3.9 VALIDITY AND RELIABILITY**

To avoid bias and ensure that findings from the research are valid, the researcher must use the measurement instrument accurately and consistently and must remain objective. As such reliability and validity are of central concern in research (Lobiondo-Wood & Haber, 2018:278). The measuring instruments have not been used in the South African setting and therefore the instruments underwent review by experts for local relevance and were pilot tested. Each concept is discussed.

### 3.9.1 Validity

Validity is of central concern in research as it focuses on the accurateness of the instrument (Lobiondo-Wood & Haber, 2018:278). There are several types of validity including face and content validity. Content validity examines whether the measurement method included all the elements related to the construct being measured (Grove *et al.*, 2013: 394). On the other hand, face validity ensures that the measurement instrument appears to be measuring the content it is supposed to measure (Burns & Grove, 2017:1289).

When the SEPSS tool was developed, Duprez *et al.* (2016:238) analysed the data using factor analysis for construct validity. Items that did not correlate with others were eliminated and the results were:  $X^2$  of 7238, Root Means Square Error of Approximation (RMSEA) of 0.12, Relative Fit Indices (RFI) of 0.93 and Standardised Root Means Square Residual (SMRS) of 0.10, which supported the validity of the instrument.

The DBK tool is an established tool developed from literature, used before on a nursing population and the researcher checked whether the questions were contextually appropriate by comparing them with local guidelines.

For face validity, the questionnaire, including sections 1 to 3, was reviewed by one assistant manager of nursing (clinic supervisor) and a sub-district trainer for PHC to assess the relevance and contextual appropriateness of the questions. The face validity and readability were further assessed during the pilot test.

### 3.9.2 Reliability

Reliability is described as the ability of the instrument to measure attributes of a variable or construct consistently (Lobiondo-Wood & Haber, 2018:2780). To measure consistency, a statistical procedure called Cronbach's alpha is used. Cronbach's alpha co-efficient is a test used to calculate internal consistency for interval and ratio level data (Lobiondo-Wood & Haber, 2018:502). As mentioned, the researcher used the DBKT and SEPSS tools.

The researcher chose the DBKT as it has been used in similar studies and shown to be reliable. In one of the studies where 50 nurses' perceptions and actual knowledge were examined, a Cronbach's alpha score of 0.75 was obtained which supported the reliability of the instrument (Ledbetter, 2011:26). According to Grove *et al.* (2011:391), a Cronbach's alpha above 0.7 would also be acceptable although 0.8 is preferred. Since the researcher revised the questions of the original questionnaire, the Cronbach's alpha for this study sample was calculated and reported (Table 3.1). The original authors did not indicate how the multiple

questionnaire questions were coded. In the present study, the Cronbach's alpha was low at 0.39. This means that the tool may not be reliable to measure diabetes knowledge in the South African context. It may also be because the original questionnaire had 45 items and the questionnaire used in the present study only contained 14 questions. However, it could still serve as an indicator for diabetes knowledge as it was validated by experts in the South African context. Furthermore, few knowledge questionnaires use Cronbach's alpha to measure internal consistency as individuals may be knowledgeable in some areas and lack knowledge in other areas.

In the study where the SEPSS tool was tested, the Cronbach alpha scores for the sub-scales were between 0.79 and 0.97, which also supported the reliability of the tool (Duprez *et al*, 2016: 1386). The Cronbach alpha score of the total self-efficacy scale was 0.96 and for test-retest reliability, the intraclass correlation coefficient (ICC) was 0.95. For the performance of self-management support scale, the Cronbach alpha score was 0.95 and the test-retest reliability 0.94 (Duprez *et al.*, 2016:1385).

Table 3.1 indicates the previous reported reliability statistics and the values in the present study, showing acceptable reliability for the SEPSS Self-efficacy and Performance scales.

**Table 3.1: Reliability of the Data Collection Instruments**

<b>Instrument</b>	<b>Cronbach alpha (Internal consistency)</b>	<b>ICC (test-retest reliability)</b>	<b>Present study Cronbach alpha</b>
DBKT	0.75	-	0.39
SEPSS- Self efficacy	0.96	0.95	0.89
SEPSS- Performance of Self-management support	0.95	0.94	0.93

Although below the original scale values, the sub-scales also showed acceptable reliability as indicated below:

- Self-efficacy: Assess sub-scale: 0.77; Advise: 0.73; Agree: 0.81; Assist: 0.83; Arrange: 0.81; Partnership: 0.75.
- Self-management performance scale: Assess sub-scale: 0.82; Advise: 0.69; Agree: 0.79; Assist: 0.75; Arrange: 0.83; Partnership: 0.72.

### 3.10 DATA COLLECTION

Approval to conduct the study was received from the University of Stellenbosch, the provincial Department of Health in the Eastern Cape, and OR Tambo District Health Department on the 7<sup>th</sup> May 2021. Data was collected over two months in 17 facilities in the King Sabatha Dalindyebo sub-district in OR Tambo District as depicted in Table 3.2.

The researcher and participants were screened for signs and symptoms of COVID-19 first. Risk mitigation strategies such as social distancing and wearing of face masks were implemented throughout.

Ethical principles were adhered to. Participants willing to participate were given informed consent forms to sign by the researcher and assistant. They were then given questionnaires to complete, and data was collected on the same day in most facilities. The researcher and research assistant visited the clinic on days that most staff members were present.

To ensure fairness, professional nurses who were not able to attend the information session were visited on different days. Participants were given a choice of whether to participate in the study or not. In addition, participants were informed that they could withdraw from the study at any point. Written informed consent was handed out to all participants and signed by those willing to participate (Appendix 1). They were then given questionnaires to complete and were given space to complete the questionnaire. Consent forms were kept separate from the questionnaires to ensure the anonymity of the participants. In the demographic part of the questionnaire, participants' names and that of the facility were not asked to further ensure the anonymity of the participant. A unique identifier was assigned to each questionnaire and data was entered in a password-protected computer.

**Table 3.2: Data Collection Dates**

NAME OF THE CLINIC	DATE OF DATA COLLECTION
Ngangelizwe health centre	01 July 2021
Ngangelizwe health centre	02 July 2021
Mqanduli health centre	05 July 2021
Mqanduli health centre	06 July 2021
Mbekweni health centre	05 July 2021
Civic Centre clinic	07 July 2021
Civic Centre clinic	08 July 2021

NAME OF THE CLINIC	DATE OF DATA COLLECTION
Stanford Terrace clinic	09 July 2021
Mthatha Gateway clinic	14 July 2021
Mthatha Gateway clinic	21 July 2021
Qokolweni clinic	15 July 2021
Hlabatshane clinic	15 July 2021
Ntlangaza clinic	20 July 2021
Ntshela clinic	23 July 2021
Ngcengane clinic	27 July 2021
Maxhwele clinic	28 July 2021
Tabase clinic	4 August 2021
Mpheko clinic	4 August 2021
Zithathele clinic	20 August 2021
Ncambele clinic	20 August 2021
Ntshabeni clinic	21 August 2021

### 3.11 DATA ANALYSIS

Data was entered into SPSS version 27 by the researcher and a data quality check was undertaken. The research assistant verified if data was accurately entered by selecting every 10<sup>th</sup> record and verifying if it was accurately captured. This was undertaken as a quality measure to verify inconsistencies. A statistician from Stellenbosch University assisted with the analysis and interpretation of results. Data was reported by descriptive and inferential statistics.

#### 3.11.1 Descriptive statistics

In descriptive statistics data was summarised, continuous variables such as age, knowledge, and self-efficacy scores were reported by mean, mode, and median, depending on whether it was normally distributed or not. The data that was normally distributed, the mean and standard deviation (SD) were reported. Gray, Grove and Sutherland (2017:1327) describe a standard deviation as a measure of the amount of dispersion from the mean that characterises data. For data that is not normally distributed, the median, range, or interquartile range were reported (Lobiondo-Wood & Haber, 2018:303). Descriptive statistics for nominal and ordinal level data was reported using frequency tables.

### 3.11.2 Inferential statistics

Inferential statistics was used to estimate how findings can be reliably generalised (Lobiondo-Wood & Haber, 2018:298). Inferential statistics are designed to address objectives, questions, and hypotheses in studies to allow inference from the study sample to the target population (Grove & Gray, 2019:378).

To test for associations between the dependent continuous variables (diabetes knowledge, self-efficacy and performance of self-management support) and independent variables with two categories; for example, a PHC qualification, the Mann-Whitney *U* test was used because scores were not normally distributed. The Mann-Whitney *U* test is used to determine whether two samples with non-parametric data are from the same population (Gray, Grove & Sutherland, 2017:1300).

To test for associations between three or more categories; for example, nursing category, and knowledge of diabetes aetiology, the independent samples Kruskal-Wallis test was used. The independent samples Kruskal-Wallis test is a nonparametric test used to test whether the mean ranks are the same in all the groups (McDonald, 2014:115).

To identify relationships between continuous variables such as age and diabetes knowledge, self-management self-efficacy and self-management, Spearman's correlation test was used, because variables were not normally distributed. Spearman's correlation is defined as a statistical test used to test whether there is a significant relationship between two sets of data (Frost, 2021:np).

### 3.12 SUMMARY

A quantitative simple correlational design to determine PHC nurses' knowledge, self-efficacy, and performance in diabetes self-management was used in this study. A pilot study was conducted first to assess whether the questionnaire was clear and addressed the research questions. The questionnaire was adapted based on the pilot test findings and data collection for the main study was done over two months. One hundred (100) participants from seventeen (17) facilities, three CHCs and 14 PHC clinics participated in the study by completing the questionnaire.

Ethical principles described in chapter one was followed throughout the research process. Ethical principles and Eastern Cape Ethics guidelines were followed during data collection. All data collected was entered in SPSS and saved on a password protected computer. Data was

analysed with the assistance of a statistician from Stellenbosch University and will be discussed in the next chapter

## CHAPTER 4: RESULTS

### 4.1 INTRODUCTION

The research methodology was discussed in the previous chapter. This chapter gives a clear picture of the research results in three sections. The demographic data is described in section A. Section B consists of questions about PHC nurses' knowledge on diabetes. Self-efficacy and performance of diabetes self-management support is described in Section C.

Descriptive findings will be presented first in frequency tables and distributions, followed by inferential statistics on associations between dependent and independent variables. Associations between diabetes knowledge and self-management performance, as well as self-management self-efficacy are presented. Lastly the results related to the associations between demographic variables and self-management performance and self-efficacy are displayed.

Valid percentages are reported; for example, the percentage out of the number of participants who responded to the question. Percentages are rounded off to the first decimal. The level of significance was set at  $p \leq 0.05$ .

### 4.2 SECTION A: DEMOGRAPHIC DATA

Seven questions related to demographical data. The participant responses to the nominal and ordinal level variables are provided in Table 4.1.

*Table 4.1: Demographic Data of Participants (nominal or ordinal level variables)*

Variable	Frequency	Percent (%)
<b>Gender (n=100)</b>		
Female	86	86.0
Male	13	13.0
Non-binary	1	1.0
<b>Job title (n=99)</b>		
Professional nurse	94	94.9
Senior professional nurse	5	5.1
<b>Highest qualification (n=98)</b>		
Diploma in Nursing	58	59.2
B Cur	24	24.5
Postgraduate	16	16.3

Variable	Frequency	Percent (%)
<b>Postgraduate diploma in PHC (n=98)</b>		
Yes	10	10.2
No	88	89.8
<b>Last time worked with patients living with diabetes (n=98)</b>		
Less than 1 month ago	54	55.1
Less than 3 months ago	11	11.2
3 – 6 months ago	5	5.1
More than 6 months ago	28	28.6
<b>Years of working experience as a professional nurse (n=92)</b>		
1 to 10 years	57	62.0
11 to 20 years	26	28.2
21 to 30 years	9	9.8

#### 4.2.1 Gender (n=100)

From 100 participants, 86 (86.0%) participants were female, 13 (13.0%) were male and one (1.0%) was non-binary. There are relatively few male nurses employed in the district, the majority are female (Mnukwa, 2021:np).

#### 4.2.2 Job title (n=99)

Most of the participants were professional nurses (n=94, 94.9%) and five (5.1%) were senior professional nurses.

#### 4.2.3 Highest qualification (n=98)

The majority of the participants had a basic diploma in nursing (n=58, 59.2%), 24 (24.5%) had an undergraduate BCur degree and 16 (16.3%) a post graduate diploma in nursing.

#### 4.2.4 Post graduate diploma in primary health care (n=98)

Out of all the participants, 10 (10.2%) had a post graduate diploma in PHC. Nurses with a post graduate diploma in PHC may be more specialised to care for patients living with diabetes than nurses without the qualification and can also prescribe treatment according to guidelines (South African National Department of Health (a), 2007:31).

#### 4.2.5 Last time worked with people living with diabetes (n=98)

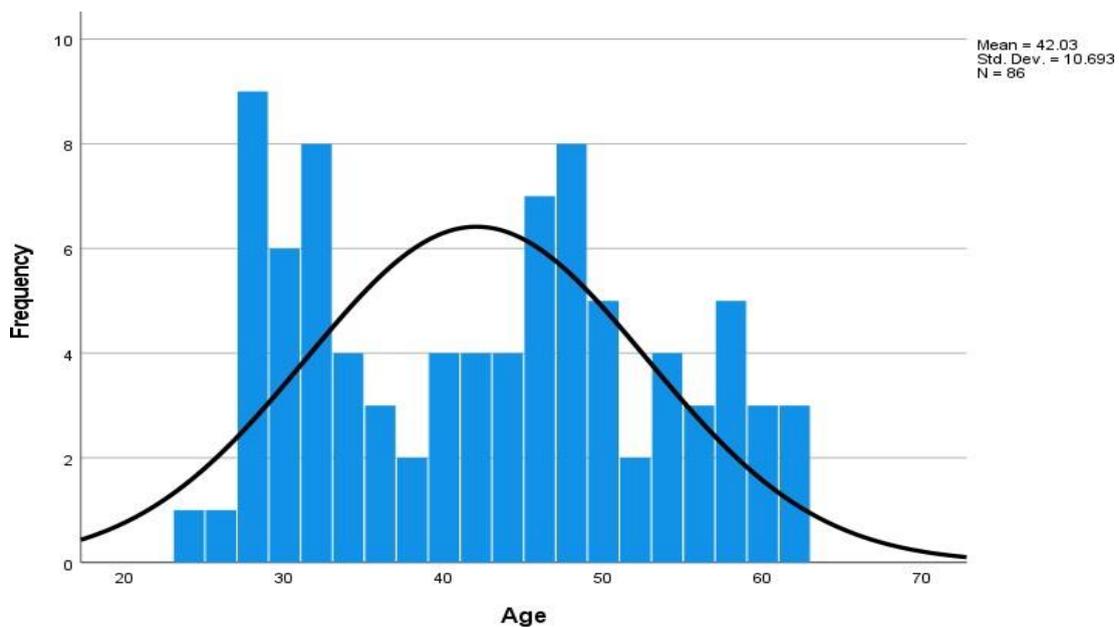
Fifty-four participants (55.1%) indicated that they last worked with patients living with diabetic less than a month before the study, 11 (11.2%) less than three months before and 28 (28.6%)

more than six months before the study. Therefore, the majority of participants had worked with persons living with diabetes less than one-month ago, indicating recent experience.

The age of the participants and the years of working experience were reported as continuous variables (Table 4.2) and discussed in sections 4.2.6 and 4.2.7 below.

#### 4.2.6 Age of participants (n=86)

Fourteen participants did not indicate their age; they may have felt uncomfortable to disclose their age. The mean age was 42.3 years and SD was 10.7. The age distribution was not normal as there were more than one mode; the median age was 43 and the interquartile range was 17 (see Figure 4.1). The youngest participant was 24 and the eldest 61 years old.



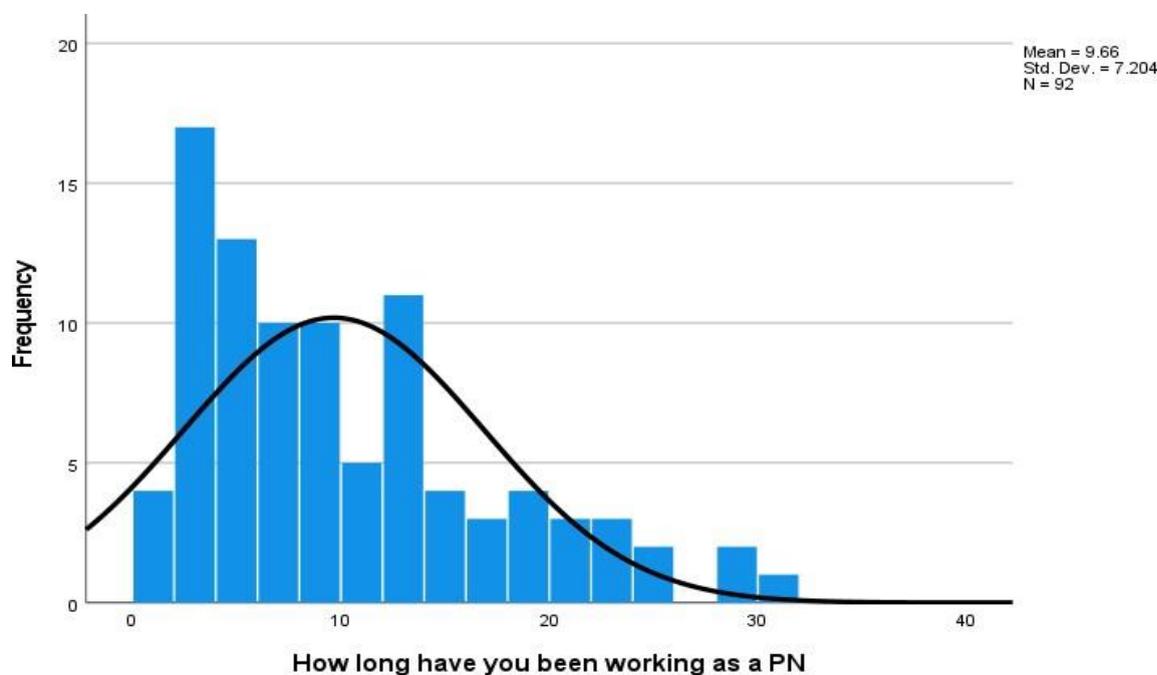
**Figure 4.1: Histogram of Participants' Age**

#### 4.2.7 Years of working experience as a professional nurse (n=92)

The mean years working as a professional nurse was 9.6 and the SD was 7.2. This distribution was also not normal (Figure 4.2). The median was 8 and the interquartile range 9. The minimum number of years worked as a professional nurse was 1 and the maximum values were 30.

When this variable was categorized (see Table 4.1), fifty-seven (62.0%) participants had been working as a professional nurse for less than 10 years, 26 (28.2%) between 11 and 20 years, and 9 (9.8%) between 21 years and 30 years making a total of 92 participants. Eight participants did not indicate the number of years they have been working as a professional

nurse. The number of years working as a professional nurse is categorised in Table 4.1 above and the frequency distribution is depicted in Figure 4.2 below.



**Figure 4.2: Histogram of Years' Experience as a Professional Nurse**

**Table 4.2: Descriptive Statistics Continuous Demographic Variables**

	n	Minimum	Maximum	Mean	Std. Deviation
Age	86	24.0	61.0	42.3	10.7
Years working as a professional nurse	92	1.0	30.0	9.6	7.2

### 4.3 SECTION B: DIABETES KNOWLEDGE

This section of the questionnaire contains 14 multiple-choice knowledge questions that were considered relevant for professional nurses to support persons living with diabetes with self-management. Table 4.3 indicates the frequency of the correct responses. All the participants (n=100) responded to the knowledge questions.

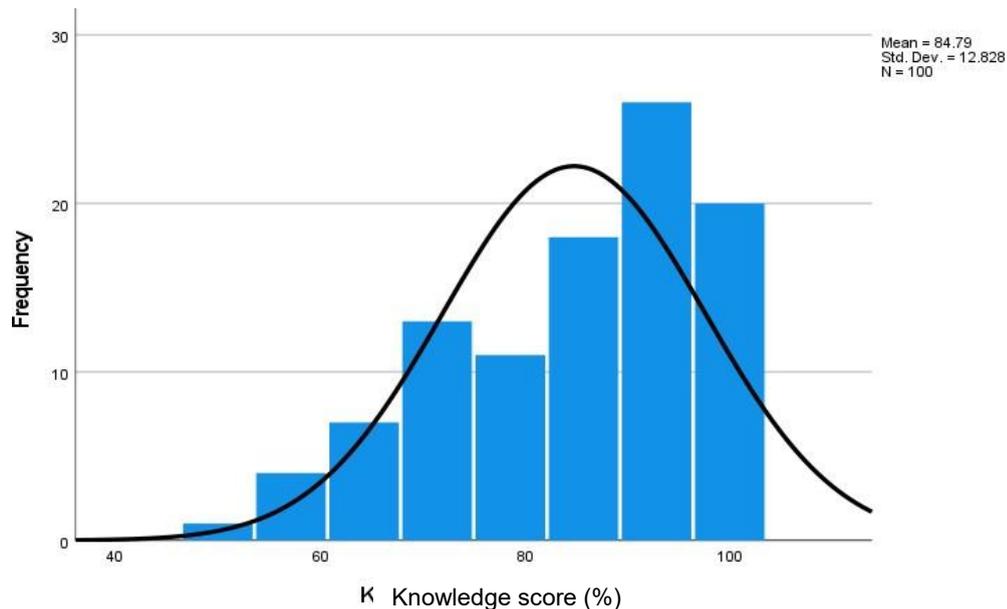
The questions with the highest frequency of correct responses included: action to take if a diabetic person is unresponsive (n=96, 96%); normal fasting blood glucose level (n=95, 95%); and dealing with causes of hypoglycaemia (n=90, 90%).

The question with the lowest frequency of correct responses was the cause of hyperglycaemia; only 45 (45.0%) participants answered this correctly. This question is crucial in the management of medical emergencies, and patient education and it puts patients in danger as they may be mismanaged (South African National Department of Health (a), 2020:112). Other low frequency correct responses were 77% and 78% which relate to needle contamination and insulin storage respectively which are important for patient education.

**Table 4.3: Frequency of Correct Knowledge Responses**

Variable	Correct response Frequency	Percentage (%)
Etiology	82	82.0
Tests to monitor diabetes control	87	87.0
Signs of hyperglycaemia	83	83.0
Cause of hyperglycaemia	45	45.0
When do you check for ketones	83	83.0
Signs of hypoglycaemia	83	83.0
Cause of hypoglycaemia	90	90.0
Insulin storage	79	79.0
Normal fasting blood glucose level	95	95.0
What guides your initial actions if a diabetic person is found unresponsive?	96	96.0
Physiological actions of insulin?	78	78.0
Action to take if needle is contaminated	77	77.0
What effect does insulin have on blood glucose	89	89.0
The most appropriate statements about management of Type II diabetes	82	82.0

Knowledge scores were calculated from the individual knowledge items as explained in chapter 3.



**Figure 4.3: Knowledge Score Percentage Histogram**

The minimum knowledge score was 7 and the maximum 14. The mean score was 11.9 (SD 1.8). All the participants had a score of  $\geq 50\%$ . Out 100 participants, 75 had a knowledge of more or equal to 75%. Only 64 of the participants had a knowledge score of more than or equal to 80%. Figure 4.3 is a histogram of the knowledge score percentages.

#### **4.4 SECTION C: SELF-EFFICACY AND PERFORMANCE IN DIABETES SELF-MANAGEMENT**

As mentioned in chapter 3, a self-reporting SPSS instrument with 36 items which measure self-efficacy and performance concerning self-management support using a Likert scale, was used. This instrument has six sub-scales with six questions in each. Findings for self-efficacy and performance will be discussed separately below.

For the self-efficacy scale, scores for the SPSS were coded from 0 to 4. The highest score was 4 which showed a higher self-efficacy, and 0 a low self-efficacy. Not at all was coded as 0 in SPSS, not sufficient = 1, more or less = 2, sufficient = 3, and good was 4.

For the performance sub-scale, the highest score was 4 which showed a high level/frequency of performance, and 0 a low/infrequent performance. Never was coded as 0 in SPSS, rarely = 1, occasionally was coded as 2, frequently = 3 and always was 4.

Although the Likert scale responses are ordinal level variables, the mean score for each item is reported in order to identify items with low and high means. A higher mean indicates a higher level of self-efficacy or a higher level/frequency of performance of self-management support.

Table 4.4 depicts the mean self-efficacy and performance of self-management support scores across the six sub-scales, namely; Assess, Advise, Agree, Assist, Arrange and Partnership.

**Table 4.4: Self-Efficacy and Performance of Self-Management Mean Scores**

	n	Self-efficacy		Performance	
		Mean	SD	Mean	SD
<b>Sub-scale: Assess</b>					
Ask the patient what he/she thinks about living with diabetes in the future	100	3.0	1.0	3.2	0.8
Ask what patient knows	100	3.3	0.8	2.3	1.2
Ask a patient to share his emotions about diabetes	100	2.7	1.1	2.7	1.1
Ask about available motivation and discipline to integrate diabetes in his life	100	2.9	1.0	2.8	1.1
Ask how much confidence he has in his own abilities	100	3.0	1.0	3.2	1.0
Ask what he can and wants to do for himself in his daily care, related to diabetes	100	3.4	0.7	3.2	0.9
<b>Sub-scale: Advise</b>					
Ask patient what information he needs	100	3.2	0.8	3.1	0.9
Ask the patient for permission to give information or advice	100	3.2	0.9	3.0	0.9
Letting the patient restate information given	100	3.2	0.8	3.0	0.9
Giving the patient education and instruction about the chronic...	100	3.4	0.8	3.6	0.7
Helping the patient to formulate questions to discuss with healthcare workers	100	2.9	1.1	2.6	1.2
Involving the family when giving information and instruction	100	3.0	1.1	2.6	1.2
<b>Sub-scale: Agree</b>					
Search for earlier positive experiences in achieving goals	100	2.7	1.3	2.4	1.3
Let the patient prioritise when setting goals	100	2.9	0.9	2.8	1.1
Developing a plan of action to achieve goals with patient	100	3.0	1.0	2.9	1.0
Document the goals and agreements in patient record	100	3.1	1.1	3.0	1.3
Help patient to make decisions concerning treatment	100	3.3	1.0	3.3	0.8
Recognise patient uncertainty about making a treatment decision	100	3.3	0.8	3.2	0.9

	n	Self-efficacy		Performance	
		Mean	SD	Mean	SD
<b>Sub-scale: Assist</b>					
Discuss with patient who he will inform about his chronic condition	100	3.5	0.8	3.4	0.9
Encourage the patient to perform as many daily activities as possible	100	3.5	0.6	3.5	0.7
Helping the patient to choose the activities that he can realistically do	100	3.2	0.8	3.1	0.9
Discuss with the patient who can provide daily support	100	3.2	1.0	3.0	1.0
Discuss with patient how he can make use of self-management assistive devices daily	100	2.9	1.1	2.7	1.1
Assist patient to monitor his own health and physical reactions	100	3.3	0.9	3.2	0.9
<b>Sub-scale: Arrange</b>					
Ask about convenient time for follow-up care	100	3.4	0.8	3.2	1.5
Inform and coordinate with other health care professionals	100	3.2	0.8	3.2	0.9
Using assistive devices and technology to provide remote guidance to the patient	100	2.7	1.1	2.3	1.3
Facilitating the patient to easily stay in contact between appointments	100	3.5	0.8	3.2	1.1
Initiating contact between appointments to discuss health and solve difficulties	100	3.0	1.1	2.8	1.1
Examining progress of care plan actions together with the patient	100	3.3	0.9	3.1	0.9
<b>Sub-scale: Partnership</b>					
Accepting patient experience as valuable information concerning care delivery	100	3.0	0.9	3.0	1.1
Consider cultural background of the patient	100	3.2	1.0	2.7	1.0
Determine together with patient how much of the care coordination I take for him	100	3.0	0.9	2.4	1.3
Using the patient choices as the basis for care, even if it's not ideal from a medical view	100	2.6	1.3	3.1	1.1
Showing empathy when patient does not succeed in achieving the established goals	100	3.2	1.0	3.2	0.9
Reflecting upon my own practice	100	3.4	0.8	3.0	1.1

#### 4.4.1 Assess

The items with the highest mean values for **self-efficacy** were 3.4 for the item: “Ask what the person can and wants to do for himself in his daily care”, and the item “ask what he knows” with a mean of 3.3. The lowest value was 2.7 for “ask a patient to share his emotions about diabetes.” This means that participants generally had more confidence to ask patients about their knowledge and daily activities than their feelings, motivation, and emotions.

For **performance**, the highest mean was 3.2 for three items “Ask the patient what he/she thinks about living with diabetes in the future”, “Ask what he can and wants to do for himself

in his daily care, related to diabetes” and “Ask how much confidence he has in own abilities.” The lowest mean score was 2.3 for the item: “Ask what patient knows for performance.” It is interesting that although participants had self-efficacy to ask about a person’s knowledge, fewer participants were doing that in practice, as indicated by the lower mean score (3.4 vs 2.3).

#### 4.4.2 Advise

The item related to “Giving the patient education and instruction about the chronic illness” had the highest mean (3.6) for **self-efficacy**. Items with the lowest values were: “Helping the patient to formulate questions to discuss with healthcare workers” (mean = 2.9) and “Involving the family when giving information and instruction” (mean = 3.0).

The highest mean value for **performance** was 3.6 in the item “Giving the patient education and instruction about the chronic illness.” The items “Helping the patient to formulate questions to discuss with healthcare workers” and “Involving the family when giving information and instruction” both had low mean scores of 2.6. Participants therefore more frequently provide education than involving the patient and family in their care.

#### 4.4.3 Agree

For the **self-efficacy** scale items, “Recognising patient uncertainty about making a treatment decision”, and “Help patient to make decisions concerning treatment”, the mean scores were the same. The item, “Search for earlier positive experiences in achieving goals” had a low mean of 2.7. Participants therefore focused more on recognising patient uncertainty about making a treatment decision than searching for earlier positive experiences in achieving goals.

For **performance**, the item with the highest mean was “Help the patient to make decisions concerning treatment” (mean 3.3). “Search for earlier positive experiences in achieving goals” had a lower mean of 2.4. Letting the patient prioritise and making action plans with the patient also had lower means compared to other items.

#### 4.4.4 Assist

The item, “Discussing with the patients who they will inform about their condition” and “Encouraging them to perform daily activities” had the highest means of 3.5 each for **self-efficacy**. The item with a lower mean was “Discussing how a patient can make use of self-management assistive devices” (mean 2.9). Participants therefore had more self-efficacy to encourage patients to perform daily activities than discussing how a patient can make use of self-management assistive devices.

In the sub-scale for **performance**, “Encouraging the patient to perform as many daily activities as possible” had the highest mean of 3.5; the lowest mean was 2.7 for the item “Discuss with the patient how he can make use of self-management assistive devices daily.” The low self-efficacy and performance means for the use of assistive devices may indicate that nurses do not have knowledge of such assistive devices. Participants focused more on encouraging patients to perform as many daily activities as possible than discussing with the patient how he can make use of self-management assistive devices.

#### 4.4.5 Arrange

“Facilitating the patient to easily stay in contact between appointments” had the highest mean for **self-efficacy** (mean 3.5) and “Using assistive devices and technology to provide remote guidance to the patient” had the lowest mean of 2.7.

The items with the highest mean for **performance** were “Facilitating the patient to easily stay in contact between appointments”, “Ask about convenient time for follow-up care”, and “Inform and coordinate with other health care professionals” with mean scores of 3.2. Using “Assistive devices and technology to provide remote guidance to the patient” had the lowest mean (2.3). This may also indicate that technology and assistive devices are not frequently used in this setting. Although participants indicated self-efficacy in facilitating contact between appointments, the performance mean was much lower.

#### 4.4.6 Partnership

The highest mean for **self-efficacy** was 3.4 for the item “Reflecting upon my own practice” and the lowest mean was 2.6 in the item “Using the patient choices as the basis for care, even if it’s not ideal from a medical view.” This may mean that participants do not have the self-confidence to integrate patient preferences to tailor care.

A mean of 3.2 was obtained for the item “Showing empathy when patient does not succeed in achieving the established goals” for the **performance sub-scale**. The lowest mean was 2.4 for the item “Determine together with patient how much of the care coordination I take for him.” Participants were more frequently empathetic when a patient does not achieve the established goals than determining with the patient how much care coordination the nurse takes.

Sub-scale scores were calculated as explained in chapter 3. See Table 4.5 for Self-efficacy and Performance of self-management mean scores. The sub-scale ‘Assist’ had the highest mean in the self-efficacy (M=3.33, SD 0.6) and performance (M=3.18, SD 0.6) scales. The ‘agree’ self-efficacy sub-scale had the lowest mean score (M=3.05, SD 0.7) and the ‘assess’ performance sub-scale the lowest mean score (M=2.81, SD 0.8).

**Table 4.5: Total Scores for Self-efficacy and Performance (Sub-scales: Assess, Advise, Agree, Assist, Arrange, & Partnership)**

	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Self-efficacy-Assess	100	3.06	0.7
Performance-Assess	100	2.81	0.8
Self-efficacy-Advise	100	3.16	0.6
Performance- Advise	100	2.98	0.6
Self-efficacy-Agree	100	3.05	0.7
Performance-Agree	100	2.92	0.7
Self-efficacy-Assist	100	3.33	0.6
Performance- Assist	100	3.18	0.6
Self-efficacy-Arrange	100	3.20	0.6
Performance-Arrange	100	2.99	0.8
Self-efficacy-Partnership	100	3.11	0.7
Performance-Partnership	100	2.93	0.7
<b>Total self-efficacy</b>	<b>100</b>	<b>18.91</b>	<b>3.2</b>
<b>Total performance</b>	<b>100</b>	<b>17.81</b>	<b>3.3</b>

The overall (total) self-efficacy and performance scores were determined by adding the mean scores of self-efficacy (range 0-24) and performance (range 0-24) sub-scales. Self-efficacy had a higher mean of 18.91 (SD 3.2) than performance which had a mean of 17.8 (SD 3.3).

The lower mean score in performance may indicate that although nurses' have self-efficacy for self-management support, they are not always performing self-management support. This may be due to various other reasons such as time constraints.

#### **4.5 RELATIONSHIP BETWEEN KNOWLEDGE, SELF-MANAGEMENT SUPPORT SELF-EFFICACY AND SELF-MANAGEMENT SUPPORT PERFORMANCE**

Lobiondo-Wood and Haber (2017:579) define correlations as the degree of association, between two or more variables. Total self-efficacy and performance could not be associated with knowledge (Table 4.6). A perfect positive correlation is indicated by a +1.0 coefficient which shows a good correlation, and a perfect negative correlation by a -1.0 coefficient which shows no correlation (Lobiondo-Wood & Haber, 2017:579).

The research hypothesis for this study was that nurses' knowledge and self-efficacy will be associated with the performance of diabetes self-management support.

As shown in Table 4.6, there were no significant relationship between the knowledge score and the total self-efficacy and performance scores ( $p$  values  $> 0.05$ ). However, there was a strong positive relationship between the total self-efficacy and total performance score ( $r = 0.78$ ,  $p < 0.01$ ). This means that participants with high self-efficacy in self-management support, are likely to report performing self-management support. Contrary to what was expected, the relationship between knowledge and self-management self-efficacy and performance was negative, indicating that more knowledge was associated with less self-efficacy and provision of self-management support.

**Table 4.6: Correlations between Knowledge, Self-management Support Self-efficacy and Performance**

			Knowledge Score%	Total self-efficacy	Total Performance
Spearman's rho	<b>Knowledge score%</b>	Correlation Coefficient	1.0	-0.3	-0.1
		Sig. (2-tailed)	.	0.7	0.3
		N	100	100	100
	<b>Total self-efficacy</b>	Correlation Coefficient	0.03	1.0	0.78**
		Sig. (2-tailed)	0.75	.	0.0
		N	100	100	100
	<b>Total performance</b>	Correlation Coefficient	-0.1	0.78**	1.0
		Sig. (2-tailed)	0.32	0.0	.
		N	100	100	100

\*\* . Correlation is significant at the 0.01 level (2-tailed).

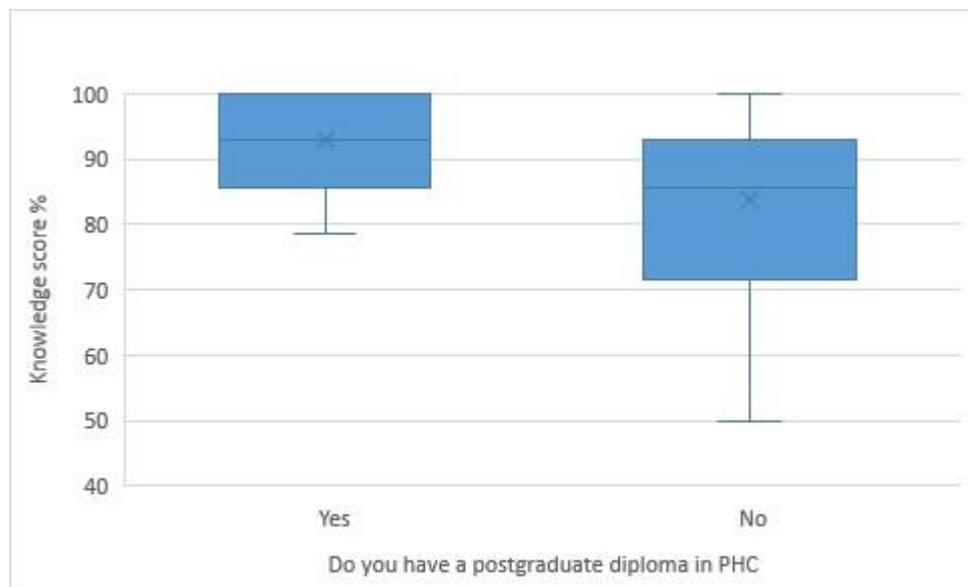
#### 4.6 RELATIONSHIP BETWEEN DEMOGRAPHIC VARIABLES AND KNOWLEDGE, SELF-MANAGEMENT SUPPORT SELF-EFFICACY AND SELF-MANAGEMENT SUPPORT PERFORMANCE

##### 4.6.1 Demographic variables and diabetes knowledge

There was no association between gender (Mann-Whitney U,  $p=0.3$ ) or job title (Mann-Whitney U,  $p=0.2$ ) and diabetes knowledge. The distribution of diabetes knowledge was also the same across categories of highest qualification (Independent-Samples Kruskal-Wallis,

$p=0.9$ ) and when last the participant worked with a person living with diabetes (Independent-Samples Kruskal-Wallis,  $p=0.06$ ).

However, the distribution of diabetes knowledge scores was not the same across categories of whether the participant had a qualification in PHC (Mann-Whitney U,  $p=0.03$ ). Figure 4.6. indicates that the nurses with a PHC qualification had a significantly higher mean diabetes knowledge score (mean 92.9 SD 7.5) compared to those who did not have a PHC qualification (mean 83.8, SD 12.9).

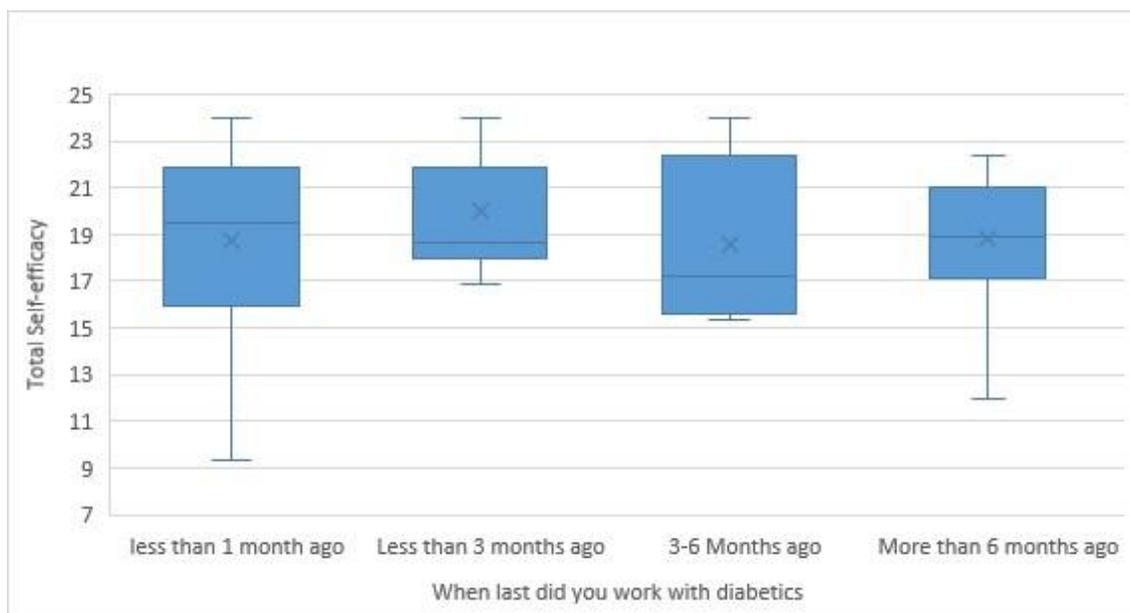


**Figure 4.4: Box and Whisker Plot of Knowledge Score across Category of PHC Qualification**

#### 4.6.2 Demographic variables and self-management self-efficacy

There was no relationship between the age of participants and their self-management self-efficacy ( $r = 0.02$ ,  $p = 0.87$ ). The self-management self-efficacy score did not differ across categories of gender (Mann-Whitney U,  $p = 0.52$ ), job title (Mann-Whitney U,  $p = 0.86$ ), highest qualification (Independent-samples Kruskal-Wallis test,  $p = 0.20$ ) or whether the participant had a qualification in PHC (Mann-Whitney U,  $p = 0.53$ ). There was also no difference in mean self-efficacy scores across categories of how long ago the participant worked with a person living with diabetes (Independent-samples Kruskal-Wallis test,  $p = 0.78$ ). However, participants with more recent experience had the highest mean self-efficacy scores (Figure

4.7).



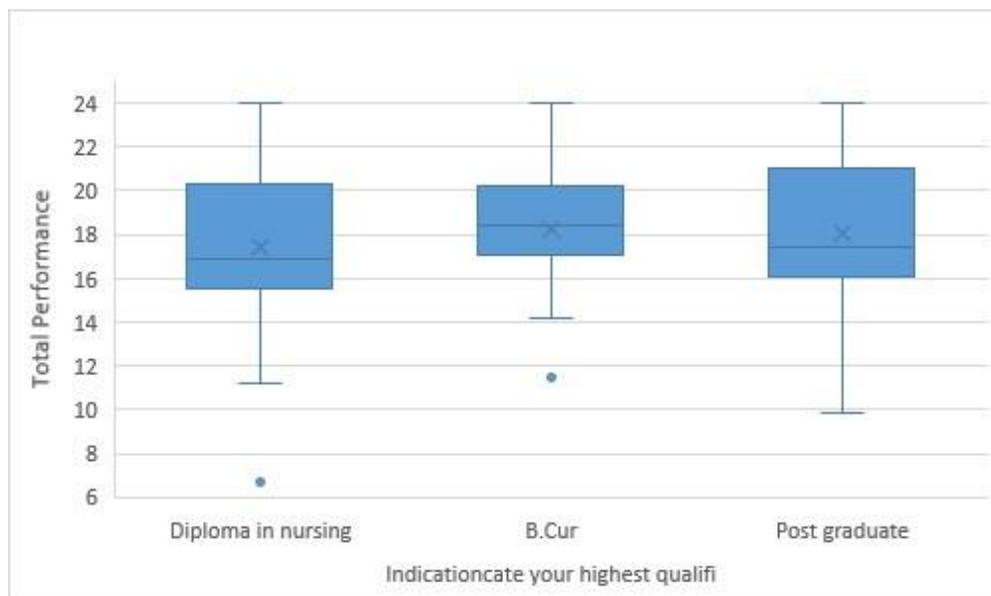
**Figure 4.5: Box and Whisker Plot of Self-efficacy and when the Participant Last Provided Assistance to a Person Living with Diabetes**

#### 4.6.3 Demographic variables and self-management performance

With regard to self-management performance, there was a significant positive correlation between the years of experience as a professional nurse and the performance of self-management support score ( $r = 0.21$ ,  $p = 0.045$ ). Although this was not a strong relationship, it means that participants with more experience as a professional nurse were more likely to perform self-management support.

There was no association between demographic variables and self-management performance in the categories of gender (Mann-Whitney U,  $p = 0.27$ ), and job title (Mann-Whitney U,  $p = 0.25$ ). The total performance score is the same across categories of highest qualification

(Independent-Samples Kruskal-Wallis test,  $p = 0.48$ ) (see Figure 4.6), PHC qualification (Mann-Whitney U,  $p = 0.88$ ), and when last a participant worked with patients living with diabetes (Independent-Samples Kruskal-Wallis test,  $p = 0.14$ ).



**Figure 4.6: Box and Whisker Plot of Performance and Highest Qualification**

#### **4.7 CONCLUSION**

The majority of nurses were knowledgeable about diabetes, as evidenced by the fact that the majority of participants scored above 75%. Self-efficacy scores were higher than the total performance scores. The only demographic variable related to diabetes knowledge was a postgraduate qualification in PHC. None of the variables were related to self-management support self-efficacy and only years of experience as a professional nurse was positively correlated with self-management support performance. The discussion, conclusion and recommendations follow in chapter 5.

## CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

### 5.1 INTRODUCTION

In the previous chapter, the study results were described. In this chapter, the research results will be discussed according to the study objectives, linking them to findings of previous studies on diabetes self-management support. Study limitations and recommendations will be discussed as well.

### 5.2 DISCUSSION

The aim of the study was to determine the knowledge, self-efficacy, and performance of PHC nurses in diabetes self-management support in OR Tambo District. The five objectives as mentioned in chapter 1 will be discussed in detail, linking each to the study results.

#### 5.2.1 Objective 1: Assess diabetes self-management knowledge of nurses

Participants' knowledge in diabetes was high in most questions. Seventy-five participants (75%) had a knowledge score of more than or equal to 75% and 64 had a knowledge score that was above 80%. The mean score in this study was 11.9 (SD 1.8) out of a maximum of 14. In a similar study using the DBKT tool conducted by Ledbetter (2011:33) in South Carolina to measure diabetes knowledge amongst nurses (registered nurses in an acute-care, 125-bed setting), the mean score of the participants' individual tests was 59.54% (SD 14.51), which is lower than the knowledge of nurses in this study. In a systematic review conducted by Aloitabi, Al Gammi, Gholizadeh and Perry (2016:43), nurses in Africa, America, Australia, the US and Europe had insufficient understanding of diabetes pathophysiology, symptoms and management.

The knowledge questions in this study included domains such as pathophysiology, insulin storage, insulin needle contamination, signs and symptoms of hypoglycaemia and hyperglycaemia as well as causes thereof.

Understanding the **pathophysiology** of diabetes is fundamental for nurses to prescribe medication that will meet the individual needs of the patient, ultimately improving patient outcomes. First line drugs are prescribed by professional nurses in PHC, and treatment is adjusted in a step wise manner according to a patient's response to it. Patients are referred to doctors only if glucose levels remain high (South African National Department of Health (a), 2020:113). Anti-hyperglycaemic drugs target one or more pathophysiological abnormalities of

diabetes type 2 or alter physiological processes such as hunger, nutrition absorption, and excretion (Inzucchi, Bergenstal, Buse, Diamant, Ferrannini, Nauck, *et al.*, 2012:159).

In this study, knowledge questions related to pathophysiology included: what are the physiological actions of insulin and what effect does insulin have on blood glucose? The number of participants who had a correct score on the effect of insulin on blood glucose was 89 (89%), and the number with correct scores for the physiological action of insulin was 78 (78%). These high scores related to insulin suggest that nurses may be able to manage patients with type 1 diabetes. Type 1 diabetes mellitus is mostly common in children but can occur in adults. Patients with type 1 diabetes mellitus require an uninterrupted supply of insulin as this type causes complete insulin depletion in the body, leading to elevated blood glucose levels (IDF, 2017:17). In addition to insulin therapy, patients with type 1 diabetes require support and education from nurses.

Certain medications to manage diabetes carry a risk of causing hypoglycaemia, a life-threatening condition that can lead to ischaemic heart disease especially in patients with an existing cardiac condition (Inzucchi *et al.*, 2012:159). Intensive education and support from nurses for these patients are vital. In addition, a clear knowledge of signs of hypoglycaemia is crucial in provision of support and education (South African National Department of Health (a), 2020:113). In this study, nurses' knowledge scores related to hypoglycaemia were high. Ninety-six participants (96%) knew what action to take if a patient is unconscious, 83 (83%) participants understood the signs of hypoglycaemia and 90 (90%) knew the causes of hypoglycaemia, which all show they can manage patients with hypoglycaemia.

Knowledge scores related to signs of hyperglycaemia were high (83%); however, only 45 (45%) of the participants understood hyperglycaemia causes. This could compromise the level of care rendered to patients. Persistent high blood glucose levels can lead to diabetes complications if not managed promptly. These include microvascular (e.g., diabetic nephropathy, neuropathy, and retinopathy) and macrovascular complications (e.g., cardiac arrest, heart failure, stroke, numbness due to low blood supply to leg complications) (Inzucchi, *et al.*, 2012: 6). Short term effects of hyperglycaemia include diabetic keto acidosis and a hyperglycaemic hyperosmolar state; both conditions can lead to death if not identified early and managed (Republic of South Africa (c), 2014: 129).

Seventy-seven (77%) participants knew the correct action to take if a needle is contaminated. Sound knowledge in infection prevention and control may result in improved patient safety and care (Republic of South Africa (b), 2020: 29).

In the context of the Eastern Cape PHC services, newly diagnosed patients living with diabetes visit the clinic monthly up until their blood glucose level is controlled (Hgt 10 mmol, and HbA1c <7) (South African National Department of Health (b), 2020:133). Once stable, they are then decanted to the Central Chronic Medication Dispensing and Distribution (CCMDD) programme where they receive pre-packed medication from the dispensary without consulting with a nurse, or at contracted pharmacies such as Clicks. They visit the clinic for review in the sixth month and obtain script renewal if still stable (Ketlledas, 2016:np). This model of care illustrates the importance of self-management education for stable patients living with diabetes as they have limited contact with health care providers.

During every clinic visit, blood glucose levels must be checked to see if the patient is responding well to treatment and to manage emergencies. The participants' knowledge on what test to perform was good, with a frequency of correct responses above 80%. In Australia, a study conducted by Hollis *et al.* (2014:1) to determine diabetes related knowledge amongst professional nurses similarly found a high frequency of correct responses (87%) on the questions related to blood glucose monitoring. When blood glucose levels are carefully monitored, development of diabetes complications can be delayed (Thomas, 2019:38).

Knowledge of normal fasting blood glucose levels had the highest frequency of correct responses (95%). In a systematic review conducted by Aloitabi *et al.* (2016:45), nurses' knowledge on blood glucose monitoring was inadequate. Nurses are expected to be familiar with normal blood glucose ranges in order to correctly detect the dangers of hyperglycaemia and hypoglycaemia in diabetic patients and take appropriate action (Aloitabi *et al.*, 2016:45). Participants in this study, nevertheless, may have the ability to promptly manage diabetes emergencies as they understand normal blood glucose levels. Due to a limited number of doctors in PHC settings, access to specialised health services is not always possible. Therefore, it is critical for PHC nurses to have a general knowledge of diabetes in order to provide DSM effectively (Hollis *et al.*, 2014:1).

Knowledge is thought to influence self-efficacy and performance of self-management, thereby improving patient clinical outcomes (Reed, 2021:30).

### **5.2.2 Objective 2: to determine nurses' perceived capacity (self-efficacy) to perform diabetes self-management support.**

Self-efficacy is important in implementing self-management tasks and in how the nurse achieves goals, tasks, or obstacles linked to the self-management programme to attain the required level of performance (Duprez *et al.*, 2016:3).

In the current study, nurses' self-efficacy mean score in self-management was 18.91 (SD 3.2.). This score is higher than the score in the study conducted by Duprez *et al.* (2016:111), where the mean score for self-efficacy was 17.2 (SD=3.31). Duprez *et al.* (2016:1386) conducted their study in Belgium and the Netherlands amongst nurses working in different health care settings (n=472) and 51 nursing students in their final year. The higher scores in the present study may be because nurses in the present study are working in PHC settings and are therefore exposed to providing care for people living with diabetes. Duprez *et al.* (2016:1390) found that nurses providing outpatient consultations had significantly higher self-efficacy scores compared to nurses in inpatient settings (mean of 18.71 vs 16.75). The total self-efficacy score for participants in the present study is therefore very similar to the scores of nurses working in outpatient settings in the Netherlands.

Self-efficacy affects behaviour and impacts how hard people work, how persistent they are, and how resilient they are (Bandura, 2006:np). People with high self-efficacy are more likely to perform self-management support as they may have the necessary skills (resilience, patience, persistence) as identified by Bandura (2006: np), for a self-management programme to be effective.

In the study by Duprez *et al.* (2016:11), the self-efficacy sub-scale 'assess' had the highest mean score of 2.96 (SD 0.63). In the present study, the sub-scale with the highest mean was 'assist' (mean 3.33, SD 0.6).

In the present study, the 'agree' sub-scale had the lowest mean score (2.92, SD 0.7) of the self-efficacy scale. The agree sub-scale focuses on the relationship between the nurse and patient as they set goals together. This low score could compromise the success of DSMS as the patient must feel that their individual needs are considered (Duprez *et al.*, 2016:1382).

### **5.2.3 Objective 3: to determine nurses' behaviour of performing self-management support**

The performance of self-management support is a measure of how nurses apply the skills of SMS in practice. Patient support focuses on equipping people to develop the skills they need to boost their confidence, encouraging patients to take an active role in managing their chronic condition, leading to better clinical outcomes (Ryan & Sawin, 2009:6).

In the study conducted by Duprez *et al.* (2016:1384), when the SEPSS tool was validated, performance scores were much lower (mean score 11.75, SD 3.8), than in this study (mean 17.81, SD 3.3). Low performance could affect care and support given to patients. A study

conducted in 2013 found that patients with a chronic condition often lack support from health workers for coping skills, emotional management, and role management (Elissen, Nolte, Knai, Brunn, Chevreul, Conklin, & Vrijhoef, 2013:1).

The 'assess' sub-scale scored the lowest mean score (2.81, SD 0.8) on the performance scale. Thorough history taking is crucial to formulate a plan that meets the individual patient's needs. If nurses do not fully assess the person's context and needs, the expected results may not be seen as the plan is not specifically designed and individualised.

Similar to what was reported by Duprez *et al.* (2016:1384), performance of self-management support was consistently lower than self-efficacy for self-management support in this study. The total performance in self-management support was lower (mean 17.81, SD 3.3) than the total self-efficacy score (mean 18.91, SD 3.2). Several factors could be the cause of this. Tharani, Van Heckea, Saeed, Ali and Duprez (2020:11) identify several factors that impede nurses from providing self-management support, which include institutional factors and personal factors. Institutional factors include availability of guidelines, and structures within the institution that encourage self-management support. The 'assistive' self-management programme is not yet implemented in South Africa, and the guideline mostly used is the APC/PAC guide (South African National Department of Health (b), 2020:134).

All nurses working in PHC settings are expected to be trained in the APC/PAC guideline and use it as a guide in their provision of clinical care (Republic of South Africa (b), 2020). This guideline does touch on the aspects nurses must focus on when educating patients living with a chronic illness. The 5 As approach is included in this guideline, but only two aspects are used: Assess, and Advise whereas the 5 A's approach includes Assess, Advise, Agree, Assist, Arrange and partnership (Duprez, *et al.*, 2016:1382). To the knowledge of the researcher there are no South African guidelines specifically focusing on the provision of self-management support.

According to Thomas (2019:168), inequities between public services and private services could also be a contributing factor as the PHC services in South Africa are very basic, due to lack of necessary resources to assist nurses to provide quality care. Though CCMDD is fully functional in all facilities, most patients prefer to collect their parcels in the clinics than at external pick-up points. CCMDD is a government strategy to encourage chronic but stable clients to collect their medicines at selected pick up points. This is done to reduce the workload on nurses, as only patients who need intensive care will be seen by health workers (Ramphal, 2019:np). Some facilities do not have a pharmacist assistant and nurses are the ones who

issue the medicine parcels. Increased workloads and performing other duties decrease the time nurses have available to provide self-management support.

Another reason why nurses are not performing SMS may be due to a lack of training and support in their workplace. Tharani *et al.* (2020:10) indicate that education increases motivation to implement self-management.

#### **5.2.4 Objective 4: to determine the association between nurses' knowledge, self-efficacy, and the performance of diabetes self-management support**

Self-efficacy affects motivation and enables a person to have a strong sense of direction and goal orientated behaviour, ultimately improving performance in self-management (Mangi, Goon & Yako, 2018:7).

Nurses form the largest group of all health professionals (Ledbetter, 2011:19). They are the ones who spend most of the time with patients, in particular in primary care settings. Doctors in OR Tambo District visit clinics once a week. Due to the high number of patients living with chronic illnesses, patients are reviewed once in six months except in cases of emergencies. For this reason, nurses must have adequate knowledge to manage patients living with diabetes. According to Ledbetter (2011:17), disease self-management requires support from nurses who are knowledgeable about diabetes and are up to date with the latest evidence-based practices related to diabetes.

The hypothesis for this study was that primary health care nurses' knowledge and self-efficacy is associated with the performance of diabetes self-management support. The results showed that there was no association between knowledge, self-efficacy and performance. Nurses who participated in this study had generally high levels of diabetes knowledge as discussed above. However, knowledge was not associated with self-management support self-efficacy or performance. This could be due to the fact that there is no formal and structured self-management programme in South Africa, thus nurses are seldom trained in self-management as a concept. Guidelines in South Africa like APC/PAC guide do touch on the aspects nurses must focus on when educating patients living with a chronic illness, but to the knowledge of this researcher, there are no guidelines focusing on self-management support.

The study results did indicate that self-management support self-efficacy was strongly positively correlated with self-management support performance. This means that nurses with self-efficacy may be more likely to perform self-management support. The correlation found in the present study ( $r = 0.78$ ) was stronger than the moderate correlation ( $r = 0.63$ ) found by

Duprez *et al.* (2016:1392). The authors indicate that it means that the responses to the two scales differed markedly. The difference in the present study was therefore not as marked.

#### **5.2.5 Objective 5: identifying demographical factors that influence nurses' diabetes self-management knowledge, self-efficacy, and performance**

Nurses with a PHC qualification had a significantly higher mean diabetes knowledge score (mean = 92.9, SD 7.5) compared to those who did not have a PHC qualification (mean = 83.8, SD 12.9). However, other demographic categories were not associated with knowledge. There were no associations between demographic variables and self-efficacy. The only demographic variable significantly associated with performance of self-management support was years of experience as a professional nurse.

Nurses with a PHC diploma probably had higher knowledge scores because their training is intensive, developing them to have intellectual, practical and reflective competences. This diploma covers aspects of health assessment, diagnosis, treatment and care including pharmacology and non-drug treatment (e.g. diet, exercise). In a study conducted by Kaufman, Rajataramya, Tanomsingh, Ronis and Potempa, (2012:6) to assess preparedness of nurses in managing escalating non-communicable diseases in Thailand, nurses with a higher level of education scored higher than nurses who were less qualified in self-management support.

Duprez *et al.* (2016:1390) found that master's degree nurses had higher performance scores than those without a master's degree, although the association was not significant. There were no participants with a master's degree in the present study. Management of diseases changes with advancing technologies and new strategies, thus continuous education to develop skills, knowledge and attitudes is imperative so as to improve the quality of care given to patients.

Opportunities for PHC nurses in OR Tambo District to study further may motivate nurses to integrate self-management support in their management of patients living with diabetes.

Knowledge, self-efficacy and performance scores did not differ across categories of recent experience in working with persons living with diabetes. However, participants with recent experience had higher self-efficacy mean scores. Self-management performance was also positively correlated with years of experience as a nurse, although the correlation was weak ( $r = 0.21$ ). Similarly, Duprez *et al.* (2016:1390) found that professional nurses had higher self-efficacy and performance scores than nursing students.

### **5.3 CONCLUSION**

The study showed that diabetes knowledge of PHC nurses in OR Tambo District is high compared to a similar study conducted by Ledbetter (2011:33) in South Carolina using the DBKT. Self- management support self-efficacy and performance scores were associated, although performance was lower than self-efficacy. A qualification in PHC was associated with higher knowledge scores which supports findings from other studies that nurses who are more qualified are more knowledgeable should perform better in SMS. However, in the current study nurses with a PHC qualification did not have higher self-management self-efficacy or support scores. At the moment there is no formal structured self-management programme or a guideline that focuses on all aspects of self-management support that primary care nurses can use.

### **5.4 LIMITATIONS OF THE STUDY**

The study has several limitations. Firstly, convenience sampling was used. The challenge in using convenience sampling is that biases are quite common; nurses who felt they had poor knowledge may have declined to participate and nurses performing outreach services were not included.

Although the questions were evaluated by local experts, the results of the knowledge questions have to be interpreted with caution.

Since data was collected in one district, results may not be generalised to settings outside OR Tambo District.

Lastly, data was collected using a self-administered questionnaire; therefore, nurses may have over-estimated their own self-efficacy and performance of diabetes SMS. The tool is also long and initially participants did not understand the questions clearly since they had to rate both self-efficacy and performance for the same item. Although reliability values were acceptable, it may be necessary to conduct further factor analyses and further contextualise the SEPSS instrument to the South African setting.

### **5.5 RECOMMENDATIONS**

#### **5.5.1 Practice recommendations**

##### ***5.5.1.1 Self-management support clinical practice guidelines and standards***

Guidelines in primary care facilities should include all of the 5A components mentioned in Section 5.2.3 above so as to orientate and provide guidance to nurses working in this setting

in self-management. Best practices from other countries like the 10 standards used in the United States of America can be adopted and modified for the South African setting (Beck *et al.*, 2019:52).

#### **5.5.1.2 Training of nurses in the provision of self-management support**

Training nurses on diabetes self-management and on-the-job mentorship and support in order to maximise clinical outcomes and diabetes self-management self-efficacy and performance is recommended. Nurses who have not had specialised training may lack the ability to provide self-management support (Hollis *et al.*, 2014:3). Nurses should also receive training on new guidelines putting more emphasis on non-drug management as the study identified that nurses have knowledge but lack performance in SM.

#### **5.5.1.3 Implementation of comprehensive chronic care systems**

Adoption of the CCM approach in the management of patients living with diabetes could result in improved clinical outcomes (Wagner, 1998:np). Identification of patients requiring pro-active care and assistance could prevent complications and reduce hospitalisation. Available community-based services to refer stable patients and reduce workload in PHC can be utilised. Training of professional nurses and CHWs in providing SMS is needed.

### **5.5.2 Recommendations for further research**

Based on the study results, there is a discrepancy between knowledge, self-efficacy and performance of DSMS. An investigation to identify factors that influence the performance in self-management support and challenges faced by primary care nurses in South Africa should be done.

As mentioned before, more research is also needed to develop a tool that will be used to measure diabetes knowledge and self-management support performance and self-efficacy that will suit the South African setting.

## **5.6 CONCLUSION**

PHC nurses in OR Tambo have high levels of diabetes knowledge; however, this does not translate into self-management support self-efficacy and performance. To improve diabetes self-management support and performance, and reduce mortality and morbidity related to diabetes in OR Tambo District, nurses need support through education and training in self-management as well as comprehensive chronic care systems.

## REFERENCES

- Absetz, P., Van Olmen, J., Guwatudde, D., Puoane, T., Alvensson, H.M., & Delobelle, P. 2020. SMART2D development and contextualization of community strategies to support self-management in prevention and control of type 2 diabetes in Uganda, South Africa, and Sweden. *Translational behavioral medicine*, 10(1), pp.25-34. [Online]. Available:  
[https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=SMART2D—development+and+contextualization+of+community+strategies+to+support+self-management+in+prevention+and+control+of+type+2+diabetes+in+Uganda%2C+South+Africa%2C+and+Sweden&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=SMART2D—development+and+contextualization+of+community+strategies+to+support+self-management+in+prevention+and+control+of+type+2+diabetes+in+Uganda%2C+South+Africa%2C+and+Sweden&btnG=). [Accessed 2020, October 23].
- Alleyne, G., Hancock, C., & Hughes, P. 2011. Chronic and non-communicable diseases: a critical challenge for nurses globally. *International Nursing reviews*, 58 (3), pp.328-331. [Online]. Available:  
[https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=Chronic+and+non-communicable+diseases%3A+a+critical+challenge+for+nurses+globally&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Chronic+and+non-communicable+diseases%3A+a+critical+challenge+for+nurses+globally&btnG=). [Accessed 2020, October 23].
- Aloitabi, A., Al Gammi, L., Gholizadeh, L., & Perry, L. 2016. Diabetes knowledge of nurses in different countries: An integrative review. *Nurses Today*. Elsevier. *Nurse education today*, 39, pp.32-34. [Online]  
Available:<https://www.sciencedirect.com/science/article/abs/pii/S0260691716000289>[Accessed 2021, November 12].
- Azami, G., Soh, K. L., Sazlina, S. G., Salmiah, S., Aazami, S., Mozafari, M., & Taghinejad, H. 2018. Clinical Study Effect of a Nurse-Led Diabetes Self-Management Education Program on Glycosylated Hemoglobin among Adults with Type 2 Diabetes. *Journal of Diabetes Research*, 2018, pp. 1-10. [Online]. Available:  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6129337/>. [Accessed 2021, May7].
- Bandura A. 2006. *Guide for Constructing Self-Efficacy Scales*. *Self-Efficacy Beliefs of Adolescents*, 5(1). Pajares F. & Urdan T., eds, Information Age Publishing, Greenwich CT, pp. 307–337.

- Barr, V.J., Robinson, S., Marin-Link, B., Underhill, L., Dotts, A., Ravensdale, D., & Salivaras, S. 2003. The Expanded Chronic Care Model. An Integration of Concepts and Strategies from Population Health Promotion and the Chronic Care Model. *Hosp Q*, 7(1), pp.73-82. [Online] Available: <https://www.areac54.it/public/the%20expanded%20chronic%20care%20model.pdf>. [Accessed 2021, October, 18].
- Beck, J., Greenwood, D.A., Blanton, C., Bollinger, T.S., Butcher., & Condon, J.E. 2019. National standards for diabetes self-management education and support. The diabetes educator, *Diabetes Care*, 46(1), pp.46-61. [Online] Available: <https://journals.sagepub.com/doi/pdf/10.1177/0145721719897952>. [Accessed 2021, May 08].
- Burns, N. & Grove, S. 2011. *Understanding Nursing Research. Build an Evidence-based Practice*. 5th Edition. St Louis: Saunders Elsevier Publishers
- Catsicas, M. E., & Sciences, H. 2014. An Assessment of the Level of Knowledge of Health Professionals on Nutrition and Diabetes Self-management in Treating Patients with Type 1 and Type 2 Diabetes Mellitus in South Africa. Unpublished Master's Thesis. Stellenbosch: University of Stellenbosch.
- Chrvala, C. A., Sherr, D., & Lipman, R. D. 2016. Diabetes self-management education for adults with type 2 diabetes mellitus: A systematic review of the effect on glycemic control. *Patient Education and Counselling*, 99(6), pp.926–943. [Online]. Available: <https://doi.org/10.1016/j.pec.2015.11.003>. [Accessed 2020, April,30].
- Center for disease control. 2019. Self-Management Education (SME) Programs for Chronic Health Conditions. *Centre for Disease Control* [Online] Available: <https://www.cdc.gov/learnmorefeelbetter/programs/index.htm>. [Accessed 2021, May 28].
- Coetzee, A., Taljaard, J.J., Hugo, S.S., Conradie, M., Conradie-Smit, M., & Dave, J.A. 2020. Diabetes mellitus and COVID-19: A review and management guidance for South Africa. *South African Medical Journal*, 110(8), pp.761-766. Available at: [www.samj.org.za/index.php/samj/article/view/12991/9424](http://www.samj.org.za/index.php/samj/article/view/12991/9424). [Accessed 2020, October 23].

- Davy, C., Bleasel, J., Liu, H., Tchan, M., Ponniah, S., & Brown, A. 2015. Factors influencing the implementation of chronic care models: A systematic literature review. *BMC family practice*, 16(1), pp.1-12 [Online] Available: <https://link.springer.com/article/10.1186/s12875-015-0319-5>. [2021, November,12].
- Neethling, I., Groenewald, P., Bradshaw, D., Day, C., and Laubscher, R. *Burden of disease*. 2020. [Online] Available: <https://www.hst.org.za/publications/District%20Health%20Barometers/DHB%202019-20%20Section%20A,%20chapter%207%20-%20Burden%20of%20disease.pdf>. [Accessed 2021,October,18]
- Dube, L., Van den Broucke, S., Dhoore, W., Kalweit, K., Housiay, M. 2015. An audit of diabetes self-management education programs in South Africa. *Journal of Public Health Research* 2015; 4(581), pp.176-184. [Online] Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4693339/pdf/jphr-2015-3-581.pdf>. [Accessed 2021, November,12].
- Doenges, T. J., & Dik, B J. 2019. "Declaration of Helsinki". *Encyclopedia Britannica*, 7 Feb. 2019. Available from: <https://www.britannica.com/topic/Declaration-of-Helsinki>. [Accessed 2021, November, 12].
- Duprez V., Van Hooft, S.M., Dwaarswaard, A., van Staa, A, Van Hecke, A., & Stratting, M.M.H. 2016. The development and psychometric validation of the self-efficacy and performance in self-management support (SEPSS) Instrument. *Journal of Advanced Nursing*, 72(6), pp.1381-1391. [Online] Available: <https://onlinelibrary.wiley.com/doi/epdf/10.1111/jan.12918>. [Accessed 2021, May, 11].
- Eastern Cape Department of Health (ECHD). no date. *Annual Performance Plan. 2020/2021*. Bhisho: ECHD Eastern Cape Department of Health, OR Tambo District Health Plan 2018/2019 2020/2021. (no date).
- Elissen, A., Nolte, E., Knai, C., Brunn, M., Chevreur, K., Conklin, A. & Vrijhoef, H. 2013. Is Europe putting theory into practice? A qualitative study of the level of self-management support in chronic care management approaches. *BMC Health Services Research*, 13 (1), pp.1-9.117.doi:10.1186/1472-6963-13-117. [Online] Available: <https://bmchealthservres.biomedcentral.com/track/pdf/10.1186/1472-6963-13-117.pdf>. [Accessed 2021, May, 11].

- Frost, J. 2020. *Introduction to statistics: An Intuitive Guide for Analyzing Data and Unlocking Discoveries*. James D Frost publishers.
- Glasgow, R. E. 2010. Interactive Media for Diabetes Self-Management: Issues in Maximizing Public Health Impact. Sage Publishers, 30(6), pp.745-758. [Online] Available at: <https://www.dhi.ac.uk/san/waysofbeing/data/health-jones-glasgow-2010b.pdf>. [Accessed 2021, June, 18].
- Grady, P. A., & Gough, L. L. 2014. Self-management: A comprehensive approach to management of chronic conditions. *American Journal of Public Health*, 108(8), pp.430– 436. [Online]. Available: <https://doi.org/10.2105/AJPH.2014.302041>. [Accessed 2020, February 16].
- Gray, J.R., Grove, S.K., & Sutherland, S. 2017. *The Practice of Nursing Research, Appraisal, synthesis, and generation of evidence*. Missouri. Elsevier.
- Grove, K., Burns, N. & Gray, J.R. 2013. *The practice of research, Appraisal, synthesis, and Generation of Evidence*. Elsevier. Missouri.
- Grove, K. & Gray, J.R. 2019. *Understanding nursing reasearch. Building an Evidence-Based Practice*. Missouri. Elsevier.
- Ji, H., Chen, R., Huang, Y., Li, W., Shi, C., & Zhou, J. 2018. *Effect of simulation education and case management on glycemic control in type 2 diabetes*. WILEY, 30(3), p.e 3112. [Online]. Available: <https://www.onlinelibrary.wiley.com/doi/full/10.1002/dmrr.3112>. [Accessed 2021, April 14].
- Haas, L., Maryniuk, M., Beck, J., Cox, C. E., Duker, P., Edwards, L., Fisher, E.B., Hanson, L., Kent, D., Kolb, L., McLaughlin, P., Rhinehart, A.S., Rothman, R., Sklaroff, S., & Youssef, G. 2014. *National Standards for Diabetes Self-Management Education and Support*. *Diabetes care*, 37(Supplement\_1), pp. S144-S153. [Online]. Available: [https://care.diabetesjournals.org/content/diacare/37/Supplement\\_1/S144.full.pdf](https://care.diabetesjournals.org/content/diacare/37/Supplement_1/S144.full.pdf). [Accessed 2021, April 08].
- Hailu, F.B., Hjortdahl, P., & Moen, A. 2018. *Nurse-Led Diabetes Self-Management Education Improves Clinical Parameters in Ethiopia*. *Frontiers in public health*, p.302. [Online].

Available: <https://www.frontiersin.org/articles/10.3389/fpubh.2018.00302/full>.

[Accessed 2020, September 04].

Hailu F., B., Moen, A., & Hjortdahl, P. 2019. *Diabetes Self-Management Education (DSME) – Effect on Knowledge, Self-Care Behavior, and Self-Efficacy Among Type 2 Diabetes Patients in Ethiopia: A Controlled Clinical Trial. Diabetes, metabolic syndrome and obesity: targets and therapy*, 12, p.2489. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6890192/> [ Accessed 2020, September 04].

Hollis, M., Glaister, K., & Lapsley, J. A. 2014. Do practice nurses have the knowledge to provide diabetes self-management education? *Contemporary Nurse*, 46 (2), pp.234-241. [Online] Available: <https://doi.org/10.5172/conu.2014.46.2.234>. [Accessed 2021, May,7].

International Diabetes Federation (IDF). 2019. IDF Diabetes Atlas Ninth edition. In *Dunia: IDF*.

International Diabetes Federation (IDF). 2017. IDF Diabetes Atlas Eighth edition. In *Dunia: IDF*.

Inzucchi, S.E, Bergenstal, R.M., Buse, J.B., Diamant, M., Ferrannini, E., Nauck, M., *et al.* 2012. Management of hyperglycaemia in Type 2 Diabetes: A Patient Centered Approach. *Diabetes Care*, 35 (6), pp.1364–1379. [Online]. Available: <https://care.diabetesjournals.org/content/35/6/1364.long>. [Accessed 2021, November, 12].

Kaufman, N.D., Rajataramya, B., Tanomsingh, S., Ronis, D.L., & Potempa, K., 2012. Nurse preparedness for the non-communicable disease escalation in Thailand: A cross-sectional survey of nurses. *Nursing Health Science*, 14 (1), pp.32–37. doi: 10.1111/j.1442-2018.2011.00657.x. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7147940/>. [Accessed 2021, November, 12].

Kettledas, R. 2016. *Central Chronic Dispensation*. [Online]. Available: [https://za.usembassy.gov/wp-content/uploads/sites/19/2016/06/Central-Chronic-Medicine-Dispensing-and-Distribution-Programme\\_Ricardo-Kettledas.pdf](https://za.usembassy.gov/wp-content/uploads/sites/19/2016/06/Central-Chronic-Medicine-Dispensing-and-Distribution-Programme_Ricardo-Kettledas.pdf)[Accessed 2021, November 17].

- Ledbetter, R.B. 2011. *Diabetes Understanding Among Staff Nurses: Examining the Actual Versus Perceived Knowledge in the Acute Care Setting*. Gardner-Webb University. [Online]. Available: [https://digitalcommons.gardnerwebb.edu/cgi/viewcontent.cgi?article=1160&context=nursing\\_etd](https://digitalcommons.gardnerwebb.edu/cgi/viewcontent.cgi?article=1160&context=nursing_etd) [Accessed 2020, May, 05].
- Levitt, N. 2019. *Chronic Disease Initiative for Africa: Summary Report*. University of Cape Town.
- Liu, T., Wu, D., Wang, J., Li, C., Yang, R., Ge, S., Du, Y., & Wang, Y. 2018. Testing the information-motivation behavioural skills model of diabetes self-management among Chinese adults with type 2 diabetes: a protocol of a 3-month follow-up study. *BMJ open* 8(10), p.e020894 . 2018 June. [Online] Available: <https://bmjopen.bmj.com/content/bmjopen/8/10/e020894.full.pdf>. [Accessed 2021, May,7].
- Lobiondo-Wood, G. & Harber, J. 2018. *Nursing research, methods and critical appraisal for evidence-based practice*. Elsevier. Missouri.
- Lorig K.R., Halsted, R., & Holman, H. 2003. Self-management education: history, definition, outcomes, and mechanisms. *Ann Behavioural Medicine*, 26(1), pp.1–7. PubMed PMID: 12867348.
- Maier, C.B., Aiken, L.H. 2016. Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study. *European Journal of Public Health*, 26(6), pp.927-934. [Online]. Available: <https://academic.oup.com/eurpub/article/26/6/92/2616280>. [Accessed 2021, November 21]
- Mangi, G.N., Goon, D.T., & Yako E.M. 2018. *Self-efficacy and Clinical Performance of Nurses Initiated and Management of Antiretroviral Therapy: Narrative Review*. *The Open Public Health Journal* 12(1), pp.86-93. [Online]. Available: <https://openpublichealthjournal.com/contents/volumes/V12/TOPHJ-12-86/TOPHJ-12-86.pdf>. [Accessed 2021, November 21].
- Mash, B., Fairall, L., Adejayan, O., Ikpefan, O., Kumari, J., Mathee, S., Okun, & Yogolelo, W. 2012. *A morbidity survey of South African primary care*. *PloS one*, 7(3), p.e32358. [Online]. Available: <https://storage.googleapis.com/plos-corpus->

prod/10.1371/journal.pone.0032358/1/pone.0032358.pdf?X-Goog-Algorithm=GOOG4-RSA-SHA256&X-Goog-Credential=wombat-sa%40plos-prod.iam.gserviceaccount.com%2F20211023%2Fauto%2Fstorage%2Fgoog4\_request&X-Goog-Date=20211023T172200Z&X-Goog-Expires=86400&X-Goog-SignedHeaders=host&X-Goog-\_. [Accessed 2021, April 30].

Massimi, A. , De Vito, C., Brufola, L., Corsaro, A., Marzuillo, C. , Migliara, G., Rega, M.L., Ricciardi, W., Villari, P., & Damiani, G. 2017. Are community-based nurse-led self-management support interventions effective in chronic patients? Results of a systematic review and meta-analysis. *Journal Plosone*, 12(3), pp.1-22. [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/28282465/>. [Accessed 2021, April 30].

McDonald, J.H. 2014. *Handbook of Biological Statistics*. (3rd ed.). Baltimore, Maryland: Sparky House Publishing.

Mnukwa, V. Human resource practitioner, King Sabatha Dalindyebo Local area, Eastern Cape.

Murphy, K., Chuma, T., Mathews, C., Levitt, N., & Steyn, K .2015. A qualitative study of the experiences of care and motivation for effective self-management among diabetic and hypertensive patients attending public sector primary health care services in South Africa. *BMC Health Services Res*, 15 (1), pp.1-9. [Online]. Available: <https://doi.org/10.1186/s12913-015-0969-y>. [Accessed 2021, November 12].

Nolte, E., Knai, C., & Saltma, R.B. 2014. Assessing chronic disease management in European health systems. *Concepts and approaches*. [Online]. Available: <https://researchonline.lshtm.ac.uk/id/eprint/2530940/1/Assessing-chronic-disease-management-in-European-health-systems.pdf>. [Accessed 2020, October, 18]

O'Brien, C., van Rooyen, D., & Ricks, E. 2020. *Self-management of persons living with diabetes mellitus type 2: Experiences of diabetes nurse educators*. *Health Gesondheide*, 25 (1), pp.1-11. [Online]. Available: [www.scielo.org.za/pdf/hsa/v25/39.pdf](http://www.scielo.org.za/pdf/hsa/v25/39.pdf). [ Accessed 2021, April 30].

Ramphal, R. 2019. The CCMDD story. Health Systems Trust Organisation.

Registered Nurses Association of Ontario clinical practice guideline: *Strategies to support self-management in chronic conditions: collaboration with clients*. Nursing Best Practice guideline. Registered Nurses of Ontario; 2010. ia BPG.

- Republic of South Africa (a). 2007. Government Notice R48, 1982, Occupational Specific Dispensation. Available from:  
[https://www.dpsa.gov.za/dpsa2g/documents/rp/2007/OSD/Annex\\_A\\_OSD\\_Professional\\_Nurse.pdf](https://www.dpsa.gov.za/dpsa2g/documents/rp/2007/OSD/Annex_A_OSD_Professional_Nurse.pdf). [Accessed 2021, November 12].
- Republic of South Africa (b). 2020 (a). COVID-19 Disease: Infection Prevention and Control Guidelines Version 1. Pretoria, Government Printers.
- Republic of South Africa (c). 2014. Management of type 2 Diabetes in adults at Primary care level. Pretoria, Government Printers.
- Republic of South Africa (d). 2005. Nursing Act, 2005 (ACT No. 33 OF 2005). Pretoria, Government Printers.
- Republic of South Africa (e), Integrated clinical services management (ICSM). nd. Pretoria, Government printers.
- Reynolds, R., Dennis, S., Hasan, I., Slewa, J., Chen, W., Tian, D., Bobba, S., & Zwar, N. 2018. A systematic review of chronic disease management interventions in primary care. *BMC, family practice*, 19 (1), pp.1-13. [ Online] Available:  
[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5759778/pdf/12875\\_2017\\_Article\\_692.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5759778/pdf/12875_2017_Article_692.pdf) [ Accessed 2020, May 21].
- Reed, J. 2021. *Improving Nurses' Knowledge to Provide Diabetes Self-Management Education for African Americans*. Doctoral dissertation, Walden University. [online]. Available:  
<https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=12226&context=dissertations>. [Accessed 2021, November 19].
- Rosique, R. 2021. *Care Pathways. The basics*. 2021. [Online]. Available:  
<https://www.asianhnm.com/healthcare-management/care-pathways-basics>. [ Accessed 2021, September 08].
- Ryan, P., & Sawin, K.J. 2009. The Individual and Family Self-Management Theory: Background and Perspectives on Context, Process, and Outcomes. *Nursing Outlook*, 57 (4), pp.217-225. [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/19631064/>. [Accessed 2021, June, 18].

- Sawin, K.J. 2017. Definitions, frameworks, and theoretical issues in self-management. *Journal of Pediatric rehabilitation*. 10 (3-4), January: pp.169-176. [Online]. Available: [https://www.researchgate.net/publication/320917977\\_Definitions\\_frameworks\\_and\\_theoretical\\_issues\\_in\\_self-management1](https://www.researchgate.net/publication/320917977_Definitions_frameworks_and_theoretical_issues_in_self-management1). [2020, June, 14].
- Segen JC. 2012. Segen's Medical Dictionary. [Online] Available: <https://www.coursehero.com/file/p2ndbrd/pdf-Segen-JC-2012-Segens-Medical-Dictionary-nd-respect-httpmedical/>. [Accessed; 2021, November 12]
- South African National Department of Health (a). 2020. *Adult Primary Care: Symptom-based integrated approach to the adult in primary care*. Pretoria: Government Printers.
- South African National Department of Health (b). 2020. *Assistive Self-management Programme*. Pretoria: Government Printers.
- South African National Department of Health (c). 2014. *Management of type 2 Diabetes in adults at primary care level*. Pretoria: Government Printers.
- Stephani, V., Opoku, D., & Beran, D. 2018. Self-management of diabetes in Sub-Saharan Africa: a systematic review. *BMC public health*, 18 (1), pp.1-11. [Online]. Available: <https://bmcpublikehealth.biomedcentral.com/articles/10.1186/s12889-018-6050-0> [Accessed 2021, October, 28].
- Steyl, T. 2017. Diabetes self-management: A post-intervention evaluation of challenges experienced in a low socio-economic community. *African Journal for Physical Activity and Health Sciences (AJPHEs)*, 2017(suppl1\_2), pp.277-289. ([Online]. Available: [https://repository.uwc.ac.za/bitstream/handle/10566/3953/Steyl\\_Diabetes-self-management\\_2017.pdf?sequence=1&isAllowed=y](https://repository.uwc.ac.za/bitstream/handle/10566/3953/Steyl_Diabetes-self-management_2017.pdf?sequence=1&isAllowed=y). Available: <https://he02.tci-thaijo.org/index.php/PRIJNR/article/view/91968/115856>. [Accessed 2021 October, 18]
- Tharani, A., Van Hecke, A., Ali, T.S., & Duprez, V. 2020. Factors influencing nurses' provision of self-management support for patients with chronic illnesses: A systematic mixed studies review. *International Journal of Nursing Studies*, 120, p.103983. [ Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/34147728/>. [ Accessed 2021, November 12].
- The society for Endocrinology Metabolism and Diabetes of South Africa Type 2 Diabetes Miletus Guidelines Expert Committee (SEMDSA). 2017. *The 2017 SEMDSA B*

Guideline for the Management of Type2 Diabetes Guideline Committee. *Journal for Endocrinology Metabolism and Diabetes of South Africa* (JEMDSA), 21(1) (Supplement 1); S1-S196.

- Thomas, V. 2019. *Investigating intervention strategies for the management of diabetes in South Africa: A system dynamics approach*. Unpublished master's thesis. Stellenbosch. Stellenbosch University.
- Udlis, K.A. 2011. Self-management in chronic illness: concept and dimensional analysis. *Journal of Nursing and Healthcare of Chronic Illness*, 3(2), pp.130–139. doi:10.1111/j.1752-9824.2011.01085.x. [Online]. Available: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1752-9824.2011.01085.x>. [ Accessed 2020, October 20].
- Uğur, E., Demir, H., & Akbal, E.2015. Postgraduate education needs of nurses who are caregivers for patients with diabetes. *Pakistan Journal of Medical Science*, 31(3), pp. 637- 642. doi: [http://dx.doi.org/ 10.12669/pjms.313.6732](http://dx.doi.org/10.12669/pjms.313.6732).
- Van Hooft, S. M. Becqué, Y. N., Dwarswaard, J., VanStaa, A., & Bal, R. 2018. Teaching self-management support in Dutch Bachelor of Nursing education: A mixed methods study of the curriculum. *Nurse Education Today*, 68(1), 146–152. [Online]. Available: <https://doi.org/10.1016/j.nedt.2018.06.005>. [Accessed 2021, April 30].
- Van Hooft, S.M., Dwarswaard, J., Jedeloo, S., Bal, R., & van Sta, A. 2015. Four perspectives on self-management support by nurses for people with chronic conditions: a Q-methodological study. *International Journal of Nursing Studies*. 2015;52(1), pp.157-166. [Online]. Available: <https://www.hogeschoolrotterdam.nl/contentassets/5349c3be7c9f4c3dbcbaff528a42d72b/proefschrift-svanhooft.pdf#page=27>. [Accessed 2021, April, 30].
- Vas, A., Devi, E.S., Vidyasagar, S., Acharya, R., Rau, N.R., George, A. Jose T., & Nayak, B. 2017. *Effectiveness of self-management programmes in diabetes management: A systematic review*. *International journal of nursing practice*, 23(5), p.e12571. [Online]. Available: [https://www.siditalia.it/images/effectiveness\\_management.pdf](https://www.siditalia.it/images/effectiveness_management.pdf). [ Accessed 2020, October 20].
- Wagner, E.H. 1998. Chronic Disease Management: *What Will It Take To Improve Care for*

*Chronic Illness?* [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/10345255/> [Accessed 2021, November 12]

World Health Organization. 2014. *Global status report on non-communicable diseases*. Geneva. [Online] Available: <https://www.who.int/publications/i/item/9789241564854> [Accessed 2020, October, 23]

## APPENDICES

### APPENDIX 1: PARTICIPANT INFORMATION AND CONSENT FORM

<b>TITLE OF RESEARCH PROJECT:</b>	
Primary health care nurses' knowledge, self-efficacy, and performance of diabetes self-management support in OR Tambo District.	
<b>DETAILS OF PRINCIPAL INVESTIGATOR (PI):</b>	
<b>PI details: Zandile Kolosani Landu</b>	<b>Ethics reference number:</b>
<b>Full postal address: NO 5 Nkqwiliso street, Mbuqe Extension Mthatha 5100</b>	<b>Contact number: 083 264 1980</b>

I would like to invite you to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are completely satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation in this study is completely voluntary, you have a right to refuse to take part. You also have a right to refuse to answer any questions you are not comfortable answering and you will not be penalized for skipping them. You may withdraw from participating in the study at any point.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University. The study will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, the South African Guidelines for Good Clinical Practice (2006), the Medical Research Council (MRC) Ethical Guidelines for Research (2002), and the Department of Health Ethics in Health Research: Principles, Processes and Studies (2015).

### **What is this research study all about?**

- o The study aim is to investigate nurses' knowledge, self-efficacy and performance of diabetes self-management support in the OR Tambo District.
- o All nurses working in primary health care in the King Sabatha Dalindyebo sub- district will be invited to participate. We anticipate that approximately 190 professional nurses will participate in this study.

### **Why am I inviting you to participate?**

- o As a professional nurse working in primary health care providing care to people living with diabetes, you can provide valuable information for the study.

### **What will your responsibilities be?**

- o You will be provided with a questionnaire to complete. It will take you 20 minutes to 30 minutes to answer.
- o You will complete the questionnaire during a time that it is quiet in the clinic so that it does not interfere with your duties.
- o The researcher will wait for you to complete it and take the questionnaire.

### **Will you benefit from taking part in this research?**

- o The study findings will help the researcher to make recommendations that may ultimately improve the quality of care rendered to patients living with diabetes. Furthermore, it will assist with the upcoming 'Assistive self-management' programme that will focus on non-communicable diseases. Findings will also highlight gaps to inform training.

### **Are there any risks involved in your taking part in this research?**

- o This is a minimal risk study. As the COVID-19 pandemic, your safety will be safeguarded by minimising time spent with the researcher, social distancing will be maintained and the researcher will wear a mask. Your particulars and that of your clinic will not be disclosed in the findings. In addition, the information captured will be kept in a password protected computer.
- o Questionnaires and signed informed consent forms will be shredded once the study is complete.

**Will you be paid to take part in this study and are there any costs involved?**

- o You will not be paid for participating in this study as there will not be any costs on your side.
- o You will be given a small token of appreciation for participating.

**Is there anything else that you should know or do?**

- o For more information about the study you can contact the Health Research Ethics Committee at 021 938 9677/9819.
- o For more information about the study, you can contact the researcher.
- o You will get a copy of the consent form and this information.

**If you agree to participate in the study, please sign below.**

**Declaration by participant**

By signing below, I ..... agree to take part in a research study entitled (Primary health care nurses' knowledge, self-efficacy, and performance of diabetes self-management support in OR Tambo District.).

I declare that:

- o I have read this information and consent form, or it was read to me, and it is written in a language in which I am fluent and with which I am comfortable.
- o I have had a chance to ask questions and I am satisfied that all my questions have been answered.
- o I understand that taking part in this study is **voluntary**, and I have not been pressurised to take part.
- o I may choose to leave the study at any time and nothing bad will come of it I will not be penalised or prejudiced in any way.

**APPENDIX 2: DIABETES SELF-MANAGEMENT SUPPORT QUESTIONNAIRE**

- ✓ Thank you for agreeing to participate in this study.
- ✓ Please take your time to read through the questions.
- ✓ Answer all the questions.
- ✓ You can ask the researcher if there are any questions that you do not understand.

**Section 1: Demographic details**

**In this section, we will ask you about your demographic details.** Please complete the following information by ticking on the appropriate box.

- |    |   |  |
|----|---|--|
| 1  | Indicate your gender  | <input type="checkbox"/> Male<br><input type="checkbox"/> Female<br><input type="checkbox"/> Non-binary  |
| 2. | Indicate your age in years  |  |
| 3. | Indicate your job title   | <input type="checkbox"/> Operational manager<br><input type="checkbox"/> Professional Nurse<br><input type="checkbox"/> Senior PN                  |
| 4. | Indicate your highest qualification   | <input type="checkbox"/> Diploma in Nursing<br><input type="checkbox"/> BCur<br><input type="checkbox"/> Post graduate                             |
| 5. | Do you have a postgraduate diploma in health assessment, diagnosis, treatment and care (Primary Health Care)? | <input type="checkbox"/> Yes<br><input type="checkbox"/> No  |
| 6. | How long have you been working as a professional nurse (indicate the number of years)                         |  |
| 7. | When was the last time you worked with patients living with diabetes  | <input type="checkbox"/> Less than 1 month ago<br><input type="checkbox"/> 1 – less than 3 months ago<br><input type="checkbox"/> 3 - 6 months ago |

More than 6 months ago

## Section 2: Diabetes basic knowledge test

In this section we will ask you questions about diabetes. Please answer all the questions, for each item select one best answer to the question. The last answer to each question, "I don't know" should be used if you truly do not know the answer.

**Circle the correct answer.**

1. Which statement is characteristic of the etiology of Type II diabetes?
  - a) predominately non-genetic
  - b) frequently associated with obesity and resistance to insulin
  - c) autoimmune, viral or toxic destruction of the beta cells
  - d) I do not know
  
2. Which of these statements about management of Type II diabetes is true?
  - a) insulin injections are necessary to maintain life
  - b) a controlled diet and exercise program is the most effective treatment
  - c) oral hypoglycemic agents are sufficient for blood control in most patients
  - d) I do not know
  
3. What effect does insulin have on blood glucose?
  - a) insulin causes blood glucose to increase
  - b) insulin causes blood glucose to decrease
  - c) insulin has no effect on blood glucose
  - d) I do not know

4. Which are physiological actions of insulin?
1. transports glucose across cell membranes for use by the cells.
  2. enhances the formation of proteins for amino acids
  3. enhances the breakdown of fats for energy
- a) 1 and 2
  - b) 1,2 and 3
  - c) 1 and 3
  - d) I do not know
5. If a person with diabetes is found unresponsive which of these assumptions should guide your initial actions?
- a) The blood sugar may be very high
  - b) The blood sugar may be very low
  - c) The blood sugar may be normal
  - d) I do not know
6. Normal fasting blood glucose level can be best described as:
- a) between 4.0-7.0 mmol/L
  - b) between 7.0 and 10mmol/L
  - c) Above10
  - d) I do not know
7. Which of the following tests can determine the patient's average blood glucose control over an extended period of time?
- a) glycosylated heamoglobin (HbA1c)
  - b) plasma renin activity (PRA)
  - c) insulin antibodies
  - d) I do not know

- 8 When should a person with diabetes check urine for ketones?
- a) whenever exercising
  - b) after eating ice cream
  - c) whenever blood glucose is greater than 11 mmol/L.
  - d) I do not know
9. Where should one store insulin that is presently being used?
- a) in the refrigerator near the freezer section
  - b) in the refrigerator away from the freezer section
  - c) at room temperature away from the excess light
  - d) I do not know
10. A person with diabetes contaminates the needle while preparing an insulin injection. What would be the best action to take?
- a) dispose of the needle even if this means disposing of the insulin and syringe and starting the preparation from the beginning.
  - b) wipes the needle with an alcohol sponge and continue preparing the injection.
  - c) continues to prepare the injection, but wipe the injection site thoroughly with alcohol
  - d) I do not know
11. A symptom of hypoglycemia is
- a) frequent urination
  - b) dry mouth and dry skin
  - c) nervousness
  - d) I do not know.
12. A symptom of hyperglycemia is:
- a) frequent urination

- b) low grade fever
- c) cool clammy skin
- d) I do not know.
13. What is one cause of hypoglycemia in someone who is taking insulin or oral hypoglycemic agents?
- a) skipping a meal
- b) emotional stress
- c) too little exercise
- d) I do not know
14. What is one cause of hyperglycemia
- a) decreased food intake
- b) infection
- c) excessive insulin
- d) I do not know

Source of test: Modified version of "Diabetes Knowledge Test" by Sandra Scheiderich Revised for use in 2007 by Sally Gerard

**APPENDIX 3: SECTION 3: SELF-EFFICACY AND PERFORMANCE IN SELF-MANAGEMENT SUPPORT**



Research Centre  
Innovations in Care



**SEPSS - 36**

**Self-Efficacy and Performance in Self-management Support**

*Subscale Assess*

*The following questions are about discussing the patient's experiences with his condition. Indicate for each activity if you think you can do this and how often you do this.*

	I think I can do this					I do this				
	Not at all	Not sufficient	More or less	Sufficient	Good	Never	Rarely	Occasionally	Frequently	Always
Asking the patient what he expects from living with a Diabetes in the future	<input type="checkbox"/>									
Asking the patient what he knows about Diabetes	<input type="checkbox"/>									
Asking the patient how he can share his emotions about the condition (Diabetes) with important others	<input type="checkbox"/>									
Asking the patient about the available motivation and discipline to integrate the chronic condition (Diabetes) in his life	<input type="checkbox"/>									
Asking the patient how much confidence he has in his own abilities	<input type="checkbox"/>									
Asking the patient what he can and wants to do himself in his daily care, related to his health	<input type="checkbox"/>									

©Academic Centre for Nursing & Midwifery, Ghent University, Belgium & Research Centre Innovations in Care, School of Health Care, Rotterdam University of Applied Sciences, the Netherlands: reproduced with kind permission of the Academic Centre for Nursing & Midwifery, Ghent University & the Research Centre Innovations in Care, Rotterdam University of Applied Sciences.

*Subscale advise*

**The following questions are about providing information to patients.**

**Subscale**

Indicate for each activity if you think you can do this and how often you do this.

	I think I can do this					I do this				
	Not at all	Not sufficient	More or less	Sufficient	Good	Never	Rarely	Occasionally	Frequently	Always
Asking the patient, during each contact, what information he	<input type="checkbox"/>									
Asking the patient for permission to give information or advice	<input type="checkbox"/>									
Letting the patient restate the information that I gave	<input type="checkbox"/>									
Giving the patient education and instruction about the (chronic) condition (for example about the treatment, the associated symptoms and a healthy lifestyle that fits with the (chronic) condition)	<input type="checkbox"/>									
Helping the patient to formulate questions to discuss with other	<input type="checkbox"/>									
Involving the family when giving information and instruction	<input type="checkbox"/>									

©Academic Centre for Nursing & Midwifery, Ghent University, Belgium & Research Centre Innovations in Care, School of Health Care, Rotterdam University of Applied Sciences, the Netherlands: reproduced with kind permission of the Academic Centre for Nursing & Midwifery, Ghent University & the Research Centre Innovations in Care, Rotterdam University of Applied Sciences.

**Below are some questions about agreeing the individual care plan with the patient. Indicate for each activity if you think you can do this and how often you do this.**

	<b>I think I can do this</b>					<b>I do this</b>				
	Not at all	Not sufficient	More or less	Sufficient	Good	Never	Rarely	Occasionally	Frequently	Always
Searching with the patient for earlier positive experiences with achieving goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Let the patient prioritize when setting goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developing a plan of action to achieve the goals in collaboration with the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Documenting the goals and agreements in the patient's record	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helping the patient to make decisions concerning his treatment jointly with me and/or the other healthcare professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recognizing the patient's uncertainty about making a treatment decision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

©Academic Centre for Nursing & Midwifery, Ghent University, Belgium & Research Centre Innovations in Care, School of Health Care, Rotterdam University of Applied Sciences, the

Netherlands: reproduced with kind permission of the Academic Centre for Nursing & Midwifery, Ghent University & the Research Centre Innovations in Care, Rotterdam University of Applied Sciences.

**Subscale**

Below are some questions about supporting the patient to solve problems arising from his illness. Indicate for each activity if you think you can do this and how often you do this.

	I think I can do this					I do this				
	Not at all	Not sufficient	More or less	Sufficient	Good	Never	Rarely	Occasionally	Frequently	Always
Discussing with the patient who he will inform about his chronic	<input type="checkbox"/>									
Encouraging the patient to perform as many daily living activities	<input type="checkbox"/>									
Helping the patient to choose the activities that he can	<input type="checkbox"/>									
Discussing with the patient who (i.e. family, friends, network) can provide daily support	<input type="checkbox"/>									
Discussing with the patient how he can make use of self-management assistive devices (i.e. diary) in his daily activities	<input type="checkbox"/>									
Assisting the patient to monitor his own health and physical reactions	<input type="checkbox"/>									

©Academic Centre for Nursing & Midwifery, Ghent University, Belgium & Research Centre Innovations in Care, School of Health Care, Rotterdam University of Applied Sciences, the

Netherlands: reproduced with kind permission of the Academic Centre for Nursing & Midwifery, Ghent University & the Research Centre Innovations in Care, Rotterdam University of Applied Sciences.

SSS

*Subscale arrange*

The following questions are about arranging the follow-up of care.

Indicate for each activity if you think you can do this and how often you do this.

	I think I can do this					I do this				
	Not at all	Not sufficient	More or less	Sufficient	Good	Never	Rarely	Occasionally	Frequently	Always
Asking the patient about a convenient time and a suitable approach for follow-up care	<input type="checkbox"/>									
Informing and coordinating with other healthcare professionals	<input type="checkbox"/>									
Using assistive devices and technology (i.e. e-health) to provide remote guidance to the patient	<input type="checkbox"/>									
Facilitating the patient to easily stay in contact between appointments	<input type="checkbox"/>									
Initiating contact in-between appointments with the patient, to discuss his	<input type="checkbox"/>									
Examining progress of the care plan actions together with the patient	<input type="checkbox"/>									

©Academic Centre for Nursing & Midwifery, Ghent University, Belgium & Research Centre Innovations in Care, School of Health Care, Rotterdam University of Applied Sciences, the

Netherlands: reproduced with kind permission of the Academic Centre for Nursing & Midwifery, Ghent University & the Research Centre Innovations in Care, Rotterdam University of Applied Sciences.

SSS

*Subscale partnership*

The following questions are about specific competencies in supporting self-management. Indicate for each activity if you think you can do this and how often you do this.

	I think I can do this					I do this				
	Not at all	Not sufficient	More or less	Sufficient	Good	Never	Rarely	Occasionally	Frequently	Always
Accepting the patient’s experiential knowledge as valuable information concerning my own care delivery	<input type="checkbox"/>									
Considering the (cultural) background of the patient	<input type="checkbox"/>									
Determining, together with the patient, how much of the care coordination I take over for him	<input type="checkbox"/>									
Using the patient’s choice as the basis for care, even if it is not ideal from a medical perspective	<input type="checkbox"/>									
Showing empathy when the patient does not succeed in achieving the established goals	<input type="checkbox"/>									
Reflecting upon my own practice	<input type="checkbox"/>									

**Scoring**

As the format of the SEPSS instrument requires nurses’ to rate both self-efficacy and performance on the same set of items.

The division in the six subscales enables to measure outcomes on subscale level and to focus on a particular aspect of the SMS-process, while the total score presents a more overall view of how SMS is provided. Scores range from 0 to 4 for the subscales and from 0 to 24 at total scale level. Higher scores on the SEPSS instrument reflect a higher level of self-efficacy or performance in SMS.

At subscale level (range 0 to 4) mean scores need to be calculated. Subscale scores need considered as missing when more than 10% of the items of that subscale were left open. The total score is calculated by summing the mean scores of the subscales for self-efficacy (range 0 to 24) and for performance (range 0 to 24) in SMS.

SSS

©Academic Centre for Nursing & Midwifery, Ghent University, Belgium & Research Centre Innovations in Care, School of Health Care, Rotterdam University of Applied Sciences, the Netherlands: reproduced with kind permission of the Academic Centre for Nursing & Midwifery, Ghent University & the Research Centre Innovations in Care, Rotterdam University of Applied Science

## APPENDIX 4: ETHICS APPROVAL



**Approved with Stipulations New**

**Application**

31/03/2021

**Project ID:** 19397

**HREC Reference No:** S20/12/349

**Project Title:** Primary health care nurses' knowledge, self-efficacy, and performance of diabetes self-management support in OR Tambo District

Dear Mrs Zandile Landu

The **Response** received on 05/03/2021 was reviewed by members of the **Health Research Ethics Committee** via Minimal Risk Review procedures on 31/03/2021 and was **approved with stipulations**.

Please note the following information about your approved research protocol:

**Approval Date: 31 March 2021**

**Expiry Date: 30 March 2022**

**The stipulations of your ethics approval are as follows:**

1. Kindly receive our apology regarding the comments under point 9 as this was erroneously included in the feedback.
2. It is noted that the researcher will collect questionnaire on the same day as it is distributed. Kindly state this clearly in the participant information leaflet.

Please remember to use your project ID 19397 and ethics reference number S20/12/349 on any documents or correspondence with the HREC/UREC concerning your research protocol.

Translation of the consent document(s) to the language(s) applicable to your study participants should now be submitted to the HREC.

Please note that this decision will be ratified at the next HREC full committee meeting. HREC reserves the right to suspend approval and to request changes or clarifications from applicants. The coordinator will notify the applicant (and if applicable, the supervisor) of the changes or suspension within 1 day of receiving the notice of suspension from HREC. HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

**After Ethical Review:**

Please note you can submit your progress report through the online ethics application process, available at: <https://apply.ethics.sun.ac.za> and the application should be submitted to the Committee before the year has expired. Please see [Forms and Instructions](#) on our HREC website for guidance on how to submit a progress report.

The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

**Provincial and City of Cape Town Approval**

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: <https://www.westerncape.gov.za/general-publication/health-research-approval-process>. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: [Forms and Instructions](#) on our HREC website

([www.sun.ac.za/healthresearchethics](http://www.sun.ac.za/healthresearchethics)) If you have any questions or need further assistance, please contact the HREC office at 021 938 9677.

Yours sincerely,

Mrs. Melody Shana

Coordinator

HREC1

*National Health Research Ethics Council (NHREC) Registration Number:*

*REC-130408-012 (HREC1)-REC-230208-010 (HREC2)*

*Federal Wide Assurance Number: 00001372*

*Office of Human Research Protections (OHRP) Institutional Review Board*

*(IRB) Number: IRB0005240 (HREC1)-IRB0005239 (HREC2)*

*The Health Research Ethics Committee (HREC) complies with the SA National Health Act No. 61 of 2003 as it pertains to health research. The HREC abides by the ethical norms and principles for research, established by the [World Medical Association \(2013\). Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects](#); the South African [Department of Health \(2006\). Guidelines for Good Practice in the Conduct of Clinical Trials with Human Participants in South Africa \(2nd edition\)](#); as well as the Department of Health (2015). Ethics in Health Research: Principles, Processes and Structures (2nd edition).*

*The Health Research Ethics Committee reviews research involving human subjects conducted or supported by the Department of Health and Human Services, or other federal departments or agencies that apply the Federal Policy for the Protection of Human Subjects to such research (United States Code of Federal Regulations Title 45 Part 46); and/or clinical investigations regulated by the Food and Drug Administration (FDA) of the Department of Health and Human Services.*

## APPENDIX 5: APPROVAL LETTER



Province of the EASTERN CAPE HEALTH

Enquiries:  
0859

Yvonne Gixela      Tel no; 079 074

Email: [YvonneGixela@echealth.govuza](mailto:YvonneGixela@echealth.govuza) / [ygixela@gmail.com](mailto:ygixela@gmail.com)

Date: 12 April 2021

RE: Primary health care nurses' knowledge, self-efficacy, and performance of diabetes self-management support in OR Tambo District.

**(EC\_202104\_003)**

Dear Mrs Z. Landu

The department would like to inform you that your application for the abovementioned research topic has been approved based on the following conditions:

1. During your study, you will follow the submitted protocol with ethical approval and can only deviate from it after having a written approval from the Department of Health in writing.
2. You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality of their identities and shall remove or not collect any information which can be used to link the participants.

3. The Department of Health expects you to provide a progress update on your study every 3 months (from date you received this letter) in writing.
4. At the end of your study, you will be expected to send a full written report with your findings and implementable recommendations to the Eastern Cape Health Research Committee secretariat. You may also be invited to the department to come and present your research findings with your implementable recommendations.
5. Your results on the Eastern Cape will not be presented anywhere unless you have shared them with the Department of Health as indicated above.

Your compliance in this regard will be highly appreciated.



SECRETARIAT: EASTERN CAPE HEALTH RESEARCH COMMITTEE

## APPENDIX 6: EDITOR'S CERTIFICATE

### Editing Service: Lee Kemp

---

14 Carlisle St

Mount Croix

Port Elizabeth

6001

29 November 2021

082 723 5408

#### TO WHOM IT MAY CONCERN

#### EDITING OF THESIS: MS ZANDILE K. LANDU

This serves to confirm that I edited Ms Landu's Master of Nursing Science Thesis to be submitted to the Faculty of Medicine and Health Sciences, Stellenbosch University

The editing covered all aspects of language, punctuation and layout. I also crosschecked the in-text references against the reference list. Additionally, I edited the reference list. In the process I used the Review facility in MSWord. I have no knowledge if the student accepted all the corrections made; thus, I cannot be held responsible for any remaining errors.

Yours faithfully



Ms L. Kemp

B. A. (Hons English); MBA

Member: Nelson Mandela University Editors' Forum

## APPENDIX 7: FORMATTING CERTIFICATE



To whom it may concern

This letter serves as confirmation that I, Lize Vorster, performed the technical formatting of Zandile Kolosani Landu's thesis entitled:

**Primary health care nurses' knowledge, self-efficacy and performance of diabetes self-management in the OR Tambo District, Eastern Cape.**

Technical formatting entails complying with Stellenbosch University's technical requirements for theses and dissertations, as presented in the Calendar Part 1 – General or, where relevant, the department's requirements.

Yours sincerely

Lize Vorster  
Language Practitioner

The Tasting Room, Uitzicht Farm, Stellenbosch, 7600 \* e-mail: [lizevorster@gmail.com](mailto:lizevorster@gmail.com) \* cell: 082 856 8221