A SURVEY OF THE PSYCHOLOGICAL WELL-BEING AND QUALITY OF LIFE OF DIABETIC PATIENTS IN THE RURAL COMMUNITY OF GA-DIKGALE, LIMPOPO PROVINCE

By

UDEH BLESSING AKPUDO

A dissertation submitted in fulfillment for a degree of

Masters of Arts (Psychology)

in

Faculty of Humanities

(School of Social Sciences)

University of Limpopo

SUPERVISOR:

Prof. S Govender

CO-SUPERVISORS:

Dr. JP Mokwena

Prof. T Sodi

2021

Declaration

I Udeh Blessing Akpudo declare that this research report titled: A survey of the psychological well-being and quality of life of diabetic patients in the rural community of Ga-Dikgale, Limpopo Province" is solely my effort, and that any borrowed ideas are properly referenced and acknowledged. This work has not been submitted to any institution for examination. This work is submitted to the School of Social Sciences in fulfillment for the degree Master of Arts in Psychology (Research).

The approval of this study was obtained from the Turfloop Research Ethics Committee, Limpopo Provincial Government department of health and Capricorn district department of health.

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Signed

Date: 3rd June 2021

Acknowledgements

- I wish to thank God, my Creator, for taking me through this amazing journey.
- My thankfulness goes to my supervisors Prof. S Govender, Dr. JP Mokwena and Prof. T Sodi for their unwavering support, guidance and wisdom all through my Master of Arts journey.
- My heartfelt gratitude goes to my guardians (uncle and brother), the pillars of my strength academically, financially and otherwise.
- I would like to thank the Department of Psychology, the Faculty of Humanities and the research department for your efforts in making this study a success.
- I cannot forget to appreciate the Director and staff at the Centre for Student Counselling and Development at the University of Limpopo, your debriefing approaches are exceptional.
- My gratitude also goes to the Limpopo Provincial Department of Health and Capricorn district Health department for acknowledging this study.
- Ga-Dikgale Tribal Authority for your immense support.
- Research assistants for your availability and assistance rendered.
- I am also thankful to Professor JA Meyer, for without your indulgence, my study would not have been accomplished.
- My special thanks to the research participants for your remarkable contributions.
- Lastly, but not least, I appreciate the VLIR-UOS (Flemish University Council) scholarship, for the financial support and all the wonderful people working for the project and the opportunities afforded me through this funding.

Dedication

I would like to dedicate this research to all health care professionals and users, especially mental health specialists, who need to be vigilant of the psychological comorbidity associated with chronic conditions such as diabetes amongst rural community dwellers. Access to quality mental health services should be made readily available upon diagnosis of diabetes or any other chronic condition.

I also dedicate this study to the We Care Foundation Africa (www.wcfa.co.za), a non-profit organisation that was inspired as a result of this study. The organisation reaches out to marginalised individuals in rural African communities, especially individuals challenged with chronic health conditions.

Abstract

Diabetes has been noted globally and nationally as one of the leading causes of mortality. Studies have also shown that this morbid condition has a negative impact on the psychological well-being of those affected. The aim of this study was to survey the psychological well-being and quality of life of diabetic patients in Ga-Dikgale community, Limpopo Province, South Africa.

The objectives of the study were to establish the psychological well-being and quality of life of diabetic patients at clinics in Ga-Dikgale according to gender and age.

Using the General Health Questionnaire (GHQ) and the Quality of Life Indexes (QoLI), data was collected from 200 diabetic patients from clinics at Ga-Dikgale. The Kruskal-Wallis test results, amongst others, show that there are no statistically significant differences between the genders on the General Health questionnaire, $X^2(1) = 1.19$, $p = 0.22$. The study recommends that outcomes of the psychological well-being and quality of life of diabetic patients can be improved if health practitioners factor in variances in modifying diabetes education and supportive care for individuals diagnosed with chronic conditions such as diabetes in association with mental health experts to ensure that the psychological well-being of these patients is prioritised. There is also a need to assess the psychological well-being and quality of life of diabetic patients in comparison to non-diabetic patients in rural communities such as Ga-Dikgale.

Key words: Psychological well-being, Diabetic patient, Quality of life.

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List of abbreviations

American Diabetes Association – AMA

Centers for Disease Control and Prevention – CDC

Diabetes Attitudes, Wishes and Needs - DAWN

Diabetes Quality of Life - DQOL

Figure – Fig

Generalised anxiety disorder – GAD

General Health Questionnaire - GHQ-28

Glycosylated hemoglobin - HbAlc

Health-related quality of life – HRQoL

Hospital Anxiety and Depression Scale – HADS

Kruskal-Wallis H – KW

Multivariate analysis of variance - MANOVA

Obsessive compulsive disorder – OCD

Post-traumatic stress disorder - PTSD

Quality of life indexes – QoLI

Quality of life - QOL

The International Diabetes Federation – IDF

The Statistical Package for the Social Science - SPSS

Type 1 Diabetes - T1D

Type 2 Diabetes - T2D

Vlaamse interuniversitaire Raad–Universitaire Ontwikkelingssamenwerking (VLIR-UOS)

World Health Organization – WHO

World Health Organization Quality of Life (WHOQOL-BREF)

CHAPTER 1

INTRODUCTION

This chapter discusses the psychological well-being and quality of life of diabetic patients in the rural areas. The chapter also covers areas such as background to the study, research problem, study aim, operational definitions and the significance of the study.

1.1 Background to the study

Diabetes is noted globally, continentally and nationally to have contributed to the rising mortality rate (Azevedo, 2017). The number of diabetic patients has increased rapidly between 1980 and 2017 (World Health Organization (WHO), 2017). The WHO statistics estimates diabetes to be the direct cause of 1.6 million deaths in 2015 (Nefs et al., 2016; WHO, 2017). Studies also indicate that diabetes is likely to be among the major causes of deaths by 2025 (Balakumar et al., 2016). A plethora of studies have indicated that diabetes affect individuals' physical being, socio-economic status and psychological well-being (American Diabetes Association (AMA), 2016). For example, individuals with chronic diabetes were found to show physical problems such as vision loss, dehydration, amputation, neuropathy and nephropathy (AMA, 2016).

At the socio-economic level, diabetes has been found to negatively impact on the affected individual's life in a number of areas. At a family level, for instance, diabetes has been found to be a stressful event for families as a whole, thus affecting family dietary patterns, lifestyle and income (Baig et al., 2015). In some parts of the world, studies indicate a high correlation between diabetes and unemployment (Haluzik et al., 2018; Young & Unachukwu, 2012). This has partly been attributed to a tendency whereby some employers believe that diabetes results in poor work performance, regular interruptions and absenteeism as a result of frequent hospitalisation and complications (Young & Unachukwu, 2012). Discrimination in the workplace was

reported to be 5–11% in a study in Switzerland (Young & Unachukwu, 2012; Gupta et al., 2016; Laraia et al., 2017). People with diabetes tend to show psychosocial and behavioural challenges ranging from reduced quality of life, social exclusion, long lasting psychological stress and heightened premature deaths (Walker et al., 2018; Young-Hyman, 2014). Diabetic patients face different challenges in rural areas based on age, comorbidity, severity of illness, income and education (Walker et al., 2015). Whilst several studies point to challenges associated with diabetes in an urban setting, not much is known about factors in a rural setting.

1.2 Research problem

Research evidence shows that individuals diagnosed with diabetes tend to show higher levels of depression, somatic symptoms, social dysfunctions, anxiety and insomnia when compared to those without the condition (Ali et al., 2006; Siegel et al., 2012; Sun et al., 2016). A study by Egede and Ellis (2010) also shows a significant impact of mental health issues in patients diagnosed with diabetes in rural communities. Depression and eating disorders, *inter alia* impact greatly on diabetic patients living in rural areas (Moussavi et al., 2007). Fink et al. (2019) also reveal that patients encounter challenges adjusting and living with a diabetic condition, which leads to problems relating to adherence to treatment measures and diabetes-related complications. A study by Adeniyi et al. (2015) conducted in Mthatha, South Africa concluded that diabetic patients in rural areas are also faced with shortages of physicians and healthcare providers, lack of knowledge, poor dietary patterns, difficulty with self-testing, transportation difficulties and lack of social support.

Other studies have indicated that diabetic patients show a considerable decline in their psychological well-being and quality of life (Elliott et al., 2003; Powers et al., 2017; Tuttle et al., 2014). This is supported by a recent study by Daya, Bayat and Raal (2016), which found that people with diabetes experience psychological problems which negatively affect their well-being. Additionally, existing literature points out that diabetes in urban areas is caused by lack of exercising (Adeniyi et al., 2016). Whilst a study by Adeniyi et al. (2015) points to challenges associated with diabetes in an urban setting, not much is known about such factors in a rural setting. The present study seeks to

address this gap by investigating the psychological well-being and quality of life of diabetic patients according to age and gender in a rural setting of Limpopo Province.

1.3 Aim of study

The study aimed to survey the psychological well-being and quality of life of diabetic patients in Ga-Dikgale community.

1.4 Study objectives

The objectives of the study were:

- To establish the psychological well-being of diabetic patients at clinics in Ga-Dikgale according to gender and age.
- To ascertain the quality of life of diabetic patients at clinics in Ga-Dikgale according to gender and age.

1.5 The study hypotheses

The study hypothesised that:

(a) There are significant gender differences in the psychological well-being of diabetic patients.
(b) There are significant age differences in the psychological well-being of diabetic patients.
(c) There are significant gender differences in the quality of life of diabetic patients.
(d) There are significant age differences in the quality of life of diabetic patients.
(e) Gender does influence psychological well-being.
(f) Age does influence quality of Life.

1.6 Operational definition of concepts

1.6.1 Psychological well-being

In the context of this study, psychological well-being will be understood to refer to the absence of somatic symptoms, anxiety and insomnia, social dysfunction and depression amongst patients with diabetes.

1.6.2 Diabetic patient

This refers to someone who is diagnosed with a chronic condition that affects the way the body processes blood sugar, or a person whereby the pancreas produces little or no insulin, and has been placed on treatment for a duration not less than six months from the point of diagnosis and challenged with varied symptoms (Miles et al., 2018). In the context of the present study, a diabetic patient will be understood to mean someone with poorly controlled blood sugar levels as diagnosed by a medical expert and faced with or without psychological issues and reduced quality of life.

1.6.3 Quality of life

Quality of life (QOL) is defined by the World Health Organization (WHO) as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (WHOQOL Group, 1998). Quality of life is also defined as diabetic patients' perceptions of their physical health, psychological state, level of independence, social relationships, and their relationship to salient features of their environment (WHOQOL Group, 1998). In the context of this study, quality of life refers to the psychological and spiritual well-being as well as the social and economic well-being of diabetic patients at Ga-Dikgale clinics.

1.7 Significance of the study

The study will contribute to a better understanding of knowledge on the psychological well-being and quality of life of diabetic patients in Ga-Dikgale community in Limpopo Province, add value to research findings and contribute to useful data to adduce the bigger VLIR IUC study. Understanding diabetes and the psychological impacts in such a rural community will hopefully assist health practitioners such as psychiatrists and

psychologists in rolling out relevant intervention programmes that will benefit patients suffering from chronic conditions such as diabetes.

1.8 Concluding remarks

This chapter has given background on current gaps on the psychological well-being and quality of life of diabetic patients at Ga-Dikgale, Limpopo Province. The chapter recognised diabetes as a global dilemma with psychological impacts on patients. Thus, the chapter has outlined the purpose of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review will cover aspects of global prevalence of diabetes, diabetes in rural communities, the psychological well-being of patients with diabetes according to gender and age, the quality of life of patients with diabetes according to gender and age, including their association, and the role of theory.

2.2 Global prevalence of diabetes

The estimation of diabetes statistics has been staggeringly increasing since its discovery in 1889. The condition is noted globally, continentally and nationally to have contributed to the rising mortality rate (Azevedo, 2017). Numerous studies have showcased the prevalence of diabetes globally, which can either be type 1, type 2 or gestational diabetes. A study by Wild et al. (2004) estimated the prevalence of diabetes and the number of people of all ages with diabetes for the years 2000 and 2030, and the prevalence of diabetes for all age-groups worldwide to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is likely to rise from 171 million in 2000 to 366 million in 2030 (Wild et al., 2004). Furthermore, the study also stated that the prevalence of diabetes is higher in men than women, but that there are more women with diabetes than men and that the urban population diabetes outcome in developing countries is projected to double between 2000 and 2030 with a proportional increase amongst people older than 65 years of age (Wild et al., 2004).

The World Health Organization (WHO) also published estimates for the years 2000 and 2030 using data from 40 countries, but concluded predictions, based on a larger number of studies than previous estimates indicate a growing burden of diabetes, particularly in developing countries (Shaw et al., 2010). Other estimates have also been produced by the International Diabetes Federation (IDF) and include all 216 countries of the United Nations (Whiting et al., 2011; Shaw et al., 2010). Whitening et al. (2011) estimated that there are 366 million people with diabetes, and the number is expected to rise to 552 million by 2030. The increase in diabetes is not only peculiar to Asian

countries, but is also the case in Africa and Western societies. These countries will also see the greatest increase over the next 19 years. However, it can be asserted that the increases reported in the current estimates are likely to relate to the use of more recent studies, most of which reported higher prevalence than earlier studies as is the case with larger countries, with newer reports showing higher prevalence for India, China and the United States of America (USA) than those used previously (Choudhary et al., 2017; Cowie et al., 2009; Gu et al., 2003; Ramachandran et al., 2001; Shaw et al., 2010).

According to the World Health Organization, we are facing an epidemic of diabetes in developing countries. Currently, over 80% of people with diabetes live in low- and middle-income countries (Camara et al., 2015). Studies also show that the diabetic epidemic will continue to increase and the prevalence in the future might be underestimated by some studies. Shaw et al. (2010) estimated the number of people with diabetes for the years 2010 and 2030 worldwide, and found that the world prevalence of diabetes among adults (aged 20–79 years) will be 6.4%, affecting 285 million adults in 2010, and will increase to 7.7% and 439 million adults by 2030. Results found predicted that between 2010 and 2030, there will be a 69% increase in the number of adults with diabetes in developing countries, and a 20% increase in developed countries (Shaw et al., 2010). The increase can be attributed to rapid urbanisation in developing countries and changes to sedentary lifestyles (Azimi-Nezhad et al., 2008; Chan et al., 2009; Ladha & Tiwari, 2013; Ramachandran et al., 1999; Whiting et al., 2011). Diabetes is frequently accompanied by severe short-term complications such as hypoglycaemia, but also by disabling long term complications like cardiovascular diseases, neuropathy, nephropathy and retinopathy. Less known is the increased risk of psychological issues amongst patients with diabetes (Bruce et al., 2018).

Diabetes mellitus is one of the most common chronic conditions in nearly all countries, and continues to increase in facts and significance due to changes in lifestyles that lead to reduced physical activity and increased obesity. An educated guess of the current and future burden of diabetes is important in order to allocate community and health resources that places emphasis on the role of lifestyle and the creation of avenues to

encourage measures to counter trends for the increasing prevalence (Shaw et al., 2010).

More so, the pattern of diabetes prediction varies considerably according to countries' economic status. For example, in developed countries, the majority of people with diabetes are aged over 60 years, whereas for developing countries most people with diabetes are of working age between 40 and 60 years (Murray et al., 1996; Shaw et al., 2010). For developing countries, adult diabetes statistics will probably increase by 69% from 2010 to 2030 in comparison to 20% for developed countries, while the total adult populations are expected to increase by 36% and 2%, respectively (Murray et al., 1996; Shaw et al., 2010). Also, for developing countries, marked diabetes increases are expected for each age-group, with a doubling for those above 60-years of age, whereas for developed countries, 38% increase is only expected amongst the over 60s, with trivial decreases predicted for the younger age-groups (Murray et al., 1996; Shaw et al., 2010).

Estimations from studies show that countries with the largest populations have the highest number of persons with diabetes. However, only Bangladesh and Nigeria of the world's 10 most overcrowded countries are not among the 10 countries with the highest diabetes rating replaced by Germany and Mexico for 2010 (Dagogo-Jack, 2017; Murray et al., 1996; Shaw et al., 2010). Also, the highest regional prevalence for 2010 after age normalisation to the world population was North America, followed by South Asia, *inter alia.* Predictively, the African region is expected to have the largest proportional increase in adult diabetes numbers by 2030, though North America will continue to have the world's highest prevalence. Regionally, there will be increase in numbers, more of the adult population, thus leading to a total number of diabetes increase of 50% over the 20 years (Murray et al., 1996; Shaw et al., 2010).

From different studies and years, it is evident that the predictions of diabetes keep changing. For example, the diabetes predictions made in 1998 are somewhat different from subsequent predictions (Shaw et al., 2010). The estimate for 2010 of 285 million adults with diabetes is 67% higher than the 2004 published estimate for the year 2000, and the 2030 estimate of 439 million is 20% higher than the same study's estimate for

2030 (Green et al., 2003; Shaw et al., 2010). Also, comparisons with other older estimates show even greater differences just as King, Aubert and Herman (1998) estimated 300 million adults with diabetes for 2025.

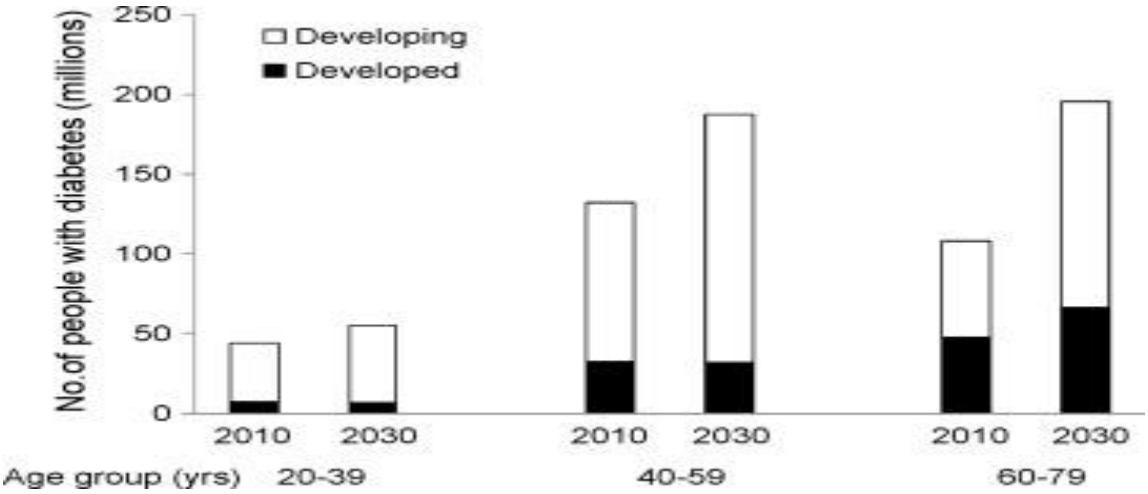
The Diabetes Attitudes, Wishes and Needs (DAWN) programme, the largest global psychosocial study related to diabetes care reported that the majority of patients with diabetes, be it Type 1 or Type 2, experience psychological problems (67.9% and 65.6%, respectively). Despite the widespread prevalence of diabetes-related distress and its negative consequences, only a small minority of people with diabetes (3.3%) had received psychological treatment for diabetes-related problems within five years prior to the survey. Also, patients with diabetes face major changes in lifestyle and the possibility of developing debilitating and life-threatening complications. Patients with poorer glycaemic control have a higher prevalence of correlated psychiatric illnesses, such as depression and eating disorders (Hunter, 2016; Lopes et al., 2016; Vancampfort et al., 2015). Individuals with diabetes have a two-fold increased risk for depression, affecting approximately 1 in every five diabetes patients (Walker et al., 2015).

A systematic review study by Pheiffer et al. (2018) whose secondary aim was to report the prevalence of impaired glucose tolerance and impaired fasting glucose stated that type 2 diabetes is a major source of morbidity and mortality in South Africa especially due to increased urbanisation and unhealthy lifestyle factors (Pheiffer et al., 2018). Diabetes also affects people of different races in South Africa. For example, a study by Erasmus et al. (2012) indicated that the coloured population has the second-highest prevalence of diabetes in South Africa. The study aimed to determine the prevalence of diabetes mellitus and metabolic syndrome in an urban coloured population in South Africa. Type 2 diabetes was evaluated according to the WHO criteria, and metabolic syndrome was based on the IDF. The study concluded that the prevalence of diabetes has increased tremendously in the coloured community, and that the high occurrence of undiagnosed diabetes indicates that cardiovascular diseases might grow to widespread magnitudes in the near future in South Africa (Erasmus et al., 2012).

Also, a study by Mabaso and Oduntan (2016) asserted that diabetes mellitus among black South Africans is on the increase because of population ageing, unhealthy lifestyles, and obesity. The study aimed to assess the knowledge and practices related to diabetes among black South Africans aged 40 years and older within seven government health care facilities in the Mopani District. The study emphasised that participants had knowledge of physical exercise, dieting, weight loss but nothing was noted about the quality of life and the psychological well-being of diabetic patients this thus suggests the need for programmes on psychological well-being and quality of life awareness amongst diabetics (Mabaso & Oduntan, 2016).

Similarly a study by Ralineba et al. (2015) in the rural areas of Vhembe District, Limpopo Province Supports the notion that Knowledge and practices associated with diabetes care that highlights the need for additional health education and national diabetes campaigns is of paramount importance. In Ga-Dikgale rural community there are no documented studies based on the quality of life and psychological well-being of diabetic patients nonetheless a study by Maimela et al. (2016) aimed to determine the prevalence and determinants of chronic non-communicable disease risk at Ga- Dikgale rural community in the Limpopo Province of South Africa. The study however, stated the prevalence of other non-communicable diseases such as hypertension, overweight, obesity and high waist circumference but nothing was reported on diabetes, quality of life and psychological well-being (Maimela et al., 2016).

Fig 1: A study by Shaw et al. (2011) depicts the global estimate of the prevalence of diabetes for 2010 and 2030.



2.3 Diabetes in rural communities

Although literature reveals that there is a correlation between diabetes and urbanisation, this is not the case with rural regions where over 70% of human population lives (Chow et al., 2006). For example, India is currently experiencing an epidemic of Type 2 Diabetes (T2D) mellitus, and has the largest number of diabetic patients. Consequently, it is often referred to as the diabetes capital of the world (Misra et al., 2011). India's national rural prevalence of T2D has quadrupled in the past 25 years. Despite a growing rural burden, few studies have examined assumed risk factors and their relationship with glucose intolerance and diabetes in rural areas. Hence a cross-sectional study by Little et al. (2016) determined the prevalence of impaired fasting glucose, impaired glucose tolerance, and T2D in a rural area of south India. A total of 753 participants were included in the study, which found that factors associated with T2D after adjusting for confounders included physical, rurality, polyunsaturated fat intake, body mass index, waist to hip ratio and tobacco consumption. Thus, the study concluded that associated risk factors should be considered as potential targets for reducing health burdens, especially diabetes in rural communities.

Similarly, another study by Mohan et al. (2012) investigated the prevention of diabetes in rural India with a telemedicine intervention. The study explained that diabetes care is

not presently available, accessible, or affordable to people living in rural areas in developing countries such as India. This assertion may likely be the reason why most people in rural India resolve to use herbal drugs to treat diabetes (Alam et al., 1990). Also, a study estimated a 30-day readmission rate of Medicare beneficiaries with diabetes across levels of rurality. Findings suggested that overall, 14.4% had a readmission, which was higher among urban (14.9%) than rural (12.9%) residents. This indicates that remote rural residents were less likely to have a readmission than urban residents. Thus the conclusion depicted that it is possible that residents in remote rural countries may not receive the necessary readmissions due to lower availability of follow-up care (Bennett et al., 2012).

Wan et al. (2007) conducted a study on cardiovascular risk levels in general practice patients with T2D in rural and urban areas. The study concluded that some key individual risk factors and coronary heart disease absolute risks (CHDAR) did not improve in rural patients with T2D despite a number of programmes designed to provide comprehensive care to rural patients with diabetes. The study suggested that more emphasis is needed to support access to lifestyle changes such as smoking, diet and physical activity in rural primary health care. Also, a systematic search was performed using electronic as well as manual methods to describe the extent of the diabetes problem in rural India based on the review of available literature and secular trends over a period of 15 years. The results revealed an increase in diabetes prevalence among rural population at a rate of 2.02 per 1000 population per year. More so, the rate of increase was high in males (3.33 per 1000 per year) as compared to females (0.88 per 1000 per year). The conclusion of the study stretched the importance of initiating cost-effective measures of diabetes care like early screening, tight metabolic control and monitoring of risk factors. The setting up of diabetic health centres in rural areas is also essential as most people are illiterate, poor and live in low resource settings (Misra et al., 2011).

2.4 The psychological well-being of diabetic patients

The international prevalence of diabetes mellitus keeps skyrocketing with recent estimates suggesting that 366 million people are currently affected (Inzucchi et al.,

2012). The psychological well-being of diabetic patients is also a crucial aspect to examine since diabetes is linked with an increased risk of both physical and psychological complications, both of which impact on the mortality rate (Colberg et al., 2010). According to this study, the psychological well-being of diabetic patients investigated are depression, anxiety, somatic symptoms, insomnia and social dysfunction.

2.4.1 Depression amongst people diagnosed with diabetes

Patients with diabetes are two-fold more likely to be diagnosed with depression as compared to people who do not have diabetes (Goldney et al., 2004; Smith et al., 2013). This is because the presence of psychological conditions such as depression emanates from poor diabetes care and monitoring exhibited through non-adherence to a recommended diet and a set of exercises (Schram, Baan & Pouwer, 2009). In a recent meta-analysis of 42 studies, Karyotaki et al. (2018) found that having diabetes doubles the odds of having depression. Moreover, it has been consistently shown that depression is associated with an increased risk of morbidity and mortality in people with diabetes, and that it may have a deleterious impact on adherence to glucose-lowering treatments (AMA, 2010; Camara et al., 2015; Tiktin et al., 2016).

The comorbidity of depression and diabetes can be seen as a prototypical example of mental and physical comorbidity (Sartorius, 2018). Health services are, by and large, inadequately prepared to deal with comorbid depression and diabetes. A series of epidemiological studies has demonstrated that depression is more likely to occur in people with diabetes regardless of whether the individuals are aware of their health status (Sartorius, 2018). A study by Sartorius (2018) reviewed the epidemiology and risk factors of the comorbidity of depression and diabetes, and described areas that should be given attention in order to reduce problems arising as a result of the comorbidity of these two conditions. According to the study, the prevalence of depressive disorders in diabetics is in the general range of 10% to 15%, which is approximately twice as high as the prevalence of depression in non-diabetics, and that comorbidity significantly worsens the prognosis of both diseases and increases their mortality (Sartorius, 2018).

Furthermore, the study also highlighted that migration is associated with higher rates of depression, and that higher rates of diabetes therefore leads to higher rates of comorbidity of depression and diabetes in migrants. Reasons for this include stresses related to migration and significant changes in lifestyle and dietary patterns. More so, the cost of treatment of diabetes when depression is present is 4.5 times higher than the treatment of diabetes alone. The presence of depression in people with diabetes also leads to poorer self-care that includes inadequate physical exercise, non-adherence to diet, irregular intake of medications for any purpose and behaviour that may increase the risk of cardiovascular illness and other chronic complications (Sartorius, 2018).

A study by De Groot et al. (2001) examined the strength and consistency of the relationship between depression and diabetes complications in studies of Type 1 diabetes (T1D) and Type 2 diabetes (T2D) adult patients. According to the study, a significant association was found between depression and complications of diabetes. Depression was significantly associated with a variety of diabetes complications such as diabetic retinopathy, nephropathy, neuropathy, macrovascular complications, and sexual dysfunction. These findings demonstrated a significant and consistent association between diabetes complications and depressive symptoms, and thus it was recommended that prospective longitudinal studies are needed to mediate this association (De Groot et al., 2001). Similarly, a study also highlighted the high rates of co-morbidity of depression and diabetes, asserting that the prevalence rate of depression is more than three-times higher in people with T1D, and nearly twice as high in people with T2D compared to those without diabetes. The study also suggested that co-morbid diabetes and depression is common; however, the implications for clinical practice remain unclear in a rural setting such as Ga-Dikgale (Roy et al., 2012).

2.4.2 Anxiety amongst people diagnosed with diabetes

Anxiety disorders are some of the most prevalent psychological disorders with an estimated general population prevalence ranging from 12% to 21% (WHO, 2017). Anxiety disorders typically present with core features of anxious cognitions, somatic symptoms and behavioural disturbance, with different subtypes of anxiety possessing

distinct characteristics (Smith et al., 2013). There is a possibility that being diagnosed with a medical condition such as diabetes could lead to an increased likelihood of developing anxiety due to cognitions like symptom-related worries and illness-progression concerns (Alizadeh et al., 2018). There is surprisingly a high prevalence of anxiety disorders in the general population, and association between various chronic diseases and obesity (Gilbert et al., 2019).

More so, studies have shown an association between diabetes and anxiety. For instance, a study by Grigsby and colleagues (2002) surveyed scientific literatures, estimated the prevalence of anxiety disorders and elevated symptoms of anxiety from 18 studies with a total of 4076 subjects. The study found that the rates of panic disorder, Obsessive compulsive disorder (OCD), Post-traumatic stress disorder (PTSD), and agoraphobia were within the range of those who reported in community studies (Hooten, 2016). Generalised anxiety disorder (GAD) was reported to be the most prevalent of the clinical disorders, and thus found in 14% of diabetic subjects most of whom drawn from clinic populations. This may be attributable to the psychological stress of self-managing the disease or to fears of hypoglycemia and medical complications (Ferrari et al., 2018; Fiore, et al., 2015; Ho et al., 2018). Anxiety may also occur secondary to hyperglycemia or to other diabetes-related abnormalities in neurohormonal or neurotransmitter function, which in future will require studies to identify behavioural and physiological paths that produce anxiety in diabetic patients (Grigsby et al., 2002).

The co-occurrence of GAD with major depression in diabetes may or may not be similar in terms of phenomenology, prevalence, etiology, course, or responsiveness to treatment, to their comorbidity in the general population, or in patients with other chronic medical conditions (Jacobson & Newman, 2017). At any rate, diabetic patients should be assessed for both GAD and major depression, since the management of these conditions may vary depending on whether they occur alone or together (Camara et al., 2015). Multiple logistic regression was also used by Sun et al. (2016) to evaluate the combined effect of factors associated with anxiety and depression, and to assess the effects of anxiety and depression on glycaemic control in participants with T2D. This

resulted in the prevalence of depressive symptoms and anxiety symptoms at 56.1% and 43.6%.

Results from a meta-analysis study provide support that diabetes is associated with an increased possibility of having anxiety disorders and elevated anxiety symptoms (Smith et al., 2013). In the study, anxiety was shown to be associated with poor outcomes in people with diabetes. The aim of the systematic review and meta-analysis was to determine whether people with diabetes are more likely to have anxiety disorders or elevated anxiety symptoms than people who do not have diabetes (Smith et al., 2013). In the case of diabetes, specific phobias such as fear of hypoglycemia and injection-phobia could only become relevant and apparent after diabetes diagnosis (Smith et al., 2013).

Evidence also supports the assumption that anxiety could lead to an increased risk of developing diabetes. For example, PTSD has been shown to be a risk-factor for the development of T2D (Huffhines et al., 2016). Furthermore, a Swedish longitudinal study found that elevated baseline anxiety symptoms were associated with an increased risk of developing T2D, but that diabetes did not predict anxiety (Hackett & Steptoe, 2017). Evidence also shows that psychosocial stress could influence the development of T1D (Young-Hyman et al., 2016). There is also the likelihood that the relationship between diabetes and anxiety is explained by other factors that share a relationship with both diabetes and anxiety (Smith et al., 2013; Sun et al., 2016). Thus, the current study seeks to examine whether there are levels of anxiety associated among diabetic patients in rural Ga-Dikgale clinics.

2.4.3 Somatic symptoms amongst people diagnosed with diabetes

In addition to depression and anxiety, diabetic patients also face somatic symptoms as a psychological issue. Several studies have a significant association of increased pain, diabetes complications, unhealthy self-care behaviours, greater disability, depression and an increased body weight in patients diagnosed with diabetes (Smith et al., 2013; Sun et al., 2016). These somatic symptoms are regarded as possible risk factors for worse glycemic control.

Furthermore, in a door-to-door survey conducted in two municipalities of Sicily, the study ascertained the prevalence of neuropathy amongst diabetic patients. The case-finding was restricted to subjects with somatic symptoms as diabetics. The study was conducted in two phases where in phase 1, a screening instrument was administered on 14,540 persons residing in Santa Teresa di Riva (Messina Province) and Terrasini (Palermo Province) for peripheral neuropathy. During phase 2, neurologists evaluated those subjects who had screened positive. Diagnoses were based on clinical criteria only, and were reviewed by an adjudication panel. Thirty-nine persons (27 women, 12 men) were found affected by neuropathy as diabetic patients. The basic prevalence, as of November 1, 1987 was 268.2 cases per 100,000 population. The prevalence increased with advancing age for both sexes and was consistently higher in women. The median time between diagnosis of diabetes mellitus and onset of neuropathy was 8 years, and almost all identified persons with neuropathy were under treatment for diabetes mellitus (Savettieri et al., 1993).

Patients with multiple somatic symptoms are common in primary care settings which may include patients with diabetes, in which more than half of them present somatic complaints (Croicu et al., 2014). However, most literature conducted above was in urban settings. There exists a gap on studies in somatic symptoms. Expectantly, this study will help in addressing this gap by assessing the psychological well-being on the basis of somatic symptoms amongst diabetic patients in rural Ga-Dikgale clinics.

2.4.4 Insomnia amongst people diagnosed with diabetes

Length of hours of sleeping, sleep quality and obstructive sleep apnea have previously been linked to worse increased symptoms of diabetes (Reutrakul et al., 2016; Ehrmann et al., 2017). Recently, epidemiological studies suggested an association between glycemic control and sleep disturbances in patients with T2D. For example, a systematic review by Lee et al. (2017) identified 20 studies (eight studies reporting duration of sleep and 15 studies evaluating sleep quality). Similarly, poor sleep quality was associated with an increased glycosylated haemoglobin (HbA1c). The results of the study suggested that the amount and quality of sleep is important in the metabolic function of T2D patients (Lee et al., 2017). Larcher et al. (2016) asserted that sleep

habits could affect health through misalignment with circadian rhythms due to constantly sleep changing behaviours amongst diabetic individuals, thus predicting that circadian phase affects glycemic control.

Diabetes and sleep disorders remain a public health threats worldwide. A community-based cross-sectional study that included 5078 participants was carried out to determine the association between insomnia and diabetes mellitus prevalence (Zhang et al., 2019). The finding reported that in patients with T2D and non-diabetic controls, the prevalence of insomnia was 20.2% and 12.2%, respectively. The results showed that insomnia was associated with T2D. After stratifying by age and sex, insomnia was significantly associated with diabetes mellitus. The study thus suggested that insomnia is independently and significantly associated with diabetes mellitus in the northern Chinese population, especially in the 40–59-year-old age group and in males (Zhang et al., 2019).

Insomnia is suggested to also increase the risk of depression and decrease the quality of life in diabetic patients. For instance, in a randomised crossover placebo-controlled clinical trial, 52 patients with T2D and insomnia were examined. The aim of the study was to evaluate the efficacy of inhaled Lavandula angustifolia Mill (lavender) as a complementary therapy for insomnia in diabetic patients. Lavender odor was traditionally used as sleep enhancer. The findings depicted that inhaled lavender resulted in a significant better outcome compared to placebo. Likewise, there was a significant better outcome for quality and quantity of sleep after inhaled lavender was compared to placebo. The study thus concluded that inhaled lavender can improve sleep quality and quantity, quality of life and mood in diabetic patients suffering from insomnia (Lari et al., 2020).

Also in another study, a total of 1,741 men and women were randomly selected from Central Pennsylvania and studied in a sleep laboratory. The study examined the joint effects of insomnia and objective short sleep duration, the combination of which is associated with higher morbidity on diabetes risk. The results showed that chronic insomnia but not poor sleep was associated with a higher risk for diabetes of which the medical impact has been underestimated (Vgontzas et al., 2009). Previous studies have

shown that several physiological and psychological conditions such as hyperglycemia, diabetic neuropathy, sleep apnea syndrome and depression may cause sleep disturbances and insomnia in diabetic patients. Laboratory studies have shown that sleep restriction is associated with an increase in sympathetic nervous activity and a decrease in insulin sensitivity without adequate compensation in beta-cell function resulting in an impact on glucose homeostasis and an elevated risk of diabetes (Shoji &Shoji, 2009).

However, sleep behaviour is likely to be associated with other lifestyle factors that could be confounders for any association between sleep behaviour and glycemic control. The social gradient of health is known to affect outcomes of patients with T1D. Conversely, socioeconomic status and workplace social capital (job demand, job control and social support at work) are known to affect sleep behaviour. Additionally, sleep behaviour might also affect eating habits (Larcher et al., 2016). Although insomnia symptoms are said to be associated with T2D, a study by Green et al. (2017) that aimed to assess whether cumulative exposure to insomnia symptoms has a causal effect on T2D found that the association between cumulative experience of insomnia and T2D incidence appeared confounded (Green et al., 2017). The above studies point to the fact that insomnia does play a role on the psychological well-being amongst people diagnosed with diabetes. This study will examine if that is also the case amongst diabetic patients at Ga-Dikgale clinics.

2.4.5 Social dysfunctions amongst people diagnosed with diabetes

Diabetic patients also exhibit social dysfunctions, leading to adverse health outcomes (AMA, 2020). For instance, eating habits as well as sleep diseases could be potential confounders for the relationship between sleep behaviour, social dysfunction and glycemic control (Larcher et al., 2016). Also, a two-stage screening strategy was used to study psychiatric morbidity and social dysfunctions in a consecutive series of out-patients with insulin-dependent diabetes mellitus (Wilkinson et al., 1988). The prevalence of psychiatric morbidity was 18%, and consisted of depression, anxiety and attendant symptoms. Patients reporting major social dysfunctions had significantly

higher levels of psychiatric symptoms whereas psychiatric morbidity was not associated with the presence of complications of diabetes (Wilkinson et al., 1988).

2.5 Psychological well-being of diabetic patients according to gender and age

A number of studies have suggested that there are gender differences associated with the psychological effect of diabetes. For example, a study by Gohil et al. (2017) found that females had increased levels of depression compared to male participants. Additionally, risk factors for developing depression and psychiatric conditions were found to be relatively higher among female diabetic patients when compared to their male counterparts (Robinson et al., 2018). Furthermore, a study by La Greca (1995) as cited in Schram et al. (2009) found that girls have low metabolic control compared to boys, which makes them susceptible to depression and anxiety (Schram et al., 2009).

The prevalence of elevated symptoms of anxiety was significantly higher in women compared to men (55.3% of 418 women vs. 32.9% of 325 men) (Grigsby et al., 2002). Results of a study by Lloyd et al., (2000) showed a high response rate (96%) and high prevalence rates of psychological symptoms (overall 28% of study participants reported moderate to severe levels of depression or anxiety or both). Men were somewhat more likely to report moderate to severe depressive symptoms, whereas women reported more moderate to severe anxiety. A significant relationship between depression and poor glycaemic control was observed in men, but not in women. One-third of subjects also reported that they would be interested in receiving counselling or psychotherapy treatment if it was available at diabetes clinics (Lloyd et al., 2000).

Furthermore, Multivariate logistic regression analysis indicated that anxiety symptoms were associated with being a woman, low income, chronic diseases, depressive symptoms and poor sleep quality. Depressive symptoms were connected with being a woman, older age, low education level, being single, diabetes complications, anxiety symptoms and poor sleep quality. Glycaemic control was not related to anxiety symptoms or depressive symptoms and a combination of depressive symptoms and anxiety symptoms was associated with poor glycaemic control (Sun et al., 2016).

The problem of psychological well-being among diabetic patients is particularly relevant in Africa where healthcare infrastructures have mainly focused on infectious diseases rather than on T2D, hence a cross-sectional study that involved 491 outpatients with T2D recruited from four diabetes clinics in Guinea in which the Hospital Anxiety and Depression Scale (HADS) was used to evaluate symptoms of anxiety and depression. A logistic regression analysis stratified by gender was performed to identify associated risk factors. It was concluded that anxiety and depression symptoms in people with type T2D are common in Guinea, showcasing that urban residence, low socioeconomic status and high levels of HbA1c were significantly related with a greater risk of anxiety and depression, which highlights the psychological burden related to diabetes in Africa (Camara et al., 2015).

Women are at higher risk than men of developing depressive disorders, with or without diabetes. A systematic review indicated that 27% of women with diabetes developed depressive disorders, which was roughly one-third higher than for men with diabetes, of whom 18% developed depression. This could be explained in part by the fact that women experience more negative life events, and experience significant hormonal changes during pregnancy and postpartum: during the perinatal period; women with diabetes had two times more depression than their non-diabetic peers. Cognitive dysfunction also increases the risk for depression; conversely, poor glycemic control leads to functional disability, higher rates of depression, and cognitive problems. In addition, comorbid depression and diabetes also increase the risk for dementia (Roy et al., 2012; Sartorius, 2018).

Studies also investigated symptoms of depression and anxiety in children and adolescents with T1D. For example, a systematic review and meta-analysis study by Buchberger et al. (2016) explored symptoms of depression and anxiety in youth with T1D. The analysis confirmed a high prevalence of symptoms of depression and anxiety in youth with T1D that potentially confronts diabetes management and glycemic control, and thus recommended early screening for psychological comorbidity and regular psychosocial assessment. The study also suggested that future prospective studies are necessary to further explore the interaction of symptoms of depression and anxiety with

T1D so as to develop evidence-based treatment models (Buchberger et al., 2016). Anxiety disorders typically have a chronic and recurrent life course, and occur early in adulthood (Smith et al., 2013).

Many adults with diabetes and depressive symptoms experience high levels of emotional distress stemming from their concerns and worries about diabetes. A study by Nanayakkara et al. (2018) explored the prevalence of, and factors associated with depression and diabetes distress in adults with T2D in a large Australian sample. Australian National Diabetes Audit data were analysed from adults with T2D attending 50 diabetes centres whereby a total of 2,552 adults with T2D participated. The result shows that 29% of patients had likely depression, 7% had high diabetes distress, and 5% had both. Difficulty following dietary recommendations, smoking, forgetting medications, and diabetes distress were all associated with greater odds of depression. Depression was also associated with sub-optimal self-care, while diabetes distress was associated with higher HbA1c and sub-optimal self-care. The findings of this study emphasise the importance of screening for and addressing emotional and psychological health of people with T2D, and stressed the need for longitudinal data to elucidate the determinants of depression and diabetes distress in T2D (Nanayakkara et al., 2018).

2.6 The quality of life of diabetic patients

The quality of life of diabetic patients is greatly affected because people living with diabetes have a higher risk of morbidity and mortality than the general population (Zimmet et al., 2001). Diabetes also adversely affects individual's quality of life diversely based on age, gender, sex, marital status, educational level or income, family and social support (Kivimäki et al., 2015; Kumar et al., 2016). Statistics on the affected quality of life of diabetes has consistently been increasing. Accordingly, the number of people with diabetes aged 20–79 years was predicted to rise to 642 million by 2040. Although some patients have been diagnosed of either T1D / T2D/ gestational diabetes, a large proportion of people live with undiagnosed diabetes, which means that there are many people worldwide living with high blood glucose, which puts them at high risk of complications such as diabetic retinopathy and cardiovascular diseases. Therefore, screening high-risk populations for diabetes will help identify those currently

undiagnosed, enabling treatment to be initiated to reduce the risk of further morbidity, thus improving the quality of life of individuals (Ogurtsova et al., 2017). The quality of life of people diagnosed with diabetes in this study focuses on areas such as health and functioning, social and economic status, psychological and spiritual status and family relationship.

2.6.1 Health and functioning of diabetic patients

Diabetes impacts on physical, social and psychological well-being of people living with the condition. This may lower the quality of life of diabetic individuals (Mugomeri et al., 2017). Documented physical dysfunction include; visual impairment, heart problems, end stage renal diseases, impotence and amputation, among others (De Berardis et al., 2002; Mugomeri et al., 2017; Rubin & Peyrot, 1999). These physical impairments may result in psychosocial problems in diabetes patients, and often result in serious negative impact on patients' well-being and social life, if left un-addressed. Examining the emotional and psychological needs of patients with diabetes and emphasising the role of diabetologists and mental health professionals to mitigate problems faced by these patients is of paramount importance.

Also, majority of guidelines on diabetes care focus on the medical aspects of initial management without addressing the psychological needs of the patient (Kalra et al., 2018). Although many people with diabetes cope well and live healthy lives, there is a need to emphasise that psychological support in this group of patients is under-resourced and inadequate, resulting in poor quality of life and reduced psychological well-being (Kalra et al., 2018). For example, it is often difficult for many to accept the reality that they have to take drugs invariably throughout their life (Kalra et al., 2018). A study also recommended that routine screening of patients with T2D be encouraged so as to optimise mental health and improve the quality of life of people living with diabetes (Nanayakkara et al., 2018). Research also indicates that patients with diabetes suffer from high levels of diabetes-specific emotional stress, which is associated with functional impairment, poor adherence to exercise, diet and medications, and inadequate glycemic control (Kalra et al., 2018).

Diabetes also plays a pivotal role in the sexuality of individuals. For example, a study by De Berardis et al. (2002) investigated 1,460 patients enrolled by 114 diabetes outpatient clinics and 112 general practitioners, whereby patients were asked to complete a questionnaire investigating their ability to achieve and maintain an erection. Various aspects of quality of life were also assessed, such as diabetes health distress, psychological adaptation to diabetes, and quality of sexual life. Findings indicated that overall, 34% of patients reported frequent erectile problems, 24% reported occasional problems, and 42% reported no erectile problems. Also, after adjusting for patient characteristics, erectile dysfunction was associated with higher levels of diabetes specific health distress, and worse, psychological adaptation to diabetes, which were, in turn, related to worse metabolic control. Thus, erectile problems were also associated with a dramatic increase in the prevalence of severe depressive symptoms (De Berardis et al., 2002; Corona et al., 2016).

Also, sexual function was assessed in male patients with T2D at baseline, and after a mean follow-up of 18 months (phase1 and 2), standard metabolic parameters and sexual and depressive symptoms were evaluated. Findings proved that as compared to the baseline, a proportion of men reported improvement in erectile dysfunction at follow-up, of which was nearly double that of the men who reported the worsening of erectile dysfunction. The study also pointed out that an integrated approach that includes adequate counseling can improve sexual function as well as depressive symptoms in men with T2D (Corona et al., 2016).

Moreover, a study conducted by Jacobson, De Groot and Samson (1994) evaluated two measures of quality of life in patients with T1D and T2D using the Diabetes Quality of Life Measure (DQOL). The study found that patients are not generally confounded by factors such as education, sex, or duration of diabetes, but that health-related quality of life is affected by the marital status of both T1D and T2D patients, in which separated and divorced individuals generally experience lower levels of quality of life (Jacobson et al., 1994).

2.6.2 Social and economic status of diabetic patients

The high prevalence of diabetes in adults has important social, financial and development implications that impact on diabetic patients' quality of life. There is an increasing urgent need for governments to implement policies to decrease risk factors for T1D, T2D and gestational diabetes, and to ensure appropriate access to treatment for all people living with diabetes (Choudhary et al., 2017; Ogurtsova et al., 2017). Dealing with the global impact of diabetes is a huge task, and the IDF continues to act as an advocate for people with diabetes, by educating both individuals and governments on the steps that can be taken to prevent and manage the disease (Ogurtsova et al., 2017).

Socio-economic status and well-being were used to predict cross-time changes in Glycosylated hemoglobin (HbAlc), a marker of glycemic control among non-diabetic older women. Regression analyses by Tsenkova et al. (2007) showed that higher income and positive affect predicted lower levels of HbA1c, after controlling for baseline HbA1c and health factors. Additionally, three well-being measures such as purpose in life, personal growth, and positive affect moderated the relationship between income and HbA1c. According to the finding, the results suggest that psychological well-being and socio-economic status interact in important ways in influencing non-diabetic glucose metabolism (Tsenkova et al., 2007).

Also at the socio-economic level, diabetes has been found to negatively impact on individuals' life in a number of areas. For instance, studies indicate a high correlation between diabetes and unemployment (Haluzik et al., 2018; Young & Unachukwu, 2012). This has partly been attributed to a tendency by some employers to believe that diabetes results in low productivity among employees as they miss a number of work days attending to their health issues (Young & Unachukwu, 2012). Also, 5-11% of diabetic patients are discriminated against at work (Young & Unachukwu, 2012; Gupta et al., 2016; Laraia et al., 2017). People with diabetes tend to show psychosocial and behavioural challenges ranging from reduced quality of life, social exclusion, long lasting psychological stress and heightened premature deaths (Walker et al., 2015; Young-Hyman, 2014; Young-Hyman et al., 2016). Thus, the above literature shows that

diabetic patients who come from low socio-economic status are more likely to be impacted, resulting in their reduced quality of life.

2.6.3 Psychological and spiritual status of diabetic patients

Evidently, diabetes critically affects living standards of patients psychologically and spiritually. A study conducted by Palizgir et al. (2013) aimed to assert the prevalence of depression and anxiety among patients with diabetes, and a correlation between age, gender, occupation, education and diabetes. High incidences of depression negatively affect the life of diabetic individuals (Chung et al., 2016; Moulton et al., 2015; Robins et al., 2015; Schram et al., 2009). Coventry et al. (2015) postulated that a combination of long term conditions such as diabetes and psychological issues is associated with the greatest decrements in quality of life of patients. In most cases, diabetic patients also have to nurse other diseases associated with diabetes which may further reduce their quality of life.

The role of spirituality amongst people with diabetes also remains a topic of much debate. Choi and Hastings (2019) conducted a study that aimed to explore how religion and spirituality impact attitudes about self-management practices among African Americans with homelessness histories, and to understand resilience in diabetes care practices. Findings showed diabetes as an illness requiring professional treatment, and stressed the relevance of balancing treatment with religion and spiritual practices in diabetes self-care activities. Additionally, a descriptive cross-sectional study by Rahimi et al. (2021) aimed to investigate the relationship between spiritual intelligence and self-management in patients with diabetes. The results of the study showed that self-management increased with increasing spiritual intelligence of individuals; and with decreasing spiritual intelligence, self-management decreased, implying that there was a positive and significant correlation between spiritual intelligence and self-management (Rahimi et al., 2021). Therefore, it is important for the present study to also examine the spirituality of diabetic patients in Ga-Dikgale clinics in relation to quality of life.

2.6.4 Family relationship of diabetic patients

At a family level, diabetes has been found to be a stressful event for families as a whole, affecting family dietary patterns, lifestyle and income (Baig et al., 2015). T1D and

T2D also denote a demanding set of biopsychosocial challenges for patients and their families, whether the age of disease onset occurs in childhood, adolescence or adulthood (Gonzalez et al., 2016). Rahimi et al. (2021) asserted that the majority of diabetic patients have a history of diabetes in the family and that more than half of the subjects were the first and second children of the family that has lived over 56.5% of an average duration of diabetes.

Family social support is also essential and contributes immensely to diabetes control and quality of life. Badriah and Sahar (2018) conducted a study to gain a deep understanding of the experience of older people with diabetes about their family support in Tasikmalaya, Indonesia. The study results identified three themes about family support towards older people with diabetes. The themes included changes in older people with diabetes, optimum family support and suboptimal family support. The study also concluded that the physical and psychological changes which older people with diabetes had experienced affect family support (Badriah & Sahar 2018).

Furthermore, a randomised controlled clinical trial by Gomes et al. (2017) aimed to evaluate the contribution of family social support to the clinical/metabolic control of people with T2D. Findings regarding the clinical impact showed that there was a greater reduction in blood pressure and glycated hemoglobin in the intervention group than in the control group, showing a positive effect on the control of the disease. The study concluded that families should be incorporated into the care of people with diabetes mellitus and in health care programmes, especially those that can encourage diverse forms of social support to strengthen the bond between family members (Gomes et al., 2017). Although the aforementioned studies depict positive correlations between family support and diabetes, this present study will further assess if such relationships exist among diabetic patients in a rural community such as Ga-Dikgale.

2.7 Quality of life of diabetic patients according to gender and age

Rwegerera et al. (2018) conducted a cross-sectional study with the objective of determining the quality of life of diabetes mellitus patients in Botswana. The results showed that the majority of patients were female with no formal education and poor glycemic control. Female patients were older than 65 years, and the presence of three

or more diabetic complications were associated with significantly worse physical composite score and mental composite score. The study therefore concluded that diabetic patients in Botswana had relatively poor quality of life (Rwegerera et al., 2018). In contrast, a cross sectional study of diabetes by Daya et al. (2016) found no significant difference on quality of life based on gender and age of diagnosis and employment status. Instead, the scores indicated that females with diabetes had a reduced QOL compared with males. Another study by Gohil et al. (2017) found a significant difference between physical and psychological domains of the quality of life questionnaire. Their study showed that males exhibited higher quality of life than females.

Diabetes also has both direct and indirect cost on the quality of life on the basis of age and gender differences. For instance, the CDC in (2011) reported that the average medical expenditures among people diagnosed with diabetes were 2.3 times higher than what expenditures would be in the absence of diabetes, with indirect costs being disability, work loss, premature mortality, et cetera. Most importantly, patients with diabetes are twice as likely to have depression, which can complicate diabetes management, thereby affecting their quality of life. In addition, depression is associated with a 60% increased risk of developing T2D (CDC, 2011; Mutonga, 2018).

It can be deduced that diabetes affects people from different ethnicity and cultural variations, and can also be linked to hereditary factors. There is a significant global variation in susceptibility to diabetes, with Pacific Islanders, Asian Indians, and Native Americans being considerably more prone to develop the disorder (Unnikrishnan et al., 2017). Although genetic factors may play a part, the rapidity with which the prevalence of diabetes has risen among these populations reflects far-ranging and rapid socioeconomic changes to which they have been exposed over the past years (Montesi et al., 2016; Unnikrishnan et al., 2017).

According to a descriptive-correlation study by Rahmanian et al. (2018), 200 adolescents with T1D were enrolled to measure their spiritual intelligence and self-efficacy of diabetes. Findings depicted that nearly 66% of the participants were female adolescents with Cronbach's alpha on the level of spiritual intelligence and self-efficacy being 0.903 and 0.082, respectively at 95% confidence level. The study concluded that

spiritual intelligence correlates with self-efficacy and has a decisive role in improving the health of adolescents with diabetes.

There is, however, a notable gap in clinical attention concerning how family relationships influence diabetes management with regards to age and gender. It is also shocking because the mean age of diagnosis of T2D use to fall in the fifth decade of life, but recently, a growing number of new patients are being diagnosed in their 20s, 30s and 40s. Therefore, it is crucial that family and couple relationships during the adult years be prioritised for diabetes management and outcomes since all individuals be it children, adolescents, or elderly are susceptible to the condition. More so, educational and behavioural intervention programmes need to address the family context of disease management among adults similar to those for patients in other developmental life stages (Fisher, 2006).

2.8 Association of the psychological well-being and quality of life of diabetic patients

The psychological well-being and quality of life of diabetic patients is an important aspect to be sincerely considered. This association is evident in studies that have indicated that if a diabetic patient is faced with psychological problems such as depression, anxiety and so on, the patient's quality of life will be directly affected (Gupta et al., 2016; Laraia et al., 2017). For example, findings from studies have shown that most diabetic patients lose their jobs and face discrimination upon diagnosis, which invariably affects their socioeconomic status and mental health (Goldney et al., 2004; Haluzik et al., 2018; Smith et al., 2013; Young & Unachukwu, 2012). The dilemma of being diabetic also worsens when the patient is faced with other comorbid conditions which further exacerbate a burden on the patient's quality of life and psychological well-being (Egede & Ellis, 2010; Ehrmann et al., 2017; Gonzalez et al., 2016; Lee et al., 2017; Ramkisson et al., 2016; Schram et al., 2009; Sun et al., 2016; Walker et al., 2015; Young-Hyman et al., 2016). In rural South African settings, there remains a gap in studies that relate psychological well-being and quality of life of diabetic patients, especially according to age and gender. The current study will thus play a vital role in

ascertaining the relevance by associating the psychological well-being and quality of life of diabetic patients at Ga-Dikgale clinics.

2.9 Theoretical perspective

This section looks at the role of theory. Cella and Tulsky (1993) developed a conceptualisation of quality of life and psychological well-being, which is arranged into four domains, namely functional well-being, social well-being, physical well-being and emotional well-being. The Cella and Tulsky (1993) concept will be used to scientifically validate this study on psychological well-being and quality of life of diabetic patients at Ga-Dikgale clinics according to age and gender. The theory also provides the basis for understanding the psychological well-being and quality of life of diabetic patients in rural Ga-Dikgale community. A comprehensive understanding of the psychological well-being and quality of life among this population with reference to age and gender might shed a new light on the intention to frame tailor-made interventions to improve the psychological well-being and quality of life of young, old, male and female diabetic patients at Ga-Dikgale clinics.

According to Cella and Tulsky's (1993) theory, psychological well-being refers to the quality of life in four domains. These consist of domains that contribute to overall psychological well-being and quality of life of Ga-Dikgale diabetic patients. The domain of functional well-being was defined by Cella and Tulsky (1993) as the subjective perspective regarding one's ability to perform daily tasks or activities of daily living. For example, this domain can be related to how an individual functions after being diagnosed of diabetes. They postulate that maintaining a good relationship with family and others can result in positive psychological well-being and quality of life. Similarly, other factors such as bad relationships and poor working conditions can negatively affect the psychological well-being and quality of life of diabetic patients (Maepa, 2009; Maepa & Idemudia 2014).

The domain of social well-being in this study addresses social dysfunction and the social status of diabetic patients in rural Ga-Dikgale clinics as concerning psychological well-being and quality of life. The social well-being domain, according to Cella and Tulsky (1993), encompasses social support, close relations with family or friends and

intimacy. Due to lifestyle changes, dietary pattern changes and changes in affiliation, among others, diabetic patients may be faced with negative social well-beings such as stigma, discrimination and poor social support from their families and friends (Hunter, 2016; Lopes et al., 2016; Vancampfort et al., 2015; Wan et al., 2007).

The domain of physical well-being informs diabetic patients of insights in terms of their own bodily functions such as somatic symptoms, health and functioning or general physical well-being in relation to psychological well-being and quality of life. For example, most diabetic patients are challenged physically with pain, fatigue, nausea, amputation, blindness, erectile dysfunction that affects both their psychological well-being and quality of life (Corona et al., 2016; De Berardis et al., 2002). This study is unique because it will assess the somatic symptoms and functioning as pertaining to psychological well-being and quality of life of diabetic patients at Ga-Dikgale clinics, which is different from several other studies that focused only on depression and anxiety aspects of psychological well-being and quality of life (Camara et al., 2015; Ogle et al., 2018).

The last domain of emotional well-being covers both the psychological aspects and quality of life of diabetic patients as evidenced in studies on how being diagnosed diabetic can lead to depression and poor quality of life (Walker et al., 2015; Young-Hyman et al., 2016). Diabetic patients can experience high fatigue severity because of high psychological symptoms such as depression, anxiety, insomnia and eating variations (Walker et al., 2015; Young-Hyman et al., 2016). These challenges can be real and can hurt as much as physiologically inspired pain and therefore raise concerns about the psychological well-being and quality of life of diabetic patients in rural Ga-Dikgale clinics. The theory of Cella and Tulsky is applied in this quantitative study of diabetic patients in rural Ga-Dikgale clinics to assess their overall psychological well-being and quality of life according to age and gender. The theory is empirically relevant in that it addresses key variables of the study.

2.10 Concluding remarks

Diabetes has attained the status of a global pandemic, spreading from affluent industrialised nations to emerging economies of Asia, Latin America and Africa. The

chapter discussed diverse literatures that focused on the global prevalence of diabetes, diabetes in rural communities, the psychological well-being of diabetic patients, the quality of life of diabetic patients on the basis of age and gender, and the association between psychological well-being and quality of life of diabetic patients. The different areas covered in the chapter further provided an in-depth understanding of diabetes, especially the theoretical contextualisation of Cella and Tulsky that encompassed sectors that addressed the psychological well-being and quality of life of diabetic patients in rural Ga-Dikgale clinics.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter unpacks the research methodology used in the study. It highlights the research design, the study population, sampling, research instruments used, data collection procedures and data analysis that were engaged in this study. It further highlights ethical considerations that the researcher adhered to during the study.

3.2 Research design

The research design is a cross-sectional study which was conducted using the quantitative research method. The design enabled the researcher an in-depth exploration of the psychological well-being and quality of life of diabetic patients in the rural community of Ga-Dikgale. According to Townsend et al. (2016), a cross-sectional method entails collecting data from the population once at a specific point in time using a survey. The researcher found this design to be appropriate in the present study because in a single instance, data was collected from diabetic patients at Ga-Dikgale clinics so as to assist in ascertaining participants' psychological well-being and quality of life.

3.3 Study setting

Ga-Dikgale is located in the rural area of South Africa's Limpopo Province, which is located on the northern part of the country. The study site is approximately 45 km to the east of the provincial city of Polokwane/Pietersburg, and is located in the Central Region of Mankweng, which also forms part of Limpopo Province, 15 km from the University of Limpopo, formerly known as University of the North. Each village has a central residential area comprising demarcated housing stands with communal grazing land some distance away. The geo-ecological zone is open woodland-steppe with continental climate, and the temperature ranges from an average minimum of 6^0C in winter to an average maximum of 26^0C in summer (Alberts et al., 1999; Kanjala et al., 2010). The average rainfall is between 401-500 mm with most of the rain falling

between November and April. Droughts are common, and together with seasonality play a major role in the availability of fresh produce. Statistically, according to the South African Community Survey of 2007, Limpopo Province accounted for approximately 5.2 million of the 48.5 million national populations (Alberts et al., 1999; Kanjala et al., 2010). However, according to the 2011 census, the total population of Limpopo Province is approximately 5,404,868, and was estimated at 5,982,584 as at 2019. With an area of 125,755.09 km², this population forms part of Capricorn, which has a population of approximately 1,261,463 with a density of 58/km^2 (150/sq mi). Ga-Dikgale alone has an area of 1.63 km^{2,} depicting a population of 430 (263.15 per km²) with 146 (89.35 per km²) households (Stats SA, 2011; 2019).

Ga-Dikgale is a peri-urban area and the main ethnic group is Pedi. Shelter units at Ga-Dikgale consist of a mixture of shacks, traditional mud huts and conventional brick houses. A few households have water taps in their dwellings, but most fetch water from taps situated at strategic points at the villages. Infrastructure at the villages is poor. Some of the roads are tarred and others are going through construction. A bus service is available mornings and evenings during weekdays. Most of the inhabitants belong to the Moria Zionist Church which has a combination of Christian and traditional beliefs, whereas others belong to the Lutheran, Anglican and other churches. The language mostly spoken by all inhabitants of the site is Northern Sotho.

A large proportion of adults here are indigenes of the area, some are migrant workers, while others work as farm labourers on neighbouring farms, or as domestic workers in nearby towns, and many are pensioners. The majority of the inhabitants are economically disadvantaged in an area remarkable with high unemployment rates, poor road infrastructure and poor service delivery. The Ga-Dikgale community also has a notable number of primary and secondary schools. Free healthcare is provided to Ga-Dikgale residents, including children, pregnant women and the elderly at government primary healthcare clinics. The service provided by the clinics includes family planning, antenatal care, growth monitoring, child immunisation and management of patients with chronic diseases such as diabetics.

Mankweng Hospital is situated 15-20km from the study site and serves as a referral hospital for services not provided at the clinics. Both communicable and non-communicable diseases are prevalent in the area. According to records kept at the clinics, health problems that predominate in adults include Type 2 diabetes, hypertension, iron overload and obesity, which differ in terms of the gastrointestinal, respiratory and under nutrition health challenges that children face in the location (Kanjala et al., 2010). As a data collection site of this study, Ga-Dikgale was chosen because of its proximity to the University of Limpopo, the presence of Primary Health Care Clinics, the rurality factor and because of the then existing bigger VLIR IUC project that ended in 2019.

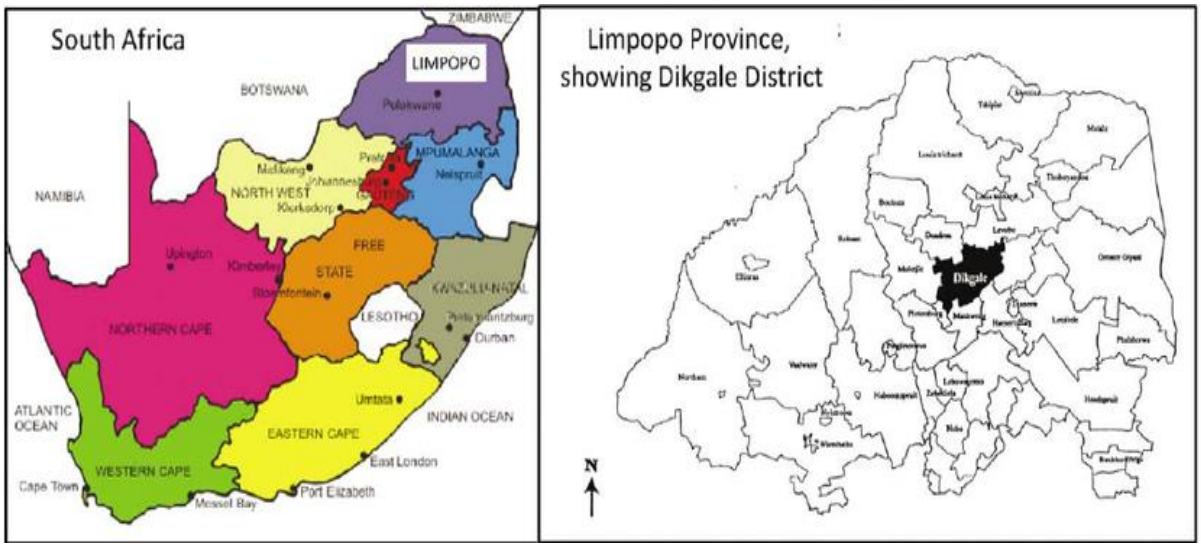


Fig 2: Displays the location of Limpopo Province within South Africa and of Ga-Dikgale community within the Province (Kanjala, Alberts, Byass et al., 2010).

3.4 Population and sampling

For the purpose of this study, participants that formed part of the study were limited to diabetic patients that visited the three rural clinics in Ga-Dikgale community in Capricorn District in Limpopo Province, South Africa. Their age group ranged from 18 years and above. However, before the study, the population of diabetic patients at Ga-Dikgale clinics was unknown. The researcher had access to the database of diabetic patients

after ethical clearance was granted. Krejcie and Morgan's (1970) table for determining population size in a given population was used to determine the sample size per clinic (Chuan & Penyelidikan, 2006) (**see Appendix (h)**). From each clinic (stratum), a systematic random sampling technique was used to select every k^{th} patient from the clinic's database (Collins et al., 2007).

For example, in every 5^{th} or 10^{th} number, a diabetic patient was selected through the assistance of healthcare providers. The age groups of participants ranged from 18 years and above. Only participants that had been on treatment for diabetes for the last six months were considered for the study. The researcher administered structured questionnaires on 200 participants. The number of participants for each clinic as retrieved from the database is as follows: Ga- Dikgale clinic 87, Sebayeng clinic 66, and Makotopong clinic 47. All participants provided demographic details such as name, age, gender, marital status, level of education, religion and period of medication. All participants were situated in Ga-Dikgale rural community in Limpopo Province, South Africa at the time when the study was conducted.

3.5 Research Instruments

The data was collected through the use of research tools consisting of general health questionnaire (GHQ) and the quality of life indexes (QoLI), which are structured instruments contextualised to assess the psychological well-being of diabetic patients at Ga-Dikgale village.

3.5.1 Reliability and Validity of the GHQ and the QoLI scales

The General Health Questionnaire (GHQ) is a 28-item using a four-point Likert (**see Appendix 1(b)**) developed by Goldberg in 1978 (Goldberg, 1978). The Likert has since been translated into 38 languages, and was developed as a testing tool to detect those likely to have or to be at risk of developing psychiatrist disorders. The GHQ-28 is a 28-item measure of emotional distress used in medical settings. Through factor analysis, the GHQ-28 has been divided into four subscales, which are somatic symptoms (items 1–7); anxiety/insomnia (items 8–14); social dysfunction (items 15–21); and severe depression (items 22–28) (Goldberg 1978; Goldberg et al., 1997; de Kock et al., 2014).

Several studies have investigated the reliability and validity of the GHQ-28 in various clinical populations. Test-retest reliability has been reported to be high (0.78 to 0 0.9) (Sterling, 2011) and interrater and intrarater reliability have both been shown to be outstanding (Cronbach's α 0.9–0.95) (Failde et al., 2000). High internal consistency has also been reported (Failde et al., 2000). The GHQ-28 correlates well with the HADS (Sakakibara et al., 2009) and other measures of depression, and is one of the most generally used and validated questionnaires to screen for emotional distress and possible psychiatric morbidity. It has been tested in numerous populations, including people with stroke, spinal cord injury, heart disease and various musculoskeletal conditions, including whiplash associated disorders (Sterling, 2011) and occupational low back pain, amongst others (Failde et al., 2000; Sakakibara et al., 2009; Sterling, 2011). The questionnaire was also used on chronic patients in Limpopo Province by Maepa and Idemudia (2014), and the Cronbach alpha of the participants was .94. However, the tool is not alien to criticisms; despite the limitations, the GHQ-28 remains one of the most robust screening tools available to assess the psychological well-being and to detect possible psychiatric morbidity. Thus, this necessitated its use in this study to access the psychological well-being of diabetic patients at Ga-Dikgale clinics.

The QOLI was developed by Carol Estwing Ferrans and Marjorie Powers in 1984 to measure quality of life in terms of satisfaction with life (**see Appendix 1(c)**. The QOLI measures both satisfaction and importance regarding various aspects of life. The internal consistency reliability for the QOLI (total scale) has Cronbach alphas ranging from .73 to .99. Cronbach's alphas for the four subscales have been proven reliable too with internal consistency ranging from .70 to .94 for the health and functioning subscale, and from .78 to .96 for the psychological/spiritual subscale. For the social, economic and family subscales, alphas were acceptably high in some studies, ranging from .71 to .92 and .63 to .92 respectively (Ferrans & Powers, 1992; Rustøen et al., 1999).

According to Ferrans and Powers (1992), the content validity of the QOLI was supported by the fact that items were based both on an extensive literature review of

issues related to quality of life, and on the reports of patients regarding the quality of their lives (Ferrans & Powers, 1992). Support for content validity was also provided by an acceptably high rating using the Content Validity Index (Oleson, 1990). Convergent validity of the QOLI was supported by strong correlations between the overall (total) QOLI score (Ferrans & Powers, 1992; Anderson & Ferrans, 1997). Further evidence for construct validity was provided by factor analysis. Four dimensions underlying the QOLI: health and functioning, social and economic, psychological/spiritual, and family had the factor analytic solution depicted 91% of the total variance (Ferrans & Powers, 1992). Construct validity was also supported using the contrasted groups approach whereby subjects were divided into groups on the basis of self-reported levels of pain, depression and success in coping with stress (Ferrans & Powers, 1992). The contrasted groups approach was also used to assess the construct validity of the social and economic subscale. It was found that those who had higher incomes had significantly higher quality of life scores on the social and economic subscale (Ferrans & Powers, 1992).

The QoLI was also used on patients with chronic conditions in a South African tertiary hospital in Johannesburg with a Cronbach's alpha of 0.93 (Daya, Bahat & Raal, 2016; Ferrans & Powers, 1992). The questionnaire evaluated four quality of life domains, being physical, psychological, social and environmental using a six-point Likert scale. Furthermore, to ensure reliability and validity of the QOLI scales utilised in this study, the scales were translated from English into Sepedi so as to enable participants to complete the research tool in their own language, which appeared to be the predominant language at the research sites. However, research assistants such as translators were available to render help. And upon analysis after data collection, the Cronbach alpha ($\propto$) for the General Health scale was calculated at 0.72 and the Cronbach $\propto$ for the Quality of Life scale was calculated at 0.86, implying that both tests are reliable and valid.

3.6 Data collection procedure

After receiving approval from different authorities that included Turfloop Research Ethics Committee (TREC/190/2019:PG), Limpopo Provincial Department of Health (LP-

201908-019) and Capricorn District Health Department (S.5/3/1/2). The researcher approached Ga-Dikgale Tribal Authority to ask for permission to collect data from the village. Then the researcher approached clinic managers at the three clinics: Ga-Dikgale clinic, Sebayeng clinic and Makotopong clinic for permission to collect data at the clinics to which they are assigned. At the respective clinics, the managers provided the researcher with relevant information required to be productive and efficient. This includes information such as days that chronic patients are available, time to get to the clinic and an office to use for the duration of the data collection.

The research was conducted in the month of January and February 2020 in Ga-Dikgale rural community, which forms part of Capricorn District Municipality in Limpopo Province. Participants are diabetic patients from three rural clinics in Ga-Dikgale situated in Capricorn District, which complements the five districts of Limpopo Province. Clinics includes; Ga-Dikgale clinic, Sebayeng clinic and Makotopong clinic. These clinics are primary healthcare facilities in the study area, and accounts for major clinics in the area where patients with chronic conditions such as diabetes go for consultations and collection of treatment packages.

During the data collection on specified days and time, questionnaires were distributed and administered to participants who are diabetic patients referred to the researcher by healthcare providers. The researcher explained to participants what the study entailed, and asked for their consent for those who were willing to participate. The questionnaire was administered accordingly from demographics to structured instruments, and where they needed assistance, the researcher and research assistants were present to assist, especially for the elderly ones and those who had developed eye problem (retinopathy) and hand abnormality (neuropathy) due to diabetes. They could not write, and thus required someone to cross for them their preferred option. It is also very important to note that the researcher provided participants with both the English and Pedi versions of the questionnaire based on their preferences.

3.7 Data analysis

The Statistical Package for the Social Science (SPSS) IBM version 23 was used to analyse data. Results are presented in frequencies and percentages in a tabular format. Initial results were presented in Multivariate analysis of variance (MANOVA) so as to further analyse the data collected, and to test gender and age differences on the basis of psychological well-being and quality of life of participants (Warne, 2014). The data did not fit a normal distribution; therefore, the results were tested using the Kruskal-Wallis H test, which is a non-parametric test that does not adopt normal distribution. The test is the non-parametric alternative to the MANOVA, and compares the medians, not the means between two or more groups.

Logistic regression was employed to establish whether age and gender influence the psychological well-being and quality of life of diabetic patients at Ga-Dikgale clinics.

3.8. Ethical considerations

In this study, the following ethical measures were adhered to:

3.8.1 Permission to conduct the study

The study is part of a bigger VLIR IUC study. The researcher sought ethical clearance from the University of Limpopo's Research Ethics Committee before commencement of the study. Permission was also obtained from the Provincial Department of Health and managers of public facilities at Ga-Dikgale community clinics (**see Appendix 1(d)**). Furthermore, gatekeeper permission was sought and obtained from Ga-Dikgale Tribal Authority. This enabled the researcher to access participants (**see Appendix 1(e)** for the English version of the gatekeeper permission letter, and **Appendix 2(e)** for the Sepedi version of the gatekeeper permission letter).

3.8.2 Confidentiality, anonymity and privacy

Participants were guaranteed confidentiality and anonymity that the information generated will not be disclosed outside the content of the study, and that their identity will, in no way, be exposed. Nevertheless, should the need arise, the researcher will improvise and use codes or pseudo names to identify participants, who were also informed that experts such as the researcher and supervisors who are involved in the study would examine the questionnaire, and that all relevant information will be kept in a

safe place after the research has been completed with no public access to the documents. Participants were also assured that their identities would remain anonymous (McMillian& Shumacher, 2006).

3.8.3 Informed consent

Before commencing with the study at the sites, participants were given an informed consent form to sign **(see Appendix 1(f)** for the English version of the informed consent letter and form, and **Appendix 2(f**) for the Sepedi version). Furthermore, participants were advised that their participation is voluntary, and as such they had every right to withdraw at any stage of the study.

3.8.4 Feedback to participants

Participants were assured that upon completion of the study, research findings will be shared with them upon request. Also diabetic patients will benefit from the study through the feedback session whereby the researcher will revert back to the participants and present to them the results from the study and also emphasis on the importance of seeking psychological assistance on a regular basis. Additionally, participants were reminded that healthcare providers, especially managers are always available and will be delighted to help them.

3.8.5 Avoidance of harm to participants

Given the fact that participants were people with existing chronic medical conditions, the researcher was aware of the possibility that some of them may show some adverse emotional reactions when they are being interviewed. Thus, the researcher was prepared to refer relevant participants to psychologists in the nearest hospitals or clinics for counselling.

3.9 Concluding remarks

This chapter explained the methodological approaches used in the study. More so, the rationale behind the chosen method was provided. The chapter also discussed how participants were chosen, the instruments used, and the reliability and validity of these

instruments. The researcher was very cautious not to leave out the procedure and ethical considerations implemented.

CHAPTER 4

RESEARCH RESULTS

4.1 Introduction

In this chapter, results of the study are presented, starting with the description of the characteristics of the sample. The data collected were analysed based on the study objectives presented in chapter 1 of this research report. The results were analysed using the Kruskal-Wallis H test to determine between-group differences and Logistic Regression to establish whether gender and age influenced the outcome.

4.2 Sample Characteristics

Herein are overviews of the main sample features presented.

Table 4.1. Characteristics of the sample

	N	%	(X^2) p
Gender			<0.001
Male	41	20.5	
Female	159	79.5	
Age group			<0.001
18-35	35	17.5	
36-50	116	58	
51+	49	24.5	
Marital status			< 0.001
Single	95	48.2	
Married	72	36.5	
Separated	3	1.3	
Divorced	2	1.0	
Education			< 0.001
No formal	47	23.6	
In primary school	84	42.2	
Primary completed	33	16.6	
In secondary school	19	9.6	
Secondary completed	10	5.0	
Left school	1	0.5	
Tertiary education	5	2.5	
Employment			< 0.001
Not employed	137	68.5	
Employed	26	13.0	
Self-employed	13	6.5	
Pensioner	24	12.0	
Religion			< 0.001
Christian	163	81.5	
Indigenous African	29	14.5	
Combined Christian + IA	7	3.5	
Other	1	0.5	
Medication			< 0.001
6 months – 1 year	44	22.0	
1 year+	156	78.0	

Table 4.2: Descriptive statistics of the sample

Gender	Age Group	N	Health Mean	Health SD	QoL Mean	QoL SD
	18-35	7	59.57	11.55	152.14	20.93
Male	36-50	27	61.56	9.71	144.48	21.96
	51+	7	67.29	6.52	154.71	19.02
	18-35	28	55.11	12.07	139.04	29.19
Female	36-50	89	61.18	9.65	147.87	19.06
	51+	42	61.55	9.33	152.90	18.07

It is important to note that because the data did not meet the criteria for a normal distribution (General Health, $\boldsymbol{X^2}$ = 0.04, Quality of Life, $\boldsymbol{X^2}$ < 0.001), a parametric test (MANOVA) could not be used; rather a non-parametric test had to be used which does not assume a normal distribution of the data. The Kruskal-Wallis H test is the non-parametric alternative to the multiple-way MANOVA and compares the medians, not the means, between two or more groups.

Figure 4.1 Graph showing gender differences for general health scores.

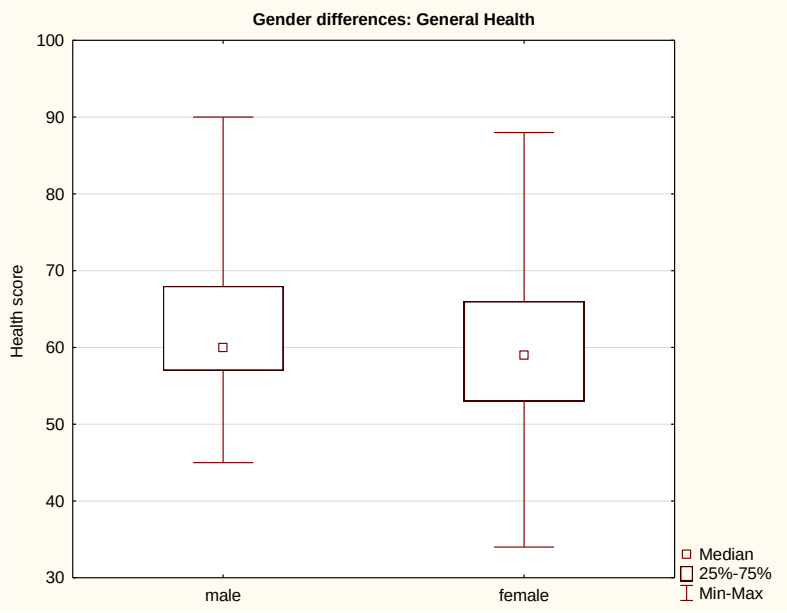


Figure 4.1 shows gender differences in diabetic patients with regards to general health with median for males (N=40) of 60 and for females (N=159) of 59.

Figure 4.2. Graph showing age differences for general health scores

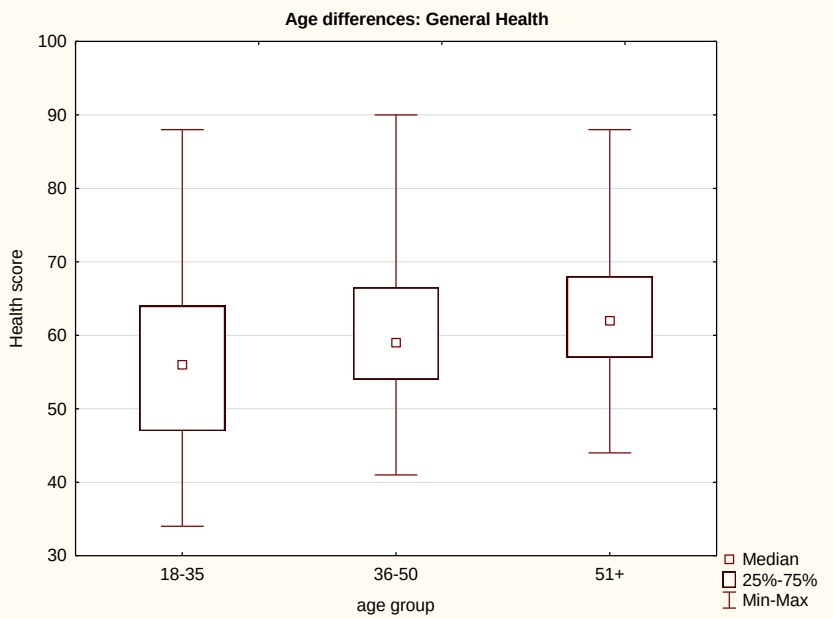


Figure 4.2. shows age differences of the general health of Ga-Dikgale diabetic patients using the K-W and correlation. The age groups with medians represented are 18-35 (56), 36-50 (59) and 51 years and above (62), showing statistically significant differences between the age groups on the General Health questionnaire.

Table 4.3: Kruskal-Wallis Analysis for gender and age differences scores for General Health

	N	Median	DF	X^2	H	*p*
General Health						
Gender	200		1	1.19	1.15	0.22
Male	41	60.00				
Female	159	59.00				
Age Group	200		2	6.34	8.96	0.01*
18-35	35	56.00				
36-50	116	59.00				
51+	49	62.00				

**p = 0.01*

Table 4.3 shows gender and age differences for scores on the general health questionnaire for Ga-Dikgale diabetic patients using K-W analysis. The table explains that only the age groups differed significantly from each other on the General Health questionnaire. *Post-hoc* (multiple comparisons) testing revealed that the 18-35 age groups scored significantly lower on the questionnaire than the 36-50 (p = 0.04) and the 51+ (p = 0.001) age groups. The scores of the latter two groups did not differ significantly from each other.

Figure 4.3. Graph showing gender differences for scores on the Quality of Life questionnaire of Ga-Dikgale diabetic patients

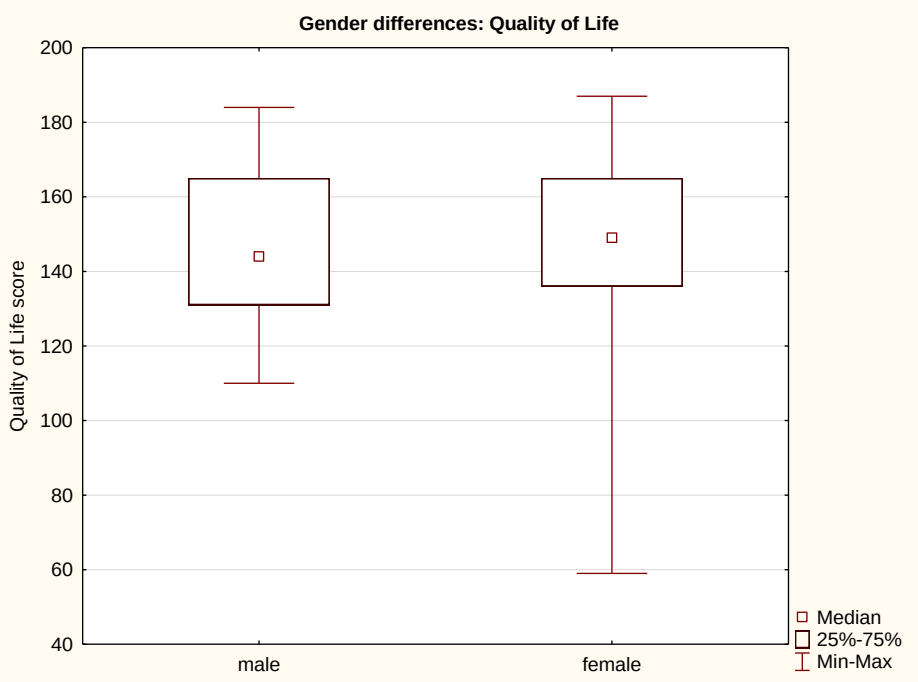


Figure 4.3. Depict gender differences of the quality of life of Ga-Dikgale diabetic patients using the K-W analysis. The males (n = 41) and females (n = 159) show medians of 144 and 149 respectively.

Figure 4.4 Graph showing age differences for scores on the quality of life questionnaire for Ga-Dikgale diabetic patients

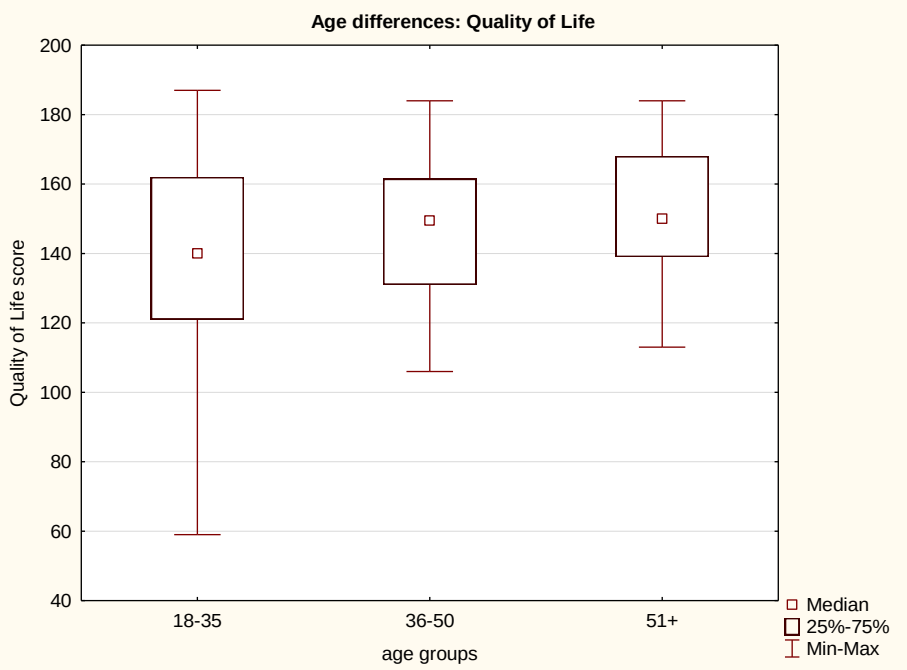


Figure 4.4. Displays age differences for scores on the Quality of Life questionnaire for Ga-Dikgale diabetic patients using the K-W analysis. The median for 18-35 (n=35) was 140, for 36-50 (n=116) 149 and for 51+ (n=49) 150.

Table 4.4 Kruskal-Wallis analysis for gender and age differences scores on the Quality of Life questionnaire

Quality of Life	N	Median	DF	X^2	H	*P*
Gender	200		1	0.31	0.51	0.82
Male	41	144.00				
Female	159	149.00				
Age Group	200		2	0.93	3.86	0.15
18-35	35	140.00				
36-50	116	149.50				
51+	49	150.00				

Table 4.4 illustrates gender and age differences for the Quality of Life scores of Ga-Dikgale diabetic patients using the K-W analysis. There were also no statistical significant differences observed between males and females. The Quality of Life questionnaire did not show a significant difference in the scores of the three age groups either.

4.3 Logistic Regression

Table 4.5 Logistic regression to show the influence of gender and age on General Health and Quality of Life of the sample

	Estimated Beta	*p*-value	Odds Ratio	95% Confidence Intervals
General Health				
Gender	0.02	0.35	1.02	0.98 – 1.05
Age	- 0.14	0.24	0.87	0.69 – 1.10
Quality of Life				
Gender	- 0.00	0.98	1.00	0.98 – 1.02
Age	- 0.01	0.89	0.99	0.92 – 1.08

Table 4.5 shows the influence of gender and age on the responses on the General Health and Quality of Life questionnaires. The Odds Ratio is a measure of the strength of the association between the conditions (gender and age) and the General Health and Quality of Life results. If it equals one, it means there is no association. A 95% confidence interval is the range of values that one can be certain that it contains the true means of the sample.

No statistically significant results were noted for General Health (gender: $p = 0.35$, age: $p = 0.23$) and for Quality of Life (gender: $p = 0.98$, age: $p = 0.89$). It can therefore be established that although significant differences were found for one age group on the General Health questionnaire, overall both gender and age did not significantly influence the outcome of both questionnaires.

4.4 Summary of research findings

As vividly displayed in the tables and graphs above, the Kruskal-Wallis test showed that there were no statistically significant differences between the genders on the General Health questionnaire, $\boldsymbol{X^2}(1) = 1.19$, $p = 0.22$ with a median of 60.00 for males and 59.00 for females.

There was, however, a statistically significant difference between the age groups on the General Health questionnaire, $\boldsymbol{X^2}(2) = 6.34$, $p = 0.01$ with a median of 56.00 for the 18-35, 59.00 for the 36-50 and 62.00 for the 51+ age groups. *Post-hoc* analysis revealed that the difference was between the 18-35 age group and the 36-50 group ($p = 0.04$) and the 18-35 and 51+ group ($p = 0.01$). The 36-50 and 51+ age groups' scores on the questionnaire did not differ significantly from each other. There were no statistically significant differences between the genders on the Quality of Life questionnaire, $\boldsymbol{X^2}(1) = 0.31$, $p = 0.82$ with a median of 144.00 for males and 149.00 for females.

There were also no statistical significant differences between the scores of the three age groups, $\boldsymbol{X^2}(2) = 0.93$, $p = 0.15$ with a median of 140.00 for the 18-35, 149.00 for the 36-50 and 150.00 for the 51+ age groups. Therefore, no statistically significant differences were observed for the gender groups on both questionnaires. The Quality of Life questionnaire did not show a significant difference in the scores of the three age

groups. Logistic regression showed that neither gender nor age had a significant influence on the outcome of both the General Health and the Quality of Life questionnaires.

Therefore, the hypothesis that there are significant gender and age differences in the psychological well-being and quality of life of diabetic patients is refuted because there were no significant differences on both questionnaires. However, the statistical significant difference noticed on the youngest age group as per the General Health questionnaire may imply that age has an influence on psychological well-being.

4.5 Concluding remarks

In this chapter, research findings were presented in graphs and tabular formats using Kruskal-Wallis H and Logistic Regression tests. The descriptive analysis of the study was also represented, including the demographic characteristics of the sample.

CHAPTER 5

DISCUSSION OF RESULTS

5.1 Introduction

In this chapter, research results are discussed in terms of selected demographics, stated hypotheses and with regards to the literature reviewed. The meaning, implication of results and their congruence and incongruence with results of other studies is expatiated. In like manner, limitations of the study are outlined with recommendations highlighted so as to assist and direct prescient research on the topic.

5.2 Demographic indicators generated from diabetic patients at Ga-Dikgale clinics

Results of the study showcased highest frequency and percentage of females diagnosed with diabetes in Ga-Dikgale clinics, of which sventy nine percent were female and over twenty percent were male. A normal distribution of the sample was therefore not achieved. The over seventy nine percent females who were reported to be diabetic is worrisome and can be ascribed to different reasons. Firstly, the population of the area from the last census conducted in 2011 proved that there are more females (54%) in Ga-Dikgale compared to their male counterparts (46%) that concede with the gender disparities in this study. This may be attributed as one of the reasons for the high female percentage as compared to the male percentage (Stats SA, 2011). Gestational diabetes during pregnancy amongst Ga-Dikgale diabetic women sample could also explain why females were overrepresented in the study sample.

Additionally, it is important to acknowledge and address gender differences that may interfere with diabetes self-care. For example, it was observed that females at Ga-Dikgale clinics are more engaging about their health conditions when compared to males. In other words, females have higher preference of going to hospitals for consultations about the changes they experience in their bodies when compared to males who may be more reluctant to seek help. This is evidenced by a growing body of research in the United States, which suggests that men are less likely than women to

seek help from health professionals for problems as diverse as diabetes, depression, substance abuse, physical disabilities and stressful life events (Galdas et al., 2005). Findings also suggest that risk factors of developing depression and psychiatric conditions were found to be relatively higher among female diabetic patients when compared to their male counterparts (Robinson et al., 2018).

More so, an inference can be drawn from a study by Galdas et al. (2005) who studied men's health-related help-seeking behaviour. The study indicated that there exist delays in seeking help among men who experience illnesses such as diabetes. This results into accompanying psychological issues. Therefore, this can be linked to reasons why the few men who visited the clinics during the data collection presented characteristics of impatience. The researcher argues that the men spend much time at clinics upon visits, waiting for doctors who sometimes do not come, medicines that are hardly available and worst of it all, unpleasant attitudes displayed by nurses. All of this could pose as reasons for their unwillingness to visit clinics where they wait for a long time, and even get hungry, thus further endangering their health. The partriarchal nature that dominates rural African communities could also be a reason for males' negligence towards help-seeking at health care facilities, and would rather insist that they are well or settle for traditional remedies when faced with disturbing health conditions.

With regards to the age groups, three age groups were analysed with varying prevalences. For example, age groups eighteen to thirty five represented over seventeen percent of the sample, the thirty six to fifty age groups showed fifty eight percent, and the fifty one and above age group depicted over twenty four percent. The thirty six to fifty age group was therefore overrepresented, contributing to the fact that a normal distribution was not possible. Various reasons can be attributed to reasons why different age groups are diagnosed as diabetic. Just like the age groups eighteen to thirty five and thirty six to fifty disclosed that they were diagnosed with gestational diabetes during pregnancy, this can be associated with studies affirming the presence of gestational diabetes amongst these groups with accompanying health issues that include psychological symptoms, amongst others (Gilbert et al., 2019; Langer & Langer, 1994). Another age group that depicted a higher prevalence of diabetics than the younger group at Ga-Dikgale rural clinics were individuals between fifty years and

above with a representation of over twenty four percent. This can be attributed to old age. It is also important to relate that as proven from this study and other studies, most diabetic patients are pensioners (Ogurtsova et al., 2017).

5.3 Psychological well-being of diabetic patients according gender and age

The Kruskal-Walis analysis showed that there were no significant statistical differences between the genders on the responses on the General Health questionnaire, which implicates that both genders regarded their general health as equally positive or negative. This finding was confirmed by a study by Fitzgerald, Anderson and Davis (1995), who examined gender differences in diabetes attitudes and adherence, where a total of one thousand two hundred and one patients with diabetes were surveyed, of which sixty five percent were women. They indicated that there are many similarities in the reactions of men and women who have been diagnosed with diabetes. The explanation of findings on the lack of gender differences on the general health could be that diabetes affects both genders in a similar pattern, with no difference in symptomatology. On the other hand, other studies in opposition to the current study findings depict that there are psychological correlates amongst diabetic patients on the basis of gender and age (Lloyd et al., 2000; Sun et al., 2016).

There was, however, a statistically significant difference between the age groups on the General Health questionnaire. The youngest age groups scored significantly lower on psychological well-being than the average age and the oldest age groups whose scores did not differ significantly from each other. This suggests that the older group may have accepted that diabetes is a chronic condition, and have adapted to it with the employment of specific coping mechanisms. The younger age group may feel more distressed as the condition may hamper an active lifestyle like sports participation, which affects their psychological well-being. This group will require more assistance on resilience and coping mechanisms. A study by the Centers for Disease Control and Prevention (CDC) (2011) on age differences reported higher rates of gestational diabetes amongst females, especially younger females corresponding to the younger age group at Ga-Dikgale clinics, ranging from two percent to ten percent of all pregnancies and immediately after pregnancy; and five to ten percent of women with

gestational diabetes develop chronic diabetes, usually type 2 that invariably play a role on their psychological well-being (CDC, 2011).

5.4 Quality of Life of diabetic patients according to gender and age

No statistically significant differences were found between the genders on the responses on the quality of life questionnaire, which implies that both genders also regarded their quality of life as equally positive or negative. An explanation about findings on lack of gender differences on the quality of life could be that diabetes affects both genders in the same form, with no symptom differences. An observational study that sought to determine the correlation of quality of life and the impact on the metabolic control of patients with T2D mellitus using a non-probabilistic convenience sampling strategy and the World Health Organization Quality of Life (WHOQOL-BREF) found that patients presented lower impact in QoL domains for pain and negative feelings. The findings reflected a negative correlation between psychological domains and the fasting glycaemia, but there was a significant difference in the physical domains that indicated that men have a higher physical QoL than women (Marte et al., 2019).

Despite findings of no significant difference on the quality of life of Ga-Dikgale diabetic patients according to gender, the researcher holds the opinion that possibly most participants' responses were false positives because some female and male patients deliberated on loss of income due to job losses after they were diagnosed with diabetes, which may directly affect their quality of life because their means of livelihood have been affected. This is peculiar in that several studies have indicated that diabetic patients show a considerable decline in their quality of life due to job losses on the basis of gender (Elliott et al., 2003; Powers et al., 2017; Tuttle et al., 2014). Therefore, the high prevalence of diabetes has important social, financial and developmental implications that may impact on diabetic patients' quality of life irrespective of the gender findings in this study.

There were also no statistically significant differences among the age groups in their responses on the quality of life questions. This explains that the age groups also regarded their quality of life as equally positive or negative. The implication of lack of

differences based on the age groups on the quality of life could be that diabetes affects the three age groups in the same manner, with no symptom differences. Contrary to the study findings, the researcher had listened to Ga-Dikgale males disclose how being diagnosed diabetic has an impact on their sexual lives. For example, this is consistent with a study by De Berardis et al. (2002), which investigated the ability to achieve and maintain an erection. Various aspects of quality of life were assessed, such as psychological adaptation to diabetes, and quality of sexual life. Findings depicted that overall, majority of adult male patients reported frequent erectile problems (De Berardis et al., 2002; Corona et al., 2016). These sexual problems can also be believed to play a role on the quality of life amongst Ga-Dikgale diabetics as majority of adult males at Ga-Dikgale clinics were very concerned about changes in their sexuality after they were diagnosed diabetic.

Still on age, a cross-sectional survey study evaluated the health-related quality of life (HRQoL) of elderly diabetic patients of sixty five to eighty four years with one hundred and seventy seven respondents from three community health centres in Stockholm County whereby diabetic subjects were compared with age and gender-matched controls from a random standard population sample of the Swedish population. In the study, elderly diabetic subjects were discovered to have a poorer HRQoL than the general population, especially regarding physical health, and reduced cognitive function was associated with poor metabolic control (Wändell & Tovi, 2000).

5.5 Association of gender and age with General Health and Quality of Life of diabetic patients

Logistic analysis was used to examine the association between gender and age, with the scores obtained on the general health and quality of life questionnaires to determine how it affected the outcome. No statistically significant results were noted for psychological well-being and for Quality of Life. It can therefore be established that although significant differences were found for one age group on the general health questionnaire, overall both gender and age did not significantly influence the outcome of both questionnaires. This finding complements a study by Hänninen et al. (1998), which

asserted that no associations were found between HRQoL and gender, age or marital status.

5.6 Clinical and scientific implications of the study

The results obtained show that the psychological well-being and the quality of life of diabetic patients at Ga-Dikgale clinics do not necessarily correspond with those obtained by other studies. Although, most studies (Egede & Ellis, 2010; Ehrmann et al., 2017; Gonzalez et al., 2016; Grigsby et al., 2002; Lee et al., 2017; Ramkisson et al., 2016; Schram et al., 2009; Sun et al., 2016) suggest that gender and age are associated with psychological well-being and quality of life in diabetic patients, this study conducted in rural Ga-Dikgale clinics hypothesised that age and gender play a role on the psychological well-being and quality of life of diabetic patients, and showed no significant variation in relation to the quality of life on the basis of age and gender. Nonetheless, the study found age differences on the younger age groups with regards to the general health. The clinical implication of findings of this study suggests that younger age groups should be prioritised for psychological screenings that place emphasis on coping and resilience, amongst others, so as to improve their psychological well-being. Regardless of results of this study, scientifically there is still a need to emphasise that psychological factors play a role amongst Ga-Dikgale diabetic patients. Thus there is a need for more heterogeneous studies.

Theoretically, Cella and Tulsky's (1993) postulation of functional well-being, social well-being, physical well-being and emotional well-being remains a valid theory applied on the quality of life and psychological well-being of diabetic patients in rural Ga-Dikgale clinics. This is despite the finding that age and gender did not influence it. Perhaps if applied in a controlled group of non-diabetics in comparison with a diabetic group, more significant results may be derived.

5.7 Concluding remarks

The predominance of diabetes has increased at disquieting rates globally. South Africa has the second highest number of people in Africa living with diabetes, with prevalence rates being among the top five countries continentally. Consequently,

psychological issues concomitant with diabetes have been of vital concern. Readings have found that patients with diabetes have heightened rates of anxiety, depression and decreased levels of psychological well-being. Therefore, this study was necessitated by the gap noticed on the psychological well-being and the quality of life of diabetic patients in rural communities. The study found that gender did not influence both general health and quality of life of Ga-Dikgale diabetic patients, but age did have a slight effect on the general health in so far that the younger age group (18-35) reported more negatively on the questionnaire. Logistic Regression analysis showed that overall, gender and age did not influence the outcome of both questionnaires. This was contrary to what was hypothesised, but a sample representing equal age and gender distribution compared with a control group of non-diabetic participants would show more in-depth results.

There is a high unemployment rate in the area. According to the two hundred (200) diabetic patients that participated in the study, most people do not have access to sanitation and a safe water source. Males and females in the study area vary in age, educational levels, marital status and periods of placement on diabetes treatment. The general health and quality of life of diabetic patients were measured with results only showing significant difference on age according to the general health. The gender of the general health, the age and gender of the quality of life showed no statistical difference.

5.8 Limitations of the study

The study was limited to diabetic patients only. No control group of healthy participants was used.

The sample was homogeneous, consisting only of Sepedi-speaking rural participants and therefore not generalisable to the larger South African population. The researcher hopes that future research will replicate this study to other cultural groups using languages other than the dominant Northern Sotho (Sepedi). The researcher also hopes that the study will be replicated in other clinics or hospitals for patients with chronic conditions other than diabetes. Not having a control group of non-diabetics for comparison was a significant limitation. There is also a possibility that some responses

from participants could be false positives, mainly because they wanted to please the researcher.

Further research is required to determine whether the presence of comorbidities amongst patients diagnosed with diabetes would have influenced the outcome. With an increased sample size and equal gender and age groups, various psychological variables could have been further investigated. Followed up by a qualitative study, more light may have been shed on the effect of these variables on general health and quality of life. More studies are needed to help assimilate the psychological well-being and quality of life of patients with other chronic conditions and those with no chronic conditions both in urban and rural areas, reflecting a clear variation on demographics and symptomatology.

5.9 Recommendations

The following are recommendations as directed by study findings:

- There is a paucity of literature concerning the general health (psychological well-being) and quality of life of diabetic patients in rural communities, especially in the continent. Thus the replication of this study could be carried out even in other countries, especially in African countries with diverse cultures and languages, be it in the rural or urban areas.
- Findings from the present study also point to a need to develop strategies sensitive to challenges facing patients diagnosed with chronic conditions such as diabetes and comorbidities in rural communities.
- There is a need to assess the psychological well-being and quality of life of diabetic patients in comparison to non-diabetic patients in rural communities such as Ga-Dikgale.
- These findings also call for the need for cohesive integrated management on diabetes. These may include psychological knowledge, self-care behaviours and adherence to medications that will improve the quality of life of diabetic patients.

- Therefore, to ensure effective management, a strategic approach that improves basic health literacy on chronic conditions and mental health implications could be an intervention measure. For adequate health education, this will enhance the psychological well-being and quality of life of patients with chronic conditions in rural communities.
- The outcomes of the psychological well-being and quality of life of diabetic patients can be improved if practitioners factor these variances in modifying diabetes education and supportive care for individuals diagnosed with chronic conditions in association with mental health experts to ensure that the psychological well-being of these patients are prioritised. Understanding these dynamics will help health-care providers to be prompt in the identification and referral of diabetic patients to appropriate mental health professionals as part of the management of diabetes care.
- Finally, the current study will not be limited to mental health practitioners, but rather the health profession as a whole will find the study beneficial. The Department of Education can also consider the study beneficial towards educating students in fields such as health, research, developmental studies as per human settlements, et cetera. The researcher will also identify other stakeholders to benefit from the study like the department of health, the department of social development, the department of human settlement, the department of rural development and land reform and the research department at the institution can all benefit from the study through health guide and policy.

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APPENDICES

Section A: Data Collection Tool: English Version

Appendix 1 (a): Demographic Information

Age:

a) 18-25
b) 26-35
c) 36-50
d) 51 and above

Gender:

a) Male
b) Female
c) Other: Specify……..

Marital status:

a) Single
b) Married
c) Separated
d) Divorced

Level of education:

a) No formal schooling
b) In primary school
c) Primary school completed
d) In High school
e) High school completed
f) Left school
g) Tertiary education (post Grade 12)

Employment status:

a) Not employed
b) Employed
c) Self-employed
d) Pensioner
e) Student

Religion:

a) Christianity
b) Indigenous African Religion
c) Combination of both A & B
d) Other…….

Period on medication:

a) 6 months to 1 year
b) More than 1 year

Appendix 1(b): General Health Questionnaire

For each of the following, please choose the answer that best describes how satisfied you are with that area of your life. Please mark your answer by CROSSING the number.

Not at all = 1, No more than usual = 2, Rather more than usual = 3,
Much more than usual = 4

HAVE YOU RECENTLY				
1 Been feeling perfectly well and in good health?	1	2	3	4
2 Been feeling in need of a good tonic?	1	2	3	4
3 Been feeling rundown and out of sorts?	1	2	3	4
4 Felt that you are ill?	1	2	3	4
5 Been getting any pains in your head?	1	2	3	4
6 Been getting a feeling of tightness or pressure in your head?	1	2	3	4
7 Been having hot or cold spells?	1	2	3	4
8 Lost much sleep over worry?	1	2	3	4
9 Had difficulty in staying asleep once you are off?	1	2	3	4
10 Felt constantly under strain?	1	2	3	4
11 Been getting edgy and bad-tempered?	1	2	3	4
12 Been getting scared or panicky For no good reason?	1	2	3	4
13 Found everything getting on Top of you?	1	2	3	4
14 Been feeling nervous and strung-up All the time?	1	2	3	4

15 Been managing to keep yourself Busy and occupied?	1	2	3	4
16 Been taking longer over the Things you do?	1	2	3	4
17 Felt on the whole you were doing thing swell?	1	2	3	4
18 Been satisfied with the way you've carried out your task?	1	2	3	4
19 Felt that you are playing a useful part in things?	1	2	3	4
20 Felt capable of making decisions about things?	1	2	3	4
21 Been able to enjoy your normal day-to-day activities?	1	2	3	4
22 Been thinking of yourself as a worthless person?	1	2	3	4
23 Felt that life is entirely hopeless?	1	2	3	4
24 Felt that life isn't worth living?	1	2	3	4
25 Thought of the possibility that you might make away with yourself?	1	2	3	4
26 Found at times you couldn't do anything because your nerves were too bad?	1	2	3	4
27 Found yourself wishing you were dead and away from it all?	1	2	3	4
28 Found that the idea of taking your own life kept coming into your mind?	1	2	3	4

Appendix 1 (c): Quality of Life Questionnaire

For each of the following, please choose the answer that best describes how satisfied you are with that area of your life. Please mark your answer by CROSSING the number.

1= Very dissatisfied, **2 =** Moderately dissatisfied, **3 =** Slightly dissatisfied**,** **4 =** Slightly satisfied, **5 =** Moderately satisfied, **6 =** Very satisfied						
1. Your health	1	2	3	4	5	6
2. Your health care	1	2	3	4	5	6
3. The amount of pain that you have	1	2	3	4	5	6
4. The amount of energy you have for everyday activities	1	2	3	4	5	6
5. Your ability to take care of yourself without help	1	2	3	4	5	6
6. The amount of control you have over your life	1	2	3	4	5	6
7. Your chances of living as long as you would like	1	2	3	4	5	6
8. Your family's health	1	2	3	4	5	6
9. Your children	1	2	3	4	5	6
10. Your family's happiness	1	2	3	4	5	6
11. Your sex life	1	2	3	4	5	6
12. Your spouse, lover, or partner	1	2	3	4	5	6
13. Your friends	1	2	3	4	5	6

14. The emotional support you get from your family	1	2	3	4	5	6
15. The emotional support you get from other people than your family	1	2	3	4	5	6
16. Your ability to take care of family responsibilities	1	2	3	4	5	6
17. How useful are you to others	1	2	3	4	5	6
18. The amount of worries in your life	1	2	3	4	5	6
19. Your neighbourhood	1	2	3	4	5	6
20. Your home, apartment, or place where you live	1	2	3	4	5	6
21. Your job (if employed)?	1	2	3	4	5	6
22. Not having a job (if unemployed, retired, or disabled)	1	2	3	4	5	6
23. Your education	1	2	3	4	5	6
24. How well can you take care of your financial needs	1	2	3	4	5	6
25. The things you do for fun	1	2	3	4	5	6
26. Your changes for a	1	2	3	4	5	6

happy future						
27. Your peace of mind	1	2	3	4	5	6
28. Your faith in God	1	2	3	4	5	6
29. Your achievement of personal goals	1	2	3	4	5	6
30. Your happiness in general	1	2	3	4	5	6
31. Your life in general	1	2	3	4	5	6
32. Your personal appearance	1	2	3	4	5	6
33. Yourself in general	1	2	3	4	5	6

Appendix 1 (d): Letter of Permission to the Department of Health

Department of Psychology
University of Limpopo
Private Bag x 1106
Sovenga
0727

Head of Department
Department of Health
Private Bag x 9302
Polokwane
0700

Dear Sir/Madam

RE: APPLICATION TO CONDUCT REASERCH STUDY IN LIMPOPO PROVINCE

I Ms. BA Udeh a student at the University of Limpopo, conducting a study on "**The psychological well-being and quality of life of diabetic patients at Ga-Dikgale community**". Based on the aim of the study, I hereby request permission to interview patients who are receiving treatment from the Ga-Dikgale clinics. I am fully aware of the ethical issues pertaining to the research involving human participants and will, therefore, ensure that I adhere to expected ethical standards of maintaining anonymity and confidentiality.

Thanking you in anticipation

Yours truly,
BA Udeh (Ms)

Appendix 1 (e): Letter of Permission Ga-Dikgale

Department of Psychology
University of Limpopo
Turfloop Campus
Private Bag x1106
Sovenga
0727
Date
Dear Sir/Madam
RE: Permission to conduct research on diabetic patients at Ga-Dikgale community clinics

I, BA Udeh (student no 201001154) currently a registered masters' student with the university of Limpopo, Turfloop campus. I am hereby requesting permission to conduct a research study among diabetic patients at the community clinics in Ga-Dikgale village as a requirement for master's degree in the department of psychology.

My research title is "A survey of the psychological well-being and quality of life of diabetic patients at Ga-Dikgale, Limpopo Province".

Should you wish to inquire any further information, please do not hesitate to contact me or my supervisor. Our contacts detailed are as follows: Ms BA Udeh (student)- 0732718652 and Dr. JP Mokwena (Co-Supervisor) – 015 268 2322.

Your permission will be greatly appreciated.

Appendix 1 (f): Consent Letter to Participants

Department of Psychology
University of Limpopo
Private X1106
Sovenga
0727
Date: _____
Dear participant

Thank you for approving to participate in this study that focuses on the examination of the psychological health and the quality of life of the Ga-Dikgale community members in Limpopo Province.

Kindly answer all the questions as honestly as you can. Your responses are strictly confidential. You are free to answer any question. Participation is voluntary and you are therefore free to withdraw from this study at any time. Thank you for your participation.
Kind regards

_____ _____

Udeh BA (Master's Student) Date

_____ _____

Prof S Govender (Supervisor) Date:

_____ _____

_____ _____

Prof T Sodi (co-supervisor) Date:

_____ _____

Dr JP Mokwena (co-supervisor)

_____ _____

Appendix 1 (g): Consent Form

I, _____, hereby agree to participate in this Master's research project (which is a part of a larger VLIR-IUC research project) that focuses on the psychological health and the quality of life of the Ga-Dikgale community members in Limpopo Province.

The purpose of the study has been fully explained to me. I understand that my participation in this study is voluntary. I understand further that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty. I also understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain protected. I have read and understood the explanation provided to

me. All my questions have been answered to my satisfaction, and I voluntarily agree to participate in this study.

Signature: _____

Date: _____

SECTION B: Data Collection Tool: Sepedi Version

Appendix 2(a): Tshedimošo Ya Taodišophelo

Mengwaga: a) 18-25 [ ]
b) 35-50 [ ]
c) 50 le go feta [ ]

Bong: Monna [ ],
Mosadi [ ]

Maemo a lenyalo: Nyetše [ ],

O noši [ ],
Hladile [ ],
Mohlologadi [ ]

Maemo a tša thuto: Ga se o tsene sekolo [ ],
Sekolo sa phoraemari [ ],
Sekolo se se phagamego [ ],
Sekolo sa dithutu tša godimo [ ]

Appendix 2(b): Lenaneopotšišo Ka Kakaretšo Ka Maphelo

Ke kgonthišišo ye kaakang yeo o ka iphago yona ga bjalo (Mo kgweding e tee yeo e fitilego) godimo ga nne. **Ka kgopelo swaya karabo ka go thalela nomoro.**

E ka ba ga bjale:

1 = Le ga tee, **2 =** E se go ka mehla, **3 =** Go ena le ka mehla, **4 =** Go feta ka mehla.				
1. O ikwa o phela gabotse e bile o na le bophelo bjo bo botse?				
2. O ikwa o duma go nwa sematlafatši?				
3. O ikwa o gakanegile?				
4. O kwele o babja?				
5. O ikwa o na le dihlabi ka bjokong/O ikwa o opa ke hlogo?				
6. O ikwa o na le kgatelelo ya monagano o lapile?				
7. O ikwa o fiša goba o tonya?				
8. O feletšwe ke boroko ka lebaka la go tšhwenyega/ balabala?				
9. O palelwa ke go robala ge o ka phafoga?				
10. O kwa o lapiša ditšhika ka mehla?				
11. O ikwa o felela batho pelo?				
12. O kwa o tšhoga goba o tlalelwa go se na lebaka?				
13. O ikwa o imelwa ke dilo ka moka?				
14. O ikwa o e ba le letšhogo ka mehla e bile o se na nako ya go				

khutša?				
15. O kgona go itshwarelela ka mošomo				
16. O tšea sebaka se setelele go dira dilo				
17. O ikwele o dira dilo gabotse?				
18. O ikwa o kgotsofetše ka tsela yeo o dirago mešomo ka gona?				
19. O ikwa o tšea karolo ya mohola go fetiša dilo tše dingwe?				
20. O ikwa o le maleba go tšea dipheto go dilo tše dingwe?				
21. O kwa o ipshina ka mešongwana ya ka mehla?				
22. O nagana go re o motho wa hloka mohola?				
23. O ikwa e ka re ga o sa na le tshepo bophelong?				
24. O ikwele e ka re ga o tsebe go re o phelela eng?				
25. O bona go ka ba le tšwelopele ka wena?				
26. Ka lebaka la letšhogo o ile wa ikhwetša o sa tsebe seo o ka se dirago?				
27. O ile wa ikhwetša o bona bokaone o hlokofetše o efogile mathata ka moka?				
28. O ile wa ikhweditše monagano wa go ipolaya o etla gantši?				

Appendix 2(c): Boleng Bja Legapi La Bophelo

Go ya tše dinngwe ya tšeo di latelago, kgetha Karabo yeo e swanelago ebile e kgotsofatša ka moo o phelago bophelo bja gago ka gona. Ka kgopelo swaya karabo ka go thalela nomoro.

1 = Ga e kgotsofatše, **2 =** Ga e kgotsofatše magareng **3 =** Ga e kgotsofatše le ga nnyane **4 =** E kgotsofatša ga nnyane, **5 =** E kgotsofatša magareng, **6 =** E kgotsofatša kudu						
1. Tša maphelo	1	2	3	4	5	6
2. Tša tlhokomelo ya tša maphelo	1	2	3	4	5	6
3. Tekanyo ya bohloko bjo o nago	1	2	3	4	5	6

le bjona						
4. Tekano ya maatla ao o nago le ona go mešongwana ya ka tšatši	1	2	3	4	5	6
5. Bokgoni bja go ka itlhokomela nrle le thušo	1	2	3	4	5	6
6. Tekano yeo o nago le yona ka taolo ya bophelo bja gago	1	2	3	4	5	6
7. Sebaka sa go phela ka mo o ka ratago ka gona	1	2	3	4	5	6
8. Tša maphelo a ba lapa la gago	1	2	3	4	5	6
9. Bana ba gago	1	2	3	4	5	6
10. Lethabo la ba lapa la gago	1	2	3	4	5	6
11. Tša thobalano	1	2	3	4	5	6
12. Mogatšago,Moratiwa wa gago,Molekani	1	2	3	4	5	6
13. Bagwera ba gago	1	2	3	4	5	6
14. Thekgo ya maikutlo yeo o e hwetšago go ba lapa la gago	1	2	3	4	5	6
15. Thekgo ya maikutlo yeo o e hwetšago bathong ba bangwe ntle le ba lapa la gago	1	2	3	4	5	6
16. Bokgoni bja gago bja go hlokomela le go tšea maikarabelo a lapa la gago	1	2	3	4	5	6
17. Naa o na le mohola o mo kae go batho ba bangwe	1	2	3	4	5	6
18. Tekano ya matshwenyego a gago ka gare ga bophelo bja gago	1	2	3	4	5	6
19. Tikologo ya gago	1	2	3	4	5	6
20. Legae la gago,lefelo leo o	1	2	3	4	5	6

dulago go lona						
21. Mošomo wa gago (ge o šoma)?	1	2	3	4	5	6
22. Ga ona mošomo (gao šome, Tlogela mošomo, goba o golofetše)	1	2	3	4	5	6
23. Dithuto tša gago	1	2	3	4	5	6
24. Naa o ka hlokomela jwang dinyakwa tša gago tša ditšhelete	1	2	3	4	5	6
25. Dilo tšeo o di dirago go ithabiša	1	2	3	4	5	6
26. Diphetogo tša gago tša gago tša bokamoso bja lethabo	1	2	3	4	5	6
27. Khutšo ya gago ya monagano	1	2	3	4	5	6
28. Tshepo ya gago go Modimo	1	2	3	4	5	6
29. Tšeo o kgonnego go di fihlela ka ditoro tša gago	1	2	3	4	5	6
30. Lethabo la gago ka kakaretšo	1	2	3	4	5	6
31. Bophelo bja gago ka karetšo	1	2	3	4	5	6
32. Ka mokgwa wo o lebelelago ka gona	1	2	3	4	5	6
33. Wena ka kakaretšo	1	2	3	4	5	6

Appendix 2(d): Letter of Permission to the Department of Health

Department of Psychology
University of Limpopo
Private Bag x 1106
Sovenga
0727

Head of Department
Department of Health
Private Bag x 9302
Polokwane
0700

Dear Sir/Madam

APPLICATION TO CONDUCT REASERCH STUDY IN LIMPOPO PROVINCE

I Ms. BA Udeh a student at the University of Limpopo, conducting a study on “the psychological well-being of diabetic patients at Ga-Dikgale community”. Based on the aim of the study, I hereby request permission to interview patients in who are receiving treatment from the Ga-Dikgale clinics. I am fully aware of the ethical issues pertaining to the research involving human participants and will, therefore, ensure that I adhere to expected ethical standards of maintaining anonymity and confidentiality.

Thanking you in anticipation

Yours truly,

BA Udeh (Ms)

Appendix 2 (e): Letter of Permission Ga-Dikgale (Sepedi Version)

Department of Psychology

University of Limpopo

Turfloop Campus

Private Bag x1106

Sovenga

0727

Date

Morena Mohumagadi yo a ratego

RE: Kgopelo ya tumelelo yago dira nyakišišo mabapi le Bophlelo bja monagano bja botho bao ba nago le bolwetsi bja swikiri setšhabeng sa Ga-Dikgale, Profeseng ya Limpopo.

Nna, BA Udeh (nomoro ya moithuti, 201001154) ke moithuti wa masters ka yunibesithing ya Limpopo, go la Turfloop. Ke ngwala lengwalo le go kgopela tumelelo

ya lena go dira dinyakišišo tšaka tša thuto maagareng ga di ngaka tša setšo sa Sepedi mo motseng wa lena wa Madibanneng bjalo ka senyakwa sa ka sa master's degree lefapeng la tša menagano le maikutlo.

Tabakgolo ya nyakišišo yaka ke "Pono mabapi le kabo ya ditho setšhabeng sa Capricon provenseng ya Limpopo**"**

Ge leka rata go tseba tshedimošo yenngwe le seke la lakalela gore leletša mo megaleng yeo e latelago. Ms Udeh BA (moithuti)-0732718652 le Dr. Mokwena JP (mofahlodi) – 015 268 2322

Thušo ya lena eka atlega
Wa lena

_____ _____

Ms BA Udeh Prof Goevender
Moithuti Mofahlodi

Appendix 2 (f): Lengwalo la tumelelo la Motšeakarolo

Lefapha la Thuto ya menagano
Yunibesithi ya Limpopo
Mokotla wa Phoraebete X1106
Sovenga
0727
Tšatšikgwedi__/__/____
Motšeakarolo wa hlomphego

Ke leboga ge o dumetše go tšea karolo mo lesolong le la thuto la leo le fang šedi go **Bophlelo bja monagano bja botho bao ba nago le bolwetsi bja swikiri setšhabeng sa Ga-Dikgale, Profeseng ya Limpopo.**

Ka boikobo ke kgopela gore o arabe dipotšišo ka nnete go ya ka mokgwa wo o ka kgonago ka gona. Dikarabo tša gago di tla swara ka sephiri, ka fao o ka lokologa go araba dipotšišo ka moka. Go tšea karolo ke ka boithaopo gomme o lokologile go

ikgogela morago was se sa tšea karolo mo nyakišišong ye ya thuto ka nako efe goba efe ge o ikwela. Ke leboga go tšea karolo ga gago.

Madume a borutho

_____	_____
Udeh BA (Moithuti)	Tšatšikgwedi
_____	_____
Prof S Govender (Mohlahli)	Tšatšikgwedi
_____	_____
Dr JP Mokwena (Mothuša-Mohlahli)	Tšatšikgwedi

Appendix 2 (g): Foromo ya tumelelano

Nna _____ ke dumela go tšea karolo mo nyakišišong ye ya thuto (yeo e welago ka fase ga projeke ye kgolo ya VLIR-IUC) yeo e fang šedi go bophelo bjo bo botse bja monagano le bophelo ka kakaretšo setšhabeng sa Ga-Dikgale, Profeseng ya Limpopo.

Ke hlaloseditšwe ka botlalo mohola wa lesolo le la thuto, gomme ke a kwešiša gore go tšea karolo mo lesolong le la thuto ke ka boithaopo le gona nka se lefšwe. Ke a kwešiša gore nka ikgogela morago ka se sa tšea karolo mo thutong ye ka nako efe goba efe ntle le kotlo goba kahlolo. Ke a kwešiša le gape gore, monyakišiši a ka se tsebagatše leina la ka gare ga sengwalwa sefe goba sefe ka tshedimošo yeo a e hweditšeng go tšwa mo nyakišišong ye, ka fao bjalo ka motšeakarolo sephiri sa leina la ka se širetšegile. Ke badile ebile ke a kwešiša hlaloso yeo ke e filwego, gomme le dipotšišo tša ka di arabilwe go fihlela ke kgotsofala, gomme ke dumelela go tšea karolo mo thutong.

Mosaeno:----------

Letšatšikgwedi: _____

Appendix 2 (h): Krejcie and Morgan's (1970) Sample Size Determination

Table 3.1

Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING: 6 August 2019

PROJECT NUMBER: TREC/190/2019: PG

PROJECT:

Title:	A survey of the psychological well-being and quality of life of diabetic patients in the rural community of Ga-Dikgale, Limpopo Province.
Researcher:	BA Udeh
Supervisor:	Prof S Govender
Co-Supervisor/s:	Dr J P Mokwena Prof T Sodi
School:	Social Science
Degree:	Master of Arts in Psychology

PROF P MASOKO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

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

Note:

i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**

ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**

iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

Ref : LP_201908_019
Enquires : Mrs PN Motimele
Tel : 015-293 6028
Email : Phoebe.Mahlokwane@dhsd.limpopo.gov.za

B. A. Udeh

PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES

Your Study Topic as indicated below;

A survey of the psychological well-being and quality of life of diabetic patients in the rural community of Ga-Dikgale, Limpopo Province.

1. Permission to conduct research study as per your research proposal is hereby Granted.
2. Kindly note the following:
    a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
    b. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
    c. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
    d. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
    e. The approval is only valid for a 1-year period.
    f. If the proposal has been amended, a new approval should be sought from the Department of Health
    g. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

Head of Department **Date** 27/09/19

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
CAPRICORN DISTRICT

REF : S.5/3/1/2
ENQ : Makgaloa M.O
TEL : 015 290 9252

FROM: DISTRICT EXECUTIVE MANAGER

TO : Ms. BA Udeh
UNIVERSITY OF LIMPOPO
PRIVATE BAG X 1106
SOVENGA
0727

CELL : 073 271 8652
EMAIL: dablissxtreme@gmail.com

SUBJECT : PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES (IN THE RURAL COMMUNITY OF GA-DIKGALE)

The above matter refers:-

1. Permission to conduct the above research is hereby granted.
2. Kindly be informed that :
   - In the course of your research there should be no action that disrupts the services.
   - Kindly note that the Department can withdraw the approval at any time.
3. Your cooperation will be highly appreciated.

DISTRICT EXECUTIVE MANAGER **DATE** 2019.12.04

Private Bag x9530, Polokwane, 0700, 34 Hans Van Resnberg ST, Polokwane 0700
Tel: (015) 290 9000, Fax: (015) 291 3260/1568 Website: http/www.limpopo.gov.za