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The awareness and performance of appropriate foot self-care practices among diabetic patients attending Dr. Yusuf Dadoo Hospital, Gauteng Province, South Africa.

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The Awareness And Performance Of Appropriate Foot Self-Care Practices Among Diabetic Patients Attending Dr. Yusuf Dadoo Hospital, Gauteng Province, South Africa.

Submitted in partial fulfillment for the award of Masters in Family Medicine of University of Witwatersrand.

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DECLARATION

I, ROBERT ANAYO DIKEUKWU, Student number: 051401H;

Hereby declare the following:

I am aware that plagiarism is wrong.

I confirm that the work submitted is my own unaided work.

I have followed the required conventions in referencing the thoughts and ideas of others.

I understand that the University of Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of ideas or words in my writing.

Signed……RA Dikeukwu.

Date: 28/11/2011

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Dr. RA Dikeukwu.

ABBREVIATIONS

DM- Diabetes mellitus
LEA- Lower Extremity Amputation
DFS- Diabetic foot syndrome
DFU- Diabetic foot ulcer
VPT- Vibration Perception Threshold
ABI- Ankle Brachial Index
PVD- Peripheral Vascular Disease
PN- Peripheral Neuropathy
NIDDM- Non insulin dependent diabetes mellitus
SIP- Sickness Impact Profile
US- United States of America
SDSCA- Summary of Diabetes Self-Care Activities

Definition of terms

Foot ulcer and foot sore were used interchangeably to mean the same thing in this study.

Family support as used in this research is the support participants got from family members in caring for their feet. It is therefore specific to support for foot care.

ABSTRACT

Introduction

Diabetes (especially type 2) is a common and growing health problem with significant mortality and morbidity including foot problems (neuropathy, ulceration, infection and amputation) These micro vascular/macro vascular complications can be decreased with certain treatments including good diabetic foot self-care. With this in mind, I set out to measure self-reported knowledge/awareness and performance of appropriate foot self-care among diabetic patients attending Dr. Yusuf Dadoo Hospital-a level one urban hospital. My premise which was borne by my result was that foot self-care and awareness thereof was poor among sampled diabetic patients. This can be attributed to both scant education and infrequent foot examination by clinicians and poor adherence to appropriate foot care by majority of the patients surveyed.

Objectives: To determine the awareness and performance of appropriate foot self-care practices among diabetic patients attending the out-patient unit of Dr. Yusuf Dadoo Hospital.

Study design and methods: This was a descriptive cross sectional study. Participants were consecutively recruited until the sample size of 120 was reached. A questionnaire was used to collect data. Data was analysed using STATA version 10.0.

Main outcome measures: foot self-care practices, the level of awareness of foot self-care and foot abnormalities found in diabetics

Results: There were more females (60%) than males (40%) and the mean age was 56.3 years. About 30.8% of patients had not inspected their feet for one week, while 21.7% had done it poorly. 92.5% did not use talcum powder to dry their feet, 45.8% did not inspect their shoe before wearing and 94.2% did not make use of a podiatrist at all. However, 53.3% did not soak their feet in water and only 25% walked bare foot while 75% did not. Only about 37.5% has had their feet examined by either a doctor or a nurse while 67.5% had not.

Hypertension was found to be the commonest co-morbidity occurring in 60% of the patients studied

Athlete’s foot was the most frequently occurring foot problem found in 16.2% of these patients.

Conclusion: Majority of the patients had poor awareness and poor foot self-care practices or inadequate foot self-care practices .Appropriate foot care education should be given to diabetic patients by health care professional to enable them carry out adequate foot self-care practices.

CHAPTER 1

INTRODUCTION

1.1 Background

Diabetes is a chronic debilitating condition that is associated with significant morbidity, mortality and increasing health care cost.[1] The World Health Organization (WHO) has predicted that in the year 2025, the number of people with diabetes will have doubled and that out of 300 million people with diabetes, 76% will be living in the low income group.[2]

Diabetes is very common in South Africa. The prevalence of adult onset diabetes ranges from 5% in whites to 13.5% in people of Indian extraction.[3] In the black population the prevalence is 6-8% and in the coloured population of the Western Cape it is 8%. Diabetes is responsible for about 4000 deaths per year in South Africa. Many of the deaths are of middle aged people and should be preventable.[3]

Ten to fifteen percent of diabetic patients develop foot ulcers at some stage in their lives.[4] Diabetic foot problems are responsible for nearly 50 percent of all diabetic related admissions. 50 percent of all lower limb amputations are performed on people with diabetes.[4] Many such amputations could be delayed or prevented by more effective patient education and medical supervision.[4] Foot infection is the most common reason for hospital admission for patients with diabetes in the United States. Foot ulceration leads to deep infection, sepsis and lower extremity amputation. Prophylactic foot care has been shown to decrease patient morbidity, decrease utilization of expensive resources and decrease the risk of amputation and premature death.[5]

A 6 year analysis of the effectiveness of preventive foot care in diabetics has shown that those diabetic patients at high risk of foot problem who complied with a preventive programme had at least a 13 fold decrease in first foot ulcers compared to those patients who did not comply with the foot care recommendation and in the group that

complied, the cumulative incidence of foot ulcer was 3.1% compared to 31.6% among those who did not.

1.2 Statement on the problem

Diabetes Mellitus is a major cause of significant morbidity and mortality. Being a chronic disease, it places a huge strain on public health funding.[6] It is largely a self-care disease and requires active involvement of the patient in the management. One of the major complications of diabetes is foot ulceration which can lead to limb amputation if adequate measures are not taken to treat it. With Diabetes mellitus reaching epidemic levels, the number of foot ulceration and other associated foot problems have equally increased and this impacts greatly on the quality of lives of people with the disease. Foot ulceration and its complications can be largely prevented and the rate of amputation greatly reduced if proper foot care practices are done by Diabetic patients.

1.3 Motivation for the study

This study was motivated by the increasing number of foot ulcerations and limb amputation observed among diabetic patients seen in the researcher's setting. In 2007, about 16 cases of diabetic foot ulcers were recorded, in 2008, about 39 cases were recorded and in 2009, the number of diabetic foot ulcers recorded was 66[67] . In South Africa, scant research have been conducted on this subject and given the established benefits of foot self-care in reducing the incidence of foot ulcers, the current study was conducted to determine current practices of foot self-care and the awareness thereof, among diabetic patients attending the researchers' hospital. It is hoped that the results of this study will be useful in developing health education programs which may serve as interventions to improve foot care practices and reduce the rates of foot amputations among these patients.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

Literature for this study was searched from various databases such as PubMed, Medline, Cochrane reviews, Google scholar, university of Witwatersrand Library and on line journals using keywords-“Diabetes”, “epidemiology”, “foot care practices”, foot “infection”, “amputation” “South Africa”.

Literature was searched with respect to epidemiology of Diabetes Mellitus (DM), global perspectives on diabetes mellitus, prevalence of DM globally and in South Africa, foot care practices, knowledge and awareness of foot care, predictors of foot ulceration and socio-economic factors associated with foot ulceration. Though literature was searched on both clinical and socio-economic predictors of foot ulceration, the main focus of this study was on socio-economic predictors of foot ulceration. Literature was directed at what is known globally and then tailored to what is known in South Africa.

In the course of this literature search, it was found that many studies have been conducted all over the world to assess the foot care practices of diabetic patients, but regrettably only very few studies were found to be conducted in this field in South Africa. Therefore, this study hopes to add to what is already known worldwide and address the South African perspective in particular.

This literature review is laid out in the following order: Global perspectives, epidemiology and prevalence of diabetes mellitus, burden of diabetes mellitus and foot ulceration, foot care practices, knowledge and awareness of foot care practices among diabetics, predictors of foot ulceration, socio-economic and racial factors, foot abnormalities in diabetics and conclusion of literature review

2.2. Global perspectives, epidemiology and prevalence of Diabetes Mellitus

The prevalence of diabetes in adults world -wide was estimated to be 4.0% in 1995 and to rise to 5.4% by the year 2025. The number of adults with diabetes in the world will rise from 135 million in 1995 to 300 million by the year 2025. The major part of this increase will occur in developing countries. This report supports earlier predictions of the epidemic nature of diabetes in the world during the first quarter of the 21st century.[6]

AF Amos et al. in 'the rising global burden of diabetes and its complications' stated that in 1997, an estimated 124 million people world-wide have diabetes and by the year 2010, the total number of people with diabetes was projected to reach 221 million people. The regions with the greatest potential increases are Asia and Africa.[7]

In England, a study largely based on self-report of diabetes estimated the prevalence for total diabetes for all persons to be 4.41% in 2001 amounting to 2,168,000.[8]

In 2005, an estimated 1.3 million Canadians aged 12 years or older (representing 4.9% of the total population of these ages) reported to the Canadian Community Health Survey (CCHS) that they had been diagnosed with diabetes.[9]

A study conducted in Cape Town South Africa to investigate the prevalence of type 2 diabetes mellitus and its risk factors in a working class peri-urban community reported a crude prevalence of type 2 DM to be 7.1% while the age adjusted prevalence of type 2 DM was found to be 10.8%.[10]

Another study found the overall prevalence of diabetes in South Africa to be 4.2% and that diabetes was more common in women than in men.[11]

2.3. Burden of diabetes mellitus and foot ulceration

Diabetes is the fifth largest cause of death by disease in the US. Diabetes also contributes to high level of morbidity. People with diabetes are at higher risk of heart disease, blindness, kidney failure, extremity amputation and other chronic conditions.[12]
A study on the economic cost of diabetes in the US in 2002 found that the direct medical and indirect expenditure attributable to diabetes in 2002 were estimated at 132 billion dollars. It concluded that this figure of 132 billion US dollars cost is likely to underestimate the true burden of diabetes because it omits intangibles such as pain and suffering and care provided by non-paid care givers and in addition, the cost estimate excludes undiagnosed cases of diabetes. It further stated that diabetes imposes a substantial cost burden to the society and in particular to those individuals with diabetes and their families.[12]

Diabetic foot abnormalities is clearly one of the most important complications of diabetes mellitus and is the leading cause of hospitalization with substantial morbidity, impairment of quality of life and engender high treatment cost.[13]

Foot ulceration is the most common reason for hospital admission of diabetic patients in the United States. Foot ulceration leads to deep infection, sepsis and lower extremity amputation.[5]

It is reasonable to predict that diabetes related lower extremity amputation (LEA) have a detrimental impact on quality of life. A study done to evaluate amputations among diabetic patients and to determine the functional levels of these patients with the sickness impact profile (SIP) found that both the physical dimension scores and the total SIP scores were significantly higher for amputees. It concluded that the findings exemplify the detrimental physical and psychosocial health status of patients with diabetic-related lower extremity amputation.[14]

A cross sectional study conducted in Basrah in Iraq with the aim of estimating the prevalence of diabetic foot abnormalities among patients with type 2 diabetes mellitus and the predictors of these abnormalities found that diabetic foot abnormalities were reported in 46.7% of patients and that most patients were having more than one foot abnormality.[13]

A prospective study conducted among veterans in the US to identify risk factors for lower extremity amputation in individuals with diabetes mellitus and to estimate the incidence of lower extremity amputation found that the age adjusted incidence among men for lower extremity amputation standardized to the 1991 US male diabetic population was 11.3/1,000 patient years.[15]

Foot pathology as a consequence of diabetes such as foot ulceration leading to lower limb amputation is common and the global burden is set to increase with the world facing an epidemic of type 2 diabetes.[10]

2.4. Foot care practices

This year 2011 and in the United Kingdom, a consensus meeting of a multi- disciplinary expert panel converged with the aim of defining and agreeing to a practical educational framework for delivery by health care professionals managing patients with diabetes particularly those at low risk of developing foot complications. The consensus identified four main health behaviours for those at low risk of developing foot complications namely; control of blood glucose levels; attendance at annual foot screening examinations; reporting of any changes in foot health immediately; and the engagement in a simple daily foot care routine. They concluded that though there is currently little evidence-based literature to support specific foot care practices, patients with diabetes at low risk of developing complications should be encouraged to undertake a basic foot care regimen to reduce their likelihood of developing complications.[16]

There is strong historical and anecdotal suggestion that certain foot care behaviours can prevent diabetes related foot pathology. However, the evidence suggest that people with diabetes often fail to employ the suggested behavioural strategies suggested in educational interventions.[17]

A formal comprehensive programme at the Gillis W. Long Hansen's Disease Centre known as the Lower Extremity Amputation Prevention programme (LEAP) consists of 5 simple activities.

1. Annual foot screening to identify people who have lost protective sensation.
2. Patient education in self- care or management.
3. Daily self inspection of foot.
4. Appropriate foot wears selection.
5. Proper management of simple foot problems such as dry skin, cutting of nails care of calluses and basic wound management.

In a number of large clinical centres where formal preventive care programme such as the above has been implemented, the rate of amputation has been reduced by as much as 85%.[18]

Preventive foot care practices such as annual foot examination by health care provider can substantially reduce the risk of lower extremity amputation. A study done in America examined the level of preventive foot care practices (reported rates of one foot examination by a physician) among patients in north Carolina with diabetes mellitus and determined the factors associated with these practices; it found that 71.6% of 1,245 adult respondents reported that they had their feet examined within the past year and that foot care was more among blacks than whites.[19]

A 6 year analysis of the effectiveness of preventive foot care has shown that those diabetic patients at high risk for foot problems who complied with a preventive programme had at least a 13 fold decrease in first foot ulcers compared to those patients who did not comply with the foot care recommendation. In the group who complied, the cumulative incidence of foot ulcer was 3.1% compared to 31.6% among those who did not.[20]

It is estimated that the risk of diabetes related foot complications can be reduced by 49 to 85% by proper preventive measures, patient education and foot self-care. However, the degree to which a person is able to perform diabetes self- care is likely to be influenced by a number of factors including personal health, access to medical care, foot care education and formal and informal support.[21]

In the context of a nationwide outcomes research program on type 2 diabetes, a study investigated physician and patient practices related to foot care and found that more than 50% of the patients had not had their feet examined by their physician and 28% reported that they had not received foot education. Foot self-examination was not performed by 33% of the patients. It concluded that a substantial proportion of type 2 diabetes patients are not offered adequate foot care even in the presence of major risk factors for lower limb amputation.[22]

A cross sectional study done to find out which self-care activities patients with diabetes perform to prevent diabetic foot syndrome (DFS) found that there are self-care deficits regarding self-control of feet, shoes and socks.[23]

Studies have shown that among persons diagnosed as having diabetes mellitus, the prevalence of foot ulcer is 4% to 10%, the annual population based incidence is 1.0% to 4.1% and life time incidence may be as high as 25%.[24]

A study conducted to gain insight in the prevalence of peripheral neuropathy (PN), foot at risk and foot ulcers in patients with diabetes mellitus at a tertiary centre reported that correct foot care practices were followed by 20.5% of study population and concluded that poor adherence to foot care practices predispose to foot problems in people with diabetes.[25]

Another research on diabetes foot self-care in a rural triethnic population in North Carolina in America also known as 'The Evaluating Long term Diabetes self-management Among Elder Rural Adults (ELDER) study- a four year population based cross sectional study found that foot care practices reported at least 6 days per week ranged from 35.6% for inspecting shoes to 79.2% for not soaking feet. The study concluded that educating patients about foot self-care may encourage routine foot care but that those dependent on either formal or informal support perform foot care less frequently than those who perform it independently.[26]

Yet another study in America on improving preventive foot care for diabetic patients participating in group education observed that more than 50% of respondents reported inappropriate self-care behaviours example walking bare foot and soaking their feet.[27]

A study conducted in the United States of America on racial/ethnic differences in multiple self-care behaviour in adults with diabetes, concluded that few patients engage in multiple self-care behaviours at recommended levels and there are significant racial/ethnic differences in physical activities, dietary and foot care behaviours among adult with diabetes. The study revealed that the proportion of patients with diabetes who performed self-foot examination at least once daily ranged from 66% in Hispanics to 82% in others. Blacks were 1-4 times more likely to do a daily foot examination compared to whites.[28]

Boulton et al have noted that people at greatest risk of ulceration can easily be identified by careful clinical examination of the feet. Education and frequent follow up is indicated for these patients.[29]

Two large population based studies have found that only 20% of participants with diabetes inspected their feet daily and 23% to 25% never inspected their feet.[30]

In India, another study has failed to demonstrate that foot examinations decrease the risk of amputation in Pima Indians with type 2 diabetes but how ever observed that foot examinations detect high risk conditions for which specific interventions have been shown to be effective in reducing amputation risk.[31]

A study conducted in Nigeria about foot care practices among Nigerian diabetic patients presenting with foot gangrene found that the male: female ratio of diabetics with foot gangrene was 2:1, of 102 diabetic emergencies that presented during the period of the study, 33% had been exposed to any form of foot care education while 63% of patients practiced no significant foot care.[32]

In South Africa, only one study was found to have been done in this area in the Transkei-a rural region in Eastern Cape to explore and describe the experiences and

foot care practices of diabetic patients who live in the rural area of Transkei. It revealed predominantly negative experiences in the internal and external environments of the persons with diabetes as well as poor foot care knowledge
and practices.[33.]

2.5. Knowledge and awareness of foot care practices among diabetics

A study has found that one of the reasons for the poor outcome of foot complications in developing countries is the lack of patient education. Due to the multifactorial pathology of diabetic foot ulceration, the person with diabetes should receive health education which is tailored to the individual risk status, promote self-care and address misconceptions. The study concluded that a targeted foot education programme can allow a fragile diabetes care system to be better utilized. It therefore recommended that providers of foot care should participate in ongoing professional educational development to obtain skill to assist people in adopting positive self-care behaviour. [34]

It has been found in a study on improving preventive foot care for diabetic patients participating in a group education that many diabetic patients were not offered adequate foot specific information during group lectures. It suggested that combining care giver and patient education in foot care practices is important.[35]

A study conducted in America to examine differences in self- reported diabetes foot care education, self-management behaviours and barriers to good foot care among veterans with diabetes by race and ethnicity reported that the majority of respondents felt that they did not know enough about foot self-care. It found large gaps between self-reported knowledge and actual foot care practices.[36]

Also, a recent high quality review concluded that education appears to have a short term positive impact on foot care behaviours and may reduce the risk of ulceration and amputation.[37]

Singh et al noted that educating patients about proper foot care and periodic foot examination are effective intervention to prevent ulceration. They also noted that other effective intervention include smoking cessation, intensive podiatric care, optimal blood glucose control and certain types of prophylactic foot surgery.[24]

In Lahore Pakistan, Hasnain S. Sheikh found out that about 29.3% had good knowledge, while 40% had satisfactory knowledge and 30.7% had poor knowledge about foot care. Whereas 14% of respondents had good practices for foot care, 54% had satisfactory practices and 32% had poor practices. The study also noted that whereas education of respondents had significant statistical association with knowledge and practices regarding foot care, sex and income per capita had shown no significant statistical association with knowledge. The study therefore concluded that about one third of diabetic patients had poor knowledge about foot care and only very few patients had goo foot care practices.[38]

Chandalia et al reported that in a population of diabetics, 44.7% of patients had not received previous foot care education, 0.6% walked bare foot out door and 45% walked bare foot indoors 4.7% gave history of foot ulcer. 2 out of 14 had received foot care education and 6 gave history of tobacco use. They concluded that poor knowledge of foot care and poor foot wear practices were important risk factors for foot problems in diabetes.[39.]

Another study in America found that educational intervention improved patient's knowledge, confidence and reported behaviours and concluded that a brief individualized educational intervention about standard foot care topics improves foot care knowledge and self-efficacy as well as reported self-care practices.[40]

In Thailand, Sriussadaporn et al, in a study of factors associated with diabetic foot ulceration reported that diabetic patients with foot ulcers had significantly lower diabetic knowledge and foot care practice scores among others.[41]

In South Africa, a study conducted in Kwa- Zulu Natal assessing the level of knowledge of diabetes mellitus among diabetic patients found that only 53% of the study population was knowledgeable on basic foot hygiene.[42]

2.6. Predictors of foot ulceration

Although many studies have been done on the clinical predictors of foot ulceration in diabetes mellitus, no study has been found to be done in South Africa on the Socio-economic predictors of foot ulceration among diabetes.

Certain socio-economic factors including smoking and alcohol consumption may predict outcome of feet care.

Cigarette smoking has been significantly associated with increased risk of foot ulceration. Vijay Viswanathan in a study in India reported that smoking increases risk of foot ulceration by reducing blood circulation in the legs and reducing sensation in the feet.[43]

Mc Gulliford et al noted that compared with non-smokers, smokers had lower socio-economic status and worse health status but were less likely to be referred to the hospital. The study stated that people with diabetes who smoke can be regarded as vulnerable group who need more intensive support and treatment.[44]

A study conducted in Iran showed that 56% of respondents are not aware of the effect of smoking on circulation, 60% failed to inspect their feet and 42% did not know how to trim their toe nails. The result highlights patients' inadequate knowledge of self care about their foot.[45]

The Seattle diabetic foot study- a prospective study of risk factors for diabetic foot ulcers concluded that certain foot deformities, poor vision, reduced skin oxygenation and foot perfusion,, autonomic neuropathy independently influence foot ulcer risk thereby providing support for a multifactorial aetiology for diabetic foot ulceration. It however found no association between foot ulcers and race, smoking status and diabetes education.[15]

One hundred and eighty seven (187) type 2 diabetic patients without a history of foot ulceration were followed for a mean period of 3.6 years to investigate the incidence of

foot ulceration in a diabetic cohort and to analyse risk factors for foot ulceration by multivariate means. In the multivariate logistic regression, significant predictors for foot ulceration were found to be elevated vibration perceptions thresh hold (VPT), increased plantar pressure and daily alcohol intake. They reported this to be the first prospective study to demonstrate plantar pressure and daily alcohol intake as predictors of foot ulceration among patients without previous ulcerations.[6]

A prospective study on cigarette smoking and the incidence of diabetes mellitus among US male physicians reported that smokers had a dose-dependent increased risk of developing type 2 diabetes mellitus and concluded that cigarette smoking is an independent and modifiable determinant of type 2 diabetes mellitus.[46]

Another prospective study conducted among veterans in the US to identify risk factors for lower extremity amputation in individuals with diabetes mellitus and to estimate the incidence of LEA, found that peripheral vascular disease (PVD), former LEA, insensitivity to monofilament testing, lower extremity ulcers were found to be associated with an increased ipsilateral risk of amputation.[15]

A study has also found out that the presence of foot complication was correlated with cigarette smoking, insulin treatment, low levels of school education and presence of other diabetic complications.[47]

Independent baseline predictors of non-healing wounds in patients with diabetic foot ulcers have been found in the ‘Eurodiale’ study to be old age, male sex, and heart failure, inability to stand or walk without help, large ulcers and Peripheral Arterial Disease.[48]

A study by Al- Maskani and El-Sadiq has shown that male gender and poor level of education among other clinical conditions were significant risk factors for foot complications.[49]

A study on alcohol consumption and adherence to diabetes self-care reported that about 50.8% of adults reported current alcohol consumption. It observed a gradient of

increasing risk of poor adherence to diabetes self-care behaviour's with increasing alcohol consumption. Former drinkers had the greatest compliance with each self-care behaviour except for current smoking. It concluded that alcohol consumption is a marker for poorer adherence to diabetic self-care behaviours.[50]

2.7. Socio-economic and racial factors

A cross sectional observational study done in Michigan, US examined social support and its relationship to diabetes specific quality of life and self-care behaviours in African Americans found that satisfaction with support was a predictor of improved diabetes-specific quality of life and negative support behavior was a predictor for not taking medication as recommended. The study concluded that social support plays a role in diabetes specific quality of life and self-management practices.[51]

Another study examined the association between socio-economic positions and extra time patients spend on foot care, shopping, cooking and exercise due to diabetes found out that extra time spent on self-care was greater for socio-economically disadvantaged patient than for advantaged patients.[52]

Byron M Perrin et al in their study of association between foot care self efficacy and actual foot care behaviour noted that there is little association between foot care self efficacy beliefs and actual foot care behaviour.[53]

Family support has been identified as an important factor in encouraging good foot care practices. Mayfield et al stated that patients along with their family members or care givers/takers should understand the importance of daily foot examination and proper foot care.[54]

Social support plays a role in diabetes specific quality of life and self-management practices. Some studies have shown that people equipped with self-management skills, have increased knowledge, and improved self-management of blood glucose, improved dietary habits and better glycaemic control.[55]

Age and physical condition can be a factor as a cohort found that 20% of respondents seldom checked their feet daily for sores or irritations, among this group, 60% feel that it was unimportant and 9% reported they were limited by poor vision or physical problem. They suggested that strategies are needed to improve the delivery of foot care services to older persons with diabetes.[56]

A racial association was described in a study in America which noted that Blacks and Hispanics engaged in preventive care more frequently than whites. It stated that whites were less likely to have seen a doctor in the previous year, less likely to have had a foot examination and more likely to smoke. Also persons of lower social class were at greatest risk of not receiving preventive care regardless of race or ethnicity.[57]

Another study conducted in America on racial/ ethnic differences in multiple self-care behavior in adults with diabetes, concluded that few patients engage in multiple self-care behaviours at recommended levels and there are significant racial/ethnic differences in physical activities, dietry and foot care behaviours among adults with diabetes. The study revealed that the proportion of patients with diabetes who performed self foot examination at least once daily ranged from 66% in Hispanics to 82% in others. Blacks were 1-4 times more likely to do a daily foot examination compared to whites.[28]

A study done using the Framingham heart study data found that hypertension and co-existent vascular disease were particularly common in elderly diabetic patients.[58]

The diabetes attitude, wishes and needs study demonstrated that patients who are more satisfied with their relationship with their providers have better outcomes.[59]

2.8. Foot abnormalities in diabetics

Diabetic patients are prone to numerous foot abnormalities and these abnormalities predispose them to developing foot ulcers and having poor foot care outcomes.

A study in Basrah Iraq reported that foot abnormalities seen in patients with diabetes included prominent metatarsal head which was reported in 36.2% of patients; hammer toes 10.9%; claw toes 3.8%; amputees 2.1%; skin changes including dryness of skin 17%; callosities 14.2%; Tinea pedis 13.7%; foot ulcers 13.7% and nail changes 7.1%. The study concluded that variables that predict foot abnormality were higher age, male sex, less school achievements, smoking history, low social class, longer duration of diabetes, insulin use, heart failure and proteinuria.[13]

A study of diabetic foot disease and foot care in Trinidad found that in those with previous foot ulceration, 47% went barefoot in the house, 44% went barefoot outside. Help was provided by a friend or relative to 28% and by a nurse or chiropodist to less than 1%. It concluded that diabetic foot disease is common but care practices predispose to foot injury.[60]

2.9. Conclusion of literature review

In conclusion, the literature suggests that the prevalence of diabetes is increasing to an epidemic proportion and the burden of the disease including foot ulceration and lower extremity amputation is much and will be felt more in developing countries. Education of patients about foot care plays an important role in foot self-care practices. People with diabetes mellitus have for the most part poor foot self-care practices, a generally low knowledge and awareness of foot care practices. Very few studies have been conducted into investigating the awareness and performance of appropriate foot care practices among diabetes and no study was found to have been conducted in this field in the West Rand district of Johannesburg, South Africa. It is hoped that the current study will bridge this knowledge gap in the literature.

CHAPTER 3

METHODS

3.1. Introduction

This chapter presents the methodology and study design in detail. It also describes the study site, sampling method, data collection and analysis and ethical considerations in this study.

3.2. Aim of study

The aim of the study was to determine the awareness and performance of appropriate foot self-care practices among adult diabetics attending Dr. Yusuf Dadoo Hospital in Gauteng Province, South Africa.

3.3. Objectives

The specific objectives of this study were to:

1. Determine the demographic profile and associated co-morbidities of participants.
2. Determine the various foot self-care practices among these participants.
3. Describe common foot problems and abnormalities observed in the participants.
4. Determine the level of awareness of foot self-care practices among the participants.

3.4. Study design

This was a descriptive cross sectional study;

In a cross sectional study, a sample of the study population is investigated and information is collected at a point in time[61.] This study design is appropriate for achieving the aim of this study

3.5. Site of study

This study was conducted at Dr. Yusuf Dadoo Hospital.

Dr. Yusuf Dadoo Hospital is a level one district hospital with approved acute bed of 175. The hospital is situated in Krugersdorp in Mogale City in the West Rand Region, west of Johannesburg in Gauteng Province. West Rand has a catchment's population of

716,469 and Mogale city alone accounts for 309,276 and on the average, about 15,000 patients are seen per month at the hospital.

As a level one hospital, it is fed by the surrounding clinics in the catchments areas. It runs a gateway (poly) clinic, HIV clinic also called Phedisong clinic, Out-Patient department and wards for in-patients. The wards are male ward, female ward, maternity ward, surgical and gynaecology wards are together, paediatric ward, post-natal ward and two TB wards The Diabetic patients are mainly seen in the Out-Patient department. The patient population is of mixed race, comprising mostly of blacks and whites and a few coloured and Indian patients. These patients have different Socio-economic backgrounds and an average of 10 diabetic patients per day or 50 per week is seen at the Out-Patient department.

3.6. Study Population

Adult diabetic patients from 30 years of age and above attending the out-patient department of Dr. Yusuf Dadoo hospital formed the study population. A minimum age of 30 years was selected to improve the prevalence of foot pathologies, since foot pathologies are more likely to occur with increasing duration after being diagnosed diabetic.

3.7. Sampling method

All consecutive cases of diabetic patients from 30 years and above attending Dr. Yusuf Dadoo Hospital were consecutively recruited until the sample size was achieved.

3.8. Sample size

Using 95% confidence level, Prevalence of 8% (0.08), population size of 300 and desired precision of 5% (0.05), a sample size of 83 was calculated using the SSCPS version. This sample size was adjusted to 120 to accommodate new cases of diabetes and to make the result more generalisable and compensate for missing data.

3.9. Inclusion criteria: Consenting adult patients from the age of 30 years and above presenting at the out-patient department of Dr. Yusuf Dadoo Hospital with the diagnosis of diabetes were included in the study sample

3.10. Exclusion criteria: Patients under the age of 30 years with diagnosis of diabetes were excluded. Also, patients who did not give informed consent, and those in serious clinical states who could not consent or communicate were excluded from the study sample.

3.11. Measuring instrument

The measuring instrument was a questionnaire which was designed for data collection. The questions on the questionnaire were adapted from previous study in which the questionnaire has been validated. Questions on diabetic self-care were adapted from the Summary of Diabetes Self-Care Activities.[62.]

The Summary of Diabetic Self Care Activities assesses the level of patients' self -care for diet, exercise, blood sugar testing, medications and foot care during the previous week. This instrument has been shown to show good internal and test-retest reliability and can be generalized to patient population with diabetes. The foot care component was particularly used in the current questionnaire.

The questionnaire collected data on:

1. Participants' demographic characteristics.
2. Socio- economic characteristics
3. Knowledge/awareness of foot care
4. Foot self-care practices.
5. The researcher used the opportunity to examine the feet of consenting participants in order to describe foot abnormalities/lesions observed during the study.

3.12. Data collection

Diabetic patients with other patients usually assemble in the waiting room of the reception hall of the Out-Patient Department of Dr. Yusuf Dadoo Hospital where they wait for their turn to be seen by the doctors.

The researcher went to this waiting room on working days to identify those who are diagnosed with diabetes and who are 30 years and above. Thereafter, a letter of introduction explaining who the researcher was, and the purpose of the study was handed out to eligible patients. Oral explanation was offered to them by way of

addressing them in a group by the researcher stating the aims, objectives, motivations and the methodology and they were encouraged to clarify any area they did not understand with the researcher. They were given the consent form to sign after explanation and making sure they understood the content of the consent form. Thereafter, the questionnaire was handed out by the researcher to the consenting patients to complete. An interpreter was trained to assist with the local language in difficult cases. Those who are literate completed the questionnaire by themselves whereas those who are illiterate were assisted by trained interpreters who spoke the local language and English language.

The researcher used the opportunity to examine the feet of consenting participants for foot problems and recorded the findings on data collection sheet.

3.13. Pilot study

A pilot study was conducted before the beginning of the proper study. This helped in validating the questionnaire and also in identifying some problems that might arise in the course of the study. Seven questionnaires were piloted but did not form part of the study since they were done outside the main research period.

3.14. Data analysis

The data from the respondents was captured on the personal computer of the researcher using Epi-info 3.5.1 developed by the Centre for Disease Control Atlanta Georgia. The data was then imported into STATA (Statistical analysis software version 10.0) and analysis was done using STATA 10.0 with the help of a bio-statistician. .

Descriptive statistics for categorical variables (proportions and percentages) and continuous variables (mean with standard deviation, and frequencies) are reported

Results were reported with their 95% confidence interval. P values were reported as statistically significant if <0.05 or 5%.

3.15. Ethical consideration

The participants recruited for this study were well informed of the nature and methodology of the study. The names of the patients were not mentioned in the study and confidentiality was strictly maintained. Participants were required to give an informed consent in writing. A written consent explained to and understood by the patient was signed by participants before recruiting them into the study. Those who refused to sign the consent form were not included. Introduction letter to the participants from the researcher inviting them to participate and stating the reasons for the research was issued to participants. Assurance of confidentiality and anonymity was stated in this letter. The researcher also made these assurances verbally while addressing the participants.

Permission and approval for the study were applied and obtained from the Human Research Ethics Committee (HREC) of the University of Witwatersrand with Protocol number **M090203**. A copy of the approval letter from HREC is attached as an appendix at the end of the report

Permission to conduct the study at Dr. Yusuf Dadoo was applied for and obtained from the Gauteng Department of Health Provincial head office in Johannesburg as required. A copy of the approval is also attached as an appendix at the end of the report.

CHAPTER 4

RESULTS

This chapter presents the findings of the study. Tables and charts were used to present results were ever necessary. The result is laid out in the following order; Response rate, demographic profile, knowledge and awareness of foot care, foot care practices, co-morbidities, predictors of foot self-care outcomes, comparison of foot care practices by foot sore status and foot problems observed in patients.

4.1. Response rate

The response rate was 100% as consecutive respondents were recruited until sample size was reached and they did not have problems participating in the study.

4.2. Demographic Profile of respondents.

4.2.1. Age distribution.

Table 1

Variable	**N= 120 Frequency**
Age in years	(mean= 56.3, std =
Age group	
30-49	37 (30.8)
50-69	64 (53.3)
70 or more	19 (15.8)

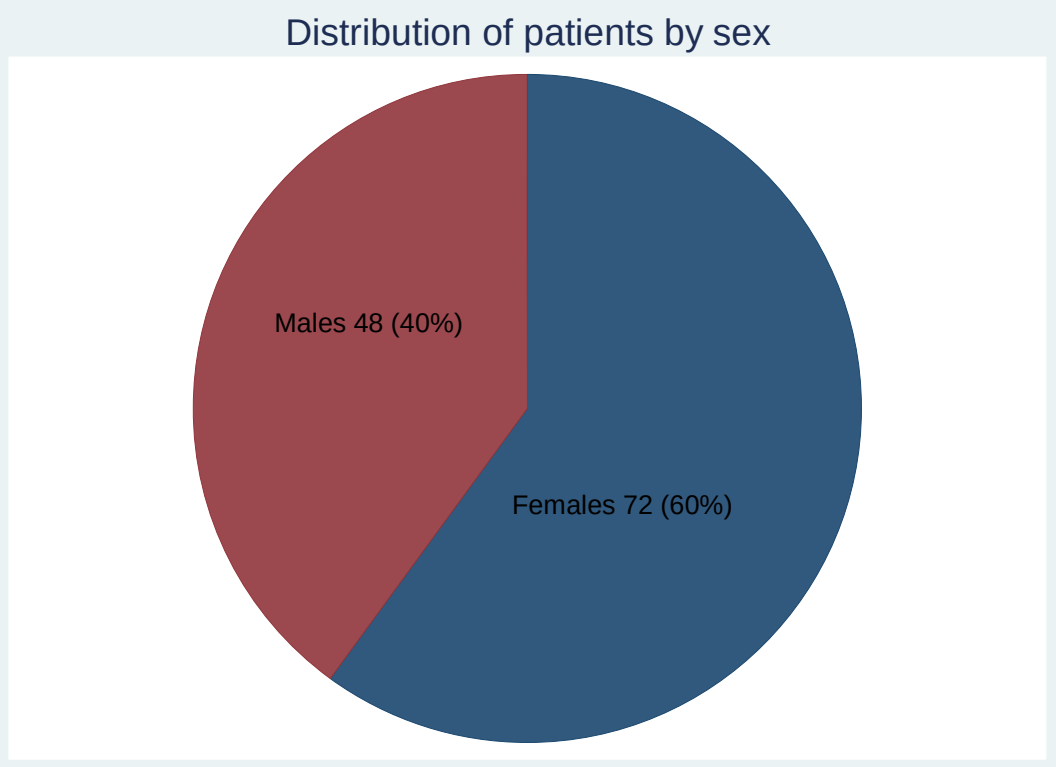
The table above shows the age distribution of respondents. The mean age is 56.3 years. The majority of the patients were of the age group of 50-69 years representing 53.3% of the total.

37 of them representing 30.8% were in the age group of 30-49 years while

19 representing 15.8% were 70 years and above.

4.2.2. Sex distribution

Figure 1



The figure above shows the distribution of the respondents by sex. The majority of the patients were females n=72 representing 60% of the sample while 40% were males n=48.

4.2.3. Marital status

Table 2

Marital Status	**N=120 Frequency (%)**
Divorced	15 (12.5)
Married	51 (42.5)
Separated	1 (0.8)
Single	32 (26.7)
Widowed	21 (17.5)

Table above shows the marital status of the respondents. The majority of the patients were married (42.5%), 26.7% were single, 17.5% were widowed, 12.5% were divorced and 0.8% were separated.

4.2.4. Distribution by employment

Figure 2

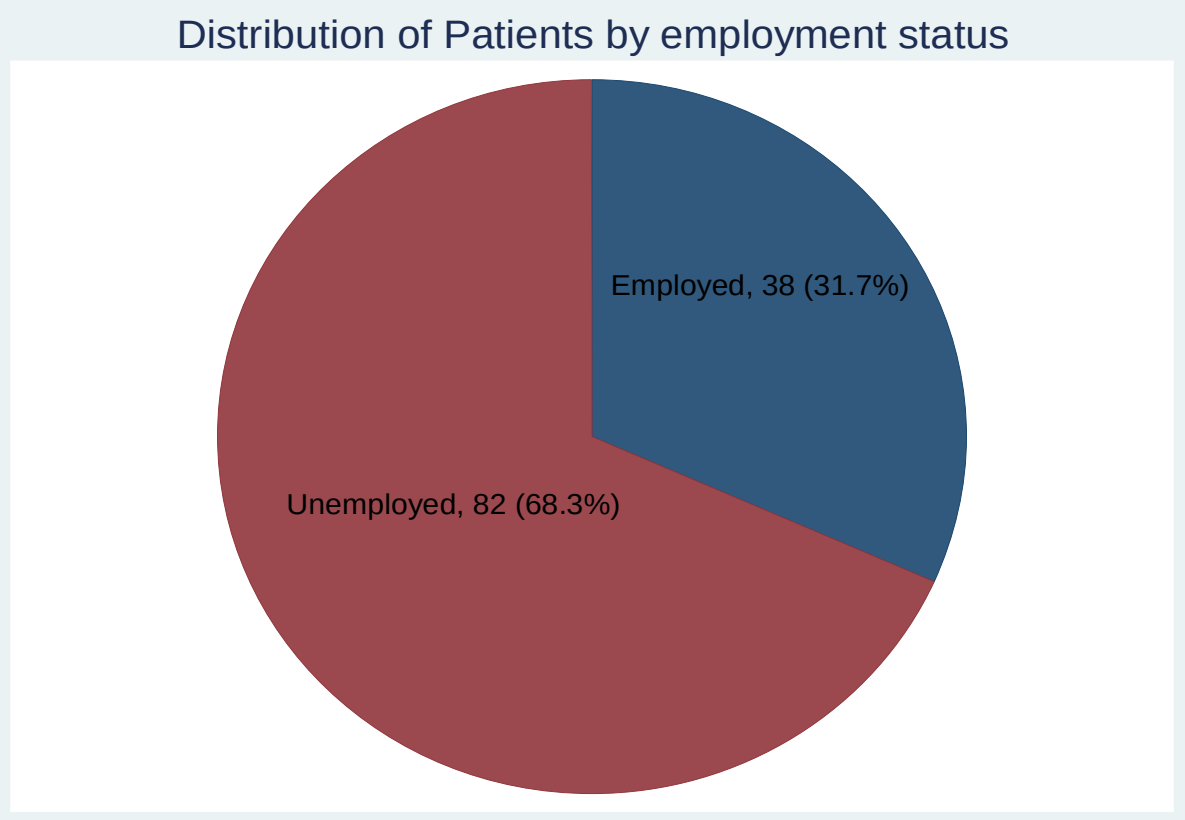


Figure above shows distribution of the respondents by employment. The majority of the respondents were unemployed accounting for 68.3%, n=82 whereas 31.7%, n=38 were unemployed.

4.2.5. Distribution of respondents by education status

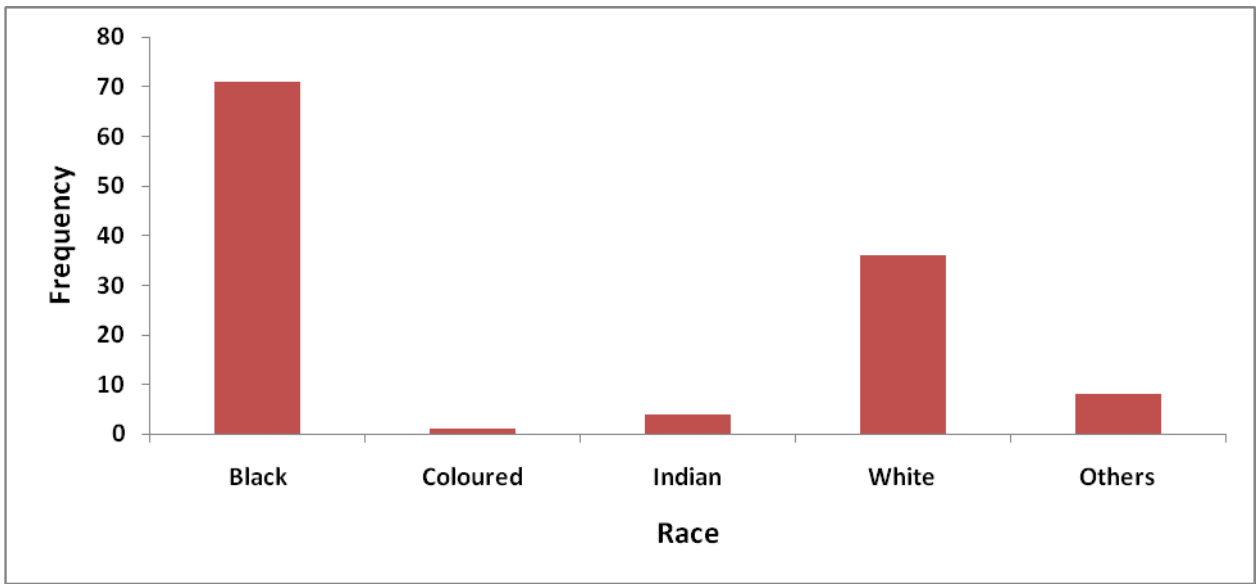
Table 3

Education Status	**N=120 Frequency (%)**
None	15 (12.5)
Less than standard 8	77 (64.2)
Completed secondary (matric)	22 (18.3)
Diploma	4 (4.2)
University education	1 (0.8)

A significant number of the respondents (12.5%) had no formal education. Majority of them about 77 representing 64.2% had less than standard 8 education. Whereas 18.3% of them completed secondary/matric education, 4.2% had diploma and only one of them representing 0.8% had university education.

4.2.6. Distribution of respondents by race

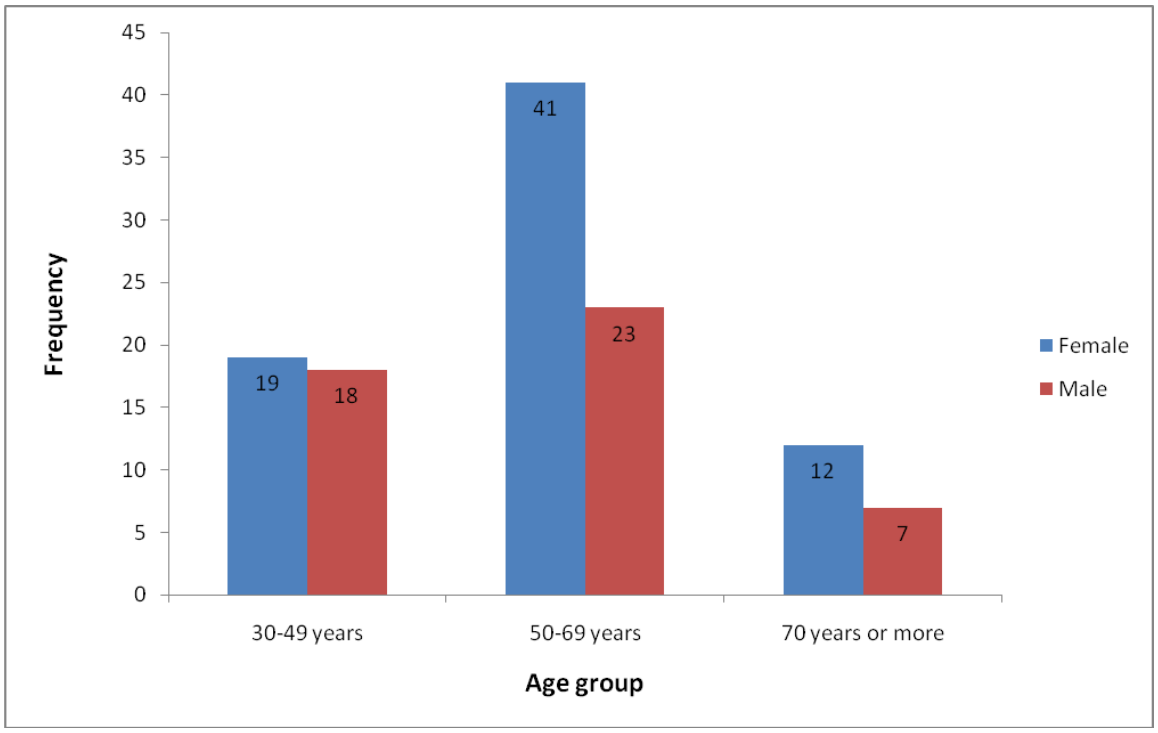
Figure 3



The respondents were mainly blacks. Blacks constituted about 59.2%, Whites constituted about 30.0% of the patients, Indians 3.3% and coloured people formed 0.8% of the sample. Those who could not be classified into one of these major groups formed the group known as others and they constituted 6.7% of the sample.

4.2.7: Distribution of respondents by age group and sex (n=120)

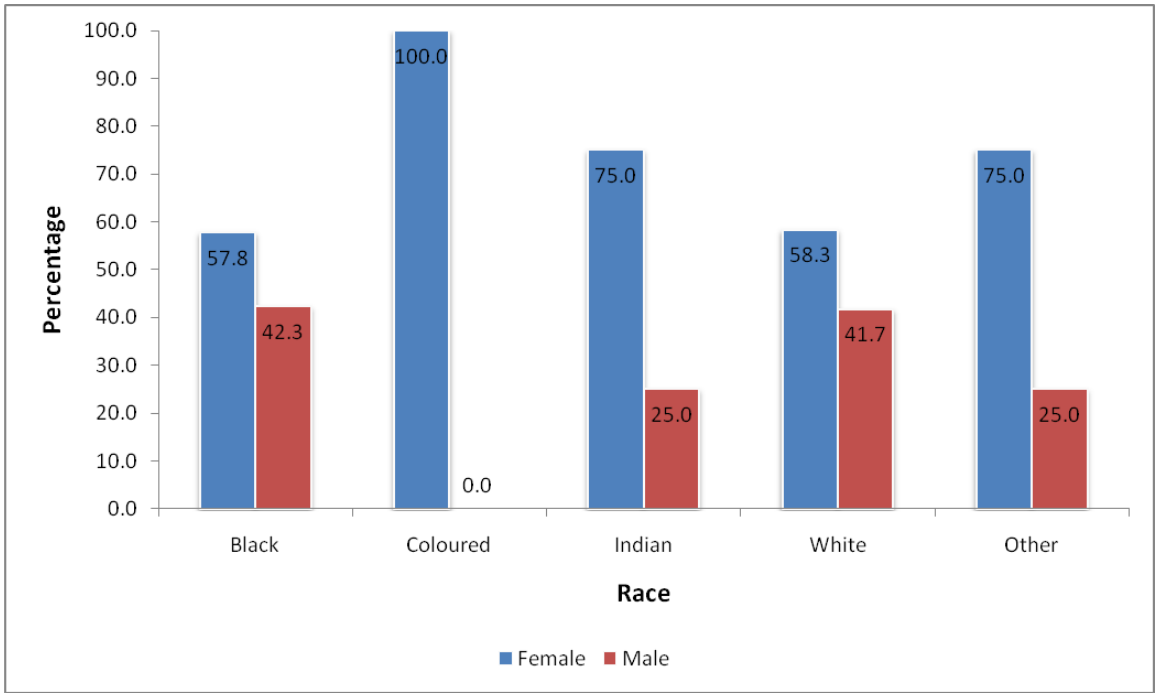
Figure 4



The figure above shows that in all the age groups, females outnumbered males.

4.2.8. Distribution by race and sex.

Figure 5

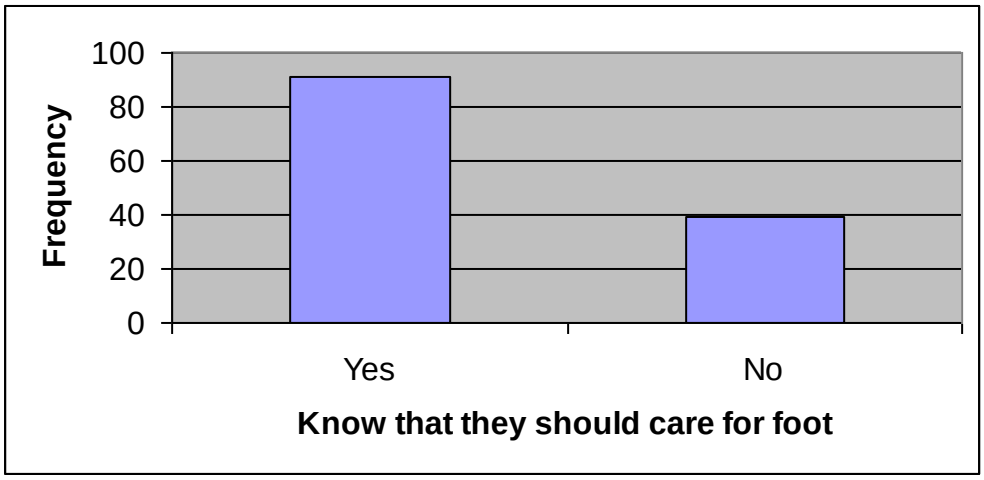


Above figure shows that females were more in number than males irrespective of the race.

4.3. Self-reported knowledge/awareness of foot care

Respondents were asked if they knew that they should care for their foot personally, a large number of them (75.8%) said they had no knowledge while 24.2% admitted having knowledge of foot care.

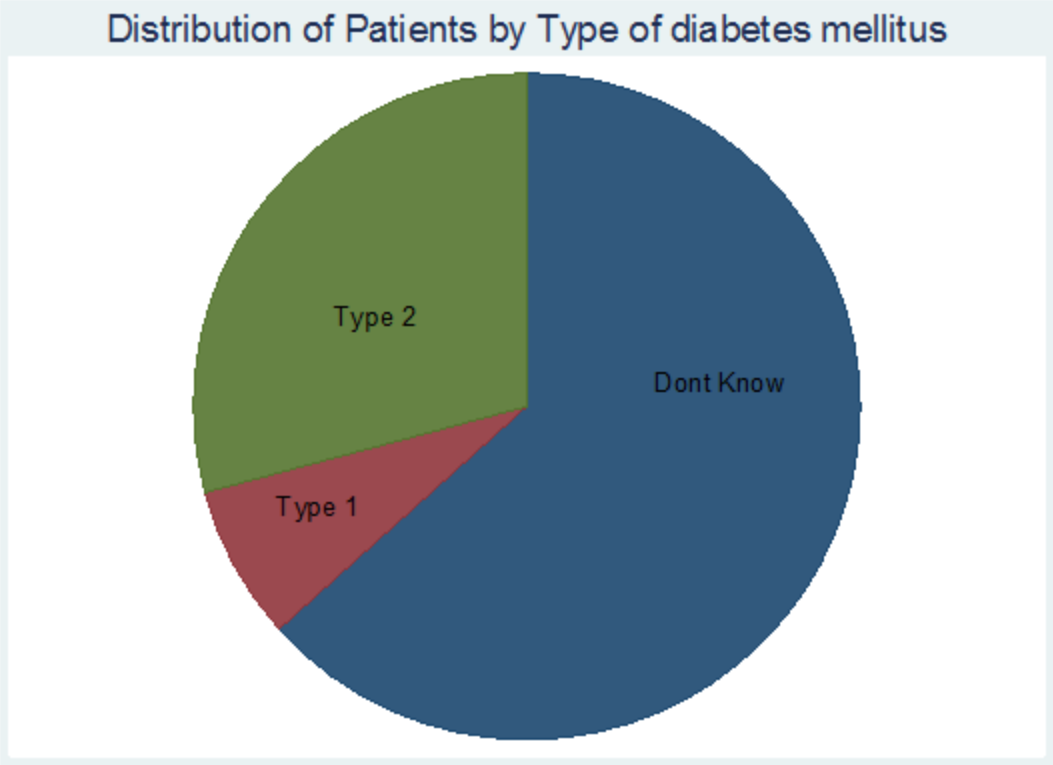
Figure 6: Self-reported knowledge/awareness of foot care



4.3.1. Distribution of respondents by their knowledge of type of diabetes

When respondents were asked if they knew the type of diabetes they were suffering from, majority of them (63.3%) did not know. 29.2% knew they have type 2 Diabetes compared to 7.5% who knew they have type1 Diabetes. This is based on self report.

Figure 7



4.4. Foot care practices

Respondents were asked to state on how many of the last seven days they performed certain foot care practices. Activities that were performed in none or zero days was regarded as bad foot care practice, 1-4 days was regarded as poor practice while 5-7 days indicates good practice. However, for soaking of feet in water, a reverse score was used where none or zero was a good foot care practice whereas 5-7 days was regarded as bad practice and 1-4 days as poor practice.[62]

4.4.1. Personal foot care

Table 4

Variable	N= 120 Frequency (%)
Have you ever cared for your foot personally?	
Yes	86 (71.7)
No	34 (28.3)

Table above shows that majority of the patients (71.7%) had cared for their foot personally while others (28.3%) had never cared for their feet.

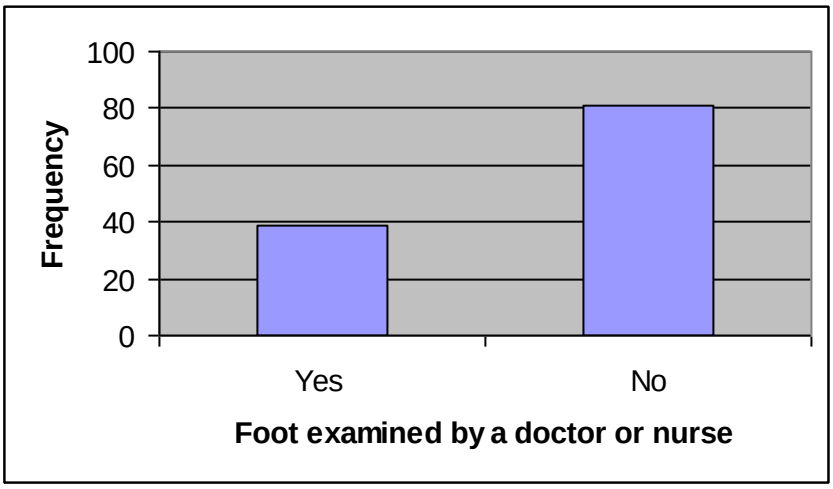
4.4.2. Feet examination by health-care practitioner

Table 5.

Have you ever had your feet examined by your doctor or nurse?	N=120 Frequency (%)
Yes	39 (37.5)
No	81 (67.5)

Table above shows that the majority of the patients representing 67.5% have never had their feet examined by either a doctor or a nurse while only 37.5% of the patients has had their feet examined by doctor or a nurse.

Figure 8: Foot examination by health care practitioner



4.4.3. Feet self-inspection

Table 6

On how many of the last 7 days did you inspect your feet?	N=120 Frequency (%)
None	37 (30.8)
1-4 days	26 (21.7)
5-7 days	57 (47.5)

Respondents were asked to state on how many of the last seven days they inspected their feet by themselves as part of foot self-care practices. Whereas most of them (47.5%) had done this for 5-7 days in the week, 30.8% had not inspected their feet at and 21.7% had inspected their feet for 1-4 days in the last week.

4.4.4. Washing of feet

Table 7

On how many of the last 7 days did you wash your feet?	N=120 Frequency (%)
None	2 (1.7)
1-4 days	14 (11.7)
5-7 days	104(86.7)

Table 7 shows that the majority of the respondents constituting 86.7% washed their feet almost daily. 11.7% of them washed their feet in only 1-4 days of the last week. A small number of the patients representing 1.7% had not washed their feet at all in the last seven days.

4.4.5. Use of talcum powder

Table 8

On how many of the last 7 days did you use talcum powder to keep feet dry?	N=120 Frequency (%)
None	111 (92.5)
1-4 days	4 (3.3)
5-7 days	5 (4.2)

The above table shows the respondents' response to the use of talcum powder to keep their feet dry. Regarding the use of talcum powder to keep feet dry, a majority of them about 92.5% had not used talcum powder to keep their feet dry. Only a very few representing 4.2% had used talcum powder in 5-7 days of the week. The remaining 3.3% did for 1-4 days in the previous week.

4.4.6. Shoe self-inspection

Table 9

On how many of the last 7 days did you inspect your shoes before wearing them?	N=120 Frequency (%)
None	55 (45.8)
1-4 days	13 (10.8)
5-7 days	52 (43.3)

45.8% of the respondents had not inspected their shoes before wearing them while 43.3% did inspect their shoes between 5-7 days before wearing them. The remaining 10.8% had inspected their shoes only between 1-4 days in the previous week.

44.7. Soaking of feet in water

Table 10

On how many of the last 7 days did you soak your feet in water?	N=120 Frequency (%)
None	64 (53.3)
1-4 days	29 (24.2)
5-7 days	27 (22.5)

On soaking of feet in water, majority of the respondents representing 53.3% did not soak their feet in water in the last seven days while 24.2% and 22.5% did between 1-4 days and 5-7 days respectively.

4.4.8. Walking bare foot

Table 11

Do you walk bare footed?	N=120 Frequency (%)
Yes	30 (25.0)
No	90 (75.0)

25.0% of the respondents reported walking on bare foot both in home and outside compared to 75% who did not.

4.4.9. Use of a podiatrist

Table 12

Have you ever made use of a foot care specialist (podiatrist)?	N=120 Frequency (%)
Yes	7 (5.8)
No	113 (94.2)

The above table shows the use of a podiatrist by the respondents. A large number of them (94.2%) had not made use of a podiatrist or a foot care specialist while 5.8% said they had made use of a podiatrist.

4.4.10. Foot sore/ulcer status

Table 13

Have you ever had a foot sore?	N=120 Frequency (%)
Yes	41 (34.2)
No	79 (65.8)

Above table shows that 34.2% of respondents had developed foot sore/ulcer whereas 65.8% had not.

4.4.11. Co-morbidity

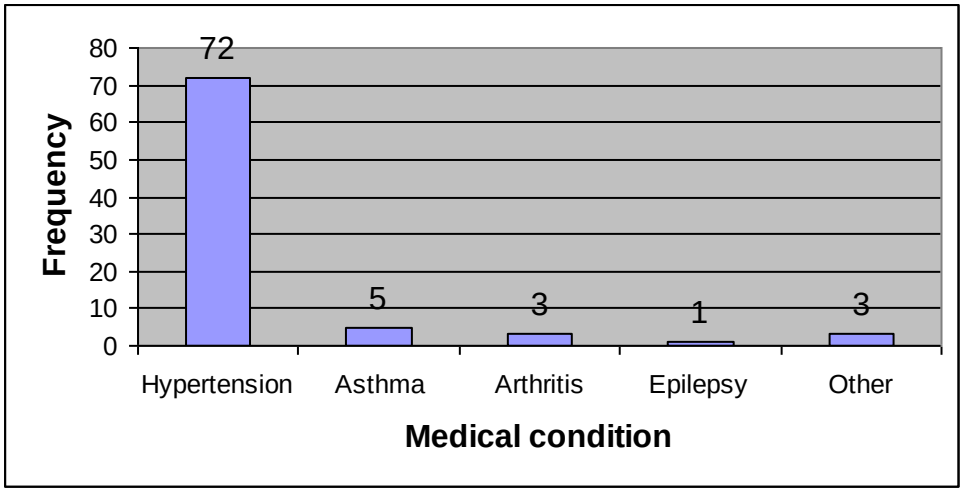
Table 14

Do you have other medical conditions?	N=120 Frequency (%)
Yes	84 (70.0)
No	36 (30.0)

The table above shows that 70% of the respondents had other medical conditions or co-morbidity compared to 30% who did not have co-morbidities.

4.4.12. Distribution of other co-existing medical conditions (co-morbidities)

Figure 9



Hypertension was the most frequently associated medical condition or co-morbidity found in the respondents followed by asthma. The least occurring was epilepsy.

4.5. Foot problems observed in respondents

Table 15

Foot condition	n	%
No foot problem	43	36.8
Athlete's foot	19	16.2
Corns	16	13.7
Thickened toe nail	12	10.3
Hammer toe	7	6.0
Ulcers	6	5.1
Calluses	5	4.3
Ingrown toe nails	5	4.3
Dry, cracked foot skin	3	2.6
Amputation	1	0.9

The table above shows the distribution of foot problems observed by the researcher in the respondents.

Majority of the patients about 36.8% had no foot abnormalities. The commonest foot problem observed in this study was Athlete’s foot with 16.2%, followed by corns with 13.7%, thickened toe nails 10.3%, hammer toe 6.0%, ulcers 5.1%, calluses 4.3%, and ingrown toe nails 4.3%, dry, cracked skin 2.6% and amputation 0.9%.

CHAPTER 5

DISCUSSION

This chapter discusses the important findings of this study and compares it to the existing literature to see if it is in line with or at variance with existing literature. It also discusses the implications of the findings to the patient, the clinician, the health care system and the academia.

5.1 Socio-demographic profile

About 60% of the patients studied were females while males formed 40% of the patients. This shows that there is a greater preponderance of females in this study and is consistent with other studies[5] and also in line with studies which have shown that diabetes is more common in females than in males.[11.] This finding also shows that females may be more likely to seek health care services compared to their male counterparts. This has been corroborated by another study which found differences in the use of health care services between males and females in which females were more likely to use health care services, to have a family history of diabetes, previous diabetes education and higher expectations of benefits.[5,63,64.]

The majority of the respondents were in the age range of 50 to 60 years with a mean age of 56.3 years. Younger people with age range of 30 to 49 were in minority forming a percentage of about 15.8. This study excluded patients under the age of 30 years in order to increase catchment of foot pathology. This may explain the difference observed in the age groupings. Higher age has been found to be a variable the predicts foot abnormality.[13]

More than 59% of the patients studied were blacks and about 30% were whites. There were only very few Indians and only one coloured person. Others who could not be classified into the above were regarded as others and they formed 6.7%. The greater preponderance of blacks followed by whites is in line with the demography of west rand-Krugersdorp area. Blacks may be more in population in the west rand district and the whites may be more likely to use private medical services than the others. Blacks are

more likely to utilize the public health systems more than the whites who are more likely to utilize the private health care sector. Also studies have found that Blacks and Hispanics engaged in preventive care more frequently than whites.[58] Blacks were also 1-4 times more likely to do a daily foot examination than the whites.[59,19]

Many of the respondents were married (42.5%) and had family support while few were divorced, separated or widowed.

Majority of them (64.2%) had less than standard 8 education and hence did not complete matric while a significant number of them (12.5%) had no form of formal education. Only about 18% completed matric and a few had diploma with only one person having attended university. This may have influenced the level of foot care knowledge which was found to be very low in this study. Less school achievement has been associated with increased foot abnormality.[13] De Berardis G. et al. found that the presence of foot complication was correlated with low levels of school education.[22]

A great number of the respondents were mainly unemployed. This could be because of high unemployment rate in the country or due to the preponderance of old people who may not be employed but receive pension. It could also be that those who were employed had more access to medical cover and were therefore able to access private medical care.

5.2 Knowledge of foot care

A large number of the respondents representing more than 75% of the patients had no knowledge of foot care when asked. This may be due to the low levels of education and high levels of unemployment among respondents. This can as well be due to the failure of health care professionals to opportunistically educate the patients about diabetic self-care including proper foot self-care. This finding is in line with studies done in South Africa where participants were found to have poor foot care knowledge.[33] Studies in other parts of the world had equally demonstrated a lack of adequate foot care knowledge among participants.[36,43,39] This implies that foot care education is lacking probably because health care professionals are failing to educate patients on foot self-care. Studies have found that foot care education both for the care giver and the

patients is essential in preventing foot ulceration.[32,34,35] Health care providers are also required to update their knowledge of foot care in order to educate patients effectively.[35]

It is interesting to note that apart from poor foot care knowledge, majority of the patients had poor knowledge of the type of diabetes they are suffering and indeed will have poor knowledge of diabetic self-care management and this collaborates well with a study which reported that diabetic patients with foot ulcers had significantly lower diabetic knowledge and foot care practice scores.[42]

5.3 Foot care practices

The majority of the respondents about 71.7% had cared for their feet personally in one way or the other while 28.3% had not.

A large number of the respondents (67.5%) had never had their feet examined by the health care professionals either by a doctor or a nurse. The international Diabetic association and also the American Diabetic Association recommends that all individuals with diabetes should receive an annual foot examination to identify high risk ulceration.[65,66] This indicates that the health care workers are either unaware of foot guidelines or simply failing to do their duty correctly. Also because of poor knowledge of foot care, patients are not asking for feet examination at least once a year as required of them whenever they consult their doctors or the nurses. This finding is in line with a study which investigated physician and patient practices related to foot care and stated that more than 50% reported that they had not had their feet examined by their physician.[22] It however contrasts sharply with another study conducted in America which found that 71.6% of adult respondents reported that they had their feet examined within the past year.[19] This finding may have geographical implication as it may seem that health care professionals in America are more aware of the importance of feet examination in diabetic patients and therefore more likely to carry out feet examination than their counterparts in Africa. This may be attributed to availability of resources, more awareness and adherence to foot care guideline in America than in Africa. Further research may be required in this field to prove this.

The Summary of Diabetes Self-Care Activities (SDSCA) measure was used to assess some of the foot self-care measures among respondents. This has been shown to be a reliable instrument in assessing self-care activities in diabetic patients.[62] Patients were assessed on their foot care practices in the last seven days. They were scored as none, 1 to 4 days and 5 to 7 days. Activities that were performed 5 to 7 days in the last week were regarded as good foot practice, while activities performed from 1 to 4 days in the last week were regarded as poor and activities not performed at all in the last seven days were regarded as bad foot care practice (This is with regards to; washing of feet, use of talcum powder to dry feet, self-inspection of feet and self-inspection of shoes). However, for soaking of feet in water, the reverse score was used where no activity (no soaking of leg) was regarded as good foot care practice and 5 to 7 days of soaking of feet regarded as bad practice and 1 to 4 days of soaking was regarded as poor practice.

About 47.5% of the respondents had inspected their feet in the last 5 to 7 days of the week while 30.8% had not inspected their feet at all in the last seven days. A significant number of them of about 21.7% had inspected their feet only in 1 to 4 days of the last seven days. This is consistent with the finding of two large population studies which reported that 23% to 25% of patients studied never inspected their feet.[30] Another cohort study also found that about 20% of respondents seldom checked their feet daily for sores and irritation.[57] However, the findings of a study in Iran reported that about 60% of the respondents failed to inspect their feet compared to 30.8% in this study but when combined with the 21.7% who inspected their feet only in 1-4 days, the total will be 52.5% which tends to agree with the Iranian study.[46]

Washing of feet was done by the majority of the respondents (86.7%) who washed their feet almost daily (between 5 to 7 days) in the last seven days while 11.7% washed between 1-4 days in the last seven days. However 1.7% did not wash their feet at all in the last seven days. This finding may be so because patients are likely to have their bath every day and therefore wash their feet while doing so. This may explain why a large number of the patients had good foot care practice in this respect.

The use of talcum powder to keep the feet dry has been said to be effective in preventing foot ulceration but surprisingly, most of the patients studied about 92.5% had

not used talcum powder at all to keep their feet dry in the last seven days whereas 3.3% of them had used talcum powder to keep their feet dry in 1-4 days of the last seven days. Only a minority of 4.2% had used talcum powder to dry their feet in the last 5-7 days of the week.

About 45.8% had not inspected their shoes before wearing them. 43.3% had inspected their shoes between 5 to 7 days in the last seven days before wearing them, and about 10.8% had done this between 1-4 days of the week. Similar finding was reported by the "ELDER study" which found that about 35.6% inspected their shoes at least 6 days per week and concluded that educating patients about foot self-care may encourage routine foot care.[14]

Soaking of feet in water has been known to be a bad feet practice and diabetic patients are discouraged from doing it. The majority of the patients studied about 53.3% of them had not soaked their feet in water in the last seven days. Conversely, 22.5% had soaked their feet in water for more than five days while 24.2% had soaked their feet between 1-4 days in the previous week. The proportion of those who soaked their feet may have done this believing that it is actually a good practice because of lack of proper foot care education.

A large proportion of the respondents (75%) reported not walking bare foot both indoors and outdoors while 25.0% walked barefoot. This contrasts with the study of Chandalia et al which reported that a total of 45.6% of patients walked bare foot both indoors and outdoors[18] and another study also found that 47% of patients walked barefoot in the house while 44% walked barefoot outside the house.[62] This may indicate that South Africans diabetic patients are more aware of the need to protect their feet with shoes while walking around but this will need further study.

The use of a podiatrist is central to adequate foot care practice all over the world. When the respondents were asked if they had ever made use of a foot care specialist or a podiatrist, a large number of them about 94.2% reported they had not made use of a podiatrist while only 5.8% said they had made use of a podiatrist. A study by Singh et al. has shown that the use of a podiatrist is an appropriate and effective foot care practice

and intervention.[8.] This finding conforms with another study done in Trinidad which found that less than 1% of respondents made use of a podiatrist.[62]

This indicates that generally, patients may not be aware of the importance of a foot care specialist or a podiatrist in preventive foot care practices. Another reason may be because of the fact that this study was conducted in a public hospital and generally, public hospitals do not have podiatrist in South Africa. Podiatrists are mainly found in the private sector and most of these patients may not be able to access care in the private sector. This poses a challenge to health care professionals whose duty it is to educate and inform patients on the importance of a podiatrist and to the Government and Policy makers to provide podiatric services in the public hospitals.

Overall, 34.2% of the patients studied had developed foot sore/ulcer at one time or the other. This may be due to the age cut from 30 years and above in this study which has increased the catchment of foot ulcers. Again this may be attributed to the poor knowledge of foot self-care due to the absence or inadequate self-care education of diabetic patients by the health practitioners as numerous studies have reported that foot care education has been found to be a very effective intervention in preventing foot ulceration and also encouraging foot self-care amongst diabetics.[16,17,18,22] This prevalence of foot ulcer in this study is at variance with the finding of another study which reported that 9% of respondents had an ulcer. This is so because the study assessed for present foot ulcer in the respondents whereas this study assessed foot ulcers developed both during the study and before. Other studies have shown that the life time incidence of foot ulcer in diabetic patients may be as high as 25%[24]

5.4 Foot abnormalities observed in the patients

This study sought to describe foot abnormalities observed in the patients as one of its objectives. Interestingly, most of the patients studied (about 63.2%) had one foot abnormality or the other while 36.8% had no foot abnormality. This shows that foot abnormalities are highly prevalent among people with diabetes at Dr. Yusuf Dadoo Hospital. This is line with a study which found that foot abnormality was reported in 46.7% of patients.[13]

The commonest or most frequently occurring foot abnormality was athlete's foot (16.2%). This is a fungal infection known as Tinea pedis and characterized by smelly foot with macerated tissues in between the toes. This is followed by corns which are keratinized or hardened areas of the foot probably resulting from wearing tight shoes as a result of inappropriate foot wear selection.

Thickened toe nails were observed in 10.3% of the respondents. Here, the toe nails are yellowish in colour, hard and thickened. They may be due to fungal infection or nail changes as a result of diabetes.

Hammer toes occurred in 6.0% of the respondents. This is a foot deformity where the toes are flexed at the distal phalanx and extended at the metatarso-phalangeal joint giving it an appearance of hammer.

Ingrown toe nails and calluses were seen in 4.3% each. In the ingrown toe nails, the toe nails actually dig into the flesh of the toes and may require surgical intervention.

Dry cracked skin was an abnormality observed in 2.6% of the respondents. Here the skin of the foot appeared leathery and dry and cracks easily thereby predisposing to ulcer development.

Amputation was observed only in one of the respondents representing 0.9%.

A study on foot abnormalities in Iran[13] found Tinea Pedis which was the most frequently occurring foot abnormality in this study to account for 13.7% compared to 16.2% found in this study. Hammer toes accounted for 10.9% compared to 6.0% found in this study. It found amputees to represent 2.1% compared to 0.9% found in this study. Callosities represented 14.2% while it was 4.3 in this study. Skin changes and dry cracked skin was found to be 17% while it was 2.6% in this study. Current foot ulcers were found to be 13.7% while it was found to be 5.1% in our study. This study shows a fair comparison of foot abnormalities with other studies. The differences observed may have arisen from the different study designs.

5.5. Limitations of study

This study has several limitations:

The study was conducted on adult diabetics from 30 years and above. This automatically excluded children and adults below 30 years thereby introducing a

selection bias in the study. However, this study was on adults and minimum age of 30 years was chosen to enhance the pick-up of foot abnormalities.

The sampling method used was convenience sampling- a method of consecutively recruiting until sample size is achieved is a weak sampling method because it only recruited those who were available at that time and did not give equal chance of being included or excluded to all eligible participants and may therefore introduce selection bias; However, it was adequate for achieving the aim and objectives of this study. Other sampling methods such as randomizing could not be used because of logistics and may be difficult in the out-patient setting.

Although a cross sectional design was adequate for achieving the aim and objectives of this study, the design could have been better if it was a cohort but because of time constraints, it was not chosen as the respondents would have been followed up for a longer period of time and some would be lost to follow up. It would have been good to follow up people and see what makes them develop foot ulcer and to find out if their foot care practice reduced their vulnerability to foot ulceration. However, cross sectional design was used to look at the snap shot of foot care practice in the respondents.

In this study, the findings were largely based on self-reporting which could have introduced some degree of information bias as people tend to give answers perceived to be desirable when they are under investigation.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter concludes this study and will point out the important findings of the study and make some recommendations.

The increasing prevalence of foot ulcer and limb amputation among diabetic patients is an important public health problem. This study provides a contribution by assessing the various foot self-care practices and the predictors thereof of foot care outcomes. It also provides the socio-demographic profiles of these patients who present in a public hospital that has a predominantly black population. This study concludes that:

- Foot self-care practiced by the patients includes, feet self-inspection, washing of feet, use of talcum powder, shoe self-inspection, soaking of feet in water, walking barefoot and the use of podiatrist.

- Majority of the respondents had poor foot self-care practices; nonetheless, some of them had good foot care practices especially in the areas of washing of feet and not walking barefoot.

- Foot self-care awareness and self-reported knowledge of foot care practices was found to be very low among patients and health care practitioners failed to carry out feet examination in these patients at least once a year.

- The commonest foot problem was Athlete’s foot and Hypertension was found to be the commonest co-morbidity in the respondents.

It is therefore recommended that:

1. Foot care education should be given to diabetic patients by health care practitioners to increase foot self-care knowledge and awareness and motivate them to engage in appropriate performance of foot care. This is best done by implementing a quality improvement programme which allows for a systematic and objective implementation of quality assurance.
2. Diabetic patients must be encouraged to actively carry out appropriate foot self-care practices through interactive teaching and demonstrations as a way of preventing foot ulceration and decreasing the rate of lower extremity amputation and not merely telling them about foot care.
3. Reminders and prompts that will ensure that health care practitioners examine the feet of diabetic patients at least once a year should be developed and implemented possibly through the adoption and the use of problem oriented medical record (POMR)
4. Podiatric services should be made available and affordable to diabetic patients.
5. Given the import of good foot care in terms of preventing serious foot and lower limb complications- these inadequacies in terms of doctor education of patients and patients adherence to (and knowledge of) good foot care need to be explored further by future research or quality improvement efforts and programmes put in place to remedy the situation

CHAPTER 7

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Appendix 1

QUESTIONNAIRE

NUMBER_____ **DATE**_____

Kindly complete this questionnaire. Information entered here is highly confidential and anonymous. Please complete the questionnaire and tick the appropriate answer.

A. DEMOGRAPHY

1. SEX: 1. MALE 2. FEMALE
2. DATE OF BIRTH/ AGE:_____
3. RACE:_____

B. SOCIO-ECONOMIC CHARACTERISTICS:

1. WHAT IS YOUR MARITAL STATUS?
1. SINGLE 2. MARRIED
3. DIVORCED 4. SEPARATED
5. WIDOWED.

2. WHAT IS YOUR EMPLOYMENT STATUS?
1. EMPLOYED 2. UNEMPLOYED.

3. IF YOU ARE EMPLOYED, WHAT TYPE OF JOB DO YOU HAVE?
1. PROFESSIONAL 2. SKILLED
3. UNSKILLED 3. PART TIME/PIECE JOB.

4. WHAT IS YOUR HIGHEST LEVEL OF EDUCATION?
1. NO EDUCATION 2. LESS THAN STANDARD 8
3. MATRIC 3. DIPLOMA/TECHNICON
4. UNIVERSITY 5. POSTGRADUATE.

5. DO YOU SMOKE CIGARETTE?
1. YES 2. NO.
6. IF YES, HOW MANY CIGARETTES DO YOU SMOKE A DAY?
1. LESS THAN 5 2. 5 TO 10
3. 10 TO 20 4. ABOVE 20

7. DO YOU DRINK ALCOHOL?
1. YES 2. NO.

8. DO YOU GET SUPPORT FROM YOUR FAMILY IN CARING FOR YOUR FOOT?
1. YES 2. NO

9. DOES ANY MEMBER OF YOUR FAMILY ASSIST YOU TO CARE FOR YOUR FOOT?
1. YES 2. NO

C. KNOWLEDGE/AWARENESS OF FOOT CARE.

1. DO YOU KNOW THAT YOU SHOULD CARE FOR YOUR FOOT PERSONALLY?
1. YES 2. NO

2. IF YES, HOW DID YOU GET TO KNOW?
1. FRIENDS AND RELATIVES
2. OTHER PEOPLE WITH DIABETES
3. YOUR DOCTOR OR NURSE
4. TELEVISION/RADIO/INTERNET
5. FAMILY MEMBERS.

3. WHAT TYPE OF DIABETES DO YOU HAVE?
1. TYPE I 2. TYPE 2
3. DON'T KNOW

D. QUESTIONS ON FOOT SELF CARE.

1. HAVE YOU EVER CARED FOR YOUR FOOT PERSONALLY?
1. YES 2. NO

2. HAVE YOU HAD YOUR FEET EXAMINED BY YOUR DOCTOR OR NURSE?
1. YES 2. NO

3. ON HOW MANY OF THE LAST SEVEN DAYS DID YOU INSPECT YOUR FOOT?
0 1 2 3 4 5 6 7

4. ON HOW MANY OF THE LAST SEVEN DAYS DID YOU WASH YOUR FEET?
0 1 2 3 4 5 6 7.

5. ON HOW MANY OF THE LAST SEVEN DAYS DID YOU USE TALCUM POWDER TO KEEP YOUR FEET DRY?
0 1 2 3 4 5 6 7.

6. ON HOW MANY OF THE LAST SEVEN DAYS DID YOU INSPECT YOUR SHOES BEFORE WEARING THEM?
0 1 2 3 4 5 6 7.

7. ON HOW MANY OF THE LAST SEVEN DAYS DID YOU SOAK YOUR FEET IN WATER?
0 1 2 3 4 5 6 7

8. DO YOU WALK BARE FOOTED?
1. YES 2 NO

9. HAVE YOU EVER MADE USE OF A FOOT CARE SPECIALIST (PODIATRIST)?
1. YES 2. NO

10. HAVE YOU EVER HAD A FOOT SORE?
1. YES 2. NO

11. IF YES, HOW DID YOU TREAT IT?
1. TREATED BY A DOCTOR
2. TREATED IT BY MYSELF
3. TREATED BY THE NURSE AT THE CLINIC
4. TREATED BY A TRADITIONAL HEALER/SANGOMA
5. I DID NOTHING ABOUT IT.

12. DO YOU HAVE ANY OTHER MEDICAL CONDITION?
1. YES 2. NO

13. IF YES, PLEASE STATE THE CONDITION?_____

14. DOES THIS CONDITION PREVENT YOU FROM CARING FOR YOUR FOOT?
1. YES 2. NO.

THANK YOU FOR TIME AND PATIENCE.

RESEARCHER'S USE ONLY
FINDINGS ON EXAMINATION OF PATIENT'S FEET

_____
_____
_____
____
_____
_____
____

Appendix 2

Letter of introduction / Participants information sheet:

Research title: Foot self-care practices and predictors of foot care outcomes among adult diabetics attending Dr. Yusuf Dadoo Hospital.

Dear patient,

My name is Dr. Robert A. Dikeukwu. I am a post-graduate student of the Department of Family Medicine of the University of the Witwatersrand, Johannesburg. With approval from the management of this hospital, I am conducting a research on how people with Diabetes take care of their foot, and factors that affect the outcome of their foot care. This research will help me to understand how people with Diabetes take care of their foot and the factors that make them have good or bad foot. The information obtained from this research will help us, the doctors, the hospital management and the government in finding ways of preventing foot sores and helping the patients to care for their foot more effectively.

I am inviting you to participate in this research. You may choose to take part or not and if you chose to, you are free to withdraw from the study at any time during the study. If you do not want to take part, your care in the hospital will not be affected by your decision.

You will assist me in completing the questionnaire. I will ask you some questions and your answer will help me to fill the forms. The questions are easy and will not take much of your time. It will take about 25 minutes to complete the forms. I will also use the opportunity to look at your feet to identify any problem.
With your permission, a photograph of any sore or problem observed in your feet may be taken. Your face will never be included in the photograph.

Your participation will not expose you to any harm. The questionnaire is completely anonymous, and you cannot be identified in any way. Your name will not be mentioned on the questionnaire.The information you will provide is confidential and will only be available to my supervisor and myself.

The report of the study will be sent to the University of the Witwatersrand and to the management of Dr. Yusuf Dadoo Hospital for assessment and implementation of the recommendations. The findings may also be published in journals.

If you require any other information about this study, you are welcome to contact me on the number and e-mail address below. If you are willing to take part in this study, you are required to sign the consent form attached.

Thank you for your time and assistance.
Yours sincerely

Dr. Robert A. Dikeukwu
Contact details: Cell 0764811529
E-mail: randiks2000@yahoo.com.

Appendix 3

CONSENT FORM:

I ----------

a patient at Dr. Yusuf Dadoo Hospital hereby consent/ do not consent to participate in the foot self-care research being conducted by Dr. Robert A. Dikeukwu at Dr. Yusuf Dadoo Hospital.

I confirm that the purpose, nature and the details of the study have been explained to me. I also confirm that I consent based on my understanding of the information provided.

Participant's signature:----------

Researcher's signature----------

Date:----------

Witness:----------