TITLE

QUALITY OF CARE IN ADULT DIABETIC PATIENTS IN THE

GRAAFF-REINET MUNICIPAL CLINIC

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DECLARATION

I, **Dr. TJ van der Merwe**, hereby declare that this dissertation is my own idea and the result of my own original research; that it has not been submitted for any degree or examination at any other University, and that all the sources I have used or quoted, have been indicated and acknowledged with complete references.

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ABSTRACT:

Introduction/Background.

Graaff-Reinet is a rural community in the Cacadau district in the Eastern-Cape with a population of about 45,000 people. The Graaff-Reinet Municipal Area includes the town of Graaff-Reinet itself and a large farming community. Healthcare workers in the area became aware that diabetic control was sub-optimal and that a number of patients were being admitted to the local hospital due to diabetic complications. Diabetes is a costly and a very serious medical problem.[1] Many patients with diabetes do not receive the standard of care required to avoid the complications directly associated with the disease. High quality care for patients with diabetes has been shown to make a difference. [2]General agreement among the community of healthcare professionals on a single set of measures could provide a powerful tool for focussing on key components of care as a basis for quality improvement. In this study quality of diabetes care was determined by assessing adherence to the American Diabetes Association (ADA) clinical practice recommendations as reported by

the American Diabetic Association Standard of medical care

guidelines.[3,4]

AIMS AND OBJECTIVES

The aims and objectives of this study were to investigate the quality

of diabetic care patients at the Graaff-Reinet Muncipal Clinic are

receiving.

METHOD:

A retrospective descriptive study design was used to investigate the

quality of care that diabetic patients at the Graaff-Reinet Municipal

Clinic are receiving. This study was conducted over a one month time

period during April 2008. Only diabetic patients 18 years and older

and who were able to give written informed consent were included in

this study. Patient interviews were conducted by healthcare

professionals and data obtained from patient files.

RESULTS:

In this study, among the 82 participants, 59 were female and 23 males. Mean patient age was 56.78 years. 74.39% of patients were unemployed. Co- morbid diseases were present in 62 (75.66%) of patients while 66 (80.48%) had an average Body Mass Index (BMI) above 25kg/m^2. The average blood glucose of patients was 10.8 mmol/L. The mean systolic and diastolic pressure was 150mmHg and 81.3mmHg respectively.

No patients had their glycosylated haemoglobin (HBA$_1$C) tested while only 26.82% of patients had an eye examination. From the 82 patients 14 (17.07%) had a foot examination. Lipograms were done on only 5 patients while no patients had their urine tested for micro albumin. Self-monitoring of glucose was reported by only 8.53% of patients.

CONCLUSION:

This study concluded that quality of care of diabetic patients at the Day Hospital in Graaff-Reinet is suboptimal and does not meet the American Diabetic Association (ADA) standards. Major changes will

need to be implemented in order to make a difference to the quality of care. A follow up study will be necessary to investigate whether the implementation of new diabetic strategies and guidelines has resulted in improvements in standards of care.

INTRODUCTION AND LITERATURE REVIEW

Due to the large number of patients with uncontrolled diabetes and diabetic related complications seen at the Graaff-Reinet Municipal Clinic, a study was conducted to assess the quality of care these patients were receiving at the clinic.

The incidence of diabetes is on the increase throughout the developed and the developing world. Currently there are approximately 150 million people with diabetes worldwide. These numbers are likely to increase over the next 25 years. It is clear that diabetes is a major health problem and that it places a large financial burden on health resources. Non-compliance and non-adherence to treatment plans are major problems in patients with chronic diseases and diabetes is no exception.

 It seems that poor compliance and non-adherence are problems seen in both developed and developing countries. The figure of non-compliance is as high as 26-28% in developed countries and it seems that it is even higher in developing countries. Non-compliance and non-adherence to medication is a significant problem for patients with

chronic conditions. The literature contains many explanations as to why patients do not adhere to treatment regimes but there are obviously gaps in our knowledge of this subject. We do not know when non-adherence to a new medication for a chronic condition commences. Furthermore, non-adherence is often classified according to patient intent as intentional or unintentional. Unintentional non-adherence occurs when the patient wishes to adhere but is prevented in some way; perhaps they forget or are unable to take the medication because the form of dosage is inappropriate. Intentional non-adherence is related to issues of motivating and how people perceive their medication.

On both a conceptual and methodological level patient compliance presents difficult issues. Several authors have suggested that the term compliance reflects a biomedical paradigm that reinforces patient passivity and stigmatizes independent patient judgment about self-treatment as deviant. An alternative term, adherence, has been offered by some investigators to denote a more active patient-physician treatment collaboration than compliance. Most medical

recommendations require some degree of independent patient judgment and accommodation. Although this is particularly true for lifestyle changes and preventive practice, most drug regimens also allow for some flexibility and patient discretion on how and when the drugs are taken.

Medical recommendations are of many kinds, from taking a single pill to following a complex regimen, seeking preventive care, returning for follow-up appointments, or modifying aspects of lifestyle. Failure to follow recommendations jeopardizes patient health and wellbeing, interferes with the doctor's therapeutic efforts, and leads to wasted health resources.

Research on patient adherence (compliance) has grown rapidly over the past 50 years as chronic disease becomes more prevalent and treatment more dependent on patient self-management. Patients are adherent when they do what their health professionals recommend. In some views, non-adherence wastes resources and causes preventable morbidity and mortality and loss of healthcare money and productivity. In other views, non-adherence represents rational choice as patients attempt to maintain their personal identity, achieve their

goals, and preserve their quality of life. Data suggests that the difference in health outcomes between high and low adherence is 26% and that the adherence-outcome relationship varies with the regimens, measurements, and diseases studied.[5] In another study estimates of non-compliance rate with prescribed therapeutic regimes ranged from 30% to 60%. [6]Most researchers agree that at least 50% of patients for whom drugs are prescribed fail to achieve full benefit through inadequate adherence. Moreover, it has been estimated that almost one third of patients who received prescriptions were using them in a manner that posed a serious threat to their health.[2]

The management of diabetes is a complex, lifelong process requiring a great deal of effort on the part of the patient. The patient, rather than the health care provider, is the key to successful management. Poor management of the disease eventually results in a number of serious complications. For this reason, noncompliance with therapeutic regimens among patients with diabetes has been a continuing problem for health care providers. If healthcare providers can predict which patients are more likely to be noncompliant and what factors are

causing their noncompliance, the providers may more effectively modify or intervene in their patient behaviour to promote better compliance.

The gap between recommended diabetes care and care actually received by patients is substantial. In a recent survey, even large medical groups often lacked practical resources such as external incentives and information systems to start or sustain quality improvement strategies. Evidence suggests that multi component quality assurance (QI) interventions that tailor quality improvement solutions to particular clinics are more effective than "one-size-fits-all" approaches.[7] Precise and appropriate definition and measurement of compliance is important so that compliance measures can be standardized. Uniform compliance measures may never be possible because of the various constraints with which each researcher has to deal. At least however, publications of compliance research should include a precise description of definitions and measurements used in determining compliance. [8] Treatment recommendations for obese individuals with non-insulin dependent diabetes (NIDDM) to change diet and exercise behaviour present a challenge for both patient and

providers. Following the lifestyle recommendations may be more problematic than other aspects of diabetes self-care. Multi component behavioural weight-control programs have been shown to significantly improve metabolic control among overweight patients with NIDDM, but failure to adhere to the programme recommendations can attenuate success. A pilot study done by Delia et al suggests that the addition of motivational interviewing to a standard behaviour weight-control programme may significantly enhance adherence to treatment recommendations and glycaemic control.[9]

Running out of medications and forgetting to take medications are behaviours that were directly associated with higher glycosolated haemoglobin level (HBA1C) levels and must be addressed. Studies have reported on the efficacy of pharmacy-based interventions in prevention of running out of medication in low-income patients. In randomized controlled trials with diabetes medication users and antihypertensive-medication users, pharmacy mailings of medication-refill reminders 10 days prior to each refill date, unit-of-use

medication packaging, and a combination of these two methods all resulted in significantly higher prescription-refill adherence as compared with standard care. The cost-effectiveness and implementation of these types of novel methods needs further investigation. The most frequently reported reason for running out of medication in a study done by Hill-Briggs et al, is not having money to buy or refill prescriptions.[10] This again indicates the continuous need to address the socioeconomic and health services in communities.

Walllston and Wallston reviewed evidence that people who have internal health locus of control (believe their health is the result of their own doing), are more likely to seek information and engage in preventive behaviour than those with an external orientation.[11] Doctors give little information about medication in their consultations and often make inappropriate judgments about the expectations of their patients. The style of communication used by doctors for patients with chronic conditions is one that concentrates on the condition rather than the whole person, which results in less satisfaction and more non-adherences. Even when patients are given

information, they often misunderstand what their doctor says and fail to recall much of the information they are given. Pharmacists have the potential to rectify many of these problems when dispensing medication, but often do not. [12]

Retinopathy is a major cause of morbidity in the diabetic patient. The presence of severe retinopathy may be a risk factor for death due to ischaemic heart disease (IHD). The pathogenesis is multi factorial with alterations in auto regulation of retinal blood flow, sorbitol, glycation end products, micro thrombosis and genetic factors being implicated. [13]Fundoscopy should be done at the time of diagnosis and annually thereafter. The pupils must be dilated for adequate visualization. Early referral to an ophthalmologist is recommended before any decline in visual acuity, maculopathy, proliferative diseases or advanced background changes. [13]Most people with diabetes eventually develop some degree of retinopathy. Early detection through regular dilated-pupil opthalmoscopy or colour fundus photography allows timely laser treatment, which can prevent severe visual loss in over 90% of those at risk. Despite this

outstanding medical benefit, only one half of the diabetic population is enrolled in regular, effective screening programmes. Thus annual eye-examinations are required for all patients with diabetes.[14]Diabetic education and nutritional counseling is the cornerstone of effective diabetes-care and sufficient time and resources should be made available in order to do this effectively. Health-education programmes can empower diabetic patients to take control of their diets, learn to monitor and interpret glucose results and understand the implications of poor glycaemic control for diabetic complications.[15] A study looking at an 8-week intervention programme indicated that a diabetes education and intervention programme involving the combination of exercise and diet enhanced the effectiveness of oral therapy on blood-glucose control in patients with type 2 diabetes.[16]The lipogram should be done initially and six monthly thereafter and therapy adjusted to attain goal levels. [13]The prevalence of hypertriglyceridaemia in type 2 diabetics ranges from 20-50% in different studies, and is higher in women.[17]The glycosolated haemoglobin levels (HBA1C) levels should be checked frequently in conjunction with home glucose profiles, and maintained at below 7%

(preferably 6.5%).[13] As obesity virtually always accompanies type 2 diabetes it should be targeted in its own right. A weight loss of 5-10% should be the initial aim and has been shown to improve insulin resistance and all its associated parameters. Evidence demonstrated that structured, intensive lifestyle programs involving participant education, individualized counseling, reduced dietary fat and energy intake, regular physical activity and frequent participant contact are necessary to produce long-term weight loss of > 5% of starting weight.[18]Due to the increased macro and micro vascular risk posed by the diabetes itself, the goal level for blood pressure should be 130/85mmHg. [13]Several arguments justify the use of lower target blood pressures in diabetics. Firstly, cardiovascular disease accounts for 49-75% of deaths in diabetics and most deaths attributable to hypertension occur in patients whose blood pressure is in the normal range. It is clear from studies that the threshold for intervention and targets in type 2 diabetics must be considered to be below the usual threshold of 140/90mmHg in the non-diabetic hypertensive population. Both the JNC-6 and the World Health Organization/ International Hypertension Guidelines recommend a target blood-

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pressure <130/85mmHg and <125/75mmHg if proteinuria is present.[19]

The American Diabetic Association advocates 6 services in the proper management of patients with diabetes mellitus. These include determination of HbA1c levels, documentation of self-monitoring of blood-glucose, annual dilated eye-examination, foot-examination, assessment of urine-protein and lipid screening.

HBA1c is a reflection of the patient's average blood-glucose over the past 3 months. Attachment of glucose on the haemoglobin-molecules lasts for the lifespan of the red blood cells (120 days). The higher the level of blood sugar, the higher the percentage of glycosylation. Therefore, HbA1c determination is the best test for blood glucose control. The Diabetic Control and Complications Trial demonstrated that lowering the HbA1c percentage could delay or prevent the development of retinopathy, nephropathy and neuropathy in diabetic patients. The study also showed that any decrease in HbA1c lowers the risk of complications. The HbA1C goal for diabetics is less than 7%. Diabetic patients whose HbA1c levels are close to 7% have a

much better chance of delaying complications than those with levels of 8% and higher. In this study no patients had a HBA_1C done, and the reasons might be there are no clear guidelines or restricted budget.

It is recommended that HbA1c be measured at least twice a year. Therefore patients should be taught to use a glucometer and to monitor their own glucose levels. Increased blood-glucose levels can easily be spotted and managed before the HbA1c is found to be elevated a few months later. Self-monitoring of blood-glucose enables patients to see and record how food, physical activity, and medication affect their blood sugar.

Eye-examination is aimed at preventing visual impairment. Blindness is one of the most dreaded complications of diabetes. This complication can be avoided if patients receive appropriate care. Risk factors for diabetic retinal disease are poor glycaemic control, raised blood pressure, increasing number of microaneurysms, duration of diabetes, microalbuminuria and proteinuria, raised triglycerides and pregnancy.

Patients with multiple risk factors should be considered at high risk of developing diabetic retinal disease. There is a twofold increased risk of cataracts in diabetic patients, which increases with poor glycaemic control. Tight control of blood-glucose reduces the risk of onset and progression of diabetic eye-disease in types 1 and 2 diabetics. Significantly, reducing HbA_{1c} by 1.5% and, if possible, to 7% in both types of diabetes, coupled with the reduction of blood-pressure to 140/80mmHg in type 2 diabetic, reduces the incidence and progression of sight-threatening diabetic eye disease. It is important for diabetic patients to be screened for retinopathy annually and those with identified retinal disease more frequently. Evidence has shown that patients with Type 2 diabetes should be screened from the time of diagnosis, and those with Type1 from the age of 12 years. If the onset of Type 1 diabetes is after puberty, screening should start 3 years after diagnosis. In primary health care settings, visual acuity measurements help in the interpretation of maculopathy.

Diabetic foot problems are common complications of diabetes, with a prevalence of 35% for neuropathy, 16% for vascular disease and 6%

for foot-ulceration. Diabetic patients experience higher amputation rates than do non-diabetics. Diabetic foot complications contribute significantly to morbidity. Recent data attributes 83% of non-traumatic lower-extremity amputations in the USA to diabetes mellitus.[20]According to the literature, 25% of all hospital-admissions of patients with diabetes in the USA and UK are for the treatment of infected foot ulcers. Fewer than14% of patients admitted for diabetic foot complications receive appropriate lower extremity evaluation, and when foot-ulcers do develop, 1 out of 5 of these patients eventually needs to undergo an amputation.[21] The rate of secondary amputation of the ipsi- or contralateral limb is as high as 50%. Diabetic foot ulcers have also been recognized as a significant problem in Africa.[22] It is important to recognize that these complications are preventable to a large extent with adequate blood glucose control, regular screening and foot-care education. Detection of diabetes-related neuropathy is important, as this nearly always precedes foot-ulceration. Patients with a previous history of amputation or foot ulceration are also considered to be at risk for subsequent ulceration.[23]

Persistent proteinuria indicates the presence of a glomerular lesion and is a forerunner of kidney disease. It may play a central role in the pathogenesis of progression of glomerulo-nephropathies to end-stage renal failure. Therefore, persistent proteinuria has been regarded as nephrotoxic.[24] To this end the use of angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs), aimed at mitigating glomerular hyperfiltration, have been recommended by consensus. The risk factors associated with diabetic nephrophathy include hyperglycaemia, raised blood-pressure, baseline urinary albumin excretion, increased age, duration of diabetes, presence of retinopathy, smoking, genetic factors, raised cholesterol and triglyceride levels, male sex and serum homocysteiene levels. In diabetic patients, once proteinuria has been established, it heralds the inevitable progression of diabetic nephropathy. Poor glycaemic control (HbA$_{1c}$ ≥ 8%) is a major risk factor for diabetic nephropathy. The earliest indicator of glomerular damage is microalbuminuria. The use of ACE inhibitors or ARBs as reno-protective therapy before an overt nephropathic syndrome emerges is recommended.

Diabetes mellitus is associated with an increased risk of cardiovascular disease. Dyslipidaemia is prevalent in both types of diabetes, although different in nature in each; poor glycaemic control and the presence of nephropathy in type 1; elevated triglyceride levels and decreased high density lipoproteins (HDL) cholesterol in type 2. It must be noted that, although the concentration of low density lipoproteins (LDL) cholesterol in type 2 diabetics is not significantly different from that in the non-diabetic. In the former the LDL cholesterol tends to have smaller and denser LDL particles, which increases atherogenicity.

AIM

The aim of this study was investigate the quality of care diabetic patients are receiving at the Graaff-Reinet Muncipal Clinic. The quality of care received by these diabetic patients has not yet been previously investigated.

OBJECTIVES

The objective of this study was to determine the quality of care diabetic patients are receiving, to identify weaknesses and then to make recommendations and implement new protocols to improve the quality of care of diabetic patients at the Municipal Clinic in Graaff-Reinet.

METHODS:

STUDY DESIGN:

Data for the research was obtained from a Retrospective Descriptive Observational study conducted at the Municipal Clinic in Graaff-Reinet during the month of April 2008. The purpose of the study was to investigate the quality of care of diabetic patients at the clinic.

SETTING:

The study was conducted at the municipal clinic in Graaff-Reinet. The Eastern Cape is divided into nine regions of which the Cacado is one. The Cacado District is divided into several sub-regions of which the Camdeboo is one. The Camdeboo is then divided into several municipalities of which Graaff-Reinet municipality is one.

Patients at the municipal clinic are seen mainly by clinical nurse practitioners. A doctor visits the clinic only on certain days for a few hours during which mainly problem cases are seen. A focus group meeting was conducted before starting the research. The focus group participants included the clinic sister, staff nurse, administration clerk, social worker, dietician, clinic doctor and community representative.

Several further focus group meetings were held to discuss and monitor the progress of the research.

SAMPLE SIZE/SELECTON:

The study population included all previously and newly diagnosed diabetic patients attending the municipal clinic in Graaff-Reinet. Only patients identified as having diabetes and who were 18 years or older were included in the study. All diabetic patients younger than 18 years were excluded. There were 118 diabetic patients on the register of the municipal clinic in Graaff-Reinet. Data for the present study was obtained by reviewing patient records, interviewing patients and by completing a standardized questionnaire in the presence of the patient. A register of all patients was kept to facilitate investigation, analysis and follow up. During the interviews a standardized questionnaire was used to record demographic details including age, gender, employment status, presence of co-morbid disease, whether the patient was seen by a dietician or an ophthalmologist during the last year, whether the patient had received diabetic education, had a foot examination and whether the patient was performing home self - monitoring of blood glucose. The patient's records were also assessed

to see if the patient had blood tests for lipogram, HbA1C, urea and electrolytes and whether the urine was tested for micro-albumin during the past year. The clinical evaluation also included the recording of height, weight, measuring of blood pressure and blood glucose. From the data, body mass index (BMI) was calculated. Prior to completing the questionnaire the patients were informed about the purpose of the study and informed consent was obtained.

ETHICAL CONSIDERATIONS

Informed consent was obtained from all patients. Since all patients in the study were 18 years and older they were able to give their own consent. All patients were assured that their identity would not be revealed and that the study would not be used for financial gain. Patients were informed that it was an observational type of study and that nothing else than what they were already accustomed to as in normal patient care would be done. Patients were informed that they would not be exposed to invasive procedures or harmful medication. There would be no risks or harm for the participants of this study. The benefits of the study would outweigh any possible risks. All information obtained and patient identities would be kept confidential and reference numbers and not patient names would be used.

STATISTICAL ANALYSIS

The decision was made not to use the statistical department of the University of Stellenbosch for this study. The data obtained was captured on an Excel spread sheet and then analyzed.

RESULTS

There are 118 adult diabetics on the Graaff-Reinet's Day Hospital register. We managed to interview and examine 82 (69.48%) of the patients over a period of one month. Characteristics of the study population are presented in table 1.

TABLE I

Table 1- Characteristics of the Diabetic patients at the Day-Hospital			
N	**TOTAL (82)**	**MEN (23)28%**	**WOMEN (59)71%**
Mean Age	**56.78**	**55(98%)**	**57(102%)**
Co Morbid disease	**62**	**17(27%)**	**45(72%)**
Employed	**21**	**5(23%)**	**16(76%)**

The mean age of the study population was 56.78 years. There were 23 males and 59 females. Table 2 demonstrates the number of patients in the different age groups. In the age group (18 to 44) years 2 (2.43%) were males and 8 (9.75%) females, in the age group (45-64), 16 (19.51%) were males and 39 (47.56%) females while 5 (6.09%) were males and 12 (14.63%) females in the age group above 65 years. Only 21 (25.6%) of patients were employed, 5 (21%) of the men and 16 (27%) of the women. It showed that a total of 61 (74.39%) of the study population were unemployed. From the 82 patients interviewed, 62 (75%) patients reported having other co-morbid diseases. More females than males had co morbid diseases (76.27% and 73.91%, respectively).

FIG I

The average blood glucose of all patients was 10.8mmol/L while the average of blood glucose of male patients was 9.69mmol/L and females11.23mmol/L. The average systolic (SBP) and diastolic pressure (DBP) of diabetic patients in the municipal clinic in Graaff-Reinet was 150mmHg and 81.3mmHg respectively. The average SBP

pressure for male and female patients was 156.4mmHg and

148.7mmHg respectively while the average DBP was 85.47mmHg for

male and 79.69mmHg for female patients. Most of the subjects

(76%) had SBP values above 140mmHg while most (75.6%) had

DBP below 90mmHg. More females than males had DBP values less

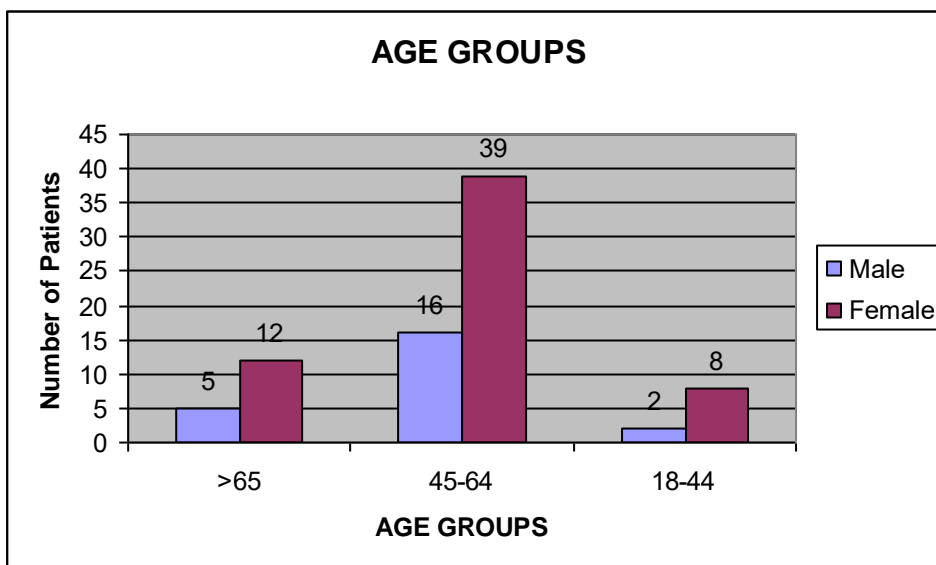than 80mmHG (27% and 14% respectively). See table III for blood

pressure.

AGE GROUPS

TABLE III

| BLOOD PRESSURE			
Systolic blood pressure mmHg	Number of patients	Diastolic blood pressure mmHg	Number of patients
<130	5	<85	41
<140	8	<90	14
140-159	34	90-99	21
160-179	28	100-119	5
180-209	5	≥ 120	1
>210	2		

The average Body Mass Index of the study population was 31.56kg/m^2. Only 10 (16.9%) of female and 6 (26.08%) of male patients had a BMI of less than 25kg/m^2. Table IV demonstrates the number of patients with a BMI below and above 25kg/m$^2.$ A total of 75 (91.46%) of patients previously received diabetic education while 54 (65.85%) of patients reported being seen by a dietician in the past twelve months.

TABLE IV
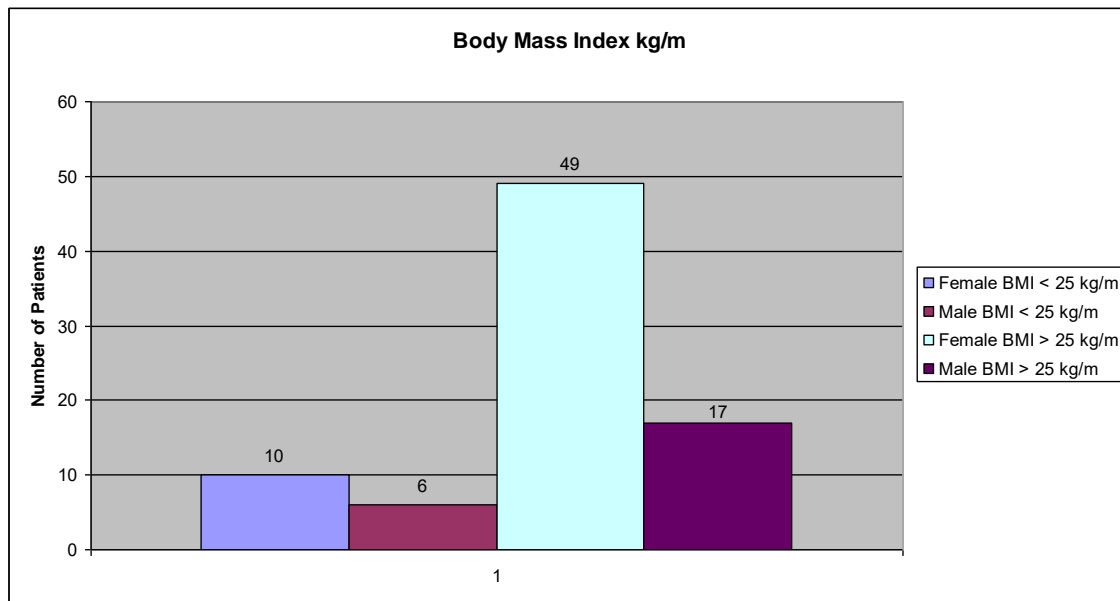
Of the 82 patients in the study-population 22 (26.82%) (16 female and 6 male) patients had been admitted to the hospital in the past 12 months due to diabetic-related complications. A total of 18 (21.95%) patients ran out of medications during the study period. The majority of patients, 63 (76.82%) were taking oral medication. 8 (9.75%) were using insulin only, while 11 (13.41%) patients were on insulin and oral medication. See table V

TABLE V

TYPE OF MEDICATION

	Oral medication	Insulin only	Oral and Insulin
Male	22	0	1
Female	41	8	10
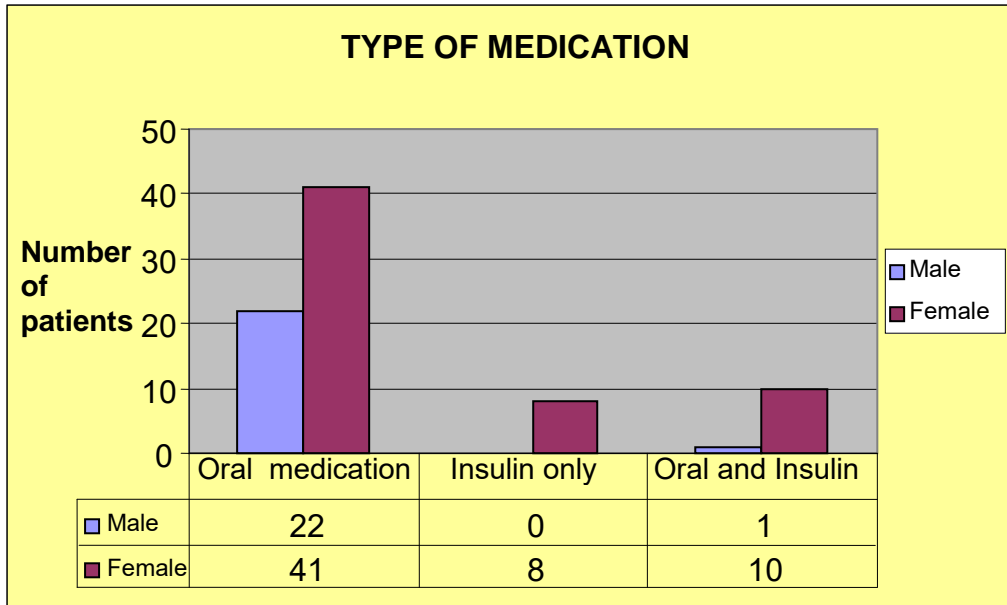
Urea and electrolytes were performed on 38 (12%) of patients.

None of the patients had their HBA_1C checked over the past 12

months. Only 22 (26.82%) of patients were seen by an

ophthalmologist or had an eye-examination during the past year. Of

the 82 patients interviewed, 14 (17.07%) claimed to have had a foot

examination. All the patients had regular urine-tests, but none had

been tested for micro albuminuria. According to patient's files,

lipograms were done on only 5 (6.09%) patients. Self-monitoring of

blood-glucose was reported by 7 (8.53%) of patients.

DISCUSSION

In a study done by Helen et al under Arab Americans[25] the quality of care of diabetic care was determined by assessing adherence to the American Diabetes Association (ADA) clinical practice recommendations. There were 53 participants in their study compare to the 82 in this study. The mean age of patients was 59 years in the Arab American study as compared to the mean age 56.78 years in this study. The ADA goal of HBA_1C was met by 30% in the Arab Americans while none of diabetic patients in this study had their HBA1C done. In the Helen study LDL (<100mg/dl) and BP (130/85) goals were met by 36% and 16% of subjects respectively, while in this study only 6.09% of patients had their lipograms done and most subjects (76%), had a systolic blood pressure above 140mmHg, while most (75.6%), had a diastolic blood pressure below 90mmHg.

The quality of care received by diabetic patients in the municipal clinic in Graaff-Reinet was clearly sub-optimal when compared to ADA standards. A large number of diabetic patients in the Graaff-Reinet municipal area are not well controlled and many of them

present with diabetic related complications. The purpose of this study was to address and identify the reasons for poor control and to plan and implement diabetic protocols with a view to improving the quality of care of patients. Optimal control of diabetics in a rural area such as this is without doubt the domain of the family physician and primary care health workers.

Diabetes is a good example of a chronic disease that requires high levels of behaviour change and self-care activities. The goals of management for diabetes are to reduce diabetic symptoms, to prevent acute and chronic complications, to promote education and self-care, to control co-morbid conditions and to improve quality of life and productivity. Health care processes are relatively easy to measure and a number have been associated with improved outcomes. The measurement or frequency of measurement of HBA_1C, documentation of self-monitoring of blood glucose, annual lipid screening, urinary protein, regular eye and foot-examinations and blood-pressure measurements, are examples of care processes that can be related to high quality diabetes management.

This study demonstrates that patients at the municipal clinic in Graaff-Reinet receive a sub-optimal quality of care according to the 6 ADA clinical recommendations. None of the patients had their HBA$_1$C checked, only 26.8% of patients were seen by an ophthalmologist, none of the patients had their urine tested for micro-albumin, lipid profiles were done on only 6.1% of patients, self-monitoring of blood-glucose was reported by 8.5% of patients, while only 17.1% of patients claimed to have a foot- examination. From the study it was possible to identify and investigate the main areas of poor diabetic quality of care. Major changes in these areas are needed to improve the quality of care that diabetic patients are receiving at the municipal clinic in Graaff-Reinet.

By identifying the reasons for non-compliance and improving on these, one could improve quality of life for our diabetic patients and make significant savings to an already exhausted health care system. Controlling diabetes mellitus means a significant change in a patient's lifestyle, involving the whole family as well as health professionals. The patients concerns, feelings, fears and expectations must also be

taken into consideration. With poverty and socioeconomic problems, it may be difficult to achieve what is ideal in terms of diet and exercise. Several strategies can be implemented to help improve the quality of care of diabetic patients.

A limitation of this research is that it is a relatively small descriptive study conducted over a limited time period. Not all patients on the diabetic register at the municipal clinic in Graaff-Reinet were involved in the study; with only 82 of the 118 registered diabetic patients being interviewed. There are many reasons for this and if the study was conducted over a longer period, more patients could possibly be interviewed. Staff and finances were also limitations. On several clinic days staff shortages meant that not all patients could be seen. In future it would be advisable for diabetic patients to be scheduled for visits on specified days of the week.

CONCLUSIONS

This study clearly demonstrates that the quality of care that adult diabetic patients in the Graaff-Reinet municipal area are receiving is sub-optimal. This study can be used as the first step in making a difference and to improve quality of care of diabetic patients. As it is also shown in other studies, compliance and adherence to treatment in chronic diseases is generally poor. The reasons are not always clear but socio-economic issues, logistics, denial, poor lifestyle choices, poor patient education, limited financial and staff resources may all play a role. What can be concluded from this study is that most of the diabetic patients at the municipal clinic in Graaff-Reinet have blood sugars which are not well controlled, are often overweight, have blood pressure control which is not optimal and that the majority do not meet or receive the 6 ADA standards of care. Although this study is small, it does suggest that diabetic control can definitely be improved by addressing standards of care.

RECOMMENDATIONS

Prior to the commencement of this study a focus group meeting was held to plan and monitor the progress. It is now important to establish a second focus group meeting to implement and monitor new management strategies and guidelines. At this focus group meeting it will be necessary to establish a diabetic multidisciplinary committee that includes doctors, nurses, social workers, dieticians, patient representatives, members of the community and hospital board members. This group must ideally meet regularly to identify and discuss deficiencies in patient care and to outline improvements for diabetic care in the community. Positive feedback and weaknesses can then be discussed.   Established guidelines and protocols according to the ADA-recommendations can be used so that there is continuity in treatment of diabetic-patients. It is also important to give feedback to patients at regular intervals.

Other guidelines and recommendations include:

Registering all diabetic-patients and maintaining good follow-up, using incentives and patient education to improve compliance,

outlining a strategy for the implementation of a plan for improvement of diabetic care in the community and motivating patients towards self-monitoring of blood glucose. These measures will encourage patients to work together with their health care provider towards improving standards of care and health outcomes.

Lifestyle-intervention should be the first step in the management of diabetics. The ADA recommends aerobic-exercise at 50-70% maximum O_2 uptake for 20-45 minutes at least 3 days per week and reduction of saturated fat-intake. Exercise has a glucose lowering effect and should be recommended for the improvement of diabetic control.

Education and family support is essential. This type of support includes adequate knowledge about diabetes, improving management of the condition and preventing complications. Home self-monitoring of blood-glucose should be encouraged and signs of hypo/hyperglycaemia should be familiar to patients and family members. Health promotion focusing on good nutrition, hygiene, dental care and active lifestyle cannot be overemphasized.

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Motivational interviews with patients and their families may help them gain insight into accepting the disease, to appreciate the value of compliance and to resolve conflicts that may arise from modification of patient and family dietary habits. A family physician needs to be actively involved in the prevention of complications and promotion of health. While a controlled diabetic may develop some complications, health education may reduce the chances of further complications. In order to prevent complications, family physicians need to make use of and manage resources such as early referral to an ophthalmologist and involving a dietician if possible. Social workers may be also useful as some of these patients may already have problems that may render them economically and socially disadvantaged. Regular home visits using field workers are also recommended. Other measures include providing incentives for patients to adhere to their medication and achieving target-weight levels, optimizing blood sugar levels and scheduling dedicated diabetic clinics on specific days each month.

It is important to identify what the patient's learning-needs are? Do they also have a voice in the way care is organized and managed?

The design of an appropriate diabetes-education program depends on a thorough understanding of the target audience.

Seeing that patient numbers are high and health workers have limited time, there can be an increased focus on group education.

Group diabetic-education has been shown to be effective in terms of reducing glycosylated haemoglobin and optimizing medication, weight and blood pressure[26]control.

This study clearly demonstrates that the quality of care that adult diabetic patients in the Graaff-Reinet municipal area are receiving is sub-optimal. This pilot study may lay the foundation for improving the diabetic care in the municipal clinic in Graaff-Reinet. A follow up study is recommended to investigate the effect of new diabetic care guidelines and this study can be used as the first step in that direction.

CONFLICT OF INTEREST STATEMENT:

The authors of this paper report no conflict of interest.

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