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ASSESSMENT OF DIABETES SELF CARE BEHAVIOURS AMONG ADULTS WITH TYPE 2 DIABETES MELLITUS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Performance of diabetes self care behaviours is associated with improved glycaemic control, however patient adherence to self care recommendations is often suboptimal. At present, little is known about the self management practices of diabetic patients in Lesotho. The primary objective of this study was to assess self care behaviours of patients with type 2 diabetes. A cross-sectional, qualitative, interview-based study was conducted between April and May 2013; 55 patients were selected using convenience sampling. 87.27% of the patients had received diabetes self management education. Adherence to medication, diet, foot care, self monitoring of blood glucose and exercise was 74.54%, 58.18%, 50.91%, 16.36% and 12.73% respectively. The majority of the study participants had deficient knowledge about diabetes self-management. Interventions to increase patients' self care behaviours in this setting should focus on improving diabetes self management education and support.

Keywords: diabetes self-care behaviours, type 2 diabetes

INTRODUCTION

Diabetes mellitus (DM) is a major cause of morbidity and mortality worldwide. Type 2 diabetes accounts for 90 - 95% of all diagnosed cases of diabetes and is usually associated with older age, obesity and physical inactivity.[1-2] The goal of diabetes management is to achieve and maintain adequate control of blood glucose levels to prevent acute complications and reduce the risk of long term complications.[1] Treatment of type 2 DM involves the use of oral hypoglycaemic agents alone or in combination with insulin and lifestyle interventions such as diet, exercise and weight loss.[1, 3]

Diabetes self-management is an essential component of diabetes care. Self-management practices for diabetes include regular exercise and dietary modification, taking medication, self monitoring of blood glucose (SMBG) and foot care.[1] Diabetes self management education (DSME) helps patients develop the knowledge, skills and abilities necessary to achieve effective self care behaviour.[4] Studies have shown that as many as 40% of diabetic patients fail to adhere to treatment recommendations; often patients adhere to some aspects of their self management regimen but not to others.[5-7] Research indicates that both psychological and social factors influence diabetes self care behaviours. Higher levels of diabetes-specific knowledge, self-efficacy and support from family and health care providers are positively associated with performance of self management activities.[6, 8-10] Ongoing support is critical to enhancing and sustaining self care activities particularly over the long term.[1, 4, 11] At present, very little is known about the self care practices of diabetic patients in Lesotho.[7] The primary objective of this study was to assess the self care behaviours of type 2 diabetic patients treated at a primary care clinic in Lesotho; secondary objectives were to identify barriers to diabetes self-management and to study the types of diabetes self management education and support received by patients.

MATERIALS AND METHODS

A cross-sectional study was conducted among diabetic patients attending the outpatient clinic at St.

Joseph's Hospital in Roma, Lesotho between April and May 2013. Patients had to meet the following inclusion criteria: 1) be at least 30 years old 2) have a diagnosis of type 2 diabetes mellitus and 3) have been treated for diabetes for at least 6 months. Patients who were unable to answer the questions or give consent were excluded from the study. Convenience sampling was used to select study participants. Consecutive eligible patients were invited to participate in the study, they were informed of the purpose of the study and informed consent was obtained from each patient.

Data was collected using a semi-structured questionnaire. The questionnaire was developed after an extensive review of the literature on diabetes self management and with input from primary care physicians, nurses and pharmacists involved in diabetes care. The questionnaire was translated into Sesotho, pre-tested and then modified accordingly. The final questionnaire consisted of three parts: 1) Sociodemographic characteristics (age, sex, education and annual household income) and medical history (diagnosis, treatment and monitoring of diabetes mellitus and comorbid conditions), 2) Diabetes self management education and support received by patients and 3) Self care behaviours of the patients (adherence to medication, diet, exercise, SMBG and foot care). Part 3 also contained a series of open-ended questions regarding the challenges and barriers in performing self care behaviours. We used face to face patient interviews and reviewed medical records to obtain relevant data.

Adherence to medications was measured by using patient recall information about the number of doses missed over the 7 days prior to the date of interview. Medication adherence was defined as taking all doses of anti-diabetic medication in the last 7 days. To assess dietary habits, patients were asked questions on the following: adoption of a specific dietary regimen since being diagnosed with diabetes - this included reducing daily caloric intake, having regular meals, eating at least 3 meals a day and eating healthy snacks in between meals. Patients were considered adherent if they had reduced their caloric intake. Adherence to exercise was defined as engaging in at least 30 minutes of mild to moderate intensity physical activity e.g. running, walking at a brisk pace, at least 4 times a week. Patients were considered adherent towards foot care if they followed any of the basic foot care principles (wearing well-fitting shoes, washing and moisturising feet and examining feet daily to detect minor injuries). For monitoring of blood glucose, patients were considered adherent if they performed SMBG at least once a week.

Data was analysed using SPSS (version 20.0). Responses to open-ended questions were organized into categories and then coded to facilitate analysis. Frequencies were calculated for descriptive analysis. Ethical approval was received from the Lesotho Ministry of Health Research and Ethics Committee.

RESULTS

Characteristics of the study participants: A total of 55 adult patients with type 2 diabetes mellitus were enrolled in the study. 65.45% of the study participants were female and the median age (IQR) was 60 (52 - 67) years; the majority were of a low educational and income level (Table 1). 61.82% had duration of diabetes > 5 years; all of the patients were treated with anti-diabetic drugs and 21.82% were using insulin. DM control was generally poor among the study participants and 23.64% had at least one recent hospitalisation (in the past 12 months) associated with uncontrolled diabetes. 85.45% of the patients had co-morbidities and 61.81% were previously diagnosed with chronic DM-associated complications. The most common co-morbidity was hypertension (85.45%) followed by heart failure (34.55%); 29 patients (52.73%) had diabetic retinopathy and 20 (36.36%) had diabetic foot.

Previous self-management education: 87.27% of all patients had received diabetes self management education (Table 2). Diabetes education was delivered mainly by nurses/diabetes educators (80.00%) and primary care physicians (38.18%); other sources of diabetes information included the mass media (radio and television, 12.73%). Most formal education interventions consisted of lecture-style group sessions lasting 15 - 30 minutes. The majority of the patients had been educated on the use of anti-diabetic medications and the importance of medication adherence, dietary modification and exercise. Less than a third of the patients had received specific education on foot care and self monitoring of blood glucose. None of the patients were attending a structured diabetes education programme and there was no follow-up and support for diabetes self management.

Study participants were aware of the value of diabetes education, especially education regarding healthy eating and many thought that self management education should start immediately after a diagnosis of diabetes. 32 patients responded to the open-ended question eliciting suggestions for

improving diabetes self management education and support: patients expressed the need for more frequent, regular education sessions (n = 19), the provision of written material to allow later reference by patients (n = 15) and inviting family members and caregivers to attend education sessions (n = 10).

Patient self care behaviours: Table 3 shows self-reported rates of adherence to self care behaviours.

Medication adherence: The majority of the patients attended regular follow-up visits for diabetes. The reported rate of adherence to anti-diabetic medications in the past 7 days was 74.54%. Of the 14 non-adherent patients, 8 had run out of medications, 4 had forgotten to take a medication (forgot the medication at home when travelling/going to work) and 2 had intentionally stopped taking their medicines (stopped taking medicine when feeling better). Most patients were aware of the importance of taking their anti-diabetic medication regularly as prescribed. When questioned about their general adherence to anti-diabetic medicines in the past, patients cited carelessness/being lazy/forgetting especially with regards to keeping appointments for checkups and refills as the main reasons for medication non-adherence.

Adherence to diet, exercise and weight control: On assessing general dietary habits, the majority of the study participants (85.45%) were eating three regular meals a day, generally consisting of a breakfast of bread and tea/coffee and traditional meals (pap – maize meal porridge, vegetables and/or meat) for lunch and dinner. In general, dietary advice had included traditional foods however none of the patients had been prescribed a specific meal plan. 58.18% of all patients had changed their diet and eating patterns since being diagnosed with diabetes: the most commonly adopted dietary practices were having specific meals times (n = 34), reducing calorie intake mainly by reducing the portion size of meals (n = 32) and eating healthy snacks between meals (n = 31). Commonly reported challenges in adopting a healthy diet included low palatability of the recommended food, limited access to food alternatives and difficulty in cooking separate meals for different members of the family. 23 patients were non-adherent to all aspect of diet modification. Love of food/poor self control (n = 10) were mentioned as specific barriers to dietary adherence; participants mentioned that portion control was difficult, especially when eating out of home or eating fast food. 12.73% of the study participants engaged in physical activity at the recommended levels and over 80% engaged in other physical activities (walking, doing housework and gardening) on a regular basis. Overall, adult males ≤ 65 years reported doing work-related physical activities frequently (vigorous manual labour, n = 8). General physical activity levels were lowest among elderly patients (> 65 years). The primary reasons for low physical activity among this group were general poor health (n = 7) and problems with mobility (n = 6).

The majority of the study participants (n = 44) were not aware of specific physical activity recommendations - i.e. types of physical activity/exercise intensity and duration/minimum amount of exercise required per week - to achieve health benefits. More than 90% of the study participants did not know their current weight and were not able to answer the question on whether they had lost any weight in the previous 6 months. A review of medical records showed that patient weight was not routinely recorded during clinic visits but of the few patients with weight records, only 2 overweight/obese patients had lost ≥ 5 kg in the past 6 months.

Self monitoring of blood glucose: 9 patients (16.36%) were performing SMBG at home. The rates of blood glucose testing were higher among females (25.00% vs. 0.00%), patients with a tertiary education level (30.00% vs. 13.33%), patients with diabetes-related complications (23.53% vs. 4.76%) and patients using insulin (33.33% vs. 11.63%); however the frequency of blood glucose testing was below the recommended guidelines for all patients. Around one third of the study participants did not give specific reasons for non-adherence to blood glucose testing; 14 patients did not feel that there was a need for self-monitoring of blood glucose, 8 did not feel comfortable using the glucometer (fear of needles/previously experiencing pain from finger-pricking) and 6 had glucometers but had not able to purchase test strips in the past 6 months.

Diabetes foot care: 28 patients (50.91%) practised basic foot care - washing, drying and moisturising the feet - daily. However most patients did not have knowledge about and did not practise foot care specific for diabetics; less than 15% of all patients performed daily examination of the feet for injuries and/or cuts and trimmed their toe nails on a regular basis. Responses to open-ended questions suggested that many patients did not understand the relationship between their feet and diabetes and/or thought there was no need to take special care of the feet as long as they were not painful.

DISCUSSION

Diabetes self management is an integral component of diabetes care. Research suggests that regular performance of self care activities such as eating a healthy diet and participating in physical activity is associated with improved glycaemic control in diabetic patients. [1, 12-13] We performed a cross-sectional study to assess self care behaviours among adult type 2 diabetic patients treated in the outpatient clinic of St Joseph's Hospital in Roma, Lesotho. We found that self care practices were generally below recommended levels among this population. Consistent with other studies,[6, 7, 14] participants reported relatively high rates of adherence to taking their anti-diabetic medications; however, adherence rates were substantially lower for other aspects of self-management such as exercise and self-monitoring of blood glucose.

Adherence to anti-diabetic medications is essential in achieving glycaemic control and preventing or delaying the onset of diabetes complications.[1] It is generally acknowledged that adherence rates to long-term therapies for chronic conditions such as diabetes mellitus average only about 50%.[15-17] Reasons for non-adherence to medication are varied: patient-centred factors such as knowledge about diabetes and its treatment and psychological factors such as beliefs and attitudes towards therapy influence adherence to anti-diabetic medications.[18-19] In this study, patients cited forgetfulness/carelessness with keeping clinic appointments and taking medicines as the main reasons for medication non-adherence, a finding which is consistent with those of other researchers. Gadkari & McHorney, [18] found that forgetting to take medication, running out of medication and being careless about taking medication were the most commonly reported unintentional non-adherence behaviours among patients taking chronic prescription medications. The reasons underlying unintentional non-adherence have not been fully elucidated, however several strategies can be employed to reduce this type of non-adherence. Recent studies suggest that interventions using reminders in the form of follow-up telephone calls by healthcare providers to patients and electronic reminders are effective in improving adherence to medication. [20-21]

Overweight/obesity is a key risk factor for the development of type 2 diabetes mellitus. Modest weight loss (5 - 10 % of initial body weight) is associated with improved glycaemic control in overweight and obese patients with type 2 diabetes.[22-24] To achieve weight loss, the American Diabetes Association recommends lifestyle changes which include increased regular physical activity and reduced caloric and dietary fat intake.[1] In the current study, more than 90% of the patients were overweight/obese, and the majority of these did not report any weight loss in the previous 6 months. Adherence was higher to dietary recommendations than to exercise, a finding which is commonly reported among patients with diabetes.[5-6, 25] Psychosocial factors such as lack of willpower,[26] and low levels of family support,[10, 27] influence adherence to self-management behaviours. Our results suggest that lack of knowledge was also an important barrier to self care among the study population; although patients were generally aware of the importance of diet and exercise in managing their disease, many individuals had significant knowledge deficits regarding specific dietary and physical activity recommendations. An appropriate diabetes self management education intervention in this setting should focus on assisting patients to acquire the knowledge and skills to successfully initiate lifestyle modifications. In addition, strategies should be put in place to provide ongoing social and professional support to help patients sustain behavioural change.

Self monitoring of blood glucose is an important component of diabetes self-management. SMBG allows patients to evaluate short-term glycaemic control and enables early detection of acute metabolic complications of diabetes. Blood glucose monitoring also increases patient empowerment by providing feedback on the results of lifestyle and pharmacological treatment. [28] In spite of these benefits, a large proportion of diabetic patients do not monitor their blood glucose.[5-7, 14] Karter et al.[29] and Adams et al.[30] identified older age, male gender, lower socioeconomic status and higher out of pocket costs for test strips as independent predictors of non-adherence to SMBG. In our study, SMBG was higher among females, insulin-treated patients and patients with chronic diabetes-related complications. However, the frequency of SMBG was suboptimal for all patients. The low rates of performance of SMBG are particularly concerning in this population in which we found evidence of general long term poor control of diabetes, frequent diabetes-related hospitalisations and a high prevalence of chronic diabetes complications. In an earlier study, financial constraints were cited as the major barrier to regular SMBG among a population of diabetic patients in Maseru, Lesotho.[7] Our current findings indicate that lack of awareness of the importance of SBMG also contributes to non-adherence to blood glucose testing. Interventions to increase blood glucose self

monitoring among this population should emphasise the value of SMBG in facilitating identification of hypoglycaemic and hyperglycaemic events thus enabling patients to implement appropriate interventions. Future studies should explore the feasibility of expanding diabetes care services at the clinic to cater to the needs of specific groups of patients such as those taking insulin for more frequent monitoring of blood glucose levels.

This study has several limitations such as bias due to self-reporting and a cross sectional study design which precludes an assessment of causality between the type of diabetes education received, self management knowledge, performance of self care behaviours and glycaemic control among the study participants. The study was conducted at a single centre and, although the response rate was above 95%, the number of patients was low thus our results may not be generalisable to the whole population of diabetic patients in Lesotho. However, based on our experience in primary care, the study participants had sociodemographic characteristics and clinical profiles typical of adult type 2 diabetic patients treated in primary care settings in Lesotho. In addition, the range of diabetes services including the type of self management education and support offered at the clinic was similar to that found in other public sector clinics. For these reasons, in spite of the limitations above, it is possible to draw meaningful conclusions

regarding patient self care behaviours and perceived barriers to self management and to make recommendations to improve diabetes self care and glycaemic control among diabetic patients in this setting.

CONCLUSIONS

In conclusion, we found that performance of diabetes self care behaviours among this population of type 2 diabetic patients treated in a primary care clinic was below recommended levels. Self-reported adherence was highest to medication taking (74.54%), followed by diet (58.18%) and foot care (50.91%); the least practised behaviours were self-monitoring of blood glucose (16.36%) and engagement in regular, physical activity (12.73%). Barriers to diabetes self care included forgetfulness, lack of appropriate diabetes self management knowledge and skills and financial constraints. Interventions to improve diabetes self care among this population should include provision of structured self management education and support to help patients acquire the knowledge and skills necessary for self-care.

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Table 1: Sociodemographic characteristics and medical history

	No. of respondents
Female gender	65.45%
Age group (years) 30 - 65 > 65	 65.45% 34.55%
Educational level Less than high school High school graduate Tertiary level and above	 47.27% 34.54% 18.18%
Employment status Unemployed Employed Pensioner	 36.36% 43.64% 20.00%

Annual household income Low (< M12 000) Middle (M12 000 - M60 000) High (> M60 000)	69.09% 23.64% 7.27%
Hypoglycaemic regimen Oral medications Oral medications + insulin Insulin only	78.18% 18.18% 3.64%
Fasting blood glucose at current visit $\geq$7.0 mmol/l	85.45%
Body mass index Normal Overweight Obese	5 (9.1) 34 (61.8) 16 (29.1)

Table 2: Diabetes self management education received

	No. of Respondents
Educated on diabetes self care	87.27%
Type of education session Group Individual	67.27% 25.45%
Areas of self care education Medication adherence Dietary modification Exercise Foot care	81.82% 85.45% 76.36% 32.73%
Patient rating of diabetes education Good Satisfactory/Fair Inadequate	54.55% 29.09% 16.36%

Table 3: Adherence to self care behaviours

Category	No. of Respondents				
	Medication n = 41	Diet n = 32	Exercise n = 7	SMBG n = 9	Foot care n = 28
Gender Male (19) Female (36)	73.68% 75.00%	52.63% 61.11%	10.53% 13.89%	0.00% 25.00%	42.11% 55.56%
Age 30 – 65 (36) > 65 (19)	72.22% 78.95%	66.67% 42.11%	19.44% 0.00%	16.67% 15.79%	52.78% 47.37%
Education < Tertiary (45) Tertiary (10)	73.33% 80.00%	57.78% 60.00%	11.11% 20.00%	13.33% 30.00%	57.78% 20.00%
Income Low-middle (51) High (4)	74.51% 75.00%	58.82% 50.00%	11.76% 25.00%	15.69% 25.00%	52.94% 25.00%
Complications Yes (34) No (21)	67.65% 85.71%	52.94% 66.67%	17.65% 4.76%	23.53% 4.76%	44.12% 61.90%
Insulin use Yes (12) No (43)	66.67% 76.74%	41.67% 62.79%	33.33% 6.98%	33.33% 11.63%	41.67% 53.49%

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