RESEARCH ARTICLE

ASSESSMENT ON KNOWLEDGE OF DIABETIC PATIENTS ON THEIR DISEASE AND THERAPEUTIC GOAL AT AYDER REFERRAL HOSPITAL, MEKELLE, ETHIOPA

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ABSTRACT

Diabetes mellitus is a chronic illness that requires continuing medical care and patient self-management education to prevent acute and long term complications. The aim of this study was to assess diabetic patients' knowledge of their disease and therapeutic goals at Ayder referral Hospital. A descriptive cross sectional study was conducted on139 diabetic patients, who attended outpatient Diabetes clinic of Ayder Referral Hospital. Data was collected through face-to-face interview using a pre-tested structured questionnaire. SPSS version 16 was used to analyze the data. The result showed that out of 139 patients, Seventy six (54.7%) of them were men. Overall the general knowledge of patients was found as; 41(29.5%) scored good, 32(23%) scored moderate and 66(47.5%) scored poor. From all the patients, 38 (27.3%) had good knowledge, 30(21.6%) had moderate and 71(51.1%) scored poor on disease related questions and 38 (27.3%) scored good, 49(35.3%) moderate and 52(37.4%) scored poor on therapeutic goal related question types. In this study patients had Knowledge deficit about their disease, which limits their involvement in the management of their disease. This study emphasizes the need for diabetes education at all levels to tackle diabetes-related complications.

Key words: Knowledge, disease, diabetes, self-management, therapeutic goal Ayder Referral Hospital

1.   INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic disorders of multiple etiologies of hyperglycemia due to disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. It is characterized by symptoms of polydypsia, polyuria, polyphagia, blurring of vision and weight loss [1].

Diabetes mellitus is classified in to four classes as: type 1, type 2, gestational diabetes mellitus and due to other causes (e.g., genetic defects, diseases, drug or chemical-induced) [2].

The latest American Diabetes Association (ADA) and American Association of Clinical Endocrinologists (AACE) criteria for the diagnosis of diabetes mellitus are: fasting plasma glucose $\geq$ 126 mg/dl (7.0 mmol/l) or 2 hour plasma glucose $\geq$200 mg/dl (11.1 mmol/l) during an oral glucose tolerance test, or in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose $\geq$200 mg/dl (11.1 mmol/l). Glycated haemoglobin (HbA1C/ A1C) $\geq$ 6.5% has been newly added as a fourth diagnostic criterion for diabetes mellitus [2, 3, 4].

The ADA and AACE emphasizes that appropriate diabetes care requires goal setting for blood glucose, blood pressure, lipid levels, regular monitoring for complications, medications, dietary and exercise modifications, appropriate self-monitoring of blood glucose (SMBG) and laboratory assessment of the aforementioned parameters. Glucose control alone does not sufficiently reduce the risk of macrovascular complications in persons with DM. As per the ADA and AACE recommendation, the goals of diabetes treatment are: blood glucose (fasting blood glucose 70-130 mg/dl, postprandial blood glucose <180 mg/dl, A1C <7 %), lipid (LDL cholesterol <100 mg/dl, total glyceride <150 mg/dl, HDL cholesterol > 40 mg/dl for men and >50 mg/dl for women) and blood pressure <130/80 mmHg [2, 3].

Diabetes mellitus is emerging rapidly as a major public health problem in the developing countries, both in numbers and costs of management [5]. The global number of individuals with DM in 2000 was estimated to be 171 million (2.8% of the world's population), this figure is expected to increase in 2030 to 366 million (6.5% of the World's population), about 81.4% of whom will live in developing countries [6].

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In Africa the prevalence and burden of DM is increasing that could be explained by rapid uncontrolled urbanization, westernization and associated life style changes and increasing life expectancy [7]. World health organization (WHO) estimated that in 2000, the prevalence of diabetes in African Region was 7.02 million people, out of which about 0.702 million (10%) people had type 1 diabetes and 6.318 million (90%) had type II diabetes[8]. The prevalence of DM in Ethiopia is also rising and it is expected to increase from 826,000 (2.0%) in 2010 to 2,030,500 (2.8%) in 2030 [5].

Diabetes is a chronic illness that requires continuing medical care and ongoing patient self-management, education, and support to prevent acute complications and to reduce the risk of long-term complications [9].

Self-management is a crucial element of good diabetes care. Self-management of diabetes can significantly decrease the development and/or progression of diabetic complications, and it has been found to be cost-effective in primary practice settings [10]. Several large-scale trials have demonstrated that comprehensive interventions that include self-management can prevent complications from type 1 and type 2 diabetes[11]. Diabetic patients' ability to practice self-care depends on their knowledge about the disease [12]. A randomized clinical trial conducted in Thailand demonstrated that a diabetic self-management program had promoted better A1C levels, a lower coronary heart disease risk and better quality of life [10].

Meta-analysis done on quality of life outcomes following diabetes self-management training showed that people with diabetes experience improved quality of life from participation in diabetes self-management training programs [13]. Improving patients' knowledge about their disease and treatment through counseling improved not only quality of life but also led to better control of blood glucose [14]. A study done in Malaysia showed that higher diabetes knowledge, good adherence and mono-therapy were predictors of better glycemic control for type 2 diabetes patients. In developing countries, the incidence of non-communicable diseases (NCDs) correlates with the degree of modernization and lifestyle changes; thus placing a double burden of diseases on people in the Sub-Saharan countries [15]. A previous study of beliefs about health and illness in Zimbabweans diagnosed with diabetes mellitus indicated limited knowledge about diabetes. It was further reported that the limited knowledge about DM affected self-care and health-seeking behaviors amongst Zimbabwean males and females with DM [15, 16]; although this was less marked in comparison with findings from a related Ugandan study [17]. From both these studies, gender seemed to influence the awareness of the disease, with females thus being more information-seeking and active in self-care. However, irrespective of gender, limited diabetes knowledge and self-care was indicated [18]. With a few exceptions [19], no other studies investigating knowledge of diabetes and knowledge gaps have been found in African populations. All previous studies concluded limited knowledge about diabetes, management and patient self-care [20]. It has been reported that patients with diabetes often lack sufficient knowledge about their disease and thus frequently have poor self-care management [21]. The outcome of diabetes depends mainly on the patient's self-management including health-related behavior which is determined by individual beliefs about health and illness, based on his or her knowledge [22]. Health education by health care staff and employing new research findings and useful strategies can reduce the burden of the disease. Nurses play an important role in fighting the pandemic and the burden of it by working with health-promoting education [23], particularly to enable the patients to take responsibility for their lives and help them feel safer in making their own decisions and to improve their knowledge and attitudes towards their health [24].

The incidence of clinical complications of type 2 diabetes was significantly associated with the level of glycaemia. According to the United Kingdom Prospective Diabetes Study (UKPDS) for each 1% reduction in updated mean HgA1C was associated with reductions in risk of 21% for any end point related to diabetes, 21% for deaths related to diabetes, 14% for myocardial infarction, and 37% for microvascular complications [25].Evidences from different studies showed that intensive management of glycaemia and other risk factors of type 2 DM had been shown to reduce the development and/or progression of microvascular and macrovascular complications [26]. A cross sectional study conducted in Malaysia showed that only 17.4 % of the respondents achieved the recommended glycemic target of HgA1C less than 6.5 % despite all of respondents were on medication [11]. In a Kenyan study from total of 305 diabetic patients about 60% of them did not achieve the target glycemic level [27].

A study done at different health institutions of Addis Ababa showed that the diabetic care was below the acceptable standard. Findings from this study showed that only 21% of patients had access for blood glucose monitoring at the same health institutions, only 5% were able to do SMBG at home and the emphasis given for diabetic education was 24%. Fifty one percent of patients did not have renal function test and lipid profile determination in the previous 1-2 years. None of diabetic patients had HgA1C determination due to unavailability of laboratory facility [28].

It is known that the prevalence of DM is increasing and becoming a public health problem in Ethiopia. Although evidences showed that good patient knowledge about the disease is associated with better outcome, no emphasis has been given to diabetes health education. According to the available data, no study has assessed the level of diabetic patients' knowledge about their disease, therapeutic goals, and goal attainment in hospitals like Ayder Referral hospital. So the present study assesses the knowledge of diabetic patients on their disease, life style modification, medication, medication adherence and therapeutic goals.

2. METHODOLOGY

Study Area and period

This study was conducted from March to June, 2013 at the diabetic follow up clinic of Ayder Referral Hospital (ARH). It is located in north part of Ethiopia, Tigray region, Mekelle town 783 km far from Addis Ababa, Capital city of Ethiopia.

Study design

A descriptive cross sectional study was conducted on 139 diabetic patients who attend outpatient DM clinic, Ayder Referral Hospital.

Source population:

All diabetic patients who have been treated and registered at the diabetic follow up clinic of Ayder Referral Hospital.

Target population:

All diabetic patients who were 18 years of age and above.

Inclusion criteria:

Patients who were: volunteer, diagnosed with type-1 or type-2 DM, ≥18 years old, on pharmacological management and followed up for at least three times have participated in the study.

Exclusion criteria:

Diabetic patients who were: not willing, seriously ill, not diagnosed withtype-1 or type-2 DM, <18 years old, not on pharmacological treatment and followed up for less than three times.

Sample size determination

The sample size for this study was calculated using the following formula:

$$n = (Z^2)\frac{P(1-P)}{d^2}$$

When n is the desired sample size for population **>10,000**, **Z** is the reliability coefficient at 95% i.e. 1.96. **P** is proportion of diabetic patients who know about their disease, therapeutic goals with self-management practice. Since there is no similar study done, **P** is taken as 50% to calculate the maximum sample size. Taking 5% marginal error (d=0.05) for precision, the maximum sample size becomes;

$$n= (1.96)^2 (0.50) (0.5)/ (0.05)^2$$

$$n = 384$$

Using the correction formula to estimate final sample size (nf) from a finite target population (**N**):

$$nf = \frac{n}{1 + \frac{n}{N}}$$

Where nf the final corrected sample size for the study, n is the minimum sample size determined and N is the number of target population. Since there were 200 diabetic patients currently on follow up which fulfill the inclusion criteria at the diabetic clinic of ARH, N is equal to 200. The final corrected sample size was132by substituting in the formula. Adding 5% for non-response rate, the final sample included in the study was;

$$132x5/100 = 6.6 \qquad \text{Then } \textbf{nf} = 132 + 7 = \underline{139}$$

Sampling technique

After sample size determined, systematic random sampling technique was used by numbering patients 1, 2…..200 and sampling interval was determined by:

$$K = \frac{\text{Total population}}{\text{Determined sample size}} = \frac{200}{139} = 1.4 \approx 1$$

Number 1was selected by lottery method from 1 & 2 (starting point) and every 1 was interviewed; i.e. 1, 3, 5, 7…139, until the number of patients reach 139.

Data Collection Procedure and Analysis

Data was collected from participant via face to face interview by the data collectors. Literate patients filled the questionnaire by themselves and those who couldn't write and read were interviewed by nurses, clinical pharmacists or other data collectors. The tool used consists of two parts; the first part consists of socio-demographic data (gender, residence, monthly income, occupation, education level, age group and marital status) and duration of diagnosis and the second part is the brief Diabetes Knowledge questions.The brief Diabetes Knowledge questionnaire was composed of 36 close ended (yes or no) questions testing the patients' general understanding of diabetes with respect to disease, medication and medication adherence, source of health information and life style modification. 16 questions assessed disease Knowledge and the remaining 20 questions assessed medication, medication adherence, lifestyle modification and source of health information Knowledge. Adding the two question parts (disease knowledge and knowledge on medication, medication adherence, life style modification and source of health information) give the score of total knowledge about diabetes. The total knowledge score was determined by giving one point for each correct answer and a zero for a wrong answer or no response. The questions correctly answered were recorded and percentile. Then data were analyzed using SPSS version 16.0. The knowledge score range was categorized as: those who answered >56% Good Knowledge, 45-55% Moderate Knowledge, <44%Poor Knowledge depending upon the maximum and minimum points they scored.

Data quality management

Great emphasis was given in designing data collection instrument for its simplicity and understandability. The data collection instrument format was developed in English and interviewed the patients in local language by data collectors for its accuracy and desired results.

Ethical consideration

Ethical clearance and approval of the study was obtained from Institutional Review Board of Mekelle University, College of Health Sciences.

3. RESULTS

Among one hundred thirty nine diabetic patients, 67(48.2%) were male and 72 (58.1%) were female. Twenty three patients (16.5%) were above 56 years of age, 52 (37.4%) of patients were in the age group of 41- 55 years, 34(24.5%) were between 31-40 years, 30 (21.6%) were in the range of 18-30 years. Majority of the patients 53 (38.1%) were diagnosed between 2-3 years, 36 (25.9%) were diagnosed above three years, 30 (21.6%) were between 1-2 years and 20 (14.4%) were below one year of diagnosis (**Table-1**).

Table 1: Socio-demographic Characteristics of the study population in Ayder Referral Hospital, June, 2013

Characteristics	Details	Population(n=139)	%
Gender	Male	67	48.2
	Female	72	51.8
Age	18-30	30	21.6
	31-40 years	34	24.5
	41-55 years	52	37.4
	> 56 years	23	16.5
Residence	Rural	47	38.1
	Urban	92	61.9
Education	No formal education	41	29.5
	Primary education	38	27.3
	Secondary education	25	25.2
	Tertiary education	35	18.0
Duration	≤1years	20	14.4
	1-2years	30	21.6
	2-3years	53	38.1
	> 3 years	36	25.9
Marital status	Married	90	64.7
	Single	32	23.0
	Divorced	12	8.6
	Widowed	5	3.5
Monthly income	<500	22	15.8
	500-1000	29	20.9
	1000-2000	54	38.8
	>2000	34	24.5
Occupation	civil servant	29	20.0
	Merchant	39	28.1
	farmer	17	12.2
	pensioner	6	4.3
	house wife	26	18.7
	Student	15	10.8

This study revealed that there was no significant differences statistically on diabetes knowledge scores among patients with difference in marital status (p*=0.871), occupation (p*=0.190), monthly income (p*=0.251) and age group (p*= 0.549). But there was significant difference in the diabetic knowledge scores between rural (33.8%) and urban (66.2%) patient groups (p<0.003). Patients' with long year of diagnosis (DM>3years) were scored higher (38.2%) than those below 3years of diagnosis **(Table 2).**

Total diabetic knowledge scores for the study group were 42.7%. Overall only 21.6% of patients responded correctly all questions regarding disease, 12.3% and 23.7% of patients responded correctly to the Medication and Medication adherence knowledge, respectively. Twenty five point nine percent of patients answered correctly regarding questions on life style modifications, 33.1% of patients answered correctly to their source of health information question while only 4.1% patients had scored correct to the therapeutic goal questions (**Figure-1**).

Table 2: The significance comparison (p- value) of participants on socio-demographic factors in Ayder Referral Hospital, June 2013

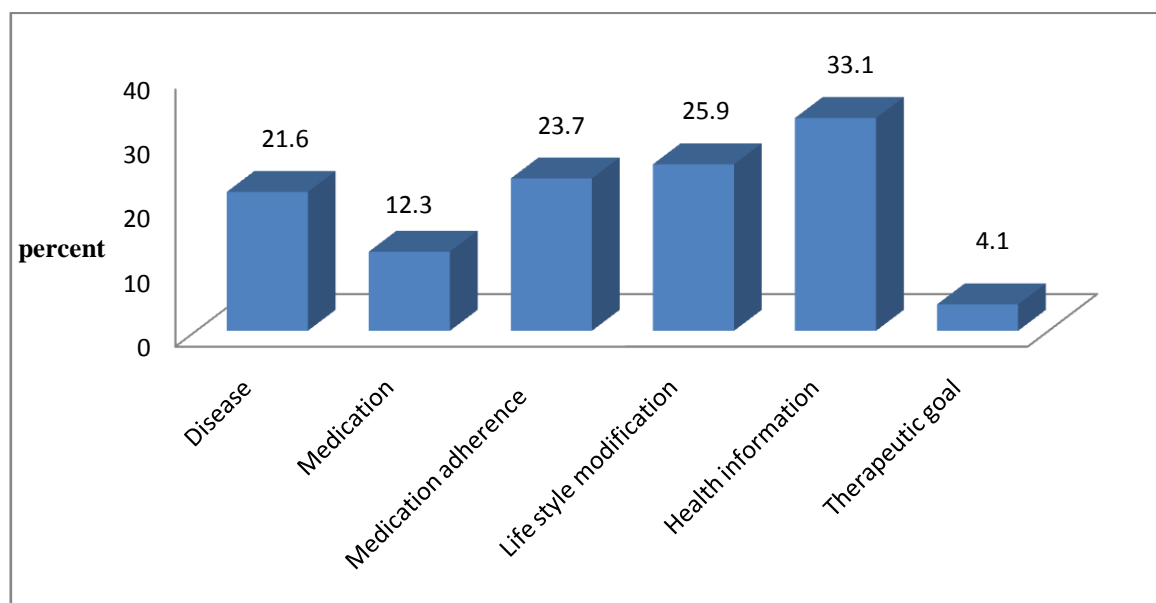| Variables	p. value's
Sex	0.041
Residence	0.003
Age group	0.549
Marital status	0.871
level of education	0.026
Monthly income	0.251
Duration of DM	0.048
Occupation	0.190

Figure 1: Percent of diabetic patients who answered all questions correctly in Ayder referral Hospital, June, 2013

The general knowledge score of patients was found as; 41(29.5%) scored good, 32(23%) scored moderate and 66(47.5%) scored poor. From all the patients, 38 (27.3%) had good knowledge, 30(21.6%) had moderate and 71(51.1%) scored poor on disease related questions, 23(16.5%) scored good to medication related questions, while 35 (25.2%) had moderate and 81(58.3%) scored poor. Thirty seven (26.7%) of patients scored good, 23(16.5%) moderate and 79(56.8%) had poor knowledge to medication adherence. Of total 40(28.8%) scored good, 30 (21.6%) moderate and 69(49.6%) scored poor on life style modification questions. Thirty eight (27.3%) scored good, 49(35.3%) moderate and 52(37.4%) had poor knowledge on therapeutic goals (**Figure-2**).
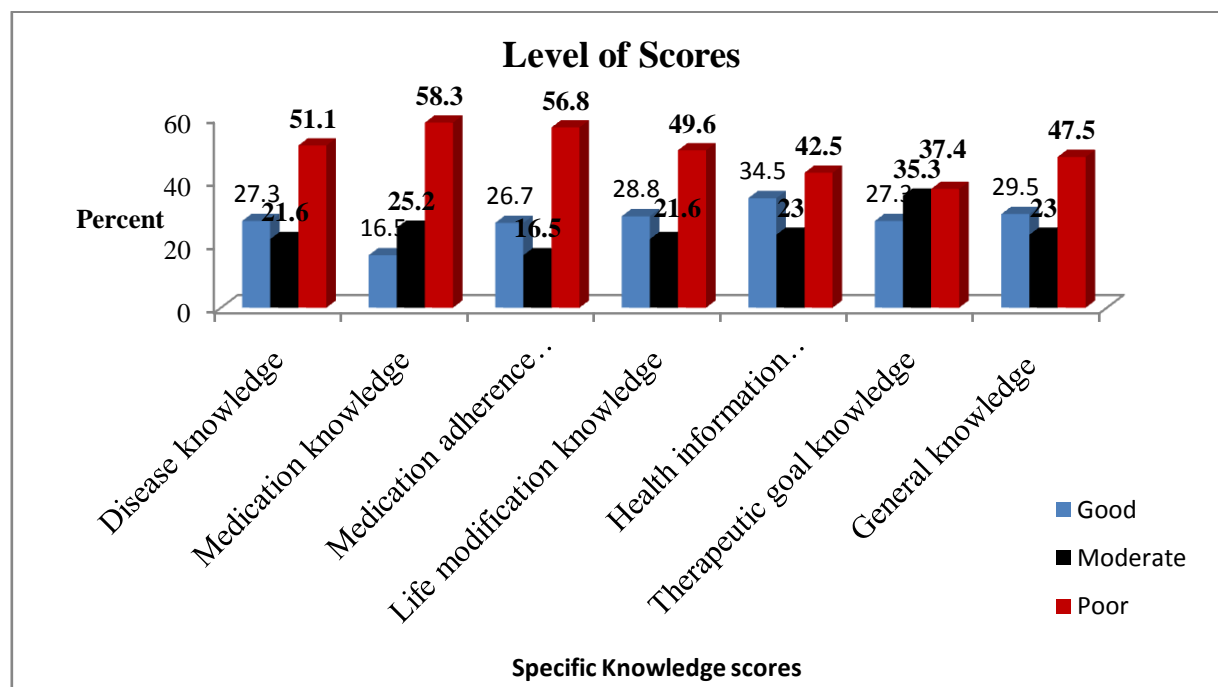

Figure 2: Summary of specific knowledge score of diabetic patients in Ayder referral hospital, June, 2013.

4. DISCUSSION

Although there are many facets that reflect the successful management of diabetes, including a strong working partnership between the patient and the health professionals, patient's knowledge has been recognized as a necessary ingredient in their ability to lead uncomplicated life. This study reveals that majority of the patients (47.5%) scored poor on general knowledge. While only 29.5% patients scored good knowledge and 23% scored moderate. This indicates that the patients' knowledge on their disease, medication, medication

adherence, life style modification and therapeutic goal was poor. This could be attributed to lack of educating diabetic patients through various ways. This finding was similar with other studies done in Kenya [9] which found only 29% good knowledge score and 71% poor knowledge score. But their study reveals that over 49.3% of those with good knowledge had poor practices as far as diabetes is concerned which was not assessed in this study. According to the Kenyan study Knowledge does not always result in behavioural change and need to be reinforced by practice [27]. The study done in Pakistan [29] showed, that the poor knowledge score (48.2%) has close similarity with the poor knowledge score of this study (47.5%) but a smaller percentage of good knowledge (13.6%) than the percentage of good knowledge (29.5%) in this study. This might be due to smaller sample size (139) and low literacy rate in this case; while a study done in Kuwait [30] found that 71% with poor knowledge which was a bit higher than this study result and the reason could be the higher sample size used by the study (1895) and the classification system which classified into poor and good only. But the good knowledge score of this study (29.5%) was the same with the Kuwait study that found 29.5%.

The present study showed that, men achieved significantly higher knowledge score than women. The result of the current study showed that the low percent of literacy of this sample had statically significant correlation with their knowledge. This finding was consistent with many other studies done in other like Zimbabwe, Cameroon and Nigeria that had similar socio-economic status and literacy levels of subjects [16, 19, 31].Women were less aware than men mostly due to low literacy rates and less access to information among women in this part of the world [20]. In contrast to this study regarding gender differences, the study done in Latinos [12] found that men were having significantly less general knowledge about diabetes than women. The discrepancy of the findings of these studies and the

findings of the present study might be attributed to the differences of the patients' populations. When the findings of the present study were compared with the study in Indian [32] which found a higher (65.1%) score of good knowledge than this study (29.5%) due to the fact that their population received diabetes education and higher literacy (81%) rates as 27.3% of the present study sample had primary school or less than 8 years of education (low literacy).

This study found that the general knowledge between the residence type and duration of diagnosis was statically significant and it might be due to low resource availability and lack of access to information at the rural area. And the knowledge of patients depends on the duration of diagnosis i.e. the newly diagnosed patients will not be exposed with any diabetes related information in past and do not have the accurate information about the disease (**Table 2**).

CONCLUSION

This study has found knowledge deficit with regard to disease, medication and medication adherence, therapeutic goal and life style modification.

RECOMMENDATIONS

It is recommended that the proper improvement of clinical outcome and improving quality of life of diabetic patients needs active participation of healthcare professionals & Medias to increase awareness of patients on their disease.

ACKNOWLEDGEMENT

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