

Knowledge of Complications of Diabetes Mellitus and its Associated Factors among Type 2 Diabetic Patients Visiting Addis Zemen District Hospital, Northwest Ethiopia

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Research note

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Abstract

Objectives: To reduce Diabetes mellitus related morbidity and mortality, knowledge about its complications is necessary. However, there is no information about knowledge of diabetic patients on diabetes mellitus complications in Ethiopia. Therefore, the aim of this study was to assess knowledge on diabetes complications and its associated factors among Type 2 diabetic patients at Addis Zemen District Hospital, northwest Ethiopia, 2019. Institution based cross sectional study was conducted among 402 type 2 adult diabetes patients at Addis Zemen District Hospital by using interviewer administered structured questionnaires. **Results:** In this study, less than half (48.5%) with 95%CI (43.3, 52.7) of participants had a good knowledge regarding diabetes complications. Being: male (AOR: 4.67, 95% CI (2.53, 8.61)), in the age of 31-45years (AOR: 7.30, 95% CI (3.10, 17.17)) educational level of high school and above (AOR: 7.46, 95%CI (3.02, 18.44)), having monthly income of \geq 2500 Ethiopian birr (AOR: 7.18, 95%CI (1.70, 30.28)) were significantly associated with good knowledge. This must get the attention of health institutions, the government, and all concerned stakeholders in the health sector to design strategies on increasing diabetes complications knowledge among diabetes patients to decrease morbidity and mortality associated with the complications.

Introduction

Diabetes mellitus (DM), a group of metabolic disorders characterized by high blood sugar levels over a prolonged period, is increasing rapidly in both developed and developing countries (1). Unless appropriate intervention is taken, it is expected that there will be at least 350 million people in the world with type 2 diabetes by the year 2030(2). Type 2 diabetes will be the predominant public health problem in Africa which is expected to be 28 million by 2030(3) and 41.6 million in 2045(4). According to the International Diabetes Federation (IDF) report, there were 2, 652,129 cases of diabetes in Ethiopia in 2017 making it the first among the top five countries of Africa for a number of people with diabetes with the age of 18-99 years (4).

Most consequences of diabetes result from its complications which include: retinopathy, diabetic foot, renal complications, stroke, heart complications, teeth decay, neuropathy, hypertension, and sexual dysfunction (1). Prevalence of diabetes and its complications are increasing alarmingly which brought a heavy burden to patients and health system (5). A systematic review and meta-analysis on the Epidemiology of diabetes and complications among adults in the Republic of Ireland 1998-2015 show that the prevalence of diabetic complications is increasing (6). Studies which were undertaken in Ethiopia showed that prevalence of visual disturbance, neuropathy, nephropathy and diabetic foot ulcer were 33.8%, 29.5%, 15.7% and 13.6% respectively (7,8).

More than (59.7%) half of the patients were found to have been affected by one or more of the diabetic complications (9).

Adequate knowledge of diabetes is a key component of diabetic care. Many studies have shown that increasing patient knowledge regarding diabetes and its complications have significant benefits for compliance to treatment and to decrease complications associated with it (10). A patients shortage of knowledge on diabetes complications contributes to high rates of complications (11). Knowledge of complications of DM is important in designing, prevention and management strategies for DM, and its complication. There is no published data regarding the knowledge of diabetic complications in Ethiopia. That is why this study was conducted to assess the level of knowledge of diabetes mellitus complications among Type 2 diabetics visiting the diabetic clinic at Addis Zemen District Hospital, northwest Ethiopia. Therefore, the findings of the present study will fill the gaps in knowledge of DM complications.

Methods And Materials

Study area and period: The study was conducted at Addis Zemen District Hospital, northwest Ethiopia, which is located in Amhara region, from April 02, 2018 to June 02, 2018.

Study design: Institution-based cross-sectional study design was employed.

Source population: All diabetes mellitus patients on chronic follow up at diabetic clinic at Addis Zemen Hospital.

Study population: Those Diabetic patients who came to diabetic clinic during the 3 months of data collection period.

Eligibility criteria: All Diabetes patients were included except those who were in severe illness that limits them to respond for questionnaires and those who were health professionals.

Sample size determination: The sample size was calculated by using single population proportion formula considering $p=50\%$ (magnitude good knowledge towards DM complications, since there was no previous study in Ethiopia), 95% level of confidence and 5% margin of error. Then sample size became 384. After adding 5% non-response rate, the minimum calculated sample was 404.

Variables of the study

Dependent variable: Good knowledge (Yes/No).

Independent variables: Age, sex, residence, marital status, occupation, educational status, income, duration since diagnosis as diabetic, family history DM,

Operational definitions:

The knowledge of the patient was calculated by summing the correct answers as follows.

Poor Knowledge= Participants who mentioned <15 correct answers

Good Knowledge= Participants who mentioned ≥ 15 correct answers

Data collection instrument and procedure: The structured pretested self-administered questionnaire was used. The questionnaires contain 28 diabetes complications knowledge assessing items. First, the adopted questionnaire was prepared in English and translated to Amharic and then, translated back to English by another person to check its consistency and wording. The cut off point for describing knowledge was calculated by the mean and the score above the mean value was good DM complications knowledge. Three supervisors participated in the data collection..

Data quality management/control: Training was given for data collectors and supervisors about the aim of the study and data collection methods and ethical issues for supervisors and data collectors. Pretest was done on 45 DM patients in University of Gondar specialized Hospital DM clinic. During data collection close supervision, daily meeting to share challenges and revision was done. Data clean up and crosschecking was done before analysis.

Statistical analysis

The data were checked for completeness and entered to Epi Info version 7 and were exported to SPSS Version 20. Descriptive statistics such as frequencies and percentage were used. The variables found to be significantly associated with the dependent variable in binary logistic regression ($p<0.2$) were entered to multivariable logistic regression analysis to predict factors associated with good knowledge of diabetic complication. P-value less than 0.05 were considered statistically significant.

Results

Socio-demographic characteristics of respondents

The study was conducted on 402 study participants with the response rate of 99.5%. Two hundred twenty-five (56.0%) patients were female. The mean age was 46 (SD \pm 14) years. Concerning age, 150 (37.3%) of the respondents were aged \geq 45 years. Majority 91(22.6%) had an educational level of high school and above. Over one third (33.8%) of the respondents had a monthly income of below 500 Ethiopian birr. One hundred and eighteen (29.4%) study participants had a family history of diabetic mellitus. (Table1)

Knowledge about complications of DM

In this study, 195(48.5%) of the diabetic patients had a good knowledge of DM complications with 95%CI (43.3, 52.7). Over two third (62.9%) of patients were informed about diabetes complications from health professionals. Most of the study participants 372 (92.5%) had knowledge of dietary modification to prevent diabetes complications. Three hundred sixty-seven (91.3%) knew about complication related risk factor of alcohol and cigarette smoking. Diabetic foot 297(73.9%) was the most known complication of DM followed by eye complications 292(72.6%), and heart complications 254(63.2%). (Table 2)

Factors associated with a good knowledge of diabetes mellitus complications among DM patients

All independent variables were tested for crude association with good knowledge by binary logistic regression, However, after adjusting for potential confounders in the multivariable analysis, being; male (AOR: 4.67, 95% CI (2.53, 8.61)), in the age of 31-45years (AOR: 7.30, 95% CI (3.10, 17.17)), \geq 45 years old (AOR: 15.02, 95% CI (6.11, 36.92)), educational level of read and write (AOR: 3.79, 95% CI (1.78, 8.06)), primary school (1-8) (AOR: 9.58, 95% CI (3.26, 28.18)), high school and above (AOR: 7.46, 95% CI (3.02,18.44)), being NGO employee (AOR: 7.24, 95% CI (2.68,19.53)), having a family history of DM (AOR: 5.55, 95% CI (2.53,12.20)); income of 1001-1500 (AOR: 3.22, 95% CI (1.28,8.10)), 1501-2500(AOR: 11.73, 95% CI (4.32, 31.81)) and $>$ 2500 Ethiopian birr (AOR: 7.18, 95% CI (1.70,30.28)) were significantly ($p<0.05$) associated with a good knowledge (Table 3).

Discussion

This study has provided data about the knowledge of complications of diabetes mellitus among diabetic patients visiting the diabetic clinic at the Addis Zemen Hospital, northwest Ethiopia. Comprehensive assessment of the level of knowledge of 402 patients on DM complications showed that less than half of participants had a good knowledge. This finding is more or less similar with the study conducted in Ghana (40%) (12), Mongolia (33.3%) (13). On the contrary, it is not in line with other studies, India (74.2%) (14), Oman (55.5%) (15) and Pakistan (62%) (16), which showed that more than half of respondents had a good knowledge of DM complications. The reason for the difference may be because of a difference in socioeconomic conditions, cultural beliefs and habits, as studies showed that differences in such variables had an impact on the pattern of knowledge on diabetic complications(17).

In the current study, age, sex, educational level, occupation and family history of DM was found to be significantly associated with knowledge of DM complications. Those who were male were 4.6 times more knowledgeable than females. This finding is congruent with the study done in Pakistan (15). The justification for this finding may be because of the cultural practice in that community; females spent more of their time at home while performing their daily tasks. But males spent most of their time outside the home that gave them more chance to gain more information and to attend different meetings and conferences. In addition, when females spend their time at home, they will either follow different Medias or read books that help them know more about DM complications. Age was also found to have a highly significant association with knowledge of DM complications. Those 31-45 years old were 7.3 more knowledgeable than those with age 15-30 years old. It is because. as age increases, they will get more counseling and health education during their follow-up at the diabetic clinic and from formal and non-formal education.

A higher level of education were found to be positively associated with more knowledge, this finding coincides with other studies (15,18). Those with educational level of read and write, 1-8 and, high school and above were 3.7, 9.5 and 7.4 times more knowledgeable respectively than those who cannot read and write. This finding is in agreement with other studies (15,16). As individuals learn more, the chance of gaining information about DM complications from different sources will increase. In addition, those individuals with a high level of education can clearly communicate with the health care professionals and can gather a lot of information about DM complications by asking them and reading different medical books. Another interesting finding of this study was the association between occupation and patient knowledge of diabetic complications. NGO employees were 7 times more knowledgeable about diabetic complications when they are compared with those who were farmers. These results agree with findings by Obirikorang et al. (12). This is because NGO employees are mostly linked to different institution especially health institutions which create them a favorable condition to gain information about complication of DM. Even they have more chance to be involved in scientific conferences and training, making them aware of DM complications.

This study also found a significant association between income and the level of knowledge on diabetic Complication. Those patients with an income of greater than 2500 were found to be more knowledgeable than those with income of less than <500. Other studies support this finding (12,15). It is clear that as income increases, individuals can access or buy any electronic media like TV, which is one means of gaining information. Even individuals with low income may do not attend their follow up regularly, because of lack of money for transportation, which affect one major source of information from a health professional at the diabetic clinic.

Another important finding of this study was patients with a family history of DM were five times more likely to have knowledge on DM complications than the counterparts that have no family history of DM. It is supported by a study done in Oman (15). If their family were diabetic patients, they will have more information from their family and in addition, they may investigate a lot of information about the disease due to fear of losing their parent.

This study reveals that less than half of patients had a good knowledge of DM complications. This gives an evidence for officials and health professionals to include strategies to increase diabetes complication knowledge among diabetes patients. Diabetes education programs should be promoted by using mass media to create awareness at a community level. It should also be incorporated in the national curriculum of education to improve awareness of DM complication and finally this will help to minimize morbidity and mortality associated with DM complications.

Limitations of the study

During assessment of knowledge of patients on DM chronic complications, even though the interviewers carried out it carefully, respondents may have replied socially acceptable responses which may cause an overestimation of level of knowledge of study participants.

List Of Abbreviations

DM: Diabetic Mellitus, NGO: Non-governmental Organization, AOR: adjusted odds ratio; CI: Confidence interval; COR: crude odds ratio;SPSS: Statistical package for social sciences

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from the Institute of Public Health College of Medicine and Health Sciences, University of Gondar. Written informed consent was obtained from all study participants and confidentiality was kept.

All the study subjects had answered voluntarily and confidently the administered pre-tested questionnaires.

Consent for publication

Not applicable

Availability of data and materials

The data will be available upon request from the corresponding author upon request.

Competing interests

None of the authors have any conflicts of interest to declare.

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Authors' contributions

YB designs the study, performed data analysis and drafted the manuscript. ²YA involved with designing the study, data analysis, and reviewed the manuscript. ³HF take part with data analysis, designing the study and reviewing the manuscript. ⁴YA participated with data analysis, designing the study and reviewed the manuscript. All authors read and approved the final manuscript.

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Tables

Table 1: Socio demographic characteristics of Type 2 DM patients at Adiss Zemen District Hospital, Ethiopia, 2019(n=402)

Variables	Categories	Frequency	Percent (%)
Sex	Male	177	44.0
	Female	225	56.0
Age	18-30	134	33.3
	31-45	118	29.4
	>45	150	37.3
Level of Education	Cannot write and read	110	27.4
	Read and write	124	30.8
	1-8	77	19.2
	High school and above	91	22.6
Marital status	married	202	50.2
	divorced	37	9.2
	Widowed	49	12.2
	Single	114	28.4
Occupation	Farmer	85	21.1
	Government worker	46	11.4
	Merchant	41	10.2
	Self employed	63	15.7
	Housewife	77	19.2
	Retired	21	5.2
	Others	69	17.2
Religion	orthodox	304	75.6
	Muslim	68	16.9
	protestant	30	7.5
Ethnicity	amhara	348	86.6
	Kimant	35	8.7
	Tigray	19	4.7
Residence	Rural	159	39.6
	Urban	243	60.4
Duration since diagnosis of DM	(1-5)	270	67.2
	(6-10)	93	23.1
	>10	39	9.7
Family history of DM?	Yes	118	29.4
	No	284	70.6
Income	<500	156	38.8
	500-1500	68	16.9
	1501-2500	86	21.4
	>2500	92	22.9
Have you been informed about complications of diabetes?	Yes	301	74.9
	No	101	25.1
Where did you get information about DM complications?	From health worker	253	62.9
	Friend/parent	27	6.7
	TV/radio	19	4.7
	Other*	2	0.5

* reading books

Abbreviations: DM= Diabetes Mellitus, N=Number, TV=Television

Table 2: Knowledge on DM complications among Type 2 DM patients at Adiss Zemen Hospital, Ethiopia, 2019

Variables	Categories	Number	Percent
What is the normal fasting blood sugar level?	1.< 70 mg/dl	38	9.5
	2. 70- 110mg/dl	77	19.2
	3. > 126 mg/dl	6	1.5
	4. Don't know	281	69.9
What are the most common symptoms of high blood sugar?	1.increased thirst	309	76.9
	2.freuquent urination	295	73.4
	3.blurring of vision	130	32.3
	4.weakness	185	46
	5.dry mouth	102	25.4
	6.confussion	30	7.5
What are the most common symptoms of low blood sugar?	1.palpitation	157	39.1
	2.tremor	220	54.7
	3.sweating	238	59.2
	4.Blurring of vision	107	26.6
	5.decreased coordination	62	15.4
Which of the following complications can happen when diabetes is not well controlled?	Diabetic foot	297	73.9
	eye complications	292	72.6
	heart complications	254	63.2
	neuropathy	217	54.0
	renal complications	216	53.7
	stroke	157	39.1
	teeth decay	130	32.3
	hypertension	142	35.3
	sexual dysfunction	102	25.4
	Can dietary modification prevent diabetic complication?	Yes	372
No		30	7.5
Can Stop smoking /and alcohol stopping prevent diabetic complication?	Yes	367	91.3
	No	35	8.7
Is physical work or exercise help to prevent diabetes complication?	Yes	343	85.3
	No	59	14.7
If you are beginning to have a low blood glucose reaction, you should?	1. exercise	16	4.0
	2. lie down and rest	85	21.1
	3. drink some	193	48.0

	juice		
	4. take rapid-acting insulin	108	26.9
What you should do when your blood sugar is raised?	1. dietary modification	87	21.6
	2. physical exercise	10	2.5
	3. lowering stress	79	19.7
	4. take insulin	226	56.2

Abbreviations: DM= Diabetes Mellitus

Table 3: Factors associated with good knowledge of DM complications among DM patients at Adiss Zemen Hospital, Ethiopia, 2019.

Variable	Knowledge status (n=402)		OR(95% CI)		P-value
	Poor N (%)	Good N (%)	COR	AOR	
Sex					
Male	64(36.2)	113(63.8)	3.08(2.04,4.64)	4.67(2.53,8.61)	000**
Female	143(63.6)	82(36.4)	1	1	
Age					
18-30	100(74.6)	34(25.4)	1	1	
31-45	59(50.0)	59(50.0)	2.94(1.73,5.00)	7.300(3.103,17.173)	000*
>=45	48(32.0)	102(68.0)	6.25(3.72,10.49)	15.02(6.11,36.92)	000**
Level of Education					
Cannot write and read and write	80(74.1)	28(45.5)	1	1	
1-8	75(49.0)	78(51.0)	2.97(1.74,5.07)	3.793(1.785,8.063)	0.001**
High school	20(40.0)	30(60.0)	4.29(2.11,8.73)	9.59(3.26,28.18)	000**
Occupation	32(35.2)	59(59)	5.27(2.86,9.68)	7.46(3.02,18.44)	000**
Farmer	55(64.7)	30(35.3)	1	1	
Government worker	15(32.6)	31(67.4)	3.79(1.77,8.10)	0.96(.31,2.95)	0.942
Merchant	47(45.2)	57(54.8)	2.22(1.23,4.01)	0.72(0.29,1.81)	0.483
House wife	43(55.8)	34(44.2)	1.45(0.78,2.73)	2.93(1.13,7.56)	0.067
NGO worker	47(52.2)	43(47.8)	1.68(0.91,3.08)	7.24(2.68,19.53)	000**
Residence					
Rural	99(62.3)	60(37.7)	1	1	
Urban	108(44.4)	135(55.6)	2.06(1.37,3.10)		
Duration of DM					
<5	152(56.3)	118(43.7)	1	1	
5-10	41(44.1)	52(55.9)	1.63(1.05,2.63)		
>10	14(35.9)	25(64.1)	2.30(1.15,4.62)		
Family history of DM					
yes	19(16.1)	99(83.9)	10.20(5.89,17.67)	5.55(2.53,12.20)	000**
No	188(66.2)	96(33.8)	1	1	
Income					
<500	93(68.4)	43(31.6)	1	1	
501-1000	44(64.7)	24(35.3)	1.18(.64,2.18)	1.85(0.75,4.57)	0.184
1001-1500	42(48.8)	44(51.2)	2.27(1.30,3.95)	3.22(1.28,8.10)	0.013**
1501-2500	21(25.6)	61(74.4)	6.28(3.40,11.60)	11.73(4.32,31.81)	0.00**
>2500	7(23.3)	23(76.7)	7.11(2.83,17.83)	7.18(1.72,30.28)	0.007**

** Shows statistically significant association

Abbreviations: DM= Diabetes Mellitus, N=Number, COR= Crude odds ratio, AOR=Adjusted odds ratio