Knowledge, Attitude and Practice Among Type II Diabetic Patients in Ambo University Referral Hospital, Oromia, Ethiopia

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Abstract

Background: Diabetes is a chronic illness significantly affecting health of population throughout the world. In Africa, about 19.8 million adults are affected by diabetes and of these, more than 50% are from Nigeria, South Africa, Ethiopia and Tanzania. Knowledge is the greatest weapon in the fight against diabetes mellitus (DM). Self-management of patients with type two DM largely depends on the knowledge, attitude and practices of such people regarding the condition. **Objective**: The main objective of this study was to assess knowledge, attitude and practices of type II diabetes (T2DM) patients attending Ambo University referral hospital, Oromia, Ethiopia. **Method**: An institutional based cross sectional study was conducted among randomly selected 248 T2DM patients aged ≥30 years old from Ambo University Referral Hospital. Data regarding KAP of diabetic patients were collected using interview techniques. In addition, anthropometric data (body mass index and waist hip ratio) of the participants were collected and assessed. The tool for data collection contains socio demographic characteristics and medical factors. Descriptive statistics was used to set the KAP level among the respondents while logistic regression model was applied to test the association of KAP with various independent variables. **Results:** The mean of age among the respondents was 44(±7.2) years. Of 248 respondents, 105 (42.3%) were from rural. Among the total 248 respondents, about 111(44.8%), 117(47.2%) and 121(48.8%) were differentiated as not knowledgeable, having poor attitude and poor practice towards diabetes mellitus, respectively. Age, place of residence, level of education, average monthly income, history of diabetes and duration of living with DM were identified as factors affecting KAP towards diabetes. Both sex and occupational status were also factors affecting the knowledge level of T2DM patients, but not attitude and practice. Furthermore, knowledge level was affecting booth attitude and practice level of participants in the study area. **Conclusion and Recommendation:** This study found that there was a gap in knowledge, attitude and practice towards diabetes among T2DM patients in the study area. Therefore, a structured nutrition and health education should be given for T2DM patients through community based behavioral change communication to assist and improve the level of KAP towards DM in the study area.

Keywords: Type 2 diabetes mellitus, Knowledge, Attitude, Practice, Adults

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1. Introduction

Diabetes is a chronic illness that significantly affecting health of the population throughout the world. It is a long-term metabolic disorder that occurs either due to inadequate insulin production by the pancreas (type 1 diabetes mellitus) or when the produced insulin is not effectively used by the body (type 2 diabetes mellitus) (WHO, 2016). Type 2 diabetes mellitus (T2DM) is the most common form of diabetes mellitus and can be controlled through healthy diet, physical activity, losing excess weight, and oral medication (CDC, 2012). Gestational diabetes mellitus occurs only during pregnancy and is a risk factor for T2DM after pregnancy (Mabaso *et al.,* 2014). American Diabetes Association stated that DM may result from causes such as genetic defects in beta cell function, insulin action, pancreatic diseases, and drug or chemical induced diabetes mellitus such as with HIV medication (ADA, 2010).

According to the world health organization estimate, globally, the number of people with diabetes will be more than double over the next 25 years and the developing world would endure an increasingly larger burden of disease in that period (Primanda *et al.,* 2011). This incidence might be varied between populations because of differences in genetic susceptibility and other modifiable risk factors.

Sub-Saharan Africa, like the rest of the world, is experiencing an increasing prevalence of diabetes alongside other non-communicable diseases. In Africa, according to the International Diabetes Federation (IDF) report, 19.8 million adults were estimated to have diabetes. Of this, more than 50% live in four highly populated countries namely; Nigeria, South Africa, Ethiopia and Tanzania (Cho *et al.,* 2013). Ethiopia is at a risk of increased diabetes incidence. The number of deaths attributed to diabetes reached over 21,000 in 2007. This estimate has increased to about 25,000 in 2011 (Feleke *et al.,* 2013). IDF also reported that about 1.9 million adults aged 20 -79 years in Ethiopia were estimated to have diabetes in 2013 (Guariguata *et al*., 2013). With national diabetes prevalence of 4.36% and there was about 34,262 estimated diabetes related deaths in same year (Cho *et al.,* 2013).

Despite the availability of different treatment modalities, diabetes has remained a major cause of death and

its burden is increasing in the developing countries including Ethiopia. IDF reported that Ethiopia ranked 3rd among African countries with 1.4 million DM by year 2012. Worku *et al*., (2010) reported that the number of diabetics in Ethiopia was about 800,000 by the year 2000, and it could reach 1.8 million by 2030. Further report in 2014 by IDF shows that about 4.9 million people adults (20-79 years) in Ethiopia live with diabetes and more than 2.9 million live with impaired glucose tolerance. Another study done in the selected hospitals of Addis Ababa reported that the prevalence of T2DM was in the range of 4.6 to 5.1% (Belayneh *et al*., 2015). Moreover, a study done in Bishoftu town, Ethiopia showed that the prevalence of undiagnosed diabetes mellitus was 5% (Megersa *et al*., 2013).Furthermore, a cross-sectional study done in Nekemte Referral hospital, Ethiopia also showed that there were many patients who lived with T2DM (55%) compared to those patients with type I diabetes (45%) (Tadele *et al*., 2014).

Knowledge is the greatest weapon in the fight against diabetes mellitus. It is therefore imperative that people with DM and their family members understand the basic facts, such as the type they have, signs and symptoms, treatments, preventive measures, and the importance of maintaining good glycemic control (Raymond *et al.,* 2016). Beke *et al.,* (2013) emphasized that self-management of patients with T2DM largely depends on the KAP. A study done in Northwest Ethiopia revealed that about more than 51% and 60.1% of T2DM patients had poor knowledge and poor attitude, respectively (Achenef *et al*., 2015). However, studies assessing KAP towards T2DM and associated factors among type two diabetic patients are scanty in the study area. Therefore, this study was designed to assess the level of KAP of T2DM among diabetic patients and factors affecting KAP towards T2DM in the study area.

2. Methodology
2.1 Description of the Study Area
Ambo University is one of the higher public academic institutions in Ethiopia. It is located in west Showa, Ambo town, west of Addis Ababa 112 km and the town has a latitude and longitude of 8°59′N and 37°51′E, respectively and an elevation of 2101 meters above sea level. The average annual temperature is 17.5 °C in Ambo. The main agricultural crops grown in the areas are tef, wheat, barley, and maize, sorghum and fruit and vegetables, especially fruits obtained from market with expensive cost. According to the town municipality, more than 121,061 populations live in the town in 2019, in which males accounts for 59,322(49%) and females 61,739(51%).

2.2 Study Design and Period
An institutional based cross-sectional study was conducted among T2DM patients attending in Ambo University Referral Hospital, Oromia, Ethiopia from December 2018 to May 2019.

2.3 Source and Study Population
All T2DM patients' ≥30 years of age and visited Ambo University Referral Hospital during the survey were the source population and all type 2 diabetic patients' ≥30 years of age and randomly selected from Ambo University Referral Hospital were the study population.

2.4. Inclusion and Exclusion Criteria
Individuals who were diagnosed to have T2DM and aged ≥30 years old were included in the study while those individuals who were chronically sick at the time of survey and aged <30 years old were excluded.
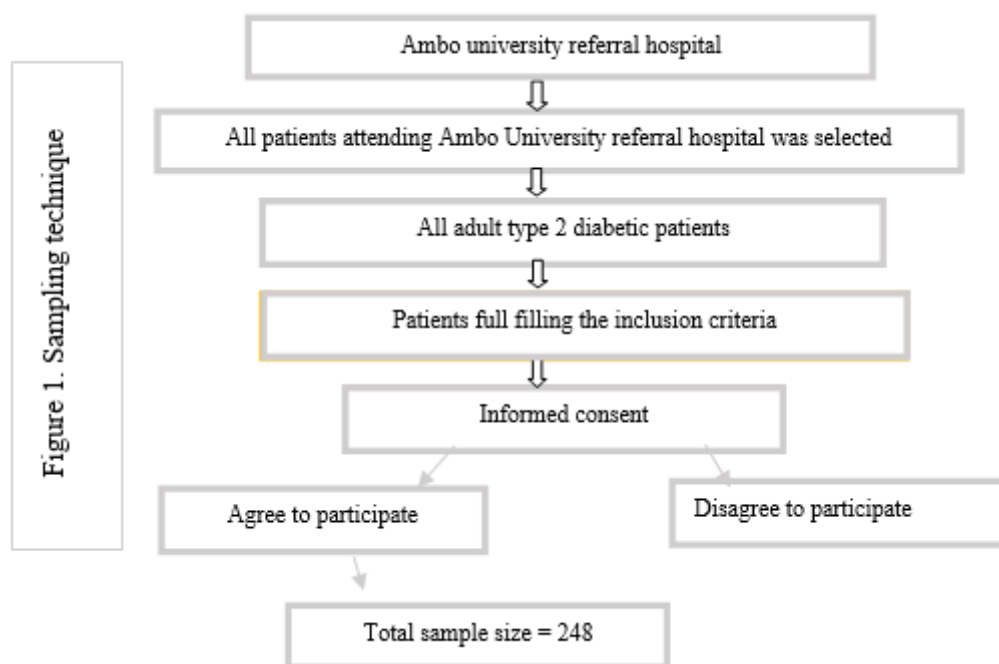
2.5. Sample Size Determination
The sample size of the study is calculated using formula for a single population proportion by considering the following assumptions:

$$n = Z_{\alpha/2}^{2} \frac{P[1-P]}{d^{2}}$$

Where: n= required sample sizes, Zα/2= 95% confidence level (Z= 1.96), P = expected prevalence of poor KAP about DM was 11.2%, 18.1% and 33.6%, respectively among T2DM patients attending Adama hospital Medical college (Abdulkadi et al., 2014) and d= 5%. Therefore, the largest sample size (n=248) was used with the consideration of 10% non response rate.

2.6. Sampling Procedures
The study samples were selected by using simple random sampling method; from subjects with type two DM ≥ 30 years old attending the diabetic clinic follow up in Ambo University Referral Hospital. Generally, the detail of sampling technique is given as the below Fig 1.

Figure 1. Sampling technique

2.7 Study Variables

In this study, the knowledge, attitude and practices (KAP) were dependent variables while socio-demographic and economic characteristics as well as medical factors were independent variables.

2.8 Data Collection Methods and Quality Assurance

Data regarding KAP towards DM were collected using interview techniques and a structured questionnaire. Data were collected by four nursing diploma holder with the supervision of the researchers. To assure data quality, a training and orientation was given for the data collectors. The questionnaire was first developed in English and then translated into Afaan Oromoo and then back translated to English. The questionnaire was pre-tested in 5% of the respondent in a health center not included in the study to check for its understandability and time required completing the questionnaire before the actual data collection begun. The completeness of the collected data was checked by the researcher daily. Anthropometric data like height, weight, waist and hip of subjects were measured. The participants BMI and Waist to Hip ration was classified using WHO standards as follows; underweight BMI<18.5, normal BMI 18.5 to 24.9, overweight BMI ≥25.0 and <29.9 and obese BMI ≥30.0 (WHO, 2008).A waist hip ratio greater than 0.90 for men or greater than 0.85 for women also indicates risk factors for type two diabetic mellitus (WHO, 2008).

2.9 Statistical analysis

Data were analyzed using SPSS statistical software version 21.0. Descriptive statistics was used and presented using tables, graphs and percentages. Logistic regression model was used to identify factors associated to KAP level of the respondents. P-value less than 0.05 were considered as statistically significant. The degree of association between dependent and independent variables was reported using Adjusted Odds Ratio (AOR) and 95% CI.

2.10 Ethical consideration

Ethical approval was obtained from Institutional Review Board (IRB) of the Addis Ababa University, College of Natural and Computational Sciences. A formal letter of permission was obtained from Ambo University Referral Hospital. After explaining the purpose of the study, verbal consent was obtained from each study participant. Participants were informed that participation is on voluntary basis and that they can withdraw at any time if they are not comfortable. Personal identifiers were not included in the questionnaires to ensure participants' confidentiality. At the end, the nutrition and health education on prevention, control and management of T2DM was given to the respondents to improve their level of KAP towards DM.

3. Results and Discussion

3.1 Results

3.1.1 Socio-demographic characteristics

The male to female ratio in this study was 1.88. The mean of age respondents was 44(±7.2). Of 248 respondents, 105 (42.3%) were from rural and 143 (57.7%) were from urban areas. Among the study participants, 57(23%) were not having formal education and 73(29.44%) of respondents were from having ≤500 Ethiopian birr monthly family income (Table 1).

Table 1. Socio demographic characteristics of type 2 diabetic patients attending Ambo, Ethiopia, 2019

Variable	Level	No.	%
Age (in year)	≤ 35	28	11.3
	36 – 55	197	79.4
	>55	23	9.3
Sex	Male	162	65.3
	Female	86	34.7
Place of residence	Rural	105	42.3
	Urban	143	57.7
Religion	Orthodox	162	65.3
	Protestant	56	22.6
	Waaqeffataa	15	6.0
	Muslim	15	6.0
Respondent education level	No formal education	57	23.0
	Primary education	87	35.1
	Secondary and preparatory	36	14.5
	College and above	68	27.4
Marital status	Married	221	89.1
	Divorced	3	1.2
	Single	13	5.2
	Widowed	11	4.4
Living status	Living alone	13	5.2
	Living with wife/husband	222	89.5
	Living with others	13	5.2
Occupational status	Housewife only	32	12.9
	Farmer	92	37.1
	Merchants	40	16.1
	Gov't and private employed	84	33.9
Family income (Birr)	≤500	73	29.4
	501 -1000	61	24.6
	1001 – 2000	18	7.3
	>2000	96	38.7

3.1.2 Anthropometric characteristics of the respondents

About 9(3.6%) and 32(12.9%) respondents were with underweight and overweight, respectively. Additionally, the mean of waist to hip ration (WHR) was 0.94 vs. 0.87 for male and female, respectively. Moreover, about 202(81.5%) respondents had waist-hip ratio above cut-off points (Table. 2).

Table 2. Body mass index and waist hip ratio status of respondents (T2DM), Ambo university referral hospital, Oromia, Ethiopia, 2019

Variable	Level (category)	No.(%)
BMI	Underweight	9(3.6)
	Normal	207(83.5)
	Overweight	32(12.9)
WHR	Normal	46(18.5)
	At risk	202(81.5)

BMI= Body mass index, WHR=waist hip ratio

3.1.3 History and duration of diabetes mellitus of participants

Table 3 below shows that, among the respondents 77(31%) were not having DM history or they do not know their family diabetes history and about 171(69%) were from those having family diabetic history, while the rests were from either father or mother was diabetic. More than two third of the study participants were with DM for 13 and above months (table 4).

Table 3 Frequency distribution of DMH and DDM of respondent's (T2DM), Ambo university referral hospital, Oromia, Ethiopia, 2019

Variables	Level	No. (%)
DMH	No diabetic history	77(31)
	Having DM history	171(69)
DDM	1-6 months	36(14.5)
	7-12 months	40(16.1)
	13 months and above	172(69.4)

DMH= Diabetic history, DDM= Duration of DM

3.1.4 Knowledge of participants towards diabetes mellitus

Table 4 below shows that the responses of participants on different questions addressing the knowledge towards DM. Participants responded as diabetes is a condition of insufficient insulin production in the body (47.6%), as DM is not curable (85.9%) and as DM is a condition of high level of sugar in the blood (85.1%). Regarding signs and symptoms of diabetes participants responded as, frequent hunger (87.1%), frequent thirst (83.9%), frequent urination (43.6%), high blood sugar (87.9%), blurred vision (70.9%). Regarding knowledge of associated factors, in this study, respondents stated that as age (33%), genetic (77.4%), lack of physical exercise (92.7%), lack of nutrient intake (39.9%) and obesity (44.7%) could be risk factors to develop diabetes. On knowledge of complications, the response was blindness (65.3%), heart problem (84.7), and brain diseases (81.1%) were major complication of diabetes identified by cases and controls, respectively. Additionally, participants also described that diabetes can be managed by insulin injection (100%), regular exercise (100%) and practices healthy diet (91.1%) (Table 4).

Table 4 Frequency distribution of participant's response of knowledge towards diabetes mellitus, Ambo university referral hospital, Oromia, Ethiopia, 2019

Questions	Response (YES)	
	n	%
What is DM		
DM is a condition of insufficient insulin production	118	47.6
DM is a condition of high level of sugar in the blood	211	85.1
DM is not curable disease	213	85.9
DM is a condition of the body which not responding for insulin	88	35.5
DM is diseases which affect any part of body	178	71.8
What are the symptoms of diabetes mellitus?		
Frequent hunger	216	87.1
Frequent thirst	208	83.9
Frequent urination	108	43.6
Weight loss	50	20.2
High blood sugar	218	87.9
Blurred vision	176	70.9
Feeling of weakness	221	89.1
Slow healing of cuts and wounds	30	12.1
What are the risk factors of diabetes mellitus?		
Age	82	33.1
Genetic/family history of diabetes mellitus	192	77.4
Lack of physical exercise	230	92.7
Low nutrient intake	99	39.9
Obesity	111	44.8
Pregnancy	50	20.2
Sleep duration	33	13.3
What are the complications of diabetes mellitus?		
Blindness	166	66.9
Heart problem	200	80.6
Kidney problem	86	34.7
Brain diseases	206	83.1
What are control and management methods of DM?		
Insulin injection is available for control and management of DM	248	100
Regular Exercise	248	100
Weight reduction	196	79
Practices healthy diet	226	91.1

3.1.5 Attitude of participants towards diabetes mellitus

Regarding the attitude of the respondents, the present study revealed that 168(67.7%) of respondents said as they do not mind if others know that they have diabetes mellitus, and 207(83.5%) were agreed that it is important for family members should be screened for DM. Additionally, among the study respondents, 130(52.4%) of them agreed that Diabetes mellitus seriously affect daily activities. However, around 120(48.4%) were think as diabetes is a communicable disease and they don't know the difference between communicable and diabetes family history (Table 5).

Table 5 Frequency distribution of respondents of attitude towards diabetes mellitus among type 2 diabetic patients, Ambo university referral hospital, Oromia, Ethiopia, 2019

Variables	Response	N	%
I don't mind if others know that I am with diabetes mellitus	Agree	168	67.7
	Disagree	76	30.7
	I don't know	4	1.6
It is important that you should be examined for diabetes mellitus	Agree	218	87.9
	Disagree	24	9.7
	I don't know	6	2.4
It is important for family members should be screened for diabetes Mellitus	Agree	207	83.5
	Disagree	25	10.1
	I don't know	16	6.5
Family support is important in dealing with diabetes mellitus	Agree	248	100
	Disagree	0	0.00
	I don't know	0	0.00
We should follow avoiding of consumption of too much sugar for controlling of DM	Agree	218	87.9
	Disagree	30	12.1
	I don't know	0	0.00
Diabetes mellitus seriously affect daily activities	Agree	130	52.4
	Disagree	51	20.6
	I don't know	67	27
Physical activity prevent risk of DM	Agree	188	75.8
	Disagree	0	0.00
	I don't know	60	24.2
Maintaining a healthy body weight is important in management of DM	Agree	115	46.4
	Disagree	0	0.00
	I don't know	133	53.6
Diabetes Mellitus is a communicable disease	Agree	120	48.4
	Disagree	92	37.1
	I don't know	36	14.5
Sleep duration can affect blood glucose	Agree	15	6.1
	Disagree	126	50.8
	I don't know	107	43.2

3.1.6 Practice towards diabetes mellitus

The present study result shows that majority of the study participants 203(81.8%) did not have meal plans to eat ahead and also 157(63.3%) have never visited dietitians or nutrition and other related professionals for their diet plan. From total respondents 157(63.3%) of them reported that they frequently use fruit and vegetable while others consume fruits and vegetables less frequently. Around, 106(42.7%) of respondents were not using fatty foods at all and the rest were using fatty foods less frequently. Again 65(26.2%) of participants were frequently practicing 30 - 60 minutes physical activity daily. Additionally 167(67.3%) of respondents frequently practice checking of blood sugar regularly (Table. 6).

Table 6 Frequency distribution of respondents practice towards diabetes mellitus among type 2 diabetic patients, Ambo university referral hospital, Oromia, Ethiopia, 2019

Variables	Response status of respondents		
	Not at all, n (%)	Less frequently, n (%)	Frequently, n (%)
Do you have meal plan?	203(81.8%)	45(18.2%)	0(0%)
Have you ever visited a dietitian/ nutritionist to consult about your diet plan?	157(63.3%)	91(36.7%)	0(0%)
Do you consume fruit and vegetable?	0(0%)	91(36.7%)	157(63.3%)
Do you consume of fatty foods?	106(42.7%)	107(43.2%)	35(14.1%)
Did you drink alcohol	187(75.4%)	41(16.5%)	20(8.1%)
Did you smoke tobacco	238(95.9%)	11(4.4%)	0(0%)
Do you do 30 - 60 minutes physical activity daily?	41(16.5%)	142(57.3%)	65(26.2%)
Have you meet sport professional for your physical activity	217(87.5%)	31(12.5%)	0(0%)
Do you participate in maintaining your healthy weight?	76(30.6%)	107(43.2%)	65(26.2%)
Do you check your blood sugar regularly	0(0%)	81(32.7%)	167(67.3%)

3.1.7 General KAP status of participants toward diabetes

Based on the 75% of total score for knowledge (21), attitude (7.5) and practice (7.5), this study revealed that, 111(44.8%), 117(47.2%) and 121(48.8%) of respondents were differentiated as not knowledgeable, poor attitude level and having poor practice toward DM (figure 1).
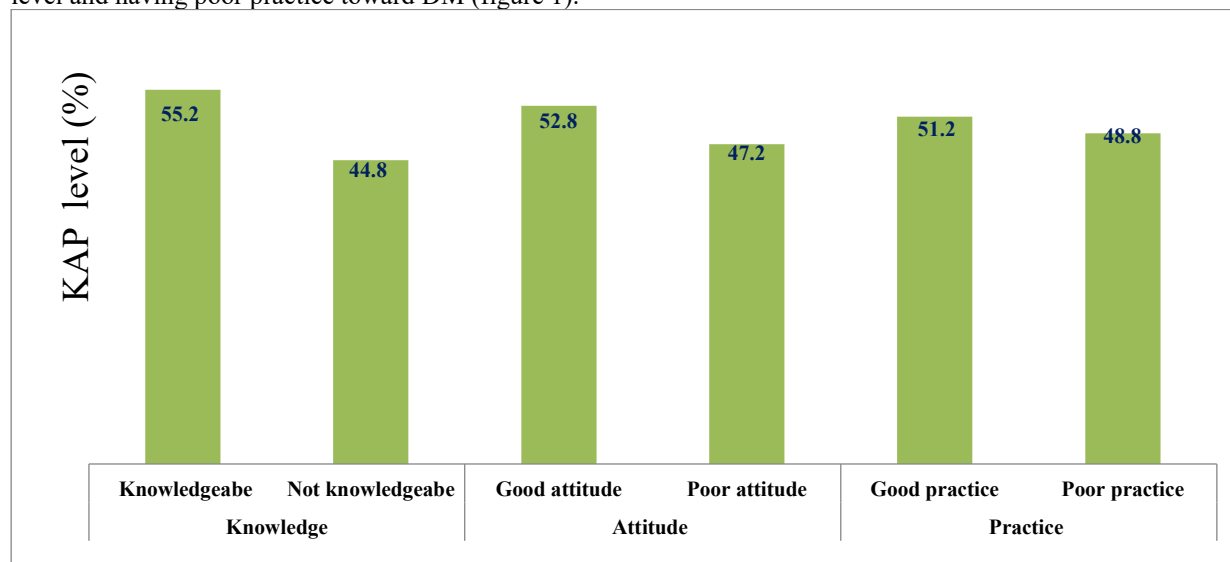

Figure 2 General status of respondents Knowledge, attitude and practice toward diabetes among type 2 diabetic patients, Ambo university referral hospital, Oromia, Ethiopia

3.2 Factors Associated with Knowledge, Attitude and Practice

3.2.1 Factors associated with participant's knowledge level towards diabetes mellitus

Table 7 below shows that age, sex, place of residence, level of education, occupational status, monthly income category, family history of diabetes and duration of living with DM showed significant associations with knowledge level of respondents. (Table 7).

3.2.2 Factors associated with participant's attitude level towards diabetes mellitus

Table 8 below shows that, age, place of residence, educational level, average monthly family income, family history, duration of diabetes and knowledge level showed significant associations with respondent's attitude. In the multivariable logistic regression analysis, young adults were 7.5 times (AOR=7.5, CI= 1.84, 30.79) more likely to have positive attitude to DM than those from older adults. Respondents from rural areas were 80.5% (AOR= 0.195, CI= 0.107, 0.353) less likely to have positive attitude to DM than those from urban areas. Also subjects those not having formal education were 94.7% (AOR=0.053, CI= 0.012, 0.239), those with primary education level were 93.2% (AOR=0.068, CI= 0.013, 0.175) less likely to have positive attitude towards DM than those with higher education level. In the case income level, individuals earning average monthly family income of ≤500 birr were 74.6% (AOR = .254, CI = 0.18, 0.69), 501-1000 birr were 72.5% (AOR = 0.275, CI = 0.13, 0.55) less likely to have positive attitude towards DM compared to those earned >2000 birr. Additionally, participants with no diabetes history were 67.6% (AOR=0.324, CI= 0.15, 0.70) less likely to have positive attitude compared to those

having family diabetes history. In the same way participants those were diabetic for 1-6 months were 93% (AOR=0.07, CI= 0.01, 0.28) less likely to have positive attitude towards DM compared to those were diabetic for 13 and above months. Furthermore being not knowledgeable about diabetes had 77.3% decreases in their positive attitude level about diabetes as compared to those who were knowledgeable (Table 8).

Table 7 Bi-variable and multivariable logistic regression predicting diabetes mellitus related knowledge level among study participants, Ambo university referral hospital, Oromia, Ethiopia, 2019

Variable	Level	Not knowledgeable	Knowledgeable		Indicators of relationship		
		n (%)	n (%)	p-value	COR (95% CI)	p-value	AOR (95%CI)
Age	young adults	6(21.4)	22(78.6)	.002**	6.87(1.97-23.88)	.043*	6.4 (1.06-38.61)
	middle-aged adults	90(45.7)	107(54.3)	.082	2.22 (0.90-5.49)	.099	2.70 (.83-8.81)
	older adults	15(65.2)	8(34.8)	1			
Sex	Male	63(38.9)	99(61.1)	.011*	1.98 (1.16-3.37)	.001**	8.46 (2.5-28.63)
	Female	48(55.8)	38(44.2)	1			
Residence	Rural	81(77.1)	24(22.9)	.000***	.07 (.04-.14)	.000***	.12(.04-.39)
	Urban	30(21.0)	113(79.0)	1			
Family size	≤5	40(46.0)	47(54.0)	.777	.92 (.54-1.56)	-	-
	>5	71(44.1)	90(55.9)	1			
Living status	Living alone	2(15.4)	11(84.6)	.004**	18.33 (2.52-133.26)	.239	.19 (.01-2.96)
	Living with wife/husband	99(44.6)	123(55.4)	.034*	4.14 (1.11-15.45)	.825	1.2 (.23-6.16)
	Living with others	10(76.9)	3(23.1)	1			
Marital status	Married	98(44.5)	122(55.5)	.082	3.32 (.85-12.84)	-	-
	Divorced	3(75.0)	1(25.0)	.930	.88 (.06-12.25)	-	-
	Single	2(15.4)	11(84.6)	.109	14.66 (1.97-109.20)	-	-
	Widowed	8(72.7)	3(27.3)	1			
Education level	No formal education	48(84.2)	9(15.8)	.000***	.009 (.002-.034)	.000**	.017(.001,.06)
	Primary education	46(52.9)	41(47.1)	.000***	.041 (.012-.141)	.001**	.043(.004,.26)
	Secondary education	14(38.9)	22(61.1)	.000***	.073 (.019-.276)	.155	.177(.017,1.88)
	Higher education	3(4.4)	65(95.6)	1			
Occupational status	Housewife only	22(68.8)	10(31.3)	.000***	.091 (.035-.233)	.004**	.046(.004,.320)
	Farmer	65(70.7)	27(29.3)	.000***	.083 (.040-.172)	.902	3.2(.064,22.65)
	Merchants	10(25.0)	30(75.0)	.275	.60 (.240-1.50)	.001**	.061(.004,.26)
	Employed	14(16.7)	70(83.3)	1			
Family income	≤500 ETB	46(63.0)	27(37.0)	.000***	.18 (.09-.36)	.000***	.198 (.08-.45)
	501 -1000 ETB	37(60.7)	24(39.3)	.000***	.20 (.10-.41)	.015*	.320 (.12-.80)
	1001 – 2000 ETB	5(27.8)	13(72.2)	.730	.81 (.26-2.54)	.827	1.15 (.30-4.33)
	>2000 ETB	23(24.0)	73(76.0)	1			
DM history of the family	No diabetic history	47(61.0)	30(39.0)	.001**	.38 (.22-.66)	.005**	.29 (.12-.68)
	Having diabetic history	64(37.4)	107(62.6)	1			
Duration of DM	1 - 6 months	28(77.8)	8(22.2)	.000***	.127 (.05-.29)	.000***	.149 (.05-.40)
	7 - 12 months	30(75.0)	10(25.0)	.000***	.148 (.06-.32)	.000***	.097 (.04.23)
	13 months & above	53(30.8)	119(69.2)	1			

* p<0.05; ** p<0.01; *** p<0.001

Table 8 Bi-variable and multivariable logistic regression predicting diabetes mellitus related attitude level among study participants, Ambo university referral hospital, Oromia, Ethiopia, 2019

Variable	Level	Poor attitude	Good attitude		Indicators of relationship		
		n(%)	n(%)	p-value	COR (95% CI)	p-value	AOR(95%CI)
Age	young adults	9(32.1)	19(67.9)	.010*	4.82(1.46-15.87)	.005**	7.5(1.84-30.79)
	middle-aged adults	92(46.7)	105(53.3)	.044*	2.60(1.02-6.62)	.193	2.06(.69-6.13)
	older adults	16(69.6)	7(30.4)	1			
Sex	Male	75(46.3)	87(53.7)	.703	1.10(.65-1.86)		-
	Female	42(48.8)	44(51.2)	1			
Residence	Rural	75(46.3)	87(53.7)	.000***	.195(.113-.337)	.000***	.195(.107-.353)
	Urban	42(48.8)	44(51.2)	1			
Education level	No formal education	40(70.2)	17(29.8)	.000***	.073(.030-.176)	.000***	.053(.012-.239)
	Primary education	60(69.0)	27(31.0)	.000***	.078(.035-.174)	.000***	.068(.013-.175)
	Secondary education	7(19.4)	29(80.6)	.535	.714(.247-2.069)	.496	.626(.162-2.414)
	Higher education	10(14.7)	58(85.3)	1			
Occupational status	Housewife only	30(93.8)	2(6.3)	.000***	.013(.003-.062)	.429	.35(.02-4.65)
	Farmer	59(64.1)	33(35.9)	.000***	.112(.055-.229)	.174	6.16 (.44-85.08)
	Merchants	14(35.0)	26(65.0)	.025*	.371(.156-.884)	.072	6.92 (.84-56.95)
	Employed	14(16.7)	70(83.3)	1			
Marital status	Married	101(46.1)	118(53.9)	.036*	5.25(1.11-24.89)	.212	2.86(.55-14.88)
	Divorced	4(80)	1(20.0)	.931	1.12(.07-16.30)	.696	.56(.03-9.83)
	Single	3(23.1)	10(76.9)	.008**	15(2.02-111.17)	.133	5.14(.61-43.71)
	Widowed	9(81.8)	2(18.2)	1			
Living status	Living alone	3(23.1)	10(76.9)	.004**	18.33(2.52-133.26)	.096	6.04(.72-50.23)
	Living with wife or husband	103(46.4)	119(53.6)	.018*	6.35(1.37-29.33)	.153	3.26(.65-16.56)
	Living with others	11(84.6)	2(15.4)	1			
Religion	Orthodox	95(58.6)	67(41.4)	.124	.050(.006-.39)		-
	Protestant	18(32.1)	38(67.9)	.078	.151(.018-1.23)		-
	Waaqeffataa	3(20)	12(80)	.304	.286(.026-3.12)		-
	Muslim	1(6.7)	14(93.3)	1			
Family income	≤500 ETB	42(57.5)	31(42.5)	.000***	.31 (.16-.60)	.002**	.254(.18-.69)
	501 -1000 ETB	38(62.3)	23(37.7)	.000***	.26(.13-.51)	.000***	.275(.13-.55)
	1001 – 2000 ETB	8(44.4)	10(55.6)	.241	.54(.19-1.51)	.274	.55(.19-1.59)
	>2000 ETB	29(30.2)	67(69.8)	1			
Family diabetic history	No diabetic history	49(63.6)	28(36.4)	.001**	.37(.21-.65)	.004**	.324(.15-.70)
	Having diabetic history	68(39.8)	103(60.2)	1			
Duration of DM	1 - 6 months	33(91.7)	3(8.3)	.000***	.065(.019-.222)	.000***	.07(.01-.28)
	7 - 12 months	12(30)	28(70)	.170	1.68(.80-3.52)	.438	1.50(.53-4.23)
	13 months & above	72(41.9)	100(58.1)	1			
Knowledge	Not Knowledgeable	77(69.4)	34(30.6)	.000***	.182(.105-.314)	.000***	.227(.127-406)
	Knowledgeable	40(29.2)	97(70.8)	1			

* p<0.05; ** p<0.01; *** p<0.001

3.2.3 Factors associated with participants practice level towards diabetes mellitus

Table below shows that as age, place of residence, level of education, average monthly family income, diabetic history of family, duration of DM, diabetes knowledge level, and diabetes attitude levels showed significant associations with practice towards DM. In the multivariable analysis, individuals who were young adults were 9.34 times (AOR = 9.34, CI=1.53, 56.68) more likely to practice compared to those older adults. The other was respondents from rural areas were 84.4% (AOR = 0.156, CI=0.030, 0.815) less likely to practice than those from urban areas. Individuals those have no formal education were 81.8% (AOR = 0.182, CI = 0.056, 0.589) less likely to practice than those with higher educational level. Also this study revealed that subjects those having ≤500 Ethiopian birr average monthly family income were 67.9% (AOR = 0.321, CI = 0.12, 0.81) less likely to practice compared to those having >2000 Ethiopian birr average monthly family income. Individuals with no diabetic history were 61.9% (AOR = 0.381, CI = 0.218, 0.673) less likely to practice than those of having family diabetes history. In the case of DM duration participants those were diabetic for 1-6 months were 58.6% times (AOR = 0.414, CI = 0.191, 0.897) less likely to practice than those were diabetic for 13 and above months. In terms diabetes knowledge level, having poor diabetes knowledge had 72.6% (AOR = 0.274, CI = 0.134, 0.560) less likely to practice than those having good diabetes knowledge. Lastly, having poor attitude had 60.7% (AOR = 0.393, CI = 0.206, 0.753) less likely to practice than those having good attitudes towards diabetes (Table 9).

Table 9 Bi- variable and multivariable logistic regression predicting diabetes mellitus related practice level among study participants, Ambo University referral hospital, Oromia, Ethiopia, 2019

Variable	Level	Poor practice	Good practice	Indicators of relationship			
		n(%)	n(%)	p-value	COR (95% CI)	p-value	AOR(95%CI)
Sex	Male	78(48.1)	84(51.9)	.781	1.077(.638-1.817)	-	-
	Female	43(50)	43(50)	1			
Age	young adults	4(14.3)	24(85.7)	.000***	21.6(5.06-92.07)	.015*	9.34(1.53-56.68)
	middle-aged adults	99(50.3)	98(49.7)	.016*	3.5(1.27-9.97)	.051	3.35(.99-11.32)
	older adults	18(78.3)	5(21.7)	1			
Residence	Rural	81(77.1)	24(22.1)	.000***	.115(.064-.206)	.028*	.156(.030-.815)
	Urban	40(28)	103(72)	1			
Education level	No formal education	44(77.2)	13(22.8)	.000***	.045(.018-.115)	.004**	.182(.056-.589)
	Primary education	57(65.5)	30(34.5)	.000***	.08(.035-.184)	.001**	.188(.070-.504)
	Secondary education	11(30.6)	25(69.4)	.037*	.347(.128-.940)	.823	.879(.283-2.732)
	Higher education	9(13.2)	59(86.8)	1			
Occupational status	Housewife only	21(65.6)	11(34.4)	.000***	.123(.050-.306)	.111	5.11(.68-38.07)
	Farmer	67(72.8)	25(27.2)	.000***	.088(.043-.179)	.062	8.52(.90-80.64)
	Merchants	17(42.5)	23(57.5)	.007**	.318(.139-.730)	.172	3.41(.58-19.91)
	Employed	16(19)	68(81)	1			
Family income	≤500 ETB	58(79.5)	15(20.5)	.000***	.086(.041-.179)	.016*	.321(.12-.81)
	501 -1000 ETB	36(59)	25(41)	.000***	.231(.116-.461)	.792	.87(.3-2.32)
	1001 – 2000 ETB	3(16.7)	15(83.3)	.449	1.667(.444-6.257)	.087	3.57(.83-15.30)
	>2000 ETB	24(25)	72(75)	1			
Family DM History	No diabetic history	50(64.9)	27(35.1)	.001**	.383(.219-.670)	.001**	.381(.216-.673)
	Having diabetic history	71(41.5)	100(58.5)	1			
Duration of DM	1 - 6 months	24(66.7)	12(33.3)	.019*	.405(.190-.863)	.025*	.414(.191-.897)
	7 - 12 months	20(50)	20(50)	.550	.811(.407-1.614)	.349	.714(.352-1.447)
	13 months & above	77(44.8)	95(55.2)	1			
Knowledge	Not Knowledgeable	83(74.8)	28(25.2)	.000***	.129(.073-.229)	.000***	.274(.134-.560)
	Knowledgeable	38(27.7)	99(72.3)	1			
Attitude	Poor attitude	77(65.8)	40(34.2)	.000***	.263(.155-.445)	.005**	.393(.206-.753)
	Good attitude	44(33.6)	87(66.4)	1			

* p<0.05; ** p<0.01; *** p<0.001

3.3 Discussion

Diabetes is a chronic illness and long-term metabolic disorder that drastically affecting health of the population throughout the world. T2DM is the most common form of diabetes mellitus that affecting adults. This study revealed that (55.2%) of respondents had a good knowledge. This finding was higher than the study done in Malaysia (41.9%) (Minhat *et al.,* 2014) and inBangladesh (17%) (Fatema *et al.,* 2017). This may be due to the study was hospital-based, where the information was accessible.

According to the findings of this study, young adults and middle aged adults were 6.4 times more likely to have knowledge than that of older adults. This finding is consistent with the results reported by Shrestha *et al.,* (2015) in Central Nepal patients, Jasper *et al.,* (2014) in Nigerian and Gillani *et al.,* (2018) in Pakistan, that younger age had significantly higher diabetes knowledge score than older participants. This is may be old age, with deteriorating cognitive function, is considered as a barrier to diabetes education whereas younger patients might have higher motivation and adaptability towards their disease. Moreover, in this study, males were 8.46 times more likely to have knowledge than females. This finding is similar to a study conducted by Saleh *et al.,*(2016)in Bangladish but contrast with a study done by Gillani *et al.,* (2018)in Pakistan where women were significantly more aware of DM than males.

Regarding the residence, respondents who living in rural area were 88% less knowledgeable than those from urban and this result is in line with studies done by El-Khawaga *et al.,* (2015) in Egypt and Gillani *et al.,*(2018) in Pakistan, in which urban residents were more knowledgeable. This may be described by the high availability and accessibility of different health based information in urban compared to rural or gap of information is available in rural compared to urban.

The present study showed significant association between levels of education and level of knowledge among the respondents. Participants who had no formal educations were 98.3% and those with primary education level were 95.7% less knowledgeable than those with college and above education level. This result is similar to other studies done by Deepa *et al.,* (2017) in India and Feleke *et al.,* (2013) in Ethiopia. Almost certainly, it is because of respondents who had higher education would have the chance to get information which make them more aware about diabetes. Concerning occupational status, individuals who had housewife only were 95.4% less likely knowledgeable than those who were government and private employed. This may be due to a gap in exposure to information compared to those who had other works.

This study revealed that participants earning average monthly income of ≤500 Ethiopian birr were 80.2% less likely to have knowledge compared to those earning>2000 Ethiopian birr. This findings were supported by studies

done in Ethiopia by Kassahun *et al.,* 2017, Pakistan (Gillani *et al.,* 2018) and Malaysia (Minhat *et al.,* 2014) This might be due to having higher income level will help to access and afford energy density food which might cause diabetes problem among those people.

According to the findings of this study, participants with no diabetic history were 71% less likely to have knowledge than those having diabetic history. Besides, respondents those with ≤ 6months disease duration were 85.1% less likely to have diabetes knowledge than those with 13 months and above durations of diseases. This finding is supported by studies conducted by Rahaman *et al.,* (2017) in Dhaka and Feleke *et al.,* (2013) in Ethiopia. This may be due to having diabetes history and living long time with the disease provide more exposure to the information regarding the disease and there will be the chance to communicate with health professionals during their health follow up.

This this study also found that participants who were young and middle adults had better attitude score than elder adults. This result is supported by studies done by Rahaman *et al.,* (2017) in Dhaka, Gautam *et al.,* (2015) in Nepal, Maretha *et al.,* (2018) in South Africa. This may be due to higher cognitive performance among younger adult than older adults.

Regarding place of residences, respondents who lived in rural were 80.5% less likely to have positive attitude towards DM than those from urban. This result is in line with Fatema *et al.,* 2017 in Bangladesh.This may be urban residents may got chance to gate more nutrition and health information from mass media compared those who lived in rural.

Moreover, respondents who had no formal education were 94.7% less likely in attitude level as compared to those who had higher educational levels. Besides, this finding is in line withthe study done in Ethiopia by Kassahun *et al.,* (2017). Probably, it is because of respondents who had higher education would have the chance to get adequate information about diabetes compared those who had no formal education.

Furthermore, this study showed that both diabetes history and duration of the disease were significantly associated with attitude level. Participants who had a 1-6 months DM duration were 93% fold decreased in attitude level. This result is consistent with the study in Dhaka (Rahaman *et al.,* 2017) in which Patients with long duration of diabetes had better attitude score than those who had short duration of diabetes. This is might be due to getting and more understanding of informationthrough experience.

Additionally, being not knowledgeable about diabetes had 77.3% decreases in their positive attitude level compared to those who were knowledgeable. This means that "the higher their knowledge, the better their attitude. These finding is supported by the ideas about positive correlation between knowledge and good attitude observed among participants in studies done in Riyadh, Saudi Arabia (Salem *et al.,* 2018) and in Ethiopia (Kashahun *et al.,* 2017).

In the sense of practice towards DM this study result shows that 48.2% of participants were having poor practice towards diabetes mellitus. different socio demographic factors including age, place of residence, education level, income level, family history of the disease, duration of the disease, knowledge and attitude level were identified as determining factors for participants attitude level towards diabetes. In addition, this study, younger participants had better practice score than their elders. The finding is supported by studies done in by Feleke*et al.,* (2013) and in Daka by Rahaman *et al.,* (2017).

Moreover, regarding residences, respondents who lived in rural were 84.4% less likely to have practice towards DM than those from urban. This result is in touch with the study conducted by Niguse *et al.,* (2019) in Ethiopia in which participants from urban were better practicing compared to those from rural.

Concerning, education level, respondents who had no formal education were 81.8% less practiced compared to those who had higher educational levels. This finding is consistent with the studies conducted inSaudi Arabia by Salem *et al.,*(2018) andMohammadi *et al.,* (2015). This might be literacy may be the most important in diabetes management.

Furthermore, this study showed that participants with no diabetic history were 61.9% less likely to have better practice than those having diabetic history. In addition, respondents who were diabetic for 1-6 months were 58.6% decreased in practice level. This result is in line with studies conducted by Salem, *et al.,* (2018); Niroomand *et al.,* (2015) and (Rahaman *et al.,* 2017) in which found that diabetic history was associated with practice level towards diabetes mellitus.

Finally, this study revealed that both knowledge level and attitude level were among the factors affecting of practicing level. According to this study, participants who had poor knowledge and poor attitude level were less likely to practice compared to their counterparts. This result is consistent with the study conducted in Ethiopia (Kassahun *et al.,* 2017). This indicates that having good KAP towards diabetes mellitus can improve practice level.

4. Conclusion

This study concluded that about 44.8%, 47.2% and 48.8% of respondents were differentiated as not knowledgeable, having poor attitude and poor practice towards diabetes mellitus, respectively. Additionally the current study revealed that age, place of residence, level of education, average monthly income, family history of diabetes and

duration of living with DM were factors affecting KAP towards diabetes. Both sex and occupational status were affecting the knowledge level, but not attitude and practice. Furthermore, knowledge level was affecting booth attitude and practice level of participants in the study area at the significance level of (p<0.05). Generally, lack of knowledge, poor attitude, and poor practice level were found in this cross sectional study. Therefore, a structured nutrition and health education should be given for T2DM patients through community based behavioral change to assist and improve level of knowledge of DM patients, since knowledge is an important factor to influence someone's attitude and practice. Nutritionists/health extension workers should also give nutrition education through mass media like TV, radio to overcome the problems of KAP regarding DM.

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