

# Knowledge and Practices Towards Diabetes Mellitus Among Adults Visiting Bole Sub-city and Lideta Sub-city Public Health Centres, Addis Ababa, Ethiopia.

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## Research Article

**Keywords:** Knowledge, practice, diabetes mellitus, non-diabetic adults, health centres, Ethiopia

**Posted Date:** July 21st, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1860894/v1>

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# Abstract

**Background:** Limited knowledge about diabetes risk factors in addition to high disease

prevalence is common in low-income countries. Identification of the level of knowledge and practice related to diabetes among the general population is essential in putting way forward for the prevention of diabetes mellitus. In Ethiopia, there is limited information about the knowledge and practice of the population towards Diabetes Mellitus. This study evaluated knowledge and practices related to diabetes in the population of Bole and Lideta sub cities, Addis Ababa, Ethiopia.

**Objectives:** To assess knowledge and practices and factors associated with good practice towards Diabetes Mellitus among adults visiting public health centres in Bole sub-city and Lideta sub-city, Addis Ababa, Ethiopia.

**Methods:** Institutional based cross-sectional study was conducted among non-diabetic adults visiting public health centers using an interviewer-administered questionnaire. The study was done in two selected health centers from March 01, 2021, to April 15, 2021. The respondents were selected by systematic random sampling at the health center level. The analysis was done using STATA version 14. Multivariate analysis was performed to determine factors associated with practice towards DM.

**Results:** Out of 412 respondents participated and the response rate was 97.8%. About 58.7% of the participants were knowledgeable and 67.2% had good practice towards DM prevention. In the multivariate analysis, being a government/private employee, previous training on diabetes, and having good knowledge were associated significantly with practice. The odds of good practice regarding DM prevention among Government/private employee study participants were 2.2 times higher than the odds of good practice for housewives [AOR = 2.2(1.16,4.3)]. The odds of good practice regarding DM among respondents who had previous training on DM were 2.6 times greater than the odds of good practice for study subjects with no previous training on DM [AOR = 2.6(1,6.2)]. The odds of good practice regarding DM prevention among participants who had good knowledge levels were 2 times higher than the odds of good practice for participants with poor knowledge levels about diabetes [AOR = 2(1.3,3.3)].

**Conclusion and Recommendation:** Low knowledge and practice towards DM prevention were seen indicating the need for health education. Improving knowledge and good practice towards DM needs to be integrated into existing health care systems.

## Introduction

Diabetes Mellitus is a chronic disease that occurs either when the pancreas does not produce sufficient insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar levels. Raised blood sugar (Hyperglycemia), is a common effect of uncontrolled diabetes and as a result leads to serious damage to many of the body's systems, especially the nerves and blood vessels. Adults with diabetes have a high risk of heart attacks and strokes(1).

According to a WHO report about 422 million people worldwide have diabetes, the majority living in low- and middle-income countries (LMIC), and 1.6 million deaths are directly related to diabetes each year. Both the number of cases and the prevalence of diabetes have been steadily rising over the past years(2). In western countries, the premature mortality rate due to diabetes decreased from 2000 to 2010 but then increased in 2010-2016. In LMIC, the premature mortality rate due to diabetes increased across both periods(1).

According to International Diabetes Federation (IDF), 463 million people have diabetes in the world and more than 19 million people in the Africa Region; by 2045 it will be raised to 47 million. Africa Region has the highest percentage of undiagnosed people of all IDF regions - 60% of adults living with diabetes do not know they have it. Among the 53,390,400 total adult population of Ethiopia, there are 1,699,400 cases of diabetes making 3.2% prevalence of diabetes in adults(3). DM is a non-communicable disease attributed to several serious health problems and complications in Ethiopia. Studies are also indicating that non-communicable diseases, such as DM are becoming major public health problems in the country(4).

According to the data published in 2018, Diabetes Mellitus deaths in Ethiopia reached 13,028 (2.13%) of total deaths. Accordingly, Diabetes Mellitus is one of the top ten leading causes of death in Ethiopia (5).

Type 1 diabetes cannot be prevented or halted with current existing knowledge. Known approaches are available to prevent type 2 diabetes and to prevent the complications and premature death that can result from all types of diabetes. These include policies and practices across whole populations and within specific settings (school, home, workplace) that results in good health for everyone, regardless of whether they have diabetes, such as exercising regularly, eating healthily, avoiding smoking, and controlling blood pressure and lipids. Taking a life-course perspective is important for preventing type 2 diabetes, as it is for many health conditions. Early in life, when eating and physical activity habits are formed and when the long-term regulation of energy balance may be programmed, there is a critical hole for intervention to mitigate the risk of obesity and type 2 diabetes later in life(5).

A research conducted in Pakistan showed, knowledge regarding risk factors, management, and care of DM in the public of Punjab (Pakistan) is low. Comparatively, there is an increase in the level of knowledge with age, and the urban community show more knowledge than rural residents. According to this study those who have sufficient financial income tend to have better attitudes toward seeking treatment(7).

Research found that people at increased risk of developing type 2 diabetes mellitus can halt the development of the disease. Lifestyle modification measures with reduction of 5%–10% of body weight and increase in moderate physical activity by 150 min/week has consistently identified to reduce the appearance of diabetes in different risky populations. The progression from pre-diabetes to diabetes mellitus can be halted. Lifestyle modification measure changes with losing weight and increased physical activity are currently recommended for the prevention of diabetes(8).

A study done on KAP towards Diabetes Mellitus in Hail region, Saudi Arabia showed that most of the study participants, regardless of education levels, employment status and residence had good knowledge of diabetes (82%) and knew that physical activity can affect/prevent diabetes positively. Respondent's age was found to have a significant association with knowledge of diabetes with the  $\geq 35$  year old group knew the different types of diabetes ( $p < 0.001$ ) and knew that high carbohydrate consumption can increase the risk of diabetes ( $p < 0.001$ ), but only the age group  $< 18$  year old's identified diabetes as an inherited disorder ( $p < 0.001$ )(9).

According to a study done in Jordan, about 53.5% of the study subjects had good knowledge levels. The association of socioeconomic factors with acknowledge was assessed using the Chi-square analysis, and there was no significant association between the factors of gender or marital status and the knowledge score ( $p$ -value  $> 0.05$ ) while the factors of a high level of education, having first-degree relatives with DM, income higher than 800 JD, and an education related to the medical/health field were significantly correlated with a good knowledge level ( $p$ -value  $< 0.05$ )(10).

The respondent's knowledge level was significantly associated with the attitude score (Pearson correlation, 0.436,  $p$ -value  $< 0.001$ ). Most of respondents (94.9%) stated that they would seek treatment if they or one of their family members get DM. However, a lesser proportion of participants (62.3%) do exercise regularly. Majority of the study subjects had never checked their blood glucose level on annual basis. The mean score of respondents' knowledge was higher among those with positive practices in regards to doing exercise regularly compared to those who do not do these practices(10).

Studies showed that most participants believed type 2 diabetes to be preventable. Lifestyle, particularly among people with diabetes, was sedentary – 47% of participants walked  $< 20$  minutes per day(11)(12)(13)(14) .

Study done in Addis Ababa Public health facilities showed that the overall prevalence of diabetes mellitus was 14.8%, where sex-specific prevalence was 18.35% and 16.62% in the case of males and female participants, respectively. Drinking alcohol, older ages, having plasma HDL  $\geq 40$ mg/dl, and triglyceride  $\geq 130$ mg/dl were factors correlated with increased risks of diabetes mellitus. The study recommended alcohol drinking cessation, control of HDL-C and triglyceride level and vagarious physical activities for prevention and control of diabetes among population of Ethiopia(15).

Knowledge about diabetes is a prerequisite for individuals and communities to take action to control the disease. However, research that assess knowledge deficiencies and their relation to health-seeking behaviour is limited in most developing countries like Ethiopia. Health promotion on Diabetes, with improvements in knowledge, attitudes and practices, will result in better control of the disease, and is widely accepted to be a component of comprehensive diabetes care(16).

A study done in Gondor city shows that only about half the non-diabetic community in Gondar city had good knowledge towards diabetes mellitus. According to the study, previous training on diabetes mellitus,

educational status and monthly family income and being male were the associated factors with good knowledge of respondents about diabetes mellitus(17).

A community based research done in Bale Zone revealed, more than 50% of the respondents were knowledgeable (52.5%), had good attitude (55.9%) and practice (56.6%) towards diabetes mellitus(13).

Growing and ageing population, economic (higher income, urbanisation, changing food availability, and evolving lifestyle and work practices) transitions and socio-cultural (lifestyle changes and eating habits), are driving increases in the risk factors and prevalence of diabetes and other risk factors of cardiovascular illnesses. In Sub-Saharan Africa, between 1980 and 2015, the number of people older than 20 years with a BMI of greater than 25 kg/m<sup>2</sup> increased from 28 million to 127 million. Greater than 90% of diabetes cases in sub-Saharan Africa are type 2 diabetes, suggesting that modifiable risk factors are major developers to the burden of disease(18).

According to systematic review done in UK on Diabetes in Sub-Saharan Africa, preventing obesity, and increasing level of physical activity is vital for reducing the onset of T2DM. Eight T2DM surveys assessed the prevalence of obesity among participants, which ranged from 0.2% among rural males in Tanzania to 21% among females in urban Cameroon. The Ministry of Health study in Cameroon reflected that controlling obesity and overweight levels would reduce diabetes by 15% and 13% in case of males and females, respectively. The comparatively higher prevalence of T2DM recorded in urban areas was associated with a higher prevalence of obesity among the urban people and a lower proportion reporting regular physical activity. The projections that by 2025, 70% of Africans will live in cities, with a regional annual urban growth rate of 4.5%, suggest that levels of obesity and T2DM diabetes will continue to increase in the region(19).

Lifestyle changes such as weight control and increased physical activity are important in the prevention of type 2 diabetes mellitus. The benefits of reducing body weight and increasing physical activity are not confined to type 2 diabetes, they also play a role in reducing heart disease and high blood pressure. Lifestyle is the key to reversing these trends (20).

Studying various potential determinants of general practice of diabetes in relation to the risk of diabetes is important. Obesity and physical inactivity were the two most important modifiable risk factors of diabetes, but smoking status and dietary factors also reportedly predict the risk of diabetes(21).

Identification of the level of knowledge, practice and risk factors associated with diabetes prevention among the general population is essential in developing strategies for diabetes mellitus control (22). In Ethiopia, there is lacking information about KAP of the population towards Diabetes Mellitus. This study is intended to identify knowledge and practice gaps of the community to escalate the health promotion on prevention of Diabetes Mellitus.

## Methods

**Study Setting:** The study was conducted in Bole and Lideta sub cities health centres. Geographically, Addis Ababa is situated in the central highlands of Ethiopia between 8° 48' and 9° 06' North latitudes and 38° 38' and 38° 54' East longitudes. It is located at the western margin of the Great East African Rift Valley at 2,100–3,000 m altitude, and it is the third highest capital city in the world with a subtropical highland climate. It is the political and cultural centre of Ethiopia, and the African Union and the Economic Commission for Africa are based in Addis Ababa. Nowadays, it is also serving as a centre for many international organizations and is becoming a city of the African nations with regard to economic, social, and political life(23). The total population of Addis Ababa is estimated to be 4.8 million according to projections (24). The city has 11 functional sub-cities and 100 public health centres. Bole sub city has 5 health centres and Lideta sub city has 6 health centers.

**Study Design:** Institutional based cross-sectional study was conducted to assess knowledge and good practice towards Diabetes Mellitus among adults visiting Dil fire and Beletishachew health centres in Bole and Lideta subcities respectively.

**Study Population:**

The study population includes all adults who visited health centres in Bole subcity and Lideta subcity during the data collection period.

**Inclusion criteria:** all non-diabetic adults who visited health centres in Bole subcity and Lideta subcity during the data collection period.

**Exclusion criteria :** known Diabetic patients, patients who were critically ill and unable to respond for the interview.

**Sample Size determination:**

The sample size was determined by taking variability of proportion from a study which showed 52.5 % for knowledge and 56.6% for practice(13).

$$n = \frac{Z_{\alpha/2}^2 Pq}{d^2}$$

where n = sample size

$Z_{\alpha/2}$  = standard normal distribution with 95% confidence level (1.96)

p = proportion (52.5%)

q = 1-p

With consideration of 10 % non-response rate and using the larger sample size, the final sample size will be **421**.

### Sampling Procedures

Out of the eleven (11) sub-cities in Addis Ababa, 2 of them were selected by lottery method (simple random sampling technique ); namely Bole and Lideta Sub-city. Bole sub-city has 5 health centres and Lideta sub-city has 6 health centres. The second stage is the selection of institutions from identified sub-cities: - accordingly one health center (Dil Fire Health Center) from Bole Sub-city and one health center (Beletishachew Health center) from Ledeta sub-city were selected by lottery method among their respective sub-cities public health centres. 211 participants were interviewed from Dil Fire Health center and 210 participants were interviewed from Beletishachew Health center. Systematic random sampling technique was utilized to select the study participants at health center level by calculating the intervals K using the formula  $K = N/n$ , i.e.  $800/412 = 2$ . Where  $n$  = sample size,  $N$  = total number of adult OPD patients in one month. Consequently, after random start, every other patients were interviewed.

**Data Collection Procedures:** All participants were provided informed consent. pre-tested structured interviewer administered questionnaire was used. pre-test was conducted in another health center on 5% of study participants. From the pre-test, clarity, and organization of the questionnaire was checked then refined accordingly for final use. The interview was conducted on selected outpatients. Two trained Nurses and one supervisor participated in data collection.

The dependent variables were knowledge and practice levels while the independent variables were demographic information (age, sex, marital status, and level of education, occupation and average family monthly income, and family history of DM), previous awareness about DM and exposure to health-related education.

### Operational Definitions:

**Knowledge:** It is the awareness of the population about diabetes mellitus. Participants who responded the mean and above of the total knowledge questions had good knowledge about diabetes mellitus. Participants who responded below the mean of the total knowledge questions had poor knowledge about diabetes mellitus. To assess knowledge, 27 questions were used.

**Practice:** The habitual public involvement to prevent DM. All individual responses to practice questions were computed to obtain total mean scores and labelled as good practice (if participants scored mean score) or poor practice (if participants scored < mean score). To determine practice level, 5 questions were used.

**Adult:** A person older than or equal to 18 years of age.

### Data Management:

Data was collected after training is given for data collectors on how to interview participants and how to submit their responses via online Google form. On the fieldwork, the supervisor closely followed the day-to-day data collection process and ensured the completeness of the collected data.

#### Data Analysis procedures:

The data was collected using web-based form and the participants were interviewed using smart mobile phone and Tablet computer. The completed questionnaires were checked for completeness and downloaded in Excel Spreadsheet, edited, sorted and imported to version 14 of STATA for analysis. The data was explored using descriptive and frequencies. Multivariable logistic regression was used to determine the associated factors with practice towards diabetes mellitus prevention by entering all independent variables into the model. The variables with a p-value of less than 0.05 is considered statistically significant associated with the outcome variables.

#### Ethical consideration:

Research protocol was approved by Addis Continental Institute of Public Health (ACIPH). After Ethical clearance was given from Ethical clearance committee of the institute and permission was obtained from the heads of health centres, the data collection was started. Verbal informed consent was sought from each participant before the interview began, and after explaining the purpose of the study. Consent was archived from Addis Continental Institute of Public Health data management unit. The questionnaire was not exposed to any other person other than the data collectors and investigator and all the study subjects was assured that they have the right to stop at the time during interview. To ensure privacy, all interviews was conducted in separate rooms.

## Results

Totally four hundred twelve (412) respondents participated and making a response rate of 97.8%.

#### Socio demographic characteristics of respondents

Of the 412 respondents, 228 were females (55.3%) aged 20 - 78 years while 184 were males (44.7%) were aged 18 - 71 years. About half of the respondents 222 (53.8%) were married and 169 respondents (41%) had college and above education. Among the study participants 194 (47%) were government/private employee and 170 participants (41%) had family income > 4000 ETB per month. One hundred and one respondents (24.5%) had family history of Diabetes Mellitus (DM), 56 (13.6%) have previous training of DM and 40 of the respondents (9.7%) have education related to health/medical field (Table 1).

Table 1. Background characteristics of respondents among adults visiting health centres in Bole and Lideta sub-cities, Addis Ababa, Ethiopia, 2021.

<b>Participant's Characteristics (N=412)</b>		<b>Frequency</b>	<b>Percentage</b>
Age (Years)	18-30	172	41.75
	31 - 45	160	38.83
	46 - 60	66	16.02
	61-78	14	3.40
Sex	Male	184	44.66
	Female	228	55.34
Marital Status	Married	222	53.88
	Single	130	31.55
	Divorced	31	7.52
	Separated	11	2.67
	Widowed	18	4.37
Educational level	Unable to read and write	36	8.74
	Able to read and write	45	10.92
	Elementary or Secondary school	162	39.32
	College and above	169	41.02
Occupation	Housewife	68	16.50
	Student	36	8.74
	Merchant	52	12.62
	Government/private Employee	194	47.09
	Daily Labourer	37	8.98
	Other	25	6.07\
Average family monthly income in ETB	< 1000	75	18.20
	1000 -2000	76	18.45
	2000-4000	91	22.09
	> 4000	170	41.26
Do you have family history of DM?	Yes	101	24.51
	No	311	75.49

Do you have previous training on DM?	Yes	56	13.59
	No	356	86.41
Do you have education related to health/medical field?	Yes	40	9.71
	No	372	90.29

### Knowledge of Participants towards Diabetes Mellitus

Out of 412 study participants, 242 (58.7%) (95% CI: 53.9, 63.5) had good knowledge. Among the study participants more than half of them did not know that DM is a condition of insufficient insulin production (76%), DM is a state of the body which not responding for insulin (81%) and DM is a condition of high sugar in the blood (52.4%).

Majority of the study participants know that older age (76.2%), family history of DM (58.2%), being obese (65.78%), physical inactivity (64.78%) and high blood pressure (63.59%) were risk factors to Diabetes Mellitus.

This study showed that nearly half of the participants know that frequent urination (53%), excessive thirst (51%), excessive hunger (53%), blurring of vision (52%) and high blood sugar level (63%) are symptoms of Diabetes Mellitus. In addition, regular physical exercise (76%), healthy diet (91.5%), weight reduction (68%) and medical check-up and care (95%) were important in DM control and management. The study participants responded that eye problem even blindness (56.5%), kidney failure (51%), heart failure (31%), stroke (28%) and amputation of limbs (54.8%) were complications of DM.

Table 2. Frequency distribution of participants of response of knowledge towards Diabetes Mellitus among adults visiting health centres in Bole sub-city and Lideta sub-city, Addis Ababa, Ethiopia, 2021.

Variables (N=412)	Yes		No		I do not know	
	No	%	No	%	No	%
<b>What is DM</b>						
DM is a condition of insufficient insulin production	90	21.84	7	1.70	315	76.46
DM is a state of the body which not responding for insulin	68	16.50	10	2.43	334	81.07
DM is a condition of high level of sugar in the blood	186	45.15	10	2.43	216	52.43
DM is disease which affect any part of body	191	46.36	54	13.11	167	40.53
<b>What are the risk factors of DM?</b>						
Do you know older age is a risk factor of DM?	314	76.21	11	2.67	87	21.12
Do you think genetic, or family history of DM is a risk factor?	240	58.25	59	14.32	113	27.43
Do you know being obese is a risk factor?	271	65.78	18	4.37	123	29.85
Do you know physical inactivity is a risk factor?	267	64.81	31	7.52	114	27.67
Do you know pregnancy is a risk factor?	69	16.75	97	23.54	246	59.71
Do you know high blood pressure is a risk factor?	262	63.59	14	3.40	136	33.01
<b>What are symptoms and signs of DM?</b>						
Frequent urination	219	53.16	9	2.18	184	44.66
Excessive thirst	212	51.46	4	0.97	196	47.57
Excessive hunger	221	53.64	3	0.73	188	45.63
Blurring of vision	216	52.43	2	0.49	194	47.09
Easy fatigability	207	50.24	4	0.97	201	48.79
High blood sugar level	261	63.35	1	0.24	150	36.41
Slow wound healing	180	43.69	57	13.83	175	42.48
<b>Control and management of DM</b>						
Medications are available for control and management of DM	299	72.57	19	4.61	94	22.82
Regular physical exercise	315	76.46	5	1.21	92	22.33
Practicing healthy diet	377	91.50	3	0.73	32	7.77
Weight reduction	281	68.20	13	3.16	118	28.64

Medical check-up and care	391	94.90	1	0.24	20	4.85
<b>Complications of DM</b>						
Eye problem or even blindness	233	56.55	4	0.97	175	42.48
Kidney failure	212	51.46	14	3.40	186	45.15
Heart failure	129	31.31	18	4.37	265	64.32
Stroke	116	28.16	14	3.40	282	68.45
Amputation of limb	226	54.85	9	2.18	177	42.96

### Practice of participants towards Diabetes Mellitus prevention

Practices towards DM prevention were assessed using five questions regarding the participants intention to have medical screening, seek treatment, do preventive measures regular physical exercises and healthy eating practices. Among the study participants, 277 (67.2%) had good practice towards DM prevention. Accordingly, 62.6% of the study participants have not ever checked their sugar level in their blood and 57% of the participants do not do physical exercise regularly. Majority of the study participants (94%) would seek treatment if they or their family member get DM. More than half of the participants do not consume fatty foods (55.8%) and do not drink alcohol/smoke cigarettes (66.5%) (Table 3).

Table 3. Frequency distributions of respondents practice towards Diabetes Mellitus among adults visiting health centres in Bole sub-city and Lideta Sub-city, Addis Ababa, Ethiopia, 2021.

Variables (N=412)	Yes		No	
	Number	Percent	Number	Percent
Have you ever checked your blood sugar level?	154	37.38	258	62.62
Would you seek treatment if you or your family member get Diabetes Mellitus?	388	94.17	24	5.83
Do you do physical exercise regularly?	177	42.96	235	57.04
Do you consume fatty foods?	182	44.17	230	55.83
Do you drink alcohol/ smoke cigarettes?	138	33.50	274	66.50

### Factors associated with practice towards DM prevention

Marital status, occupation, previous training on DM and diabetes knowledge levels showed significant associations in the bivariate logistic regression analysis. In the multivariate analysis, being government/private employee, previous training on diabetes and having good knowledge were associated significantly with practice (Table 4).

Table 4 shows that the odds of good practice regarding DM prevention among Government/private employee study participants were 2.2 times greater than the odds of good practice for housewives [AOR = 2.2(1.16,4.3)]. The odds of good practice regarding DM among study participants who had previous training on DM were 2.6 times greater than the odds of good practice for study subjects with no previous training on DM [AOR = 2.6(1,6.2)]. The odds of good practice regarding DM prevention among study participants who had good knowledge level were 2 times greater than the odds of good practice for study participants with poor knowledge level about diabetes [AOR = 2(1.3,3.3)].

Table 4. Logistic regression on factors associated with good practice towards DM among adults visiting health centres in Bole sub-city and Lideta Sub-city, Addis Ababa, Ethiopia, 2021.

Variables (N=412)	Practice level		COR (95%CI)	P-value	AOR (95%CI)	P-value
	Good	Poor				
	No (%)	No (%)				
<b>Marital Status</b>						
Married (Ref)	152 (36.89)	70 (16.99)				
Single	95 (23.06)	35 (8.50)	1.25(0.7,2)	0.36	1.4(0.8,2.5)	0.26
Divorced	13 (3.6)	18 (4.37)	0.33(0.15,0.7)	<b>0.005*</b>	0.44(0.2,1)	0.052
Separated	5 (1.21)	6 (1.46)	0.38(0.11,1.3)	0.124	0.45(0.12,1.7)	0.24
Widowed	12 (2.91)	6 (1.46)	0.92(0.33,2.55)	0.874	1.6(0.5,4.7)	0.386
<b>Occupation</b>						
Housewife (Ref)	39 (9.47)	29 (7.04)				
Student	24 (5.83)	12 (2.91)	1.5(0.6, 3.4)	0.352	0.9(0.3,2.45)	0.86
Merchant	29 (7.04)	23 (5.58)	0.9(0.45, 1.94)	0.86	0.8(0.4,1.8)	0.667
Government/private Employee	154 (37.38)	40 (9.71)	2.86(1.6, 5)	<b>0.001*</b>	2.2(1.16,4.3)	<b>0.015*</b>
Daily Labourer	19 (4.61)	18 (4.37)	0.78(0.35,1.75)	0.55	0.9(0.4,2.18)	0.84
Other	12 (2.9)	13 (3.16)	0.68(0.3,1.7)	0.4	0.74(0.3,2)	0.57
<b>Do you have previous training on DM?</b>						
Yes	49 (11.89)	7 (1.70)	3.92(1.7, 8.9)	<b>0.001*</b>	2.6(1,6.2)	<b>0.034*</b>
No (Ref)	228 (55.34)	128 (31)				
<b>Knowledge level</b>						
Poor (Ref)	93 (22,57)	77 (18.7)				

Good	184 (44.66)	58 (14)	2.6(1.7,4)	<b>0.000**</b>	2(1.,3.3)	<b>0.003*</b>
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\* For significant variables

\*\* For highly significant variables

Statistically significant at p-values <0.05

## Discussion

This study was conducted to determine knowledge and practices and associated factors with good practice towards Diabetes Mellitus among non-diabetic adults visiting health facilities in Addis Ababa. The study showed, 242 (58.7%) of the participants had good knowledge about Diabetes Mellitus, risk factors, complications, and control measures. The finding of the study was in line with studies conducted in Gondor city (51.4%) (17), Bale zone administrative town (52.5%) (13), Karachi (51.88%) (25) and Jordan (53.3%) (10). This study showed higher as compared to study conducted in Kenya (27.2%) (16) and Mekelle and Ayder Referral Hospitals (44%)(26). This study showed lesser level of knowledge as compared to studies done in Sri Lanka (>75%) and Hail Region, Saudi Arabia (82%) (9) (22).

Among the participants more than half of them did not know that DM is a condition of insufficient insulin production (76%), DM is a state of the body which not responding for insulin (81%) and DM is a condition of high level of sugar in the blood (52.4). Majority of the study participants know that older age (76.2%), family history of DM (58.2%), being obese (65.78), physical inactivity (64.78%) and high blood pressure (63.59%) were risk factors to Diabetes Mellitus.

This study showed that near half of the participants know that frequent urination (53%), excessive thirst (51%), excessive hunger (53%), blurring of vision (52%) and high blood sugar level (63%) are symptoms of Diabetes Mellitus. In addition, regular physical exercise (76%), healthy diet (91.5%), weight reduction (68%) and medical check-up and care (95%) were important in DM control and management. The study participants responded that eye problem even blindness (56.5%), kidney failure (51%), heart failure (31%), stroke (28%) and amputation of limbs (54.8%) were complications of DM. Limited knowledge were seen as compared to the study done in Bale zone, which showed that symptoms of diabetes were excessive hunger (79.6%) feeling of weakness (73.4%), excessive thirst (56.6%), and high blood sugar (53.4%). The findings on the knowledge level about the complications of DM were higher as compared to study done in Bale Zone, which showed that complications of diabetes were blindness(43.9%), heart failure (39.2%), kidney failure (37.7%), brain disease (29.1%) and limb amputation (36%)(13).

Two hundred seventy seven (67.2%) of the study participants had good practice on DM prevention. This finding was greater as compared to study conducted in Kenya (41%) (16) and Bale zone administrative town (56.6%)(13). The respondent's level of practice was the same with those study participants having

DM family members (67.3%) in a study done in Kemisse and Kombolcha suburban cities, Ethiopia(27). Since this study was conducted in Addis Ababa city (Capital city of the country), this high level of good practice might be due to better educational level and high socioeconomic status in urban areas. The urban community show more knowledge than rural residents as indicated by the study done in Pakistan (7)(17).

According to this study, 62.6% of the study participants have not ever checked their blood sugar level and 57% of the participants do not do physical exercise regularly. Majority of the study participants (94%) would seek treatment if they or their family member get DM. This result is consistent with study done in Jordan that shows 94.9% of study participants stated they would seek treatment if they or one of their family members get DM (10). More than half of the participants do not consume fatty foods (55.8%) and do not drink alcohol/smoke cigarettes (66.5%). A study done in Southern Sri Lanka showed that more than half of the study subjects never had their blood sugar checked and about 65% used to take refined sugar liberally and a large majority (80%) had no regular exercise activity (22). A study conducted in Jordan also shows, 37.7% of participants did not engage in regular exercise while more than half of the study subjects had never checked their blood glucose level on an annual basis (10).

In the current study, the odds of good practice regarding DM prevention among Government/private employee study participants were 2.2 times greater than the odds of good practice for housewives [AOR = 2.2(1.16,4.3)].The odds of good practice regarding DM among study participants who had previous training on DM were 2.6 times greater than the odds of good practice for study subjects with no previous training on DM [AOR = 2.6(1,6.2)].This finding was agreed by the study conducted in Gondor city in which the odds of good knowledge regarding diabetes mellitus among study participants who had previous training on diabetes mellitus were five times higher than the odds of good knowledge for study subjects with no history of training on diabetes mellitus (17). This finding was comparable with another study done in Bale zone (13).

The current study found that there was significant positive association between the participants knowledge and practice level i.e. The odds of good practice regarding DM prevention among study participants who had good knowledge level were 2 times greater than the odds of good practice for study participants with poor knowledge level about diabetes [AOR = 2(1.3,3.3)]. The study reflected that individuals with good knowledge towards diabetes will implement diabetes prevention measures.

The study indicated that the participants were better at implementing DM prevention than having knowledge about the causes, risk factors and complications of DM. This might be because some study participants were implementing general preventive measures of metabolic syndromes even though they have limited knowledge about the causes, risk factors and complications of DM.

## Limitations

Since this study is cross-sectional study, by its nature the study has limitations because it was to ascertain the temporal relationships between the variables. The other limitation of this study was some of the result was compared with studies conducted on diabetic patients due to limited studies on non-diabetic patients.

## Conclusion

The study showed limited knowledge towards DM and low level of DM risk reduction activities. Being government/private employee and having previous training on DM had positive associations with good practice towards DM prevention. It was also indicated that having good knowledge towards DM increases the level of practice towards DM risk reduction activities; thus, awareness creation is highly encouraged. Well informed people would be motivated to assess their risk for the disease, seek proper treatment and care and take charge of their disease. Therefore, campaign on prevention and control via creating awareness about DM should be pursued. The means of improving knowledge and practice towards DM must be integrated into existing health care systems.

## Declarations

## Acknowledgements

I am thankful to Addis Continental Institute of Public Health for giving me opportunity to conduct this study. I also would like to thank the administration of Dil Fire and Beletishachew Health Centres for allowing me to conduct a research in the health centres. Finally, I appreciate my colleagues, friends and my family for their support in every aspect.

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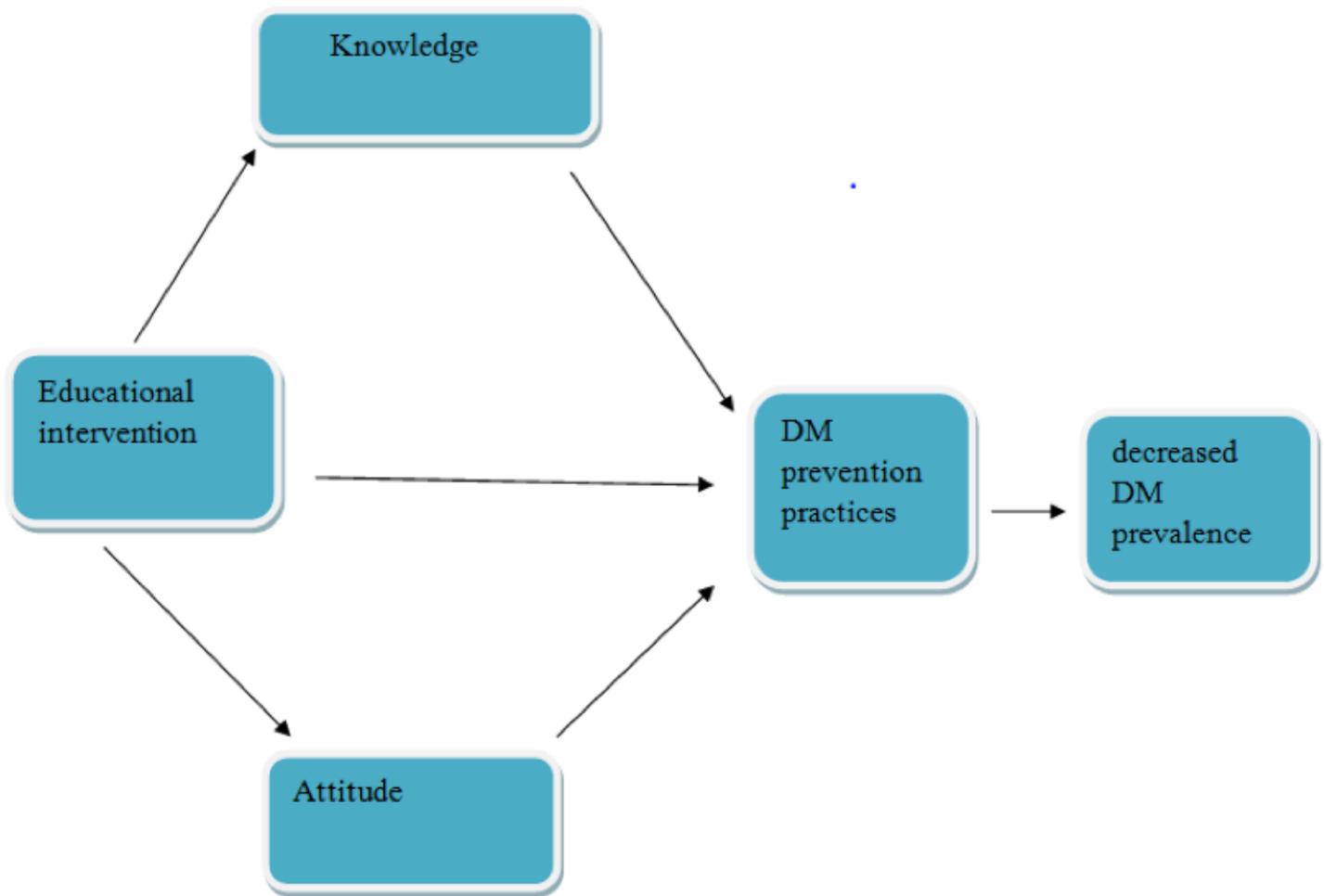
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# Figures



**Figure 1**

Conceptual framework of study (Adopted from Rav-Marathe et al., 2006: 13)

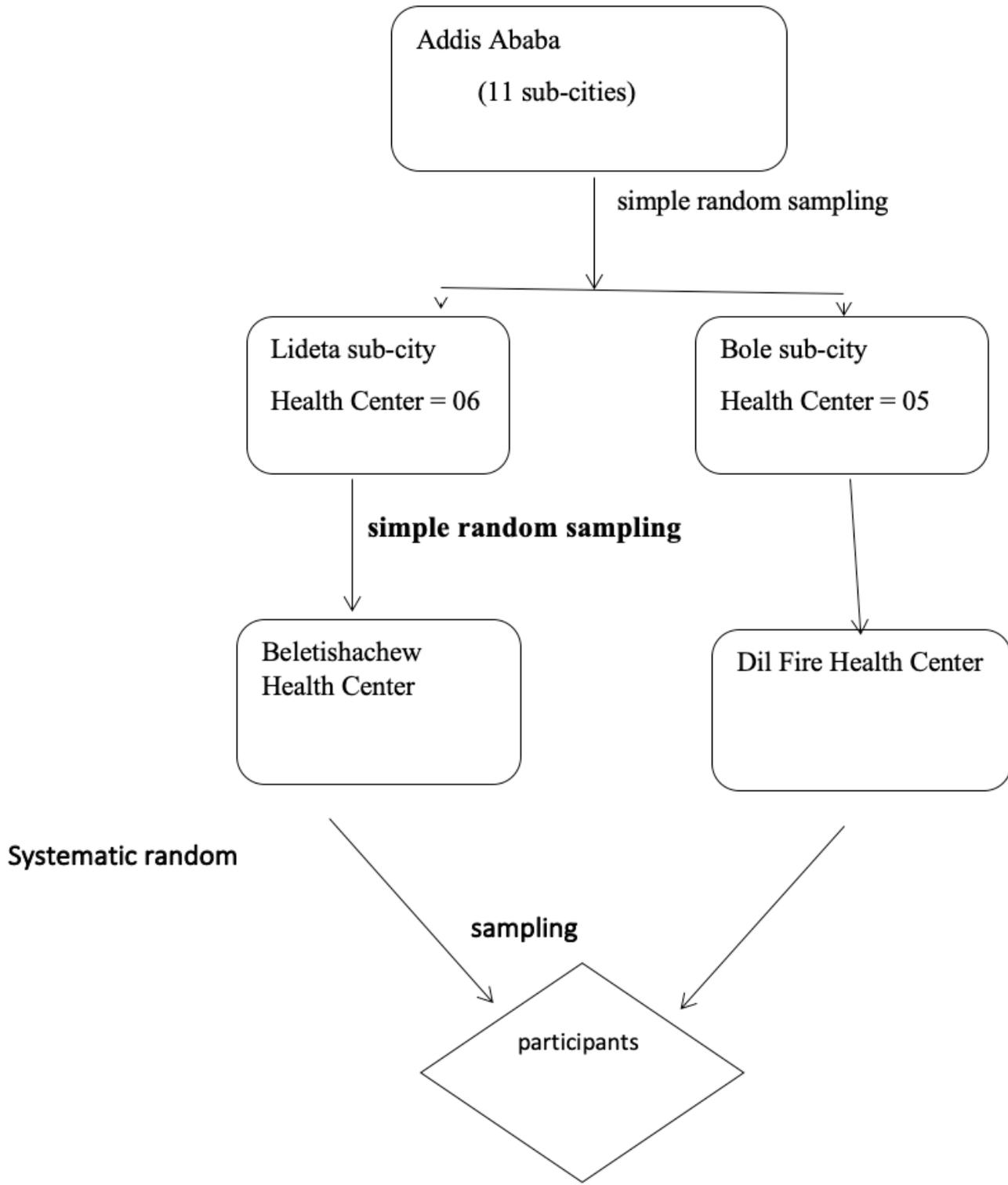
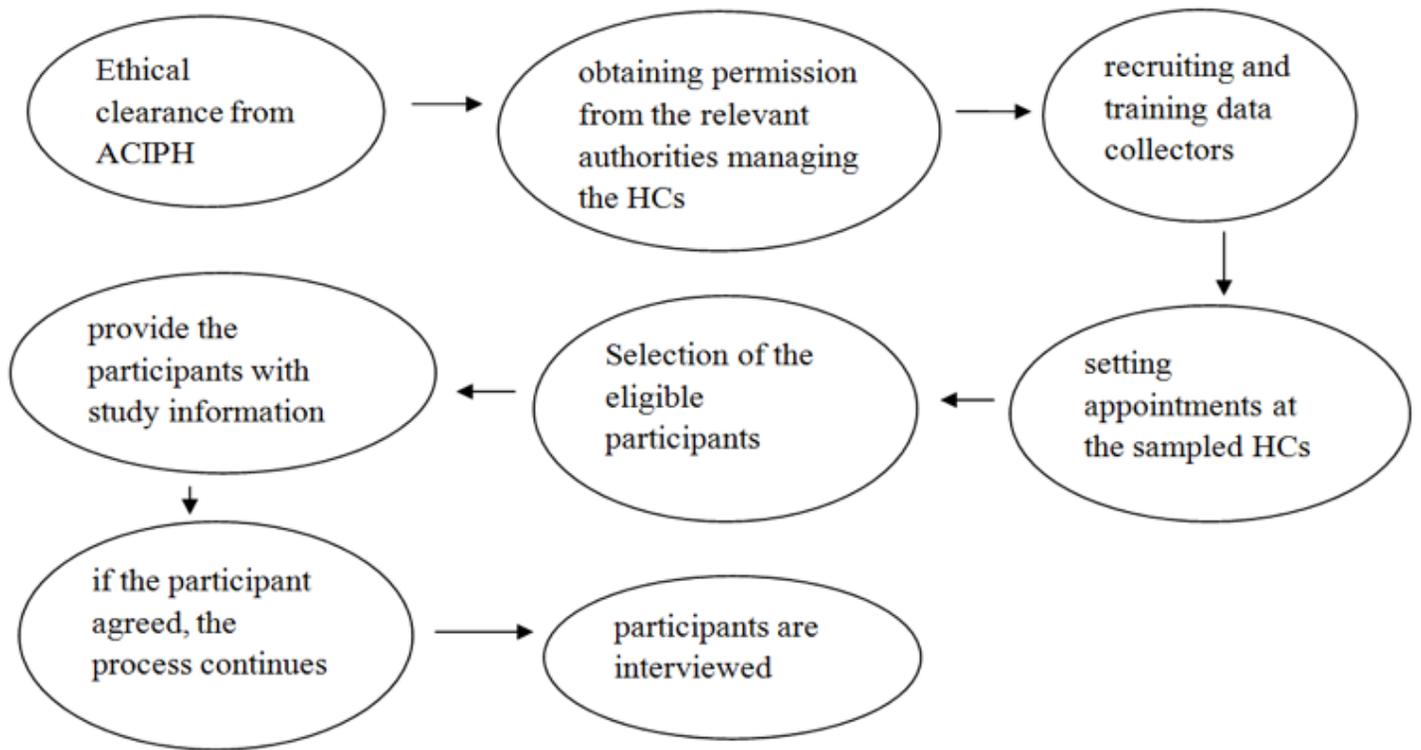


Figure 2

sampling procedures



**Figure 3**

Data collection plan