Awareness on Type 2 Diabetes Mellitus does not Necessarily Translate to a Better Knowledge and Practices on Prevention and Management among Adults

Msollo, S.S.[1]*, G.L. Shausi[2] and A.W. Mwanri[1]

[1]Department of Human Nutrition and Consumer Sciences, Sokoine University of Agriculture, Morogoro, Tanzania
[2]Department of Agricultural Extension and Community Development, Sokoine University of Agriculture, Morogoro, Tanzania

*Corresponding author e-mail: *msollosafiness@yahoo.co.uk*

Abstract

The prevalence of diet-related non-communicable diseases such as type 2 diabetes is on the rise in Tanzania. This creates a need to explore knowledge on prevention and management for designing appropriate interventions. This study aimed to assess the prevalence, knowledge and practices on prevention and management of type 2 diabetes among adults in urban areas of Dodoma region. This cross-sectional study involved 313 randomly selected adults. A pre-tested questionnaire adapted from the Tanzania STEPS SURVEY was administered through face-to-face interviews. Fasting blood capillary was tested using Gluco-plusTM. Sixty three percent were females and 53.6% (n=168) completed primary school. About 11% (n=35) had diabetes and 23% (n=72) pre-diabetes of which 82% (n=88) were undiagnosed before this study. About 60% (n=188) knows that diabetes can be prevented whereby 34% (n=64) and 21.3% (n=40) mentioned preventive measures to be physical activities and eating balanced diet respectively. Knowledge was positively associated with education level (AOR 2.05, 95% CI: 1.57-3.25) and female sex (AOR 1.76, 95% CI: 1.08-2.87). Half of the respondents did not know how to manage diabetes; 46% (n=70) mentioned diet as the only management strategy while 24% (n=36) mentioned physical activity. Furthermore, all participants were aware of type 2 diabetes existence of which 48% (n=150) reported it to be a consequence of overweight/obesity. However, about 89% (n=278) were unaware of gestational diabetes. Although pre-diabetes and diabetes rate was high, majorities were undiagnosed before the study and there was limited knowledge on prevention and management of diabetes creating a need for public education.

Keywords: Diabetes, Knowledge, Practices, Prevention, Management

Introduction

Non-communicable diseases (NCDs), such as, cancers, diabetes, chronic lung and cardiovascular diseases, pose a growing global problem, particularly in low-income countries like Tanzania. These diseases are responsible for 70% of all deaths worldwide, surpassing all other causes combined (MoHCDGEC *et al.,* 2016). The modifiable risk factors for NCDs include poor dietary quality, particularly high salt intake, and high carbohydrate consumption, excessive intake of saturated and trans-fatty acids, and inadequate fruit and vegetable consumption. Additionally, insufficient physical activities, as well as tobacco and alcohol use, contribute significantly to the burden of NCDs (Chen *et al.,* 2017). The NCDs may also be due to pregnancy conditions such as maternal obesity and hyperglycemia which are associated with cardiovascular disease and diabetes for both mother and the newborn (WHO, 2016). Therefore; addressing these risk factors should be a priority for interventions (Beaglehole *et al.,* 2011; NCDI report, 2020).

In Tanzania specifically, NCDs such as diabetes, cancer and cardiovascular diseases contribute to about a third of all deaths (MoHCDGEC *et al.,* 2016). The noted high

prevalence of NCDs in Tanzania is increasing in parallel with overweight/obesity which is reported to rise from 28% in 2015 to 31.5% in 2018 among women of reproductive age in the country and 29.4% in Dodoma region specifically (MoHCDGEC *et al.,* 2016; 2018). On the other hand, the prevalence of type 2 diabetes mellitus is on the rise globally especially in developing countries compared to developed nations (World Health Organization [WHO], 2016). Tanzania is among the five Sub Saharan Africa (SSA) countries with a significant number of people affected by diabetes mellitus (DM), estimating approximately 822,800 individuals, particularly in urban areas (IDF, 2015; Chiwanga *et al.,* 2016; Lunyera *et al.,* 2016).

The national prevalence of Type 2 diabetes (T2DM) among adults aged 25-64 in Tanzania is reported to be 8% in males and 10% in females (MoHSW, 2012). However, evidence from various small studies conducted in different regions of Tanzania indicates varying rates of T2DM. For instance, the rate of T2DM was found to be 22.9% among Maasai in urban areas and 9.9% in rural areas of Arusha region (Masaki *et al.,* 2015) while in Dodoma region, it was reported to be 11.8% (Munyogwa, 2015). Hence, if no appropriate measures are taken, the problem may be frightening the lives of majorities in Tanzania considering that most of the individuals are not informed of their conditions (Munyogwa, 2015).

Knowledge about diabetes can prevent the emerging chronic comorbidities of diabetes mellitus which affects the quality of life of the diabetes patients. This is due to fact that information can help people to assess their risk of diabetes, stimulate them to search for proper treatment and care, and motivate them to take charge of their disease or conditions for their lifetime (Moodley *et al.,* 2007). Furthermore, good knowledge on diabetes and its complications make individuals to search for proper management and take control of their health (Shrivastava *et al.,* 2013). Evidence shows that educated individuals are in a position to take self-care which can help to achieve better and robust diabetic control (Powers *et al.,* 2015). Therefore there is a need for providing public awareness and knowledge to promote self-care with regards to prevention, diagnosis, and risk factor control.

Dodoma is a rapidly urbanizing region with changing lifestyles that may increase the risk of overweight and obesity, leading to high rates of NCDs, including diabetes. However, the majority of adults are unaware of their diabetes conditions (Munyogwa, 2015). This implies that most of adults do not have a culture to test their glucose status, which may hinder their ability to control, prevent, and manage their conditions, thereby increasing the risk of diabetes-related complications. If NCDs, including diabetes, are not prevented and/or managed, they may impose a substantial burden on the global economy, adversely affecting human health, well-being, economic growth, productivity, and development. This burden also strains national health systems and health budgets, undermining countries' capacity to progressively deliver universal health coverage to their people. Therefore, health promotion and prevention can be the most cost-effective measures to combat NCDs (Metta *et al.,* 2014).

However, there is limited information on the knowledge and practices towards the prevention and management of diabetes, which impedes the design of appropriate interventions to prevent the condition and its complications. Most studies have focused on assessing the prevalence and risk factors of diabetes and only a few on awareness (Ruhembe *et al.,* 2014; Mbuya *et al.,* 2014; Khamis *et al.,* 2020; Jorgensen *et al.,* 2020), but there is insufficient information on the knowledge and practices for prevention and management as awareness alone does not guarantee practices.

Therefore, the current study aimed to assess the prevalence, knowledge, and practices of diabetes mellitus prevention and management among adults in urban areas in Dodoma region. This will establish the basis for improving community knowledge on diabetes prevention, aligning with Sustainable Development Goal number three (SDG 3), which aims to ensure access to quality health care for all by reducing premature mortality from NCDs by one-third through prevention and treatments (Morton *et al.,* 2017).

Materials and Methods

Study area, population and design

Dodoma region is semiarid with a long dry season from late April to November and a short wet season from late November to the end of April. The region has little rainfall with an annual average rainfall between 550 and 600 mm. It has erratic changes in temperature whereby in July, the average temperature is 20°C, while in November it is around 30°C making it to experience both hot and cold weathers. Dodoma city is one of the seven districts in the Dodoma region which shares borders with Chamwino district in the East and Bahi district to the West. The city is located between Latitudes 6.000 and 6.300 South and Longitudes 35.300 and 36.020 East. Covering an area of about 2,769 square km, Dodoma city exhibits both urban and rural characteristics. The city is further divided into 4 divisions, 41 wards, 18 villages, 170 streets, and 89 hamlets. As of the last available data from NBS (2012), Dodoma city had a population of 410,956, consisting of 196,487 males and 211,469 females, with a projected population growth rate of approximately 3%. The region was selected due to a high prevalence of overweight and obesity among women of reproductive age with an overall prevalence of type 2 diabetes mellitus of 11.8% with almost 71% of the adults being uninformed of their blood glucose status (Munyogwa, 2015).

A cross- sectional study was conducted among male and female adults between the ages of 25-65 years not on transit and excluded pregnant women, individuals who are on-transit and those who refused to consent for participation.

Sampling techniques and sample size determination

The study employed a multistage sampling technique to select the Streets/Mitaa to be included. Firstly, Dodoma city was purposively selected based on its urban characteristics. Next, wards with health facilities were purposively sampled, and then four wards with health facilities were chosen using simple random sampling. Subsequently, one street was randomly selected from each of the four chosen wards, resulting in a total of four streets. From each selected street, a list of all households was provided, and a simple random selection was applied while considering the proportion of households in each street to obtain a sample of 313 male and female participants. In households where there were multiple eligible adults meeting the selection criterion, a simple random selection was used to select one person to represent the household. Eligible individuals were selected from each participating site until a total of 313 adults were enrolled. The sample size of 313 adults was determined based on a previous large study dealing with NCDs, which utilized the formula for prevalence studies according to Daniel (1999):

$n = [z^2 * p * q]/d^2$

Where:

n = desired sample size; Z = standard normal deviation set at 1.96 corresponding to 95% CI

q=1.0 – p; d = degree of accuracy desired (0.05);

p= proportion of the target population with DR-NCDs

The National prevalence of hypertension (26%) MOHSW (2012) was used to represent the prevalence of DR-NCDs with an assumed response rate of 95 %. The prevalence of hypertension was used in this study as the current study is part of the large study on NCDs.

Data collection

Demographic characteristics, such as age, income, and number of household members were assessed using a structured questionnaire adapted from the STEPS instrument for Non-Communicable Diseases (NCDs) by the World Health Organization (WHO, 2008) and modified to suit the context of the study areas. Face-to-face interviews were conducted with adults using a pre-tested questionnaire to gather information on their level of knowledge and practices regarding the prevention and management of diabetes mellitus. The questionnaire included closed- and open-ended questions, modified from the Tanzania STEPS SURVEY (2008), to assess respondents' views on the causes, consequences, and risk factors of diabetes, as well as common practices used to prevent, screen, and manage the condition. The knowledge interpretation was based on scores obtained, with correct responses receiving a

score of 1, indicating adequate knowledge, and incorrect responses graded with a score of zero for each question (Dhyani *et al.,* 2018).

The study was introduced to the participants before the actual data collection day. The selected participants were insisted to fast for eight (8) hours at night (meaning that the last meal should not exceed 23:59 hours) and not eat anything after waking up until fasting blood glucose is tested. The blood samples were collected from 7:00 AM and thereafter participants were provided with some refreshments while waiting for their results and completing other information. During blood sample collection, a drop of blood was drawn from the capillary using a finger prick with a sterile lancet after cleaning the site with an antiseptic alcohol swab. The finger was then squeezed to obtain a drop of blood, which was tested for fasting glucose within five minutes using Gluco-plus™. The testing was conducted by a medical laboratory technician in the health facility to ensure participants safety and avoid contamination. The collected blood samples were used solely for glucose testing and discarded immediately after the test. Blood glucose levels were classified as follows: normal (≤ 5.6mmol/L), pre-diabetes (5.6-6.9mmol/L), and diabetes (≥7mmol/L) based on the American Diabetes Association's guidelines (2014). Individuals with glucose levels ≥5.6mmol/L were asked to return for another fasting glucose test to confirm the diagnosis. Those diagnosed with diabetes were advised to visit the health facility for further checkup with a doctor.

Data collected was cleaned, coded, entered, and analyzed using the Statistical Package for Social Science™ (SPSS™) Version 20. Descriptive statistics, such as frequencies, means, medians, and percentages, were obtained for demographic information, knowledge, and practices related to the prevention and management of type 2 diabetes mellitus. Furthermore inferential statistics were run to establish the association between knowledge and demographic factors. In this case, knowledge on prevention of diabetes was dichotomized into yes and no for univariate followed by multivariate analysis. Multiple logistic regression analysis was done using stepwise backward conditional to obtain adjusted odd ratios. Statistical inference was based on 95% confidence intervals (CIs) and significance at p-value< 0.05 (Wynants *et al.,* 2017).

Ethical considerations

The study was approved by the Tanzania National Institute for Medical Research (NIMR) with a registration number NIMR/HQ/R.8a/Vol.IX/3798 and permission was offered by the Regional Executive Director and District Medical officers who provided introduction letters to the selected wards. The written consent form was provided to the participants who were willing to participate. The participation was voluntary and privacy was ensured using special identification number rather than their names during data handling.

Results

Demographic information

The results show that 71% (n=222) of the respondents were 25-49 year with an average mean age of 41±12.5 years and 63% (196) were female participants. Almost 54% (n=168) completed primary school followed by those who completed secondary education (20.8%, n=65). About 66.8% (n=209) of respondents were self-employed mainly in small business (Table 1).

Prevalence of type 2 diabetes mellitus

Results for glucose test shown that 11.2% (n=35) of the participants had diabetes and 23% (n=72) pre-diabetes. Among the respondents diagnosed with pre-diabetes and diabetes, 82% (n=88) were not informed of their glucose status before the study (Table 2).

Knowledge on prevention of diabetes

All participants (n=313) were aware of the existence of diabetes and 48% (n=150) reported that it is a consequence of overweight and obesity while 19.2% (60) did not know that overweight or obesity is one of the risk factors. Very few participants (11.2%, n=35) were aware of GDM and among those who were aware, 91.3% (n=32) did not know what it is all about. About 60% (n=188) knew that diabetes can be prevented while 33.2% (n=104) did not

Table 1: Demographic characteristics of the participants (N=313)

	Variables	Frequency	Percent
Age (years)	25-49	222	70.9
	50-65	91	29.1
Sex	Female	196	62.6
	Male	117	37.4
Education level	Completed primary school	168	53.7
	Completed secondary school	65	20.8
	College/University	36	11.5
	Did not complete primary school	19	6.1
	Did not complete secondary school	15	4.8
	No formal schooling	10	3.2
Main occupation	Self employed	209	66.8
	House wife	38	12.1
	Non-Government employee	33	10.5
	Government employee	16	5.1
	Unemployed	13	4.2
	Retired officer	2	0.6
	Student	2	0.6
Family history of diabetes	Yes	90	28.8
	No	204	65.1
	Don't Know	19	6.1
	N	**Mean**	**Standard Deviation**
Respondent average age	313	41.06	12.478

know. Among those who knew that diabetes can be prevented, 34% (n=64) mentioned the preventive measures to be engaging in physical activities while 23.4% (n=44) did not know or were not sure and 21.3% (n=40) reported eating balanced diet as one of the preventive measures (Table 3).

Knowledge on management of type 2 diabetes mellitus

The results show that, 52% (n=161) of respondents did not know how to manage diabetes. For those who reported to know the management, 46% (n=70) mentioned diet as the only management method while physical activity was mentioned by about 24% (n=36)

Table 2: Prevalence of type 2 diabetes mellitus among adults

Variables	Glucose categories	Frequency	Percent
Current glucose status (n=313)	<5.6mmol/L (Normal)	206	65.8
	5.6-6.9mmol/L (Prediabetes)	72	23.0
	>=7mmol/L (Diabates)	35	11.2
Knew their glucose status before the study (n=107)	Yes	19	17.8
	No	88	82.2

Table 3: Respondents' knowledge about diabetes and its prevention

Variables	Responses	Frequency	Percent
Have you ever heard about diabetes (N=313)	Yes	313	100.0
	No	0	0.0
What are the consequences of overweight or obese? (N=313)	Diabetes	150	48.0
	Hypertension	94	30.0
	Don't know	60	19.2
	Hypertension and Cancer	9	2.9
Have you ever heard about GDM? (N=313)	Yes	35	11.2
	No	278	88.8
What do you understand about GDM? N=35)	Diabetes due to pregnancy	3	8.6
	Not sure	32	91.4
Can Diabetes be prevented? (N=313)	Yes	188	60.1
	Don't Know	104	33.2
	No	21	6.7
What measures can be taken to prevent diabetes? (N=188)	Engaging in physical activities	64	34.0
	Eat right foods (Balanced diet)	40	21.3
	Not sure	44	23.4
	Eating less fat foods	12	6.4
	Eating well and avoiding stress	12	6.4
	Eating less sugar foods	10	5.3
	Avoiding stress	6	3.2

of the respondents. Almost 41% (n=129) of the respondents did not know proper foods for a diabetes patient while 14% (n=44) mentioned low energy foods (unrefined foods) and 8% (n=25) mentioned vegetables and/or fruits. Respondents' knowledge on foods that are not suitable for diabetes patients shows that 40.6% (n=127) don't know the foods, followed by 43.5% who mentioned high sugar foods and 9.6% (n=30) who mentioned high energy (refined foods) (9.6%, n=30) (Table 4).

Practices on screening and controlling of blood glucose levels

Results show that, 36% (n=114) of the participants had tested their blood glucose levels previously, of which 16.6% (n=19) were diagnosed with high blood glucose levels. Among the respondents who were diagnosed with high glucose levels, 52.6% (n=10) use medication and special diet to manage blood sugar, while 47.4% (n=9) started doing physical activities to reduce their body weight (Table 5). Furthermore, when respondents were asked on whether they normally control their blood sugar levels regardless of their glucose status, 56.2% (n=176) of the respondents claimed to be controlling of whom 60.2% (n=106) control by doing physical activities only (Table 5).

Main sources of health information among adults

The main source of adults' information on health was reported to be hospital (64%, n=200), followed by internet (10.5%, n= 33). The most common information obtained was prevention of different diseases (47%, n=147) and reproductive health (31.6%, n=99). When asked about preferred source of information, 26% (n=81) of respondents suggested meetings followed by health facilities (21%, n=65) (Table 6).

Table 4: Respondents' knowledge on management of diabetes mellitus

Variables	Responses	Frequency	Percent
Do you know how to manage diabetes mellitus? (N=313)	Yes	152	48.2
	No	161	51.8
What measures can be taken to manage diabetes? (N=152)	Dietary management (low fat and sugar foods)	70	46.1
	Physical activities	36	23.7
	Using medication	17	11.2
	Dietary management, Physical activities and Medication	14	9.2
	Dietary management and Physical activity	12	7.9
	Medication and physical activity	2	1.3
	Medication and dietary management	1	0.7
Which foods are suitable for a diabetes patient? (N=313)	Don't know	129	41.2
	Low energy foods (unrefined foods)	44	14.1
	Low salt foods	38	12.1
	Roots/tubers	26	8.3
	Vegetables and/or fruits	25	8.0
	Low fat foods	24	7.7
	Meat and meet products	13	4.2
	Refined foods	6	1.8
	Low sugar and salt foods	6	1.9
	Legumes	2	0.6
Which foods are not suitable for a diabetes patient? (N=313)	Don't know	127	40.6
	High sugar foods	136	43.5
	High energy foods (Refined foods)	30	9.6
	High fat foods	6	1.9
	Too much fat and salt	5	1.6
	High salt foods	2	0.6
	Meat and meet products	2	0.6
	Milk and milk products	1	0.3
	Unified foods	1	0.3
	Cereals	1	0.3
	Roots/tubers	1	0.3
	Vegetables and/or fruits	1	0.3

Factors associated with knowledge on prevention of diabetes

The selected demographic factors were analyzed using multiple logistic regression analysis with a stepwise backward selection to find out their association with knowledge on prevention of diabetes. A significant association was observed with increased level of education (AOR 2.05, 95% CI: 1.57-3.25) and female sex (AOR 1.76, 95% CI: 1.08-2.87) even after adjusting for age of respondents, occupation, income and family history of diabetes mellitus

Table 5: Testing and control of glucose levels (N=313)

Variables	Responses	Frequency	Percent
Ever tested blood sugar levels	Yes	114	36.4
	No	199	63.6
Blood glucose status (n=114)	High	19	16.5
	Normal	95	83.5
Actions taken to manage it	Using medication and special diet as remedy	10	52.6
	Started or increase physical activities to reduce weight	9	47.4
Normally control blood sugar level (N=313)	Yes	176	56.2
	No	137	43.8
Control measures (N=176)	Doing exercises	106	60.2
	Reduce intake of high fat and sugar foods	9	5.1
	Reduce the amount of food	15	8.5
	Reduce intake of fatty foods	15	8.5
	Diet management and physical activities	31	17.6

which were not significantly associated with knowledge on prevention of diabetes mellitus (Table 7).

Discussion

The current study was conducted to assess knowledge and practices on prevention and management of type 2 diabetes mellitus among adults residing in urban areas of Dodoma region to enable designing of appropriate interventions that can help to reduce the problem and its associated complications.

Prevalence and knowledge on prevention of type 2 diabetes mellitus

The current study revealed that 11.2% of the participants were diagnosed with type 2 diabetes, and 23% had pre-diabetes mellitus. All respondents were aware of the existence of type 2 diabetes with nearly half of them attributing it to overweight and obesity while others remained uncertain about its causes. However, only few participants were aware of gestational diabetes (GDM), and among those who were aware, most lacked a clear understanding of its implications. The lack of awareness regarding GDM and its implications indicates a knowledge deficit concerning different types of diabetes and their interconnections, which may contribute to increasing rates of type 2 diabetes. It is important to note that GDM is a risk factor for developing type 2 diabetes, particularly in women and their offspring. Failing to recognize this condition may prevent individuals from taking preventive and control measures, potentially exacerbating the problem.

Existing literature supports the idea that women previously diagnosed with GDM have a high likelihood of developing type 2 diabetes, underscoring the need for timely identification of those at higher risk. Early identification allows for the implementation of suitable measures to delay or prevent the onset of diabetes (Noctor *et al.,* 2015; Diaz-Santana *et al.,* 2022). Beyond the limited community knowledge of GDM, the majority of pregnant women, who are most affected, are also unaware of the condition (Msollo *et al.,* 2021). This lack of awareness further hinders individuals from taking appropriate precautions to prevent the onset of diabetes mellitus.

Respondent's knowledge on prevention of diabetes was shown to be low as many individuals were not sure if it can be prevented. Among those who declared to know that diabetes can be prevented, some mentioned the preventive measures to be either engaging in physical activities or eating balanced diet while

Table 6: Respondents' source of health-related information (N=313)

Variables	Responses	Frequency	Percent
What is your main source of health related information?	Health facilities	200	63.9
	Internet	33	10.5
	Social media	30	9.6
	Never	15	4.8
	Radio	12	3.8
	TV	12	3.8
	Meetings	7	2.2
	Profession health visitors	4	1.3
Which information do you get from the source you mentioned?	Prevention of diseases	147	47.0
	Reproductive health	99	31.6
	General health information	47	15.0
	Don't remember	3	1.0
	Environmental hygiene	2	0.6
What could be the best source of health-related information in your community?	Meetings	81	25.9
	Health facility	65	20.8
	Don't know	51	16.3
	Home visits	27	8.6
	Social media	22	7.0
	TV	22	7.0
	TV and Radio	14	4.5
	Professional health visitors	10	3.2
	Radio	14	4.5
	Books	6	1.9
	Internet	1	0.3

Table 7: Odd ratios for factors associated with knowledge on prevention of diabetes

Variables	COR	95% CI	P-Value	AOR	95% CI	P-value
Sex						
Male	Reference					
Female	1.87	1.16-3.03	0.011*	1.76	1.08-2.87	0.023*
Education levels						
Not completed primary	Reference					
Completed Primary	2.738	1.99-7.54	0.05*	1.75	0.36-1.73	0.555
Completed Secondary and/ or College	3.94	1.56-9.96	0.004*	2.05	1.57-3.25	0.045*

Note: **significance at p <0.05, COR=Crude Odd ratio, AOR-Adjusted Odd ratio, CI= confidence Interval. The model also included age of respondents, income, family history of diabetes and occupation but was not significant.*

others were unsure of the prevention methods. Unawareness on the prevention strategies for diabetes is an indication of little knowledge on prevention of the condition which implies that most of the individuals are not taking any preventive measures that could help to reduce the occurrence of the condition. A similar study was done in Eastern Saudi Arabia and reported that there is a poor knowledge on risk factors and preventive measures for diabetes mellitus among adults which creates a need for community health education (Aljoudiet *et al.,* 2009). Literatures reveal that knowledge and health literacy are critical aspects in epidemiological shift of diseases or conditions as well as in the prevention and diagnosis of diabetes in low-income areas with limited resources (Malanda *et al.,* 2012; Islam *et al.,* 2014; Fatema *et al.,* 2017).

The current findings show that knowledge on prevention of diabetes mellitus is significantly associated with female sex and the higher level of education among adults. The higher level of knowledge among females may be attributed by ease of accessing nutrition and health information as it has been a tendency that most of the nutrition activities/events are attended by females. It may also be due to fact that most of the health information is provided in the health facility and women are attending most of these sessions when they are pregnant and after delivery during child growth monitoring. A study done in Southern Sri Lanka supports our findings that level of education is significantly associated with knowledge on diabetes (Herath *et al.,* 2017). Another similar study done in Poland revealed that female gender and higher education levels are significantly associated with awareness of diabetes (Sekowski *et al.,* 2022). Hence, there is a need for public education to create awareness for all regardless of their sex, level of education and occupation.

Knowledge on management of type 2 diabetes mellitus

In this study, respondents lack knowledge on how to manage diabetes in individuals with diabetes. Among those who reported to have knowledge of management, mentioned diet as the sole method, while physical activity was mentioned by less than one third of the participants. Furthermore, a majority of the respondents are unaware of suitable foods for diabetes patients, with only a few mentioning low-energy foods (unrefined foods) and vegetables/fruits as beneficial options for individuals with diabetes. Understanding which foods to increase (promote) and which foods to avoid or reduce is crucial for both preventing and managing diabetes mellitus. Also, it is essential to recognize that diabetes is caused by multiple factors, and addressing these factors collectively rather than in isolation is necessary for effective prevention and management. Merely focusing on one aspect is insufficient. Other studies in Ethiopia have supported the findings of this study, indicating that approximately half of the adults lack knowledge on controlling and managing diabetes and its associated complications (Asmamaw *et al.,* 2015; Kassahun *et al.,* 2017).

Practices on testing and managing diabetes mellitus

The study reveals that a majority of the participants do not regularly test their blood glucose levels, leading to a significant number of undiagnosed individuals. This lack of regular assessment poses a risk of serious health complications and economic burdens due to increased treatment costs. Timely diagnosis, treatment, and self-management are crucial for disease prevention and control. A similar study in Bangladesh supports these findings, showing that only 14% of participants had ever tested their blood glucose levels before the study (Fottrell *et al.,* 2018). Among the respondents who were diagnosed with high blood glucose levels before the study, some used medication and special diets for management, while others engaged in physical activities to control their blood glucose and body weight. However, it is essential to consider not only lowering blood glucose levels but also addressing associated risk factors such as smoking, hyperlipidemia, and obesity, as well as monitoring blood pressure and treating hypertension (WHO, 1994).

Diabetes management should begin with dietary therapy combined with increased physical activity, as this promotes weight

reduction and improves insulin sensitivity, thus lowering blood glucose levels. A proper dietary management plan involves reducing the intake of saturated fats, salt, and cholesterol while moderating protein and carbohydrate intake to maintain a desirable body weight (WHO, 1994). Despite the burden of Type 2 diabetes and the knowledge, attitudes, and practices of patients, literature shows that the management of diabetes is generally poor (Gyawali *et al.,* 2016). Effective management of diabetes necessitates adherence to self-management practices, which involves developing knowledge and skills to manage the complexities of diabetes in a social context (Paterson & Thorne, 2000).

Sources of health information among adults in the study area

The study revealed that health facilities are the primary source of health-related information, followed by social media and the internet. The most commonly obtained information pertained to reproductive health and disease prevention, particularly infectious diseases. However, relying solely on health facilities for information dissemination may not be highly effective since not everyone can access these facilities, leading to uneven distribution of health knowledge among the population.

To address this issue, study respondents suggested that health information should be communicated through community meetings, which are attended by a larger segment of the population. This would help to ensure that information reaches a majority of community members, including those with health concerns. Increasing knowledge on diabetes mellitus in the broader population is essential for both prevention and management of the condition and its complications.

Interestingly, another study with similarities to the current research found that family members, friends, and neighbors were the most common sources of information on diabetes prevention and care-seeking (Das *et al.,* 2017). While involving community members in disseminating health information can be beneficial, it may not always guarantee reliability, as the information shared might not be consistently accurate. Similarly, a study conducted in Tanzania reported that various social media platforms such as newspapers, radios, internet, and television were the main sources of health information, particularly for gestational diabetes mellitus (GDM), while health facilities were mentioned by only a few respondents (Msollo *et al.*, 2021).

Therefore, to enhance health information dissemination, a multifaceted approach that includes both health facilities and community meetings, along with proper fact-checking, should be adopted. This will ensure that accurate and essential health information reaches a wider audience, leading to better health outcomes within the population.

Conclusion and recommendations

Despite the adults being aware of the existence of type 2 diabetes mellitus, knowledge on prevention and management is poor. Tendency of diabetes testing is low and monitoring of blood glucose among identified diabetes individuals is infrequently done. All these imply that awareness is not a determinant of proper practices. Hence, there is a need for diabetes prevention and control efforts including large-scale initiatives which focus not only on individuals at high risk but the public.

Source of funds

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Conflict of interests

All authors declare that there is no conflict of interest.

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