FACTORS ASSOCIATED WITH DIABETES AMONG ADULTS AGED 45 TO 60 YEARS AT ORUM HEALTH CENTER IV, OTUKE DISTRICT. A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background
Diabetes is a chronic metabolic disorder characterized by the presence of elevated levels of blood glucose which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves.

Purpose
Determined the prevalence, knowledge, and health facility-related factors associated with diabetes among adults aged 45 to 60 years at Orum Health Center 1V, Otuke district

Methodology
A descriptive cross-sectional study design was employed where 67 respondents were obtained by simple random sampling method. Data was collected by face-to-face interview using a questionnaire.

Results
The prevalence of diabetes was 28(33%) among the respondents, 61(91%) had heard about diabetes and knew something about diabetes, 06(9.0%) were not sure, majority 34(50.8%) reported obesity as a major risk factor whereas few 05(7.5%) reported smoking with most 23(34.3%) reporting excessive thirst as symptom, least 04(6.0%) stated numbness, majority of respondents 34(50.8%) would take more than thirty-one minutes to reach the facility while few 07(10.4%) would take between 1-10 minutes 36(54%) reported health workers attitude was good, 04(6%) reported bad attitude towards diabetic patients, with transport 31(46.3%) most hindrance to the facility, whereas the least 07(10.4%) reported health workers absence, most respondents 24(36%) would wait 30 minutes to 2 hours whereas few would wait for less than 30 minutes before attended to.

Conclusion
Prevalence of diabetes was high with a high number of respondents between 56-60 years, the knowledge of respondents about diabetes was good because the majority had heard and knew about diabetes, and health workers' attitude towards diabetic patients was good because most of them were willing to help the patients.

Recommendations
Government through the Ministry of Health should avail more resources for screening diabetes, carry out public awareness campaigns, train health personnel, and other measures that improve service delivery and reduce the burden of disease in the nation.

Background of the study

Diabetes is a chronic metabolic disorder characterized by the presence of elevated levels of blood glucose which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves (WHO, 2021). It is divided into Mellitus and insipidus, Diabetes mellitus is divided into several types including type 1, type 2, mature onset, gestational diabetes, and many more. Type 2 diabetes is the most prevalent type and is more prevalent in adults with every 1 in 11 adults affected. Type 2 diabetes is due to a combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucagon secretion (CDC, 2023).

Globally, the number of people with diabetes quadrupled in the past three decades, and 1 in 8 adults are living with diabetes, and over 1 in 2 adults living with diabetes are undiagnosed (IDF, 2021). In 2019, an estimated 1.5 million deaths were directly caused by diabetes and 2.2 million were directly attributable to high blood glucose (WHO, 2021). However, the latest diabetes prevalence has reached 10.5% with almost 44.7% of adults undiagnosed. IDF

projections show that by 2045, 783 million adults will be living with diabetes, this would be an increase of 46% more than the double-estimated population growth of 20% over the same period (Gamboa-Antinolo et al, 2023).

Early onset of diabetes Type 2 has become increasingly common and substantial increases in the incidence of type 2 diabetes have been reported in some countries the United States reported a 4.8% annual increase in Type 2 diabetes from 2011-2012 in adolescents aged 10-19 years (Xie et al, 2022).

In Africa, it was estimated that 24 million adults live with diabetes as of 2019. However, this figure is estimated to increase to approximately 55 million by 2045. Africa also has the highest percentage of undiagnosed people with Type 2 Diabetes Mellitus with 60% of those living with diabetes unaware of it. Africa has the greatest variability in the prevalence of Type 2 Diabetes Mellitus from less than 1% in some regions to up to 16% in other regions (WHO, 2022).

In Sub-Saharan Africa, the number of adults living with Type 2 Diabetes Mellitus in 2017 was between 9.8-27.8 million with a regional prevalence of 6%. The increase in Type 2 Diabetes Mellitus prevalence in sub-Saharan Africa is expected to outpace all other global regions. SSA countries face several challenges in tackling the growing T2DM burden including limited health and social care resources and the continued costs of diseases such as Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome and malaria (Zimmermann *et al,* 2018).

East Africa has a high rate of Type 2 Diabetes Mellitus though this is not fully statistically assessed. This is mainly because most of the diabetes cases in East Africa are undiagnosed with a pooled prevalence of 4.43%. A few of those who are aware of their glycemic condition have received treatment and not all have their blood glucose under control (Dessie *et al,* 2020).

A study conducted in Tanzania on a total population of 20,350 showed that the pooled prevalence of undiagnosed diabetes mellitus in Tanzania was 5.37%. The pooled prevalence from subgroup analyses indicated that undiagnosed diabetes mellitus in the urban population of 8.68% is twice higher than that of the rural population (Asmelash et al, 2019).

According to a study carried out in Uganda, the prevalence was higher among females 19.5% compared with males 1.3%. Participants who were married or cohabiting and participants who were separated or divorced were more likely to be diabetic compared with those who had never married before. Compared with rural dwellers, participants from urban areas were more likely to be diabetic. Compared with participants with normal blood pressure, those with elevated blood pressure were more likely to be diabetic (Kabwama et al, 2018).

In a study conducted in Kampala, Uganda, the risk factors attributed to diabetes included hypertension, high lipids in the blood, and physical inactivity and the complications arising from this condition included diabetic ketoacidosis, diabetic neuropathy, infections, and associated morbidities as well as death (Kibirige et al, 2019). To determine the prevalence of diabetes, Knowledge, and associated factors among adults aged 45-60 years at Orum Health Center IV, Otuke district.

METHODOLOGY

Study design
A descriptive cross-sectional study design was employed in this study. This was because its being time-sensitive it fitted my limited schedule.

Study area
The study was conducted at Orum Health Centre IV which was a public health facility in Otuke District. It served a population of about 21,000 people with a total of 40 staff. Otuke district is bordered by Alebtong, Abim, Agago, and Lira districts. Langi and Acholi were the most widely spoken local languages in the area. Common religions were Roman Catholic, Anglican, SDA, Islam, Born Again, and the church of Jesus Christ of Latter-day Saints. The study focused on "factors associated with diabetes among adults aged 45-60 years at Orum Health Center IV, Otuke District". The study was carried out in July 2023.

Study population
The study population included a target population of adults aged 45 to 60 years with diabetes and an accessible population which included the patients attending Orum Health Centre IV diabetic clinic that were aged 45 to 60 years.

Sample size determination
The sample size was determined using Kish Leslie's (1965) formula

$n = Z^2PQ/e^2$

Where; n = sample size required

e = acceptable error/ required precision of the estimate = 5%

Z = the standard variate (normal Z-score) corresponding to the confidence interval i.e., for the confidence interval of 95% Z = 1.96

P = the estimated prevalence of diabetes among people 45 to 60 years in Uganda i.e 4.6% (World Bank, 2023)

Q = 1-P

$n = Z^2PQ/e^2$

$n = (1.96^2 \times 0.046 \times 0.954)/(0.05*0.05)$ n = 67 respondents

Therefore, the study involved 67 respondents.

Sampling technique
Convenient sampling was employed to select the representative members to participate in the study. The study participants were selected depending on how accessible, convenient, and co-operation to participate in the study as well as the fitting time of the respondent.

Sampling procedure
The study participants were selected using convenient sampling. The researcher selected everybody who attended a diabetic clinic at Orum Health Center IV and

was willing to participate in the study at their convenience in terms of time and resources.

Data collection method

The questionnaire method was used for data collection in the study. The questionnaires were delivered by the researcher to the selected participants in this study. Questions targeting the objectives were conveyed in the questionnaire, on prevalence, 2 samples were used and sugar level was determined by oral glucose tolerance test colorimetrically.

Data collection tools

The only data collection tool that was used in this study was the questionnaire which included both open and closed-ended questions. These were printed on papers in English and for respondents who did not know English, the researcher guided them in filing the questions. Respondents were expected to use their writing material such as pens or pencils as appropriate. Parcels for proper storage of the questionnaire forms were used before and after the study.

Data collection procedure

Serial numbers were given to every respondent which were put on the questionnaires. The respondents were then informed about the content and intent of the study and informed consent was sought.

A part of the questionnaire provided a space for documenting the informed consent. The questionnaire forms were then handed to the respondents and they were given instructions on the way of filling them.

Standard semi-structured questionnaires were used and the respondents were guided on how to fill them using either pen or pencil. The time of collection of the questionnaires was communicated to the respondents. For this study, the respondents were offered a maximum of one day to return the forms to the researcher.

In the case of refusal to consent to the study or failure to fill out the questionnaire form, the respondent was eliminated from the sample and replaced by another respondent from the stratum as the former. In case of loss of the questionnaire by a respondent, another copy was supplied at the expense of the researcher. This was catered for by obtaining a surplus of copies of the forms which was retained by the researcher.

Study Variables

Independent Variable

Factors associated with diabetes.

Dependent Variable

Prevalence, knowledge, and health facility-related factors associated with diabetes among adults.

Quality control

The only activity that was relevant in this aspect was seeking consent from the authorities. As the study was conducted within the area and population of which the researcher was a resident, there was no relevant need for a pilot study as the researcher deemed the area to be qualified for the study. This was because it was relevant to the study, and the required research and information were available from the members hence the area automatically qualified for the study.

The data collection tool i.e., the questionnaire was pretested by selecting randomly a few respondents from the hospital attending the diabetic clinic and administering it to them.

The answers were then scrutinized to check their perceptibility by respondents and the necessary adjustments were made in the questionnaire. Adjustments range from change, omission, and addition of questions to changing the font of the questions in the forms.

For quality data collection two research assistants were selected from the hospital of which the principal researcher was part. These were trained on how to answer questions in the questionnaire form, how to treat respondents ethically, and how to translate any question in the questionnaires for the respondents. These assistants helped the researcher in the distribution and collection of the forms before and after the respondents finished filling them. It was their responsibility to ensure the exact number of forms were retrieved after the study.

Data analysis and presentation

The researcher ensured completeness of data while in the field and data was encoded and cleaned. The data collected was analyzed using Microsoft Excel, SPSS software version 2, and STATA version 13.0. Results were presented in the form of narratives, frequency tables, percentages, pie charts, and graphs.

Ethical considerations

A letter of introduction was written, addressed to the in charge of Orum Health Center IV to carry out research in the facility. Letters of request were also presented to the head of internal medicine and the in-charge of diabetic clinics in their areas of jurisdiction.

The respondents were assured of a high level of confidentiality by the researcher and his team. This was ensured by the use of serial numbers instead of names on questionnaire forms to ensure anonymity. The respondents were also informed of their right to refuse to be enrolled in the study and their right to withdraw from the study at any time along the way without any repercussions.

Informed consent was sought from the respondents by presenting them with a consent form to sign after a thorough explanation of the study. The researcher and his team observed and respected the expectations of the respondents.

PRESENTATION OF FINDINGS
Demographic data of respondents.
Table 1: Shows the demographic characteristics of the respondents (n=67)

Characteristics	Category	Frequency	Percentage
Age	45-50	12	18
	51-55	24	36
	56-60	31	46
Tribe	Langi	29	43
	Acholi	17	25
	Lugbara	05	08
	Itesot	09	13
	Others	07	11
Education level	None	04	06
	Primary	30	45
	Secondary	19	28
	Above secondary	14	21
Marital status	Married	27	40
	Single	16	24
	Divorced	18	27
	Others	06	09
Gender	Male	39	58
	Female	28	42
Occupation	Peasant farmer	04	06
	Business personnel	31	46
	Civil servants	22	33
	Others	10	15

From Table 1, the majority of the respondents 31(46%) were aged between 56 and 60 years, whereas few were aged between 45 and 50 years. Most of the respondents 29(43%) were Langi, while the fewest tribe was Lubgara. The biggest number of the respondents, 30(45%) had attained some primary level education, whereas few 04(6%) had not attained any level of education, with males 39(58%) than females 28(42%), and most respondents are business personnel while very few 04(6%) were peasant farmers.

Prevalence of diabetes among adults 45 to 60 years
Table 2: shows Individuals who would like to take a diabetes test

Taking diabetes test	Frequency	Percentage (%)
Yes	67	72.8
No	25	27.2
Total	92	100

From the table, 67(72.8%) accepted to take a diabetes test whereas 25(27.2%) refused to take a diabetes test.

Table 3: showing the prevalence of diabetes

Prevalence	Frequency	Percentage (%)
Positive	28	33
Negative	39	67
Total	67	100

Most of the respondents 39(67%) were negative of diabetes, while 28(33%) were positive of diabetes

Knowledge about diabetes
Table 4: Distribution of respondents by knowledge of diabetes (n=67)

Knowledge on diabetes	Frequency	Percentage (%)
High blood sugar level	26	38.8
Abnormal sugar level	11	16.4

Increased sugar level than normal	24	35.8
Not sure	06	9.0
Total	67	100

Majority of the respondents knew diabetes as high blood sugar level 26(38.8%), while 6(9.0%) were not sure.

Table 5: Distribution of risk factors associated with diabetes(n=67)

Risk factors	Frequency	Percentage (%)
Alcohol intake	6	8.9
Smoking	5	7.5
Obesity	34	50.8
Eating sweet foods	22	32.8
Total	67	100

Most of the respondents, reported obesity 34(50.8%) as the major risk factor while 5(7.5%) smoking as the least risk factor.

Table 6: Distribution of respondents by symptoms of diabetes (n=67).

| Symptoms	Frequency	Percentage (%)
Numbness	04	6.0
Fatigue	14	20.9
Excessive thirst	23	34.3
Night sweat	09	13.4
Frequent urination	17	25.4
Total	67	100

Most of the respondents stated excessive thirst 23(34%) as a major symptom, whereas the fewest 4(06%) reported night sweating.

Health facility-related factors for Diabetes among adults aged 45-60 years.
Table 7: Distribution of respondents by duration taken to reach facility (minutes)

Duration taken (mins)	Frequency	Percentage (%)
1-10	07	10.4
11-20	15	22.4
21-30	11	16.4
More than 31	34	50.8
Total	67	100

Of 67 respondents, most of them 34(50.8%) reported they took more than 31 minutes to reach the facility whereas a few 07(10.4%) reported 1-10 minutes taken to reach the facility.

Figure 1: shows the distribution of health workers' attitudes towards diabetic patients (n=67)
Health worker's attitude towards Diabetic patients
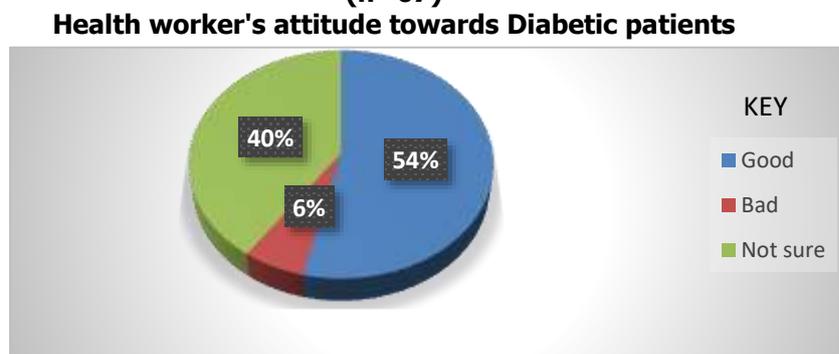
The majority of the respondents about 36(54%) showed that the health workers' attitude was good towards diabetic patients, whereas very few 04(6%) reported a bad attitude toward health workers.

Table 8: Distribution of respondents by hindrance to access facility (n=67)

Hindrance	Frequency	Percentage (%)
Transport challenges	31	46.3
Health worker's absence	07	10.4
Lack of essential supplies	19	28.4
Others	10	14.9
Total	67	100

The majority of the respondents reported the biggest hindrance to the facility was transport challenge 31(46.3%), while 07(10.4%) Health worker's absence was the least.

Figure 2: Distribution of respondents by duration taken in the facility before being attended to (n=67).
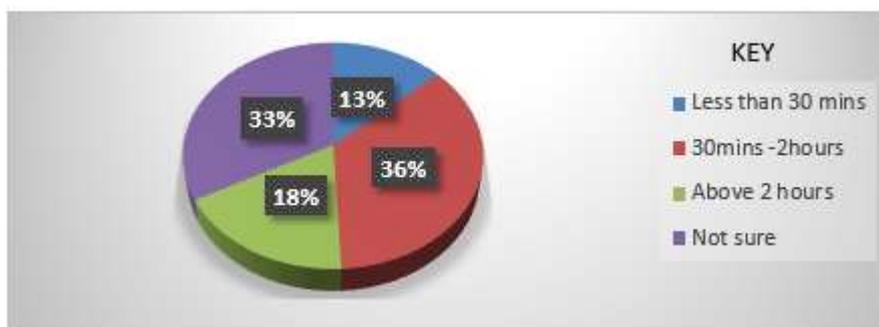
Most respondents 24(36%) reported that they waited 30 minutes to 2 hours while few stated that they waited less than 30 minutes.

Discussion of results

Prevalence of Diabetes

The study found that the prevalence of diabetes was 33% among the respondents. This is in disagreement with the study by (Dickson et al, 2016) which revealed that the prevalence of diabetes in the Hospital was 2.5%. The finding of the study showed that the number of respondents who developed diabetes was more compared to the study above in Kitagata Hospital. This was due to the age group that increased the risk of diabetes as well as some other risk factors such as obesity, physical inactivity, and lifestyle since obesity leads to insulin resistance while alcohol intake reduces the sensitivity of beta cells of the pancreas, all resulting in the development of diabetes.

According to the findings of this study, the prevalence of diabetes was 33% a little relatively agreed with the study by (Akhtar et al, 2022) which showed that the pooled prevalence of diabetes was 14.39%.

The findings of the study showed that it was more prevalent in females with 58%, This is because females are more likely to be obese than males however this study agreed with a study by (Asiimwe et al, 2020) which revealed that out of 22.8% patients, 18.7% were female while 7.8% being males.

Knowledge about diabetes among adults

The study found that the majority of the respondents 91% had heard about diabetes and knew something about diabetes. This was because some had attended diabetic health education before, others had received the information from the radios and televisions while others had seen its manifestation from others who were sick. This study is in agreement with a study conducted by (Sathish et al, 2023) which showed that among 1007, 96.1%had heard the term diabetes, 92.9% knew at least one risk factor and this study is in agreement with the study by (Alemayehu et al, 2020) which showed that most study participants defined diabetes as the presence of high blood sugar levels in the body but nearly half of the study Participants did not know DM as a condition of insufficient insulin production.

Most of the respondents in this study at least stated the risk factor of diabetes with the highest being obesity 34(51%) and the least being smoking 5(07%). This was because some of them had attended diabetic health education while others had heard over the radio. This was in agreement with a study conducted by (Alemayehu et al, 2020) which revealed that most respondents mentioned being obese 70.5% as the major risk factor for the development of diabetes.

The majority of respondents in this study at least named one sign and symptom of diabetes with the most selected one being excessive thirst 23(34%) and the least sign being numbness 4(6%). This was because of personal experiences of different signs and symptoms by the affected individuals. The findings of this study are in

disagreement with the study carried by (Sekowski et al,2022) which showed that out of the 10 symptoms analyzed in the study high blood sugar 80.7% and chronic fatigue, feeling sleepy during the day 74.6% were the most recognized symptoms.

Health facility-related factors

The study found that the majority of respondents would take more than thirty-one minutes 34(50.8%) to reach the facility. This is because most of the respondents were dwelling in places far from the facility and also because of poor transportation which would make them reach late, sometimes respondents were disturbed by family daily activities such as farming. This study is in agreement with a study conducted by (Maldill et al, 2018) which showed that traveling to diabetic health services was between 5.89 to 4.02 minutes faster by motor vehicle compared with public transport which was between 20.00 to 25.03 minutes.

The majority of the respondents in this study stated that the attitude of the health workers toward diabetic patients was good 54% and 40% were not sure of the health workers' attitude, with the least being bad 6%. This was because the health workers were ready to provide services regarding diabetes.

According to the findings of this study, the majority of the respondents stated that the biggest hindrance to accessing health facilities was the transport challenge 46.3% with the least being health workers' absence (10.4%). This was because most dwelled in areas poorly facilitated with transport equipment with poor roads while the facility had enough health workers and available resources to manage diabetes. This study agreed with a study conducted by (Rawlance et al, 2021) which showed that access to care was mostly hindered by transport challenges, the absence of health workers, and the lack of essential supplies for monitoring in the health facility.

Conclusion

The specific objective of the study was to determine the prevalence of diabetes among adults aged 45-60 years at Orum Health Center 1V, Otuke District. The results found a relatively high number of respondents most commonly in the age group between 56-60 years, as the age increases the risk of diabetes by the respondents, and also the result found it more in females than males as most women become more obese, in which obesity is a risk factor of diabetes and from the results, I conclude that the prevalence of diabetes was high.

Another specific objective of the study was to assess the knowledge about diabetes among adults aged 45-60 years at Orum Health Center 1V, Otuke District. The results found relatively good levels of knowledge among the respondents. Most of the respondents could define diabetes, knew at least the risk factor for diabetes as most suggested obesity as the major risk factor for diabetes and also majority knew the signs and symptoms of diabetes as they singled out excessive thirst being the most. Therefore, based on these results, I conclude that the respondents had sufficient knowledge about diabetes.

The last specific objective was to establish the health facility-related factors associated with diabetes among adults aged 45-60 years at Orum Health Center 1V, Otuke District. The findings of the study indicated that health workers had a good attitude towards diabetic patients and the facility had available health workers, however, the facility was relatively far from respondents' residences, and most of them were hindered by transport to reach the facility.

Recommendations

From the results obtained from the study among adults at Orum Health Centre 1V, Otuke District, the researcher therefore recommends that;

The government through the Ministry of Health avails more resources for screening diabetes, carrying out public awareness campaigns, training health personnel, and other measures that improve service delivery and hence reduce the burden of disease in the nation.

To the staff of Orum Health Center 1V, regular screening of adults and creating awareness through health education on risk factors for diabetes and lastly out especially to remote areas far from the facility.

To the people of Orum and Otuke at large, early preventive measures should be taken, such as maintaining a normal weight, proper diet, carrying out physical exercise daily, regularly attending health education, and minimizing social lifestyles such as alcohol and smoking as these measures would prevent the risk of diabetes.

Acknowledgements

List Of Abbreviations/Acronyms

CDC: Center for Disease Control
DCM: Diploma in Clinical Medicine and Community Health
HIV: Human Immune-deficiency Virus
IDF: International Diabetes Foundation
IFG: Impaired Fasting Glycaemia
MoH: Ministry of Health
T1DM: Type 1 Diabetes
T2DM: Type 2 Diabetes
UAHEB: Uganda Allied Health Examinations Board
WHO: World Health Organization

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