Knowledge and Challenges Associated with Management of Type 2 Diabetes Mellitus among Adults aged 45-60 Years attending Diabetic Clinic at Buwambo Health Centre IV. A Cross-sectional Study.

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Abstract

Background:
Type 2 diabetes mellitus is a type of diabetes mellitus that is very prevalent in Uganda and affects a wide percentage of the adult population. Much as there have been successive
Interventions in the prevention and control of this non-communicable disease, it is still increasing annually.

Methodology:
This was a cross-sectional study conducted to assess the challenges associated with the management of type 2 diabetes mellitus among adults aged 45-60 years attending the diabetic clinic at Buwambo Health Centre IV and the researcher sought to determine the knowledge, lifestyle factors, and health facility-related factors associated with the management of type 2 diabetes mellitus among the same population.

Results:
Study findings revealed that males were the majority 65% and stayed in a rural residence 69%. Most of the respondents had sufficient knowledge of diabetes mellitus. More than 80% knew the definition, types, signs, and causes of diabetes. The majority of respondents said there was general readiness of facilities to handle diabetes but the health workers needed more training.

Conclusion:
The study findings indicated that health facilities are generally ready to manage diabetes mellitus with enough medications and fairly well-trained personnel to manage the disease

Recommendation:
There is a need for the government to therefore prioritize the non-communicable disease treatment and prevention budget, for the health facilities to develop better organizational structures in diabetic clinics and proper stock management. All these will help to reduce the diabetes disease burden in the country at large.

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1 Background

Diabetes mellitus 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).

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 every1in 11 adults affected. Type 2 diabetes mellitus is due to a combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucagon secretion (Khardori 2022).

Globally, the number of people with diabetes quadrupled in the past three decades and is the ninth major cause of death from 108 million in 1980 to 422 million in 2014. Prevalence has been rising more rapidly in low- and middle-income countries especially in Asia and Africa than in high-income countries (Zheng *et al,* 2018). 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). In Africa, it was estimated that 19 million adults live with type 2 diabetes as of 2019. However, this figure is estimated to increase to approximately 47 million by 2045.

In Sub-Saharan Africa, the number of adults living with T2DM in 2017 was between 9.8-27.8 million with a regional prevalence of 6%. The increase in T2DM 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 HIV/AIDS and malaria (Zimmermann *et al,* 2018).

East Africa has a high rate of T2DM 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).

Uganda has a relatively low prevalence of diagnosed diabetes mellitus at 1.4% of all adults as of 2016. This is because most of the affected people aren't aware of their glycemic status (Bahendeka *et al,* 2016).

2 Methodology

Study design

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

Study area

The study is to be conducted at Buwambo health center IV which is a public health facility found in kyadondo county, Wakiso district along kitezi road in Banda hill area. It serves a population of about 21,000 people with a total of 40 staff.

Runyankole and Luganda are the most widely spoken local languages in the area. Common religions are Roman Catholic, Anglican, SDA, Islam, Born again, and the church of Jesus Christ of latter-day saints.

Study population

The study population included a target population of adults aged 45-60 years with diabetes mellitus type 2 and an accessible population which included the patients attending Buwambo health center IV diabetic clinic that are aged 45 to 60 years between November and December 2021.

Selection criteria

Inclusion criteria

The study will include all patients attending the diabetic clinic of Buwambo health center IV that are between the ages of 45 and 60years. Only patients who consent to participate in the study were considered.

Exclusion criteria

Patients who have other types of diabetes mellitus, those who do not attend the diabetic clinic, and those who are beyond the ages of 45 and 60 years did not participate in the study. Patients who didn't consent to participate also were not included in this study.

Sample size determination

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

n = Z2PQ / e2

Where; n = sample size required

e = acceptable error/ required precision of the estimate = 0.081

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 mellitus type 2 among people 45 to 60 years in Uganda i.e., 78.4% (UBOS, 2017)

Q = 1-P

n = Z2PQ /e2

n = (1.962 × 0.784× 0.216)/ 0.0812 n = 98 respondents

Therefore, the study involved 98 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 their cooperation 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 the diabetic clinic at Buwambo health center and was willing to participate in the study at her 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. In this method, information regarding challenges associated with the management of type 2 diabetes mellitus among adults aged

45-60years attending diabetic clinic at Buwambo health centre IV were sought. Questions targeting these fields were conveyed in the questionnaire.

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, a 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 was 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 are given instructions on the way of filling them. Standard semi-structured questionnaires are to be used and the respondents were guided on how to fill them using either pen or pencil. A 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 the questionnaire form, the respondent was eliminated from the sample and was 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 and retained by the researcher.

Piloting the study

The only activity that was relevant in this aspect was the seeking of consent from the authorities. As the study was conducted within the area and population of which the researcher is a resident, there was no relevant need for a pilot study as the researcher deems the area qualified for the study. This is 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.

Quality control

The data collection tool i.e., the questionnaire was pretested by selecting randomly a few respondents from the hospital attending a 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 ranged from change, omission, and addition of questions to changing the font of the questions in the forms.

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 form of narratives, frequency tables, percentages, pie charts, and graphs.

Ethical considerations

A letter of introduction was written addressed to the director of Buwambo health centre IV to carry out research in the same hospital. Letters of the request were also presented to the head of internal medicine and the in-charge of a diabetic clinic 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 to them 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.

Study limitations

Some limitations of the study were inadequate resources such as funds to fully fund the activities involved in the study.

Non-compliance by some of the respondents was expected and might have led to inaccurate results. However, this was counteracted by ensuring the willingness of the respondents before they are involved in the activities of the study.

3 Results

Socio-demographic factors of respondents about Diabetes mellitus at Buwambo Health center IV regarding the management of type 2 Diabetes mellitus.

The majority of the respondents 40(40.8%) were aged between 45 – 50years. Most of these respondents were married 70(71.4%) and only the minority divorced 12(12.4%). Born again 35(35.7%) was the biggest religious denomination amongst the respondents and Muslims 10(10.2%) were the fewest. The majority of the respondents were residing in a rural place 68(69.4%) and had attended at least secondary school education 48(48.9%).

Knowledge of respondents about Diabetes mellitus at Buwambo Health center IV regarding the management of type 2 Diabetes mellitus.

The majority of the respondents could define diabetes mellitus as persistent high blood sugar 78(80.6%) but only a few could quantify it 17(17.3%) and the rest 3(3.1%) were not sure about the definition.

Most of the respondents knew that taking too much sugar is the cause of diabetes mellitus 89.9(89.8%), 61(62.2%) picked old age, 53(54.1%) picked obesity, 56(57.1%) picked family history of diabetes and 1% didn't know the cause of diabetes.

The majority of the responses showed that diabetes is genetic (86.7%) and only 13.3% thought it wasn't genetic

The majority of the respondents were not sure about the types of diabetes mellitus 73(74.5%), type 1 was the most recognized type 18(18.4%), 7(7.1%) recognized type 2(2%) recognized gestational diabetes mellitus and none of the respondents recognized mature onset diabetes of the young.

The majority of the respondents 52(53.1%) reported that they had excessive sweating while the minority 19(19.4%) of the respondents reported that they had paralysis.

Regarding susceptible ages, respondents chose as follows. Above 60years 38(38.8%), 40-60 years 22(22.4%), 21-40 years 12(12.2%), 0-20 years 4(4.1%), all ages (11.2%). Only 1 respondent wasn't sure which ages are affected by diabetes.

Health facility related factors about Diabetes mellitus at Buwambo Health center IV regarding the management of type 2 Diabetes mellitus.

The majority of the respondents thought their facilities were ready to treat diabetes mellitus 83(82.7%) and the rest 17(17.3%) thought the facility wasn't ready.

The majority of the respondents stayed far from the facility 65(65.3%), 21(21.4%) stayed at a moderate distance, 12(12.2%) stayed near the facility and 1(1.1%) respondent wasn't sure about the distance.

Of the 98 respondents, 40(40.8%) traveled to the facility on foot, 28(28.6%) used a bicycle, 23(23.5%) used a motorcycle and only 7 used a motorcar.

Regarding the availability of medication, 44(44.9%) respondents reported that there was enough medication at the health facilities and the majority 54(55.1%) reported that there weren't enough medications at the health facility.

The majority of the respondents waited in line for 30 minutes to 2 hours, 21(21.4%) waited for greater than 2 hours, 12(12.2%) waited for less than 30 minutes and only 2(2.1%) were unsure about the waiting period.

The majority of the respondents 74(75.4%) thought that the health workers at the facility were well-trained in the management of diabetes mellitus and only 24(24.6%) thought the health workers lacked in their training in the management of diabetes mellitus.

4 Discussion, Conclusion, and Recommendations

Discussion of results

Knowledge of patients

The specific objective was to assess the knowledge of respondents attending the diabetic clinic

Table 1. Socio-demographic factors of respondents (n=98)

		Number	Percentage
Age	45-50	40	40.8
	51-55	37	37.8
	56-60	21	21.4
Gender	Male	64	65.3
	Female	34	34.5
Marital status	Married	70	71.4
	Divorced	16	16.3
	Widowed	12	12.4
Religion	Muslim	10	10.2
	Anglican	19	19.4
	Born again	35	35.7
	Catholic	22	22.4
	Other	12	12.2
Residence	Rural	68	69.4
	Urban	30	30.6
Education level	Primary	23	23.5
	Secondary	48	48.9
	Tertiary	27	27.6
	Total	98	100

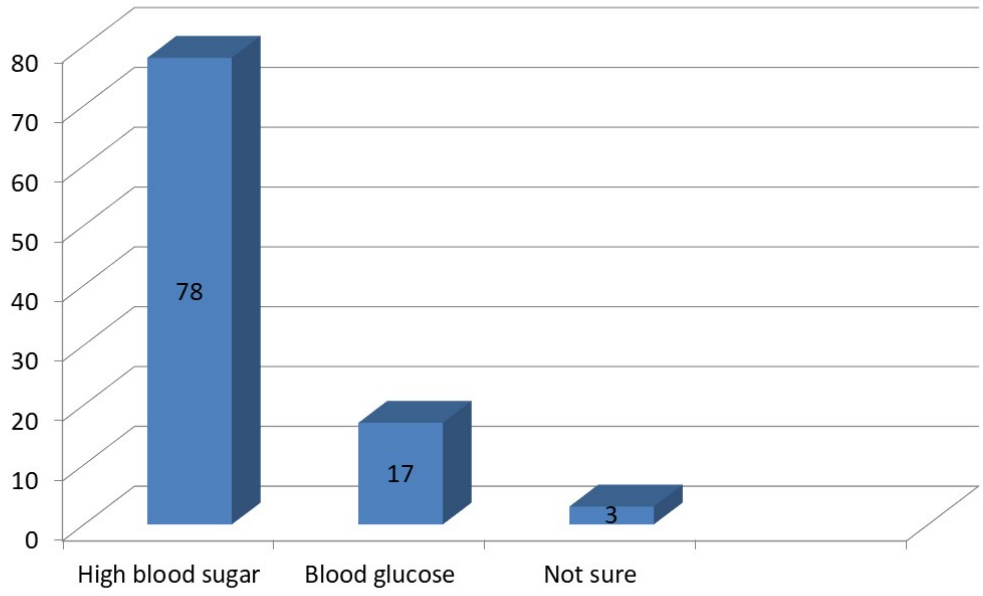

Figure 1. Distribution of Responses about their knowledge of the definition of diabetes (n=98)

Table 2. Responses on causes of diabetes (n=98)

Response	Number	Percentage
Taking too much sugar	88	89.8
Old age	61	62.2
Obesity	53	54.1
Parents with diabetes	56	57.1
Don't know	1	1.01
Other	17	17.3
Total	98	100

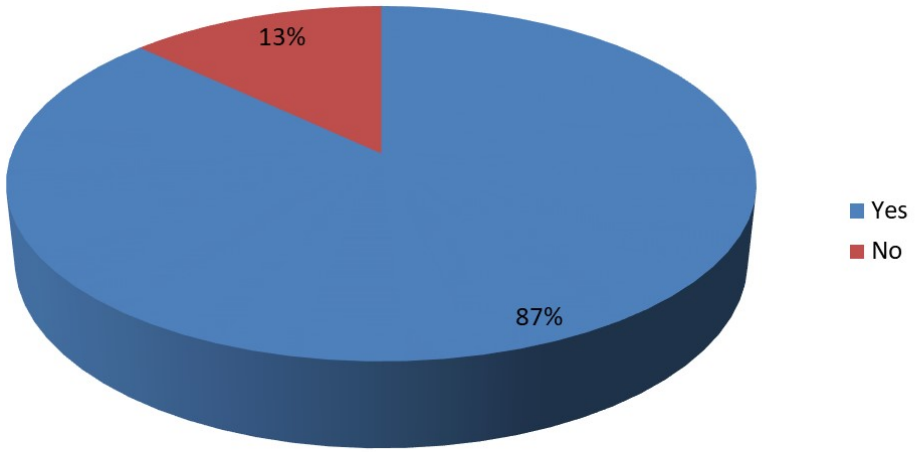

Figure 2. Distribution according to their Responses on whether diabetes is genetic (n=98)

Table 3. Distribution according to the Responses of clients on types of diabetes mellitus (n=98)

Response	Number	Percentage
Type 1	18	18.4
Type 2	7	7.1
Gestational diabetes	2	2
MODY	0	0
Other	0	0
Not sure	73	74.5
Total	98	100

Table 4. Distribution according to the Respondents' choices on signs of diabetes mellitus (n=98)

Response	Number	Percentage
Over urination	42	42.9
Paralysis	19	19.4
Excessive sweating	52	53.1
Obesity	21	21.4
Poor vision	38	38.8
Other	3	3.1
Total	98	100

Table 5. Distribution according to their Responses on the susceptible ages of diabetes mellitus (n=98)

Response	Number	Percentage
0-20	4	4.1
21-40	12	12.2
40-60	22	22.4
Above 60	38	38.8
All ages	11	11.2
Not sure	1	1.1
Total	98	100

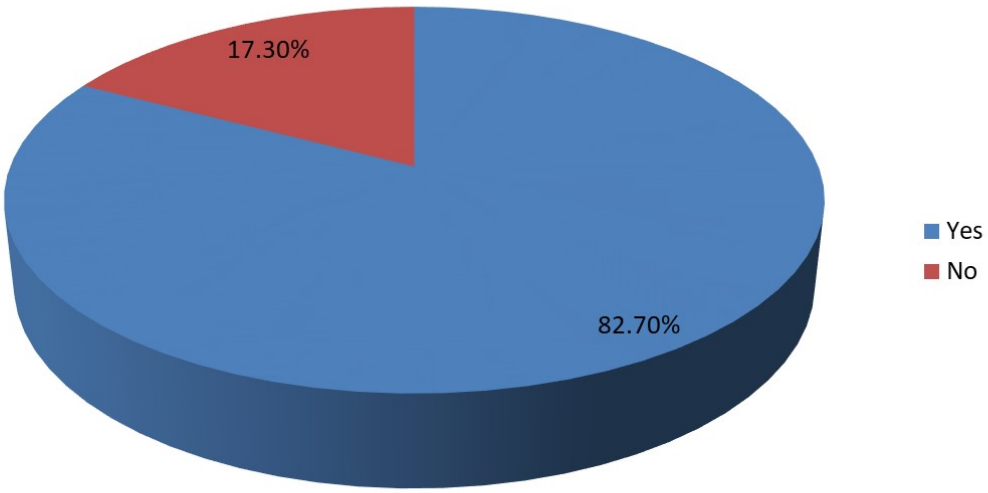

Figure 3. Distribution according to their Responses on whether health facilities are ready to treat diabetes (n=98)

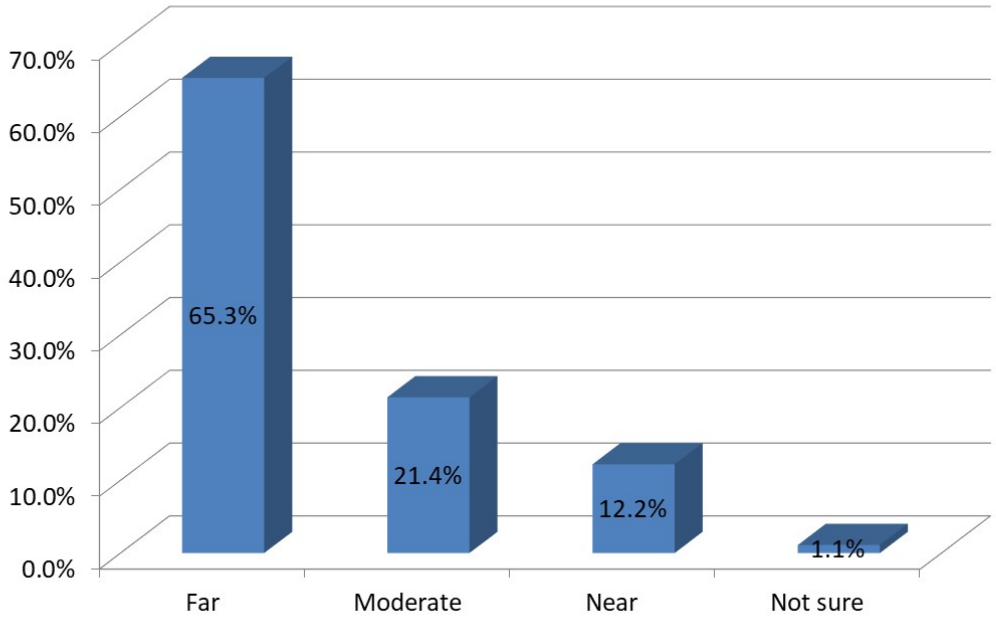

Figure 4. Distribution according to the Distance of respondents' homes from a health facility (n=98)

Table 6. Distribution of respondents according to their Modes of transport to the health facility (n=98)

Response	Number	Percentage
Car	7	7.1
Bicycle	28	28.6
Motorcycle	23	23.5
Foot	40	40.8
Total	98	100

Table 7. Distribution of respondents according to their Waiting hours at the health facility (n=98)

Response	Number	Percentage
< 30 minutes	12	12.2
30 mins - 2 hours	63	64.3
> 2 hours	21	21.4
Not sure	2	2.1
Total	98	100

at Buwambo health centre IV regarding the management of type 2 diabetes mellitus. The study found out that the majority(80.6%) of the respondents had good knowledge regarding type 2 diabetes mellitus because most of them were tested and initiated on anti-diabetic medication, sensitization through continuous health education when receiving treatment, and information via radios and televisions regarding diabetes mellitus . This is in agreement with the study done in Ugandan universities where 99% of the respondents had sufficient knowledge regarding diabetes mellitus. (Kharono *et al,* 2017)

In this study, all the respondents named at least one sign and symptom of diabetes mellitus with the most selected sign being excessive sweating with 52 choices and the least being obesity with 21 choices. This was because of personal experiences

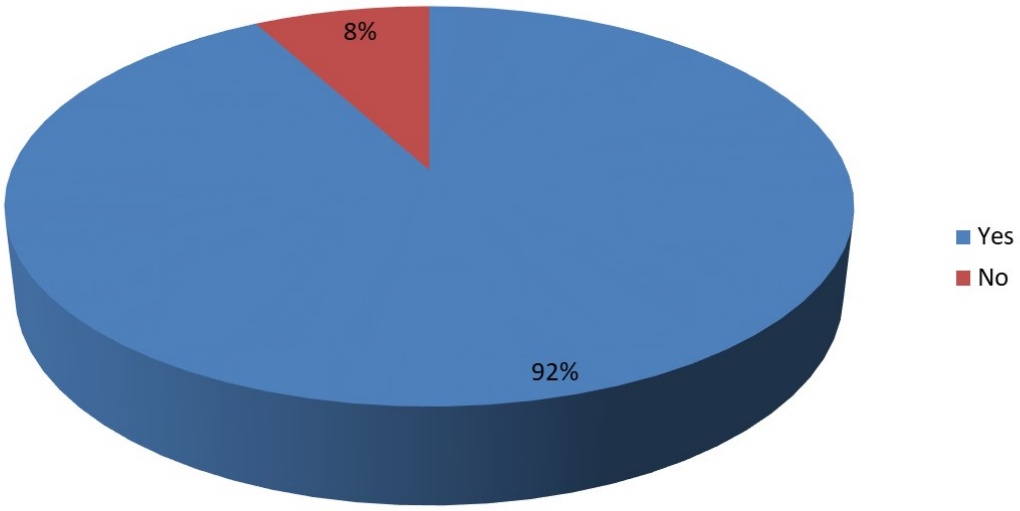

Figure 5. Distribution of respondents according to their responses on the availability of medication (n=98)

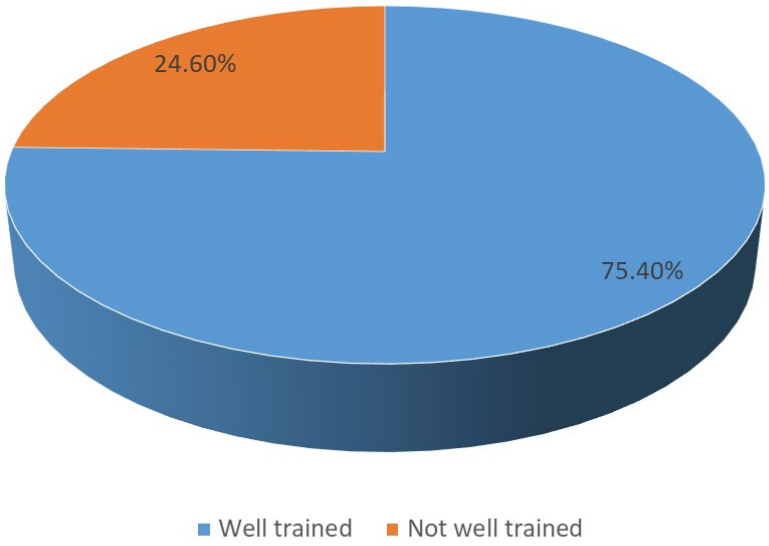

Figure 6. Distribution of respondents according to their responses on Health worker's diabetes management training. (n=98)

of different signs and symptoms by different individuals. This is not in agreement with the study conducted in Saudi Arabia (Ahmed et al, 2019) where only 19.2% of the respondents were aware of type 2 diabetes mellitus and only 40.3% were aware of the complications of diabetes mellitus.

The majority of the respondents in this study (86.7%) believed that diabetes mellitus is hereditary. This was because most of them reported that their parents either mother or father died of diabetes mellitus and some are still living with it. This is not correlating with the results of the study carried out by (Atwine *et al,* 2017) in Uganda which found that only the minority 38% believed that diabetes mellitus is hereditary.

The majority of the respondents in this study believed that the risk of diabetes mellitus is higher above 45 years of age that is, 61.1% of the 98 respondents. This is because almost all of them developed Diabetes mellitus in their later life of age. This is in agreement with the study conducted amongst Ugandan students which also found that only a minority worried about catching diabetes mellitus before the age of 45. (Kharono *et al,* 2017)

Individual lifestyle factors

The majority of the respondents in this study were male (65.3%) and the rest 34.5% were female. This is not in agreement with the study conducted in Ethiopia in Minz Aman town where the majority of the diabetics were female (63%) and the rest were male (Shiferaw *et al,* 2018). However, it agrees with a study done in the Kanungu district in Uganda which found that only a minority of the respondents (22.8%) were female (Asiimwe *et al,* 2020).

In this study, more than 60% of the respondents had achieved at least secondary school education. This was because most of them had attended Universal Primary Education and Universal Secondary Education schools. This correlates with the study conducted in 2018 in Ethiopia which had similar results showing that most diabetics (48%) had attained secondary school and higher (Gurmu *et al,* 2018). It is also in agreement with a study in Ethiopia where the majority of the diabetics had attained diploma level and above (Shiferaw *et al,* 2018).

The majority of the respondents in this study resided in rural homes (69.4%) and this was because of the high cost of living in towns. This is not in agreement with a study conducted in Rwanda where the majority (85.1%) resided in urban areas and only 14.9% were rural residents. (Bavuma *et al,* 2020)

Health facility factors

The specific objective of the study was to determine the health-related factors associated with the management of type 2 diabetes mellitus among adults aged 45-60 years attending Buwambo health centre IV. The study found that 82.7% who were the majority agreed that the health facilities were ready to treat diabetes mellitus. This was because the facility has experienced health workers in managing type 2 Diabetes mellitus. This correlates with a study conducted in rural health facilities in Uganda which revealed that health facilities were generally ready to manage diabetes mellitus with a score of 73.9% (Birabwa *et al,* 2019).

Findings from this study indicate that majority of the diabetics who participated in the study waited in queues for only less than 2 hours, a total of 76.5%, which is a relatively tolerable time for waiting in line. This is because the facility has enough health workers who are willing and diligent in the provision of health care. This disagrees with findings from a study done in Bangladesh which found that over 67% of the respondents waited in the queue for long hours to be served (Zhang M *et al,* 2018).

Regarding the availability of medication, 44.9% of respondents thought there was enough medication at the health facilities and 55.1% who were the majority reported there weren't enough medications at the health facility. This is in agreement with a study done in southwestern Nigeria among patients with type 2 diabetes Mellitus which found that non-availability or stock-out of anti-diabetic medication was at a rate of 64% (Onwuchuluba *et al,* 2019).

Conclusions

The first specific objective of the study was to assess the knowledge of the diabetic patients aged 45-60 attending the diabetic clinic at Buwambo health centre IV. The results found relatively good levels of knowledge among the respondents. Most the diabetics could define diabetes, and knew at least two causes of diabetes mellitus though most thought that taking too much sugar was the most likely cause. The respondents know the types of diabetes mellitus, signs and symptoms, and the susceptible ages of diabetes mellitus. From these results, I conclude that the respondents had sufficient knowledge of diabetes mellitus.

Another specific objective of the study was to determine the individual/ lifestyle factors affecting the management of type 2 diabetes mellitus among patients attending diabetes clinics at

Buwambo health centre IV. The results found most respondents were below the age of 55years and the majority were female and married. Most of the respondents were from rural residences and had at least attained secondary school education. Therefore higher socio-economic status was a high predictor of diabetes mellitus.

The last specific objective of the study was to assess the health facility-related factors affecting the management of type 2 diabetes mellitus among patients at Buwambo health centre IV. The study findings indicated that health facilities are generally ready to manage diabetes mellitus with enough medications and fairly well-trained personnel to manage the disease. The facilities are relatively far from the residences of most of the clients but have relatively waiting hours in the queue. These results show a general facility readiness and well-equipped nature in the management of diabetes mellitus.

Recommendations

From the results obtained from this study among diabetics attending diabetic clinic at Buwambo health centre IV, the researcher, therefore, recommends that;

The government through the national Ministry of Health should prioritise diabetes mellitus in the annual budget to help in availing the medicines, carry out public awareness campaigns, train health personnel, and other programs that directly improve service delivery to diabetic patients hence reducing the burden of the disease to the nation.

The health facility (Buwambo health centre IV) and other similar health facilities that offer services to diabetic patients should develop proper organizational structures for the diabetic clinics. These include having flow charts to reduce waiting hours, proper record keeping, and proper stock keeping to enable early requisitions hence avoiding frequent stock-outs of medicines and other materials.

The author recommends that the findings from this study be availed to the Uganda Bureau of Statistics such that they are a point of consideration in the development of infrastructure such as roads in the area.

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6 List of Abbreviations/Acronyms

DCM : Diploma in Clinical Medicine and Community Health

HIV : Human Immune-deficiency Virus

IDF : International Diabetes Foundation

MoH : Ministry of Health

T2DM : Type 2 Diabetes Mellitus

UAHEB : Uganda Allied Health Examinations Board

WHO : World Health Organization

7 Definition of Terms

Diabetes Mellitus : A metabolic disorder characterized by high blood glucose levels due to an abnormality in the body's glucose maintenance.

Drug : A natural or synthetic substance used in the prevention or treatment of disease.

Knowledge : Awareness or familiarity gained about diabetes mellitus.

Medical student : A tertiary institution student pursuing a Diploma in Clinical medicine and community health or other health related course.

Practices : The actual application or habits of the respondents regarding diabetes mellitus.

A References:

1) Atwiine Fortunate, K. H. (2016); Healthcare seeking behaviour and management of type 2 diabetes: from Ugandan traditional healers' perspective. International Journal of Africa Nursing Sciences, 5, 17 -23.https://doi.org/10.1016/j.ijans.2016.09.002

2) Gathoni Eunice, B. K. (2020). Knowledge and self care practices among diabetic patients - a case study of Thika level 5 hospital Kenya. Journal of

Health, Medicine and Nursing, 5(5), 25- 43.https://doi.org/10.47604/jhmn.1180

3) Shiferaw Solomon, E. Z. (2018). Adherence to diabetic self care practices and its associated factors among patients with type 2 diabetes in Adis Ababa. Patient preference and adherence, 12, 963.https://doi.org/10.2147/PPA.S156043PMid:29922042 PMCid:PMC5995298

4) Zheng L, L. S. (2018). Global aetiology and epidemiology of type 2 diabetes mellitus. pp.88-98.https://doi.org/10.1038/nrendo.2017.151PMid:29219149

5) Bahendeka S, W. R. (2016, March 21). Prevalence and correlates of diabetes Mellitus in Uganda: a population based national survey. Trop Med Int Health, 405-416.https://doi.org/10.1111/tmi.12663PMid:26729021

6) Kharono Brenda, R. N. (2017, JULY). Knowledge, attitudes and perceived risks related to diabetes mellitus among university students in Uganda. East Africa Health Res J, 105-112.https://doi.org/10.24248/eahrj.v1i2.556PMid:29250612 PMCid:PMC5729204

7) Yan Zheng, S. L. (2018, February). Global aetiology and epidemiology of type 2 Diabetes Mellitus and it's complications. Nature reviews endocrinology, 13(2), 1-66.https://doi.org/10.1038/nrendo.2017.151PMid:29219149

8) Zimmermann M, B. C. (2018, September 03). Experiences of type 2 Diabetes in Sub Saharan Africa; A scoping review. Global Health Res Policy, 25.https://doi.org/10.1186/s41256-018-0082-yPMid:30214942 PMCid:PMC6134599

9) Asiimwe Deborah, G. O. (2020, January). Prevalence and risk factors associated with type 2 diabetes in elderly patients aged 45-80yrs at Kanungu District. (A. Sugawara, Ed.) Journal of Diabetes Research.https://doi.org/10.1155/2020/5152146

10) Dessie G, M. H. (2020, June). A systematic analysis on prevalence and sub-regional distribution of undiagnosed dibetes mellitus among adults in African countries. Journal of Diabetes Metabolic Disorders 19, 1931-1941.https://doi.org/10.1007/s40200-020-00635-9PMid:33553047 PMCid:PMC7843872

11) Bavuma Charlotte, D. S. (2020, Dec); Atypical forms of diabetes mellitus in Africans and other non-European ethic populations. J Global Health, 9(2).https://doi.org/10.7189/jogh.09.020401PMid:31673335 PMCid:PMC6818125

12) Organization, W. H. O (2021, September). Diabtetes Mellitus. Retrieved October 2021, from WHO: https://www.who.int/health-topics.

13) Khardori R. (2022). Type 2 Diabetes Mellitus Treatment & Management. https://emedicine.medscape.com/article/117853-treatment.

14) Ahmed, I. B., Binnwejim, M. S., Alnahas,T. M., Asaad Ali Raes, A., Abdulqader Basamad, M., Eidhah Alqurashi, A. and et al. An assessment of the level of diabeticpatients' knowledge of diabetes mellitus, its complications and management in Saudi Arabia. Arch Pharma Pract 2019;10(4):80-6

15) Kharono, B., Nabisere, R., Kiddu Persis, N., Nakakeeto, J., Openy, A., & Bakeera Kitaka, S. (2017). Knowledge, Attitudes, and Perceived Risks Related to Diabetes Mellitus Among University Students in Uganda: A Cross-Sectional Study. The East African health research journal, 1(2), 105-112.https://doi.org/10.24248/eahrj.v1i2.556PMid:29250612 PMCid:PMC5729204

16) Gurmu, Y., Gela, D. & Aga, F. Factors associated with self-care practice among adult diabetes patients in West Shoa Zone, Oromia Regional State, Ethiopia. BMC Health Serv Res 18, 732 (2018).https://doi.org/10.1186/s12913-018-3448-4PMid:30249246 PMCid:PMC6154910

17) Birabwa, C., Bwambale, M.F., Waiswa, P. et al. Quality and barriers of outpatient diabetes care in rural health facilities in Uganda - a mixed methods study. BMC Health Serv Res 19, 706 (2019).https://doi.org/10.1186/s12913-019-4535-xPMid:31619234 PMCid:PMC6796349

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