SELF-MANAGEMENT GOAL SETTING AMONG WOMEN DIAGNOSED WITH GESTATIONAL DIABETES MELLITUS; A CROSS-SECTIONAL STUDY IN A LOW-INCOME SETTING IN CENTRAL UGANDA.

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ABSTRACT.

Background:
Copying with a diagnosis of Gestational Diabetes Mellitus (GDM) is very stressful and the task of GDM Self-management is challenging given the circumstances that surround the diagnosis amidst the challenges of pregnancy. In Uganda, little is known about how women diagnosed with the condition manage it through pregnancy. The study assessed the prevalence of self-management goal setting and associated factors among women diagnosed with Gestational Diabetes Mellitus in a low-income setting in central Uganda.

Methodology:
A cross-sectional study was done among 245 women who attended antenatal care in the selected 16 health facilities within Wakiso district, central Uganda who were diagnosed with GDM during their visit to the Clinics from July 2021 to May 2022. Data was collected using telephone interviews, and analyzed using SPSS, the results were reported in the form of tables and figures. Data was collected from March 2023 to May 2023.

Results:
The majority 123(53.9%) of the respondents were aged between 28 to 37 years old. Only 17% (n=41) of women diagnosed with GDM managed to set a self-management goal. The common self-management goals set include doing 1-2 Ultrasound scans during pregnancy to monitor the baby 82.93%(n=34%), followed by doing regular exercises 63.41% (n=26) and eating a regular diet every day 53.66% (n=22).

Conclusion:
Only a small proportion of women diagnosed with GDM can set self-management goals with common goals being doing Ultrasound scans, regular exercise, and eating regular diets.

Recommendation:
There is a need for public health specialists to study the factors that might be associated with setting self-management goals in a low-income setting of Wakiso district, Uganda.

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BACKGROUND OF THE STUDY.

According to WHO, 71% of all deaths worldwide are due to Non-communicable diseases (WHO, 2021) among which include Diabetes. Evidence on the increasing burden of Gestational Diabetes Mellitus (GDM) suggests that it varies from 1 - 28 % and a recent study by (Ochieng *et al.*, 2022) reported this to be 4.5% for Uganda. Despite this, self-management of GDM remains unclear at the global level with different recommendations for managing GDM (Tsakiridis *et al.*, 2021). The burden of (GDM) in Africa is poorly documented, making it hard to know how best it can be managed. In East Africa, (GDM) Self-management has been reported to have a negative impact on women diagnosed, and this includes the burdens of self-care, fear, community influences, and cultural and financial barriers as described by (Siad *et al.*, 2018).

In Uganda, the Setting of self-management goals for GDM is not documented. The guidelines recommend Stopping smoking, moderate exercise, and dietary advice as the management for GDM. Despite these recommendations from the Ministry of Health, a lot remains unanswered which makes copying with a diagnosis of GDM very stressful, because little is known about how women diagnosed with the condition

manage it through pregnancy. The task of GDM Self-management is challenging given the circumstances that surround diagnosis. Failure to do effective GDM Self-management for example setting clear self-management goals and following them strictly risks adverse birth outcomes and also increases the chances of type II diabetes after pregnancy. A review of the literature suggests that there is no information on the nature of the goals set by women to manage GDM in Wakiso district despite the district having 60% of pregnant women attend antenatal care (ANC) visits for at least four (4) or more times as recommended during their entire pregnancy ('UBOS, 2021), in the health facilities located in the district. This means that all are at risk of GDM. Evidence from Kampala, the nearest district (Nakabuye, Bahendeka, and Byaruhanga, 2017) shows that 39.1% of the women are diagnosed with GDM, and yet it remains unknown how they manage the condition after diagnosis. In the Wakiso district where the prevalence is not yet documented, there is no evidence of Self-management is also documented. Lucking evidence on how Self-management is done alone exposes all infected women to a risk of disease progression to type II diabetes hence increasing the burden of Non-communicable Diseases in Uganda's health care system which is characterized by inadequate manpower and limited resources with minimal public health interventions for Gestational Diabetes Mellitus. The study aims to describe the proportion of women with GDM who can set a self-management goal and the different self-management goals they managed to set in a low-income setting in Uganda.

METHODOLOGY.

Study design and Study area.

A cross-sectional study design was used where quantitative methods of data collection were used to collect data relating to self-management goal setting. Data was collected from March 2023 to May 2023. The study was conducted in 16 public health centers with busy maternity units, within the Wakiso district as they serve the urban/peri-urban poor, who potentially have the biggest unmet need for GDM care. Data collected from the facilities included are described in Table 1

Table 1: Shows the different Health centers within Wakiso District selected to participate in the study.

NO	HEALTH FACILITY	LEVEL
1	Kasangati	IV
2	Ndejje	IV
3	Ttikalu	III
4	Mirembe	III
5	Wakiso Epicentre	III
6	Kasanje	III
7	Wakiso	IV
8	Namayumba	IV
9	Kajjansi	IV
10	Nabweru	III
11	Wattuba	III
12	Kabubu	III
13	Bulondo	III
14	Nakawuka	III
15	Kiziba	III
16	Kigungu	III

Study population, Inclusion, and Exclusion Criteria.

The study targeted women who attended antenatal care in the 16 health facilities mentioned in table 1 and were diagnosed with GDM during their visit to the Clinics from July 2021 to May 2022. They are usually low-income earners and need more knowledge of GDM self-management to treat the condition. The study included level III and IV facilities that recorded GDM cases between the period of July 2021 to May 2022. Women aged above 18 years who attended ANC in the participating Health Facilities, those who were diagnosed with gestational diabetes mellitus, and those who were willing to give informed consent to take part in the study. Any health facility that recorded a case during the study period but could not provide contact details for the women was excluded, and women who could not remember the details that followed the diagnosis of GDM were excluded from the study.

Sample size determination.

A sample size of 245 participants was determined using Yamane's formula of 1967 and it was determined using the desired level of precision at 5% at 95% confidence

interval. the population size of desired characteristics, Women diagnosed with GDM N = 648 as per GDM registers at the health facilities.

Participant Sampling.

A systematic sampling method was used to select several participants. The population of this study was pregnant women who were diagnosed with GDM. All possible participants will be divided into 3 groups namely;

Pre-urban group.
The urban group
and rural group

Every member of the population studied was in exactly one of the strata mentioned above. Each stratum was then sampled using systematic sampling. According to (Thomas, 2020), this is a probability sampling method in which members of the population are selected at a regular interval determined in advance. This allowed the study to estimate statistical measures for each subpopulation. The sampling frame was prepared with detailed information about the study population of interest to be a sample. This was prepared in Microsoft Excel 2016 and the system of sampling started with the participant in the 2nd position and selected every participant in the 3rd position. The selection of participants in the 3rd position was maintained until the required number was obtained.

Data collection.

The study used the Telephone interview data collection method to collect the data required for the objectives. During this quantitative data collection method, standardized questionnaires with closed-ended questions were used. This method of data collection was chosen because this study was a multi-centric study that was conducted at 16 health facilities within the Wakiso district. The potential participants received GDM diagnosis and care at these facilities and are believed to be staying in the nearby villages of the facilities. However, because the period of interest (from July 2021 to May 2022) includes a period when the country was under lockdown, there was a possibility that most of these participants shifted to other areas or home areas after the lockdown was lifted. To capture such a large number of subjects from different geographic places and the ability to compare results from all of them study was possible if a telephone interview was done. The study used a questionnaire with close-ended questions. This questionnaire was administered using a phone as a method of communication. This was because the close-ended questionnaire was able to provide quantitative insights since responses were predetermined. This helped to increase consistency in the responses from women with GDM history and to understand the general outlook of a parameter across the respondents. The phone as a tool was

the best option in a low-income setting in Uganda where the use of Mail or Online interviews may not be possible. The proposal to conduct this study was submitted to the Mildmay Uganda Research Ethics Committee for approval. After approval was obtained, Visits were conducted to all health facilities to take part in the study. During the site visitations, self-introductions to the in-charges were done and the purpose of the visit and the study was explained to them, and seek authorization to access the health facilities selected. This was followed up Facility assessment. During the facility assessment stage, information regarding whether the facility was located in the urban, pre-urban, or rural area of Wakiso was obtained, and if the facility managed to record any GDM Cases in the previous period of 11 months will be obtained. The GDM Nurse/Midwife at the health facility was requested to provide the GDM register that was used during the GUIDES study where patient results were recorded from the period of July 2021 to May 2022. Once the register was obtained, information such as names, telephone contacts, GDM diagnosis status, and Results at diagnosis was captured. This happened to all the selected 16 health facilities within the Wakiso district, in central Uganda to determine their eligibility.

Once the facility eligibility had been confirmed, the required information was captured into a computer using Microsoft Excel 2016. This information was kept private on a password-protected computer. When all the described data above was entered into the computer, they were given random unique numbers and sampled.

During the process of obtaining informed consent, attention was focused on providing information, discussing and answering questions, and obtaining an agreement to participate in the study. A telephone consent script was read out to every participant who successfully got on the phone. This script included information about the following;

1. Statement about the study explanation of the purpose of the study
2. Duration of the subjects' participation
3. Description of the procedure
4. Descriptions of the risks/discomforts
5. Description of the benefits
6. Confidentiality
7. Who to contact and how about the study?
8. The voluntary nature of participation
9. The approximated number of required participants.

After obtaining this consent, the prepared questionnaire was administered and data was collected following Good Clinical Practice Guidelines in data collection. During the telephone interviews, participants were informed about the purpose of the call and requested consent to have an interview over the phone. The information to be provided was clearly stated. If the

participant was not comfortable during the time of the call, options on the best period to call were requested and another phone call was made as agreed. Participants who agreed to take part in the study and said YES to the interview were considered as those who had provided verbal consent. These were interviewed.

Data Analysis.

Quantitative data was analyzed using the (Burnard, 1991) method of analysis. Questionnaire data was captured on password-protected smartphones. Reports were exported in Microsoft Excel format and stored for longer-term use as comma-separated values (.csv) files. The dataset was developed using Microsoft Access 2016, and it was exported to SPSS software for analysis. Descriptive analysis was done at the Univariate analysis stage to summarize data findings, patterns, and associations. This was very important in describing the data obtained.

Data to determine the percentage of women diagnosed with Gestational Diabetes Mellitus who can set a self-management goal in a low-income setting in Uganda was collected during the telephone interview using the questionnaire. Questions regarding goal setting were asked and a response was captured using the Likert scale which will capture responses as Yes or No. Data analysis was done using SPSS software. In preparation for the analysis, data was cleaned before the actual analysis was done. During the univariate analysis, Categorical data obtained was presented in Counts in percentage. Self-management of Gestational diabetes Mellitus was measured as the proportion of women who managed practice activities aimed at controlling their blood sugar levels. These include those who managed to eat regular diets every day, those who managed to do regular exercises, monthly checking of blood sugar levels, and lastly those who managed to do 3-4 Ultrasound scans during their pregnancy. In this study, we considered adequate self-management of GDM as one where 80% of the self-management goal was done in an attempt to do self-management.

Ethical considerations.

The proposal was presented and approved by the study supervisor. After this approval, the protocol was submitted to the Mildmay Uganda Research Ethics Committee for review. This study was approved by the ethics committee on Ref. No. MUREC-2023-205. The purpose of the study was explained to participants for informed consent.

RESULTS.

Study profile.
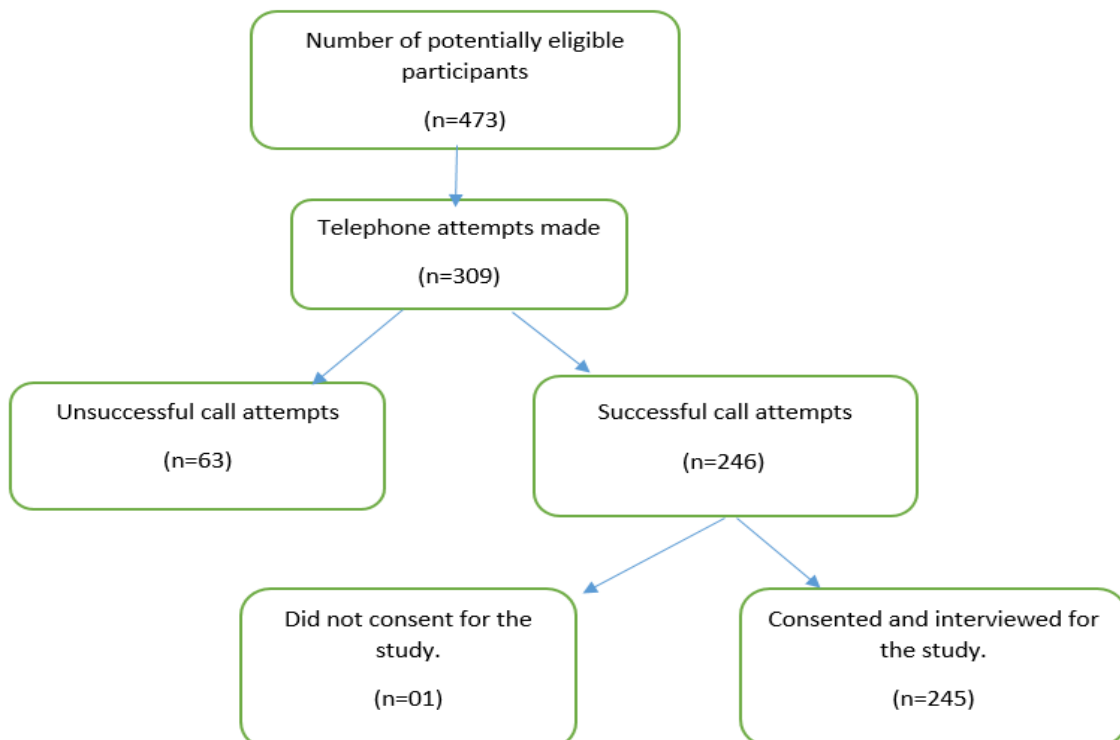
Figure 1: Shows the number of participants who were included in the study and those who were potentially eligible for the study but did not take part.

A total of 473 participants were considered potentially eligible for the study of which, Call attempts were made to 309 to determine if they could participate in the study. 63 calls were unsuccessful on 2 attempts, and a total of 246 attempts were successful. These were consented to and enrolled in the study. 01 participant did not consent to take part in the study.

Table 2. Socio-demographic characteristics of the study participants.			
Variable	Category	Frequency	Percentage (%)
Age	18-19	94	38.4%
	28-37	132	53.9%
	38-45	19	7.8%
Religion	Muslim	98	40.0%
	Christians	143	58.4%
	Traditionalist	4	1.6%
Education level	Primary	109	44%
	Secondary/High school	61	25%
	Graduate/Post-graduate	2	1%
	None	73	30%
Employment status	Self-employment	66	27%
	Unemployed	107	44%
	Informal employment	65	26%
	Formal employment	7	3%
Marital status	Single	64	26%
	Married	181	73%
Income enough for basic needs	Yes	61	24.9%
	No	184	75.1%
Family type	Nuclear family	50	20.4%
	Extended family	195	79.6%

(Source: Primary data 2023)

Table 2 shows that the Majority 123(53.9%) of the respondents were aged between 28 to 37 years old, 143 (58.3%)were Christians, most (44%) had attained primary one education level, 44% were employed, the majority 181(73%) were married, Most (75.1%) of the respondents' Income enough for basic needs, and the majority 195 (79.6%) came from extended families.

Figure 2. The percentage of women diagnosed with Gestational Diabetes Mellitus who set a self-management goal.
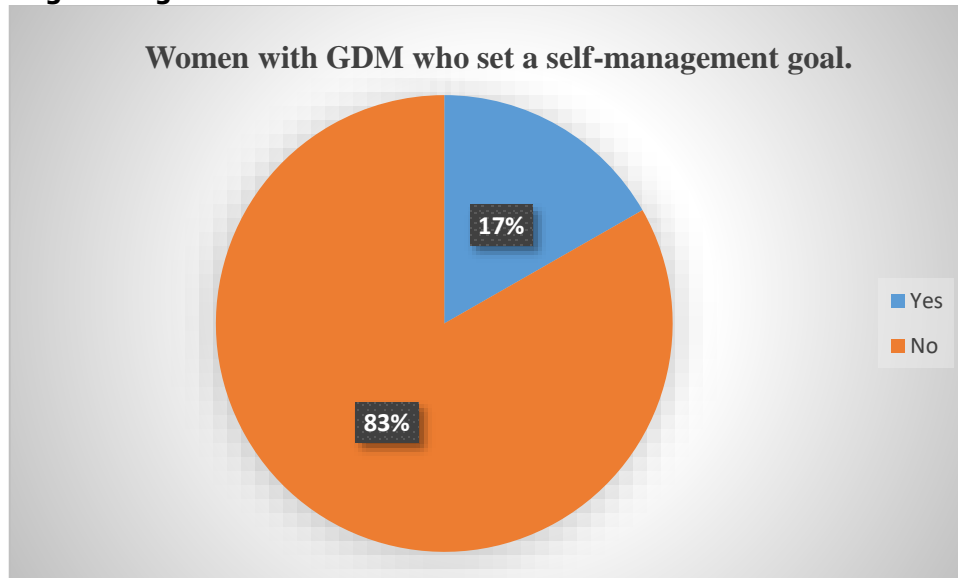
Figure 2: shows that only 17% (41) of women diagnosed with GDM managed to set a self-management, and the majority of the respondents 83% (204) did not set a self-management goal after diagnosis of GDM.

Common Self-management Goals set by women in a low-income setting in Uganda.

Table 3. Common Self-management Goals set by women in a low-income setting in Uganda.

Self-management goal	Category	Frequency	Percentage (%)
Eating regular diet	Everyday	22	53.66
	Someday	13	31.71
	Not at all	06	14.63
Regular Exercises	Yes	26	63.41
	No	15	36.59
Monthly checking of Blood sugar levels	Yes	24	60
	No	16	40
Number of Ultra-sound scans done during pregnancy	1-2 Ultrasound scans	34	82.93
	3-4 Ultrasound scans	7	17.07

Women who managed to set a self-management goal (n=41) were asked which goal they managed to set. Table 3 shows the different goals women set. On eating a regular diet as a goal, 53.66% (n=22) managed to eat a regular diet every day, 31.71%(n=13) managed to eat a regular diet on some days, and 14.63% (n=06) did not set eating a regular diet as a management goal. Another goal set by women was doing regular exercises. Results show that 63.41%(n=26) managed to do regular exercises and 36.59%(n=15) did not set regular exercises as a self-management goal. When monthly checking of blood sugar levels was evaluated as a self-management goal, 60%(n=24) of women managed to set it as a self-management whereas 40%(n=16) did not check their blood sugar levels. On the numbers of Ultra-sound scans done during pregnancy to monitor the unborn child, table 5 shows that 82.93%(n=34) set to do 1-2 Ultrasound scans, and only 17.07%(n=7) managed to set doing 3-4 ultrasound scans during pregnancy as a self-management goal.

DISCUSSION.

This study documents only 17% (41) of women diagnosed with GDM managed to set a self-management goal, and the majority of the respondents 83% (204) did not set a self-management goal after diagnosis of GDM. This means that a lot of women who got diagnosed

with GDM did not plan on different lifestyle modifications to be made during pregnancy to control high blood sugar levels. This is reflected by the fact that 83% reported not having set any self-management goal. This is the first study in Uganda to document the proportion of women who can set a GDM self-management goal in a low-income setting. There is no previous literature to compare this finding within the local context of Uganda. However, this finding is supported by previous findings from South Africa (Collier, 2019) that reported that over 70% of patients with GDM in South Africa both in private and Public health facilities do not meet their diabetic goals, which correlated with the complications related to GDM. This emphasizes how big and dangerous the issue of women diagnosed with GDM failing to set a SMART self-management goal and following it up closely. The possible explanation for the low proportion of women setting a self-management goal can be explained by the individual factors of women. Available evidence about GDM diagnosis has been reported to bring out different reactions from women as discussed by (Craig*et al.*, 2020) and (Zalwango*et al.*, 2021), and this suggests that individual factors might have a contribute to the women's ability to set self-management goals.

The common Self-management goals for Gestational Diabetes Mellitus set by women in a low-income setting in Uganda.

The study evaluated the different goals and discovered what women in a low-income setting set in an attempt to manage GDM and these included 1). dietary modifications, 2). Regular exercises, 3). Monitoring of blood sugar levels, and 4). Doing Ultra-sound scans is recommended during pregnancy.

Firstly, on eating a regular diet as a goal, this study documents that 53.66% (n=22) managed to eat a regular diet every day, 31.71%(n=13) managed to eat a regular diet on some days, and 14.63% (n=06) did not set eating regular diet as a management goal. This means that a few women diagnosed with GDM can successfully take care of this condition by making modifications to their diet. Although findings in this study show that making diet modifications soon after pregnancy is possible in women, there is a large number of women who cannot make this modification. This can be explained by the fact that during pregnancy, women are very selective in what they prefer to eat, and even when they decide to eat healthier, the food options available to them make it hard to make the required modification.

Secondly, another goal set by women was doing regular exercises. This study documents that 63.41%(n=26) managed to do regular exercises and 36.59%(n=15) did not set regular exercises as a self-management goal. This means that the majority of women decide to do self-management by setting a goal of doing regular exercises. This finding agrees with a study by (Walasik*et al.*, 2020) who reported that most pregnant women exercised regularly until the delivery date (47.5%) or until the last week before term (20.7%). Despite this agreement, the proportion of women who do exercises is higher in this study population (63.41%) as compared to the one reported by (Walasik*et al.*, 2020). This can be explained by the fact that this study was done among Women who have been diagnosed with GDM, and it can be argued that the women studied in this study had a purpose and motivation to exercise more regularly as compared to the one studied by (Walasik*et al.*, 2020) which was a study among Women in Poland with no history of diabetes. The findings of this study are more applicable to Ugandan Women in a low-income setting. This study's findings also agree with another study by (Zhang and Savitz, 1996) that showed physical activity among 42% of pregnant women in the US. Similar to the local context, the findings so of this study are more applicable to Ugandan women diagnosed with GDM in a low-income setting.

Thirdly, monthly checking of blood sugar levels was evaluated as a self-management goal, 60%(n=24) of women managed to set it as a self-management whereas 40%(n=16) did not check their blood sugar levels. This means that the number of women who decide to do self-management by regularly checking their blood sugar levels is slightly above average among Uganda women diagnosed with Gestational Diabetes Mellitus. The findings of this study are in disagreement with a study by (Nakidde*et al.*, 2022) from western Uganda that reported that the level of self-care practice was below average (35%). This difference can be explained by the fact that the study by (Nakidde*et al.*, 2022) was carried out in the western part of the country, and this present study was carried out in the central part of the country. This means that the level of self-management might vary by region in Uganda. Secondly, another possible explanation for the difference could be that the results of this current study have been generated from a population of Women who had a history of Gestational Diabetes Mellitus. This is different from the study population of (Nakidde*et al.*, 2022) who studied a general population of people at the Regional Referral Hospital in Mbarara City. This means that when it comes to women with GDM in Uganda, the findings of this study are more applicable to this population. This is the first study in Uganda to document this finding.

Lastly, on the numbers of Ultra-sound scans done during pregnancy to monitor the unborn child, results show that 82.93%(n=34) set to do 1-2 Ultrasound scans, and only 17.07%(n=7) managed to set doing 3-4 ultrasound scans during pregnancy as a self-management goal.

This means that the level of self-management is very low if women decide to set doing Ultrasound scans to monitor their baby as a goal. This is too dangerous and it risks the life of the unborn child and that of the mother. This finding is in agreement with a study by (Yetwale*et al.*, 2022) who reported the proportion of prenatal ultrasound utilization to be 60.7%. Despite this being higher than what is reported in this study, it concluded that

the proportion of prenatal ultrasound utilization during pregnancy was lower than the World Health Organization (WHO) recommendation.

CONCLUSION.

Only 17% (n=41) of women diagnosed with GDM managed to set a self-management goal. The common self-management goals set include doing 1-2 Ultrasound scans during pregnancy to monitor the baby 82.93%(n=34%), followed by doing regular exercises 63.41% (n=26) and eating a regular diet every day 53.66% (n=22).

RECOMMENDATION.

There is a need for public health specialists to study the factors that might be associated with setting self-management goals in a low-income setting of Wakiso district, Uganda.

ACKNOWLEDGEMENT.

LIST OF ABBREVIATIONS.

WHO-World Health Organization.
NCD- Non-communicable Diseases.
HS-Health System.
HSH- Health System Research.
GDM- Gestational Diabetes Mellitus.

SOURCE OF FUNDING.

CONFLICT OF INTEREST.

No conflict of interest was declared.

AUTHOR BIOGRAPHY.

David Serunjogi is a researcher with an interest in contributing to the control of the growing burden of NCD in Africa particularly focusing on designing public health interventions aimed at improving the quality of life among infected people and delaying the new infections of Diabetes and Hypertension in Africa. His current work focuses on understanding the challenges that come with transforming the available public health information and evidence into practice among people infected with Diabetes and Hypertension in Africa and designing well-tailored interventions. He has trained in 1). Biomedical Laboratory Technology, and 2). Public Health-Health Promotion from the Faculty of Health Sciences at Uganda Martyrs University, 3). Fundamentals of Implementation Science from the University of Washington, 4). Introduction to Hypertension Research, and 5). Fundamentals of Epidemiology and Biostatistics for Hypertension Research from the London School of Hygiene and Tropical Medicine.

David Livingstone Ejalu is a lecturer at the Faculty of Health Sciences at Uganda Martyrs University who supervised this study from concept level to publication level.

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