Diabetes Mellitus Type 2 Risk Factors in Adults at Hoima Regional Referral Hospital in Uganda

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ABSTRACT

This study aimed to identify factors influencing diabetes mellitus type 2 among adults at the diabetic clinic in Hoima Regional Referral Hospital. A cross-sectional study was conducted, involving 105 participants with a 100% response rate. The results showed that 60% of the respondents were female and 48.6% were male, with a mean age of 36 years. The study found that diabetes mellitus is highly associated with a positive family history of diabetes, female gender, increasing age, and comorbidities, particularly hypertension. The study used self-administered questionnaires and convenience sampling techniques. The results were presented in 95% Confidence Intervals (C.I) in SPSS Version 20 and Microsoft Excel Software. The study highlights the importance of understanding the factors influencing diabetes mellitus in adults.
Keywords: risk factors, diabetes mellitus, adults

INTRODUCTION

Diabetes mellitus is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces, leading to increased glucose in the blood (hyperglycemia) [1, 2, 3].

On the basis of laboratory findings, World Health Organization (WHO) has defined diabetes mellitus as a fasting venous plasma glucose concentration greater than 7.8mmol/l (140mg/dl) or greater than 11.1 mmol/l (200mg/dl) two hours after a carbohydrate meal or two hours after an oral ingestion of the equivalent of 75g glucose, even if the fasting concentration is normal [4].

There are three types of diabetes mellitus. Type 1 diabetes (Juvenile Diabetes) which affects primarily children and young adults, it results from insulin insufficiency due to destruction of pancreatic cells. Type 2 diabetes mellitus [T2DM] accounting for 85% to 95% of all cases characterized by insulin resistance when the body no longer uses the insulin properly. The third type is gestational diabetes which occurs during pregnancy [1, 5, 6, 7].

Type 2 DM (formerly known as non-insulin dependent DM) is the most common form of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. People living with type 2 DM are more vulnerable to various forms of both short- and long-term complications. There is tendency of increased morbidity and mortality in patients with type 2 DM because of the commonness of this type of DM, its insidious onset and late recognition, especially in resource-poor developing countries like Africa [8, 9, 10, 11].

Diabetes mellitus is associated with symptoms of marked hyperglycemia include polyuria, polydipsia, weight loss, sometimes with polyphagia, and blurred vision. Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycemia. Acute, life-threatening consequences of uncontrolled diabetes are hyperglycemia with ketoacidosis or the non ketotic hyperosmolar syndrome [12, 13, 14].

Diabetes mellitus type 2 is also associated with chronic micro vascular, macro vascular, and neuropathic complications. Micro vascular complications include retinopathy, neuropathy, and nephropathy. Macro vascular complications include coronary heart

disease, stroke, and peripheral vascular disease [15, 16].

The Ugandan Ministry of Health (MoH) established the Programme for the Prevention and Control of Non-communicable diseases (NCDs). This small unit is one of nine divisions within the Department of Community Health and is responsible for all national NCD-related activities. A separate division, Health Promotion, is actually responsible for promoting healthy lifestyle changes in the population. According to the Government of Uganda Ministry of Health Ministerial Policy Statement 2014/2015, the NCD Programme is allocated 0.01 percent of the total MoH budget, representing three percent of the Departmental budget the Programme budget is currently supplemented by the World Diabetes Federation. (UNCDA, 2015).

METHODOLOGY

Study design
A descriptive cross-sectional study design was done involving both quantitative and qualitative data [17].

Study Area
The study was carried out in HRRH, Hoima District.

Study population
The study population was composed of diabetic patients aged 30-60 years who are attending diabetic clinic at HRRH for four months.

Inclusion criteria
Adult diabetic patients with diabetes mellitus type 2 who attended diabetic clinic in HRRH during the four months of the research.
Adult diabetic patients who gave their consent to participate in the study.

Exclusion criteria
✓ Those patients who had diabetes mellitus type 2 but attended diabetic clinic at HRRH after the time of the study and those who had not consented.
✓ Patients who didn't consent.
✓ Patients with diabetes mellitus type 1.
✓ All patients above 60 years and those below 30 years of age were excluded.

Sample size determination
Determination of the sample size will be by Kish Leslie (1965) formula.

$$N = Z^2 \frac{P(1-P)}{E^2}$$

Where:
N= Estimated minimum Sample size
Z =1.96 for 95% Confidence interval.
P = Proportion of adults with diabetes mellitus type 2. (7.4%), [18]
E = Margin of Error (E = 5%)
$N = 1.96^2 \times (0.074 (1-0.074)) / 0.05^2$

$N= 3.8416 \times (0.074 \times 0.926) / 0.0025$
N= 105
Therefore, the sample size will be 105 respondents.

Sampling Procedures
A Simple random sampling method by convenience was used to obtain participants' responses by the use of questionnaires. Only those participants present at the time of the interview were approached.

Data collection methods
A questionnaire was used to collect data from the patients with diabetes mellitus type 2 attending the diabetic clinic. The questionnaire will have 3 sections: Personal factors, lifestyle factors and co-morbidities. The research assistants with some clinical knowledge were trained in data collection. Regular cross checking, inspection and scrutinizing of information on the research instrument was done to ensure accuracy, completeness, consistency and uniformity of the data collected. Data collection was done once a week because the diabetic clinic was open only on Wednesday of every week. The number of patients to be interviewed depended on several factors which include: the assistants' convenience, how often patients attended the diabetic clinic and our effort to ensure that the questionnaire was filled.

Data Analysis
Qualitative data was obtained very well through interviews using our fluent Runyoro and Luganda speakers. Quantitative data was re-checked for completeness and consistency. Data was analyzed using SPSS Version 26.

Ethical consideration

The research was carried out at the diabetic clinic in HRRH. The authority to conduct the research was obtained from Kampala International University Western Campus. Permission to interview was further sought from Executive Director HRRH and Health Center in charge. The respondent's informed consent was sought before the conduction of interview. Confidentiality was maintained [19].

RESULTS

A total of 105 participants was studied, with a response rate of 100%. Table 1 below shows the distribution of the study population by demographic characteristics. The results based on the 105 respondents showed that about 63(60%) of the respondents were female and 51(48.6%) were male. The mean age of the study population was 36 years (with a standard deviation of 5.05 years).

Table 1: Social-demographic Characteristics of the Study Population

Characteristics	Frequency	Percentage (%)	95% Confidence Interval	
			Lower	Upper
Sex				
Male	51	48.6	43.8	54.4
Female	54	51.4	45.9	57.6
Age				
18-39	22	20.9	19.5	27.2
40-49	40	38.1	33.1	43.8
50>	43	41.0	35.3	45.8

The results depict that non-adherence to diet is more in participants aged 40-49 then those aged 50 and above who account for 8(7.6%) and 13(12.4%) respectively of the total (21) number of participants who do not adhere to diet recommendations. Figure 1 below shows the prevalence of non-adherence to diet recommendations as reported by the study participants.
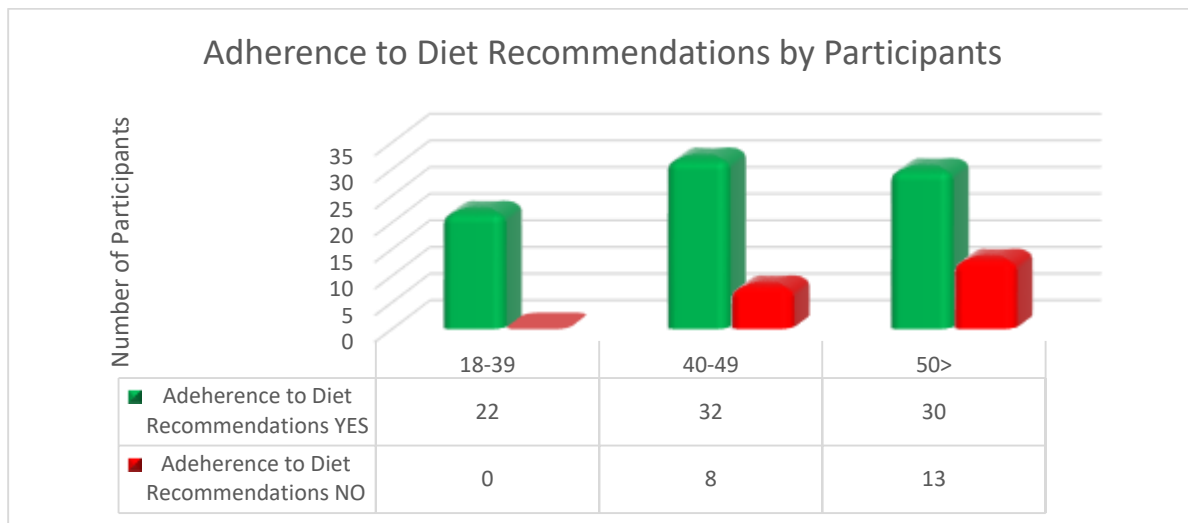

	18-39	40-49	50>
■ Adeherence to Diet Recommendations YES	22	32	30
■ Adeherence to Diet Recommendations NO	0	8	13

Figure 1: Prevalence of Non-Adherence to Diet Recommendations among the Participants

Prevalence of Diabetes in Accordance to Family History

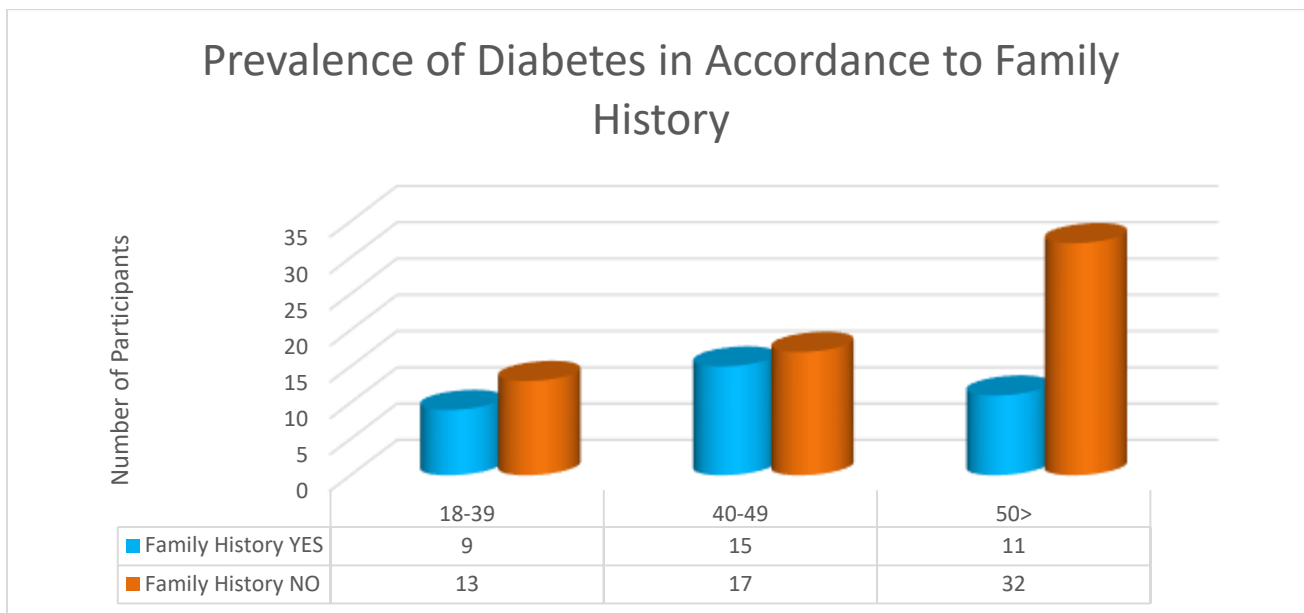|	18-39	40-49	50>
Family History YES	9	15	11
Family History NO	13	17	32

Figure 2: Prevalence of Diabetes in Accordance to Family History

PREVALENCE OF DIABETES IN ACCORDANCE TO OCCUPATION

Self-Employed 68%
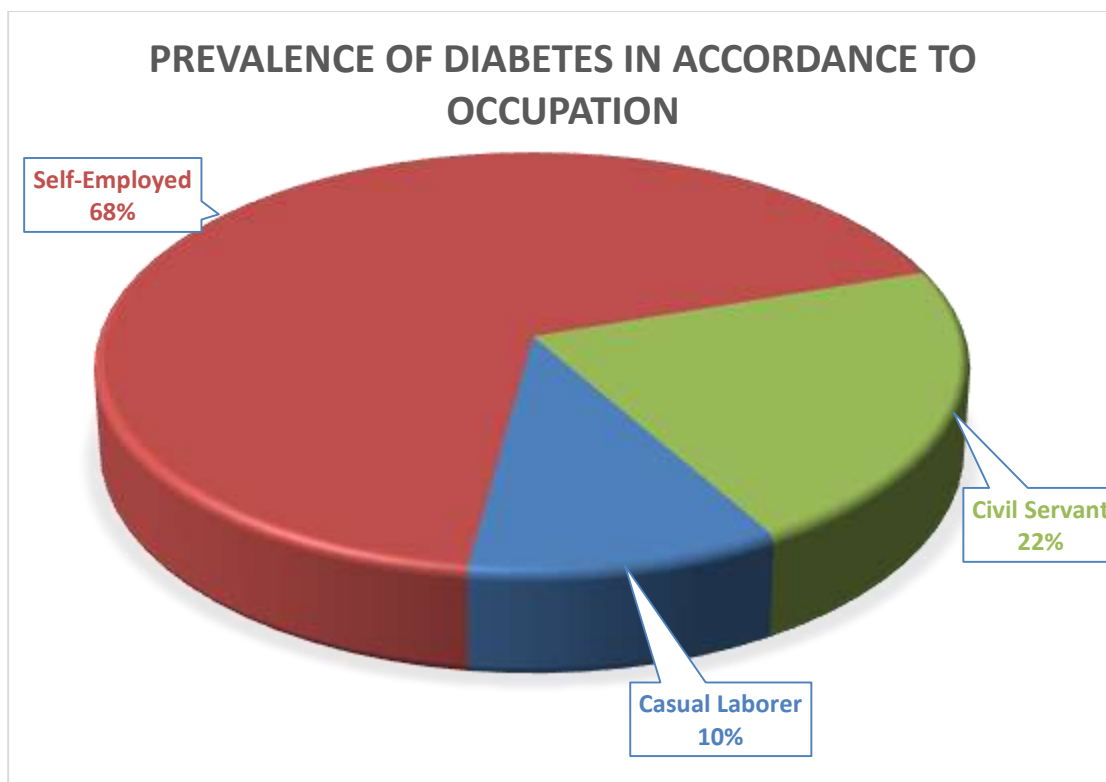
Civil Servant 22%

Casual Laborer 10%

Figure 3: Prevalence of Diabetes in Accordance to Occupation

DISCUSSION

This study was a sectional study that focused on determination determine the factors associated with diabetes mellitus among patients aged between 18 to 60 years attending diabetic clinic at Hoima Regional Referral Hospital. The study showed that diabetes mellitus is highly associated with a positive family history of diabetes, the female gender, and social life. The significance of the associated of these factors was computed using correlation of which the female gender being significant at P=0.011; increasing age being significant with a value of P=0.002; a positive family history of diabetes being significant at P=0.025* and hypertension P=0.001 with a 2 tailed test at 95% confidence level, P<0.05.

Sixty per cent of diabetic patients reported a positive family history with in the family that is to say a family member or relative had diabetes [20]. World health organization [21] argues that a positive family history of diabetes mellitus contributes to about 80% risk of developing diabetes mellitus, this risk is increased more with DM type 1.

In global populations, nearly 80 genetic loci have been implicated in susceptibility to type 2 diabetes [22] and about 50% of these risk loci were replicated in a 2015 study of three sub-Saharan African countries enrolled in the AADM study [23]. The results of that study suggested that the genetic architecture of type 2 diabetes in sub-Saharan Africa is probably characterized by several risk loci shared with populations of non-African ancestry, and that genetic data from Africans promise to inform the genetics of all human populations. Epigenetic changes have also been shown to have differential effects on diabetes incidence depending on the population studied, and such changes might be significant in African populations given early-life risks of under nutrition [24].

Globally, 83.3% of diabetic patients have type diabetes mellitus while almost 98% of diabetic patients below 15years have type 1 diabetes mellitus [25]. In a study conducted by [20] in Southwestern Uganda in 2016, it was revealed that about 79% of diabetic patients had type 2 DM and about 77% of them were 31-69 years indicating a strong association between diabetes and age.

These findings are I agreement with the report that was released by Ugandan ministry of health in 2014 that indicated that the onset of type 2 DM was in late 30s and the prevalence increased with age unlike type 1 DM that was dominate among those aged 15years ad below [26-30].

According to a study done by [20], females were the most affected group (60%) for both type 2 and type 1 diabetes. Further analysis showed that diabetes type2 was strongly affected by gender (p=0.035). A different study conducted by [30-36] had findings in agreement with that above revealing that female had prevalence of 67.6% ad males at 32.4%. It is estimated that the prevalence of diabetes mellitus is similar in women and men with no significant association between gender and diabetes mellitus [30-36].

CONCLUSION

The study aimed at determining the factors associated with diabetes mellitus among attending diabetic clinic at Hoima Regional Referral Hospital, and were aged between 18 to 60 years. The study showed that diabetes mellitus is highly associated with a positive family history of diabetes, the female gender, increasing age and comorbidities especially hypertension.

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