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# Factors associated with Diabetes Mellitus among Patients Aged 18 to 60 years Attending Diabetic Clinic at Hoima Regional Referral Hospital-Hoima District

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ABSTRACT

Diabetes mellitus often referred to simply as diabetes, is defined as a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin produced. Insulin is a hormone that is needed to convert or regulate sugar (glucose), starches, and other food into energy needed for daily life and if the body cells do not absorb the glucose, the glucose accumulates in the blood (hyperglycemia) causing severe adverse effects to many body systems including the nervous, digestive, circulatory, endocrine and urinary systems, but all body systems are in some way affected. Thus, diabetes is a metabolic and multi-system disorder. Type 2 results from the body's ineffective use of insulin. It is common in middle-aged and later life, although it had been more frequently seen in adolescents and young adults due to an increase in child obesity and inactivity and comprises between 90% and 95% of people with diabetes around the world. This study aimed to determine the factors associated with diabetes mellitus among patients aged between 18 to 60 years attending diabetic clinics at Hoima Regional Referral Hospital. A cross-sectional study embracing both analytical and descriptive data was conducted whereby both qualitative and quantitative data were acquired using participant self-administered questionnaires and investigator-administered questionnaires using the convenience sampling technique. A total of 105 participants were studied, with a response rate of 97.1%. Results are depicted in 95% Confidence Intervals (C.I), Odd Ratios (OR), and P-values; all calculated using Binary Logistic Regression with Pearson's correlation in the Statistical Package for Social Sciences (SPSS) Version 20. Graphical representation was done by Microsoft Excel Software. A total of 105 participants was studied, with a response rate 97.1%. The results based on the 102 respondents showed that about 62(60.6%) of the respondents were female and 38(39.4%) were male. The mean age of the study population was 35 years with a standard deviation of 6.32 years. The significance of the associated factors was computed using Pearson's correlation with the female gender being significant at P=0.021; increasing age being significant with a value of P=0.002; family history of diabetes being significant at P=0.027* with a 2-tailed test at 95% confidence level, P<0.05. The study showed that diabetes mellitus was highly associated with a positive family history of diabetes, the female gender, and social life.

**Keywords:** Diabetes mellitus, Insulin, Glucose, Female gender, Body systems

## INTRODUCTION

Some people may call it "sugar", but Diabetes mellitus (DM) often referred to simply as diabetes, is defined as a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin produced [1-3]. Insulin is a hormone that is needed to convert or regulate sugar (glucose), starches, and other food into energy needed for daily life and if the body cells do not absorb the glucose, the glucose accumulates in the blood (hyperglycemia) causing severe adverse effects to many body systems including the

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nervous, digestive, circulatory, endocrine and urinary systems, but all body systems are in some way affected. Thus diabetes is a metabolic and multi-system disorder [4-6]. Some of the common forms of Diabetes mellitus include among others: Diabetes mellitus Type 1 sometimes known as childhood-onset diabetes, juvenile diabetes, or insulin-dependent diabetes mellitus (IDDM); Diabetes Mellitus Type 2 or non-insulin-dependent diabetes mellitus (NIDDM), or adult-onset diabetes and Gestational Diabetes Mellitus [7, 8]. Type 1 diabetes is an autoimmune disease often characterized by deficient insulin production and a patient has to receive insulin for the rest of life. Often diagnosed before age 20, some of its symptoms include excessive excretion of urine (polyuria), drinking more than normal (polydipsia), constant hunger, unexplained weight loss, vision changes, lethargy (weakness), and malaise (feeling of unease) [9, 10]. The World Health Organization says diabetes is one of the most common chronic childhood diseases with Type 1 diabetes growing by 3% per year in children and adolescents, and 5% per year in preschool children. This disease is sporadic with no particular category of child populations [11]. Type 2 results from the body's ineffective use of insulin. It is common in middle aged and later life, although it is being more frequently seen in adolescents and young adults due to an increase in child obesity and inactivity and comprises between 90% and 95% of people with diabetes around the world [12, 13]. Symptoms may be similar to those of Type 1 diabetes but it may go unnoticed for years before diagnosis, since symptoms are typically milder and can be sporadic. Many people destined to develop Type 2 diabetes, spend many years in a state of pre-diabetes condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of Type 2 diabetes. Pre-diabetes does not readily have full-blown symptoms. Type II diabetes is often part of a metabolic syndrome that includes obesity, elevated blood pressure, and high levels of blood lipids [14, 15]. Gestational Diabetes mellitus is a temporary type of diabetes brought on when the body does not produce enough insulin to deal with the increasing blood sugar during pregnancy and can be detected between 24-28 weeks of pregnancy. It occurs in about 2%–5% of all pregnancies and usually (90% of the time) disappears after delivery and gestational diabetic patients have a 3-4 times greater risk of Type 2 diabetes later in life [16, 17]. According to IDF [18], some of the main factors associated with increased risk of diabetes include hereditary, age, unhealthy dietary, deficiency of Vitamin $D_3$, reduced physical activity, stress, increasing urbanization, excessive consumption of alcohol, smoking, and drugs like ARVs, Pyrinuron, Streptozotocin among others. If one is already diabetic a lifestyle characterized by inactivity, comfort, eating, and abusing alcohol exacerbates the situation. Globally, the prevalence of diabetes mellitus among adults was 382 million (8.3%) in 2013 [19] and is predicted to rise to around 438 million (7.7%) by 2030 [20]. There is likely to be an increase in the number of people living with diabetes mellitus worldwide unless preventive action is taken. Sub-Saharan Africa is reported to be one of the regions with the fastest-growing rates of diabetes mellitus in the world. Estimates anticipate the number of people affected by diabetes to increase by 98% from 12 million (3.8%) in 2010 to 24 million (4.7%) in 2030 [19, 20]. In Uganda, the diabetes population has drastically increased from an estimated 98,000 patients in 2000 to about 1.5 million in 2010 – from a population of 30 million people [21]. It should be noted, however, that despite the increase in diabetic burden, interventions are poor and epidemiological data scarce. There is no national non-communicable disease (NCD) survey in Uganda, so information is from a few local surveys [22]. Research about the prevalence and associated factors of diabetes mellitus has not been carried out in the Hoima district yet the condition seems to be on the increase hence fostering this research to be carried out. Thus, this study was designed to determine the factors associated with diabetes mellitus among patients aged between 18 to 60 years attending the diabetic clinic at Hoima Regional Referral Hospital.



## METHODOLOGY

### Study Design

A cross section study was conducted to determine prevalence and factors associated with diabetes mellitus among patients aged 18 to 60 years attending diabetic clinic at Hoima Regional Referral Hospital.

### Area of Study

Hoima Regional Referral Hospital Is Approximately 110 Kilometers (68 Mi), By Road, North-West of Mubende Regional Referral Hospital. This Is Approximately 198 Kilometers (123 Mi.), By Road, North-West of Mulago National Referral Hospital, In Kampala, Uganda's Capital City. The Coordinates of Hoima Regional Referral Hospital Are 01°25'41.0"N, 31°21'16.0"E (Latitude: 1.428051; Longitude: 31.354451).

### Study Population

All diabetic patients attending diabetic clinic at Hoima Regional Referral Hospital.

### Inclusion Criteria

All diabetic patients attending diabetic clinic at Hoima Regional Referral Hospital during the time of research.
Diabetic patients aged between 18 to 60 years.
Patients who consented.

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**Exclusion Criteria**

Care takers of diabetic patients. Non diabetic patients in diabetic clinic during the time of research. Diabetic patients attending diabetic clinic at Hoima Regional Referral Hospital before or after the time of research. Patients who did not consent. Diabetic patients aged below 18years and those above 60years of age.

**Sample Size determination.**

The sample size will be determined using the Kishlslie [23]

$n = z^2 P (1- p)/E^2$

n = sample size

Z=1.96 - approximate 95% confidence level.

P –prevalence (7.4%).

E=5 0.05), which is the margin of error.

$n = 1.96^2 X 0.23 (1-0.074)/0.05^2$

n =105

n = 105 as the minimum sample size for this study.

**Sampling Technique Procedure**

Simple Random sampling technique was used to select participants to ensure equal chance of being selected for the study. All patients who fitted the selection criteria were approached and asked to participate in the study.

**Data Collection methods and management**

This will involve distribution of Open and closed ended questionnaire to the mothers to answer them. The questionnaire will be designed in to two major parts; Demographic section and main section. The main section will be subdivided into individual factors and social demographic factors. The questionnaire will be developed in English and translated to Luyoro. The questionnaire will first be pretested before the actual data collection to check whether questions and responses are appropriate. The pretest will be done on diabetic patients I the ear by health center IV (Kigolobya health center IV) since these will not be among the selected patients for the study. Data will be further checked by the researcher and the supervisor from the field for completeness and errors.

**Data analysis**

Data was qualitatively and quantitatively, statistically analyzed using the Statistical Package for Social Sciences (SPSS) (version 26.0).

**Quality control**

To ensure quality control, questionnaires were pretested, assistants were trained and necessary adjustment made.

**Ethical consideration**

Voluntary recruitment was done and informed consent was signed. Informed consent from participants was obtained after fully explaining the details of the study to them in English and local languages like Luyoro. Identification of participants will be by means of numerical code. Details of participants will be kept safely. There will be no disclosure of participants names to the public and all identities will be removed from the results before publication.

**RESULTS**

**Social-Demographic Characteristics of the Study Population**

A total of 105 participants was studied, with a response rate 97.1%. Table 1 below shows the distribution of the study population by demographic characteristics. The results based on the 102 respondents showed that about 62(60.6%) of the respondents were female and 38(39.4%) were male. The mean age of study population was 35 years (with a standard deviation of 6.32 years).

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**Table 1: Social-Demographic Characteristics of the Study Population**

| Characteristics | Frequency | Percentage (%) | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower | Upper |
| **Sex** | | | | |
| Male | 38 | 39.4 | 34.3 | 44.9 |
| Female | 62 | 60.6 | 55.5 | 66.1 |
| **Age** | | | | |
| 18-39 | 22 | 21.7 | 16.6 | 27.2 |
| 40-49 | 37 | 36.3 | 31.2 | 41.8 |
| 50> | 43 | 42 | 36.9 | 47.5 |

**Prevalence of Non-Adherence to lifestyle Recommendations**

The results depict that non-adherence to life style is more in participants aged 40-49 then those aged 50 and above who account for 6(5.9%) and 11(10.8%) respectively of the total (17) number of participants who do not adhere to life style recommendations. Figure 1 below shows the prevalence of non-adherence to life style recommendations as reported by the study participants.

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**Figure 1: Prevalence of Non-Adherence to life style Recommendations among the Participants**

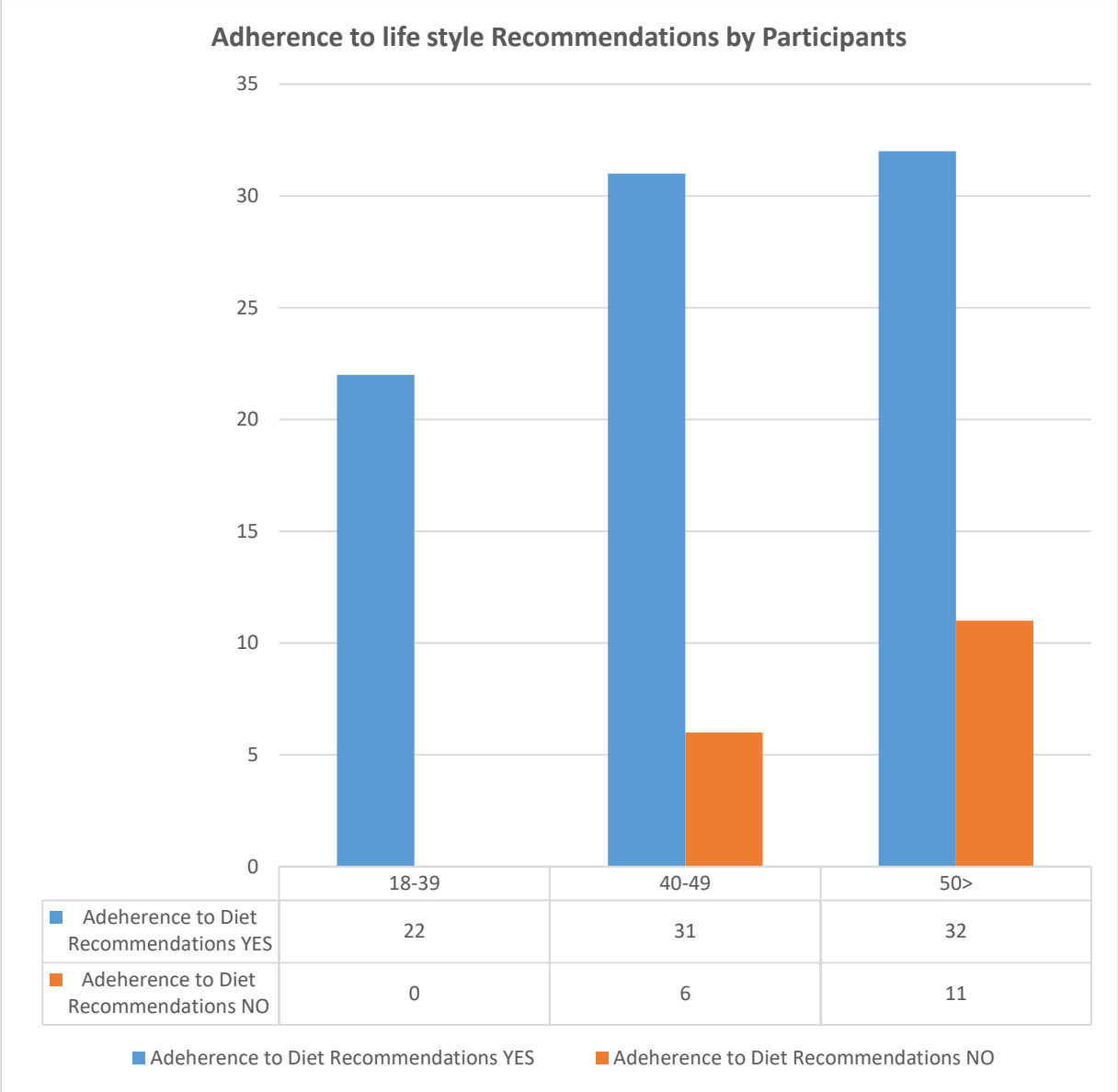

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**Figure 2: Prevalence of Diabetes in Accordance to Family History**

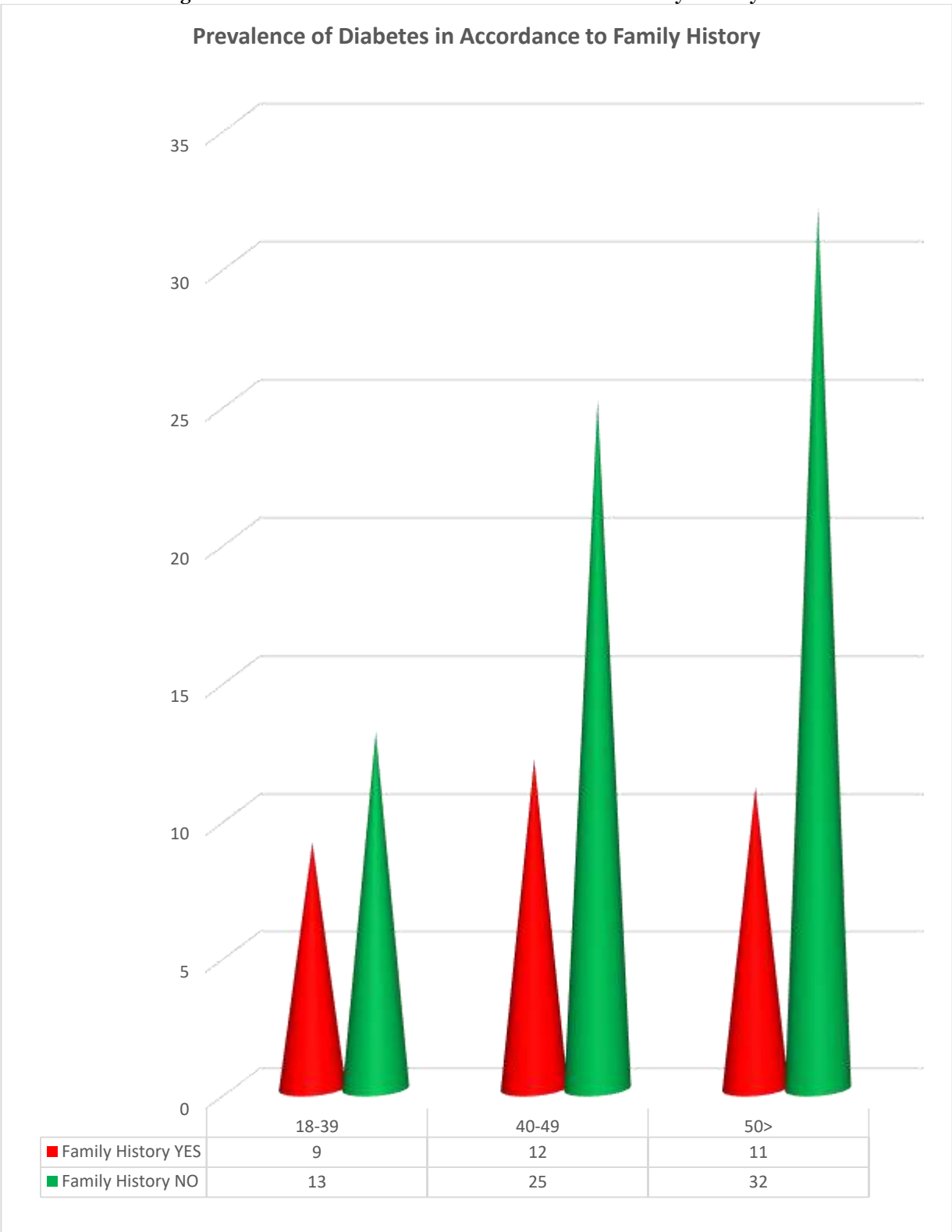

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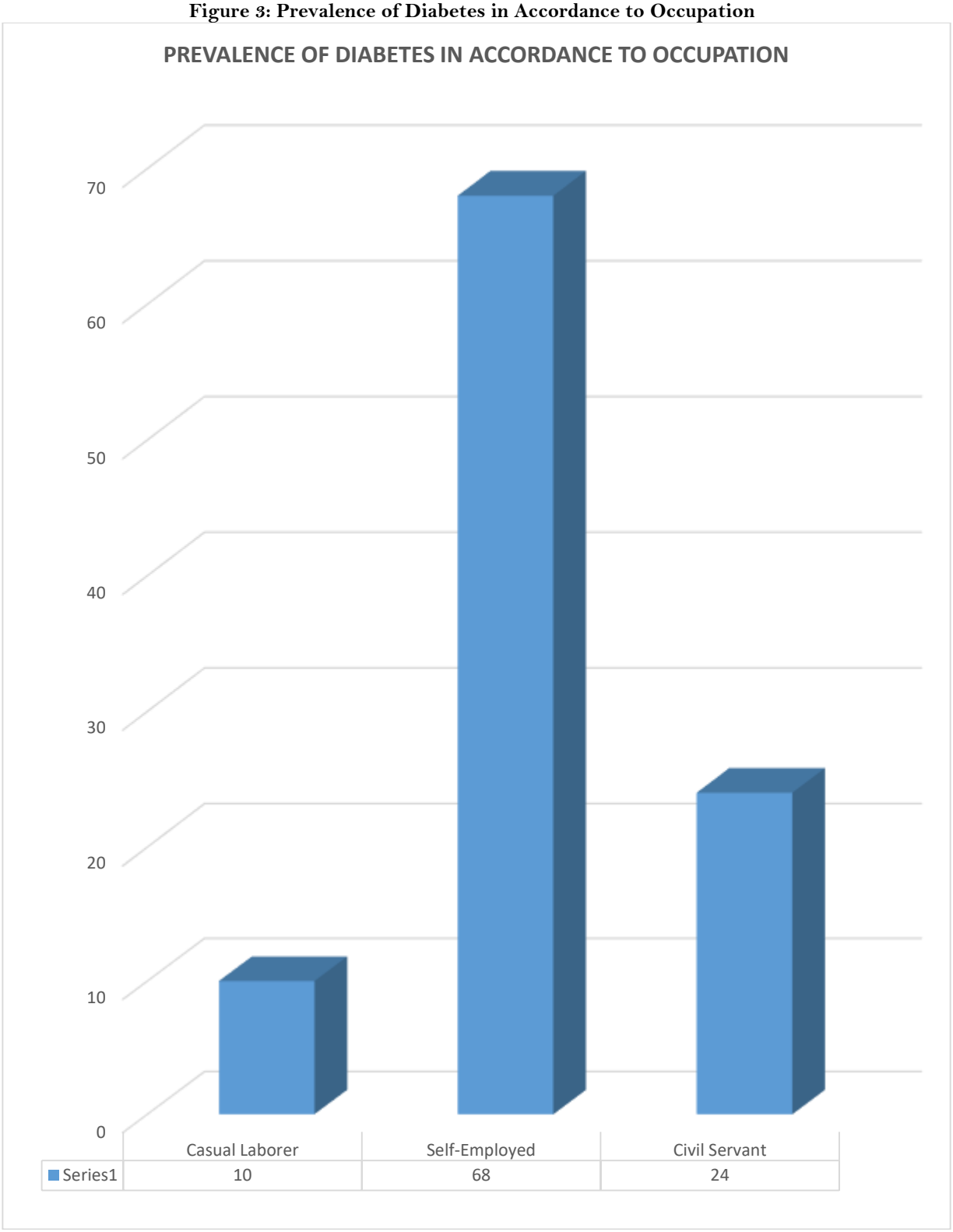
**Figure 3: Prevalence of Diabetes in Accordance to Occupation**



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## DISCUSSION

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 association of these factors was computed using Pearson's correlation of which the female gender being significant at P=0.021; increasing age being significant with a value of P=0.002; family history of diabetes being significant at P=0.027* with a 2 tailed test at 95% confidence level, P<0.05. 60% of diabetic patients reported a positive family history within the family that is to say a family member or relative was diabetic. World Health Organization [24] 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 [25] and about 50% of these risk loci were replicated in a 2015 study of three sub-Saharan African countries enrolled in the study of Adeyemo et al. [26]. 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 very important in African populations given early-life risks of under nutrition [27, 28]. Studies in sub-Saharan African populations suggest that natural selection has acted on several genomic regions associated with obesity and type 2 diabetes, and a study that mapped the genetic risk of type 2 diabetes by measuring the allelic frequency of 16 diabetes-associated variants in 51 populations suggested that Africans face the greatest known genetic risk for type 2 diabetes of any ethnicity studied thus far [29-37]. Globally, 83.3% of diabetic patients have type 2 diabetes mellitus while almost 98% of diabetic patients below 15years have type 1 diabetes mellitus [38-45]. In a study conducted by Kajobba Dickson 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 [29-37]. These findings are in 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 [33]. According to a study done by Kajoba Dickson, females were the most affected group (60%) for both type 2 and type 1 diabetes [30-45]. Further analysis showed that diabetes type 2 was strongly affected by gender (p=0.035). A different study conducted by Sajeevaiah et al. [34] had findings in agreement with that above revealing that female had prevalence of 67.6% ad males at 32.4%.

## CONCLUSION

The study aimed at assessing the factors associated with diabetes mellitus among patients aged between 18 to 60 years attending the 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.

## RECOMMENDATIONS

Intensive health education and awareness campaigns on the importance of diabetic diet and diabetes prevention diet to patients should be done to equip them with tactical knowledge thus this will reduce the burden of diabetes and non-adherence to diet recommendations by diabetic patients. Ministry of Health in Uganda in conjunction with other stakeholders, should increase awareness by creating awareness campaigns about the dangers of non-adherence to dietary recommendations. More effort must be applied to spreading awareness about proper health services by diabetic patients to seek specialized healthcare from properly equipped health facilities with trained health workers on diabetes management. All people should be educated about the dangers of diabetes and its prevention.

## REFERENCES

1. Egwu CO, Offor CE, Alum EU. Anti-diabetic effects of *Buchholzia coriacea* ethanol seed Extract and Vildagliptin on Alloxan-induced diabetic albino Rats. *International Journal of Biology, Pharmacy and Allied Sciences(IJBPAS).*2017;**6(6):**1304-1314.www.ijbpas.com. https://ijbpas.com/pdf/2017/June/1497506120MS%20IJBPAS%202017%204202.pdf
2. Aja PM, Ani OG, Offor CE, Orji UO, Alum EU. Evaluation of Anti-Diabetic Effect and Liver Enzymes Activity of Ethanol Extract of *Pterocarpus santalinoides* in Alloxan Induced Diabetic Albino Rats. *Global Journal of Biotechnology & Biochemistry.* 2015; 10 (2): 77-83. DOI: 10.5829/idosi.gjbb.2015.10.02.93128.
3. Alum EU, Ugwu OPC, Obeagu EI, Aja PM, Ugwu CN, Okon MB. Nutritional Care in Diabetes Mellitus: A Comprehensive Guide**.** *International Journal of Innovative and Applied Research.* 2023; 11(12):16-25. Article DOI: 10.58538/IJIAR/2057 DOI URL: http://dx.doi.org/10.58538/IJIAR/2057.
4. Agbafor KN, Onuoha SC, Ominyi MC, Orinya OF, Ezeani N, Alum EU. Antidiabetic, Hypolipidemic and Antiathrogenic Properties of Leaf Extracts of Ageratum conyzoides in Streptozotocin-Induced diabetic

OPEN ACCESS
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041


rats. *International Journal of Current Microbiology and Applied Sciences.* 2015; 4 (11): 816-824. http://www.ijcmas.com. https://www.ijcmas.com/vol-4-11/Agbafor,%20K.%20N,%20et%20al.pdf

5. Aja PM, Igwenyi IO, Ugwu OPC, Orji OU, Alum EU. Evaluation of Anti-diabetic Effect and Liver Function Indices of Ethanol Extracts of *Moringa oleifera* and *Cajanus cajan* Leaves in Alloxan Induced Diabetic Albino Rats. *Global Veterinaria.* 2015; 14(3): 439-447. DOI: 10.5829/idosi.gv.2015.14.03.93129.
6. Uti DE, Igile GO, Omang WA, Umoru GU, Udeozor PA, Obeten UN, Ogbonna ON, Ibiam UA, Alum EU, Ohunene OR, Chukwufumnanya MJ, Oplekwu RI, Obio WA. Anti-Diabetic Potentials of Vernonioside E Saponin; A Biochemical Study. *Natural Volatiles and Essential Oils.* 2021; 8(4): 14234-14254.
7. Offor CE, Ugwu OPC, Alum EU. The Anti-Diabetic Effect of Ethanol Leaf-Extract of *Allium sativum* on Albino Rats. *International Journal of Pharmacy and Medical Sciences.* 2014; **4 (1):** 01-03. DOI: 10.5829/idosi.ijpms.2014.4.1.1103.
8. Alum EU, Umoru GU, Uti DE, Aja PM, Ugwu OP, Orji OU, Nwali BU, Ezeani N, Edwin N, Orinya FO. Hepato-protective effect of Ethanol Leaf Extract of *Datura stramonium* in Alloxan-induced Diabetic Albino Rats. *Journal of Chemical Society of Nigeria.* 2022; 47 (3): 1165 – 1176. https://doi.org/10.46602/jcsn.v47i5.819.
9. Ugwu OPC, Alum EU, Okon MB, Aja PM, Obeagu EI, Onyeneke EC. Ethanol root extract and fractions of *Sphenocentrum jollyanum* abrogate hyperglycemia and low body weight in Streptozotocin-induced diabetic Wistar albino Rats, *RPS Pharmacy and Pharmacology Reports.* 2023; 2,1-6. https://doi.org/10.1093/rpsppr/rqad010.
10. Obeagu EI, Scott GY, Amekpor F, Ugwu OPC, Alum EU. COVID-19 infection and Diabetes: A Current Issue. *International Journal of Innovative and Applied Research.* 2023; **11**(01): 25-30. DOI: 10.58538/IJIAR/2007. DOI URL: http://dx.doi.org/10.58538/IJIAR/2007.
11. American Diabetes Association, A. D. (2018b). 2. Classification and Diagnosis of Diabetes. In Standards of Medical Care in Diabetes—2018 (Vol. 41, pp. S13–S27). https://doi.org/10.2337/dc18-S002.
12. Aja PM, Igwenyi IO, Ugwu OPC, Orji OU, Alum EU. Evaluation of Anti-diabetic Effect and Liver Function Indices of Ethanol Extracts of *Moringa oleifera* and *Cajanus cajan* Leaves in Alloxan Induced Diabetic Albino Rats. *Global Veterinaria.* 2015; 14(3): 439-447. DOI: 10.5829/idosi.gv.2015.14.03.93129.
13. Obeagu EI, Ugwu OPC, Alum EU. Poor glycaemic control among diabetic patients; A review on associated factors. *Newport International Journal of Research in Medical Sciences (NIJRMS).* 2023; 3(1):30-33. https://nijournals.org/newport-international-journal-of-research-in-medical-sciences-nijrms-volume-3-issue-1-2023/.
14. Ugwu OPC, Obeagu EI, Alum EU, Okon BM, Aja PM, Amusa MO, Adepoju AO, Samson AO. Effect of Ethanol Leaf extract of *Chromolaena odorata* on hepatic markers in streptozotocin-induced diabetic wistar albino rats. *IAA Journal of Applied Sciences*, 2023; **9**(1):46-56. https://doi.org/10.5281/zenodo.7811625.
15. Ugwu OPC, Alum EU, Obeagu EI, Okon MB, Aja PM, Samson AO, Amusa MO, Adepoju AO. Effect of Ethanol leaf extract of Chromolaena odorata on lipid profile of streptozotocin-induced diabetic wistar albino rats. *IAA Journal of Biological Sciences.* 2023; 10(1):109-117. https://www.iaajournals.org/wp-content/uploads/2023/03/IAAJB-101109-117-2023-Effect-of-Ethanol-leaf-extract-of-Chromolaena-odorata-on-lipid-profile-of-streptozotocin-induced-diabetic-wistar-albino-rats..docx.pdf.
16. Anyiam AF, Obeagu EI, Obi E, Omosigho PO, Irondi EA, Arinze-Anyiam OC, et al. ABO blood groups and gestational diabetes among pregnant women attending University of Ilorin Teaching Hospital, Kwara State, Nigeria. *Int J Res Rep Hematol*, 2022; 5, 113-21.
17. Ugwu OPC, Kungu E, Inyangat R, Obeagu EI, Alum EU, Okon MB, Subbarayan S, Sankarapandiyan V. Exploring Indigenous Medicinal Plants for Managing Diabetes Mellitus in Uganda: Ethnobotanical Insights, Pharmacotherapeutic Strategies, and National Development Alignment. *INOSR Experimental Sciences.* 2023; 12(2):214-224. https://doi.org/10.59298/INOSRES/2023/2.17.1000.
18. International Diabetes Federation. (2017). IDF Diabetes Atlas Eighth Edition 2017. International Diabetes Federation. https://doi.org/10.1016/j.diabres.2009.10.007.
19. Guariguata L, Whiting DR, Hambleton I, Beagley J, Linnenkamp U, Shaw JE. Global estimates of diabetes prevalence for 2013 and projections for 2035. Diabetes Res Clin Pract. 2014; 103(2):137– 149. [PubMed: 24630390]
20. Shaw JE, Sicree RA, Zimmet PZ. Global estimates of the prevalence of diabetes for 2010 and 2030. Diabetes Res Clin Pract. 2010; 87(1):4–14. [PubMed: 19896746.
21. Nyanzi R, Wamala R, Atuhaire KL. Diabetes and quality of life: a Ugandan perspective. J Diab Res 2014; doi 10.1155.

OPEN ACCESS
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041



**22.** Mayega RW, Guwatudde D, Makumbi F, et al. Diabetes and pre-diabetes among persons aged 35 to 60 years in eastern Uganda: prevalence and associated factors. PLoS One 2013; doi 10.1371.

**23.** Wiegand, H.: Kish, L.: Survey Sampling. John Wiley & Sons, Inc., New York, London 1965, IX + 643 S., 31 Abb., 56 Tab., Preis 83 s. Biometrische Zeitschrift. 10, 88–89 (1968). https://doi.org/10.1002/bimj.19680100122

**24.** WHO. Obesity: preventing and managing the global epidemic: report of a WHO consultation. WHO Technical Report series 894, 1999.

**25.** McCarthy MI. Genomics, type 2 diabetes, and obesity. N Engl J Med 2010; 363: 2339–50.

**26.** Adeyemo AA, Tekola-Ayele F, Doumatey AP, et al. Evaluation of genome-wide association study associated type 2 diabetes susceptibility loci in sub-Saharan Africans. Front Genet 2015; 6: 335.

**27.** Yako YY, Guewo-Fokeng M, Balti EV, et al. Genetic risk of type 2 diabetes in populations of the African continent: a systematic review and meta-analyses. Diabetes Res Clin Pract 2016; 114: 136–50.

**28.** Aja PM, Fasogbon IV, Mbina SA, Alum EU, Eze ED, and Agu PC. Bisphenol-A (BPA) Exposure as a Risk Factor for Non-Communicable Diseases. Intechopen, 2023. www.intechopen.com. DOI: http://dx.doi.org/10.5772/intechopen.112623

**29.** Corona E. Mapping the genetic risk of disease across the world. 2016. http://geneworld.erikcorona.com/geneworld (accessed March 10, 2017).

**30.** Shiri T, Birungi J, Garrib AV, Kivuyo SL, Namakoola I, Mghamba J, et al. Patient and health provider costs of integrated HIV, diabetes and hypertension ambulatory health services in low-income settings—an empirical socio-economic cohort study in Tanzania and Uganda. *BMC medicine*, 2021; *19*(1), 1-15.

***31.*** Hope O, Ifeanyi OE, Braxton AQ. Investigation of some haematological parameters in pregnant women with gestational diabetes at Federal Medical Center, Owerri, Imo State, Nigeria. *Annals of Clinical and Laboratory Research*, 2019; *2*, 305.

**32.** Dickson K. Prevalence of diabetes and its associated risk factors in southwestern Uganda. African Journal of Diabetes Medicine. 2016: 24(1):15-17. DOI:10.13140/RG.2.2.12910.15683.

**33.** MoH. Government of Uganda. Health Sector Strategic Plan II 2005/06 - 2009/2010. Kampala: Ministry of Health; 2005.

**34.** Sanjeevaiah A, Sushmitha A, Srikanth T. Prevalence of Diabetes Mellitus and its risk factors. IAIM, 2019; 6(3): 319-324.

**35.** Ugwu OPC and Amasiorah, V. I. The In Vivo Antioxidant Potentials of the Crude Ethanol Root Extract and Fractions of Sphenocentrum jollyanum on Oxidative Stress Indices in Streptozotocin-Induced Diabetic albino rats. *IDOSR Journal Of Biology, Chemistry and Pharmacy*, (2020) *5*(1), 26-35.

**36.** Enechi, O. C., Oluka, I. H., Ugwu, O. P., & Omeh, Y. S. Effect of ethanol leaf extract of Alstonia boonei on the lipid profile of alloxan induced diabetic rats. *World Journal Of Pharmacy and Pharmaceutical Sciences*, (2013) *2*(3), 782-795.

**37.** Udeh Sylvester M.C., O.F.C. Nwodo, O.E. Yakubu, E.J. Parker, S. Egba, E. Anaduaka, V.S. Tatah, O.P. Ugwu, E.M. Ale, Ude C.M. and T.J. Iornenge (2022). Effects of Methanol Extract of Gongronema latifolium Leaves on Glycaemic Responses to Carbohydrate Diets in Streptozotocin-induced Diabetic Rats. *Journal of Biological Sciences*, 22. 70-79. https://ascidatabase.com/.

**38.** Ugwu Okechukwu, P. C., Nwodo Okwesili, F. C., Joshua Parker, E., Odo Christian, E., & Ossai Emmanuel, C. Effect of ethanol leaf extract of Moringa oleifera on lipid profile of mice. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, (2013). *4*(1), 1324-1332.

**39.** Enechi, O. C., Manyawo, L., & Ugwu, P. O. Effect of ethanol seed extract of Buccholzia coriacea (wonderful kola) on the lipid profile of albino rats. *African Journal of Biotechnology*, (2013) *12*(32).

**40.** Ugwu Okechukwu, P. C., Onwe, S. C., & Okon, M. B. The effect of Methanol Extract of Rauwolfia vomitoria on Lipid Profile of Chloroform intoxicated Wistar Albino Rats. *IAA Journal of ScientificResearch*, (2022). *8*(1),73-82.

**41.** Aja, P. M., Ibekwe, V. I., Ekpono, E. U., Ugwu, P. C., & Okechukwu, P. C. Effect of ethanol extract of Cajanus cajan leaf on plasma lipid level in albino rats. *Inter J Cur Res Acad Rev*, (2015) *3*(1), 161-167.

**42.** Ugwu O.P.C., and Amasiorah, V. I. The effects of crude ethanol root extract and fractions of sphenocentrum jollyanum on the lipid profile of streptozotocin-induced diabetic wistar albino rats. *IDOSR Journal of Biology, Chemistry And Pharmacy*, (2020) *5*(1), 36-46.

**43.** Anaduaka, E. G., Egba, S. I., Ugwu, J. U., APEH, V. O., and Ugwu, O. P. C. Effects of dietary tyrosine on serum cholesterol fractions in rats. *Afr J Biochem Res*, (2014). *8*(5), 95e100.

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**44.** Eze-Steven, P. E., Udeozo, I. P., Chidiebere, E. U., Emmanuel, O., Okechukwu, P. U., & Egba, J. J.Anti-Lipidemic Effects of Desmodium velutinum Water Leaf Exract on Albino Wistar Rats Fed with High Fat Diet. *American-Eurasian Journal of Scientific Research*, (2014) *9*(2), 26-30.

**45.** Ezekwe, C. I., Okorie, A., Ugwu. O.P.C, Nwodo OFC, and Eze SC, (2014). Blood Pressure Lowering Effect of Extract of Gongronema latifolium. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, *5*(2), 952-959.



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