

Assessment of Diabetes Mellitus Prevalence and Associated Complications among Patients at Jinja Regional Referral Hospital

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ABSTRACT

In recent years, Africa has witnessed a notable shift in its disease landscape from acute infectious conditions to chronic non-communicable diseases like diabetes. The economic impact of diabetes and its complications has become a significant concern, affecting individuals, families, healthcare systems, and national economies through direct medical costs and productivity loss. Uganda, in particular, has observed a rising prevalence of diabetes, with the Uganda Diabetes Association reporting a 1.4% prevalence, accounting for approximately 500,000 individuals affected. This surge in diabetes presents a dual challenge as both a public health issue and an economic burden, necessitating vigilant monitoring and stringent management. Recognizing its profound public health implications in terms of morbidity, mortality, and cost, a comprehensive investigation into the prevalence and complications of diabetes mellitus was conducted at Jinja Regional Referral Hospital (JRRH). Using a retrospective facility-based cross-sectional study design encompassing qualitative and quantitative approaches, this research reviewed 784 patient records admitted to JRRH from January 2018 to December 2018. The findings revealed a notably high prevalence of diabetes mellitus at 8.2%. Noteworthy gender disparities were observed, with a higher prevalence among males (12%) than females (6%) within the studied population. Moreover, urban dwellers exhibited a higher susceptibility to diabetes compared to rural counterparts, and the risk was observed to escalate with age. Complications associated with diabetes mellitus were alarmingly prevalent, reaching 89.23%, predominantly characterized by microvascular complications, accounting for 56.90%. Despite the severity of complications, the case fatality rate stood at 1.54%, lower than the documented 4%, possibly influenced by a spectrum of contributing factors both positive and negative. The study underscores the urgency for increased focus on diabetes care in Jinja, emphasizing the imperative for further research, robust health education initiatives, and enhanced funding allocation toward managing this escalating health concern.

Keywords: Diabetes Mellitus, Diseases, Public Health, Complications, Males and Females.

INTRODUCTION

With the lifestyle change that accompanies improvement in earning, the prevalence of Diabetes Mellitus (DM) (especially type 2 DM) has increased in tandem due to an increase in the number of people, especially in Africa, who lead a more sedentary, high-calorie-intake life [1-3]. Diabetes is a group of metabolic diseases characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action, or both [4-6]. For clinical purposes,

DM has been classified into Type I and Type II based on several metabolic and clinical criteria, but one thing that is common for both types is chronic hyperglycaemia and the metabolic derangements that accompany it [7, 8]. The chronic hyperglycaemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels [9, 10].

Over the past couple of years, the disease burden in Africa has steadily shifted from acute infectious conditions to chronic non-communicable diseases, Diabetes being one of them. Diabetes has long ceased to be a disease of the obese, old affluent Westerner; it has crept into the young African population and the affected age group gets younger by the day [11, 12]. As a result of the increased prevalence of diabetes, complications also have become more common and physician has to deal with diabetes complications more now than ever before. Possible complications include heart attack, stroke, kidney failure, leg amputation, vision loss and nerve damage [13, 14]. In pregnancy, poorly controlled diabetes increases the risk of foetal death and other complications [15]. Diabetes and its complications cause significant economic loss to people with diabetes and their families, and to health systems and national economies through direct medical costs and loss of work and wages [16, 17]. In Sub-Saharan Africa, the disease burden of DM has increased steadily over the past few decades or so [18]. An estimated 14.2 (9.5-29.4) million people aged 20-79 have diabetes in the sub-Saharan Africa (SSA) region, representing a regional prevalence of 2.1-6.7 %. SSA has the highest proportion of undiagnosed cases of diabetes; over two-thirds (66.7 %) of people with diabetes are unaware of their status. The majority of people with diabetes (58.8 %) live in cities, even though the population in the region (61.3 %) is predominantly rural. With

increasing urbanization and population aging, diabetes will pose an even greater threat. It is expected that by 2040 there will be 34.2 million adults in the region living with diabetes, more than double the number in 2015 [19]. Uganda still has to grapple with poor and inadequate diabetes care, especially in rural areas [21]. What makes the situation in Uganda even direr is the fact that regular blood pressure monitoring is only done in about 56% of the diabetics and only a few (26.7%) achieve the recommended target of < 140/90 mmHg, only 11.5% go for the recommended annual eye check-up, 2.2% for the annual foot exam, 4.5% annual dental check-up, 13.9% have their lipid/cholesterol check-up done and only about 32% have their annual kidney function assessment done [22]. This might be so from the high cost incurred in managing diabetes. This makes diabetes in Uganda both a public health and an economic problem that needs close and adequate monitoring with stringent management if Uganda is to progress at the same pace as other countries in the developed world toward the achievement of the Sustainable Development Goals (SDGs) of 2030. Given the increased public health importance, morbidity, and mortality burden, plus the cost implications of DM and its complications in African countries, a study into its prevalence and complications was warranted and the researcher conducted such a study at Jinja Regional Referral Hospital (JRRH), Uganda.

METHODOLOGY

Study Design

A retrospective facility-based cross-sectional study design was used which applied both qualitative and quantitative approaches.

Area of Study

The study was conducted at Jinja Regional Referral Hospital.

Study Population

The study population was all patients admitted in the male and female medical wards of Jinja Regional Referral Hospital within the time scope of the study.

Inclusion Criteria

All files of Patients admitted and treated in the medical wards of JRRH within the time scope of the study were used for the study.

Exclusion Criteria

All files of patients admitted and treated in the medical wards of JRRH within the time scope of the study but whose data was unclear and unverifiable were excluded.

Sample Size Determination

Being a retrospective cross-sectional study, which involved the review of patient records all the files of patients admitted to the medical wards of JRRH and attended to between January 2018 to December 2018 were used in the study.

Sampling Procedures

Convenient sequential enrolment was used for the study whereby all patients' records falling within the time scope of the study were collected and used.

Data Collection Methods and Management

Data was collected chiefly through record review. Medical records of patients that had been chosen by the sampling procedure above were reviewed and biodata, diagnosis, complications and outcomes of treatment were useful for this study. Data collected was tallied, tabulated, and charted in a way that reflected the study objectives.

Data Analysis

Data was entered into Microsoft Excel 2016 professional spreadsheets and analyzed using SPSS version 17.0. Data analysis was done as per the objective; descriptive statistics in the form of percentages, charts, tables and graphs with univariate,

bivariate and multivariate analytical methods being employed.

Quality Control

Data obtained from the participants' files were scrutinized for consistency and where any uncertainties arose clarifications were sought from the staff at the internal medicine department and diabetic clinic where necessary to compare records. Files whose diagnoses were found not to be clear and could not be clarified or verified were excluded from the study.

Ethical Considerations

Clearance was obtained from Kampala International University-Western Campus faculty of Clinical Medicine & Dentistry through IREC and an introductory letter was obtained which was presented to the administration of FPRRH. The researcher affirmed the use of the information obtained from the patient's records for purposes meant only for the research and did not divulge the said information to any unauthorized parties.

RESULTS

Social-demographic factors contributing to the prevalence of diabetes mellitus and its complications at Jinja Regional Referral Hospital

Table 1: Showing Socio-demographic characteristics of respondents (N = 784)

Characteristic of patients		Frequency	Percentage
Sex	Male	314	40%
	Female	470	60%
Age	Below 45 years	502	64.03%
	45 years and above	282	36.97%
Tribe	Basoga	470	51.80%
	Others	314	20.06%
Residence	Rural	659	84.06%
	Urban	125	15.94%

Table 1 shows that the majority of the respondents were female 470 (60%) compared to males who were 314(40%). Also, the study findings show that the majority of the respondents 502 (64.03%) were aged below 45 years whereas the least 282 (36.97%) were aged 45 years and

above. Most of the respondents were Basoga (51.80%) compared to the rest of other tribes who were 314 (20.06%). Furthermore, the study shows that the majority of the respondents 659 (84.06%) of the respondents were from rural areas while 125 (15.94%) were from urban areas.

Prevalence of Diabetes Mellitus

Table 2: Showing the prevalence of Diabetes Mellitus (N=65)

Characteristic of patients		Frequency	Percentage	Prevalence
Sex	Male	38	58.46%	4.85%
	Female	27	41.53%	3.44%
	Total	65	100	8.29%
Age	Below 45 Years	16	24.62%	
	45 Years And Above	49	75.30%	
	Total	65	100	
Tribe	Basoga			
	Baganda			
	Total			
Residence	Rural	22	33.85%	3.34%
	Urban	43	66.15%	34.4%
	Total	65	100	

65 respondents out of the total 784 had a diagnosis of diabetes. Out of the 65, 38 were males and 27 were females. This gave an overall diabetes prevalence of 8.29%, with the males contributing 4.85% and the females 3.44%. 12.00% of the total male population and 6.00% of the female population were diabetic. The ages of the total number of subjects fell between 18 and 75 years while of the 65 with a DM

diagnosis, the majority were above 45 years. For the sake of convenience, the researcher divided the subjects into two age clusters; those below the age of 45 years and those 45 years and above. The 45-year mark was chosen based on the recommendation by the American Diabetes Association (ADA) that annual screening for diabetes is done from this age onwards.

The proportion with a diagnosis of DM

Diagnosis of Diabetes 38, 12%
 Other Diagnoses 276, 88%

n=314

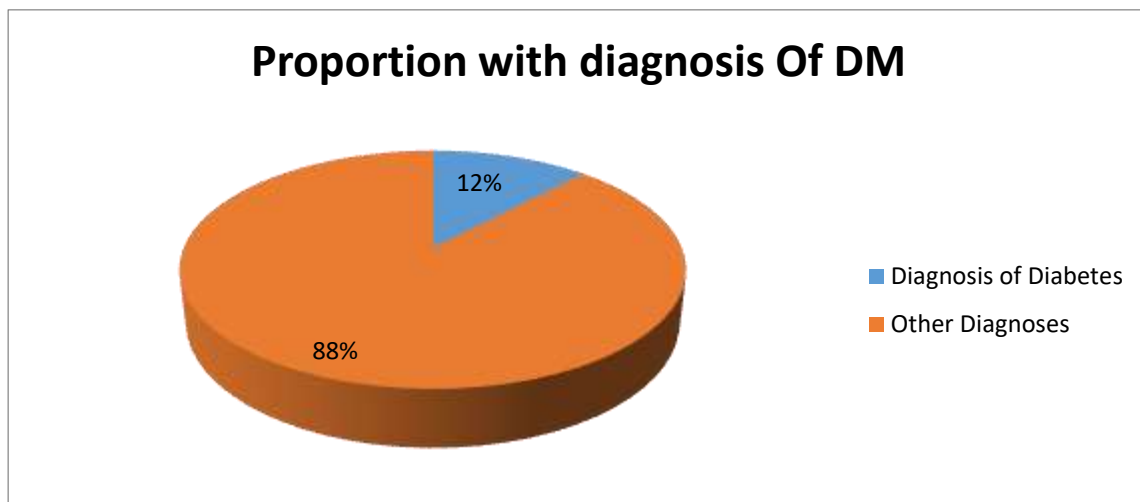


Figure 1: Showing proportion with diagnosis of DM

The proportion of males and females with DM

The researcher then went ahead to calculate the odds of being diabetic in the

two age clusters to try and find out the association between age and DM within the population.

Table 3: Showing odds of diabetes by age cluster (N = 784)

AGE CLUSTER	With DM	Without DM	TOTALS
Below 45 years	16	486	502
45 years and above	49	233	282
TOTALS	65	719	784

In Table 3 above the odds of having diabetes below the age of 45 years was found to be 0.16 times the odds when 45

years and above. In other words, below the age of 45, one was 0.16 times more likely to be diabetic.

(n = 58)

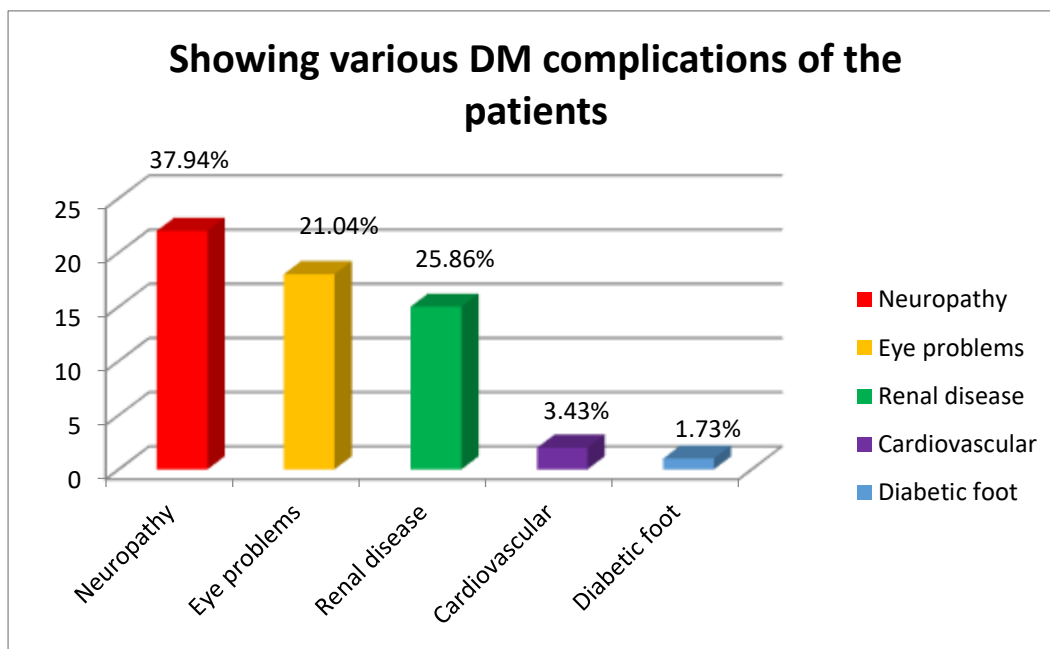


Figure 2: showing various DM complications of patients

Table 2 shows complications on record that were directly attributed to DM: - neuropathy 22(37.94%), Eye problems 18(31.04%), Renal disease 15 (25.86%) cardiovascular disease 2 (3.43%) and Diabetic foot 1(1.73%). 58 (89.23%) of those

who had diabetes were reported to have some sort of complication related to DM. Of these, 33 (56.90%) had microvascular complications while the rest (43.10%) had macrovascular types as illustrated in the figure below.

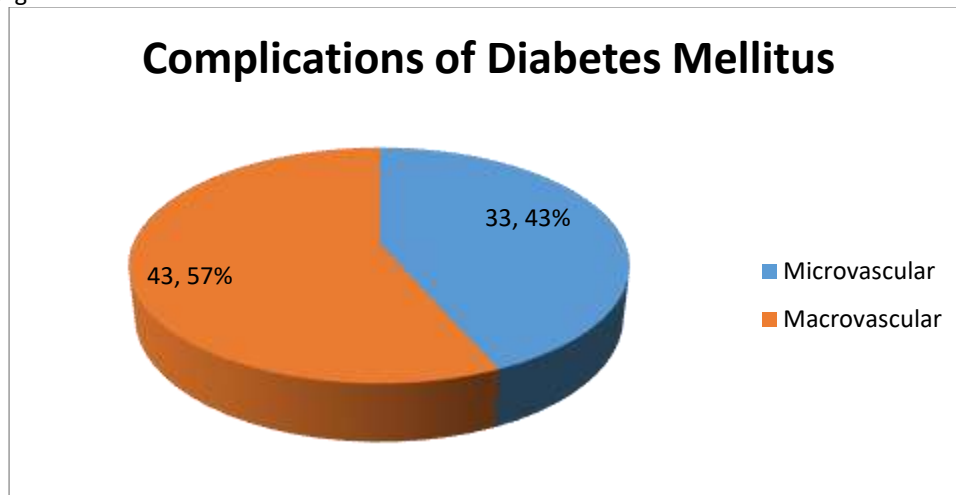


Figure 3: showing complications of diabetes mellitus

Diabetes-Related Deaths

Over the 12 months of the study, one (1.54%) death that could be directly

attributed to DM or its complications was on record. This was from a total of 65 cases with a diagnosis of DM. 19.

DISCUSSION

Prevalence of Diabetes Mellitus

The prevalence of DM was high (8.2%), a large proportion of them being males (4.855); higher than females (3.44%). More of the males (12%) were diabetic than females (6%) within the study population. The prevalence is close to the global prevalence of 8.5% [23] and far better than that of the Asian population of 60% [24]. The findings are also similar to those in Eastern China of 8.0% but higher than 4.6% in Western China [25] and higher than the standardized prevalence of 4.0% among Chinese adults [26]. Of even more importance, it is lower than the overall prevalence for Uganda and Tanzania in 2015. The overall prevalence for the two countries was 10.1% (8.3% for Tanzania and 16.1% for rural Ugandans [27] It is however slightly higher than the 7.4% obtained for Eastern Uganda in 2013 [28], but a bit lower than the 9.0% obtained in Kasese District [29]. What the findings emphasize is the regional variation that does exist as pertains to the prevalence of DM which could be a result of several factors. For instance, variations in population dynamics, socio-demographics, and lifestyles could be the cause of these variations. Different study designs and methodologies used could also result in these variations. More

importantly, study limitations encountered could also have affected the final result; for one, missing records and missing files could have impacted the final prevalence value making it higher or lower than those from similar studies elsewhere. The study, however, agreed with some findings of other previous studies. The prevalence of DM in males is higher than in females. This agrees with existing literature that males are at an increased risk of DM than women [30]. What was also apparent from the study is the fact that the prevalence of DM was higher in urban folk compared to rural folk [30]. This could be attributed to the different 'modernized' lifestyles in the urban areas. High-caloric foods and a more sedentary lifestyle are seen in urban areas [31]. The risk of DM is also seen to increase with advancing age. From the study, those 45 years and above had a prevalence of 75.38% compared to 24.62% for those below. The mean age of people with DM is 35 years and the Ugandan Prevalence is 1.4% [30]. From our study, people with increased prevalence or more at risk of DM are older and the prevalence of 8.2% is higher than the 1.4% in the previous study. This could either be a result of many undiagnosed cases in the previous studies or that our study dealt with those already diagnosed and the

values were bound to be higher. People are diagnosed later when complications have already set in [32].

Complications of Diabetes Mellitus

The prevalence of DM complications was 89.23%. Both macrovascular and microvascular complications were encountered in the study subjects. The prevalence of macrovascular complications was 43.10% and that of microvascular was 56.90%. All these three values were higher than those from previous studies [32]. This could be attributable to our patients having been diagnosed late and when they seek healthcare, complications have already set in [33]. Of the total diabetic cases, 25.86% had renal disease, 31.04% had eye problems, 1.73% had foot complications, 37.94% had neuropathies and 3.43% had cardiovascular complications. Neuropathy, eye problems, and renal disease were the most significant complications in our population of diabetics [34].

The prevalence of Diabetes Mellitus was high. Prevalence in males was higher than in females; the risk of DM is higher in males than females. Urban dwellers are more at risk of DM compared to rural dwellers. The prevalence of complications was high among diabetics. The case-fatality rate of DM was lower than the available values.

Recommendations

Allocate more funding to Diabetes; research, education, care, screening drives, and campaigns. Organize seminars, for a, and continued medical education

Cardiovascular complications also emerged as an important increasing complication of diabetes [32].

Deaths resulting from Diabetes Mellitus

Only one (1.54%) death was attributable to DM and/or its complications. The case-fatality rate related to DM is placed at 4.0% [23]. Various factors could be attributed to the lower fatality rate obtained in our study. On the positive end, it could mean that diabetic care within the population has markedly improved; refuting previous Ugandan studies [21].

In the negative, underdiagnosed and/or undiagnosed cases, poor health-seeking behaviour and irregular checking of blood sugar levels cause people to remain undiagnosed and die at home thus giving a lower value than is true [22]. It could be a product of study limitations such as incomplete/missing records and missing files. Or it could be an indicator of a lack of adequate follow-up and loss of contact with cases [21].

CONCLUSIONS

(CMEs) for health workers particularly those involved in diabetes care to empower them with current trends and developments. Make efforts towards subsidizing or waiving DM care and treatment. Organize regular seminars and conferences on Diabetes management and progress reporting. Regular publications and journals on new trends management protocols and criteria concerning diabetes and making these accessible to medical personnel, the general population, and patients alike.

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