Pattern of Diabetes Mellitus Complications and Co-morbidities in Ughelli North Local Government Area, Delta State, Nigeria

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Abstract

Context: Diabetes mellitus (DM) is a metabolic disorder associated with reduced life expectancy, microvascular complications, increased risk of macrovascular complications and diminished quality of life. **Aims:** To assess the pattern of DM complications and co morbidities in Ughelli North Local Government Area, Delta State, Nigeria. **Settings and Design:** This was a 7 year retrospective study conducted in General Hospital Ughelli Delta State, Nigeria. **Materials and Methods:** A designed pro forma was used to collect the basic information from patients who presented themselves from the year 2010–2017. **Statistical Analysis Used:** The collected data were entered into the computer and analysed using the SPSS software version 20.0. The data were presented in simple percentages and charts, whereas Pearson correlation was used to test for correlation among variables of interest at the level of significance ($P < 0.05$). **Results:** The total number of patients was 53,421, of which 19,391 (36.29%) were females, 18,559 (34.75%) males and 15,435 (28.95%) children. The overall prevalence of diabetes was 25.46% with the prevalence among males 46.63% and females 53.37% at ($P = 0.000$), respectively. The pattern of diabetes complications was kidney failure (27.87%), heart attack (27.27%), erectile dysfunctions (21.0%) and cardiovascular diseases (10.0%). Prevalent diabetes comorbidity recorded were hypertension (54.0%), peptic ulcer (7.0%) and asthma (4.0%). **Conclusion:** The present study showed the prevalence of DM and the presence of complications among the patients.

Keywords: Comorbidities, complications, diabetes mellitus, pattern, prevalence

Introduction

Diabetes mellitus (DM) is a metabolic disorder, characterised by either absolute or relative deficiency of insulin, resulting in hyperglycaemia, which if not managed properly can lead to acute or chronic complications such as diabetic retinopathy, nephropathy and neuropathy.[1] It is associated with reduced life expectancy, significant morbidity due to specific diabetes related-microvascular complications, increased risk of macrovascular complications (ischaemic heart disease, stroke and peripheral vascular disease) and diminished quality of life.[2]

DM is one of the leading causes of death worldwide as nearly half a billion people are currently living with the disease worldwide.[3] The number is expected to increase to about 700 million people by the year 2045 representing an increase of 51%.[3]

In 1901, diabetes was virtually unknown in Africa. However, there has been a steady increase in the disease over the years from 7 million people in 2003, to 15 million people in 2005. In addition, there are 463 million people with diabetes in the world, with about 19 million of them currently living in the African subregion.[3] Thus, by 2045, it is estimated that this figure will increase by 143% to reach 47 million in this region, with a higher prevalence in the urban areas.[3] Currently, in Nigeria, there are more than 2.7 million cases of diabetes in Nigeria in 2019,[3] with a prevalence rate of 3% in adults 20–79 years.[4]

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The long-term impact of DM leads to the complications in many organ systems in the body.[1] Commonly documented microvascular complications associated with diabetes include retinopathy, neuropathy, nephropathy, foot disease while macrovascular complications are peripheral vascular disease, coronary artery disease, stroke and heart failure. Others include increased risk of cancers such as breast cancer, pancreatic cancer and colorectal cancer and other disorders such as depression, cognitive decline and pancreatitis.[1] Co-morbidity, defined as the occurrence of one or more chronic conditions in the same person with an indexed disease, occurs frequently among patients with diabetes.[5,6] Furthermore, the experience of several co-morbidities among type-2 DM patients leads to a high-pill burden, increased morbidity and mortality, poor outcomes and low quality of life.[1] Documented co-morbidities of DM include breast cancer, end-stage renal failure, severe depression, hypertension and hyperlipidaemia among others. Subsequently, both complications of DM and its comorbidity have been documented to have significant social and economic impact on individuals, families, health systems and the nation at large and associated with considerable health-care consequences, with increases in health-care utilisation and medical-care costs.[6-10]

MATERIALS AND METHODS

Study design

The study design was a retrospective, cross-sectional study assessing the pattern of DM complications and co-morbidities in Ughelli North Local Government Area, Delta State from the year 2010–2017.

Study area

Ughelli North is a Local Government Area of Delta State, Nigeria. Its headquarters is in the city of Ughelli. It has an area of 818 km^2 and a population of 321,028 at the 2006 census. The local government has a general hospital which serves all the communities in the entire local government.

Study population

The study population was all members of the public who presented themselves for the treatment at the General Hospital, Ughelli from 2010 to 2017. A total of 53421 people presented for treatment during the period under review, of which 13600 patients were diagnosed with DM. This high number of patients could be because of the fact that the hospital caters for the patients in the entire local government including other adjoining local governments in Delta and Bayelsa State.

Sample size

The sample size for the study was all patients who presented for the treatment at the general hospital Ughelli from 2010 to 2017.

The instrument for data collection

The instrument for data collection was a designed pro forma containing all the variables to be examined in the study. The variables include the year, the total number of inpatients and outpatients, number of adults (male and female), number of children, number of male and females diagnosed with diabetes, other diagnosed diseases, number and type of complications and number and type of co-morbidities.

Method of data collection

The data were collected from the records Department of General Hospital Ughelli. After obtaining permission from the hospital management and head of the records department, case files were searched for both inpatients and outpatients, and all the obtained information was documented in a designed pro forma. Diabetes was diagnosed with fasting blood glucose >7.0 mmol/l, or a random blood glucose >11.0 mmol/l Classification.[11]

Data analysis

The generated data were entered into the computer and analysed using the Statistical Package for the Social Sciences (SPSS) software version 20.0 (IBM Corporation Chicago, USA). The analysed data were presented in descriptive statistics and charts.

Ethical consideration

Ethical clearance for the study was obtained from the Department of Public and Community Health, Novena University Ogume, Delta State and from the Management of General Hospital Ughelli.

RESULTS

According to Table 1 below, the total number of inpatients and outpatients was 53421 with the year 2017 having a total of 15088 (28.24%) patients followed by 2015 with 8180 (15.31%) patients, and 2014 with 5523 (10.35%) patients. Furthermore, more than one-third of the patients 19391 (36.39%) were females and 15435 (28.95%) were children. Furthermore, more than half of the patients 7258 (53.37%) diagnosed with DM were females and 6342 (46.63%) were males. The total prevalence of DM of all patients that reported at the hospital was 25.46%.

Pattern of diabetes mellitus complications

The pattern of DM complications shows that the patients reported complications of kidney failure (27.87%), heart attack (27.27%), erectile dysfunction (21.0%) and Cardiovascular Attack (10.0%) [Figure 1].

Pattern of diabetes comorbidity

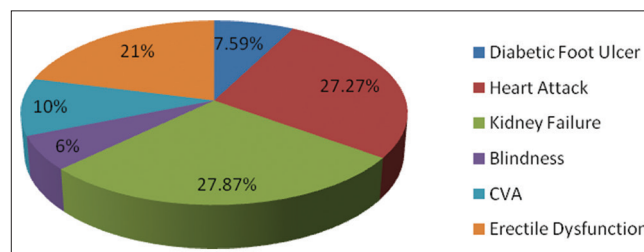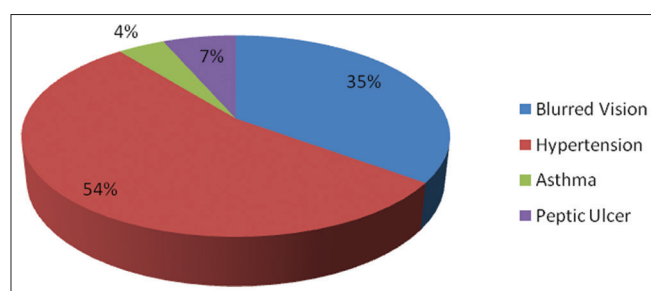The pattern of diabetes comorbidities shows that the patients

Figure 1: Pattern of diabetes complications

Table 1: Characteristics of the patients

Variable	Frequency (n=53,421), n (%)	Number of patients diagnosed with DM	P
Number of inpatients and outpatients			
2010	5482 (10.26)	1272	
2011	3420 (6.40)	1182	
2012	4722 (8.84)	1307	
2013	4040 (7.56)	1062	
2014	5523 (10.35)	1646	
2015	8180 (15.31)	3052	
2016	6966 (13.04)	1491	
2017	15,088 (28.24)	2588	
Status of patients			
Male	18,559 (34.75)		
Female	19,391 (36.29)		
Children	15,435 (28.95)		
Prevalence of diabetes mellitus (n=13,600)			
Male	6342 (46.63)		0.000
Female	7258 (53.37)		

Pattern of diabetes mellitus complications

Figure 2: Pattern of diabetes co-morbidity

reported hypertension (54.0%), blurred vision (35.0%), peptic ulcer (7.0%) and asthma (4.0%) [Figure 2].

Prevalence of other diagnosis (malaria, diarrhoea, typhoid, road traffic accident, gastroenteritis and repeat variable di-residues)
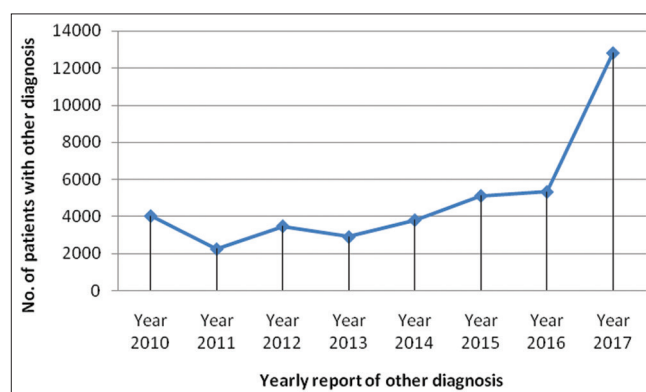
According to Figure 3 below, the yearly report of other diagnosed diseases shows that more of the diseases were diagnosed in the year 2017 (12,801), followed by the year 2016 (5341), 2015 (5128), 2010 (4043) and 2014 (3825). Furthermore, the prevalence of other diagnosed diseases was 74.54%.

As shown in Table 2 below, diabetes complications that showed significant correlation with prevalence of DM were blindness ($r = 0.931$, 0.009), impotence ($r = 0.490$, 0.000), kidney failure ($r = 0.429$, 0.000) and heart attack ($r = 0.414$, 0.000).

Diabetes co-morbidities that showed a significant correlation with the prevalence of DM were blurred vision ($r = 0.549$, 0.000) and hypertension ($r = 0.517$, 0.000) [Table 3].

Discussion

The findings of the study showed that more than one-third of

Figure 3: Yearly report of number of other diagnosis

the patients were females as compared with males and children. This finding was similar to a previous study conducted among TB patients in the Lagos University Teaching Hospital were almost two-thirds of the patients were females.[6] Furthermore, the finding was also similar to the findings of a community- and hospital-based studies conducted in Edo State where more than half of the study participants screened for diabetes and hypertension were females.[12-14] The finding from the study was, however, different from a study conducted in Imo State and other South-Eastern states which showed the hospital presentation of more males than females.[15-19] This shows the health-seeking behaviour among the members of a community might not necessarily be influenced by gender, but by other factors such as intrapersonal and interpersonal factors which should be explored more by public health researchers, especially among DM patients.

The overall prevalence of DM was 25.46% as 13,600 patients out of the 53421 were diagnosed with DM. This finding was higher than the overall prevalence of DM in a previous study in Benue State North-Central Nigeria,[20] in Imo State Eastern

Nigeria[15] and Delta State Southern Nigeria.[21] Besides, the prevalence was higher than the consolidated "Southern Nigeria" data indicating the overall prevalence of 3.1% diabetes,[22] but was, however, lower than the prevalence of a study in Agbor Delta State which reported a prevalence of 59%.[23] This high prevalence of DM in the study area should be a source of concern both to the State Ministry of Health and the Local Government Health Department on how to stem the tide of DM in the area and initiate better management practices for those already diagnosed.

In addition, females showed a higher prevalence of DM than their male counterparts. This finding was different from the study in Imo State which had a higher prevalence among males than females.[15] The finding was, however, consistent with the previous findings in Nigeria which diagnosed more females than males.[13,14,24] This finding shows the disproportionate rise of DM among the males and females population which could be researched further to unveil the factors responsible for this observed pattern of DM prevalence.

Furthermore, the study showed a statistically significant relationship between the prevalence of DM and sex of the patients ($P < 0.05$) which was similar to the finding of a previous study.[12]

The yearly report of the diagnosis of DM of both male and female patients showed that DM was diagnosed more in the year 2015 and 2017 as compared with other years. Although the study did not account for possible reasons for this observed increase, it could be likened to the factors such as increased screening in communities, hospital policy, presence of endocrinologists and other DM management professionals.

Similarly, the prevalence of other diagnosed diseases such as malaria, diarrhoea, typhoid, road traffic accidents and gastroenteritis was 74.54% indicating that DM alone accounts for about one-fourth of the diagnosed diseases in the hospital during the period under review. Although the study showed a weak correlation between the prevalence of DM and other diagnosed diseases, there might also be some possibilities that some of these patients were only screened for DM when they presented for the treatment based on these other diseases most especially the communicable diseases such as malaria, diarrhoea, typhoid and gastroenteritis which is very common in the study area.

The pattern of diabetes complications shows that the patients presented with kidney failure 27.87% which was higher than that reported in a previous study,[15] Heart attack 27.27%, erectile dysfunction 21% which was also higher than a previous

study.[15] Others include cardiovascular complications, diabetes foot ulcer and blindness. The higher prevalence of kidney failure among the patients shows a pattern of rising kidney complications among DM patients which have been reported in previous studies in the world,[25-28] sub-Saharan Africa[29-30] and Nigeria.[31,32] Furthermore, the study showed a statistically significant correlation with diabetes complications such as heart attack, kidney failure, blindness and erectile dysfunction at ($P < 0.05$).

The prevalence of hypertension as one of the co-morbidity of diabetes among the patients was consistent with previous studies.[12,15,33] Other presented co-morbidity such as asthma and peptic ulcer was consistent with a previous study.[15]

Limitation of the study

The study was limited only to the information available in each patients file and was presented accordingly. Furthermore, the prevalence of DM reported might not represent the general prevalence of DM in other parts of delta State. The study utilised one facility and thus might not be a representative of the general population and prone to selection bias. Incomplete information such as anthropometric data and lipid profile is also a limitation for the study.

CONCLUSION

In conclusion, the study showed the prevalence of DM among the patients in the period under review as the prevalence was higher in females than males. Furthermore, the study also showed the prevalence of kidney failure and heart attack as complications and hypertension as a co-morbid condition which usually results in heart attack and other cardiovascular conditions associated with DM patients.

Recommendations

1. Community-based diabetes education should be carried out both in rural and urban areas educating people about the modifiable risk factors of the ailment such as obesity, sedentary lifestyle, alcoholism and smoking, and then encouraging them to adopt healthy lifestyle to prevent the onset of the disease and the development of chronic complications
2. Health workers should be trained and re-trained through various workshops and forums on recent practices both in the diagnosis and management of the disease. As this will help them to pass the right information to the public concerning the pattern of presentation of DM
3. Government and other stakeholders should demonstrate enough political will and commitment by increased funding, capacity building and provision of necessary

Table 2: Relationship between the prevalence of diabetes and diabetes complications

	Diabetes ulcer	Heart attack	Kidney failure	Blindness	CVA	Erectile dysfunction
Prevalence of diabetes mellitus	0.200*	0.414*	0.429*	0.931*	0.301*	0.490*
	0.05**	0.000**	0.000**	0.009**	0.105**	0.000**

*Pearson correlation coefficient, **P value. CVA: Cardiovascular Attack

Table 3: Relationship between the prevalence of diabetes and diabetes co-morbidity

	Hypertension	Blurred vision	Asthma	Peptic ulcer
Prevalence of diabetes mellitus	0.517*	0.549*	0.910*	0.185*
	0.000**	0.000**	0.064**	0.072**

*Pearson correlation coefficient, **P value

materials and equipment at the primary health-care level, for early detection and treatment. Where complications and co-morbidities occur, integrated diabetes management approach should be adopted to prevent death and improve the quality of life of the diabetic patient

4. At the facility level comprehensive diabetes register, a diabetes audit system, and diabetes association should be established to foster proper patient management and improve follow-up including social support for affected patients. Establishment of these would improve patient management and reduce the morbidity and mortality associated with the disease.

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Conflicts of interest

There are no conflicts of interest.

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