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Original Article

DRUG USE INDICATORS IN PATIENTS WITH TYPE 2 DIABETES IN A TERIARY HEALTHCARE FACILITY IN NIGERIA

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ABSTRACT

Objective: The study analyzed the utilization pattern of antidiabetic drugs at the outpatient clinic of a teaching hospital in Nigeria to document information for enhancing the rational use of drugs in type 2 diabetes.

Methods: A retrospective analysis of prescription records of patients with type2 diabetes, seen between the months of May and October, 2013 was carried out; adapting the World Health Organization's (WHO) recommended drug use indicators. Data was analyzed for drug use indicators, concurrent illnesses and co-prescribed medications.

Results: A total of 286 prescriptions of T2DM were collected and analyzed. Mean age of patients was 61(±11.8) years. The number of drugs per prescription averaged 4(±1.6), with majority of prescriptions, 70% containing between 3 and 5 drugs each. Metformin (55.8%) was the most commonly prescribed antidiabetic drug followed by glibenclamide (35.1%). Antibiotics were prescribed in 11% of encounters. The percentage of drugs prescribed by generic name was 58%. Hypertension was identified in 42.2% of the diabetic patients as the most co-existing condition.

Conclusion: The study suggests a significant compliance to T2DM treatment guidelines but with scope for improved rational use of drug to reduce the risk of drug therapy problems and enhance patients' quality of life. It provides a baseline data for further studies on institutional drug use in diabetes.

Keywords: Drug utilization, Type 2 diabetes, Antidiabetics, Treatment guideline, Rational drug use.

INTRODUCTION

Type -2- diabetes mellitus (T2DM) is a chronic progressive disease of global importance characterized by hyperglycemia and cardiovascular complications. It is estimated to affect about 366 million people worldwide in 2011 [1]. It has become a disease of public health importance in Nigeria affecting an estimated 6 million people with prevalence projected to rise to 5.5% in 2030 [2, 3]. As a chronic condition, treatment of T2DM occurs over a patient's lifetime requiring regular monitoring and treatment to ensure effective control and improved patient's quality of life. Treatment of T2DM involves the use of oral antidiabetic drugs referred to as hypoglycemic agents [4]. Injectable insulin is used in patients who do not tolerate or respond properly to the oral agents or in conditions where they are contraindicated like in pregnant women [5, 6]. However, due to the presence of other medical conditions often occurring with T2DM, a wide range of pharmaco-therapeutic agents are co-administered to the patients, exposing them to irrational use of drugs and the risks of drug related problems due to poly-pharmacy [4]. These lead to failed treatment outcomes and poor patients' quality of life. Drug utilization study (DUR) as recommended by the WHO [3]; provides the basis for regularly monitoring drugs prescription and dispensing pattern to identify opportunities for policy interventions to improve the rational drug use for enhanced patient's quality of life [7]. Few studies have been published on the use pattern of anti-diabetic drugs in Nigeria, which is necessary for promoting the rational use of drugs in diabetics. The study was aimed to evaluate the prescription of antidiabetic drugs in the outpatient clinic of a tertiary healthcare facility in south-eastern Nigeria, to document information for improving rational use of antidiabetic drugs.

MATERIALS AND METHODS

Setting

The study was conducted at Nnamdi Azikiwe University Teaching Hospital at Nnewi, south east Nigeria. It is a tertiary health facility providing specialized clinical and teaching services with bed space of over 500. It is a major referral health center in Anambra state, south-east Nigeria owned by the federal government. It has a work force of over 2400 staff spread across various clinical and non-clinical departments, comprising about 400 doctors, 400 nurses, 52 registered and intern pharmacists. Over 21,000 patients are treated annually at the outpatients unit of the hospital. Patients pay for their drugs at the hospital pharmacy while out-of-stock drugs are purchased from community pharmacies outside the hospital. The city of Nnewi is the second biggest commercial city in Anambra State after Onitsha and the people are known predominantly for trading, farming and commerce.

Data collection and analysis

The study was based on the retrospective analysis of patients records treated for T2DM in the teaching hospital, using the WHO method of DUR [7] adapted for diabetes. Data were collected from the hospital records manually kept at the medical records and pharmacy departments respectively. Records of patients diagnosed with T2DM who were prescribed hypoglycemic drugs were selected. Prescription and patient folders were examined and relevant information on patients demographics, diagnosis, drugs prescribed, cost of prescription were manually copied into an Excel work sheet designed accordingly. The data were analyzed using descriptive statistics, in SPSS version 16 (Statistical Package for Social Sciences Inc. USA) package

- Average number of drugs per prescription was estimated by dividing the total number of drugs prescribed by the total number of prescriptions/encounters identified
- Percentage of drugs prescribed by generic name was obtained by dividing the number of drugs prescribed by generic name by the total number of drugs prescribed, and multiplied by 100
- Percentage of drugs prescribed from essential drug list was obtained by dividing the number of the drugs prescribed from

essential drug list by the total number of prescribed drugs multiplied by 100

- Drug cost per encounter was estimated by dividing the total cost of all prescribed medications by the total number of prescriptions.
- Frequency of drug prescription was based on the number of times each drug or category was prescribed

Ethical consideration

Ethical approval was obtained from the hospitals research and ethics committee prior to the commencement of the study. Utmost confidentiality of information was maintained by excluding patients name and their information that could reveal their identity.

RESULTS

A total record of 286 patients with T2DM were collected and analyzed. There were more female cases, 61% than male, 39%. Average age of the cohort was 61(± 11.8) years with majority falling between 55 and 75 years. Table 1 summaries the characteristics of the group in terms of co-morbidities, showing hypertension as the most common co-existing condition found in 42% of the diabetics. 11.4% of the patients were also treated for malaria infection. Diabetic foot ulcer, 60% were identified as the most common diabetic complication.

Table 1: Distribution of common co-morbidity in the study group

Co-morbidity	Frequency	Percentage (%)
Hypertension	121	42.2
Arthritis	11	3.8
Malaria	33	11.4
Depressive illness	7	2.4
Liver disease	4	1.4
Hyperlipidemia	16	5.7
Heart disease	4	1.4
Urinary Tract Infections (UTI)	9	3.3
Peptic ulcerative disease (PUD)	11	3.8
Pneumonia	5	1.9
Kidney disease	3	0.9
Gastroenteritis	7	2.4
Seizure disorders	3	0.9

Summary of drug use indicators is presented in Table 2 which shows the average number of drugs per prescription as 4 (±1.6), with majority (70%) of encounters falling between 3 and 5 drugs per prescription. About 12% of the cohort was prescribed monotherapy anti-diabetic drug.

The median cost of medication (including co-medication) per patient was N2, 254 (US$14.54), ranging from N60 to N15, 840 (US$0.34 – 102.19). Median statistics was used in cost estimation due to skewed nature of the cost data

Table 2: Drug use indicators

Indicator	*Value*
Total number of prescriptions analyzed	286
Total number/frequency of drugs prescribed	1,148
Average number of drugs per prescription (Standard deviation)	4 (±1.6)
Percentage of encounters with antibiotics prescription	11%
Percentage of drugs prescribed by generic name	58%
Percentage of drugs prescribed from essential drug list	85%
Percentage of prescription on monotherapy	12%
Median cost of medication per encounter	N2,254 (US$14.54)

1US Dollar = 155 Nigerian Naira

Findings show that antihypertensives were the most co-prescribed/non-anti-diabetic medication at 16 % closely followed by vitamin preparations, 5.6%. (Table 3)

Table 3: Distribution of commonly prescribed medications

Medication class	Frequency	Percentage (%)
Antidiabetics	513	44.67
Antihypertensives	184	16.06
Antibiotics	47	4.10
Antimalarials	32	2.81
Analgesics/anti- inflammatory agents	48	4.22
Antilipidemia	22	1.88
Antiulcer	30	2.58
Antidepressants	5	0.47
Vitamin preparations	65	5.63
Others	202	17.58

n = 1148

Table 4 shows the pattern of anti-diabetic drugs prescription in the study group, with metformin as the most frequently used anti-diabetic drug in 55.8% of the time, followed by glibenclamide, 35%. Metformin+glibenclamide was the most used combination therapy in the study group.

Table 4: Distribution of anti-diabetic drugs

Anti-diabetic	Number of prescriptions	Percentage (%)
Metformin	286	55.8
Glibenclamide	180	35.1
Pioglitazone	35	6.8
Glimepiride	5	1.0
Gliclazide	4	0.8
Insulin	3	0.6

n = 513

DISCUSSION

The study revealed the predominance of T2DM in the cohort between ages 55 and above, at an average age of 61 years, indicating higher prevalence of diabetes among the elderly in the community, corroborating the findings of similar studies in Nigeria and other African settings which reported averages of between 45 and 65 years [4, 8, and 9]. Advancing age has been identified as a risk factor for diabetes [10], and in Nigeria a report suggested that the incidence of diabetes peak after 45 – 50 years [11]. The higher proportion of female cases in this study is consistent with other studies in Nigeria [9, 12], to suggest that women suffer from diabetes more than men. However, contributing to the higher proportion of female cases in this study may be the fact that women tend to use public health facilities more than men [13].

The study showed an average of 4 drugs per prescription, higher than the value, 2.6 reported 3.3 by Adibe et al (2009), in south-east Nigeria [14], Jimoh et al (2011), in north-west Nigeria [9] and similar to 4 drugs reported by Bnouham et al (2006) in south-west Nigeria [15]. The WHO recommended 2 -3 drugs per prescription for developing countries [7], suggesting a tendency for poly-pharmacy in this study. Many of the prescriptions recorded up to 7 to 9 drugs per prescription, thereby increasing the risks of drug related problems and reduced quality of life of patients. This indicates the need for improved rational use of drugs for the patients in view of the long-term therapy in diabetes. The use of fewer drugs reduces side effects, drug interactions and minimizes cost [16]. However the relatively higher average number of drugs in this study can be attributed to the extent of co-morbidity associated with diabetes and hence the need to manage such conditions. Consequently it was not surprising that antihypertensives were the most co-prescribed/non-diabetic medication considering the predominance of hypertension

as the most common co-morbidity in the study, findings similar to previous studies in Nigeria and other settings [9, 11, 14]. The use of Angiotensin Converting Enzyme Inhibitors (ACEIs) and Angiotensin Receptor Blockers (ARBs) in this study as the most prescribed antihypertensives is consistent with their documented benefits in T2DM through the prevention of diabetic nephropathy [17], a major complication in diabetes. Similarly the use of metformin, a biguanide as the most prescribed anti-diabetic in the study conforms to current clinical guideline recommendation as the preferred agent in T2DM [18 – 21].

Study limitations

As a retrospective study which relied only on information available in the hospital record, findings will highly depend on the accuracy of documentation, which may have explained the differences in some of the study findings with previous studies. Patients' related information/use indicators were not collected to provide further data for comprehensive analysis of the drug use pattern in the facility.

CONCLUSION

The study indicated a significant compliance to treatment guidelines in the management of type 2 diabetes in the teaching hospital with slight tendency to poly-pharmacy and the risk of drug related problems. This suggests scope for improved rational use of drugs to improve treatment outcomes and enhanced quality of life for diabetic patients. The study contributes current information to research on the management of T2DM to enhance the quality of life of patients living with the chronic condition.

CONTRIBUTION

BOO and CCE designed the study, collected and analyzed data, prepared, read and agreed on the final the manuscript

CONFLICT OF INTEREST

Authors declare no conflict of interest

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