



The Utilization pattern of drugs used in treatment of diabetes mellitus in a tertiary care Hospital

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Abstract

Aim: To analyze drug utilization pattern in the treatment of patients suffering from Diabetes Mellitus.

Materials and Methods: This prospective study was carried out in the Department of Pharmacology at Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar from March 2019 to August 2019. Total 110 patients with diabetes were analysed for their prescription pattern and the data was recorded on a case record form (CRF). Data for drug utilization as per the core prescribing indicators of WHO for drug utilization studies and data for evaluating drug consumption was calculated in terms of defined daily dose (DDD).

Result: Drug utilization pattern of diabetic patients showed an average of 6 drugs per prescription out of which on an average 2.20 drugs were for diabetes. The average daily prescribed dose of anti-diabetics was under the defined daily dose (DDD) range prescribed by WHO which is indicative of a rational drug prescription pattern. Among the antidiabetic drugs prescribed, metformin 500mg was the most commonly prescribed drug in monotherapy while in combination therapy glimepiride 2mg + metformin 500mg was most commonly prescribed.

Conclusion: Our study revealed that drug prescription in diabetic patients is quite rational in terms of prescribed dose and number of drugs being prescribed for each patient.

Keywords: drug utilization pattern, diabetes mellitus, drug prescription

Introduction

Diabetes mellitus is a metabolic disorder with common denominator of hyperglycemia, arising from a variety of pathogenic mechanisms. It has emerged as an epidemic both in the developing and developed countries and shows no signs of regression ^[1]. Currently, India leads the world with the largest number of diabetic subjects and this is expected to further rise in the coming years. Given the high prevalence of diabetes in Indians with over 50 million diabetics already, and the numbers expected to increase to 87 million by the year 2030, this could place considerable burden on the health budgets of this country ^[2]. The study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescribing practice of the prescribers as well as recommends necessary modifications to achieve rational and cost-effective medical care ^[3]. Therefore, drug utilization studies, which evaluate and analyse the medical, social and economic outcomes of the drug therapy, are more meaningful, and observe the prescribing attitude of physicians with the aim to provide drugs rationally ^[4, 5].

The concept of drug utilization research holds its importance in rationalizing and increasing access to available medicine and to achieve health by all. For the same purpose it is essential to validate information about use of drug for assessing patterns of drug use, identification of hurdles, access, interventions, and outcome monitoring for the rational use of drugs. Patterns of drug therapy vary for the disease course in different hospital settings. The drug

utilization data from diabetic patients can provide data for determining pattern of prescription.

Material and Methods

This prospective study was carried out in the Department of Pharmacology at Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar from March 2019 to August 2019.

Total 110 patients with diabetes were analysed for their prescription pattern and the data was recorded on a case record form (CRF).

Methodology

Data for drug utilization as per the core prescribing indicators of WHO for drug utilization studies and data for evaluating drug consumption was calculated in terms of defined daily dose (DDD).

Drug utilization studies as per the prescribing parameters

- Average number of drugs per encounter
- Percentage of drugs prescribed by generic name
- Percentage of encounters with an antibiotic prescribed
- Percentage of encounters with an injection prescribed
- Percentage of drugs prescribed from the Essential medicine drug list (WHO/National)
- Patient care indicators include:
- Average consultation time

World Health Organization (WHO) has defined the unit of drug utilization research as measure of defined daily dose

(DDD) which uses anatomical therapeutic chemical [ATC] classification. Thus, the drug utilization was expressed as average dose prescribed per day and DDD/1000 patients/day. DDD/1000 patients/day was calculated by applying the following formula.

$$\frac{\text{Total amount of drug consumed during the study period}}{\text{WHO recommended DDD of a drug} \times \text{duration of treatment} \times \text{sample size}} \times 1000$$

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 19 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages and means.

Results

Table 1: based on demographic parameter

Gender	N=110	%
Male	70	63.64%
Female	40	36.36
Age		
Below 30	8	7.28
30-40	12	10.90
40-50	34	30.90
50-60	46	41.82
Above 60	10	9.10

Table 2: Drug use indicators for anti-diabetic medications

Parameter	
Average number of drugs per prescription	6
Average no. of hypoglycaemic drugs per prescription	2.20
Prescription by generic name	48.0%
Drugs in essential drug list	79.0%
Facility Indicators	
Availability of essential drug list	Yes
Availability of key drugs	77.0%
Patient Care Indicators	
Average consulting time	7 min

Table 3: Pattern of drug therapy in diabetic patients

Drug therapy	N (%)
Monotherapy	36 (32.72%)
Dual Therapy or Triple therapy	74 (67.28%)

Table 4: Types of anti-diabetic medications prescribed according to their classes

Classes of Therapy	N (%)
Single anti-diabetic drugs used in order of their frequency	
Biguanides	17(47.22)
Thiazolidinediones	14(38.88)
Dipeptidyl peptidase-4 (DPP-4) inhibitors	3(8.34)
Alpha glucosidase inhibitor	2(5.55)
Anti-diabetic drug combinations used in order of their frequency	
Thiazolidinediones + Biguanides	53(71.62)
Dipeptidyl peptidase-4 (DPP-4) inhibitors + Biguanides	21(28.38)

Table 5: Commonly used anti-diabetic medications

Drug Therapy	N (%)	Most commonly used drug
Metformin 500 mg	17(47.22)	Metformin 500 mg (47.22% of the patients)
Glimepiride 2 mg	10(27.78)	
Glipizide 5 mg	4(11.11)	
Teneligliptin 20 mg	2(5.56)	
Acarbose 25 mg	2(5.56)	
Voglibose 0.2 mg	1(2.77)	
Glimepiride 2 mg + Metformin 850 mg	5(6.76)	Glimepiride 2 mg + Metformin 500 mg (35.14% of the patients)
Glimepiride 2 mg + Metformin 500 mg	26(35.14)	
Glimepiride 1 mg + Metformin 500 mg	20(27.02)	
Sitagliptin 50 mg + Metformin 500 mg	16(21.62)	
Teneligliptin 20 mg + Metformin 500 mg	7(9.46)	

Table 6: Defined Daily Dose of anti-diabetic medications

Drug Therapy	Number of encounters	Average dose	WHO DDD (mg)	DDD/1000 patients/day
Metformin	91(82.72%)	519.23mg	2000 mg	2.44
Glimepiride	61(55.45%)	1.67 mg	2 mg	5.31
Glipizide	4(3.63%)	5 mg	10 mg	0.179
Teneligliptin	9(8.18%)	20 mg	NA	-
Sitagliptin	16(14.55%)	50 mg	100 mg	1.36
Acarbose	2(1.82%)	25 mg	300 mg	0.0104
Voglibose	1(0.90%)	0.2mg	0.6 mg	0.0425

Discussion

Amongst the 110 patients' studies for diabetes 70(63.64)% of the patients were male and most commonly affected age group was 50 to 60 years of age followed by 40-50 years of age. Similar findings were reported by Mandal S *et al.* [6] which showed male being predominantly affected 61.33% and the most common age group was found to be 50 -59 years of age. Study done by Mittal *et al.* [7] most common age was 40.5±17.6 years and males were more affected than females. Abidi *et al.* [8] also showed the similar finding in a study done in north Indian population where the most commonly affected age group was 50-60 years and with a pre dominance of male population (53.82%).

Assessment of drug utilization indicators of oral anti-diabetics

79% of the AHA prescribed in this study was as per national essential drug list 2015. The values of our study as compared to various other studies are high for instance study performed by Khan [9] where it ranges from 34.18% to 43.24%, thus indicating rational prescribing in the present study. All prescription medications were not from essential medicine list the reason of which could be availability of better options and classes of drugs still not mentioned in the national list of essential medicine (NLEM). There is a need for modification of NLEM according to the current standard recommendations and local requirements of the country. To determine an estimate of drug consumption, defined daily dose of various all anti-diabetic drugs as per the WHO were calculated. The average DDD of metformin was 519.23 mg/day. Concomitant vitamin B complex was prescribed along with metformin based on rationale that metformin is known to be associated with lower levels of vitamin B12. Similar studies to determine the drug utilization of anti-diabetic s have been done in different regions with varied results like Lahiry *et al.* [10] other studies also performed drug utilization with DDD/100 bed days was calculated by Abidi *et al.* [8]

Assessment of drug utilization based on pattern and class of anti-diabetics

From the prescription pattern analysis of our study dual therapy/ Triple therapy was most common reported in 74 (67.28) of the patients followed by monotherapy in 36(32.72%) of the patients. Satpathy *et al.* [11] performed similar study and results showed that combination antidiabetic drug therapy was more common than monotherapy. Polypharmacy in patients was reported by 67.17% of the patients by Abidi *et al.* [8] and even higher polypharmacy of 85.3% by Gnanasegaran *et al.* [12] It is evident that the reason for polypharmacy in diabetes is for a better glycaemic control and combination therapy help in improving patient compliance.

Oral antidiabetic drugs use according to classes in our study showed biguanides to be the most common used antidiabetic group in 17(47.22) of monotherapy followed by biguanides + thiazolidinediones combination therapy which were encountered in 53(71.62%) of the prescriptions. Overall utilization of metformin was the maximum in 82.72% prescriptions followed by glimepiride in 55.45% prescriptions.

The use of glimepiride as a common drug utilized amongst the sulfonylureas may be because of its long half-life, stronger extra pancreatic action, lesser hyperinsulinemia and lower incidence of hypoglycaemia [13]. Drug utilization patterns of our study were similar to findings of other studies, Satpathy *et al.* [11] according to which 48% of all patients were prescribed metformin and sulfonylureas, similar findings were found in Sultana G *et al.* [14] and Mandal *et al.* [15] This reflects that sulfonylurea and biguanides are still the choice of physicians for achieving adequate glycaemic control and are in line with the recommendations of the American Diabetes Association Standard of care guidelines 2019. [16]

Conclusion

Drug utilization pattern of diabetic patients showed results similar to that of hypertensive patients with an average 6 drugs per prescription out of which on an average 2.20 drugs were for diabetes. The average daily prescribed dose of antidiabetics was under the defined daily dose (DDD) range prescribed by WHO which is indicative of a rational drug prescription pattern. Among the antidiabetic drugs prescribed, metformin 500mg was the most commonly prescribed drug in monotherapy while in combination therapy glimepiride 2mg + metformin 500mg was most commonly prescribed. The prescription showed adherence to most of the parameters of rational drug utilization. But lesser prescription drugs from the essential medicine list points towards the need to revise and update the national essential drug list.

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