



Evaluation of Antidiabetic Prescriptions from Medical Reimbursement Applications at Banaras Hindu University Health Care Facility

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ABSTRACT

Background: Diabetes is on rapid increase in third world countries undergoing rapid transition in terms of development particularly in India, which is often being referred as Diabetic capital. It is a disease more prevalent at latter part of life of human beings when finances dwindle and social care gets neglected. The medication continues till the whole life on a regular basis. In present study, the objective has been to provide pharmacoeconomic medication to the diabetic pensioners in the backdrop as mentioned in above background.

Methods: The data was collected at the medical reimbursement section of pensioners of the University. The data was examined to answer issues of therapeutic decisions in the light of the pharmacoeconomic considerations. In this paper essentially data on choice of prescriptions with the angle of pharmacoeconomic prudence were included. The dichotomy of specialist versus non specialist prescribers at the tertiary center (i.e. medical college hospital) was compared. Effort was made to define merit of the prescription based on comprehensive considerations of patient profile, disease profile and therapeutic choice.

Results: Total 72 prescriptions were analyzed for the study in which 475 drugs were prescribed to the patients. Total antidiabetic drugs prescribed to the patients were 169. Out of 72 cases 39 were males and 33 were females with mean age 66.04 ± 5.80 (Mean \pm SEM). The average number of drugs per prescription was 6.59 which was very high as per guidelines. Most commonly prescribed antidiabetic drug was Metformin (63.89%) followed by Glimepiride (31.95%).

Conclusion: This study reflects that there is need to make available the standard therapeutic option at University Health Care Facility based upon pharmacoeconomic considerations.

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Introduction

Pharmacoeconomics refers to the scientific discipline that compares the value of one pharmaceutical drug or drug therapy to another. A pharmacoeconomic study evaluates the cost (expressed in monetary terms) and effects (expressed in terms of monetary value, efficacy and enhanced quality of life) of a pharmaceutical product. It is a branch which deals with cost-effectiveness, cost-

minimization, cost of illness and cost-utility analysis to compare pharmaceutical products and treatment strategies (1). Generally, it involves patients, society and economy with respect to drug therapy (2, 3). The value of health services to the public can be analyzed by using the approach of pharmacoeconomics, as opposed to the traditional market place scenario where values are measured by the prices that the patient is willing to pay (4). There is increasing competition among health professionals for the limited resources available within the institutions and communities. Pharmacists have discretionary obligation for due reimbursement

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and payment in case of workforce suffering chronic disorders (5). The objective of pharmaco-economic study is to influence policy formulation and effective decision making, rational prescribing behavior and effective utilization of resources, to make a person or a group of people change their behavior and persuade them that a new course of action is more efficient (6). It focuses on the costs and benefit of drug therapy and provide a basis for better resource allocation and utilization. It is increasingly becoming important for health policy decision-making (7).

Diabetes mellitus (DM) is a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism, resulting from defects in insulin secretion, insulin action or both (8). Diabetes is a chronic morbid condition which requires lifelong treatment. So the cost of antidiabetic drug is the major deciding factor for the patients' compliance. There exists a wide range of variation in the prices of drugs marketed in India and other countries of the world. Percentage cost variation is an effective tool to find out the difference between the various brands prescribed by prescriber in the same setting (9). Several regional investigations continue world over in therapy of major non-communicable disease, diabetes. Keeping in view of increasing burden of the disease and demand for comprehensive care and newer treatments, it is important to apply the framework of economics in diabetes prevention and control (10). According to the International Diabetes Federation, in 2012, more than 371 million people worldwide have diabetes. In India, 63 million people have diabetes as of 2012, and the number is estimated to increase to 101 million by 2030 (11).

The elderly population is increasing rapidly worldwide. Their growth rate (1.9%) is higher than general population (1.2%) (12). India is the third country after China and USA with large elderly population in the world. Elderly population has special problems related to health, social support, and economic security. Their healthcare need differs from younger people (13). Therefore, data available from younger subjects are used to guide prescribing in elderly. Physiological and pharmacological variations in elderly population include decreased total body mass, blood flow to various organs, immunity, and nervous functions; down or up regulation of various receptors; and disturbance in first pass metabolism, bioavailability, metabolism, and excretion (14). Presence of co-morbidities in elderly people require use of multiple medications which increase the irrational prescription, use of inappropriate medications, non-compliance, economic burden, adverse drug reactions (ADRs), and drug interactions (15). These hurdles in pharmacotherapy can be overcome by periodic evaluation of drug utilization and optimizing prescribing pattern by forming prescription guidelines for geriatric patients (16).

In view of above, there is need to study prescription

pattern, comparison of the cost of antidiabetic drugs, evaluate the adherence to treatment guidelines in diabetic patients and then suggesting the best pharmaco-economic therapy for patients at the University.

Methods

The study was carried out prospectively over a period of 3 months from May 2013 to July 2013. Data were collected at the reimbursement section of University Health Center from papers of prescription and purchase bills. The drug lists were examined for the total prescribed and reimbursed medications of each patient. The personal characteristics of age, sex, duration of therapy, department of treatment, diagnosis and change in therapy, if any, were also noted. The exact formulation, price, manufacturer details were recorded for specific anti-diabetic medication. The retail cost of a particular drug being manufactured by different companies, in the same strength, number and dosage form was analyzed and compared. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies was calculated. Majority of drugs were prescribed by their brand names. For those prescriptions whose generic name of the drugs and price were not mentioned in the prescription, they were obtained from Current Index of Medical Specialty, Indian Drug Review (IDR), Drug Update, Med India and Genericpedia. The prescriptions were also compared according to the department of treatment that whether disease was diagnosed by specialist physicians or not.

Poly pharmacy has been variously defined. It has been defined as the concurrent use of multiple drugs, and some researchers have discriminated between minor (two drugs) and major (more than four drugs) poly pharmacy (17-19).

Statistical Analysis

All data were analyzed by using statistical methods that is simple frequencies and percentage for representing the data.

Results

A total of 72 prescriptions were collected in the study during the period of 3 months. The demographic profiles of patients were found to be: 3% patients were found in the age range of 45-55 years, 46% patients were found equally in the age range of 56-65 and 66-75 years, 5% patients were found in the age range of 76-85 years. The proportion of males was higher at 54% as compared to females who were only 46%. Only 14% patients were belonging to lower socio-economic category. 56% patients were diagnosed with only diabetes while 44% patients were associated with co-morbid condition (Table 1). Total number of drugs prescribed in 72 prescriptions was 475. Therefore average number of drugs per prescription is

Table 1. Profile of patients with prescribed antidiabetics.

Total number of patients under study	72
Duration of Treatment	More than 1 year
Patient's Profile	
1) Gender-	
Male patients	39 (54%)
Female patients	33 (46%)
2) Age Range of patients (%) -	
45- 55	2 (2.77%)
56-65	33 (45.83%)
66-75	33 (45.83%)
76-85	4 (5.5%)
3) Socio-economic Status (%)	
Lower Socio-economic patients	10 (13.88%)
Others	62 (86.11%)
Morbidity (%)	
Diabetes alone	40 (55.5%)
Diabetes with co-morbidity	32 (44.44%)

6.59. A total of 28 antidiabetic drugs were used as shown in (Table 2). Most commonly used drug was Metformin 46 (63.89%), in which 36 (78.26%) patients were prescribed highest price branded Metformin. Doctor profile indicates that 62.5% were specialist doctors and rest 37.5% were non-specialist (Table 3).

The average number of drugs per prescription was 6.59 which show poly pharmacy. Out of 72 prescriptions 18 prescriptions were prescribed maximum number of drugs that is Seven (25%) followed by 24 prescription with six (16.66%) and five (16.66%) drugs (Table 4).

Discussion

The study of prescribing pattern and evaluation of the prescribing practice may recommend necessary modifications to achieve rational and cost-effective medical care by practitioners for making medical care rational. The Diabetes mellitus patients are generally treated with many pharmacological agents which may leads to poly pharmacy and drug related problems in the prescriptions (20). It may increase the risk of drug interactions, ADRs, and economic burden. Prescribing drugs with generic name, avoiding irrational use of drugs, and poly pharmacy can help in reducing the cost of treatment (21).

Total number of drugs prescribed in 72 prescriptions was 475. Therefore average number of drugs per prescription is 6.59. The risk of drug interactions may increase with increase in the number of average drugs per prescription which finally lead to the prescribing and dispensing errors. Influence of medical representatives for undue favors by

physicians may not be ruled out. Prescribing generic drugs could be a viable alternative as it decreases the economic burden on the patients. Further, educational intervention methods and strict compliance to WHO drug policies could play a role in generic prescribing. Doctors should not prescribe unnecessary medicines like multivitamins, minerals and enzymes unless absolutely required by the patient (22). We have seen a trend of using brand name with highest cost for prescribing and a very less amount of branded drug least price was prescribed. In our study, Mean of branded antidiabetics with highest price is 4.28 ± 7.74 whereas branded antidiabetics with least price were 1.71 ± 2.99 . So, more and more amount of drugs should be prescribed with least price for bringing uniformity and lower cost of drug therapy. Total cost of treatment can be reduced drastically by using the cheapest brand of drugs and prescriber should avoid writing the costliest brand of drugs in order to curtail the total cost of drug therapy (23). This is relevant in the present study as patients were pensioners.

In conclusion, the cost of prescribed drug options reflects the options of prudent economic therapy of diabetes treatment. The branded drugs are costly in comparison with generic drugs. Therefore, the therapy of diabetes with economical antidiabetic drugs or generic drugs may provide a better option for the common people and reduce expenditure for the University as the therapy is for many years. This further supports need for availability of uniform medication through University facility, so that the pensioners of the University are able to take the diabetic drugs on a regular basis throughout their life. This

Table 2. Drugs in order of used frequency and Pharmacoeconomical Prudence.

Medicine Name	Total Recipients	Highest price branded medicines	Least price branded medicines
Metformin (500mg)	46 (63.89%)	36 (78.26%)	10 (21.73%)
Glimepiride (2 mg)	23 (31.95%)	22 (95.65%)	1 (4.35%)
Vildagliptin(50mg)	12 (16.67%)	0 (0%)	12 (100%)
Glimepiride (1 mg)	10 (13.89%)	9 (90%)	1 (10%)
Soluble insulin (30%), isophane insulin(70%)	10 (13.89%)	10 (100%)	0 (0%)
Voglibose(0.2mg)	7 (9.72%)	7 (100%)	0 (0%)
Metformin HCL (1000mg)	6 (8.34%)	2 (33.33%)	4 (66.67%)
Insulin glargine	6 (8.34%)	6 (100%)	0 (0%)
Gliclazide (60 mg)	5 (6.94%)	5 (100%)	0 (0%)
Sitagliptin phosphate(50 mg)	5 (6.94%)	0 (0%)	5 (100%)
Acarbose(25 mg)	4 (5.56%)	3 (75%)	1 (25%)
Sitagliptin phosphate (100 mg)	4 (5.56%)	0 (0%)	4 (100%)
Pioglitazone(15mg)	4 (5.56%)	4 (100%)	0 (0%)
Glibenclamide (5 mg)	3 (4.17%)	3 (100%)	0 (0%)
Gliclazide (80 mg)	3 (4.17%)	3 (100%)	0 (0%)
Glipizide (5 mg)	3 (4.17%)	3 (100%)	0 (0%)
Saxagliptin	3 (4.17%)	0 (0%)	3 (100%)
Acarbose (50 mg)	2 (2.78%)	2 (100%)	0 (0%)
Voglibose(0.3mg)	2 (2.78%)	2 (100%)	0 (0%)
Insulin lispro (25%), insulin lispro protamine(75%)	2 (2.78%)	0 (0%)	2 (100%)
Soluble insulin inj. 100IU/mL(monocomponent human insulin rDNA origin)	2 (2.78%)	0 (0%)	2 (100%)
Gliclazide (40 mg)	1(1.38%)	1(100%)	0 (0%)
Linagliptin (5 mg)	1(1.38%)	0 (0%)	1 (100%)
Metformin hydrochloride(MR) (850mg)	1(1.38%)	0 (0%)	1 (100%)
Pioglitazone (30 mg)	1(1.38%)	1(100%)	0 (0%)
Repaglinide (1mg)	1(1.38%)	1(100%)	0 (0%)
Insulin lispro(50%) ,insulin lispro protamine(50%)	1(1.38%)	0 (0%)	1 (100%)
Soluble insulin (50%), insulin isophane (50%)	1(1.38%)	1(100%)	0 (0%)

population (Pensioners) needs special pharmacoeconomic considerations for efficacy and safety in relation with complex disorders. The fact that the low-socioeconomic family status and sex composition among the patients also has bearing on timely purchase of medications and regularity. This needs to be addressed through appropriate

prescription practice.

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Table 3. Prescription profiles.

Profile of patients	Specialist	Non specialist
Total No. of prescriptions	45(62.5%)	27(37.5%)
Patient Profile		
1) Gender		
Total No. of male patients	24 (53.34%)	15 (55.56%)
Total No. of female patients	21(46.66%)	12 (44.44%)
2) Age range of patients (years)		
Below 60	4 (8.89%)	5 (18.52%)
Above 60	41 (97.1%)	22 (81.48%)
3) Socio-economic Status		
Lower Socio-economic patients	11 (24.45%)	8 (29.63%)
Others	34 (75.55%)	19 (70.37%)

Table 4. Number of drugs prescribed per prescription (Poly Pharmacy).

Prescription containing number of drugs	Number of prescription (%)
One	0 (0%)
Two	2(2.77%)
Three	2(2.77%)
Four	6(8.33%)
Five	12(16.66%)
Six	12(16.66%)
Seven	18(25%)
Eight	8(11.11%)
Nine	6(8.33%)
Ten	3(4.16%)
Eleven	1(1.38%)
Twelve	2 (2.77%)

Table 5. Prescribed drug regimen combination for diabetic patients.

Drugs	Total no. in Prescription
Glimepiride + Metformin	19
Soluble insulin and isophane insulin (Combination of short acting and intermediate acting)	10
Insulin glargine (Long acting)	6
Voglibose + Metformin	5
Sitagliptin + Metformin	4
Gliclazide + Metformin	3
Vildagliptin + Metformin	3
Glibenclamide + Metformin	3
Lispro, aspart (Fast acting)	3
Soluble insulin (Short acting)	2
Acarbose + Metformin	1
Glipizide + Metformin	1

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