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ORIGINAL ARTICLE / RESEARCH

Prescribing Pattern in Diabetic Outpatients in a Tertiary Care Teaching Hospital in Nepal

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ABSTRACT

Background: Diabetes is a chronic disease associated with significant morbidity and mortality. Diabetics are at a higher risk of polypharmacy and more vulnerable to irrational prescription. Data regarding drug use pattern in diabetes is lacking in South Asian countries.

Objectives: The present study was conducted with the objectives of collecting the demographic details of diabetes patients, studying the pattern of drug prescribing among diabetic outpatients, calculating the mean prescription cost for the diabetes patients and analysing the prescriptions according to prescribing indicators.

Methods: A cross-sectional study was carried out at the Out-patient Pharmacy (OPP), Manipal Teaching Hospital, Pokhara, Nepal, from 22nd August to 7th December 2006. All the diabetes patients who visited the OPP during the study period were enrolled after getting verbal consent and interviewed by the researchers, based on the study objectives. The details were entered in the structured patient profile form, and the filled forms were analysed.

Results: Altogether 182 patients, 103 males (56.59%) and 79 females (43.41%), were enrolled. Among these, 69 (37.91%) were in the age group 51–60 years, 128 (70.33%) had a diabetic history of less than 5 years and 136 (74.72%) had at least one concurrent illness. Two, three and four drugs were prescribed in 39 (21.43%), 35 (19.23%) and 40 (21.98%) patients, respectively. Altogether, 685 drugs were prescribed with an average of 3.76 drugs per prescription. Antidiabetics were accounted for 314 (45.84%) of the total drugs. Among the various antidiabetics, biguanides were accounted for 161 (51.27%) of the total antidiabetic medications. Among the study patients, 28 (15.38%) had an encounter with an injection prescribed and 16 (2.34%) of the total drugs were fixed-dose combinations and 0.88% (n = 6) of the drugs were antibiotics. The duration of prescription of medicines ranges from 29 to 35 days for 41.17% (n = 282) of the total drugs and 57 to 63 days for 44.23% (n = 303) drugs. Majority [650 (94.89%)] of the drugs were prescribed in oral dosage form. The average cost per prescription was NPR 1156.15 (US $16.17). Antidiabetic medications constituted 58.93% of the total cost. Among the antidiabetic medications insulin accounted for 41.07% of the total cost followed by biguanides (32.60%).

Conclusions: Insulin and biguanides were the most commonly prescribed antidiabetics. Our study was done for a short period of time, and the number of patients studied was low. Hence, similar studies covering large number of patients are needed to confirm our findings.

Key words: Antidiabetic medication, diabetes, Nepal, prescribing patterns.

Introduction

Diabetes is a chronic disease, affecting nearly 6% of the world population [1]. It is associated with abnormal carbohydrate, protein and lipid metabolism [2]. In Nepal, the incidence of diabetes and impaired fasting glycaemia was found to be 14.6% and 9.1%, respectively, in people aged ≥20 years, in urban and 2.5% and 1.3% in rural areas [3]. The management of type-1 diabetes depends on insulin mainly, whereas the management of type-2 diabetes is mainly managed using oral hypoglycaemic agents (OHAs) [4]. Diabetes, if uncontrolled, leads to several acute and chronic complications [5]. The chronic complications of diabetes make it necessary to prescribe drugs for these patients life long. Moreover, a good number of diabetes patients suffer from cardiovascular disease such as hypertension, hyperlipidaemia and ischaemic heart disease [2]. This further necessitates polypharmacy in these patients.

In Nepal, several problems in drug use patterns have been reported. This includes use of irrational combinations, excessive prescription of multivitamins, use of antibiotics in viral infections, etc. [6]. Often, the chronically ill patients like the diabetic patients suffer from multiple diseases and hence are prescribed multiple drugs. Moreover, irrational prescribing can lead to an increase in the cost of drug therapy, which may lead to non-adherence. A study from the United States of America (USA) reported that about 1.3 million adults with disabilities did not take their medications as prescribed because of cost, and as a result, more than half reported health problems [7]. In diabetes, the complications can be prevented only if the patient maintains strict glycaemic control [8],[9]. Carrying out a drug utilisation study can provide valuable information to the researchers, policy makers and the drug and therapeutics committee members to determine the drug use pattern. During our literature review, we could not locate such a study from South Asia. Hence, the present study was carried out with the following objectives:

1. to study demographic details of diabetes patients;
2. to study the pattern of drug prescribing among diabetic outpatients;
3. to calculate the mean cost of the prescription; and
4. to analyse the prescriptions as per the International Network for Rational Use of Drugs/World Health Organisation (INRUD/WHO) indicators.

Methodology

Study type

Cross-sectional study.

Study site

Out-patient Pharmacy (OPP), Manipal Teaching Hospital, Pokhara, Nepal.

Study duration

The study was carried out from 22nd August to 7th December 2006.

Inclusion and exclusion criteria

All the diabetes patients who visited the OPP during the study period were enrolled in the study. In case if a diabetic patient has not taken medicines from our OPP, those patients were excluded.

Operational modality

Patients were enrolled in the study after getting a verbal informed consent. Patients were interviewed by the researchers based on the study objectives. The details were entered in the structured patient profile form.

Result analysis

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The filled patient profile form was analysed for various parameters like age distribution and gender of patients, duration of diabetes, concurrent illness, family history of diabetes, number of drugs per prescription, average number of drugs prescribed, therapeutic category of drugs, class of antidiabetics, types of insulin preparations used, dosage form, duration of therapy and the prescribing indicators.

Results

Altogether 182 patients were enrolled in the study.

Demography details

Males were 103 (56.59%) and females were 79 (43.41%). Among these patients, the greatest number were in the age group of 51–60 years [69 (37.91%)], followed by 61–70 years [40 (21.98%)], 41–50 years [31 (17.03%)], 31–40 years [13 (7.14%)], 21–30 years [3 (1.65%)], less than 10 years [1 (0.55%)] and more than 70 years [25 (13.74%)]. The mean ± SD age of the patients was 56.9 ± 12.55 years.

Duration of diabetes (n = 182)

Among the study population, 128 patients (70.33%) had a diabetic history of less than 5 years, followed by 6–10 years in 41 patients (22.53%), 11–15 years in six patients (3.30%), 16–20 years in six patients (3.30%) and more than 20 years in one patient (0.55%).

Coexisting illness

Among the 182 patients, 136 (74.72%) had at least one coexisting illness during the study period. There were total of 177 illnesses in these 136 patients. The detail regarding the coexisting illness of the study patients is shown in [Table/Fig 1].

Family history of diabetes

Among the study population, one (0.55%) had both the parents suffering from diabetes. Two (1.1%) patients had their father alone and three (1.65%) had their mother alone suffering from diabetes. The details regarding the family history of 163 (89.56%) patients were not available.

Number of drugs per prescription (n = 182)

Among the study patients, one, two, three, four, five and six drugs were prescribed in 12 (6.59%), 39 (21.43%), 35 (19.23%), 40 (21.98%), 26 (14.29%) and 17 (9.34%) patients, respectively. More than six drugs were prescribed in 13 (7.14%) patients. The average number of drugs per prescription was 3.76.

Therapeutic category of drugs prescribed

Altogether 685 drugs were prescribed in the study population. Antidiabetics were the commonest class of drugs accounting for 314 (45.84%) of the total drugs. The details regarding the therapeutic category of drugs prescribed are listed in [Table/Fig 2].

Class of antidiabetics

Among the various antidiabetics, biguanides were the common class of drugs accounting for 161 (51.27%) of the total antidiabetics, followed by sulfonylureas 111 (35.35%), insulin 25 (7.96%), thiazolidinediones 15 (4.78%), meglitinides and alpha glucosidase inhibitors 1 (0.32%).

Type of insulin prescribed (n = 25)

Among the various insulin preparations, Insulin (30/70) was prescribed in 24 (96%) patients and Insulin Human Mixtard in one (4%) patient.

Duration of drug therapy

Twenty-three (3.36 %) drugs were prescribed up to 7 days, 23 (3.36%) for 8–14 days, 23 (3.36%) for 15–21 days, 282 (41.17%) for 29–35 days, five (0.73%) for 43–49 days, 303 (44.23%) for 57–63 days and 26 (3.80%) for 85–91 days. The mean ± SD duration of the drugs was 43.69 ± 19.62 days.

Dosage form

Majority of the drugs were prescribed in oral dosage form [650 (94.89%)] followed by parenteral [28 (4.09%)], inhalation [4 (0.58%)] and topical [3(0.44%)] preparations.

Average cost of the prescription

The average cost per prescription was found to be NPR 1156.15 (US $16.17). The details regarding the cost of the prescriptions are listed in [Table/Fig 3].

Cost distribution among the antidiabetics

Antidiabetic medications constituted 58.93% of the total cost of medications. Insulin was the antidiabetic drug responsible for the highest percentage of the cost incurred on antidiabetics. The details regarding the cost distribution among the antidiabetic drugs is listed in [Table/Fig 4].

Prescribing indicators

The analysis as per the INRUD/WHO indicators is listed in [Table/Fig 5].

Discussion

Diabetes is a chronic disease requiring lifelong treatment. Although lifestyle modifications play an important role in diabetes management, drugs become unavoidable in many patients. This study analysed the prescription pattern in diabetic patients attending out-patient departments in a Nepalese hospital. The average number of drugs per prescription was found to be 3.76. Biguanides were the most commonly prescribed antidiabetics. Majority of the drugs were prescribed in oral dosage form. Antidiabetic medications accounted for more than half of the total prescription cost.

In this study, we found a higher incidence of diabetes among elderly patients, with a high incidence in the age group 51–60 years. The mean ± SD age of patients in this study was 56.9 ± 12.55 years. A study from Netherlands had reported an average age of 67 years [10]. Another study from Spain reported an average age of 60.5 ± 12.8 years [11]. This study reported a lower age of patients as compared to other studies. In general, elderly patients are at greater risk of developing type-2 diabetes mellitus (DM). The duration of diabetes plays an important role in diabetes management. In patients with a long duration of diabetes, tight glycaemic control results in a lesser incidence of complications.

In the present study, nearly two-thirds of the patients had a diabetic history of less than 5 years. A study from Spain reported the mean duration of diabetes as 11.8 ± 8.0 years [11]. Patients with a long duration of diabetes are at a higher risk of developing complications. Among the various complications, cardiovascular complications pose a major threat. In this study, hypertension accounted for 70.62% of the total complications seen in the diabetes patients.

Once the patients are diagnosed to have cardiovascular complications, multiple drugs are required for their management. Polypharmacy is associated with a higher cost, increased risk of side effects, drug interactions and non-compliance [12],[13],[14]. One should be especially aware of the drug interactions between antidiabetics and antihypertensive drugs. Drugs like beta blockers and ACE inhibitors can interact with antidiabetic drugs. Beta blockers are known to mask the symptoms of hypoglycaemia if taken with insulin [15]. Similarly, ACE inhibitors are known to have a hypoglycaemic effect. In post-marketing studies, hypoglycaemia has been reported in patients taking Ramipril and concomitant hypoglycaemic agents or insulin [16]. If prescribed simultaneously, the patients should be counselled regarding the possible risk of hypoglycaemia.

Depression was responsible for 6.21% of the concurrent complications in our patients. In general, diabetes patients are at a higher risk of developing depression. Studies suggest that diabetes doubles the risk of depression [17]. These patients are more vulnerable to miss their medications, and the possibility of non-adherence is very high [18]. Moreover, certain antidepressants such as tricyclic antidepressants (TCAs) are known to cause cardiovascular complications, and hence the doctor should be careful while prescribing antidepressants to these patients. According to one study, the use of higher dose of TCAs was associated with an increased risk of sudden cardiac death [19]. In our study, antidepressants accounted for 1.75% of the total drug prescribed.

The average number of drugs per prescription was 3.76. In general, due to multiple diseases, diabetes patients are at a greater risk of polypharmacy. Previous studies from our hospital have identified lacunae in drug use pattern in the hospital [20],[21],[22],[23]. Overuse of vitamins was also observed [24]. In this study, vitamins accounted only for 2.92% of the drugs. This is a positive effect. While prescribing vitamins, one must be cautious. Recently, concern has been raised regarding the risk of bleeding due to vitamin-E

[25]. Analgesics and anti-inflammatory drugs accounted for 1.31% of the total drugs. The prescriber should be aware of the interaction between OHAs and non-steroidal anti-inflammatory drugs (NSAIDs). Concurrent use of NSAIDs and sulfonylureas may result in an increased risk of hypoglycaemia [26].

In this study, antidiabetic drugs accounted for 45.84% of the total drugs prescribed. Among the antidiabetics, biguanides accounted for 51.27% of the total drugs, followed by sulfonylureas (35.35%) and insulin (7.96%). A study from Taiwan reported sulfonylureas as the most common drug class followed by biguanides [27]. A similar finding was made by Yuen and coworkers [28]. The choice of antidiabetic depends on the type of patients, their concurrent illness, cost factors, as well as the availability of medicines. In general, Metformin is considered as a safer drug in terms of hypoglycaemia and hence to be preferred in our set-up.

Moreover, the cost of Metformin is very low, thus making it affordable by the patients in economically weak countries like Nepal. In this study, Insulin was prescribed in 7.96% of the patients. A study from Spain reported that 25.3% of the patients were prescribed insulin [13]. However, the Spanish study had a good number (15.6%) of type-1 diabetes patients. In this study, there were no type-1 diabetes patients. In general, there are several limitations for prescribing insulin in our set-up. The major problems are the cost, difficulty in injecting the drugs, risk of hypoglycaemia, etc. In our hospital, however, a medication counselling centre is located adjacent to the out-patient pharmacy, where patients are counselled by qualified pharmacists [29], regarding the use of insulin syringes and insulin pen among other devices.

The study found that 94.89% of the drugs were prescribed in oral dosage form. This is a good prescribing habit. Oral dosage forms can definitely play an important role in improving patient adherence to treatment. Moreover, these days modified drug delivery systems have been introduced in the market with an objective of increasing patient adherence. In our hospital, once-daily Metformin is available.

Cost of drug therapy is a cause for non-adherence. The average prescription cost was NPR 1156.15 (US $16.17). We found that antidiabetic drugs accounted for 58.93% of the total prescription cost. In a study by Wu et al. [30], antidiabetic drugs accounted for 45% of the total drug cost and antihypertensives accounted for 39% of the total drug cost. Cost of prescription is important in chronic disease like diabetes. One of the better approaches to decrease the prescription cost is to prescribe cheaper brands. A study from Nepal reported a huge variation in cost among brands of a particular drug [31]. Also in India, a huge variation in cost of antidiabetic medications have been documented [32]. A similar finding has been seen in other developing countries [33]. Thus, there is a huge scope in reducing the prescription cost by prescribing cheaper alternatives. However, while choosing cheaper brands, one should keep in mind the quality of the brands. In our hospital, drugs are selected by the Drug and Therapeutics Committee, and a drug list is prepared [34]. The prescribers are instructed to prescribe the drugs from this list. This allows the pharmacists to procure cheaper brands. The doctors prescribe the drugs by generic name. In our study, we found 47.45% of the drugs to be prescribed by generic name and 98% from the hospital drug list.

Implications of This Study

This study was the first of its kind in South Asia to study the utilisation pattern of antidiabetic drugs in a hospital. Thus, this study had provided a baseline data regarding the prescribing pattern in diabetes patients. Since diabetes is a common problem in South Asia and prescription cost is one of the major reasons for non-adherence to drug therapy, there is a need to prescribe cheaper alternatives for these patients. This study has provided a scope for further research in this area.

Limitations

Our study had a few limitations. The diabetes patients admitted in the hospital were not included in the study. The diabetic patients who did not buy their medicines from our OPP were also excluded. Moreover, our study was done for a short period of time and the number of patients studied was low. Hence, similar studies covering large number of patients are needed to confirm our findings.

Conclusion

The study was successful in studying the prescribing pattern of antidiabetics in a Nepalese teaching Hospital. The study found the incidence of polypharmacy in diabetes patients to be high. The prescription cost can be reduced by choosing cheaper brands, and the hospital DTC has a major role in improving the prescribing habits in diabetes patients, as well as in procuring economic brands for the hospital. There is also a huge scope for improving prescribing by generic name.

Table/Fig 1

Coexisting illness	Number	Percentage
Hypertension	125	70.62
Gastritis	15	8.47
Asthma	02	1.13
Depression	11	6.21
Angina	09	5.08
Rheumatoid arthritis	05	2.82
Renal Failure	02	1.13
Hepatic failure	02	1.13
Psychiatric illness	03	1.69
Fungal infection	01	0.56
Tuberculosis	01	0.56
Thyroid problem	01	0.56

Coexisting illness (*n* = 177)

Table/Fig 2

Therapeutic classification	No. of drugs	Percentage
Antidiabetics	314	45.84
Cardiovascular drugs	246	35.91
Vitamins, minerals and dietary supplements	20	2.92
Diuretics	16	2.34
Anticoagulants	15	2.19
Antidepressants	12	1.75
Gastrointestinal system drugs	11	1.61
Analgesics and anti-inflammatory	9	1.31
Antihistamines	8	1.17
Antimicrobials	6	0.88
Antiasthmatics	5	0.73
Antiepileptics	4	0.58
Miscellaneous	19	2.77

Therapeutic category of drugs prescribed (*n* =85)

Table/Fig 3

Cost (NPR)	Number of prescriptions	Percentage
0–600	56	30.77
600–1200	70	38.46
1200–1800	23	12.64
1800–2400	12	6.59
2400–3000	12	6.59
More than 3000	9	4.95

US $1 = 71.50 NPR.

Cost analysis (*n* = 182)

Table/Fig 4

Antidiabetic class	Percentage
Insulin	41.07
Biguanides	32.60
Sulfonylureas	21.91
Thiazolidinediones	3.51
Alpha glucosidase inhibitors	0.54
Meglitinides	0.36

Cost of the drugs based on the class of antidiabetics

Table/Fig 5

Parameter	Number (%)
Number of encounters with an injectable preparation prescribed	28 (15.38)
Number of drugs prescribed from the hospital drug list	670 (97.80)
Number of fixed dose combinations prescribed	16 (2.34)
Number of drugs prescribed from essential drug list of Nepal	371 (54.16)
Number of drugs prescribed from the Nepalese National Formulary	428 (62.48)
Number of drugs prescribed from WHO essential drug list	337 (49.20)
Number of encounters with an antibiotic prescribed	6 (0.88)
Number of drugs prescribed by generic name	325 (47.45)

Prescribing indicator

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