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Original Research Article

To Investigate the Prescribing Pattern of Anti-Diabetic Drugs in Diabetic Patients

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Abstract

Aim: The aim of the present study was to investigate the prescribing pattern of anti-diabetic drugs in diabetic patients attending tertiary care teaching hospital in Bihar region.

Methods: A retrospective study carried out at Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India. The sample size for this study was 200 patients in accordance with world health organization (WHO) manual to assess drug use in individual facilities.

Results: There were 58% male and 42% females. Out of total 200 prescribed anti-diabetic drug products, 110 (55%) were OHA and 90 (45%) were insulin. Thus OHA's were the most common class of anti- diabetic drugs prescribed in this study. Biguanides were the most commonly prescribed class followed by fixed dose combination (FDC)-sulfonylureas+biguanides among the different classes of OHA. Other classes of OHA prescribed were thiazolidinediones and dipeptidyl peptidase 4 inhibitors (DPP 4 inhibitors) and FDC- biguanides+DPP-4 inhibitors. Insulin preparations accounted for 90 of the total anti- diabetic drugs in which short acting insulin 40 followed by insulin mixture preparations 20, others are ultra-short acting and intermediate insulin are 15 in each.

Conclusion: Oral hypoglycemic agents still dominate the prescribing pattern, but there was a shifting trend toward the use of insulin preparations in the management of type 2 diabetes mellitus. In achieving optimal glycemic control, intensification of current drug treatment as well as planning multiple drug interventions with lifestyle modification is necessary to prevent diabetic complications.

Keywords: Anti-diabetic drugs, Glycemic control, Insulin, Oral hypoglycemic agents, Prescribing pattern

Introduction

In India, diabetes has become a significant healthcare issue. By 2025, there will be 70 million diabetics in India, up from 40 million in 2007, and every fifth of those with the condition would be from India, according to the Diabetes Atlas (DA) released by the International Diabetes Federation (IDF). Globally, there is a predicted increase from 171 million in 2000 to 366 million in 2030. It is predicted that between 2000 and 2030, the population of emerging nations living in cities would double. [1] According to WHO predictions, the number of fatalities from diabetes will rise by 50% over the next ten years, making it the seventh most common cause of death by 2030. Concerning the possible impact that diabetes may have on the nation, these anticipated extrapolations and projections provide concerning data. [2]

Sometimes, with diabetes mellitus, prudent administration of insulin and oral hypoglycemic agents (OHAs) may avoid poor glucose control. [3] "That patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time and at the lowest cost to them and their community" is the definition of rational drug usage. [4] Rational use of the drugs in populations can be effectively evaluated with drug utilization studies. The World Health Organization (WHO) defines "drug utilization" as the marketing, distribution, prescription and use of the drugs in a society considering its medical, social, and economic consequences. [5]

Therefore, it is crucial to conduct drug consumption studies on anti-diabetic medications in order to

encourage diabetics to take medications sensibly and to provide the medical team with useful information. Dipeptidyl peptidase inhibitors, or DPP-IV Inhibitors, are a novel family of anti-diabetic medications that have been available on the market since 2009. This has increased the options for treating diabetes. Given the new medications being developed and extensively utilized therapeutically, the research will assist in identifying any changes, if any, in the prescription patterns of antidiabetic agents as monotherapy and combination treatment. [4]

In India, diabetes is a significant healthcare issue. "A chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves" is how the World Health Organization describes diabetes mellitus. [6] According to a demographic census conducted in India, 4% of individuals had diabetes mellitus in 2000, and by 2025, that number is predicted to increase to 6%. [7] In developing nations such as India, the bulk of people with diabetes are between the ages of 45 and 64, but in industrialized nations, the majority of people with diabetes are over 65. [8] According to Diabetes Atlas (ADA) published by the International Diabetes Federation (IDF), there is an alarming rise in disease progression from 40 million in 2007 to 70 million by 2025 in India and every fifth person in the word with diabetes will be an Indian. [9]

The aim of the present study was to investigate the prescribing pattern of anti-diabetic drugs in diabetic patients attending tertiary care teaching hospital.

Materials and Methods

A retrospective study carried out at Department of Pharmacology, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for one year. The sample size for this study was 200 patients in accordance with world health organization (WHO) manual to assess drug use in individual facilities.

Inclusion Criteria

All type 2 diabetes mellitus patients of both sexes irrespective of age and on treatment with oral hypoglycemic agents and insulin therapy.

Exclusion Criteria

Pregnant/lactating woman, patients of type 1 diabetes mellitus (DM), pediatric cases and patients with gestational diabetes.

Statistical Analysis

Data was entered using Microsoft excel quantitative variables as mean±SD. Prescribing drug products were expressed in percentages.

Results

Table 1: Gender and anti-diabetic drug distribution

Gender	N	%
Male	116	58
Female	84	42
Anti-diabetic drug		
OHA	110	55
Insulin	90	45

There were 58% male and 42% females. Out of total 200 prescribed anti-diabetic drug products, 110 (55%) were OHA and 90 (45%) were insulin.

Table 2: Prescribing frequency of different class of OHAs

OHA drugs	N
Biguanides	48
Sulfonylureas	18
FDC+sulfonylureas+biguanides	28
Thiazolidinediones	8
DPP 4 inhibitors	5
FDC+biguanides+DPP-4 inhibitors	3

Thus OHA's were the most common class of anti- diabetic drugs prescribed in this study. Biguanides were the most commonly prescribed class followed by fixed dose combination (FDC)-sulfonylureas+biguanides among the different classes of OHA. Other classes of OHA prescribed were thiazolidinediones and dipeptidyl peptidase 4 inhibitors (DPP 4 inhibitors) and FDC- biguanides+DPP-4 inhibitors.

Table 4: Prescribing frequency of different insulin preparations

Insulin preparations	N
Ultra-short acting	15
Short acting	40
Intermediate	15
Mixtures	20

Insulin preparations accounted for 90 of the total anti- diabetic drugs in which short acting insulin 40 followed by insulin mixture preparations 20, others are ultra-short acting and intermediate insulin are 15 in each.

Discussion

A pandemic illness that has ravaged every country on earth is diabetes mellitus. There are 62.4 million diabetics in India at the moment. By 2030, this is expected to rise to more than 100 million. Diabetes affects around 20% of individuals in India's urban population and about 10% of those in its rural areas. Diabetes is now treated using a variety of anti-diabetic medication classes, such as insulin and oral hypoglycemic agents (OHA), which work by various methods to lower blood glucose levels in order to maintain ideal glycemic control. [10,11] Poor glycemic control, uncontrolled hypertension, dyslipidemia, and diabetic vascular problems affect about 50% of individuals with diabetes. [12]

Of them, 42% were female and 58% were male. Of the 200 anti-diabetic medication items given, 90 (45%) were insulin and 110 (55%) were OHA. OHAs were thus the most often recommended class of anti-diabetic medications in our investigation. Among the several classes of OHA, biguanides were the most frequently prescribed class, followed by fixed dose combination (FDC)-sulfonylureas +biguanides. Thiazolidinediones, dipeptidyl peptidase 4 inhibitors (DPP 4 inhibitors), and FDC-biguanides+DPP-4 inhibitors were the other kinds of OHA that were given. Ninety of the anti-diabetic medications were insulin preparations; these included forty short-acting insulin, twenty insulin combination preparations, fifteen ultra-short-acting insulin, and fifteen intermediate insulin. Insulin preparations can provide intensive, near physiologic delivery of insulin and can help patients achieve better glycemic control. [13] This reflects a change in prescribing trend and shift toward insulin-based therapy from the dominated class of OHA in type 2 diabetes treatment. Thus, lifestyle modification along with anti-diabetic drug treatment has the potential to improve glycemic control in patients with type 2 diabetes despite optimized anti- diabetic drug treatment. [14,15]

Insulin preparations may assist patients achieve improved glycemic control by delivering insulin in a concentrated, near-physiologic dose. [13] This shows that the dominant class of OHA in the treatment of Type 2 diabetes is giving way to insulin-based therapy, reflecting a change in the prescription pattern. The research showed that newer OHA, such as DPP 4 inhibitors and thiazolidinedione, were not prescribed very often. Similar to earlier research, they were used in conjunction with other OHAs to improve glycemic control. [16,17]

For obese individuals, metformin is a desirable option since it is weight neutral, unlike sulfonylureas, thiazolidinediones, and insulin. Moreover, hypoglycemia may significantly hinder the goal of glycemic control and complicate the treatment of Type II diabetes. Metformin, when administered as a monotherapy, seldom causes substantial hypoglycemia because it reduces excess hepatic gluconeogenesis without increasing insulin levels. Metformin is thus often regarded as the best first-line medication for the management of Type 2 diabetes. Furthermore, metformin is quite inexpensive, making medication accessible to patients in developing nations like India. [18] It's interesting that the findings disagreed with how DPP4 inhibitors were used. Less use patterns were documented by Alex SM et al. [19], Akshay A. Agarwal et al.19, and Jambu Jain et al. [20] than what was found in the current research. The findings highlight the growing clinical use of this relatively new class of anti-diabetic medications. DPP-4 inhibitors may have a neutral impact on weight, a benign adverse-effect profile, and a complimentary mode of action with other antidiabetic drugs. DPP-4 Inhibitors are useful for individuals who are nearing their goal HbA1c but who consistently have increased glucose levels after meals since they have a minimal risk of hypoglycemia. [21]

Conclusion

Although the majority of prescriptions are still for oral hypoglycemic medications, there has been a change in the therapy of type 2 diabetes mellitus toward the use of insulin preparations. Planning various pharmacological treatments with lifestyle change and intensifying existing medication therapy are essential for obtaining optimum glycemic control and preventing diabetes complications.

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