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Original Research Article

A Study on the Prescribing Pattern of Antidiabetic Drugs in Patients with Type 2 Diabetes Mellitus

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Abstract:

Background: Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and hyperglycemia, with increasing prevalence worldwide. Effective management often requires pharmacotherapy tailored to patient-specific factors.

Aim: To evaluate the prescribing patterns of antidiabetic drugs in patients with T2DM and assess associated comorbidities.

Methodology: A prospective observational study was conducted over 7 months at Darbhanga Medical College and Hospital, Bihar, India. Ninety patients with T2DM receiving antidiabetic therapy for at least one month were enrolled. Data on demographics, prescribed medications, combination therapies, and comorbid conditions were collected using a structured proforma and analyzed with SPSS v22.

Results: Among 90 patients, 57.78% were male, and 43.33% were aged 41–60 years. Oral monotherapy was prescribed to 31.11%, injectable monotherapy to 52.22%, while multi-drug combinations (five or six drugs) were used in over 60% of patients, indicating a high reliance on polypharmacy. Hypertension (40%) and dyslipidemia (33.33%) were the most common comorbidities, with dyslipidemia showing a significant association ($p < 0.05$).

Conclusion: The study highlights prevalent polypharmacy and the need for individualized treatment strategies in T2DM patients. Comprehensive management addressing both glycemic control and comorbidities is essential for optimizing clinical outcomes.

Keywords: Type 2 diabetes mellitus, antidiabetic drugs, prescribing pattern, polypharmacy, comorbidities.

Introduction

Type 2 diabetes mellitus (T2DM), also known as the adult-onset diabetes or non-insulin-dependent diabetes, is a metabolic syndrome that causes hyperglycemia by impairing insulin release, insulin effects, or both [1]. As a hormone that is secreted by the beta cells of the pancreas, insulin is a very important hormone in terms of controlling the level of blood glucose in the body because it helps in the uptake of glucose in the body to generate energy in the cells. T2DM patients have insulin resistance in which the body does not respond to normal levels of insulin in peripheral tissues and in other cases, the pancreas is not able to produce enough insulin to ensure normoglycemia [2] in patients. The development of T2DM is usually slow and metabolic alterations may take place several years before the onset of clinical symptoms making an early diagnosis and treatment of the condition important to avoid complications that may happen in the long term like cardiovascular disease, nephropathy, neuropathy, and retinopathy.

The rate of prevalence of T2DM is alarming across the globe and posing a major challenge to the overall health of the population. The World Health Organization (WHO) forecasts that in the near future, 300 million people will have T2DM as compared to 5 million in 1995. Likewise, the International Diabetes Federation (IDF) indicated that in 2013, some 382 million were diabetic across the globe and it is projected that the number may reach up to 592 million as early as 2035 [3]. The alarming increase in prevalence highlights the necessity of effective management techniques, such as pharmacological therapy, lifestyle changes and community-level activities to control the escalating diabetes rate.

T2DM management is usually based on a combination of lifestyle changes and pharmacotherapy in

terms of achieving glycemic control and avoiding complications. There is a large variety of antidiabetic medications, oral hypoglycemic drugs, metformin, sulfonylureas, thiazolidinediones, DPP-4, SGLT2, and injectable treatments, including insulin and GLP-1 receptor agonists. The choice of an appropriate antidiabetic regimen depends on a number of factors, such as the age of the patient, the age of diabetes onset, comorbidity, susceptibility to hypoglycemia, and the availability of drugs. Prescribing patterns can thus be of great value in terms of clinical decision making as well as giving an insight into the current treatment guidelines and healthcare practices [4].

One such study is the drug utilization studies (DUS) which is important in optimizing pharmacotherapy as it evaluates prescribing trends, rational drug use, and improvement areas. The main aim of DUS is to keep medications utilized adequately, securely, and at optimal costs which will eventually increase the treatment results of patients [5]. DUS can be used in the setting of T2DM to understand the most prescribed antidiabetic agents, the combinations of the most commonly used in clinical practice, the adherence to treatment recommendations, and the possible discrepancies between the evidence-based recommendations and the actual prescribing behavior. Moreover, the DUS results can be used to help inform the healthcare policy, encourage the rational distribution of resources, and promote the quality of care in general.

The medical audit that usually contains reviews of drug use comes in aiding a reasonable and economical choice of prescription. These audits are systematic in monitoring, evaluating and where need be changing prescribing behaviors in order to enhance the quality of healthcare delivery [6]. Prescribing patterns are crucial in the management of T2DM as there is a variety of pharmacological treatments and different treatment approaches that keep changing over the years, and there is a need to optimize the therapy, reduce the adverse effects and offer patients the best and evidence-based treatment.

Due to the increasing number of patients with T2DM and the difficulty in managing the condition, the necessity to investigate antidiabetic medication prescribing habits of patients is evident. These studies give us an idea of the present therapeutic practice, trends in drug use, and areas of discrepancy between practice as recommended by guidelines and real-life prescription. The current research was thus carried out to evaluate the prescribing behaviors of antidiabetic medications in patients with type 2 diabetes mellitus. The purpose of this study is to offer information that can help in improving rational use of the pharmaceutical, better clinical outcomes and inform the healthcare approaches of managing T2DM to achieve success by analyzing the frequency, type and combination of the antidiabetic medicines administered.

Methodology

Study Design: The present study was a prospective observational study aimed at evaluating the prescribing pattern of antidiabetic drugs in patients with type 2 diabetes mellitus.

Study Area: The study was conducted in the Department of Pharmacology, in collaboration with the Department of Medicine, at Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India.

Study Duration: The study was carried out over a period of 7 months from March 2025 to September 2025.

Sample Size: A total of 90 patients diagnosed with type 2 diabetes mellitus were included in the study.

Study Population: The study population consisted of patients of both genders attending the outpatient department (OPD) or emergency care at Darbhanga Medical College and Hospital who had been diagnosed with type 2 diabetes mellitus.

Inclusion Criteria

- Patients diagnosed with type 2 diabetes mellitus.
- Patients of both genders.
- Patients willing to provide written informed consent.
- Patients receiving antidiabetic therapy for at least one month.

Exclusion Criteria

- Patients with type 1 diabetes mellitus or gestational diabetes.
- Patients with severe comorbidities that may interfere with drug therapy assessment.
- Patients who did not consent to participate in the study.

Data Collection

After obtaining written informed consent, patient information was collected using a structured proforma. The following parameters were recorded:

- Demographic details: Name, age, gender
- Clinical details: Duration of diabetes, family history of diabetes
- Medication details: Prescribed antidiabetic drugs, dosage, frequency, combination therapy
- Associated medications and comorbid conditions

Procedure: Patients fulfilling the inclusion criteria were enrolled consecutively during their OPD or emergency visits. Data regarding antidiabetic prescriptions, comorbidities, and concurrent

medications were recorded. Patients were followed up as necessary during the study period to assess treatment patterns.

Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using SPSS software version 22. Descriptive statistics such as mean, standard deviation, and percentages were used to summarize the data. Chi-square test or Fisher's exact test was applied where appropriate. A P value <0.05 was considered statistically significant."

Result

Table 1 summarizes the socio-demographic characteristics of 90 Type II diabetic patients. Males comprised 52 patients (57.78%) and females 38 patients (42.22%). Age distribution showed that 22 patients (24.44%) were under 40 years, 39 patients (43.33%) were between 41–60 years, and 29 patients (32.23%) were over 60 years. Regarding socio-economic status, most patients belonged to the upper middle class (40, 44.44%), followed by the upper lower class (20, 22.22%), upper class (15, 16.67%), lower middle class (8, 8.89%), and lower class (7, 7.78%). Overall, the majority of patients were middle-aged males from the upper middle or upper lower socio-economic groups.

Table 1: Socio-demographic parameters of Type II diabetic patients (n = 90)

Parameters	Number of patients	Percentage
Gender		
Male	52	57.78
Female	38	42.22
Age (years)		
<40	22	24.44
41–60	39	43.33
>60	29	32.23
Socio-economic status		
Upper class	15	16.67
Upper middle class	40	44.44
Lower middle class	8	8.89
Upper lower class	20	22.22
Lower class	7	7.78

Table 2 shows the pattern of antidiabetic drug therapy among 90 Type II diabetes patients. Oral monotherapy was used in 28 patients (31.11%), whereas injectable monotherapy was more common, used by 47 patients (52.22%). Combination therapy varied in complexity: two-drug combinations were prescribed to 36 patients (40%), three-drug combinations to 23 patients (25.56%), four-drug combinations to 21 patients (23.33%), five-drug combinations to 61 patients (67.78%), and six-drug combinations to 58 patients (64.44%). Overall, the data indicate that most patients required multiple antidiabetic agents, with injectable therapy and higher-order combinations being particularly prevalent.

Table 2: Pattern of antidiabetic drug therapy among Type II diabetes patients (n = 90)

Type of therapy	Number of patients	Percentage
Monotherapy: oral	28	31.11
Monotherapy: injectable	47	52.22
Two drug combination	36	40
Three drug combination	23	25.56
Four drug combination	21	23.33
Five drug combination	61	67.78
Six drug combination	58	64.44

Table 3 presents the evaluation of comorbidities among 90 patients with Type II diabetes. Hypertension was the most prevalent comorbidity, affecting 40% of patients, followed by dyslipidaemia in 33.33%, coronary artery disease (CAD) in 15.56%, and hypothyroidism in 11.11% of patients. The p-value reported (<0.05) for dyslipidaemia indicates a statistically significant association, suggesting it occurs more frequently than would be expected by chance in this population. Overall, hypertension and dyslipidaemia were the most common comorbid conditions among these diabetic patients.

Table 3: Evaluation of comorbidities among Type II diabetic patients (n = 90)		
Comorbidities	**Percentage wise distribution**	**P value**
Dyslipidaemia	33.33%	< 0.05
Hypertension	40.00%	
Hypothyroidism	11.11%	
Coronary artery disease (CAD)	15.56%	

Discussion

Among 90 patients with Type 2 Diabetes Mellitus (T2DM) studied in the present study, the prevalence of males (57.78% vs. 42.22% of all patients) was higher than that of females, which is consistent with the result of earlier studies in India. As an example, Dominic et al. (2016) found the same pattern of male dominance (56% among males and 44% among females), which suggests the existing gender-specific pattern in the prevalence of T2DM (Dominic et al., 2016) [7] Certainly, this predominance of the male species can be explained by gender-specific lifestyle determinants, health seeking behavior, and genetic vulnerability which have been proposed in various regional studies (Raheja et al., 2001; Patel et al., 2013) [8,9]."

The age brackets of the patients in this analysis revealed that most of the patients were middle aged (41-60 years, 43.33%), with the rest being aged above 60 years (32.23%), and the remaining being under 40 years of age (24.44%). This trend corresponds to Sharma et al. (2016) [10] who found out that most diabetic patients who visited tertiary care hospitals were in the age range of 41 60 (Sharma et al., 2016). Nevertheless, Dominic et al. (2016) [7] recorded a somewhat lower mean age distribution that could be attributed to local changes or variations in how healthcare is delivered and the detection of diseases. The progressive character of T2DM and the influence of age-related insulin resistance and metabolic alterations (Meneilly et al., 1996; Rizvi, 2007) [11,12].

Seemingly, socio-economic status was used to determine prevalence of diabetes in which close to half of study population was in upper middle class (44.44%) and 16.67% in upper class. This fact is similar to the results presented by Sharma et al. (2016) [10], who proposed that the greater the socio-economic status, the more prone one is to become exposed to T2DM, potentially through lifestyle habits, including sedentary lifestyle, diet, and obesity. On the contrary, research in rural or poor communities has found a greater percentage of diabetes in lower socio-economic groups indicating the impact of geographic and lifestyle factors on the disease's patterns (Sivasankari et al., 2013) [13].

The review on antidiabetic therapy showed that 31.11% of patients received monotherapy using oral medications, and injectable monotherapy was the most common type of therapy at 52.22%. The use of combination therapy was common, as 40, 25.56, 23.33, and five and six drug combinations were administered in 67.78 and 64.44 percent, respectively. These findings suggest a high dependency on polypharmacy as evidence of difficulty in glycemic control to an adequate level. Pushpa et al. (2020) [14] also provided widespread use of combination therapy, most of which are metformin with another oral hypoglycemic agent but reported that oral therapy was the majority compared to injectable therapy. Conversely, Alex et al. (2015) [15] observed that oral therapy especially metformin therapy was the most commonly prescribed treatment and insulin was administered to approximately 42% of the patients. The stronger injectable therapy use in our cohort could be a sign of the higher stages of disease or clinical choices based on comorbidities and glycemic goals.

Our study also had a high prevalence of comorbidities, with hypertension having 40 percent and dyslipidemia having 33.33 percent followed by coronary artery disease (15.56) and hypothyroidism (11.11). These results are consistent with Vengurlekar et al. (2008) [16] who determined that hypertension is the leading comorbidity in diabetic patients (35%), with dyslipidemia coming next. Alex et al. (2015) [15] reports even greater prevalence of comorbidities (87.3%), which is indicative of the number of factors contributing to T2DM and the elevated risk of cardiovascular issues, which are posed by the disease. The comorbidity burden of our study gives importance to the need to develop integrated management strategies that will deal with glycemic control and metabolic and cardiovascular risks (Truter, 1998; Alam et al., 2014) [17,18].

As far as particular antidiabetic medications are concerned, our research has pointed to the prevalence of combination therapy, but we did not measure the preferences of particular drugs. Earlier research, like Vengurlekar et al. (2008) [16] have identified metformin (27%), glimepiride (22.6%), but the use of insulin was low (4.5%). Pushpa et al. (2020) [14], as well, highlighted metformin as the most common oral agent, which is also first line in line with the guidelines. Although our data indicate that injectable therapy is overused, the general tendency of polypharmacy demonstrates the clinical difficulty of ensuring glycemic normalization among the patients with comorbidities and patients with long-term diabetes.

In general, these findings suggest that patient demographics, length of stay, comorbidity, and socio-

economic status have a role in shaping the prescribing pattern of antidiabetic drugs. The agreement between the current Indian data and the earlier studies highlights a more general tendency in the treatment of patients with diabetes in tertiary care, which is characterized by an excess of middle-aged men with high socio-economic status, polypharmacy, and comorbidity. The dissimilarity in the age composition, favored therapy, and medication choice among research is likely to be based on the practices of the health care of the regions, access to care, and the behavioral patterns of prescription by doctors, which underscores the fact that locally customized and modified diabetes treatment guidelines are necessary.

Conclusion

The research offers knowledge about the prescribing behavior of antidiabetic medications in patients with Type 2 Diabetes Mellitus, which revealed the differences between the overall approaches to the therapy and the impact that patient demographics have. A substantial percentage of patients were observed to get combination therapy indicating that individualized treatment plans are necessary in order to attain maximum glycemic control. The comorbidities, including hypertension, dyslipidemia, hypothyroidism, and coronary artery disease are very common among this population, which is why their management is so essential. The findings also highlight the importance of unique treatment plans, which take into account the age of a patient, their socio-economic background, and other underlying health issues to enhance treatment results and general patient care.

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