

Research Article

Investigation of In-Patient Prescribing Patterns of Oral Antidiabetic Drugs in a Tertiary Care Teaching Hospital

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Background: Type 2 diabetes is a chronic condition associated with abnormally high levels of glucose in the blood. Absence or insufficient production of insulin and/or defective actions of insulin causes diabetes. Diabetics are at a higher risk of polypharmacy and more vulnerable to irrational prescribing.

Methods: A non-interventional, prospective cross sectional study conducted at inpatient medicine department of K.S Hegde Charitable Hospital, Mangalore, India, with the objectives of collecting demographic and disease details of diabetes patients, studying the pattern of oral hypoglycemic agents prescribed in type 2 diabetic patients and to assess the awareness of patients about diabetes, its medication and lifestyle modifications. A prospective study was carried out over a period of five months in medicine in-patient department.

Results: A suitable data collection form was prepared and used to collect the required data. The knowledge of the patients was assessed by using a questionnaire. About 120 patients were recruited for the study. Among the study population 57.5% (69) were males. The majority of patients (48%) were in the age group of 41-60 years. About 49.2% of the patients have a history of diabetes less than 5 years.

Conclusion: Metformin and glimepride was the most common drug used among the various oral antidiabetics prescribed. The present study found that majority of patients had knowledge about diabetes.

Keywords: Diabetes, Oral antidiabetic agents, prescribing patterns, metformin, knowledge

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1. Introduction

Type-2 diabetes is a disease marked by high levels of blood glucose due to the action of insulin and insufficient insulin production. Type-2 diabetes accounts for approximately 90% to 95% of all diagnosed cases of diabetes (Kyle, 2008). Diabetes is a chronic disease affecting almost 6% of world population (Mayor, 2006). It is associated with abnormal carbohydrate, protein and lipid metabolism (Triplitt et al, 2005). Diabetes if uncontrolled can lead to several

acute and chronic complications (Powers, 2001). The chronic complications of diabetes makes necessary to prescribe drugs for these patients lifelong (Triplitt et al, 2005).

India has the largest population of diabetes in the world. The international diabetes federation (IDF) estimates the number of people with diabetes in India will reach 80million by the year 2025. A survey depicts that 4% of adults in India suffered from diabetes in the year 2000 and is expected to increase to 6% by the year

2025 (Kannan and Kumar, 2011). The world health organization (WHO) has projected that the global prevalence of type-2 diabetes mellitus will more than double from 5 million in 1995 to 300 million by 2025. Between 1995 and 2025, there will be a 35% increase in worldwide prevalence of diabetes mellitus, from 4 to 5.4% (Kannan and Kumar, 2011).

Diabetes can cause both morbidity and mortality and requires appropriate treatment to improve the quality of life. A wide range of oral antidiabetic drugs such as sulphonylureas and biguanides have been used for since the last 50 years for the treatment of diabetes. The last decade and a half has seen the introduction of a number of oral antidiabetic drugs like Alpha glucosidase inhibitors, thiazolidinediones, meglitinides and the most recently introduced dipeptidyl peptidase-4(DPP-4) inhibitors (Akila et al, 2011).

The use of oral hypoglycemic agents (OHA) has tremendously changed globally due to development of

novel therapeutic agents and emerging clinical evidences. Particularly, the last one decade has seen a new trend in OHA utilization throughout the world. A rational approach for managing patients with varying stages of disease requires an understanding of features that lead to disease progression and a thorough review of new oral agents for the treatment of type 2 diabetes and the clinical and economic basis for appropriate drug selections (Hassan et al, 2009).

Oral antidiabetics are at a higher risk of polypharmacy and are more vulnerable to irrational prescribing. While the drug options for achieving glycemic control have broadened, the optimum use of these agents and their combinations in the treatment of type 2 diabetes remains suboptimal as indicated by the growing prevalence of the disease. In the view of above situation, drug utilization review of antidiabetic medicines in Indian health care settings has a valid significance to promote rational drug use in diabetics.

Table 1: Demographic data of the patients

	Groups	No. of Patients n = 120	Percentage (%)
Gender distribution	Male	69	57.5
	Female	51	42.5
Age Range (years)	20 - 40	5	4
	41 - 60	58	48
	61 - 80	55	46
	Above 80	2	2
Diabetes history interval (years)	0-5	59	49.2
	6-10	20	16.7
	11-15	28	23.3
	16-20	10	8.3
	Above 20	3	2.5
Comorbidities	Hypertension	81	67.5
	Dyslipidemia	6	5
	CCF	2	1.66
	Hepatomegaly	3	2.5
	None	28	23.33

2. Methods

This was a non-interventional, prospective cross sectional study conducted at inpatient medicine department of K.S Hegde Charitable Hospital, located in Dakshina Kannada, Mangalore, India which is a multi specialty tertiary care teaching hospital with 750 bed strength. This study was approved by the Institutional Human Ethical Committee of Nitte University (NU/CEC/P.G.-15/2011). This study was carried out for a period of 5 months i.e. June 2011 to October 2011, with the sample size of 120 patients, hospitalized with diabetes, qualifying the study criteria.

Inclusion criteria: (i) Inpatients (both sexes) in medicine wards who were on oral antidiabetic drugs.

(ii) Those patients with a history of previously using oral antidiabetic drugs. (iii) Age 18 years and above.

Exclusion Criteria: (i) Patients of type-1 diabetes and juvenile diabetes. (ii) Inpatients of other specialties. (iii) Patients enrolled in clinical trials or on treatment with any investigational drug(s). (iv) Incomplete medical records.

A suitable data collection form was designed to collect and document the data. Data collection form included the provision for collection of information related to demographic details of the patient, past medical history, family history, duration of diabetes mellitus, dose, frequency, and number of anti diabetic drug prescribed, patient's knowledge about diabetes, diabetic

complications, and coexisting illness. All the necessary and relevant information were collected from prescription and interviewing the patients. Data were

analyzed using SPSS software version 16.0 and Microsoft excel.

Table 2: Details of oral antidiabetic drugs prescribed among the study population

Drugs Prescribed	No. of drugs prescribed n = 137	Percentage of total drug prescribed (%)
Metformin	60	43.8
Glibenclamide	10	7.3
Glimepride	19	13.9
Glipizide	4	2.9
Pioglitazone	7	5.1
Metformin+Glibenclamide	10	7.3
Metformin+Glimepride	15	10.9
Metformin+Pioglitazone	2	1.5
Metformin+Gliclazide	8	5.8
Metformin+Glimepride+Pioglitazone	2	1.5

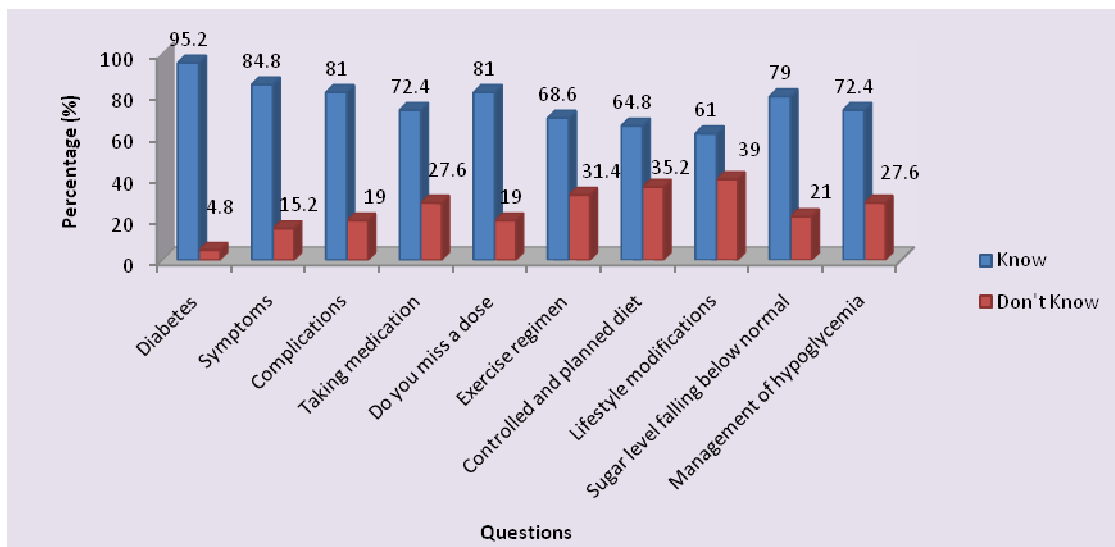


Figure 1: Graphical representation of awareness of disease, medication and life style modification in patients

3. Results and Discussion

Type 2 diabetes is a chronic disease requiring lifelong treatment. Although life style modification plays an important role in diabetes management the drugs became unavoidable in many patients. A prescription based study is considered as one of the most effective method to assess and evaluate the prescribing pattern of medication. This study analysed the prescription pattern in type 2 diabetic patients who were admitted to the Medicine Department of K. S. Hegde Charitable Hospital, Mangalore. A total of 120 patients who

fulfilled the inclusion criteria were included in the study which was carried out for a period of 5 months from June 2010 to October 2010.

3.1 Demographic data of the patients

Out of 120 prescriptions of antidiabetic drugs studied, 57.5% were men and 42.5% were women, indicating the men predominated over women (**Table 1**). The study found a higher incidence of diabetes was among elderly patients, with a high incidence in the age group of 41- 60 years (48% of the total) followed by age group

61-80 years (46% of the total) (**Table 1**). Similar results were obtained in the study conducted by Upadhyay, 2007. A study from Netherland reported an average age of 61 years which is higher compared to this study (Velasco et al., 2005). In general it was found that elderly patients are at a greater risk of developing type 2 diabetes mellitus.

3.2 Disease data of the patients

The duration of diabetes is an important factor 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, it was found that greater number of patients (49.2%) have a diabetic history less than 5 years, followed by 23.3% of patients with a history of 11-15 years. This result is in accordance with the previous studies done in different countries (**Table 1**).

Out of total population 76.6% of patients have co-existing illness in which hypertension was found to be the highest (67.5%). Hypertension is frequently associated with diabetes mellitus and its prevalence doubles in diabetics compared to the general population. This high prevalence is associated with increased stiffness of large arteries, which often precedes macrovascular events. Dyslipidemia accounted for 5% of the total complications seen in the diabetes patients and hepatomegaly (2.5%) and congestive cardiac failure (1.66%) was found to be less incident in the patients (**Table 1**).

3.3 Prescribing pattern of oral antidiabetic agents

In elderly patients with type 2 diabetes treatment may be initiated with monotherapy followed by early intervention with a combination of oral antidiabetic drugs. The therapeutic approach mainly depends on the severity of the disease and the physician's perspective. The data collected during the study showed that the monotherapy (85%) was predominant over dual therapy (12.5%) and triple therapy (2.5%).

The present study showed that out of 137 drugs, metformin was found to be the highest prescribed drug (43.8%). Similar results were obtained by the study conducted by (Kannan and Kumar 2011) and Upadhyay, 2007. Metformin is the therapy of choice for overweight and obese patients with type 2 diabetes. Metformin is a peripheral sensitizer of insulin and has beneficial effects on insulin resistance, an important factor in pathogenesis of type 2 diabetes (Sultana et al., 2010). Accordingly, metformin is reported to be regarded as the first drug of choice for most patients with type 2 diabetes.

In this study among the second generation sulphonylureas, glimepride and glibenclamide were most commonly prescribed. Glimepride was prescribed 13.9% of the total drugs followed by glibenclamide (7.3%). The major advantages of glimepride are its long half life allowing a single daily dose leading to better compliance and formation of inactive metabolites eliminating the risk of hypoglycaemia

Among the fixed drug combinations, the study found that combination of metformin and glimepride was

most commonly used followed by combination of metformin and glibenclamide. From the data collected, it was observed that among the antidiabetic drug category, drugs were found to be prescribed in the following order; metformin> glimepride> combination of metformin and glimepride> glibenclamide> combination of metformin and glibenclamide> pioglitazone (**Table 2**).

3.4 Awareness of patients about diabetes

The study conducted in the given population evaluated the awareness of diabetes patients regarding their knowledge about the disease, drug therapy and life style modifications in order to manage it effectively.

Out of 120 patients enrolled in the study, 105 patients responded to the questionnaire. Total of 10 questions were included in the questionnaire. The study found that most of the patients have knowledge about the disease. Even though they know about the basics of the disease they are not following the exercise regimen, controlled or planned diet and the life style modifications. The study found that 79% of the patients know about the hypoglycemic condition and its management by means of their personal experience. It was found that a good number of respondents had positive knowledge and attitude regarding diabetes, the same was not practiced (**Figure 1**).

4. Conclusion

The present study showed that type 2 diabetes was more prevalent in males than females. The geriatric patients were found to have high risk of developing type 2 diabetes. A total of 92 patients had co morbid conditions along with diabetes and commonly seen co morbid condition in the study was hypertension [81(67.5%)]. The study has shown metformin as the predominantly prescribed oral antidiabetic drug both in monotherapy and in combination therapy. Overall, monotherapy was found to be predominant over combination therapy. There was no significant increase in the prescriptions of newer oral antidiabetic agents like α -glucosidase inhibitors and DPP-4 inhibitors. It may be concluded that the incidence of polypharmacy is low and the essential drug prescription is high and therefore drug use is quiet rational. The present study also found that a good number of respondents had positive knowledge and attitude regarding diabetes, the same was not practiced by them. Improving patient knowledge on correct dosage will perhaps boost up the health care setting in the hospital. Thus this study strongly highlights the need for creating awareness in patients so that we can improve the patient's condition. The 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 this study.

Conflict of Interest declaration

The authors declare no conflict of interest

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