



A Survey on Oral Antidiabetic Drugs available in Market for Non-complicated Diabetic Patients within Ratnagiri Region

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Abstract : Background: This survey was designed to analyze the current oral anti-diabetic drugs prescribed for non-complicated diabetic patients within Ratnagiri region on the basis of variation in prices of same drug available in different brands. **Methods:** The present survey has been conducted for a period of 4 months involving number of medical stores in Ratnagiri, Maharashtra, Doctors and Patients with randomly evaluating around 650 prescriptions. A standard questionnaire was prepared containing different questions; based on patient's data (such as age, gender, disease history and medications), Doctor's data (commonly prescribed drug, combination) and chemist data (available alternatives, cost and most selling brands). **Results:** Statistical analysis of patients data reveals that there were 47.5% patients are in between the ages of 50 to 60 years and 92.5 % patient depends on oral antidiabetic drugs. Hypertension was the most common complication found among them (54%). Data from Doctor's during survey suggested Metformin as mostly prescribed drug to patients having type-II *Diabetes Mellitus* as a single entity or in fixed dose combinations with Glimiperide or Gliclazide. An exhaustive survey over medical shops revealed that many brands of Metformin and Metformin in combination with Glimiperide or Gliclazide are available in market, but Glycomate (Metformin), Glycomate GP-1 (Metformin and Glimiperide) and Glizid-M (Metformin and Gliclazide) is mostly prescribed by Doctors and sold by Chemist though their cheapest alternatives are available in market. Cost analysis indicates that, wide variation in price of several brands (75-87 %) for oral anti-diabetics. Annual Turnover of these products in Indian domestic market indicates dominance of USV Pvt. Ltd. and Mankind Ltd. over other Pharmaceutical companies. **Conclusions:** This report will create better awareness among people for the availability of various brands of same anti-diabetic drug and also motivate our physicians to prescribe the economic products.

Key words : Ratnagiri, Diabetes, oral antidiabetic drugs, Cost.

Introduction

Diabetes is fast gaining the status of a potential epidemic in India. According to a survey, the prevalence of diabetes is predicted to double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India. It is predicted that by 2030 *Diabetes mellitus* may afflict up to 79.4 million individuals in India which makes it the second most affected in the world, after China. About 90% of them are suffering from Type 2 diabetes¹.

Diabetes is a chronic and complex disease characterized by the body's inability to produce or respond to the pancreatic hormone insulin that controls blood glucose levels². The common symptoms are polyuria, polydipsia, and increased hunger. Untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma. Serious long-term complications include heart diseases, stroke kidney failure, food ulcers and damage to eye. There are three main types of *diabetes mellitus*, Type 1 DM or insulin dependent diabetes mellitus, Type 2 DM termed as non insulin-dependent diabetes mellitus and gestational diabetes. Prevention and treatment involves a healthy diet, physical exercise, not using tobacco, and being a normal body weight. All forms of diabetes increase the risk of long term complication. These typically develop after 10-20 years. Type 1 diabetes is typically treated with a combination of regular and intermediate acting insulin, or synthetic insulin analogs. When insulin is used in type 2 diabetes, a long-acting formulation is usually added initially, while continuing oral medication. The main drug classes prescribed are biguanides (Metformin), sulfonylureas (glipizide, glyburide, gliclazide, glimepiride), and alpha glucosidase inhibitors (acarbose, voglibose, miglitol).

The diabetes market in India mainly consisting of Type 1 and Type 2 diabetes is large and growing significantly. The global market value for diabetes therapies and diagnostics has reached to \$48.5 billion. The fastest-growing segment of oral anti-diabetic drugs manufacturing funding is \$14.13 in present scenario of diabetes market. Market is expected to grow at the average CAGR of 6.5% during 2016-2023. India Diabetes Market is expected to grow US\$ 7441.6 million by 2023 from US\$ 4778.7 million in 2016.

In a developing country like India, apart from safety and efficacy, price of drugs plays a important role to both physician and patient. There are hundreds of brands available in Indian markets for a same drug and same strength thus leads to wide variation in prices. Cost of drug therapy is the major hurdle in effective treatment of disease and compliance toward the drug regimen. Limited studies are available in which statistical analysis of available brands of oral hypoglycemic agents is compared by considering all potential stakeholders: doctors, patients and medical shop. Hence, it was decided to carry out such analytical study which will fulfill the need of all stakeholders.

High prevalence of diabetes in Ratnagiri Region, as per the National Family Health Survey-4 (2015-16) in Ratnagiri District stating that about 23.1% peoples are suffering from diabetes³ encouraged to perform this survey.

The objective of this study is to evaluate various available drugs for diabetes, their alternative brands, maximum sold brand and their potential partners.

Methods⁴

This survey was performed in three heads for a period of 4 months from January 2020 to April 2020 involving 03 Doctors, 30 chemists and 40 Patients covering around 650 prescriptions. A standard questionnaire was prepared and filled on the basis of face to face interaction.

Selection Area

Selecting proper area for survey is a crucial part for getting perfect data, which represent the actual condition. We emphasized on out patients of endocrinology department of some private hospitals, well-known medical stores in Ratnagiri, Maharashtra. Patients below the age of 18 years and above 80 years were excluded from the study.

Sampling Design

A sampling design is a definite plan for obtaining a sample from a given area. It refers to the technique or the procedure, the researchers would adopt in selecting items for the sample.

a) Questionnaire:

A structured questionnaire was developed and validated by experts in the field of pharmacy for the collection of data related to the survey. Questionnaire was translated into the local language also and administered to the patients.

The questionnaire incorporated three sections: (i) Patients data about the medications currently taken. (ii) Doctors data about mostly prescribed drug for T2DM (iii) Chemist data related to available alternatives. Under section (i) questions regarding age, medicine being used, and complications. Section (ii) included commonly prescribed drug, combination for T2DM. Section (iii) included available alternatives, cost and most sold brands.

b) Data processing and graphical representation

On the basis of inputs from Medicinal Practitioners, three products were selected for further analysis from chemist. This includes oral antidiabetic agent Metformin and its FDC with same strength. Current Index of Medical Specialties (CIMS) (July 2019–October 2019) were referred to know the price in INR (Per 10 Tablet). The author took only one dosage form, i.e., tablets for the uniformity of the data in markets. Finally all the collected raw data were processed and represented to various aspects through MS-Excel.^{5, 6, 7}

Results

Patient Survey:

Patient survey revealed that majority of patients are in the age group 50-60 years (Figure 1) and 93% of patients are on oral medication (Figure 2). The most common complication is hypertension amongst all (Figure 3).

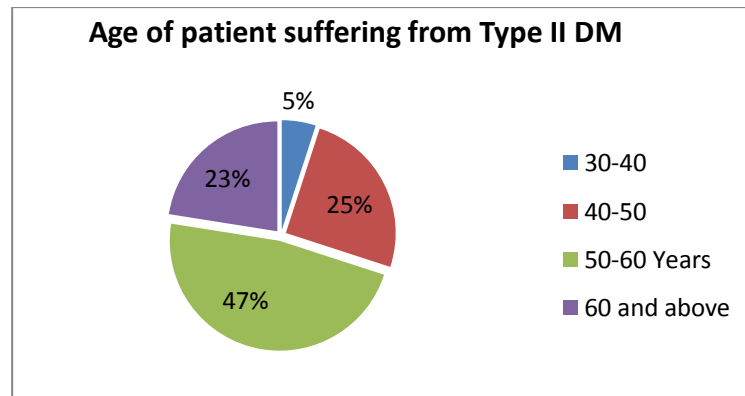


Figure 1: Percentage of diabetic patients according to their age group, n=40

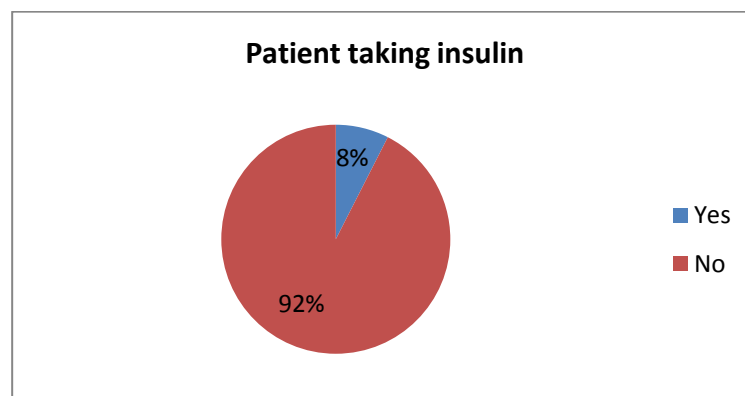


Figure 2: Percentage of patient taking Insulin, n=40

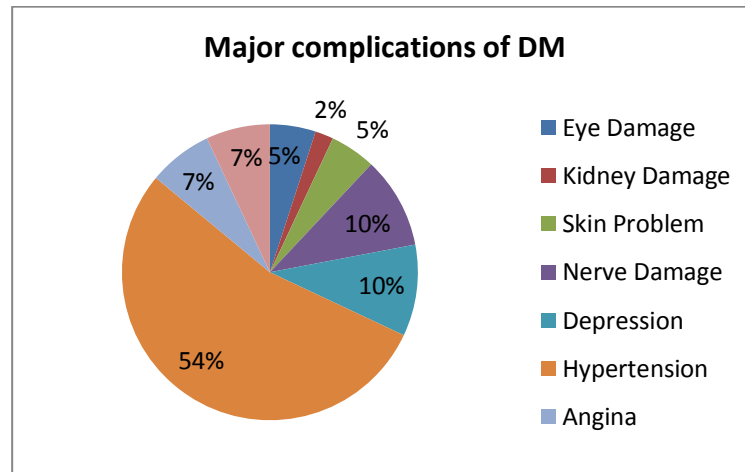


Figure 3: Percentage of diabetic patients with secondary Complications, n=40

Doctor Survey

Data from Doctors during survey suggested Metformin as mostly prescribed drug to patients having type-II *Diabetes Mellitus*, as a single entity or in fixed dose combinations. About 58% prescription prescribed by physician contained Metformin in combination with glimiperide, 22% contained viglibose and 20% contained gliclazide (Figure 4).

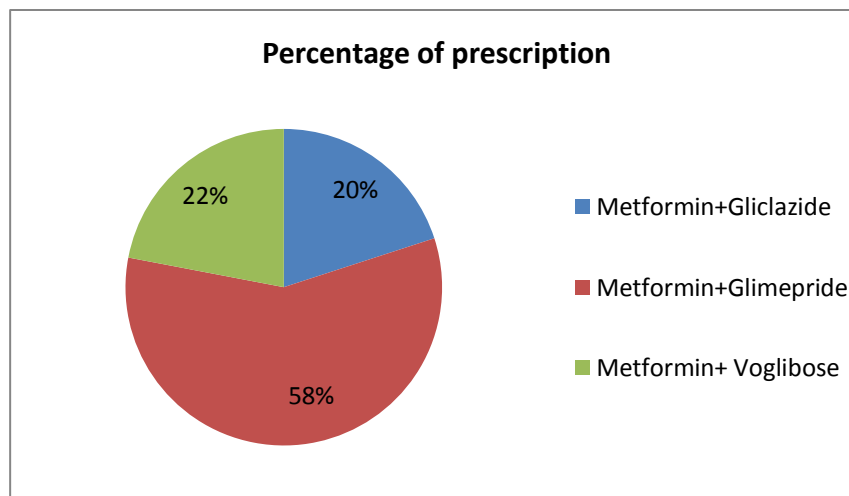


Figure 4: Percentage of prescription containing Metformin with its combinations, n=100

On the basis of above data three mostly prescribed products a) Metformin, b) Metformin+ Glimiperide, c) Metformin + Gliclazide were selected. Analysis of this products were performed at medical shop related to price and alternatives available. We named plain Metformin as P1, Metformin + Glimiperide as P2 & Metformin + Gliclazide as P3.

Medical Store Survey:

Mostly prescribes brands: An exhaustive survey over medical shops revealed that there are total 25 brands of P1, 31 brands of P2, 18 brands of P3 available in the shop with the same strength. Out of them Glycomet (17%) (Figure 5), Glycomet GP 1(14%) (Figure 6), Glizid M (21%) (Figure 7) are the brands which are mostly

prescribed by doctors and sold by chemist respectively. Glycomet contributes 36%, Glycomet GP 1- 11% and Glizid M 16% in total sale of all brands of P1 P2 and P3 respectively (Figure 8).

$$\text{Percentage Prescribed} = \frac{\text{Prescription containg selected brands}}{\text{Total prescription}} \times 100$$

$$\text{Percentage sale} = \frac{\text{sale of selected brands}}{\text{Total sale of product}} \times 100$$

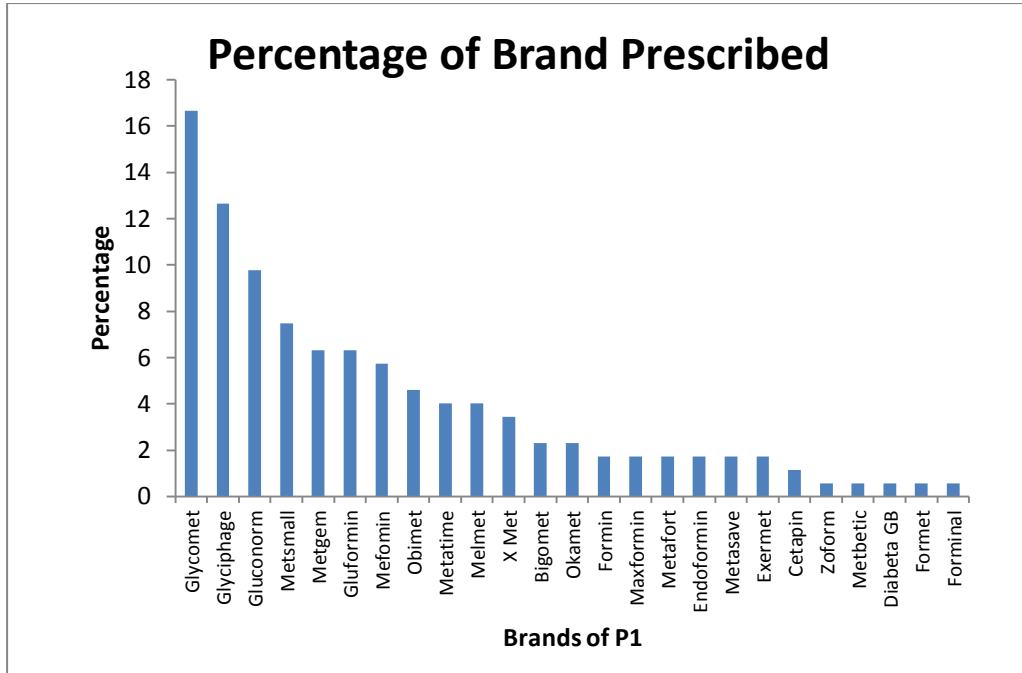


Figure 5: Percentage of brand prescribed by doctors for Metformin, n=500

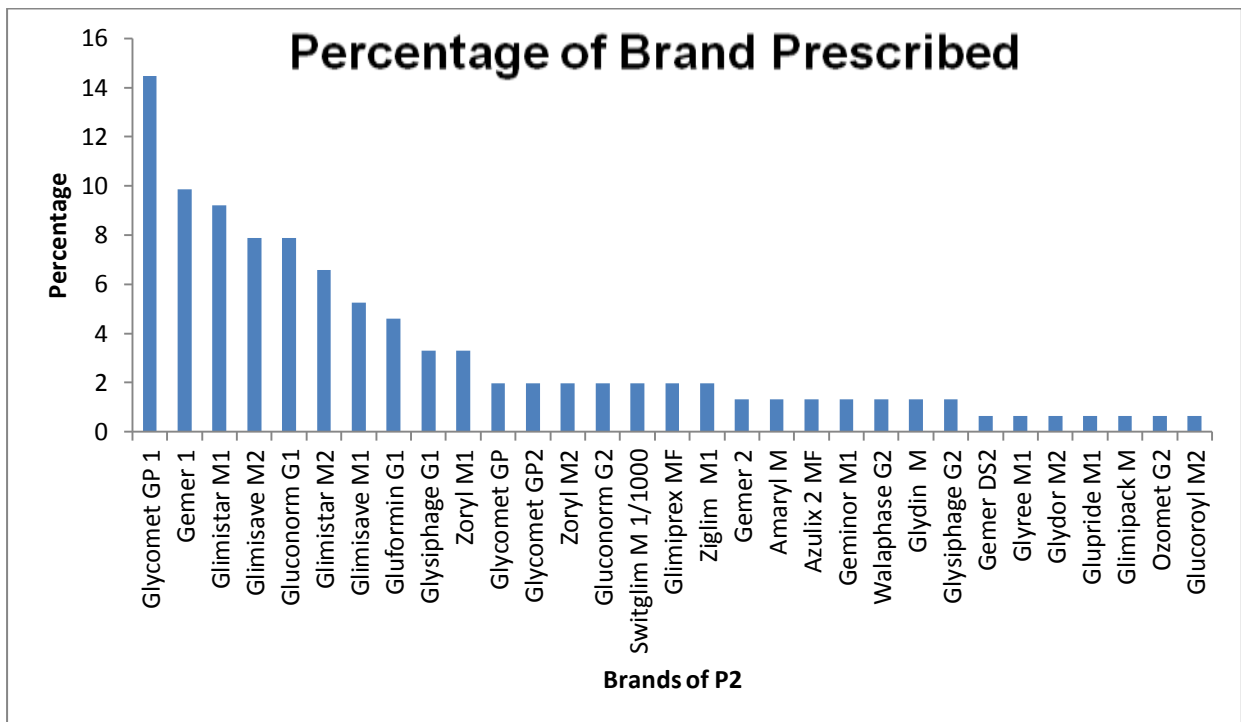


Figure 6: Percentage of brand prescribed by doctors for Metformin+ Glimiperide

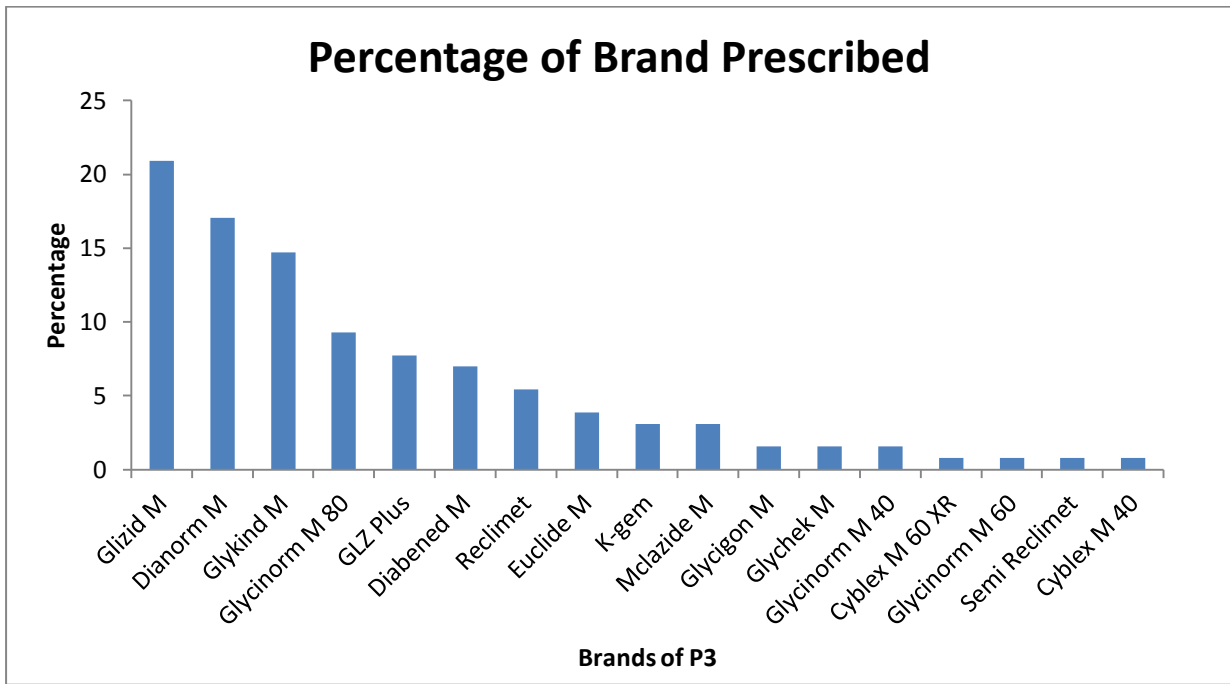


Figure 7: Percentage of brand prescribed by doctors for Metformin+ Gliclazide

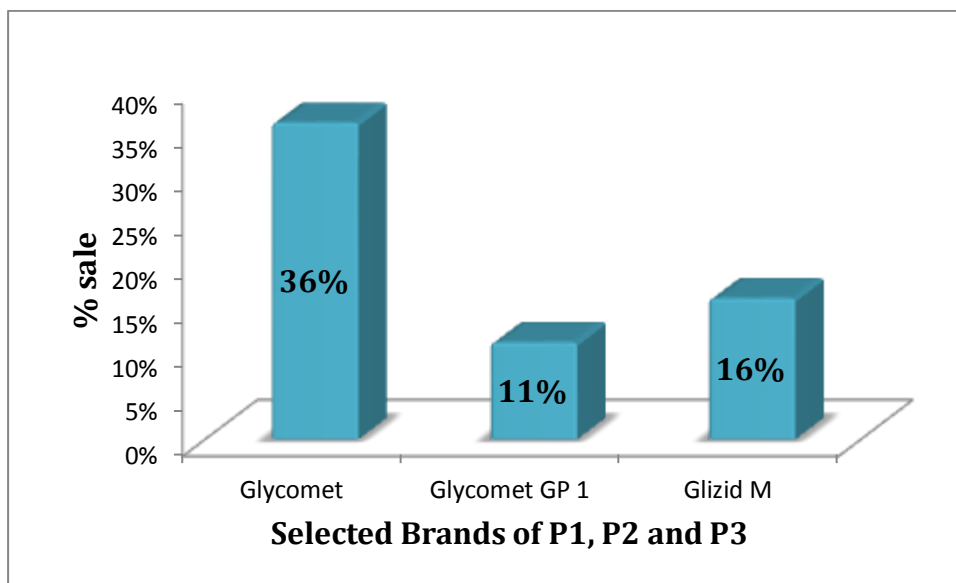


Fig.8: Percentage sale of Glycomet, Glycomet GP1, Glizid M

Price of Brands: Cost of a particular Brands being manufactured by different companies in the same strength was obtained from the price list provided by the pharmaceutical companies in Current Index of Medical Specialties (CIMS) (Figure 9-11).

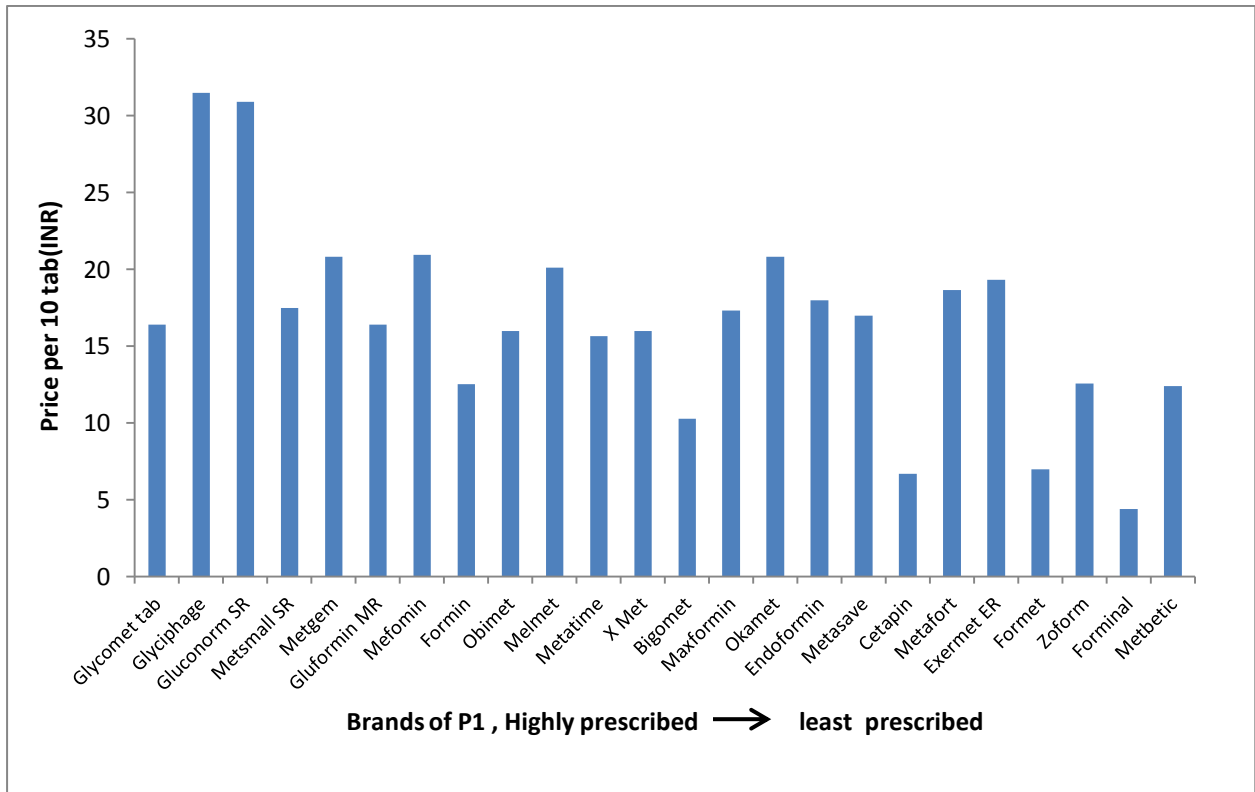


Figure 9: Cost of 10 tablets (INR) of different brands of P1

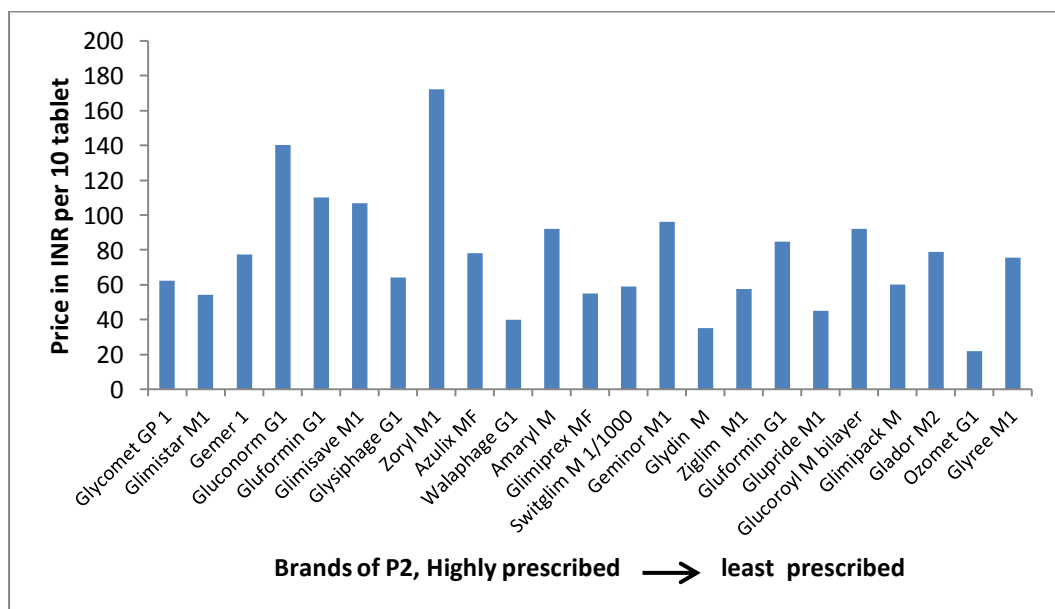


Figure 10:- Cost of 10 tablets (INR) of different brands of P2

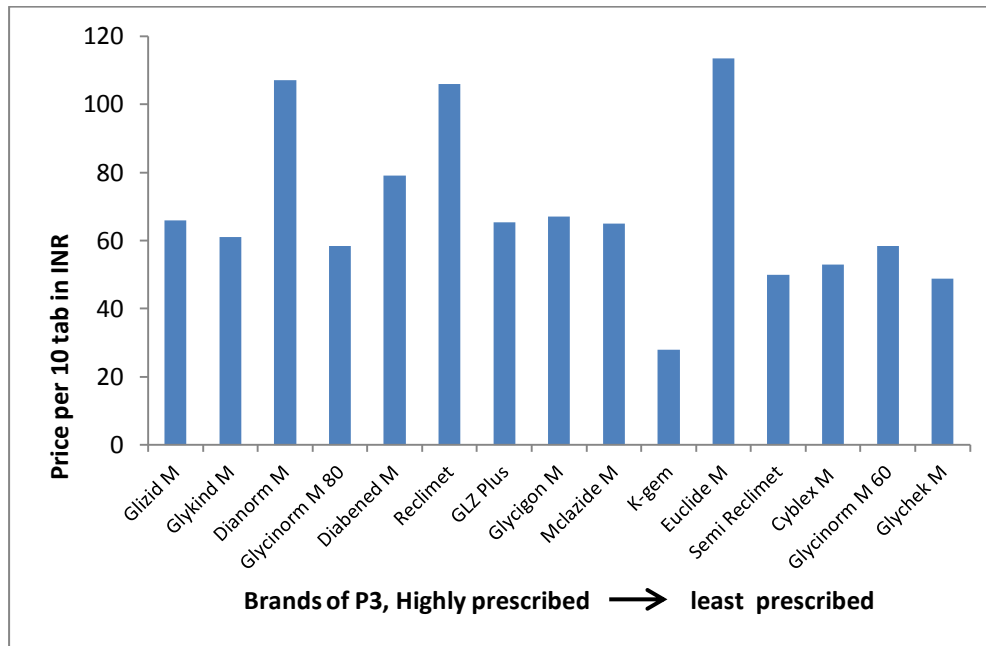


Figure 11: Cost of 10 tablets (INR) of different brands of P3

Over the years with the advancement in global marketing strategy and technologies, pharmaceutical industry, similar to other profit driven industry, also had join the band wagon in the process of maximizing profits in the current era of challenging global market. So these factor may be attributed to the highest sale of these brands of P1 P2 and P3 as their cheapest alternatives are also available in marker viz. Forminal, Ozomet G2, K gem.

The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies and percentage variation in price was analyzed. It is clear from the study that there is a huge variation in prices (75-87%) amongst all (Table 1).

$$\text{Percentage price variation} = \frac{\text{Maximum price} - \text{Minimum price}}{\text{Maximum price}} \times 100$$

Table 1: Price variation amongst the different company’s product

Products	Maximum Price (INR)	Minimum Price (INR)	% Price variation
P1 (500mg)	31.48	4.4	86.02 %
P2(500mg+1mg)	172	34.2	87.20%
P3(500mg+80mg)	113.5	28	75.33%

Most popular industry: Some of the key players for these products in Indian market are: USV Ltd., Lupin Ltd., Eris lifescience Ltd., Intas Pharmaceutical Ltd., IPCA Ltd., Macleods Lab., Panceae Biotech, Sun Pharma Ltd., Dr. Reddy Ltd. Annual Turnover of these products indicates dominance of USV Pvt. Ltd., Mankind Pharma, Lupin Ltd over other companies in India's domestic Pharmaceutical market (Figure 12).

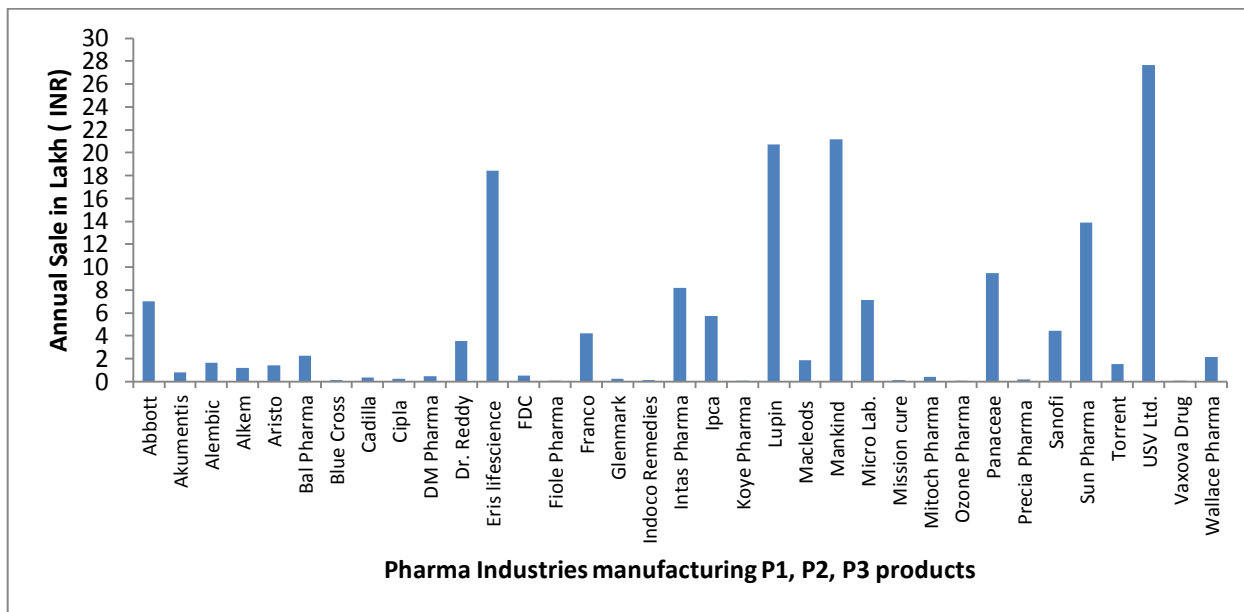


Fig 12:- Average annual turnover of Pharma Industries for P1, P2 and P3 products (n=30 Chemist shop)

Summary

Present research work deals with the market survey on treatments available for type-II *Diabetes Mellitus*. The survey was performed by giving questionnaire to doctor, patients and chemist and the data was compiled on the basis of face to face interaction.

Patient survey revealed that majority of patients are in the age group of 50-60 years and 93% of them are on oral medication. The most common complication is hypertension amongst all.

Data from Doctors during survey suggested Metformin and its combinations as mostly prescribed drug to patients having type-II *Diabetes Mellitus* out of many antidiabetic drugs available in market.

On the basis of inputs from Medicinal Practitioners, an exhausted market survey was done on Metformin and their combinations available in the Market. Analysis of data from the chemist reveals that, plain Metformin and its combination with Glimiperide or Gliclazide are most common combinations prescribed by doctors to T2DM patients. Therefore we used these 3 products (Metformin, Metformin+ Glimiperide and Metformin+ Gliclazide) to analyze their market potential.

A comprehensive survey over Medical shops revealed that many brands of these products are available in the market but Glycomet for P1, Glycomet GP 1 for P2 and Glizid M for P2 are the brands which are mostly prescribed by doctors. Their high sale in medical shops as Glycomet (16.42 INR/10 tab) contributes 36%, Glycomet GP 1 (96.63 INR/10 tab) contributes 11% and Glizid M (66 INR/10 tab) contributes 16% in total sale proves the same.

Cost comparison of drug being manufactured by different companies, in the same strength was evaluated, indicates that these products are much costlier as compared to other brands available in market. Their cheapest alternatives available in market are Forminal (4.4 INR/10 tab), Ozomet G2 (24.2 INR/10 tab), K gem (28.00 INR/10 tab) for P1, P2, P3 respectively. Cost variation in price was analyzed for all the products which indicate huge variation of prices.

It is concluded from many studies that pharmaceutical promotional activities are able to influence the behaviors of the physicians⁸ and their prescribing behaviors. So because of these marketing techniques employed by pharmaceutical industries in order to remain competitive in this era, the sale of said products may be high. This is not acceptable for patient leading to unfair burden on the customers.

Annual Turnover of these products was estimated which indicates dominance of USV Pvt. Ltd. Mankind and Lupin over other companies in India's domestic Pharmaceutical market.

Conclusion

The present survey was done to analyze market potential of antidiabetic formulation by involving potential stakeholders: doctors, patients and medical shop. Our findings revealed that many brands of same drug and their combinations in same strength are available in market with huge price variation. Therefore modification or strict policy is needed to control high price variation by different companies to reduce unfair burden on both patient and health-care system that will decrease even noncompliance. Noncompliance leads to incomplete treatment which tends to increase morbidity or mortality. Non-affordability of medication is found to be associated with nonadherence to prescription medication by patient. The appraisal and management of marketing drugs should be directed toward maximizing the benefits of therapy and minimizing negative personal and economic consequences.

The study results make the prescriber and people aware about various brands of antidiabetic available with their difference in prices. The low cost drugs can reduce the expenditure of patients on the drugs.

This report will provide the basis to the Indian Pharma sector specially Alembic Pharmaceutical, Blue Cross Lab., Ozone Pharmaceutical Ltd., whose products are cheapest, for making marketing strategies to boost their sale turnover of formulation containing Metformin alone and in its combination with Glimiperide or Gliclazide.

Top leading industries like USV Pvt. Ltd., Mankind and Lupin Ltd. that are in process to develop new combinations, may use this survey report for the development of some combination with anti-hypertensive drugs to avoid the inconvenience caused to old age patients as most of them are suffering from hypertension.

In future there is further scope to perform similar studies with increase sample size covering all regions of India which will give more precise and accurate data related to the need of all stakeholders.

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