

Original Research Article

Studies on Prescribing Pattern in the Management of Diabetes Mellitus in Rural Teaching Hospital

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Abstract: The aim of the study was to observe and analyze the prescribing pattern of anti diabetic drugs in medicine ward. This study was a descriptive cross sectional study/ prospective observation study. The study was conducted at Rajah Muthiah Medical College Hospital (RMMCH), Annamalai University, Chidambaram, a 1250 bedded multi specialty tertiary care University teaching hospital located in rural India. Analyze the prescription as per the WHO Prescribing Indicators. The following are the parameters: Prescribing indicator, Patient care indicator and Facility indicator. A prescribing practices measure the performance of health care providers in several key dimensions related to the appropriate use of drugs. The indicators are based on the practices observed in a sample of clinical encounters taking place at outpatient health facilities for the treatment of acute or chronic illness. A total of 1232 drug products were prescribed. Thus, the average number of drugs per prescription or mean was 4.83. The total number of drugs prescribed by generic name was 40.01% (493 drugs), 32.46% drugs prescribed with diabetic medication and 67.54% of drugs prescribed with the management of co morbidity diseases conditions, 17.04% of prescription containing injections that include insulin, antibiotics, GIT and some vitamins. Almost all drugs (58.76%) prescribed from Tamilnadu EDL, as well as RMMCH drug list. Drugs prescribed from an Essential Drug List (EDL) were 74.30%. Since Insulin can be administered only by subcutaneous route, % of injections (17.04%) comprise only of insulin injection. Among the 255 patients the average consultation time with prescribe was 8.40 minute and the average dispensing time in medical store was 7.2 minute. About 30.58% patients have good knowledge about the correct dosage of each tablet. Present study shows that the majority of diabetes patients were in the age group of 40 -60 years. Resulting in the development of diabetic related complications in most productive years of life, as compared to western studies were mean age is around 60 years, Prescription pattern analysis showed that most of the patients were on combination therapy 51.37% and followed by monotherapy 48.62%, Commonest drugs used in monotherapy were sulfonylureas, Insulin and metformin. The commonest two drug combinations were sulfonylureas with metformin. There are no overall changes in prescription pattern by the physicians during the three year study period.

Keywords: Prescribing pattern, Diabetes, Prescribing indicators.

INTRODUCTION

Diabetes mellitus (DM) is one of the oldest diseases known to man, which was the first reported in Egyptian literature about 3000 years ago [1]. The name diabetes was first given by the Greek Physician Aretaeus (30 - 90CE). Avicenna is the famous Arabian physician who first described the complications and progression of the disease [2]. People living with type 2 DM are more vulnerable to various forms of both short and long-term complications, which often lead to their premature death.

Irrational use of drugs is a major health concern of present day medical practice. Indicators provide a measure of performance of health care providers in the area of prescribing practices. Based on the practice samples were observed in clinical treatment taking place at health care facilities for the treatment of acute and chronic diseases indicators are formulated. The World Health Organization (WHO) developed a core

prescribing indicators to measure the degree of poly pharmacy, the tendency to prescribed drugs by generic name and overall level of use of antibiotics and injections. The degree to which the prescribing practice is adhered to the essential drug list (EDL), formulary or standard treatment guidelines were measured. This is done by seeking for number of drugs prescribed from the essential drug list [3]. Access to essential drug list and essential drugs available on regular basis help the physicians to treat the patients in a rational way [4]. Ineffective treatment, unnecessary prescription of drugs particularly antimicrobials and as injections, development of resistance to antibiotics, adverse effects and economic burden both on the patients and the society are inevitable consequences. It has been estimated that 50% or more expenditure of medicines is being wasted through irrational prescribing, dispensing and patient use of medicine [5]. In health care settings of developing countries irrational prescriptions and long

term use of drugs is characterized by poly pharmacy, excessive use of antibiotics and injections and use of drugs of doubtful efficacy is quite common [6].

METHOD

Study design

This study was a descriptive cross sectional study/ prospective observation study.

Study site

The study was conducted at Rajah Muthiah Medical College Hospital (RMMCH), Annamalai University, Chidambaram, a 1250 bedded multi specialty tertiary care University teaching hospital located in rural India.

Selection / eligibility criteria

Inclusion criteria

- All the inpatients as well as outpatients diagnosed with diabetes alone and also with Co morbidity diseases were included.
- Patient with the age group above 30 years.

Exclusion criteria

- The Patient having BP 180/110 mm/Hg or higher.
- Patients with age less than 30 years.
- Patient with intellectual or physical disability that preventing them from participating in this study.
- Patient with drug abuse.
- The prescriptions containing incomplete information are excluded from this study.
- Patients who discontinued and not willing to participate in the study were excluded from this study.

To analyze the prescription as per the WHO Prescribing Indicators [7]: The following are the parameters:

Prescribing Indicator

1. Average number of drugs per prescription (encounter)
2. Percentage of drugs prescribed by generic name
3. Percentage of prescriptions with an antibiotic prescribed
4. Percentage of prescriptions with an injection prescribed
5. Percentage of drugs prescribed from an Essential Medicine List
6. Average drug cost per prescription or encounter

Patient Care Indicator

1. Average consultation time

2. Average dispensing time
3. Percentage of drug actually dispensed
4. Percentage of drug adequately labeled
5. Patient knowledge of correct dosage

Facility Care Indicator

1. Availability of copy of essential drug list or formulary
2. Availability of key drug

Ethical consideration

This study was conducted after getting approval from the Institutional Human Ethical Committee (M18/RMMC/2015) of Rajah Muthiah Medical College Hospital (RMMCH)

Statistical analysis

Graph Pad PRISM (Version 5.01) software was used for the statistical analysis in this present study. Continuous variables were expressed as mean \pm SD and categorical variables were expressed as percentage. The aim of the study was to observe and analyze the prescribing pattern of anti diabetic drugs in medicine ward.

RESULT

Demographic details

The study participants consist of 58.03% (n= 148) males and 41.96% (107) females. Demographic detail revealed that the age of the person interviewed ranged from 30 years to 80 years with the mean age of males participants were 54.88 ± 3.22 years and female participants were 52.48 ± 2.62 years respectively

From the results of our study we observed that among male patients, majority of patients (35.013%) belong to age group of 51 – 60 yrs followed by 30.40% of the patients in the age group of 41 – 50. This incidence is more as observed in the other study [8][59.89%] whereas among females majority of patients (31.38%) belong to age group of 41 – 50 yrs, followed by 28.03% of patients in age group of 51 – 60 years. From these results we infer that more % of female patients in lesser age group (41 – 50 yrs) were suffering when compared with male patients. However majority of diabetic patients (65.88%) fall in the age group of 41 to 60 years.

In this study population 70.94% (n=105) of the male patients are having a mixed diet and 29.05% of the patients having vegetarian. In female patients 69.15% (n=74) of the patients having mixed diet and 30.84% (n=33) of the patient having vegetarian.

Table-1: Co - Morbidity status

Sl. No	Co – morbidity diseases	Number of respondents			Percentage (%)		
		Male	Female	Total	Male	Female	Total
1	DM alone	78	45	123	52.70	42.05	48.23
2	HTN	29	17	46	19.59	15.88	18.03
3	CAD	3	5	8	2.02	4.67	3.13
4	Gastritis	10	12	22	6.75	11.21	8.62
5	Arthritis	3	7	10	2.02	6.54	3.92
6	UTI	2	1	3	1.35	0.93	1.17
7	HTN + CAD	11	16	27	7.43	14.95	10.58
8	Foot ulcer	6	-	6	4.05	-	2.35
9	Ketoacidosis	5	1	6	3.37	0.93	2.35
10	Peripheral neuropathy	1	2	3	0.67	1.86	1.17

Hypertension was reported in 19.59% (n=29) of males and 15.88% (n=17) of females in the study population, Coronary artery diseases 2.02% (n=3) of male and 4.67% (n=5) female respondents, 6.75 % (n=10) of male and 11.21% (n=12) of female were affected with Gastritis, 2.02% (n=3) of male and 6.54% (n=7) of female were affected with Arthritis, 1.35% (n=2) of male and 0.93% (n=1) female were affected Urinary tract infection, 7.43% (n=11) of male and 14.95% (n=16) of female were affected with Hypertension with Coronary artery diseases, 4.05% (n=6) of male patients were affected with diabetic foot

ulcer, 3.37% (n=5) of male and 0.93% (n=1) of female are affected with diabetic Ketoacidosis and 0.67% (n=1) of male and 1.86% (n=2) of female patients were affected with Peripheral neuropathy. Majority of the male diabetic patients had a duration of ≤ 5 years 37.83% (n=56), followed by 34.45% (n=51) of the patients were in the duration of 5 – 10 years and 27.7% (n=41) of the patients were ≥ 10 years. In female patients the majority of diabetic duration was observed in ≤ 5 years 52.33% (n=56), followed by 28.03% (n=30) of the patients were 5 – 10 years and 19.62% (n=21) of the patients were ≥ 10 years.

Table-2: Prescribing Indicator

Sl. No	Prescribing indicator	Frequency
1	Total number of prescription analyzed	255
2	Total number of drugs used in this study	1232
3	The average number of drugs per prescription	4.83
4	Average number of drugs per encounter	4.83
5	Percentage of drugs prescribed by generic name	40.01%
6	Percentage of drugs with an anti diabetic drug prescribed	32.46%
7	The Percentage of drug with an injection prescribed	17.04%
8	Percentage of drugs prescribed from the essential drug list (EDL) or formulary	58.76%

A prescribing practices measure the performance of health care providers in several key dimensions related to the appropriate use of drugs. The indicators are based on the practices observed in a sample of clinical encounters taking place at outpatient health facilities for the treatment of acute or chronic illness. A total of 1232 drug products were prescribed. Thus, the average number of drugs per prescription or mean was 4.83. The total number of drugs prescribed by generic name was 40.01% (493 drugs), 32.46% drugs prescribed with diabetic medication and 67.54% of drugs prescribed with the management of co morbidity

diseases conditions, 17.04% of prescription containing injections that include insulin, antibiotics, GIT and some vitamins. Almost all drugs (58.76%) prescribed from Tamilnadu EDL, as well as RMMCH drug list. Similar study was reported [9] the average number of drugs prescribed per encounter was 5.15. Percentages of drugs prescribed by generic name were found to be 25.37%, antibiotic drugs 22.66% and injections 20.5%. Drugs prescribed from an Essential Drug List (EDL) were 74.30%. Since Insulin can be administered only by subcutaneous route, % of injections (17.04%) comprise only of insulin injection.

Table-3: Patient Care Indicator

Sl. No	Patient care indicator	Frequency
1	Average consultation time	8.40 min
2	Average dispensing time	7.2 min
3	Percentage of drugs actually dispensed	88.79%
4	Percentage of drugs adequately labeled	82.30%
5	Patient knowledge of correct dosage	30.58%

The time that prescribers and dispensers spend with each patient sets important limits on the potential quality of diagnosis and treatment. Understand the way drugs are used it is important to consider what takes place at health facilities from both the provider's and the patient's perspectives. Patients enter facilities with a set of symptoms and complaints, and with expectations about the care they will receive; they typically leave with a package of drugs or with a prescription to obtain them in the private market. Among the 255 patients the average consultation time with prescribe was 8.40

minute and the average dispensing time in medical store was 7.2 minute. About 30.58% patients have good knowledge about the correct dosage of each tablet. According to [10], the average consultation time 7.8 minutes was adequate and it is noteworthy that in our study average consultation time is 8.4 mts, higher than that of requirement. The fact that almost 88.79% of prescribed drugs are available in the RMMCH medical store and all most all the drugs (82.30%) was adequately labeled and dispensed to the patients are positive signs of management.

Table-4: Distribution of drugs in essential drug list

Sl. No	Prescription item N=1232	Frequency
1	Drugs from essential drug list	58.76% (n=724)
2	Drugs out of essential drug list	41.23% (n=508)

The ability to prescribe drugs rationally is influenced by many features including working environment. Two particularly important factors for rational prescribing are an adequate supply of essential drugs and access to unbiased information about these drugs. The prescription trend were analyzed, and it was inferred that 58.76% (N=724) were prescribed from WHO essential drug list and 41.23% (N= 508) were prescribed out of essential drug list.

Patients having multiple problems are involved in the study so, number of drugs per prescription

exceeded in more than 10 drugs. All prescription contain more than one drug, 64.18 % (n=95) Of prescription contain less than 5 drugs, 29.05% (n=43) of prescription contain 5 – 8 drugs, 3.37% (n=5) of prescription contain 8 – 10 drugs and 3.37% (n=5) of prescription contain more than 10 drugs. In female patients 52.33% (n=56) of prescription contain less than 5 drugs, 27.10% (n=43) of prescription contain 5 -8 drugs, 4.67% (n=5) of prescription contain 8 – 10 drugs and 3.73 % (n=4) of prescription contain more than 10 drugs.

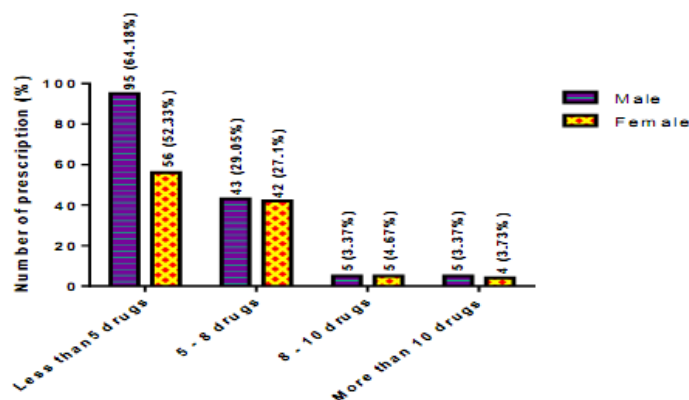


Fig-1: Number of drugs per prescription

From the study analysis of prescription it was observed that various classes of anti-diabetic agents like Biguanides class with 68.91% are most prescribed class and followed by Sulfonylurea with 56.08%, Insulin analogs 15.54%, Thiazolidinediones with 8.10% and α -Glucosidase inhibitors are 2.02% and almost all traditional and newer class agents are covered under the prescribing pattern. The following graph represents the result of percentage wise drug use in patients of diabetes mellitus. Same as in female patients, the study analysis of prescription it was observed that various classes of anti-diabetic agents like Biguanides class with 84.11%

are most prescribed class and followed by Sulfonylurea with 58.87%, Insulin analogs 4.67%, Thiazolidinediones and α -Glucosidase inhibitors are 2.80% and almost all traditional and newer class agents are covered under the prescribing pattern. The following graph represents the result of percentage wise drug use in patients of diabetes mellitus. Similarly study, the average number of OHAs prescribed per prescription [11] was found to be 2.2. Biguanides (n = 160, 37%) were the most commonly prescribed class, followed by sulphonylureas (n = 138, 31.9%), thiazolidinediones (n = 107, 24.8%) and alpha-glucosidase inhibitors (n = 27, 6.3%).

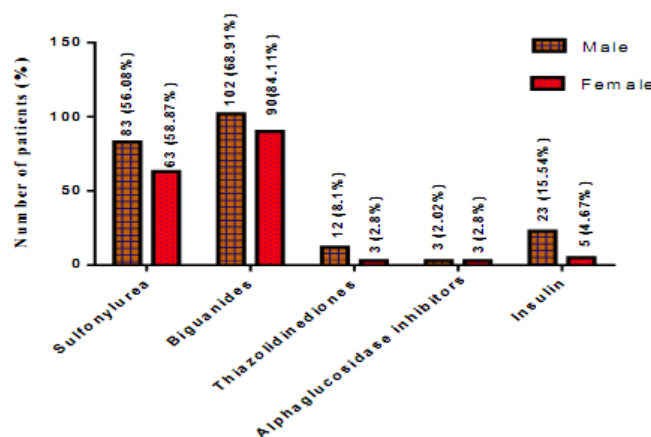


Fig-2: Types of hypoglycemic agents

A total number of 255 prescriptions were surveyed. Total number of drugs prescribed in 255 prescriptions was 1232. Out of 1232 encounters, 546 (44.31%) females and 686 (55.68%) males were observed. The present study found that the average number of drugs per prescription was 4.83. NSAID's related drugs like Ecosporin, Paracetamol etc., were prescribed in 45.94% (n=68) of male and 45.94% of female respectively majority of them belong to vitamins group 52.70% (n=78), Lipid lowering drugs like

atorvastatin, Simvastatin etc., 35.13% of male and 50.46% of female, 25% of male and 38.31% of female were prescribed with anti hypertensive drugs, 42.56% of male and 42.99% female were prescribed with GIT drugs like Pantaprazole, Ranitidine etc., 11.48% of male 16.82 of female were prescribed with Anti-anxiety drugs like Alprazolam, Diazepam etc., and other commonly prescribed drugs like diuretics, Hypothyroid drugs and antibiotics.

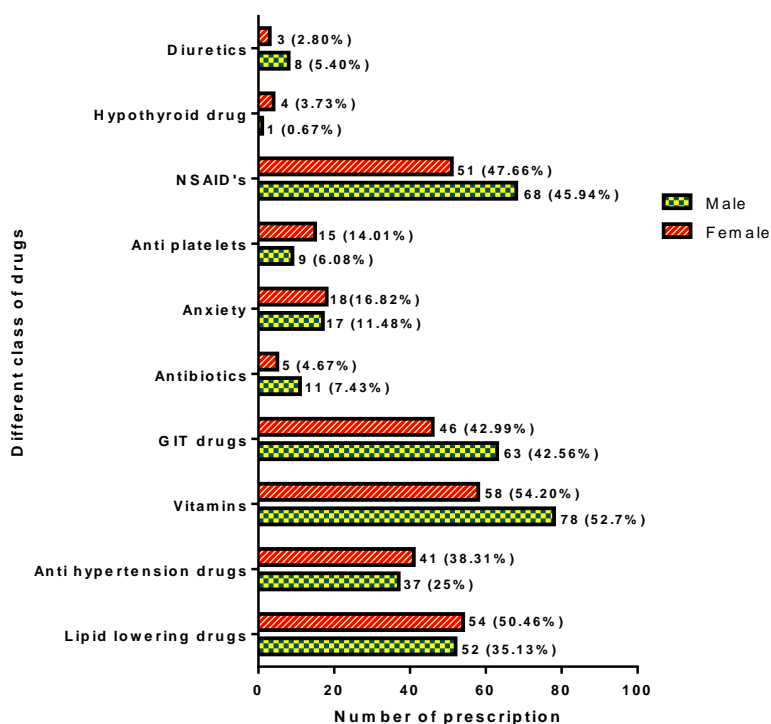


Fig-3: Different class of drugs

The result revealed that, out of 148 male patients who underwent mono therapy for treatment of diabetes mellitus, 22.29% (n= 33) patients were prescribed with Metformin, 10.81 % (n=16) patients were prescribed Glimepride, 9.45% (n=14) of patients were prescribed with Insulin analogue, followed by 5.40% (n=8) patients

were prescribed with Glibenclamide and 1.35% (n=2) patients were prescribed with Pioglitazone. The result revealed that, out of 107 female patients who underwent monotherapy for treatment of diabetes mellitus, 33.64% (n=36) patients were prescribed with Metformin, 9.34 (n=10) patients were prescribed Glimepride, 2.80%

(n=3) of patients were prescribed with Glibenclamide and followed by 1.86% (n=2) patients were prescribed

with Insulin analogue.

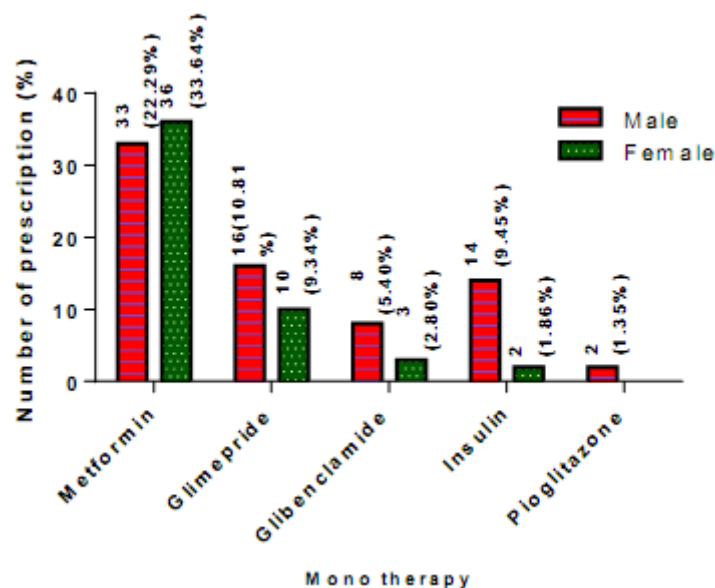


Fig-4: Current therapeutic management for female

Out of 148 male patients (47.94%) in whom two anti diabetic drugs were prescribed, among which 34 (22.97%) patients were prescribed with a combination of Gliclazide + Metformin, followed by 11 (7.43%) of patients were prescribed with Glimipride + Metformin, 8 (5.40%) patients were prescribed with Metformin + Pioglitazone, Glibenclamide + Metformin and Metformin + Insulin both, each 6 (4.05%) patients were prescribed and 1(0.67%) patient were prescribed with Glibenclamide + Pioglitazone. Out of 107 female

patients (45.77%) in whom two anti diabetic drugs were prescribed, among which 21 (19.62%) patients were prescribed with a combination of Glimipride + Metformin, followed by 19 (17.75%) of patients were prescribed with Gliclazide + Metformin, 5 (4.67%) of patients were prescribed with Glibenclamide + Metformin, 3 (2.80%) patients were prescribed with Metformin + Insulin and 1 (0.93%) patient were prescribed with Metformin + Pioglitazone.

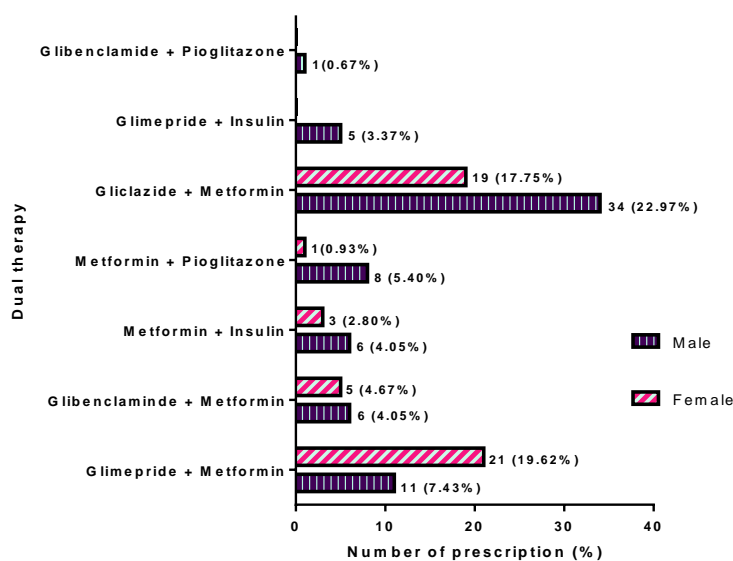


Fig-5: Two drug combination therapy

The result revealed that, out of 4 (2.69%) male patients treated with three anti diabetic drugs, 3 (2.02%)

patients were prescribed with combination of Sulfonylurea + Biguanide + α - Glucosidase (Gliclazide

+ Metformin + Voglibose) and 1 (0.67%) patient were prescribed with combination of Sulfonylurea + Thiazolidinediones + Biguanide (Metformin + Pioglitazone + Glimepiride). Out of 7 (6.52%) female patients treated with three anti diabetic drugs, 3 (2.80%) patients were prescribed with combination of Sulfonylurea + Biguanide + α - Glucosidase (Gliclazide

+ Metformin + Voglibose), followed by 2 (1.86%) patient were prescribed with combination of Sulfonylurea + Thiazolidinediones + Biguanide (Metformin + Pioglitazone + Glimepiride) and 2 (1.86%) patients were prescribed with combination of Biguanide + Sulfonylurea + Insulin analogues (Glimepiride + Metformin + Insulin).

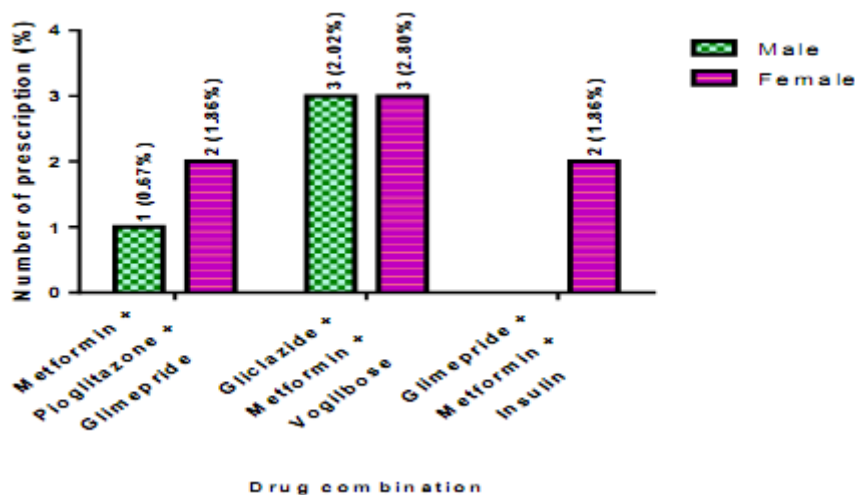


Fig-6: Triple therapy

From the medication profile of the patients it was found that 62 (41.89%) of total medication was prescribed generic name and 86 (58.10%) of patient medication was prescribed with brand name. In female patients 72 (67.28%) of patient medication was prescribed with brand name and 35 (32.71%) of patient

medication was prescribed with generic name. similar study [12] the prescription trend were analyzed, out of 925 drugs prescribed to the type 2 diabetes mellitus inpatients, 787 drugs (85.08%) were prescribed by their brand names.

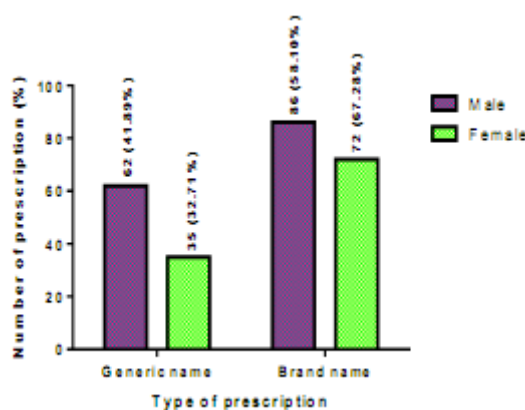


Fig-7: Distribution of drugs in generic name and brand name

CONCLUSION

Present study shows that the majority of diabetes patients were in the age group of 40 -60 years. Resulting in the development of diabetic related complications in most productive years of life, as compared to western studies where mean age is around 60 years, Prescription pattern analysis showed that most of the patients were on combination therapy 51.37% and followed by monotherapy 48.62%, Commonest drugs

used in monotherapy were sulfonylureas, Insulin and metformin. The commonest two drug combinations were sulfonylureas with metformin. There are no overall changes in prescription pattern by the physicians during the three year study period.

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