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Research Article

Analysis Of Potential Drugs Interaction On Antihypertensive Prescribing Patterns : A Retrospective Study

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ABSTRACT

INTRODUCTION

Cardiovascular disease ranks among the leading causes of death. Heart and blood vessel conditions known as cardiovascular diseases include coronary artery disease, rheumatic heart conditions, congenital heart defects, deep vein thrombosis, and pulmonary embolism. Being one of the systematic strategies for evaluating the standard of medical care, prescription audit also provides the documentation to back up diagnosis and treatment.

METHOD

Utilizing the UpToDate® online DDI checker, DDIs in the prescriptions were looked into. For the purpose of DDI identification in clinical settings, the UpToDate® database known as the Lexicomp Interact Module is typically employed.

RESULT

103 prescriptions from the pharmacies were included in this investigation. The majority of the prescribed medications belonged to the type-C group (80), while Type-B, Type-D, and TYPE-X were, respectively, (44), (22) and (04).

CONCLUSION

Type-B, had greatest frequency of drugs-drug interactions with metformin-telmisartan, with 48.64% we declare from this data.

INTRODUCTION

The term "drug-drug interaction" (DDI) refers to the pharmacokinetic or pharmacodynamic effects of two medications on one another that could lead to Reduced efficacy and effectiveness or higher toxicity are not the desirable results. Adverse medication responses caused by DDIs may be so severe as to call for hospitalisation. The potential for medicine combinations in inpatients to interact with one another. The capacity of experts to

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identify probable DDIs is crucial for lowering their risks and negative effects. In order to reduce medication-related issues and enhance pharmaceutical treatment, it will be helpful to measure prevalence and patients at risk for clinically relevant DDIs at the time of the visit. Consider the severity of the DDI and the presence of alternatives when weighing the possible advantages of medication combinations. The risks of a potential DDI may be accepted and treatment prolonged if the benefit of treatment justifies the potential dangers and there are no safer options [1] Most diseases need more than one medicine to be treated, yet polypharmacy involves a significant risk of catastrophic health consequences from DDIs. Risky medication interactions may be more likely when certain conditions are present, such as the use of pharmaceuticals with a low therapeutic index, the severity of underlying illnesses, and patient age (often the elderly).[2] Field specialists advise a step-by-step comprehensive strategy to reducing the risk of CVD, including the following:

a. Analyze people's lifestyles;

b. Determine the primary CVD risk factor; and

c. Raise awareness of this issue among the general public and medical professionals Cardiovascular illnesses take a long time to develop. Effectively addressing modifiable risk factors through pharmacologic medication, lifestyle modifications, and surgery can prevent or postpone CVD. Modifiable risk factors include being overweight, obese, smoking, eating poorly, not exercising enough, and having high cholesterol.[3] Age and concomitant disorders should be taken into account when selecting the best antihypertensive medication from among the numerous classes that are available. Moreover, the kind of antihypertensive medications may have an impact on prescription trends and medication compliance.[7-9] Determining if current medication is rational, supported by evidence, and cost-effective requires evaluating prescription patterns.[10-11]

METHODS

Study Area

The hospitals in the study region were chosen at random from the hospitals in the Dhule District. State of Maharashtra.

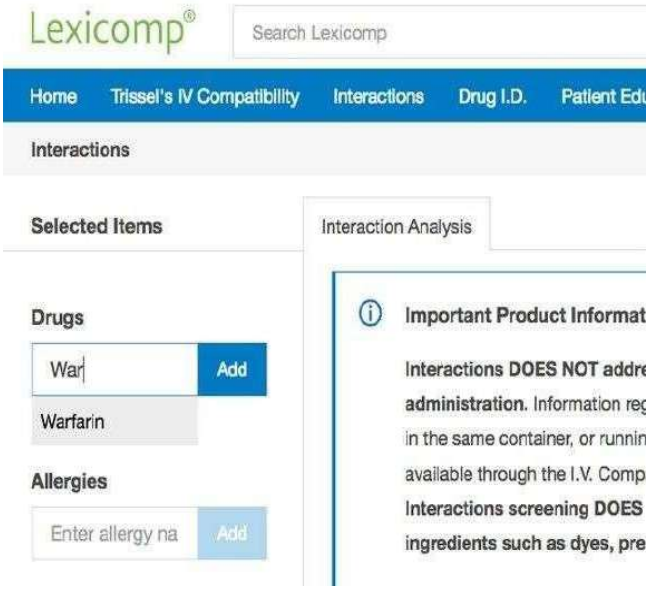
Study design and period

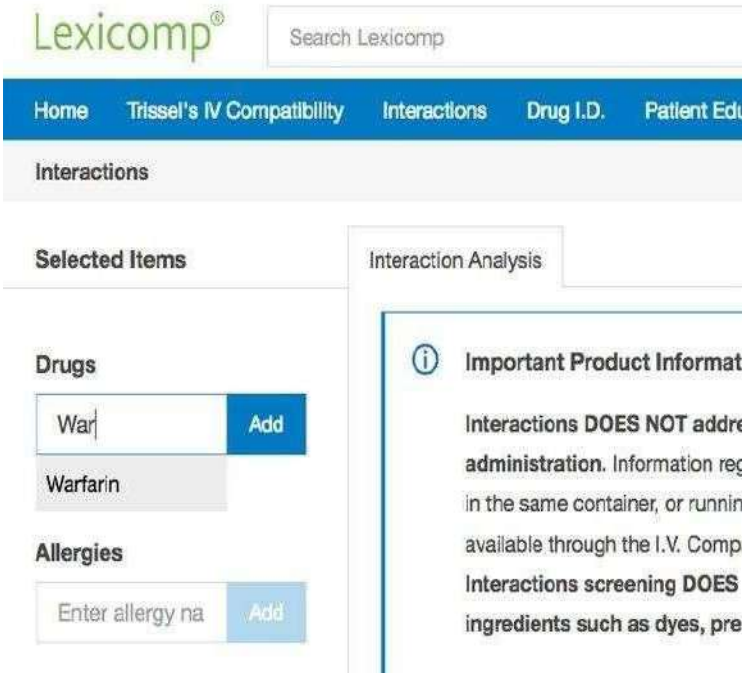
From September 9, 2022, through March 27, 2022, a cross-sectional survey of hospitals was used as the research's design. Cross-sectional methodology was used to conduct a descriptive-analytic study.All of the information used in this investigation was secondary, meaning that prescription records for antihypertensive medications were collected and examined in the past. [4] The information on drug-drug interactions of antihypertensive drugs is gathered through a literature review. We went to the cardiologist in the first place to collect the prescriptions of people who had hypertension. From physicians and the individuals they treat who have hypertension, we gathered 103 prescriptions. All prescribed medications were examined for their effects ondrug-drug interactions.By comparing percentages, the statistical analysis is carried out. The questionnaires were created with the assistance of a pharmacologist to conduct the survey on the drug-drug interactions of antihypertensive drugs. Cardiologists across the board were given these surveys, and their responses are indicated.[5] Prescriptions for antihypertensive drugs that satisfied the inclusion criteria were included in the samples. The inclusion criteria are drug prescriptions for antihypertensive medications that contain two or more medications and the age of patients with hypertension ≥ 18 years. Proportionate stratified random sampling was used for the sampling. The

quantity and types of pharmaceuticals in a prescription, any potential drug interactions, the mechanism of a drug interaction, and the probable level of drug interaction severity were all determined using Lexcicomp analyses of the research samples.[4] Agents that reduce hypertension. Angiotensin receptor blockers (ARB), angiotensin-converting enzyme inhibitors (ACEi), calcium channel blockers (CCB), beta blockers (BB), and thiazide diuretics (including indapamide and chlorthalidone) or other antihypertensive drugs were the five main categories of antihypertensive agents.[7]

Assessment of DDI

Utilizing the UpToDate® online DDI checker, DDIs in the prescriptions were looked into. For the purpose of DDI identification in clinical settings, the UpToDate® database known as the Lexicomp Interact Module is typically employed. The clinical relevance of DDIs is classified in this database according to a system as A, B, C, D, and X. Drug therapy needs to be watched in the event of an interaction in the C category. Drug combinations with category X interactions must be avoided, while treatment modifications are required for category D interactions (Lexicomp ® OnlineTM user guide, 2015).Clinically pertinent DDIs of B, C, D, and X were taken into consideration in the current investigation. Additionally, B, C, D, and X categories that were examined separately were defined as significant DDIs.





Statistical analysis

The use of descriptive statistics was made, including prevalence (percentage) for qualitative variables and mean (SD) for quantitative variables. Comparing the average amount of DDIs across prescribers with various levels of education and specialties. In order to further examine the impact of various factors on getting clinically relevant and significant DDIs, logistic regression was also used.

The list of prescribed drug interactions received from the lexicomp software was chosen and sorted, and then coding was performed to determine the frequency of drug interactions. Conditional formating was used to acquire frequently used drug interaction by amplifying the drug interaction. The material is then transferred to a graphical analysis.

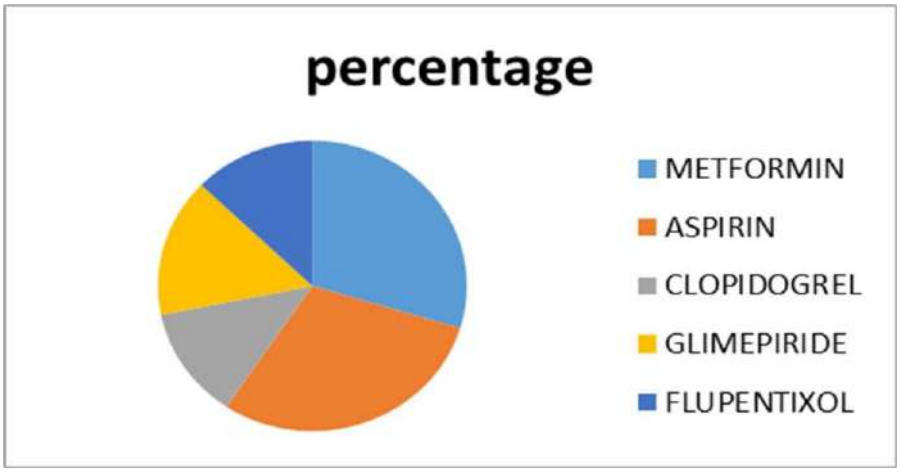
DRUG LIST

Table 1 DRUG LIST

Drug Name	Code	No.	Percentage
ACECLOFENAC	1	12	1.64
CILNIDIPINE	2	7	0.95
ESCITALOPRAM	3	15	2.05
ETIZOLAM	4	3	0.41
DOMPERIDONE	5	13	1.77
PARACETAMOL	6	2	0.27
METFORMIN	7	79	10.8
TELMISARTAN	8	27	3.69
ASPIRIN	9	47	10.8
CALCIUM CARBONATE	10	6	0.82
ATORVASTATIN	11	6	0.82
CLOPIDOGREL	12	33	4.51
GLICLAZIDE	13	23	3.14
AMLODIPINE	14	6	0.82
CINNARIZINE	15	3	0.41
DIMENHYDRINATE	16	3	0.41

NITROGLYCERIN	17	4	0.54
GLIMEPIRIDE	18	41	5.6
ROSUVASTATIN	19	7	0.95
PANTOPRAZOLE	20	3	0.41
ACEBROPHYLLINE	21	4	0.54
CALCIUM 500/D	22	7	0.95
OFLOXACIN	23	4	0.54
RANITIDINE	24	1	0.13
CLONAZEPAM	25	1	0.13
PAROXETINE	26	2	0.27
TERBUTALINE	27	5	0.68
VILDAGLIPTIN	28	8	1.09
LEVOSALBUTAMOL	29	5	0.68
METHYLPREDNISOLONE	30	3	0.41
CIPROFLOXACIN	31	1	0.13
DEFLAZACORT	32	1	0.13
MELITRACEN	33	22	3
ESOMEPRAZOLE	34	3	0.41
FLUPENTIXOL	35	34	4.65
SPIRONOLACTONE	36	9	1.23
TORASEMIDE	37	27	3.69
METOPROLOL	38	22	3
SITAGLIPTIN	39	6	0.82
ATORVASTATINE	40	1	0.13
CLINIDIPINE	41	3	0.41
VITAMIN D3	42	5	0.68
PROPRANOLOL	43	3	0.41
AMITRIPTYLINE	44	19	2.59
TAMSULOSIN	45	3	0.41
ENALAPRIL	46	2	0.27
GLIPIZIDE	47	4	0.54
DIMENHYDRAMINE	48	1	0.13
NIFEDIPINE	49	5	0.68
TENELIGLIPTIN	50	12	1.64
PIOGLITAZONE	51	6	0.82
CHLORTHALIDONE	52	11	1.5
DEXTROMETHORPHAN	53	1	0.13
VENLAFAXINE	54	1	0.13
PHENYLEPHRINE	55	1	0.13
ATENOLOL	56	6	0.82
GEMIFLOXACIN	57	1	0.13
CLONAPAM	58	4	0.54
LEVOCETIRIZINE	59	6	0.82
FRUSEMIDE	60	3	0.41
PRAZOSIN	61	4	0.54
INSULINE ISOPHANE	62	3	0.41
DAPAGLIFLOZIN	63	1	0.13
LEVOSULPIRIDE	64	3	0.41
DOXYCYCLINE	65	5	0.68

RABEPRAZOLE	66	1	0.13
DARIFENACIN	67	3	0.41
PROCHLORPERAZINE	68	2	0.27
ALFACALCIDOL	69	2	0.27
TRIFLUOPERAZINE	70	19	2.59
CHLORDIAZEPOXIDE	71	9	1.23
GABAPENTIN	72	5	0.68
NORTRIPTYLINE	73	11	1.5
PREGABALIN	74	4	0.54
SERTRALINE	75	3	0.41
DIVALPROEX	76	2	0.27
CALCIUM CITRATE	77	2	0.27
BROMOCRIPTINE	78	4	0.54
CEFPODOXIME	79	1	0.13
VOGLIBOSE	80	2	0.27
HYDROCHLOROTHIAZIDE	81	9	1.23
NEBIVOLOL	82	3	0.41
ALPHA LIPOIC ACID	83	3	0.41
CHOLECALCIFEROL	84	1	0.13
DIGOXIN	85	7	0.95
RAMIPRIL	86	9	1.23
LEVOBUPIVACAINE	87	3	0.41
BUDESONIDE	88	1	0.13
NAPROXEN	89	1	0.13
CEFIXIME	90	1	0.13
SODIUM PICOSULFATE	91	1	0.13
ALUMINIUM HYDROXIDE	92	3	0.41
CEFUROXIME	93	2	0.27
MILK OF MAGNESIA	94	4	0.54
Total		731	



RESULT

Baseline Characteristics. During the course of the trial, 103 participants in total began using antihypertensive drugs. Patients who were 44 (45.32%) men and 59 (60.77%) women. All study participants lived in the District Dhule region.

According to the Charlson comorbidity index, more than half of the study's participants had one or more comorbidities. The subjects had a variety of comorbid diseases related to hypertension, including chronic renal disease, diabetes, congestive heart failure, and coronary artery disease. 103 prescriptions from the pharmacies were included in this investigation. The majority of the prescribed medications belonged to the type-C group (80), while Type-B, Type-D, and TYPE-X were, respectively, (44), (22) and (04).

Table 2 DDIof TYPE-C

DDI of TYPE-C	%
Flupentixol (Anticholinergic Agents) – Melitracen [INT] (AnticholinergicAgents)	1.36
Flupentixol (Antipsychotic Agents) – Melitracen [INT] (Agents withSeizure Threshold Lowering Potential)	1.36
Flupentixol (Antipsychotic Agents) – Melitracen [INT] (Serotonergic Agents (High Risk))	1.36
Flupentixol (CNS Depressants) – Melitracen [INT] (CNS Depressants)	1.36
Aspirin (Agents with Antiplatelet Properties) – Clopidogrel (Agents withAntiplatelet Properties) Depends on International labeling	2.39
Spironolactone (Antihypertensive Agents) – Torsemide (INT) (LoopDiuretics)	1.36
Aspirin (Salicylates) – Metformin (Agents with Blood Glucose LoweringEffects) Depends on Dose	2.39
Metformin (Antidiabetic Agents) – Metoprolol (Beta-Blockers (Beta1Selective))	2.39
Amitriptyline (Agents with Seizure Threshold Lowering Potential) –Flupentixol (Antipsychotic Agents)	1.36
Amitriptyline (Anticholinergic Agents) – Flupentixol (AnticholinergicAgents)	1.36
Amitriptyline (CNS Depressants) – Flupentixol (CNS Depressants)	1.36
Amitriptyline (Serotonergic Agents (High Risk)) – Flupentixol(Antipsychotic Agents)	1.36
ChlordiazePOXIDE (CNS Depressants) – Trifluoperazine (CNS Depressants)	1.36
Glimepiride (Hypoglycemia-Associated Agents)– Metformin(Antidiabetic Agents)	4.79
Digoxin (Cardiac Glycosides) – Torasemide (INT) (Loop Diuretics)	1.36
Metformin (Antidiabetic Agents) – Torasemide (INT) (Hyperglycemia-Associated Agents)	1.36

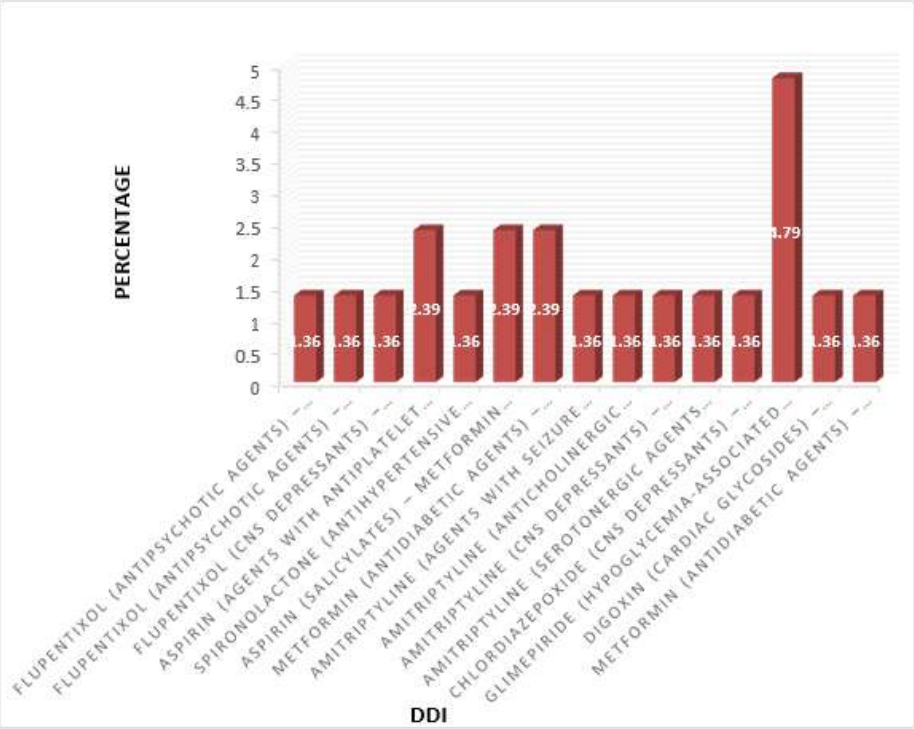


Table 3 Drugs of TYPE-C

Drugs of TYPE-C	Frequency
FLUPENTIXOL	34
ASPIRIN	45
CLOPIDOGREL	31
METFORMIN	67
GLIMEPIRIDE	34

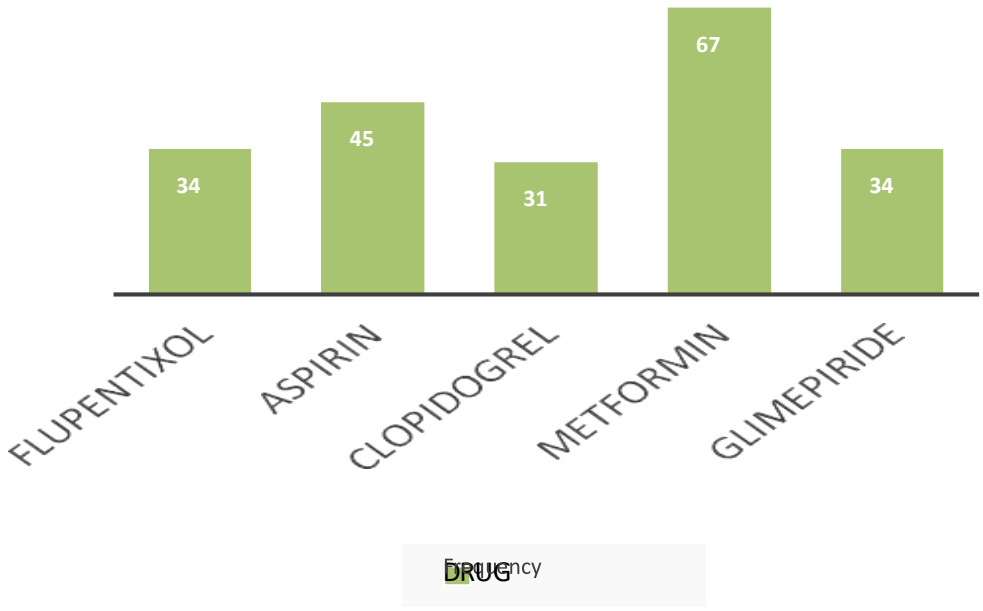


Table 4 DDI of TYPE-B

DDI of TYPE-B	%
Aceclofenac – Cilnidipine	3.84
MetFORMIN – Telmisartan	23.07
Atorvastatin – Clopidogrel	11.53
Rosuvastatin – Telmisartan	11.53
Clopidogrel – RABEprazole	6.41
AmLODIPine – Atorvastatin	3.84
Glimepiride – Ramipril	3.84

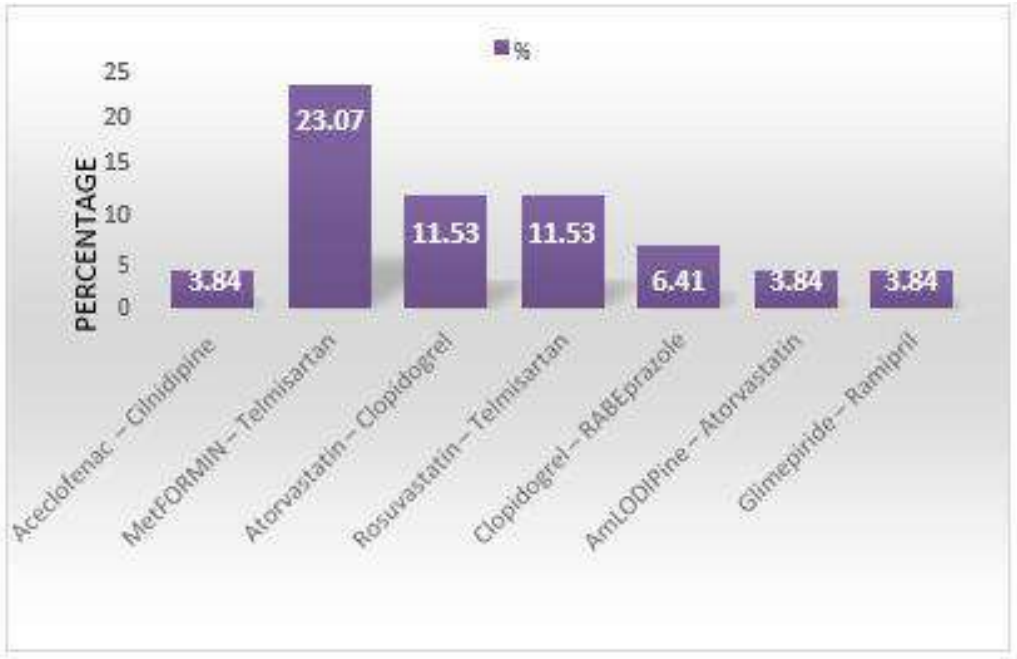


Table 5 Drug of TYPE-B

DRUGS OF type-B	FREQUENCY
Escitalopram	5
Domperidone	4
MetFORMIN	5
Telmisartan	5
Atorvastatin	4

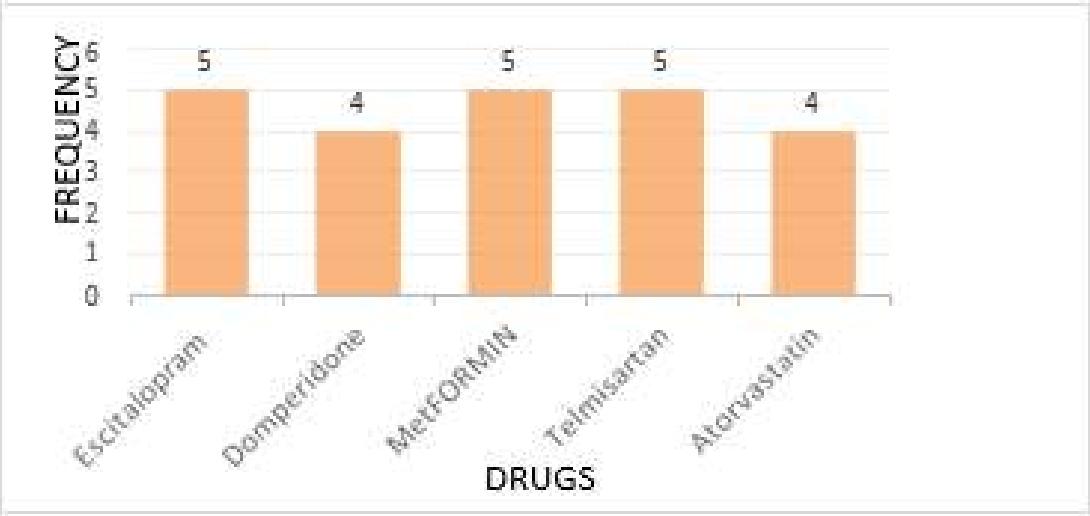


Table 6 DDI of TYPE-D

DDI of TYPE-D	%
Aceclofenac – Escitalopram	8
Gliclazide – Pioglitazone	8
Glimepiride – Teneligliptin	12

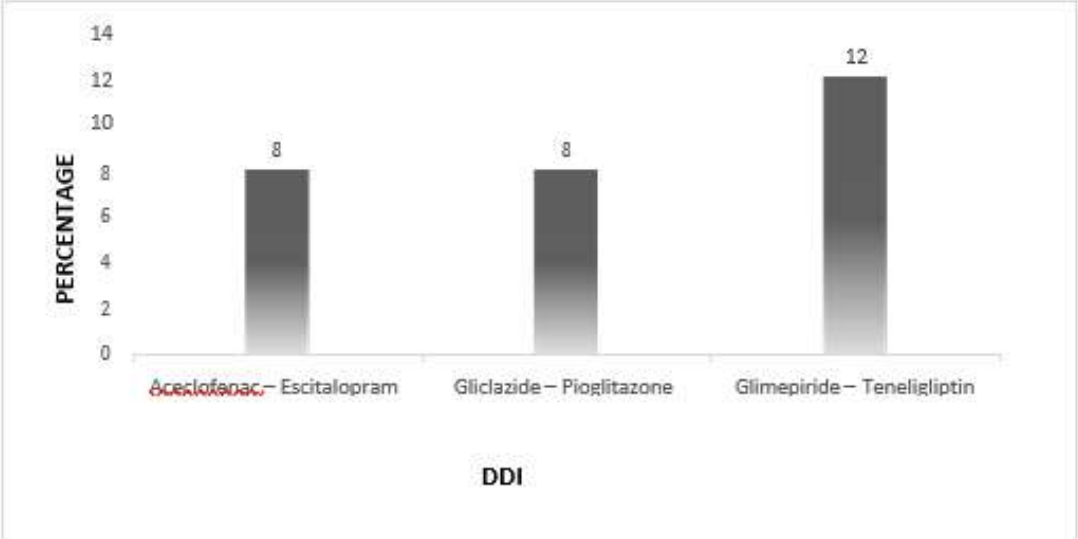


Table 7 Drugs of TYPE-D

DRUGSOF TYPE -D	FREQUENCY
Ofloxacin	3
Gliclazide	3
Glimepiride	3
Vildagliptin	3
Aluminium Hydroxide	3
Doxycycline	3
Milk of Magnesia	4

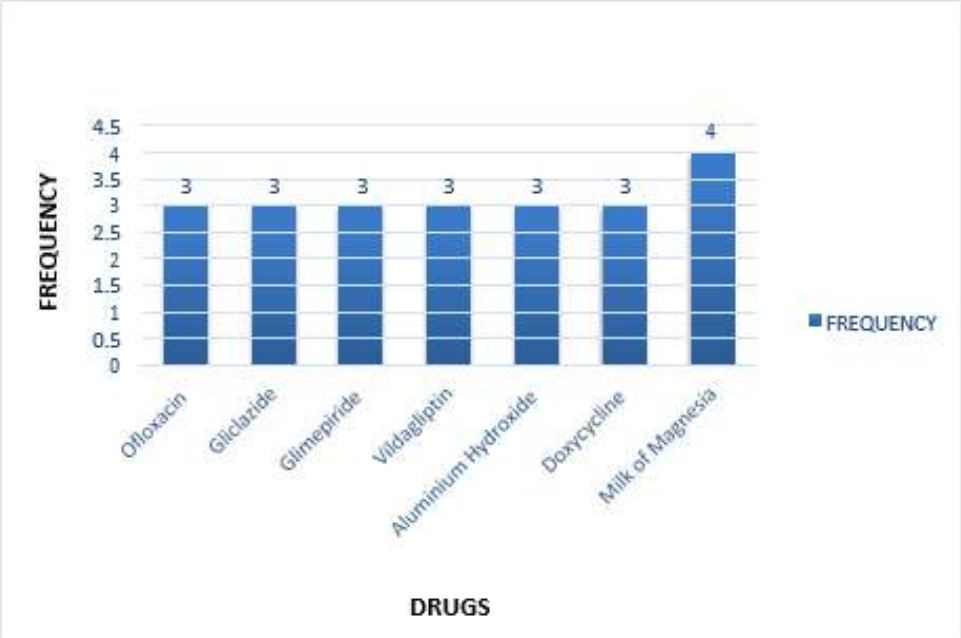


Table 8 DDI of TYPE-X

DDI OF type-X	%
Prazosin (Alpha1-Blockers) – Tamsulosin (Alpha1-Blockers)	33.33
Levosulpiride – Trifluoperazine (Anticholinergic Agents)	66.66

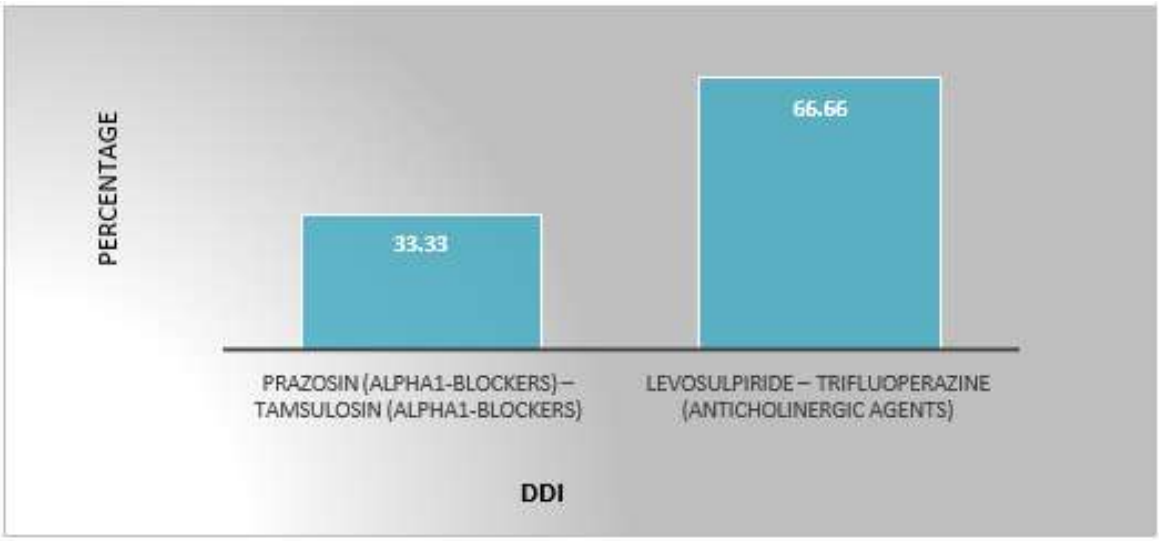


Table 9 Drug of TYPE-X

DRUG OF TYPE-X	FREQUENCY
Prazosin	1
Tamsulosin	1
Levosulpiride	2
Trifluoperazine	2

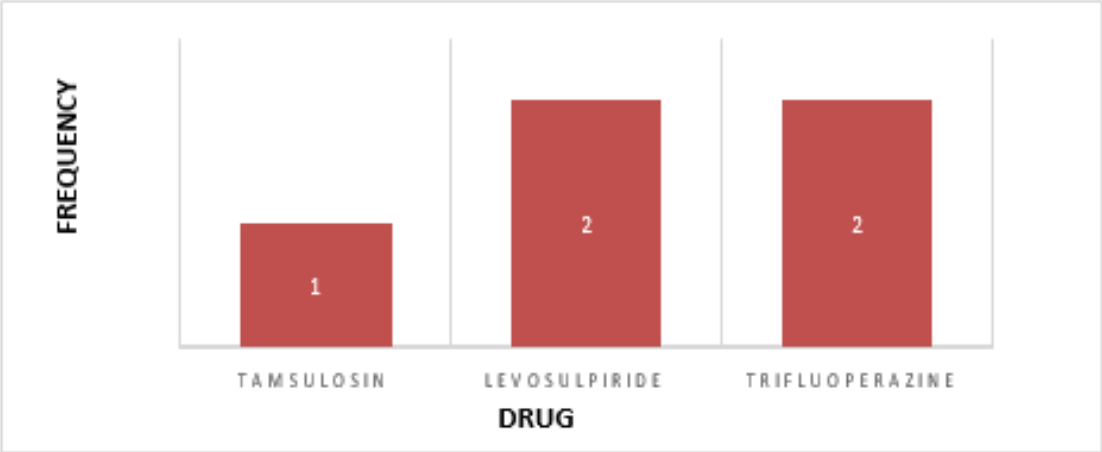
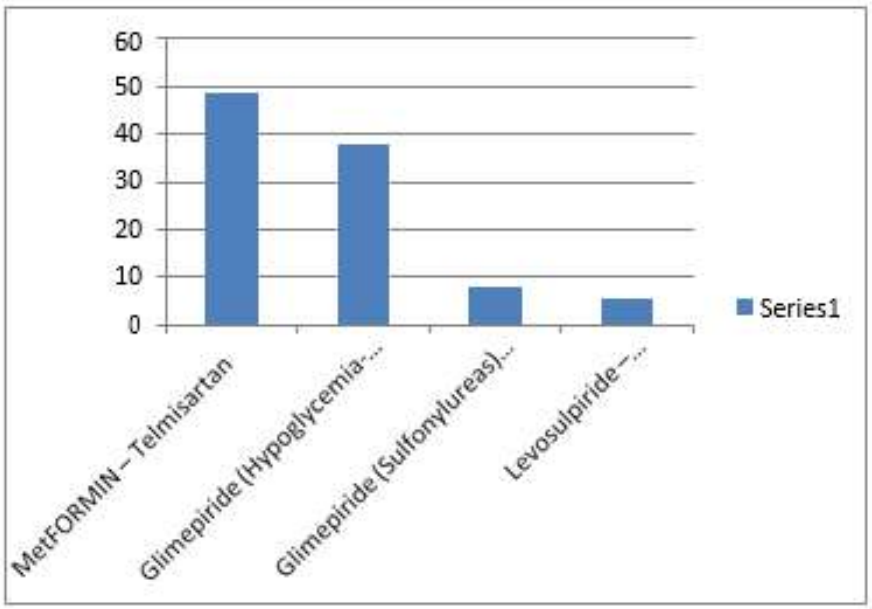


Table 10COMPARISON OF TYPES OF DDI

Types	Ddi	%
B	Metformin – Telmisartan	48.64
C	Glimepiride (Hypoglycemia-Associated Agents) – Metformin (Antidiabetic Agents)	37.83
D	Glimepiride (Sulfonylureas) – Teneligliptin (Dipeptidyl Peptidase-Iv Inhibitors)	8.1
X	Levosulpiride – Trifluoperazine (Anticholinergic Agents)	5.4



CONCLUTION

103 individuals with hypertension who were taking medications had possible drug interactions. The majority of interaction instances were caused by the combination of metformin and telmisartan, with 48.64% of cases coming from type type-B, 37.83% from type type-C, 8.1% from type type-D, and 5.4% from type type-X. Type-B had greatest frequency of drugs-drug interactions with metformin- telmisartan, we declare from this data.

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