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COMPARATIVE EFFICACY OF ORAL HYPOGLYCEMIC AGENTS – METFORMIN AND GLIMEPERIDE WITH METFORMIN AND SITAGLIPTIN

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ABSTRACT

Background: Recently several patients are suffering from Type 2 diabetes mellitus and they are using oral hypoglycaemic but the evidences about which combination is efficacious are very light. **Objectives:** To check the clinical efficacy of Metformin Glimeperide and Metformin Sitagliptin. To compare the pharmacological effects of the both drugs in Type-2 Diabetes Mellitus. To compare combinations of Metformin Glimeperide with that of Metformin Sitagliptin in patients with Type-2 Diabetes Mellitus. **Methodology:** The Data were collected which includes all demographic details. After that we are dividing the data into two groups i.e., patients using Metformin and Glimeperide patients using Metformin and Sitagliptin. We compare the efficacy of both drugs with the help of their clinical outcomes. **Results:** The baseline clinical parameters of Metformin and Sitagliptin i.e. FBS values at first visit was found to be 154.02±60.401 and P value is 0.0011 and Metformin and Glimeperide FBS values at first visit was 187.12±34.123 and P value found to be >0.10 which shows very significance. **Conclusion:** Our results show that there is significal difference in between both the clinical and economical outcomes between two study groups such as Metformin and Sitagliptin, Metformin and Glimeperide.

INTRODUCTION

Diabetes mellitus (DM) is a severe medical and social problem that affects patient's general well being[1]. Despite of the advances in understanding the disease and its management, the morbidity and mortality rate are in rise[2]. Poverty, non-compliance, lack of knowledge and poor follow ups are the factors observed in poor glycaemic control[3]. Individuals with poor management of diabetes are at a greater risk of developing long term micro and macro vascular complications that lead to the damage of end organs such as kidney, heart, brain and eyes, affects the direct and indirect health care costs and overall quality of life[4]. In the last three decades role of pharmacist has changed dramatically.

Presently, the pharmacists are becoming more patient oriented than product oriented. Pharmacist is now becoming indispensable in monitoring patient drug therapy[5]. Patient counseling by pharmacist deals with providing information to the patients regarding the disease, medications and lifestyle modifications[6]. It has been shown to improve therapeutic outcomes. The clinical pharmacy grew with the concept of pharmaceutical care, the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patients' quality of life[7-9]. It involves the pharmacist's decision to avoid, initiate, maintain, or discontinue drug therapy, both of prescription and non- prescription

drugs[10]. It is thus practiced in collaboration with patients, physicians, nurses, and other health care workers. The ultimate goal of pharmaceutical care is to optimize a patient's quality of life. Pharmacists are in a prime position to ensure that use of medications by the patients safely and appropriately[11].These outcomes can be achieved by influencing the cure of the disease, elimination or reduction of symptoms, arresting or slowing the disease progress, prevention and diagnosis of disease or desired alterations in the physiological process. Because of the rapid expansion of available therapeutic agents to treat diabetes, the pharmacist's role in caring for diabetic patients has expanded. The pharmacist can educate the patients about the proper use of medication, screening for drug interactions, explain monitoring devices, and make recommendations for ancillary products and services[12]. Over time high blood sugar can seriously compromise every major organ system in the body causing heart attacks, strokes, nerve damage, kidney failure, blindness, impotence and infections that can lead to amputation[13].In this present study we want to assess the efficacy of metformin when compared with the combination therapy of metformin and glimiperide, the mostly prescribing drugs for diabetes mellitus in present scenario.

METHODOLOGY:

Aim: To compare the clinical outcomes of Metformin, Glimeperide and Metformin, Sitagliptin.

Objectives: To check the clinical efficacy ofMetformin Glimeperide and Metformin Sitagliptin. To compare the pharmacological effects of the both drugs in Type-2 Diabetes Mellitus. To compare combinations of Metformin Glimeperide with that of Metformin Sitagliptin in patients with Type-2 Diabetes Mellitus.

Study design: Prospective cross-sectional study.

Study centre: The study was conducted by Department of Pharmacy Practice, Balaji College of Pharmacy, Ananthapuramu, Andhra Pradesh at Government General Hospital, Ananthapuramu.

Study Period: The study conducted over the period of Six Months from July 2019-December 2019.

Data collection: The Data were collected which includes all demographic details. After that we are dividing the data into two groups i.e., patients using Metformin and Glimeperide patients using Metformin and Sitagliptin. We compare the efficacy of both drugs with the help of their clinical outcomes. The above mentioned data were collected and saved in Microsoft Excel and later Statistical data will be calculated by using GRAPH PAD INSTAT P Version 3.01 software

RESULTS

Total 100 patients with Type-2 Diabetes Miletus were included in the study with the mean age of52.55years.The male ratio was found to be 59% and female ratio was found to be 41%.Thebaseline demographic details like age, gender, educational and occupational history weredetailed in Table.1 where as age groups between 30-50 and 50-70 were found more in numbers i.e., 37% and 43% respectively.Males were found to be more in number when compared to that counterpart group.Illiterates were more number in our study where as there is no much difference between primary intermediate and degree groups with percentage of 21%,23%,19% respectively.Daily labours and farmers were more in number where as house wives also plays the key role in our study .The details were listed in table 1. The baseline values of FBS values in Metformin and Sitagliptin were found to be 154.02±60.41, Where as Metformin and Glimeperide was found to be 187.12±34.123 were incomparable in both the groups at first visit. The baseline clinical parameters of Metformin and Sitagliptin i.e. FBS values at first visit was found to be 154.02±60.401 and *P* value is 0.0011 and Metformin and Glimeperide FBS values at first visit was 187.12±34.123 and *P* value found to be >0.10 which shows very significance. These detailed are listed in Table 2.

Table 1: Baseline Demographic details

S.No	Parameter	Number of Subjects
1.	Age Group(in years)	
	30-50	37(37%)
	50-70	43(43%)
	70-90	8(8%)
	>90	10(10%)
2	Gender	
	Male	39(39%)
	Female	61(61%)
3	Education	
	Illiterate	37(37%)
	Primary	21(21%)
	Inter	23(23%)
	Degree	19(19%)
4	Occupation	
	Daily Labour	25(25%)
	Farmer	23(23%)
	Employed Business	15(15%)
	House Wife	37(37%)

Table: 2 VISIT 1 FBS VALUES

DRUGS	CLINICAL PARAMETERS	P VALUE
Metformin+Sitagliptin	154.02±60.401	0.0011
Metformin+Glimeperide	187.12±34.123	>0.10

***P value shows very significant**

Table: 2.1: VISIT 1 PPBS VALUES

DRUGS	CLINICAL PARAMETERS	P VALUE
Metformin+Sitagliptin	220.58±69.053	0.1143
Metformin+Glimeperide	238.52±39.628	>0.10

**P value* shows not significant.

TABLE: 2.2: VISIT 2 FBS VALUES

DRUGS	CLINICAL PARAMETERS	P VALUE
Metformin+Sitagliptin	142.9±56.328	0.0014
Metformin+Glimeperide	173.58±34.153	>0.10

***P value shows significance.**

Comparitive Efficacy Of Metformin And Sitagliptin And Metformin Glimeperide Of First Visit Clinical Parameteres (FBS AND PPBS).

Figure 1: Graphical representation of comparative efficacy of fbs and ppbs values at first visit:

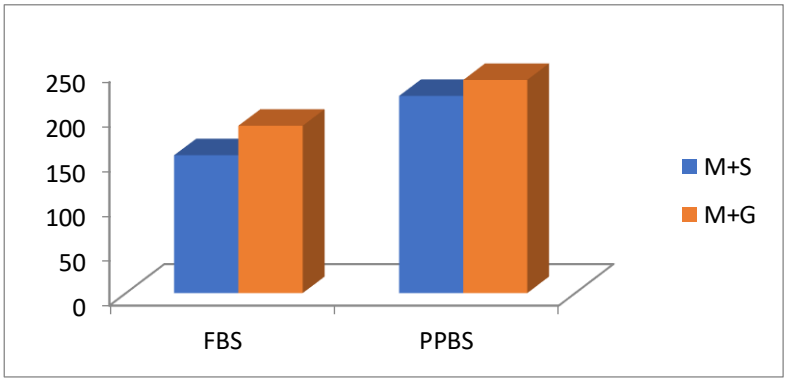


TABLE: 2.3: VISIT 2 PPBS VALUES

DRUGS	CLINICAL PARAMETERS	P VALUE
Metformin+Sitagliptin	205.32±68.171	0.1607
Metformin+Glimeperide	220.94±38.182	>0.10

***P value shows not significant.**

TABLE: 2.4: VISIT 3 FBS VALUES

DRUGS	CLINICAL PARAMETERS	P VALUE
Metformin+Sitagliptin	141.18±52.636	0.0266
Metformin+Glimeperide	161.26±34.708	0.0153

***P value shows significance**

Figure 2: Graphical representation of comparitive effecacy of fbs and ppbs values at second visit

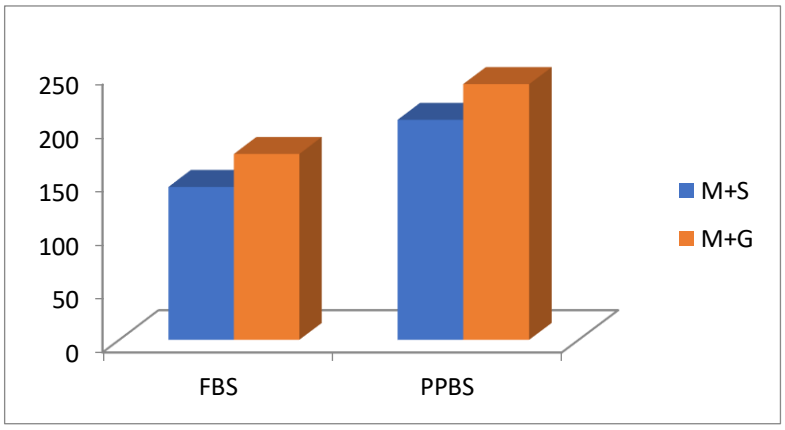
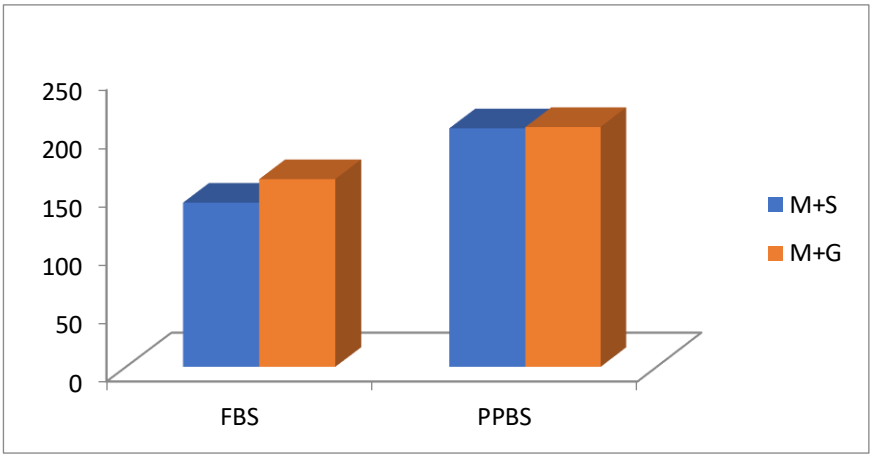


Table: 2.5: Visit 3 Ppbs Values

DRUGS	CLINICAL PARAMETERS	P VALUE
Metformin+Sitagliptin	204.74±69.992	0.9220
Metformin+Glimeperide	205.88±43.035	>0.10

***P values shows not significance**

Figure 3: Graphical Representation of Comparitive Effecacy of Fbs and PPBS Values At Third Visit



The baseline characteristics of Metformin and Sitagliptin PPBS values at first visit found to be 220.58±69.053 and *P value* 0.1143 and Metformin and Glimeperide PPBS values at first visit found to be 238.52±39.628 and *P values*>0.10 and *P value* shows not significant these details were listed in Table 2.1. The baseline characteristics of Metformin Sitagliptin FBS values at second visit found to be 142.9±56.328 and *P values* 0.0014 and FBS values of Metformin and Glimeperide at second visit shows 173.58±34.153 and *Pvalues*>0.10 *P value* shows significancethese details listed in Table 2.2

PPBS values at second visit were found to be 205.32±68.171. and *P value* 0.1607 and Metformin and Glimeperide PPBS values at second visit found to be 220.94±38.182 and *P value*>0.10 and *P value* shows not significant these details listed in Table 2.3. The baseline characteristics Metformin and Sitagliptin FBS values at Third visit found to be 141.18±52.636 and *P value* 0.0266 and Metformin and Glimeperide FBS values at third visit found to be 161.26±34.708 and *P value* 0.0153 and *P value* shows significance these details were listed in Table 2.4. Metformin and Sitagliptin PPBS values at third visit found to be 204.74±69.992 and *P value* 0.9220 and Metformin and Glimeperide PPBS at third visit found to be 205.88±43.035 *and P value* >0.01 and *P value* shows not significant, these details were listed in Table2.5.

DISCUSSION

Management of Type 2 Diabetes mellitus has changed dramatically with the introduction of newer antidiabetic agents including dipeptidyl peptidase-4 inhibitors(DPP4i), sodium-glucose co-transporter 2 inhibitors, glucagon-like peptide-1 (GLP-1) analogs, and insulin analogs. DPP4i are a well-established class of oral agents having moderate efficacy with a good overall safety profile including low risk of hypoglycemia and weight neutrality[14]. However, sulfonylureas have been a part of the therapeutic armamentarium for T2DM since 1950 and are one of the most potent oral antidiabetic agents[15]. Due to good efficacy, safety, and cost-effectiveness, sulfonylureas, especially modern ones like glimepiride, are the most preferred first add-on to metformin in Indian clinical settings[16].Due to its extra pancreatic activity, glimepiride reduces insulin resistance and improves glucose utilization through glucose transporter 4[17].These results are consistent with prior studies comparing glimepiride and sitagliptin or other DPP4i as add on to metformin. In a study by Srivastava et al[18]. A study comparing different classes of oral anti diabetic agents (sulfonylurea, thiazolidinedione or DPP4i) as second line therapies to metformin monotherapy among ~20,000 patients revealed that in routine clinical practice, adding a DPP4i to metformin resulted in an increased, earlier requirement for treatment intensification as compared to a sulfonylurea or a thiazolidinedione over 5 years. Moreover, the addition of sulfonylurea resulted in 0.3%–0.5% greater reduction in HbA1c with a slight reduction in body weight of 0.2 kg from baseline. The weight reduction seen with sulfonylurea was attributed to therapeutic patient education, lifestyle changes, and using it in combination with metformin[19]. Similar findings were seen in a 104 weeks study wherein glimepiride resulted in a mean HbA1c reduction of 0.36% versus sitagliptin which resulted in a mean HbA1c reduction of 0.16% as add on to metformin[20]. Illiterates were more number in our study where as there is no much difference between primary intermediate and degree groups with percentage of 21%,23%,19% respectively. The baseline values of FBS values in Metformin and Sitagliptin were found to be 154.02±60.41, whereas Metformin and Glimeperide was found to be 187.12±34.123 were incomparable in both the groups at first visit. This study demonstrates Metformin with Sitagliptin is more efficacious when compared with Metformin with Glimeperide. But in third visit PPBS levels there is no significant difference between those two combinations. But in FBS there was a significant improvement in patients with Metformin with Sitagliptin.

CONCLUSION:

Our results show that there is significal difference in between both the clinical and economical outcomes between two study groups such as Metformin and Sitagliptin, Metformin and Glimeperide.The addition of Sitagliptin to Metformin monotheraphy, regimens in patients with inadequate Glycemic control is a good therapeutic option for achieving efficacy in patients with Type-2 Diabetes Miletus.To conclude that, all the patients showed improvement in Glycemic parameters such as FBS, PPBS, RBS, during the study period. Thecomparison showed better Glycemic control in patients receiving a combination o Sitagliptin and Metformin PPBS and it was insignificant for FBS and PPBS.

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Conflict of interest: The authors declare no conflict of interest.

Abbreviations: FBS: Fasting blood sugar, PPBS: Post Prandial blood sugar, HbA1c-Glycosylated Haemoglobin, GLP-1: glucagon-like peptide-1, DPP4i: dipeptidyl peptidase-4 inhibitors

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