

**GLYCEMIC CONTROL IN DIABETES TYPE 2 PATIENTS BY METFORMIN AND OTHER SULFONYLUREAS**Sombel Mazhar<sup>1\*</sup>, Roma Ehsan<sup>2</sup> and Mariam Zaka<sup>3</sup><sup>1,2,3</sup>Institute of Pharmacy, Lahore College for Women University Lahore, Pakistan.**\*Corresponding Author: Sombel Mazhar**

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**ABSTRACT**

**Background:** Diabetes mellitus (DM) is a prevalent disorder worldwide, characterized by elevated serum glucose levels and a constellation of symptoms including polydipsia, polyuria and fluctuations in weight. The mainstay of treatment for DM depends greatly on the A1C levels. A1C levels measure the average blood glucose level over the past two to three months. In order to prevent progression of DM patients are treated with lifestyle modifications and a combination of pharmacological agents to achieve long term glycemic control. One such combination includes Metformin and an oral antihyperglycemic agent such as Sulfonylureas. This combination of medications will be the focus of this study on patients with Type 2 Diabetes (T2DM). **Objective:** The objective of this study is to evaluate the effectiveness of a combination of sulfonylurea and metformin on glycemic control in patients with Type 2 Diabetes Mellitus. **Methods:** A cross-sectional study design was adopted using a convenient sampling technique during a one month period from June to August, 2017. A sample size of 100 patients was studied and data was collected from two major hospitals in Lahore, Pakistan. A data collection form was designed and was filled during face to face interviews with the patients, and physicians. Data was presented as a percentage. **Results:** The study showed that 80% of the patients were prescribed metformin, 20% sulfonylureas. 90% patients have performed their HbA1c. **Conclusion:** Type II diabetes is a common disease prevailing throughout the world. Type II diabetes is also associated with several other metabolic abnormalities. The main pathologic defects in diabetes consist of excessive hepatic glucose production, peripheral insulin resistance and defective beta-cell secretory function. Metformin improves glycemic control by reducing hepatic glucose production, increasing insulin sensitivity, and reducing intestinal glucose absorption, without increasing insulin secretion. Sulfonylureas prefer for metabolic abnormalities by reducing hypoglycemia.

**KEYWORDS:** Type 2 Diabetes Mellitus, treatment, Oral antibiotic agents, Older people.**INTRODUCTION**

Type 2 Diabetes Mellitus (T2DM) is one of the most prevalent illnesses worldwide. T2DM is a progressive disease marked primarily by insulin resistance along with inappropriate glucagon release and eventually a decrease in pancreatic beta cell function in secreting insulin in response to elevated blood glucose levels.<sup>[1]</sup> One of the main functions of insulin is to regulate blood sugar levels by binding to it and making it available to be absorbed by cells in our body to be further used as a source of energy.<sup>[2]</sup> Consequently, as the body's cells lose the ability to recognize insulin, glucose is not absorbed thus, leading to elevated serum glucose levels. Common risk factors associated with T2DM include obesity, family history of diabetes, age, ethnicity, sedentary lifestyle and hypertension. T2DM is a progressive disease with a multisystem sequelae affecting the cardiovascular system, renal system and even the peripheral nervous system.<sup>[3,4]</sup> Lifestyle modifications and appropriate glycemic control with antihyperglycemic agents has proven to prevent these complications. Metformin is the

first-line drug for many patients with T2DM. It decreases fasting glucose level and HbA1c. It activates the mucosal AMP protein kinase level that maintain intestinal integrity which along with activation of liver AMP decrease lipopolysaccharide in intestine and liver allow metformin to inhibit gluconeogenesis in blood circulation.<sup>[5,6]</sup> It works by affecting liver cAMP level, mitochondrial electron transport chain and NADH. On the other hand Sulfonylureas is a classic first or second line agent for the treatment of T2DM.<sup>[7]</sup> Sulfonylureas increase insulin secretion, which is regulated by ATPsensitive potassium channels of pancreatic beta cells. Although the receptor's binding site is different for sulfonylureas it induces channel closure and cell depolarization leading to an increase in cytoplasmic calcium level and consequently insulin secretion which reduces glucose level.<sup>[8,9]</sup>

**MATERIALS AND METHODS**

A cross-sectional study design was adopted using convenient sampling technique, during the period June-

2017 to August-2017. 100 sample sizes were taken and study carried out in two major hospitals of Lahore Pakistan were Ganga Ram and Services Hospital.

**Inclusion and Exclusion Criteria**

Patients age 20-60 years, Male/Female having Diabetes Mellitus being treated by Metformin and Sulfonylureas were included and patients with Retinopathy, Nephropathy and Cognitive impairment were excluded from this research study.

**Ethical Considerations**

The study was conducted after obtaining ethical approval from the Institute of Pharmacy of Lahore College for Women University. The institute provided ethical approval after assessing informed verbal consent submitted with all components of the research protocol. The verbal consent of questionnaire was asked before data filling. The participants for the study were asked whether they were willing or unwilling after hearing about the consent of the study and this was confirmed by their response shown as yes or no. Data collection was carried out after the confirmation of the willingness of the participant. The data was recorded anonymously in order to ensure confidentiality and privacy of the participant.

**RESULT**

Table-1 shows about number of people performing physical exercise, Table-2 shows about medications mostly recommended to type 2 Diabetic patient, Table-3 shows about Insulin injection either patient use Insulin or not and Table-4 shows about HbA<sub>1c</sub> Test.

Figure-1 depicts that 64% patients doing physical exercise daily to overcome their diabetic issue whereas 36% of patients do not perform physical activity. Figure-2 depicts prescribing ration between Metformin and sulfonylureas 80% patients were given Metformin and 20% were provided with Sulfonylureas. Figure-3 depicts the use of insulin by patients. Figure-4 depicts HbA<sub>1c</sub> test that is performed to check type 2 Diabetes.

**Table # 1: Physical Exercise.**

Yes	64%
No	36%

**Table # 2: Mostly use Diabetic Pills.**

Metformin	80%
Sulfonylureas	20%

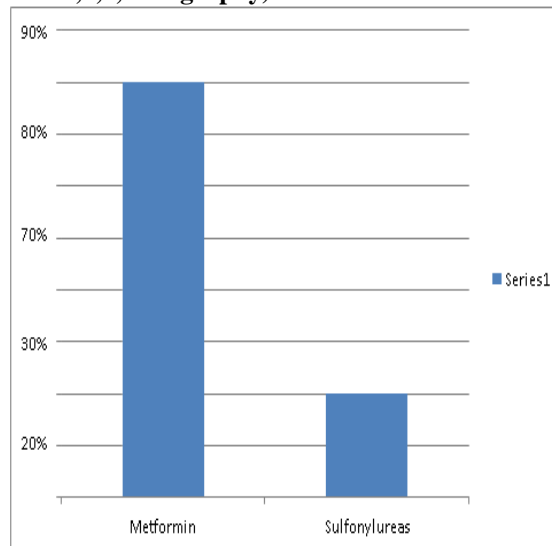
**Table # 3: Use Insulin Injection.**

Yes	20%
No	80%

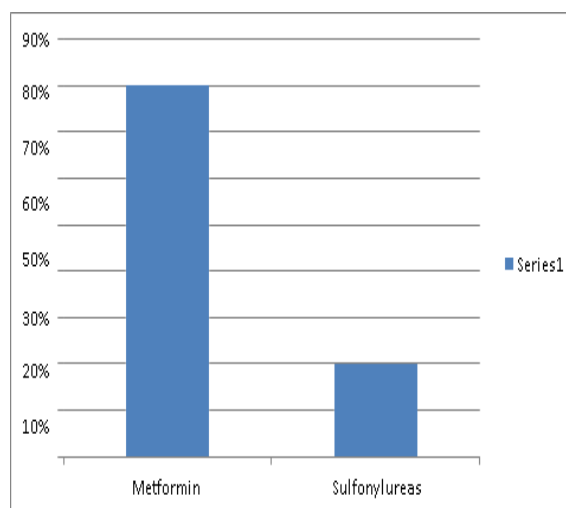
**Table # 4: HbA<sub>1c</sub> Test.**

Yes	90%
No	10%

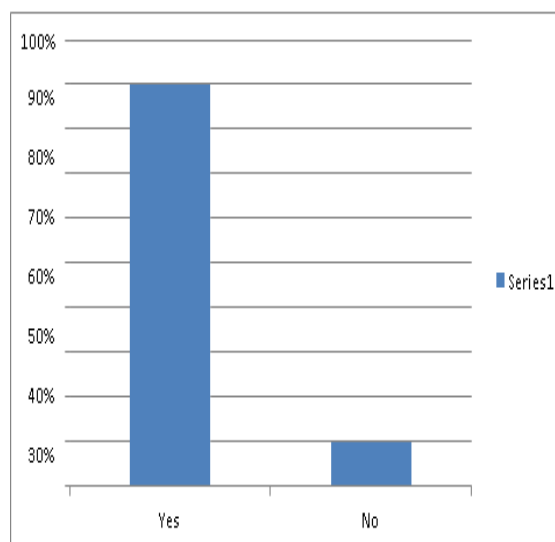
**(Table 1,2,3,4 Biography)**



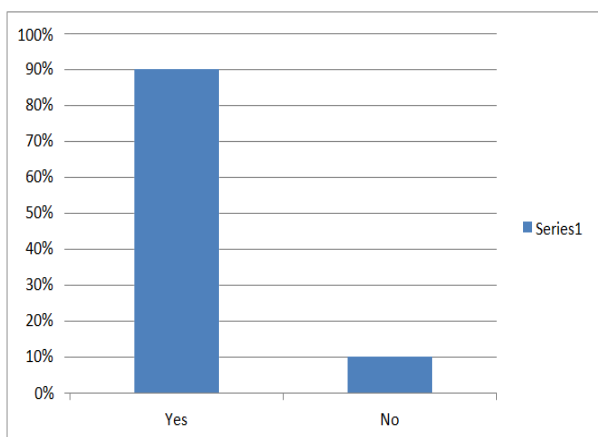
**Figure 1: Physical Exercise.**



**Figure 2: Mostly use Diabetic Pills.**



**Figure 3: Use Insulin Injection.**



**Figure 4: HbA<sub>1c</sub> Test.**

## DISCUSSION

Type II diabetes is a common disorder whose prevalence is increasing in the United States and throughout the world. Type II diabetes is also associated with several other metabolic abnormalities such as central obesity, hypertension and dyslipidemia, which contributes to the very high rate of cardiovascular morbidity and mortality.<sup>[10]</sup> The main pathologic defects in diabetes consist of excessive hepatic glucose production, peripheral insulin resistance and defective beta-cell secretory function. The diabetes symptoms includes frequent urination, thirst, hunger, extreme fatigue, blurry vision, cut/bruises heal slowly, weight loss and tingling and pain in hands/feet.<sup>[11,12,13]</sup>

During survey of general population in Diabetic Management Centre of Services Hospital and Sir Ganga Ram Hospital, Lahore we found that: 40% men population were having diabetes and 60% females are involved. Out of 100 patients 64% have time for physical exercise, 58% patients have diabetes as genetic disease as it run in their family and out of 50.36% have diabetes due to other symptoms like increase urination, stress and life style. 80% patients were given Metformin and only 20% patients used sulfonylureas. In severe condition out of 50 sample size 20% patients used insulin. Among 50, HbA<sub>1c</sub> Test was ordered to 90% patients.

Remarks of many patients were satisfactory they have maintained their Glycemic level very well by physical exercise, metformin and sulfonylurea as. They were ordered to have HbA<sub>1c</sub> Test, monitor their glucose level frequently.

## CONCLUSION

Lifestyle modification and Metformin are the initial therapy for the type 2 Diabetic patients. Metformin is always a first line agent other insulin analogues always be a second line agents. Use of Metformin and sulfonylureas will depend on degree of hyperglycemia, presence of co-morbidities and patient preference. It appears that in near future other agents have been developed that improves the quality of T2DM.

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