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## POLYPHARMACY AND MEDICATION COMPLIANCE IN PATIENTS WITH TYPE 2 DIABETES

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**ABSTRACT:** Polypharmacy may affect patient’s QOL. Polypharmacy has been shown to result in Unnecessary and/or inappropriate medication prescribing, increased risk for drug interactions and ADRs, Non adherence, and increased overall drug expenditures. That’s how poly pharmacy affects patient compliance. A retrospective study was conducted about the polypharmacy and medication compliance in patient with type 2 diabetes in various teaching hospitals of Lahore. 19% of patients were prescribed at least one diabetes related medicine and 81% was prescribed more than one diabetes related medicines. 100 patients surveyed were taking a  $\sum$  of 4 medicines per patient to control diabetes and related comorbidities for a total of 378 medicines. Despite the complexity of medical regimens, patients reported high level of compliance for each diabetes related medicine 92% of the prescribed doses were taken with the 6% of missing doses. It was concluded that despite the complexity of medical regimens, patients reported high level of compliance for each diabetes related medicine. Patient’s perception of the immediate and future benefit of prescribed medication had a significant impact on their compliance. Moreover Attitudes and beliefs about medications play a large role in compliance.

**INTRODUCTION:** Polypharmacy is “the prescription, administration, or use of more medications than are clinically indicated. “Inappropriate drug combinations, unnecessary medications, and inappropriate drugs for specific patients constitute the problems of polypharmacy. Thus, patients receiving only two medications could have polypharmacy.<sup>1</sup> Compliance describes the degree to which a patient correctly follows medical advice. Diabetes is a group of metabolic disorders characterized by hyperglycemia.

The burden of taking multiple medications has been associated with greater health care costs and an increased risk of adverse drug events drug-interactions, medication non-compliance, reduced functional capacity and multiple geriatric syndromes.<sup>2</sup> An alternative definition for polypharmacy is the use of more medications than are medically necessary.<sup>3</sup> For this definition, medications that are not indicated, not effective, or constitute a therapeutic duplication would be considered polypharmacy.<sup>4</sup>

Patients presenting with type 2 diabetes mellitus are initially encouraged to maintain a healthy diet and exercise regimen, followed by early medication that generally includes one or more oral hypoglycemic agents and later may include an injectable treatment. To prevent the complications associated with type 2 diabetes, therapy frequently also includes medications for control of blood

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pressure, dyslipidemia and other disorders, since patients often have more than three or four chronic conditions.<sup>5</sup> Unfortunately, there are many negative consequences associated with polypharmacy. Specifically, the burden of taking multiple medications has been associated with greater health care costs and an increased risk of adverse drug events drug-interactions, medication non-compliance, reduced functional capacity and multiple geriatric syndromes.<sup>6</sup> The majority of patients with type 2 diabetes fail to control glycemia with diet and exercise and require pharmacotherapy—in general, initially monotherapy with an oral hypoglycemic agents (OHA); however, owing to the progressive nature of the disease, most of the patients will eventually require combination therapy and ultimately injectable treatments as monotherapy or part of polytherapy. Glycemic control in type 2 diabetes is essential to prevent long-term micro- and macrovascular complications.<sup>7</sup>

Guidelines from the ADA and the European Association for the Study of Diabetes (EASD) stress the importance of diet and exercise in the treatment of all stages of type 2 diabetes. The main reasons for non-adherence to the anti-diabetic treatment are the appointment schedule, and the exercise and diet regimen. Unavailability of transport and forgetfulness, Physician–patient relationship as well as patient's knowledge of diabetes. Even though adherence to medications leads to beneficial outcomes, it is often poor.

There are numerous reasons for poor adherence including age, social and psychological factors, education and a lack of understanding of the long-term benefits of treatment, the complexity of the medication regimen, cost of medication and negative treatment perceptions. Poor communication between doctor and patient, adverse outcomes such as weight gain and hypoglycemia, and failure of clinicians to modify medications appropriately can also affect adherence. New innovative methods are needed to assist those patients who fail in their medication compliance.

Most patients who have type 2 diabetes mellitus (DM) require several different medications. However these agents can substantially reduce

diabetes-related morbidity and mortality, the extent of treatment beneficial aspects may be limited by a lack of treatment adherence.

The present study aims to determine medication compliance of patients with diabetes and to understand the impact of polypharmacy on medication compliance in different teaching hospitals of Lahore.

**METHODS AND MATERIALS:**

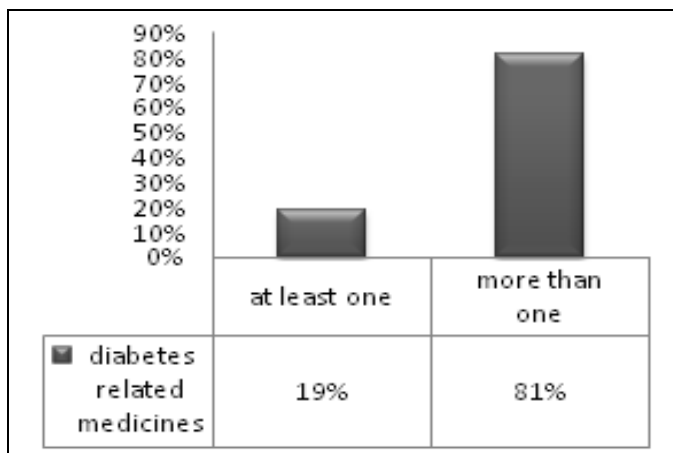
**Study Area, Period and Design:** A retrospective study was conducted about the polypharmacy and medication compliance in patient with type 2 diabetes. Hundred patient who have been diagnosed with type 2 Diabetes Mellitus of age 30-60 years, formed the study group. Study duration was two months. Various public and private teaching hospitals were visited. A data collection form was designed and was filled during face to face interview with the patients. Data was presented in the form of graphs and tables.

**RESULTS:** Female patient comprised 57 (57%) out of 100 patients surveyed with type 2 diabetes. Generic prescribing was 1.32%. The average HbA1c was 9.2 with 39% patients above 9.8 and 31% below 7.8. The average total cholesterol was 233 mg/dl with 42% above 199 mg/dl. The average blood pressure was 139 mmHg for systolic and 88 mmHg for diastolic. **(Table 1)**

**TABLE 1: DEMOGRAPHIC DATA AND PRESCRIBING INDICATORS**

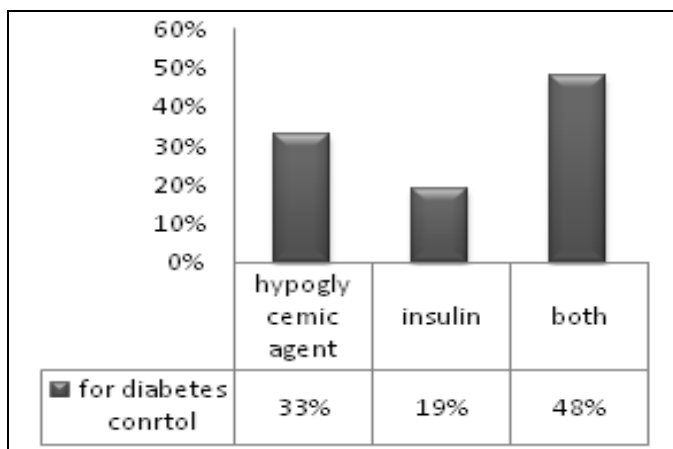
Characteristics/parameters	results
Female patients	57%
Male patients	43%
Generic prescribing	1.32%
Brand prescribing	98.68%
Average cost per prescription	PKR.398
Average HbA1c (%)	9.2
Patients > 9.8	39%
Patients <7.8	31%
Average total cholesterol(mg/dl)	233
Patients >199	42%
Average blood pressure (mmHg)	139/88

**Polypharmacy:** 19% of patients were prescribed at least one diabetes related medicine and 81% was prescribed more than one diabetes related medicines. **(Fig. 1)**



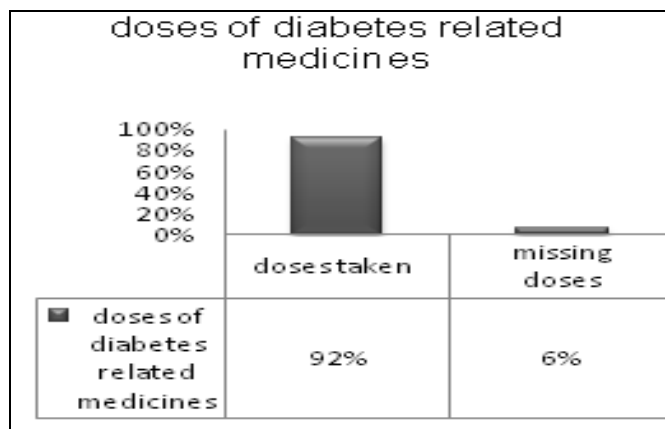
**FIG. 1: DIABETES RELATED MEDICINES PRESCRIBED**

33% of patients were taking hypoglycemic agent for diabetes control, 19% were taking insulin and 48% were taking both (hypoglycemic agent & insulin) for diabetes control. (Fig. 2)



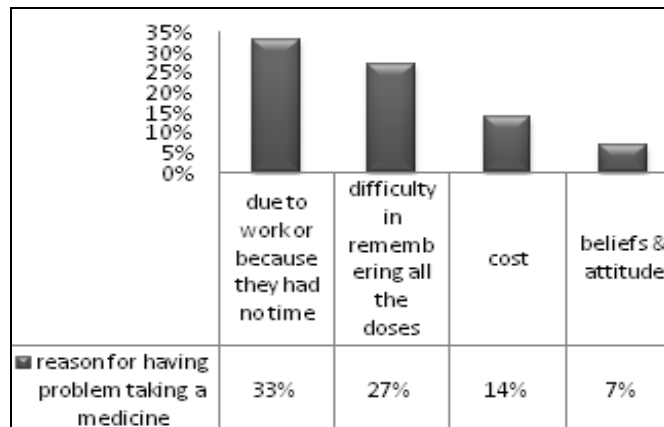
**FIG. 2: MEDICATIONS RELATED TO DIABETES CONTROL**

**Patient Compliance:** For each diabetes related medicine 92% of the prescribed doses were taken with the 6% of missing doses. (Fig. 3)



**FIG. 3: DOSES TAKEN**

The single most reason for having a problem taking a particular medicine was because they had no time or due to work (33%) followed by forgot or difficulty in remembering all the doses (27%), cost (14%) and social reason (7%). (Fig. 4)



**FIG. 4: REASONS FOR NON-COMPLIANCE**

**DISCUSSION:** Polypharmacy is unavoidable, given that multiple drug therapy has become the standard of care in most chronic conditions. Poly pharmacy was observed in 81% of the patients which were prescribed with more than one diabetes related medicines including hypoglycemic agent and insulin. Most common related comorbidities were found to be hypertension, hyperlipidemia, and GI disorder, allergy, itching depression, and coagulopathies and delayed wound healing, each of which may require one or more drugs for adequate control. Thus the most commonly used therapy component used was both insulin and hypoglycemic agent. Despite the complexity of medical regimens, patients reported high level of compliance. Males showed high level of compliance then females. As in the survey females were more in number so, the most common reason for having a problem taking a particular medicine was because they had no time or due to work, followed by forgot or difficulty in remembering all the doses, cost and social reason. The lack of knowledge about prescribed medications often leads to fear of taking the medications.

**CONCLUSION:** Polypharmacy is unavoidable when treating a common chronic condition such as diabetes. The potential for polypharmacy will continue to increase with time, as additional therapeutic options become available.

The most commonly used therapy component used was both insulin and hypoglycemic agent. It was concluded that despite the complexity of medical regimens, patients reported high level of compliance for each diabetes related medicine. Polypharmacy did not majorly affect the patient's compliance. Although Patient's perception of the immediate and future benefit of prescribed medication had a significant impact on their compliance. Attitudes and beliefs about medications play a large role in compliance.

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