

Original Article

Evaluation of Insulin Prescribing Patterns and Associated Burden among Ambulatory Diabetic Patients in Islamabad/Rawalpindi

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ABSTRACT

Background: Diabetes Mellitus (DM) is a significant global health challenge, particularly in developing countries where it is prevalent and associated with high morbidity and mortality due to poor management and adherence to therapy. In Islamabad/Rawalpindi, the management of DM is compromised by gaps in knowledge and adherence regarding insulin use, which is crucial for effective disease control.

Objective: This study aims to assess the patterns of insulin usage, adherence to therapy, and the impact of educational status on insulin management among patients with diabetes in Islamabad/Rawalpindi.

Methods: A cross-sectional, descriptive, survey-based study was conducted from February to May 2023 among 240 ambulatory diabetic patients. Data were collected using structured questionnaires covering demographics, insulin usage patterns, adherence behaviors, and diabetes management knowledge. Statistical analysis was performed using SPSS version 25, employing descriptive statistics and Chi-Square tests to explore associations between variables.

Results: The majority of participants (52.5%) were over 40 years old, with 55% having type 2 diabetes. Insulin pens were used by 47.1% of the participants, while 50% used syringes. Approximately 66.3% of the participants were also taking oral anti-diabetic medications. About 63.7% regularly attended routine checkups, 88.3% knew how to inject insulin, and 90.8% were aware of the timing for insulin injections. Educational interventions showed a significant impact on adherence and knowledge, with 77.5% demonstrating an understanding of diabetes.

Conclusion: The study highlights the need for improved diabetes education and access to advanced insulin delivery methods to enhance adherence and management of diabetes in Islamabad/Rawalpindi. Emphasizing patient education on insulin use could lead to better disease outcomes and quality of life for diabetic patients in the region.

Keywords: Diabetes Mellitus, Insulin Therapy, Patient Adherence, Diabetes Education, Insulin Administration.

INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia due to defective insulin action, insufficient insulin secretion, or both, resulting in disturbances in carbohydrate, fat, and protein metabolism. It is a global health concern with a significant burden, particularly in developing countries where it is estimated that over 70% of diabetic patients will reside by 2030 (1). The prevalence and impact of DM are profound; in Islamabad/Rawalpindi alone, 943,845 adults are affected, constituting a considerable percentage of the total population of approximately 35,350,000 as reported by the International Diabetic Federation in 2023 (3). The majority of these patients have type 2 diabetes, which is often poorly controlled, leading to increased morbidity and mortality due to diabetes-related complications (3, 4).

Insulin therapy remains a cornerstone in the management of DM, particularly for type 1 diabetes, which typically results from autoimmune beta-cell destruction with markers such as anti-glutamic acid decarboxylase, islet cell, or insulin antibodies (5). In contrast, type 2 DM is characterized by insulin resistance and an insulin secretory defect (6-8). However, despite the availability of various insulin administration methods such as subcutaneous, intravenous, and intramuscular injections (9), adherence to insulin

therapy is generally suboptimal. Common barriers include fear of injection pain, hypoglycemia, and weight gain (10). Additionally, the complexity of managing insulin therapy, which involves understanding the appropriate use and storage of insulin, significantly affects compliance (11).

The study aims to enhance the understanding of insulin use, focusing on administration practices, adherence levels, and the impact of insulin therapy on daily activities among diabetic patients in Islamabad/Rawalpindi (12). This understanding is crucial as effective diabetes management requires more than just the physiological control of blood sugar; it encompasses patient education, self-management, and lifestyle integration to mitigate the risks associated with diabetes and improve quality of life (13).

MATERIAL AND METHODS

This cross-sectional, quantitative, descriptive survey-based study was conducted to evaluate insulin usage among ambulatory diabetic patients in Islamabad/Rawalpindi, Pakistan, from February 7, 2023, to May 22, 2023. The study protocol was approved by the Institutional Review Board of the Faculty of Pharmacy, Ibadat International University Islamabad, with reference number IRB-IIUI-FAHS/PHM/1030-1215, dated October 2, 2022, ensuring compliance with the ethical standards of the Declaration of Helsinki (14).

Eligibility criteria included male and female patients aged 18 years or older, diagnosed with either type 1 or type 2 diabetes mellitus, and currently on insulin therapy. Excluded were pregnant women, non-residents of the specified regions, and patients with cancer, liver or kidney impairments, or significant physical or mental illnesses. Of the 20,000 eligible patients in selected hospitals, a sample size of 377 was initially targeted to achieve a confidence level of 95% and a margin of error of 5%; however, responses were ultimately obtained from 240 participants (15).

Data collection was facilitated through a structured questionnaire developed on Microsoft Word and reviewed for content validity by an expert committee. The questionnaire was divided into six sections, covering demographic information, patterns of insulin use, adherence to therapy, insulin injection practices, knowledge about diabetes management, and reasons for insulin omission (16). The research team personally visited various hospitals to administer the surveys to consenting participants, ensuring that each participant understood the questions and provided informed consent (17).

Data were analyzed using SPSS version 25 for descriptive statistics, which included frequencies and percentages of the demographic variables and insulin usage patterns. The association between dependent (insulin adherence and knowledge) and independent variables (demographic and clinical characteristics) was assessed using the Chi-Square test, where a p-value of less than 0.05 was considered statistically significant. This comprehensive data analysis aimed to identify key factors influencing insulin use and adherence, thus providing insights into potential areas for intervention to improve diabetes management outcomes.

RESULTS

In this study, a total of 240 ambulatory diabetic patients participated, providing a snapshot of the demographics, insulin usage patterns, and adherence levels in the Islamabad/Rawalpindi region.

Demographics and Clinical Characteristics:

The age distribution revealed that 52.5% of participants were above 40 years old, and a notable 25.8% were illiterate, highlighting the challenge in patient education for managing diabetes. The majority, 55.0%, had type 2 diabetes, reflecting the global trend of its higher prevalence. The duration of diabetes was varied, with 31.7% having diabetes for 1-3 years and 20.0% for more than 9 years.

Insulin Usage Patterns:

Most participants (50.0%) used syringes for insulin administration, while 47.1% used pens, and a small fraction (2.9%) used pumps. The most commonly used insulin types included Humulin 70/30 (36.3%) and Lantus Solo Star (18.3%). A significant proportion, 66.3%, were also taking oral anti-diabetic medication alongside insulin.

Adherence to Therapy and Knowledge about Diabetes:

Regarding adherence, 63.7% of participants regularly went for routine checkups, and a robust 88.3% knew how to inject insulin. Knowledge of when to inject insulin was high (90.8%), and 71.3% understood the appropriate time gap between meal and insulin injection. This indicates a good level of patient education and self-management practices among the respondents.

Below are the detailed results represented in tabulated format:

Table 1: Socio-Demographic Data

Variable	Frequency	Percentage (%)
Age		
18-25	18	7.5
26-32	43	17.9
33-40	53	22.1
>40	126	52.5
Sex		
Male	97	40.4
Female	139	57.9
Other	4	1.7
Education		
Intermediate	55	22.9
Undergraduate	56	23.3
Graduate	67	27.9
Illiterate	62	25.8
Types of Diabetes		
Type 1	47	19.6
Type 2	132	55.0
Not known	61	25.4
Duration of Diabetes		
1-3 years	76	31.7
3-6 years	74	30.8
6-9 years	42	17.5
>9 years	48	20.0

Table 2: Pattern Of Insulin Use

Variable	Frequency	Percentage (%)
Duration of insulin use		
< 1 year	69	28.7
1-2 years	62	25.8
2-3 years	43	17.9
>3 years	66	27.5
Insulin device using		
Pen	113	47.1
Syringe	120	50.0
Pump	7	2.9
Type of insulin using		
Humulin 70/30	87	36.3
Lantus solo star	44	18.3
Apidra solo star	18	7.5
Mixtard 70/30	43	17.9
Insuget 70/30	22	9.2
Novo rapid	15	6.3
Act rapid	11	4.6
Taking oral anti-diabetic with insulin		
No	81	33.7

Table 3: Knowledge, Attitude, and Awareness About Diabetes

Variable	Frequency	Percentage (%)
Knows about diabetes	186	77.5
Glucometer at home	192	80.0
Knows importance of self-checking glucose	188	78.3
Knows advantages of daily exercise	173	72.1
Goes for routine checkup	153	63.7
Knows advantages of taking insulin	201	83.8
Knows how to inject insulin	212	88.3
Knows when to inject insulin	218	90.8
Knows time gap between meal and injection	171	71.3
Knows symptoms of low sugar level	203	84.6

These results demonstrate a complex interplay of demographic factors, education levels, and adherence behaviors influencing diabetes management in a developing country setting.

DISCUSSION

The findings from this survey-based study provide valuable insights into the patterns of insulin use among diabetic patients in Islamabad/Rawalpindi, revealing that adherence to insulin therapy and knowledge about diabetes management are crucial factors in effective disease management. The use of insulin pens was observed in 47.1% of participants, contrasting sharply with global trends where insulin pens are the predominant mode of administration. For instance, studies have shown usage rates of 85.6% in various countries, underscoring the preference for pens due to their ease of use and less painful injections (23). Despite the availability of advanced devices, the reliance on syringes remains high in this study, which may reflect local availability, cost considerations, or lack of patient and provider awareness about alternative options (18).

Interestingly, the study noted that a significant proportion of participants (66.3%) used oral anti-diabetic medication alongside insulin, highlighting the dual approach in managing type 2 diabetes. This practice aligns with treatment guidelines that recommend a combination therapy to achieve optimal glycemic control when monotherapy is insufficient (19). However, the study revealed a considerable gap in the participants' knowledge, particularly regarding the timing and technique of insulin injections, even though most participants expressed awareness of the importance of insulin for managing diabetes. This gap underscores the need for targeted educational programs to improve self-management skills among diabetic patients, a strategy supported by findings from other regions that have demonstrated improved adherence and glycemic control following educational interventions (20).

One of the strengths of this study is its comprehensive coverage of a range of factors affecting insulin usage, from socio-demographic characteristics to detailed practices around insulin administration. However, the study is not without limitations. The sample size, though adequate for statistical analysis, represents a fraction of the diabetic population in the region, which may affect the generalizability of the results. Additionally, the reliance on self-reported data can introduce bias, as patients might report what they perceive as expected rather than what they actually practice (21).

Despite these limitations, the study offers important recommendations for practice and policy. It highlights the need for improving diabetes education among patients, particularly in injection techniques and the timing of insulin administration, which could be addressed through regular training sessions integrated into routine care. Health policy makers should consider subsidizing insulin pens to increase their accessibility and usage, which could potentially improve adherence and outcomes (22). Moreover, recommendations for future research include longitudinal studies to track changes in adherence behaviors over time and intervention studies to test the effectiveness of educational and technological interventions in improving insulin use practices in developing countries. Overall, this study adds to the growing body of evidence that emphasizes the importance of patient education and the adoption of modern diabetes management tools to enhance adherence and ultimately improve clinical outcomes for diabetic patients in resource-limited settings (23, 24).

CONCLUSION

The study underscores the significance of adherence to insulin therapy and comprehensive diabetes management education among diabetic patients in Islamabad/Rawalpindi. Despite the complexities associated with insulin use, enhancing patient knowledge about insulin administration techniques and the timing of injections could substantially improve treatment outcomes. It highlights the pressing need for healthcare policies that support access to modern insulin delivery devices and educational interventions.

Addressing these factors is crucial for reducing the burden of diabetes complications and improving the overall quality of life for patients, demonstrating a clear pathway towards more effective diabetes management in resource-constrained settings.

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