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FACTORS THAT INFLUENCE INSULIN ACCEPTANCE AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN A PRIMARY CARE CLINIC

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Abstract

Objectives: *To determine frequency of factors that influence insulin acceptance among type 2 diabetes mellitus patients in a primary care clinic.*

Study Design: *Cross sectional study.*

Place and Duration of Study: *PEMH, Rawalpindi from June to November 2023.*

Patients & Methods: *A total of 66 type 2 diabetic patients were included in the study who were planned to be started on insulin therapy. All these patients were interviewed through a structured questionnaire to determine factors that influenced their decision toward or against the acceptance of insulin therapy. Data was analyzed using SPSS 22:00.*

Results: *In our study, mean age was 53.01 ± 8.62 years [42 (63.64%) males and 24 (36.36%) females]. Mean duration of having diabetes was 10.76 ± 2.42 years. Mean HbA1C% at presentation was 9.47 ± 1.08%. Frequency of patients whose initial response towards the initiation of insulin therapy was "acceptance" was 41 (62.12%) while of "reluctance" was 25 (37.88%). Most common factors that led to "acceptance" were "trust on doctor" 13 (31.71%) and "oral hypoglycemic not working" 11 (26.83%) while of "reluctance" were "fear of insulin dependency" 9 (36.00%) and "side effects of insulin" 5 (20.00%).*

Conclusion: *Frequency of insulin acceptance is relatively high in our population with "trust on doctor" and "oral hypoglycemic not working" being most common factors driving this decision. A fair proportion of patients also showed reluctance mainly due to "fear of insulin dependency" and "side effects of insulin".*

INTRODUCTION

Type 2 diabetes is a chronic metabolic disorder characterized by elevated blood sugar levels due to insulin resistance and impaired insulin secretion. [1] It affects millions of people worldwide with an approximate of 462 million people across the globe and a prevalence of 16.98% in Pakistan. [2] While lifestyle modifications, particularly diet and exercise, play a crucial role in managing type 2 diabetes, many individuals require pharmacological interventions to achieve glycemic control. These pharmacological agents include oral

hypoglycemic agents and parenteral agents like insulin therapy which is one such intervention that has proven to be highly effective in managing the condition. [3] Insulin plays a pivotal role in regulating blood sugar levels by facilitating the uptake of glucose into cells for energy production. When cells become resistant to insulin, glucose remains in the bloodstream, leading to hyperglycemia. Over time, the pancreas may also lose its ability to produce sufficient insulin, further exacerbating the problem. [4]

The primary goal of insulin therapy is to normalize blood sugar levels, reduce the risk of complications, and improve overall quality of life. There are several insulin therapy options available for individuals with type 2 diabetes, including basal, regular, short-acting and rapid acting insulin, each with its own characteristics and advantages. [5] The choice of insulin regimen depends on various factors, including the patient's glycemic control, their lifestyle and preference of the patients and physician. However, when it comes to insulin therapy, there are several considerations that a physician has to think about before prescribing it to the patient and it is essential to approach insulin therapy as part of a comprehensive diabetes management plan that includes regular monitoring, proper education and lifestyle modifications. [6]

These barriers along with various patient and physician related factors can lead to delay in the initiation of insulin therapy in diabetic patients that make them prone to develop diabetic complication much earlier in their course of disease. One such factor that is essentially considered to be one of the most common cause of this delay is patient's lack of education, attitude and fears regarding insulin use that lead to reluctance in using insulin therapy. [7, 8] For this purpose, it is essential that such factors should be studied in our local population of Pakistan as there is gross lack of knowledge related to health care as well as general reluctance of patients towards insulin therapy for the reasons yet to be quantified. Therefore, we conducted this survey based study with aim of determining frequency of various factors that influence insulin acceptance/reluctance among type 2 diabetes mellitus patients presenting at a primary care clinic.

MATERIAL AND METHODS

We conducted this cross sectional study at "Pak Emirates Military Hospital, Rawalpindi" from June to November 2023 after obtaining approval from the ethical review board of "Pak Emirates Military Hospital (PEMH), Rawalpindi" (ERB #: A/28/ERC/605/23). Sample size of 66 was calculated using WHO sample size calculator by assuming confidence level of 95%, absolute precision of 12% and anticipated frequency of prescribing insulin therapy in type 2 diabetics of 43.6% [9] using following formula [10]:

$$n = \frac{z^2_{1-\alpha/s} P(1-P)}{d^2}$$

Inclusion criteria:

We included adult patients who had the age more than 18 years, who were either male or female, who type 2 diabetes mellitus (HbA1C% ≥ 6.5% [11]) for ≥ 12 months and met the criteria for initiation of insulin therapy (HbA1C% ≥ 7.5% or 58mmol/mol [12])

Exclusion criteria: We excluded the patients who had previously used insulin therapy, who did not meet the criteria for initiation of insulin therapy and those who were mentally incapacitated to consent and communicate for participation in the study.

We selected our study population by using "non-probability consecutive sampling technique". A written consent which was signed by the study participants was made an essential pre-requisite. Once selected, baseline characteristics including age (in years), gender, duration of diabetes and HbA1C% were documented. Once included all the patients were communicated that they would require insulin therapy from now onwards and their initial response regarding the initiation of insulin (acceptance or reluctance) were recorded. A structured questionnaire (table I) was developed based on a qualitative survey conducted by Abu Hassan et al. [13] through which various factors that drove patients towards either acceptance or reluctance to start insulin treatment were identified. All the questions in the questionnaire were asked by the researchers directly from the patients in the language they

perceived best and the answers were documented.

Table I: Questionnaire to assess factors that influence insulin acceptance/reluctance among type 2 diabetes mellitus patients

Initial response to insulin therapy					
Acceptance			**Reluctance**		
Which of the following factor led you to this decision?					
1	**Trust on doctor:** I trust that my doctor's advice is most beneficial for me.		1	**Fear of needle:** I have fear of needles.	
2	**Side effects of oral medication:** I read/heard that oral medications can damage my kidneys while insulin is safer.		2	**Fear to self-inject:** I cannot self-inject.	
3	**Insulin gives better control:** I read/heard that insulin is much more efficacious to control my diabetes.		3	**Job restriction:** My job makes it difficult to carry insulin around with me.	
4	**Inulin improves energy:** I read/heard that insulin use improves the energy status of body		4	**Fear of insulin dependency:** I read/heard that I will become dependent on insulin for life.	
5	**Insulin is natural:** I read/heard that insulin is from natural source so it seems to be more beneficial		5	**Fear of insulin allergy:** I heard that insulin can cause serious allergic reactions.	
6	**Oral hypoglycemic not working:** My oral hypoglycemic agents are not controlling my blood sugar levels		6	**Social stigma:** It is embarrassing to have self-inject in front of people.	
7	**Good peer experience:** My family member/ relative/ friend already use insulin and they have much better glycemic control		7	**Fear of insulin side effects:** I have read/heard that insulin use can cause weight gain, frequent low blood sugar and even sudden unconscious.	

"Data was analyzed by using Statistical Package for Social Sciences (SPSS) 22.00. Quantitative data (age, duration of diabetes and HbA1C%) was represented using mean ± standard deviation. Qualitative data (gender, initial response regarding the initiation of insulin and factors that influenced insulin acceptance/reluctance) was represented by using percentage and frequency. Chi square test (for qualitative variables), Student t-test (for quantitative variables) were applied and p-value of ≤0.05 was considered as statistically significant".

RESULTS

A total of 66 patients fulfilling the inclusion criteria were included in this study. Mean age of our study population was 53.01 ± 8.62 years. There were 42 (63.64%) male participants while remaining 24 (36.36%) participants were female. Mean duration of having diabetes amongst patients of this study was 10.76 ± 2.42 years. Mean HbA1C% at presentation in our study population was 9.47 ± 1.08%. These baseline demographics are summarized in tabulated form below in table II:

Table II: Baseline characteristics (n = 66)

Sr. No.	Characteristics	Value (n = 66)
1	Mean age	53.01 ± 8.62 years
2	**Gender** - Male - Female	 42 (63.64%) 24 (36.36%)
3	Mean duration of diabetes	10.76 ± 2.42 years
4	Mean HbA1C%	9.47 ± 1.08%

In our study, we found that the frequency of patients whose initial response towards the initiation of insulin therapy for further treatment of their diabetes was "acceptance" was 41 (62.12%) while frequency of patients who showed "reluctance" regarding initiation of insulin therapy was 25 (37.88%), depicted below in figure 1.

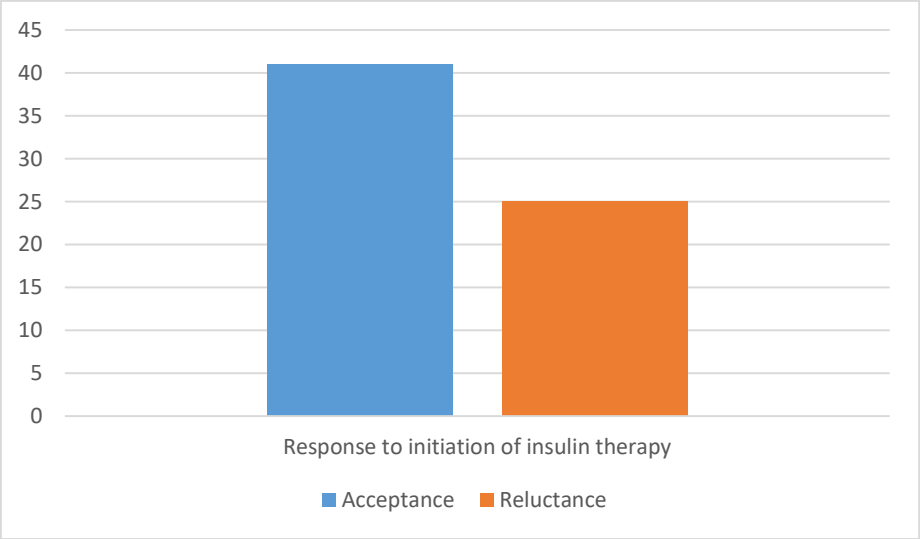

Figure 1: Initial response regarding initiation of insulin therapy (n = 66)

Amongst patients who showed "acceptance" towards initiation of insulin therapy (n = 41), most common factor that led them to this decision was "trust on doctor" 13 (31.71%), followed by "oral hypoglycemic not working" 11 (26.83%), "good peer experience" 9 (21.94%), "side effects of oral medication" 4 (9.76%), "insulin is natural" 2 (4.88%), "insulin improves energy" 1 (2.44%) and "insulin gives better control" 1 (2.44%). This data is depicted below in figure 2:

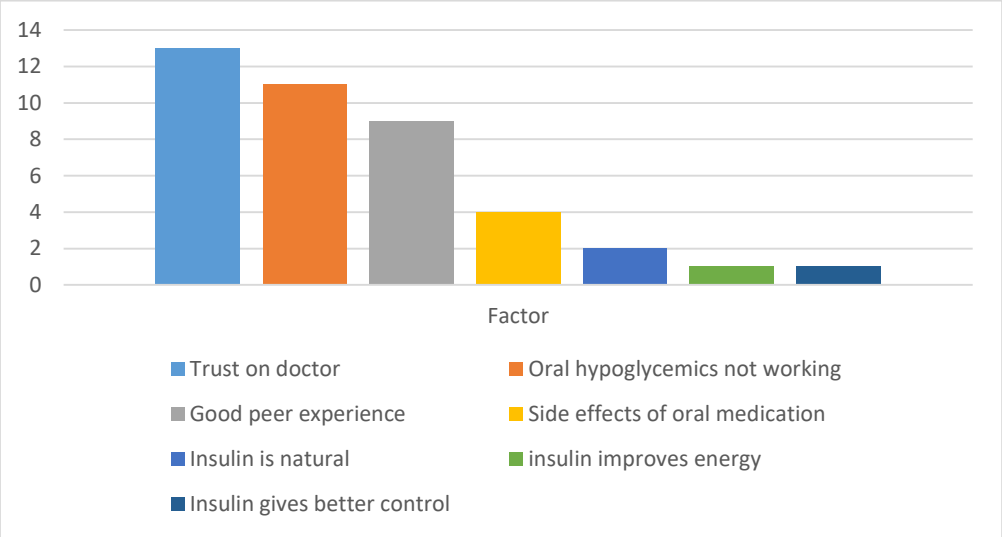

Figure 2: Factors that led to "acceptance" towards initiation of insulin therapy (n = 41)

Amongst patients who showed "reluctance" towards initiation of insulin therapy (n = 25), most common factor that led them to this decision was "fear of insulin dependency" 9 (36.00%), followed by "side effects of insulin" 5 (20.00%), "fear of needles" 3 (12.00%), "fear to self inject" 3 (12.00%), "job restriction" 3 (12.00%), "social stigma" 1 (4.00%) and "fear of insulin allergy" 1 (4.00%). This data is depicted below in figure 3:

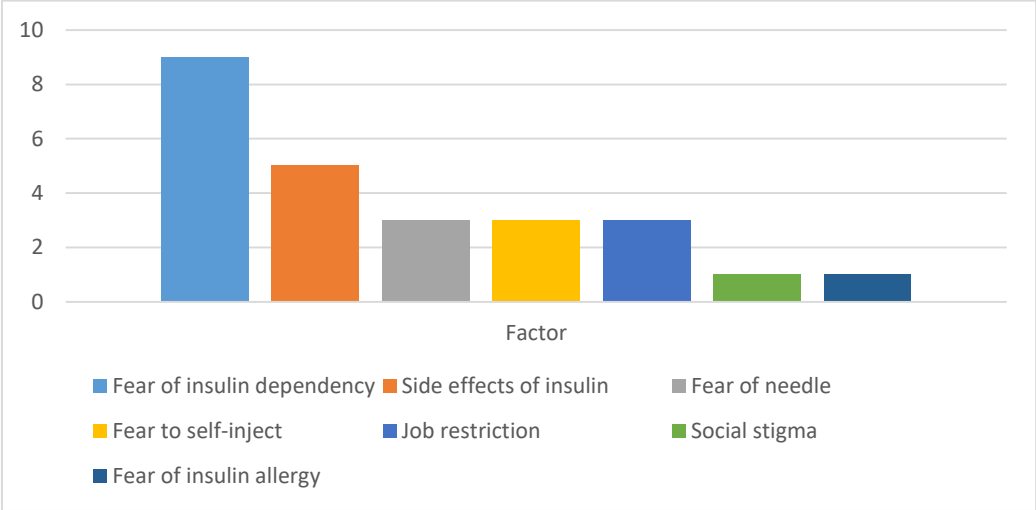

Figure 3: Factors that led to "reluctance" towards initiation of insulin therapy (n = 25)

DISCUSSION

It is recommended to provide insulin at an early stage for the management of poorly controlled diabetes in order to prevent and mitigate the long-term consequences associated with the condition. [14] Nevertheless, it is frequently seen that there is a prevalent delay in the commencement of insulin treatment. Approximately half of individuals experiencing inadequate management of diabetes exhibit delayed commencement of insulin therapy, often occurring 3-5 years subsequent to the ineffectiveness of oral hypoglycemic medications. [15, 16, 17, 18] Delayed initiation of insulin can be influenced by different factors, including those attributable to healthcare systems, patients and healthcare practitioners. [19, 20] However, specifically speaking about patient related factors, not much studies have been conducted in Pakistani population that have addressed and quantified factors that influence

insulin acceptance/reluctance among type 2 diabetes mellitus in a systematic way.

In our study, most of the patients belonged to middle age and at presentation when they had HbA1C% value high enough to make them candidates for insulin therapy initiation almost a decade had passed for them to have diabetes diagnosis. This time is alarmingly much higher as compared to some developed countries where the gap between diagnosis of diabetes and insulin initiation is almost half than what we observed in our population. [21] In terms of HbA1C% at presentation, mean HbA1C% value of our patients matched the criteria set by "American Diabetes Association (ADA)" at which insulin therapy is warranted and deemed essential. [22] Response to insulin therapy initiation was overall positive in our study with more than half of the patients showing willingness to start insulin therapy without any reluctance.

We found that the major factor that contributed to this choice was the trust of patients towards their doctor's choice of treatment. In addition, poor control of their blood sugar levels with oral hypoglycemic agents and positive experiences of their peers regarding the use of insulin drove them towards acceptance of insulin therapy. However, amongst patients who showed reluctance to start insulin, major driving factor was fear of becoming dependent on insulin for life as well as its side effects. Arshad et al. [23] also conducted somewhat similar study but they primarily focused on factors that were barriers in the way to start insulin therapy. They also found insulin dependency and its side effects as major barriers but embarrassment to self-inject in front of others (social stigma) was the most frequent factor that made patients reluctant to insulin use. Similarly, Khan et al. [24] also conducted a study focusing on factors leading to insulin reluctance in Pakistani population and reported fear of needle and insulin side effects as major factors leading to reluctance towards insulin use. Almost similar findings were reported by Ali Shah et al. [25] but they also only focused on factors influencing reluctance.

Since most studies only focus was studying factors that lead to reluctance towards insulin therapy initiation, this study has its uniqueness in a way that it also addresses the factors that influence acceptance of insulin therapy in Pakistani population. We recommend that structured medical education programs should be devised to improve awareness among patients regarding insulin use to minimize reluctance in patients regarding insulin therapy initiation.

CONCLUSION

The concerns and views of patients regarding the use of insulin are significantly shaped by their level of knowledge, personal experiences, and the support they receive from others. Therefore, it is imperative to impart knowledge to individuals through efficient communication, support, and educational initiatives, along with providing pleasant experiences. This approach will facilitate the adoption of favorable attitudes and beliefs that encourage the acceptance of insulin.

CONFLICT OF INTEREST

We declare that there was no conflict of interest.

KEY WORDS

Diabetes, Glycemic control, Insulin, Oral hypoglycemic agents.

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