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Insulin refusal in uncontrolled Type 2 Diabetes in Bangladesh: Barriers and the role of patient-centered education

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Abstract

Background: Reasons for insulin refusal among uncontrolled type 2 diabetes (T2D) are well-documented, yet the effect of patient-centered education (PCE) remains insufficiently studied in Bangladesh.

Objectives: This study aimed to identify reasons for insulin refusal and to evaluate the effectiveness of PCE on insulin acceptance.

Method: This cross-sectional study included patients with uncontrolled T2D from the outpatient department of three hospitals in Bangladesh between April 2024 and September 2025. All initially refused insulin despite clinical indications. Reasons for refusal were identified via interviews. A subset of 113 patients received physician-delivered PCE, and acceptance rates were recorded. Logistic regression analyzed factors associated with continued refusal.

Results: The study consisted of 202 patients (age: 48.4±11.5 years, mean ± SD, female: 134, 66.3%, mean HbA1c: 10.90±1.93%). The most common reasons for initial refusal were needle phobia (153, 75.7%), followed by absence of a caregiver for injections (47, 23.3%) and lack of knowledge of injection technique (45, 22.3%). Following PCE, 61.1% (69/113) of patients agreed to initiate insulin. We found higher odds for refusal among undergraduates (OR: 7.09; 95% CI 1.05-47.93, p=0.002) and rural residents (OR: 1.84; 95% CI 1.04-3.25, p=0.018), while male sex (OR: 0.36; 95% CI 0.17-0.78, p=0.002) and duration of DM <10 years (OR: 0.61; 95% CI 0.39-0.96, p=0.032) were associated with lower odds. After adjustment, only male sex remained significantly associated with a lower odds of continued insulin refusal (aOR: 0.22; 95% CI: 0.06-0.69; P=0.01).

Conclusion: Needle phobia is the prime cause of insulin refusal among the study participants, and the PCE effectively promotes insulin initiation in over 60% of refusers. *[J Assoc Clin Endocrinol Diabetol Bangladesh,* January 2026; 5(1): *28-34]*

Keywords: Diabetes, Insulin, Insulin Refusal, Bangladesh

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Introduction

Diabetes mellitus (DM) is the fastest-developing epidemic of the 21st century. According to the International Diabetes Federation (IDF), an estimated 589 million (11.1%) adults aged 20–79 years are living with diabetes worldwide. Over 3.4 million people (9.3% of global deaths from all causes) died as a result of diabetes in 2024. Bangladesh ranked 7th among the top 10 countries by number of adults (20–79 years) with diabetes in 2024, with an estimated 13.9 million adults with DM and a prevalence rate of 13.2%.[1] The Diabetes Control and Complications Trial (DCCT) have revealed that intensive glycemic control can prevent micro and macrovascular complications.[2] Commonly, insulin is initiated in type 2 DM (T2DM) when there is failure of oral antidiabetic drugs, during acute medical and surgical conditions, pregnancy, lactation, and advanced complications related to diabetes. The American

Diabetes Association (ADA) recommended early initiation of insulin in newly diagnosed T2DM when HbA1C ≥10%, plasma glucose ≥300mg/dl, and patients in a catabolic state.[3] National guideline of Bangladesh also recommends insulin initiation in T2DM with similar situations and clearly mentions the fasting plasma glucose (FBS) ≥14 mmol/L, random plasma glucose ≥ 18 mmol/L (with or without symptoms).[4] Despite insulin therapy being proven to be efficacious, many patients are reluctant to initiate or adhere to insulin therapy. A critical barrier to optimal diabetes management is "psychological insulin resistance" (PIR)-the reluctance or refusal of patients and healthcare providers to initiate insulin therapy when it is medically indicated.[5,6] In the UKPDS study, about 27% of the patients allocated to insulin treatment were found to have refused insulin.[7] Almost similar study findings noted from the Western world in recent studies.[8,9] In the Western community, a comparable proportion (28-39%) of patients was found to be reluctant to use insulin.8,9 In contrast, an alarmingly higher proportion (57.1- 70.6%) of PIR was reported in the Asian studies.[10,11] This phenomenon is often multifactorial, with common reasons including fear of injection pain and needle, concerns about hypoglycemia, perception of poor self-efficacy and reliance on others to give insulin, complexity of regimen, misconceptions about insulin signifying end-stage disease and that one's own diabetes is not serious enough, social stigmata, and a belief that insulin causes irreversible dependency.[6,12,13] Cultural beliefs, literacy levels, and healthcare access may further influence these perceptions in our country.[14]

There are insufficient published studies on the reasons for insulin refusal among patients in resource-constrained settings such as Bangladesh. Therefore, this study aimed to investigate the possible factors that could hinder a patient's acceptance of insulin therapy. The current study will also appraise the impact of a physician-delivered, patient-centered education (PCE) on subsequent insulin acceptance.

Methods

This cross-sectional study included patients with T2DM from the endocrinology outpatient department who required insulin initiation for their glycemic control, (e.g., HbA1C ≥10%, Plasma glucose ≥ 16.67mmol/L, symptomatic hyperglycemia, patient in catabolic state, advanced organ failure, failure of oral antidiabetic drugs) according to the American Diabetes Association guidelines 2025.[3] Study subjects were enrolled from the three hospitals of three different districts (Dhaka, Mymensingh, and Feni) of Bangladesh. Patient's demographic and clinical information were recorded in a structured data collection sheet. Any previous history of insulin treatment, along with the reasons for its discontinuation, was also recorded. A face-to-face interview was arranged with the patients who initially refused to initiate insulin to determine the possible reasons for refusal. A semi-structured questionnaire was developed based on a previous publication and modified to be more flexible and simplified for our setting.[2,15,16] The questionnaire was pretested before finalization and expert opinion was taken regarding standardization and validity of the questionnaire. a total of 21 closed questions were added to the questionnaire and asked each participant. To accommodate any uncommon reasons for insulin refusal that were not listed before, we added an option to add new reasons.

A recent study from India reported that fear of pain contributed 68.9% of insulin refusal among the study participants.[2] To calculate the sample size, we considered the needle phobia as one of the main reasons for insulin refusal. Using the $n=4pd/d^2$ formula, with p=0.689 and an absolute precision of 7%, our calculated sample size is 175. We enrolled 202 participants consecutively.

Not all, but a group of study subjects were conveniently counselled on the importance of insulin initiation in this condition, clarifying the patient's false perception of insulin and the possible outcomes if insulin is not initiated. Patient-centered counseling was provided face-to-face by the treating physicians at their convenience. Only a single session of patient counselling was arranged, lasting 10-15 minutes. The principal investigator demonstrated the counselling approach and which part should be focused on. Family members of the patient, if accompanied during the patient consultation, were allowed to be present besides the patient. Patients' final decisions regarding insulin acceptance were recorded. Patients with acute hyperglycemic crisis, pregnancy or lactational state, or patients who required recent surgery and were referred for urgent diabetes control with insulin were excluded from the study.

Data were entered in SPSS software (Version 25.0) for analysis. Quantitative data were expressed as mean ± standard deviation (SD) or median with interquartile range, depending on the distribution, and qualitative variables were expressed as frequencies and percentages. Both univariate and multivariate binary

logistic regression were performed to estimate the odds of various factors related to insulin refusal after PCE. A p-value of <0.05 was considered statistically significant with a 95% confidence interval (CI).

Result

Baseline characteristics of the study participants are shown in Table I. The mean age of our study participants was 48.4 years; the majority of them were female (134, 66.3%). Mean glycated hemoglobin (HbA1C) at the time of presentation was 10.9%. Among participants who initially refused insulin, around one-fourth (52, 25.7%) had experience of previous insulin use.

Table II, showed the basic reasons regarding insulin refusal among the study participants. The majority of the participants refused insulin due to needle phobia (153, 75.7%), with a much smaller proportion of people reporting a lack of caregiver support and a lack of knowledge regarding insulin administration. Various other factors contribute to insulin refusal or a desire to delay its initiation among participants, including a minority (15.3%) who believe it is a lifetime commitment, 10.9% citing difficulty with busy schedules, 5.0% influenced by negative motivation from others, and over half (52.5%) preferring to continue oral medications for a few more weeks.

Figure 1, shows the impact of PCE by treating physicians on subsequent insulin acceptance among the study participants who initially refused insulin. Of 113 participants counselled and provided PCE, 69 (61.1%) agreed to start insulin, and 44 (38.9%) still refused despite an appropriate indication for insulin therapy according to the standard guideline.

Univariate analysis found higher odds for insulin refusal among undergraduates and rural residents, while male sex and duration of DM <10 years were associated with

Table-I: Baseline characteristics of study subjects (n=202)

Traits	Total, n (%)
Age, mean± SD	48.4 ±11.5
Sex, Female	134 (66.3)
BMI (kg/m2), median with IQR	25.25 (23.2-28.1)
FBS (mmol/L), median with IQR	11.6 (9.3-14.3)
2h ABF (mmol/L), median with IQR	18.0 (14.8-21.9)
HbA1C (%), mean ±SD	10.90 ±1.93
Literacy	
Illiterate	24(11.9)
Undergraduate	141(69.8)
Graduate	37(18.3)
Living area, rural	98(48.5)
Family history of DM, present	150(74.3)
Insulin use among family members, yes	59(29.2)
Duration of DM, <10yr	148(73.3)
Previous use of insulin, yes	52(25.7)
Comorbidities	
HTN	107 (53.0)
Dyslipidemia	56 (27.7)
CKD	4 (2.0)
IHD	11(5.4)

Duration of DM, FBS, 2h ABF, and BMI had a Skewed distribution, where data were expressed in median with interquartile range (IQR)

HTN: Hypertension, CKD: Chronic Kidney Disease, IHD: Ischemic Heart Disease. SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure, FBP: Fasting blood glucose, 2hABF: Blood glucose at 2 hours after Breakfast, BMI: Body mass index, SD: Standard deviation

Table-II: Reasons for insulin refusal among the study participants (n=202)

Traits	n (%)
Needle phobia	153 (75.7)
No person to inject insulin	47(23.3)
Lack of knowledge to inject insulin	45(22.3)
It causes dependency on another person	34 (16.8)
Belief in lifelong continuation if started once	31(15.3)
Busy office schedule to move with insulin	22(10.9)
Very expensive	18(8.9)
May hamper daily life	15(7.4)
Frequent travel	15(7.4)
Living alone	11(5.4)
Negative information about insulin from other persons	10 (5.0)
Lack of knowledge to adjust the dose of insulin	7(3.5)
It is the last treatment option for diabetes	7(3.5)
Fear of hypoglycemia	3(1.5)
Lack of a refrigerator for Insulin preservation	2(1.0)
Fear of death with insulin	2(1.0)
Sugar control may worsen after taking insulin	2(1.0%)
Negative information about insulin from social media	1 (0.5)
The doctor did not inform me adequately about insulin	1(0.5)
No specific reasons for refusal, but the patients want to try the medicine for another few weeks	106(52.5)
Others*	3(1.5)

Reasons for insulin refusal are not mutually exclusive

*Among the other causes of insulin refusal, one person has a mental illness, one person believes it can cause kidney damage, and one-person experienced excessive pain at the injection site from previous use of insulin.

Table-III: Factors related to insulin refusal among those who receive education by treating physician (n=113)

Traits	OR (95% CI)	p value	aOR (95% CI)	p value
Male Sex	0.36 (0.17-0.78)	0.002	0.24 (0.08-0.71)	0.01
Duration of DM <10 yr	0.61(0.39-0.96)	0.032	0.45 (0.18-1.11)	0.08
Literacy-Undergraduate	7.09 (1.05-47.93)	0.002	4.87 (0.56-42.37)	0.151
Rural Resident	1.84 (1.04-3.25)	0.018	2.05 (0.79-5.27)	0.137

OR: Odds ratio, aOR: Adjusted odds ratio

Univariate and multivariate binary Logistic Regression were done to see the OR and aOR, respectively

Variables entered into the equation are Sex category (Male, Female, Duration of Diabetes (<10 years, ≥10 years), Literacy status (Undergraduate, Graduates or above), and Living area (Rural, Urban).

Model fitness 69.9%

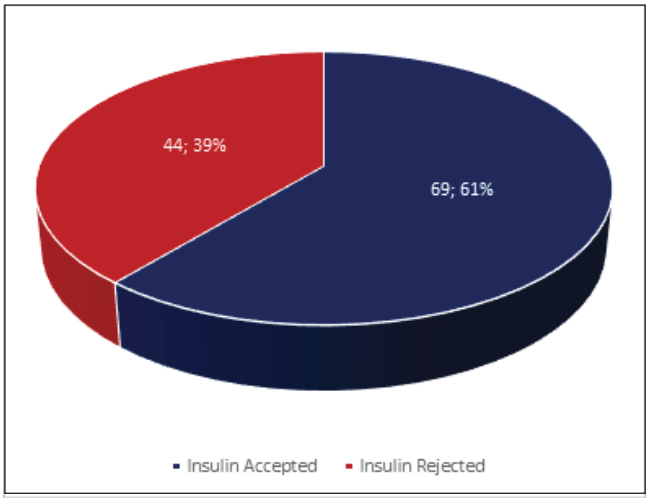

Figure-1: Impact of Patient-centered education on insulin acceptance (n=113)

lower odds (p<0.05). Multivariate analysis identified male sex as the only significant association with lower odds for continued refusal post-counselling (aOR: 0.22; 95% CI 0.06-0.69, P=0.01) (Table III).

Discussion

This study was intended to explore the multidimensional factors underlying insulin refusal among patients with uncontrolled type 2 diabetes in Bangladesh and to assess the impact of PCE on reversing this decision. Our findings highlight that the principal barrier to insulin initiation is not necessarily the lack of access to medicine, rather profound psychological apprehensions, with injection phobia being the most pervasive. Moreover, the current study exhibits that a significant proportion of PIR can be overcome through a structured PCE interference delivered by a healthcare provider.

Patients often have multiple concerns about insulin, stemming from both the insulin itself and its administration. The five main factors were needle phobia, ignorance about insulin technique, dependency on others, embarrassment of carrying insulin in public places and reluctance about intensive glycemic control. The preponderance of injection/needle phobia (75.7%) as the chief reason for insulin refusal is consistent with a global body of evidence, including the Middle East, Asia and Western countries.[10,11,13,17-19] This universality suggests that the fear of self-injection is a fundamental human concern that goes beyond cultural and geographic variations. Morris et al. highlighted that the use of thinner and shorter needles could reduce needle phobia, making the injection less painful.[20] However, Snoek et al. found that a large proportion of diabetes patients who were treated with insulin (38%) using thinner needles still proclaimed injecting insulin as painful.[21] Perhaps, pain anticipated by the insulin naïve patients may be overstated compared to the real pain experienced by those who are regularly using insulin. However, the exceptionally high percentage of needle phobia in this study may also reflect a lack of prior exposure to modern, smaller-gauge needles in our healthcare setting.

Another reason for fear of injection is apprehension about self-injection, which was far more common (40%) among insulin naïve patients in previous studies.[22] Appropriate patient education targeting insulin technique would diminish this apprehension with time. Nonetheless, the current study uncovered significant educational gaps in our population. A substantial number of patients refused to take insulin because of a lack of knowledge about injection techniques (22.3%) and the absence of a caregiver to administer the insulin (23.3%). These indicate a critical failure in the existing patient education paradigm, which often focuses on the "why the insulin should be used" but neglects the "how." Patients are left to conceive insulin technique as frightening and complex. The fear of being dependent on another person (16.8%) further complicates this issue, raising concerns about loss of autonomy and being

a burden on family members. Concerns about the impacts of insulin use on the patient's life have been widely investigated, and almost 50% of diabetes patients on insulin felt that its use restricted their lives.[10,23] In fact, one-third of insulin users had poor self-efficacy and difficulties in fulfilling personal responsibilities.[24] These injection-related concerns should be evaluated and addressed suitably by healthcare providers. Appropriate patient education and use of newer insulin-delivery devices might alleviate injection-related concerns in diabetic patients.

Another factor leading to avoidance of insulin injections in this study was the patients' reluctance to achieve good glycemic control and to continue oral anti-diabetic medications at any cost. They often view insulin as a last resort and a punishment for uncontrolled blood glucose levels, rather than recognising the importance of intensive glycemic control and early insulin initiation. Polonsky et al. have found that psychological resistance to insulin injections was a common factor in type 2 diabetic patients, with the chief component being the failure of patients to control their disease and forced insulin injections.[23] Haque et al. stated that the most common psychological reasons for not being interested in insulin included patients' misperceptions of insulin and diabetes, fear of injection, and low levels of education.[25] PCE is the only intervention to break down these stigmata.

An interesting finding was the lower rate of fear of hypoglycemia (1.5%) as a stated reason for insulin refusal. It contrasts sharply with studies from Western populations, where it is often a top concern.[26] This inconsistency could be attributed to several factors. In our population, uncontrolled diabetes is more prevalent, one study reported only 18.2% T2DM patient had optimal glycemic control, so prevalence of persistent hyperglycemia is more dominant than the prevalence of hypoglycemia.[27] Very few patients had CKD (2%) in our study population, which is an important contributor of hypoglycemia in T2DM, another issue is our study population are mostly female, none of them are alcoholic. Chronic alcoholism potentiates the risk of hypoglycemia. These factors may make an important difference from other Western studies. The cornerstone finding of this study is the success of the PCE intervention. Achieving a 61.1% acceptance rate after counselling is clinically highly significant. It strongly supports that a substantial portion of PIR is built on amenable misconceptions and information deficits. This aligns with the work of Polonsky et al., who emphasized that addressing specific, individual concerns (e.g., demonstrating an insulin pen, discussing needle size) is more effective than generic advice.[23] Current study depicts that when physicians take the time to empathize, clarify false perceptions (e.g., 'insulin as a last resort,' 'lifelong dependency'), and demonstrate insulin technique practically, these can boost up psychological well-being and increase insulin acceptance in diabetic patients.

The multivariate analysis revealed that males have lower odds of refusing insulin after receiving PCE, which parallels the findings of previous studies.[18,28] This gender disparity may be influenced by socio-cultural factors unique to the context. Women in Bangladesh may have lower health literacy, less autonomy in health-related decision-making, and greater domestic responsibilities. It makes it overwhelming to incorporate a demanding treatment regimen.[29] Furthermore, cultural norms and perceptions regarding modesty might make the act of self-injection distressing for women. This underscores the crucial need for gender-sensitive counselling strategies addressing these concerns rather than just the clinical aspects of insulin therapy.[18]

The trend towards lower insulin refusal among graduates and urban residents emphasizes the role of education and healthcare access in influencing health-related behaviors. Educational attainment was inversely associated with insulin refusal. This finding strongly correlates with the conclusions of Shah et al., who found higher education to be positively associated with insulin acceptance.[30] Similarly, Elkarim & Abdelaziz reported that insulin refusal was much more common among less-educated patients.[31] These findings further reinforce the critical role of health literacy in insulin acceptance and recommend that patient-centred educational interventions could substantially improve treatment adherence.

This study has some limitations. First, the use of convenience sampling for the PCE intervention is a major limitation. Physicians might have unconsciously chosen to counsel patients they perceived as more receptive, hypothetically miscalculating the effectiveness of PCE. Thus, it could introduce a potential for selection bias. Second, the cross-sectional design only permits us to measure acceptance straightaway after counselling. But long-term adherence could not be measured. Some patients who initially agreed might later discontinue insulin. Third, the study was conducted in three selected hospitals within a specific territory of Bangladesh, which might limit the

generalizability of these findings to a broader spectrum.

Conclusions

The current study demonstrates that insulin refusal by diabetic patients is primarily driven by injection phobia and technical concerns in Bangladesh. These can be partially mitigated by physician-led, patient-centered education. However, the predominant reluctance among female patients indicates that a one-size-fits-all educational approach is inappropriate. Future efforts should emphasize developing and validating structured PCE modules that are specifically tailored to address the target groups, particularly women. Further longitudinal studies are required to assess whether this initial acceptance translates into sustained adherence and improved glycemic control. As with other treatment modalities, a good doctor-patient relationship will enhance acceptance of insulin injections and contribute to achieving long-term treatment targets in diabetic patients.

Conflict of interest

The authors have no conflicts of interest to disclose.

Financial Disclosure

This study did not receive any funding.

Data Availability

From the corresponding author on reasonable request

Ethical Approval

The study was approved by the ethical committee of the Medical College for Women and Hospital, Uttara, Dhaka, on 17/January/2024, Memo number: MCWH/Ethical Committee/2024/02

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