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Factors Affecting Insulin Therapy Acceptance Among Patients with Type 2 Diabetes Mellitus at a Tertiary Care Center in Jordan

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Abstract

Introduction: Although insulin plays a vital role in managing blood sugar levels, many patients are reluctant or unwilling to start insulin therapy. This hesitation stems from a range of factors—demographic, psychological, social, financial, and clinical. While these barriers have been well-documented internationally, limited research has explored them in the Jordanian context.

Aim: This study will investigate the factors influencing insulin refusal among Jordanian patients with type 2 diabetes mellitus (T2DM). By identifying the main barriers, we hope to support the development of targeted strategies that improve insulin acceptance, patient adherence, and overall diabetes care in Jordan.

Methodology: A cross-sectional study was conducted at Jordan University Hospital, involving 1,010 adult T2DM patients selected through systematic random sampling. Data were collected via structured, face-to-face interviews led by sixth-year medical students using a validated questionnaire adapted from Ghadiri-Anari et al. (2013). Data analysis was performed using SPSS.

Results: Among the participants, 27.4% declined insulin therapy, while 17.4% expressed hesitation. Insulin refusal was significantly associated with gender, age, education, and income, whereas factors like duration of diabetes and family history showed no significant association. The most cited reason for refusal was the belief that starting insulin signified worsening disease (40%), followed by fear of hypoglycemia (34.8%) and weight gain (27.9%). Notably, 72.4% of patients did not consider insulin cost a barrier.

Conclusion: Insulin refusal among Jordanian patients with T2DM is shaped by a multifaceted set of influences. Demographic variables such as age, gender, and education level significantly affect patient attitudes. Psychological concerns—especially fear of injections and hypoglycemia—also play a key role. While cost was less of a concern for most patients, lower income still showed some association with refusal. These findings highlight the need for patient-centered interventions and awareness campaigns that address fears, correct misconceptions, and support informed decision-making. Further longitudinal studies are recommended to explore how these attitudes evolve over time.

Keywords: Diabetes Mellitus, Type 2; Insulin; Patient Acceptance of Health Care; Jordan

1. INTRODUCTION

Diabetes mellitus is a major global health challenge, significantly impacting the well-being of individuals, families, and societies across countries of all income levels [1]. In Jordan, the prevalence of type 2 diabetes mellitus (T2DM) among adults aged 20–79 was 14.0% in 1990, rising to 16.0% by 2020, and is projected to reach 20.6% by 2050. Correspondingly, the total number of individuals with T2DM is expected to increase from 218,326 in 1990 to 702,326 in 2020, and to reach 1.9 million by 2050 [2].

This rising prevalence is accompanied by a growing burden of diabetes-related complications affecting multiple organ systems. As one of the most common chronic conditions worldwide, T2DM is associated with a wide range of health issues, including blindness, renal failure, ischemic heart disease, stroke, peripheral neuropathy, foot ulcers, and lower-limb amputations [3]. Urologic complications, such as bladder and sexual dysfunction, are also frequently reported among diabetic patients [4]. Additionally, T2DM increases the risk of mental health disorders, particularly depression and anxiety [5]. However, awareness of diabetes management among adults in Jordan is often suboptimal, highlighting the need for targeted health-promoting lifestyle interventions [6]. Insulin not only regulates glucose homeostasis but also promotes protein synthesis, inhibits lipolysis, and supports cellular proliferation [7]. Despite these benefits, many patients remain reluctant to start or comply with insulin therapy. This reluctance poses a significant challenge for healthcare providers [8].

Multiple studies from diverse geographic and healthcare settings have explored the reasons behind insulin refusal among patients with T2DM. These reasons span demographic, psychological, social, economic, and clinical factors. Among them, psychological barriers are particularly prevalent [9]. Common concerns include fear of injection pain, insulin dependence, and hypoglycemia. For instance, patients from an international study anxiety about daily injections [10], while those in Oman and Iran cited fears of painful injections and lifelong dependency on insulin [11,12]. Similar findings have been reported in Iran, where insulin was associated with complications and perceived as a marker of disease progression [13-15].

Studies from Malaysia [16], India [17], Turkey [18], Iraq [19], and Singapore [20] have shown that insulin is often viewed as a burden that disrupts daily life. Social stigma is another notable barrier, particularly in India [17], Saudi Arabia [21] and Malysia [22], where patients avoided public insulin use due to fear of judgment. Economic constraints also play a critical role, with the cost of insulin and associated supplies influencing patients' willingness to initiate therapy, as seen in a study from India [17]. Demographic factors further contribute to insulin refusal. Research from South Korea [23] and Saudi Arabia [24] indicates that older adults are less likely to accept insulin therapy. Gender-based differences have also been observed, including studies from the Democratic Republic of Congo [25] and the United States [8]. Educational level influences acceptance, as demonstrated in Malaysia and Sudan [9,26], while the type of diabetes treatment was found to impact insulin refusal in Botswana [27].

In Jordan, research on this topic remains limited. A qualitative study by Amer Al-Sahouri (2019) [28], involving 38 patients with diabetes, explored their knowledge and attitudes toward T2DM and insulin therapy. The study identified fear of painful injections, concerns about hypoglycemia,

and the perception of insulin as an indicator of poor glycemic control as key barriers to insulin initiation. However, no comprehensive, systematic investigation has been conducted in Jordan to assess the multifactorial causes of insulin refusal among patients with T2DM.

The present study aimed to address this gap by identifying the factors associated with insulin refusal among patients with T2DM in Jordan. Given the country's diverse sociodemographic characteristics, including variability in socioeconomic status and educational level, we employed a cross-sectional, quantitative design using a structured questionnaire. The findings of this study were expected to inform targeted interventions that enhance insulin acceptance and ultimately improve diabetes management outcomes in Jordan.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

A cross-sectional study was conducted at the Diabetes and Endocrinology clinic at Jordan University hospital. Participants were selected using systematic random sampling. Data collection took place through structured, face-to-face interviews conducted by sixth-year medical students from the University of Jordan.

2.2 Study Participants

The study included 1,010 adult patients (aged 18 years and above) with a confirmed diagnosis of T2DM. Patients with prediabetes, type 1 diabetes mellitus (T1DM), or those who declined participation were excluded.

2.3 Study Tool

Data were gathered using a structured questionnaire consisting of two main sections. The first section collected socio-demographic and clinical information, including age, gender, educational level, monthly income, marital status, smoking status, family history of diabetes, HbA1c levels, and comorbidities.

The second section explored reasons for insulin refusal and was adapted from a previously validated questionnaire by Ghadiri-Anari (2013), titled "Insulin Refusal in Iranian Patients with Poorly Controlled Type 2 Diabetes Mellitus" [13]. It assessed a range of perceived barriers to insulin use, including fear of injections, fear of hypoglycemia, concerns about weight gain, dependence on insulin, social stigma, interference with daily activities, cost, belief that insulin indicates disease progression, injection difficulty, and worry about long-term complications.

Participants rated their responses on a 5-point Likert scale:

1. Strongly disagree
2. Disagree
3. Neutral / Undecided
4. Agree
5. Strongly agree

2.4 Ethical approval

Ethical approval was obtained from the Institutional Review Board (IRB) at the University of Jordan (10202418260). Prior to participation, the study's purpose was clearly explained to all participants, and an informed consent was obtained. Participation was voluntary, and confidentiality was assured throughout the process.

2.5 Statistical Analysis

Data analysis was performed using SPSS software (version 21). Associations between insulin refusal and key variables—such as age, gender, educational level, monthly income, family history, duration of diabetes, and specific barriers—were examined using the chi-square test. Results were reported as frequencies and percentages in cross-

tabulations. Statistical significance was defined as $p < 0.05$.

3. RESULTS

3.1 Socio-demographic Characteristics and Prevalence of Insulin Refusal

This study included 1,010 patients diagnosed with T2DM, of whom 598 (59.2%) were female and 412 (40.8%) were male. Nearly half of the participants (47.1%) were over the age of 60. Regarding educational background, 34.2% had only completed elementary school, while 36.8% held a bachelor's degree. Most participants (62.6%) reported a monthly income of less than 500 Jordanian Dinars (JD) (Table 1).

Among the entire study population, 277 participants (27.4%) refused insulin therapy when indicated, while an additional 176 (17.4%) expressed hesitancy to initiate it (Chart 1).

Table 1: Socio-demographic characteristics of the study participants (N=1010)

Variable	Frequency	Percentages
Gender		
• Male	412	40.8%
• Female	598	59.2%
Age		
• 18-40	56	5.5%
• 41-50	126	12.5%
• 51-60	352	34.9%
• >60	476	47.1%
Educational level		
• Bachelor's degree	372	36.8%
• Secondary school	293	29%
• Elementary school	345	34.2%
Income level		
• <500 JD	632	62.6%
• 500-1000 JD	304	30.1%
• >1000 JD	74	7.3%

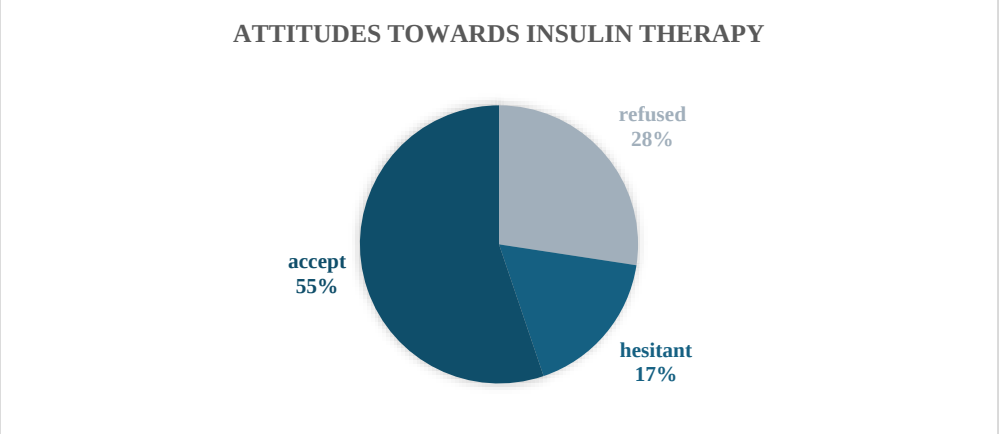

Chart 1. Prevalence of insulin therapy refusal and hesitancy among patients with type 2 diabetes mellitus (N= 1010)

3.2 Association Between Socio-demographic Characteristics and Insulin Acceptance

As shown in Table 2, insulin refusal was significantly associated with several socio-demographic variables:

- Gender: A higher proportion of females (30.9%) refused insulin therapy compared to males (22.3%), with a statistically significant difference (p = 0.009). Hesitancy was relatively similar across genders (17.1% in females vs. 18.0% in males).
- Age: Refusal rates were highest among participants older than 60 years (29.8%), followed by those aged 51–60 years (25.9%). Younger patients (18–40 years) had the highest acceptance rate (60.7%). These age-related differences were statistically significant (p = 0.029).
- Educational Level: Participants with a bachelor's degree were more likely to accept insulin therapy (58.3%) compared to those with only elementary education (51.0%). This difference was also statistically significant (p = 0.021).
- Income: Insulin refusal was more common among those with lower monthly income. Among participants earning less than 500 JD per month, 28.8% refused insulin, compared to only 14.9% of those earning over 1,000 JD (p = 0.024).

Table 2: Acceptance of insulin therapy in relation to socio-demographic characteristics among type 2 DM patients (N=1010)

Variable	Accept	Refuse	Hesitant	p-value[1]
Gender				
• Male	246 (59.7%)	92 (22.3%)	74 (18.0%)	0.009*
• Female	311(52.0%)	185 (30.9%)	102 (17.1%)	
	557	277	176	
Age				
• 18-40	34 (60.7%)	10 (17.9%)	12 (21.4%)	0.029*
• 41-50	59 (46.8%)	34 (27.0%)	33 (26.2%)	
• 51-60	198 (56.3%)	91 (25.9%)	63 (17.9%)	
• >60	266 (55.9%)	142 (29.8%)	68 (14.3%)	
	557	277	176	
Education level				
• Bachelor's degree	217 (58.3%)	81 (21.8%)	74 (19.9%)	0.021*
• Secondary school	164 (56.0%)	86 (29.4%)	43 (14.7%)	
• Elementary school	176 (51.0%)	110 (31.9%)	59 (17.1%)	
	557	277	176	
Income				
• <500 JD	342 (54.1%)	182 (28.8%)	108 (17.1%)	0.024*
• 500-1000 JD	161 (53.0%)	84 (27.6%)	59 (19.4%)	
• >1000 JD	54 (73.0%)	11 (14.9%)	9 (12.1%)	
	557	277	176	
Total				1010
[1] Pearson's Chi squared test.				

3.3 Clinical Factors and Insulin Acceptance

Table 3 presents the association between clinical variables and insulin therapy acceptance:

- Treatment Type: A strong association was found between current treatment modality and willingness to accept insulin ($p < 0.001$). Patients already on insulin showed the highest acceptance rate (77.3%), whereas those receiving only oral medication had the highest refusal rate (42.8%).
- HbA1c Levels: No significant association was found between HbA1c levels and insulin acceptance ($p = 0.945$). Refusal and hesitancy were relatively consistent across glycemic control categories.
- Duration of Diabetes: Although patients with a shorter disease duration (<5 years) showed slightly higher refusal (29.7%), the association between duration and insulin acceptance was not statistically significant ($p = 0.139$).
- Family History of Diabetes: No significant association was observed between family history and insulin acceptance ($p = 0.374$).

Table 3: Clinical characteristics of DM in relation to insulin acceptance (N=1010)

Variable	Accept	Refuse	Hesitant	p-value [1]
HbA1c • <7 • 7-8 • >8	 167 (30.0%) 200 (36.0%) 189 (34.0%)	 86 (31.2%) 96 (34.8%) 94 (34.1%)	 52 (30.2%) 66 (38.4%) 54(31.4%)	0.945
Duration of diabetes • <5 years • 6-10 years • >10 years	 137(51.5%) 113(52.1%) 307 (58.3%)	 79(29.7%) 57(26.3%) 141(26.8%)	 50(18.8%) 47(21.7%) 79(15.0%)	0.000*
Family history of diabetes • Yes • No	 431(56.3%) 126(51.4%)	 206(26.9%) 71 (29.0%)	 128(16.7%) 48 (19.6%)	0.139
• [1] Pearson's Chi squared test.				0.374

3.4 Barriers to Insulin Therapy

Perceived barriers to initiating insulin therapy were explored using a 5-point Likert scale (Table 4, Chart 3). Several key concerns emerged:

- Perception of Disease Progression: The most commonly reported barrier was the belief that insulin use signifies worsening of diabetes. Half (48.9%) of respondents either agreed or strongly agreed with this statement.
- Fear of Hypoglycemia: A combined 44.5% of participants reported fear of low blood sugar as a major concern.
- Injection-Related Issues: About 31.8% of participants feared weight gain, while 30.2% cited fear of injections as a deterrent.
- Other Misconceptions and Psychological Barriers:
  - 25.1% agreed that insulin might cause long-term complications.
  - A minority (15.9%) expressed concern about the cost of insulin.
  - Only 11.7% were worried about becoming dependent on insulin.

- Most participants rejected the idea of insulin-related stigma, with 67.9% strongly disagreeing with this notion.

Overall, psychosocial and clinical misconceptions—rather than financial or social factors merged as the primary contributors to insulin refusal.

Table 4: Distribution of reasons of insulin refusal among type 2 diabetic patients (N=445)

	strongly agree	Agree	Neutral	Disagree	strongly disagree	sum
	5	4	3	2	1	
Insulin means worsening DM	178 (40%)	40 (8.9%)	82 (18.4%)	23 (5.2%)	122 (27.4%)	445
Fear of hypoglycemia	155 (34.8%)	43 (9.7%)	71 (15.9%)	25 (5.6%)	151 (33.9%)	445
Fear of weight gain	124 (27.9%)	41 (9.2%)	65 (14.6%)	36 (8.1%)	179 (40.2%)	445
Fear of injection	104 (23.4%)	35 (7.9%)	39 (8.8%)	43 (9.7%)	224 (50%)	445
Continuous dependency on it	67 (15.1%)	28 (6.3%)	94 (21.1%)	31 (6.9%)	225 (50.6%)	445
Fear of social stigma	52 (11.7%)	19 (4.3%)	36 (8.1%)	36 (8.1%)	302 (67.9%)	445
Limitation of daily works	87 (19.6%)	39 (8.8%)	77 (17.3%)	51 (11.5%)	191 (42.9%)	445
High cost of insulin therapy	60 (13.5%)	11 (2.5%)	30 (6.7%)	22 (4.9%)	322 (72.4%)	445
Insulin causes DM complication	89 (20%)	45 (10.1%)	156 (35%)	24 (5.4%)	131 (29.4%)	445
Hardship from insulin injection	79 (19.1%)	43 (10.4%)	34 (8.1%)	55 (13.3%)	203 (49%)	445

4. DISCUSSION

This study, based on data from 1,010 patients with T2DM, provides important insights into the factors influencing insulin refusal in Jordan. To our knowledge, this is the first study in Jordan to comprehensively explore this issue, thereby shedding light on previously underexamined barriers. The findings revealed that 27% of participants refused insulin therapy and 17% were hesitant. In comparison, a study conducted in Korea [29] reported a higher refusal rate of 35.7% among patients with type 2 diabetes. These barriers span demographic, psychological, socioeconomic, and clinical factors, highlighting the multifaceted challenges patients face when initiating insulin. The following discussion situates these findings within the context of existing regional and international literature.

4.1 Demographic Factors

Older patients in this study were significantly more likely to refuse insulin therapy, consistent with findings from Korea [23] and Saudi Arabia [24]. This trend may be linked to therapeutic inertia, as older adults often develop long-term reliance on oral medications and may resist treatment changes. Additionally, age-related factors such as visual or cognitive impairment may hinder the ability to self-administer insulin, as previously reported [30].

Gender differences also emerged, with female patients showing significantly higher refusal rates than males. Similar trends were reported in studies from the United States [8] and the Democratic Republic of Congo [25]. This may be due to the greater caregiving responsibilities women often bear, which can lead them to deprioritize their own health needs.

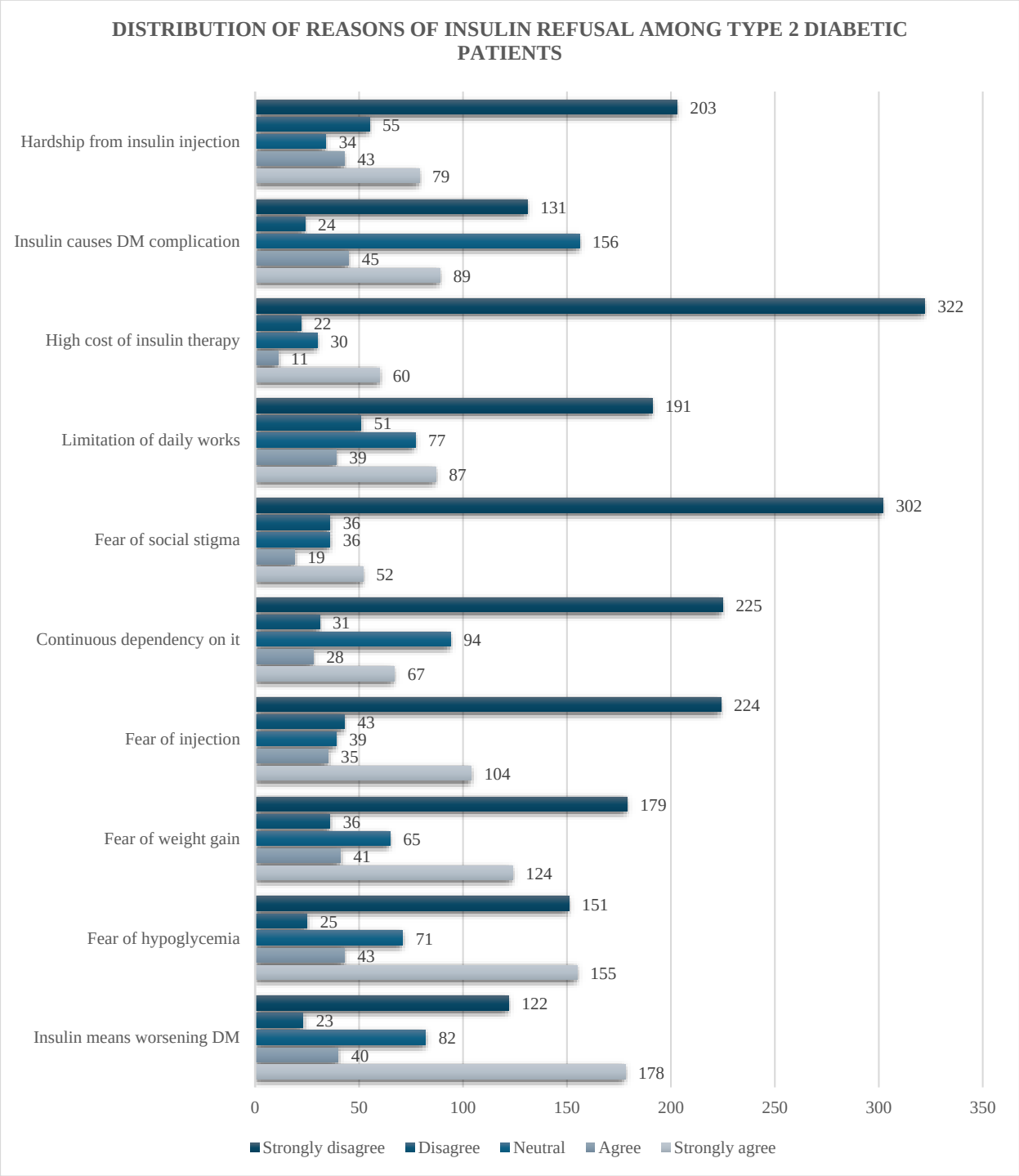

Chart 2. Perceived barriers to insulin therapy among patients who refused insulin (N=445)

Educational level showed a significant association with insulin refusal. Patients with lower education levels were more likely to refuse insulin therapy, consistent with findings from Malaysia and Sudan [16,26]. This suggests that higher education levels may enhance understanding of diabetes management and the importance of insulin therapy.

4.2 Psychological Factors

Psychological barriers played a significant role in insulin refusal. Fear of injections was one of the most cited concerns, echoing findings from an international study and Oman [10,11]. This fear may stem from inadequate patient education on injection techniques or negative past experiences.

Interestingly, social stigma was not perceived as a significant barrier in our study; 67.9% of participants strongly disagreed that stigma played a role in their insulin decision-making. This contrasts with studies from Saudi Arabia [21] and India [17], where stigma was more pronounced. These differences may reflect variations in cultural norms and perceptions of chronic illness.

The misconception that insulin use signifies disease worsening was prevalent, with 40% of participants agreeing with this belief. This concern has been widely documented [11,13,14] and may stem from the common clinical practice of introducing insulin at later disease stages.

Fear of hypoglycemia was also a key barrier, reported by 34.8% of participants similar to findings from Malaysia and India [16,17]. This suggests a gap in diabetes education, particularly in counseling patients about hypoglycemia prevention and management.

Concerns about weight gain were notable and these concerns mirror those reported from Turkey [31]. Additionally, fear of dependency on insulin remains a persistent issue, as reflected in studies from Oman [11].

Many participants believed that insulin therapy would interfere with daily life activities. Similar concerns have been reported in studies from the United States [8], Malaysia [20], and Singapore [32], where patients feared insulin would hinder social activities, travel, or work responsibilities.

A considerable number of patients believed insulin might cause complications, such as blindness—misconceptions also documented in studies from San Diego [8]. These beliefs may be perpetuated by misinformation within social networks or insufficient counseling from healthcare professionals.

Although injection-related difficulties were not a major barrier in our sample, they were significant in a study conducted in Basrah, Iraq [19]. This discrepancy may be due to differences in patient education or healthcare system support.

4.3 Socioeconomic Factors

Income level and insulin refusal were strongly correlated. Patients with lower incomes (less than 500 JD) were more likely to refuse insulin therapy. These findings are consistent with studies in Malaysia [16] and Saudi Arabia [21], where lower-income patients frequently cited the high cost of insulin as a major barrier to starting therapy. This may be attributed to the limited ability of these patients to pay for insulin or transportation to healthcare facilities.

Interestingly, 72.4% of patients in our study did not view the high cost of insulin therapy as a concern. This could be because the participants were primarily from the University of Jordan Hospital, where most had health insurance.

4.4 Clinical Factors

Contrary to expectations, having a family history of diabetes did not significantly influence insulin acceptance. This finding aligns with a study from Tehran [33], suggesting that familiarity with the disease alone may not translate into greater treatment adherence.

Similarly, disease duration did not significantly impact willingness to initiate insulin therapy, consistent with findings from

Iran [14]. However, treatment modality showed a clear relationship with insulin acceptance. Patients already using insulin were more likely to accept continued use, supporting similar findings from Botswana [27]. This may reflect increased familiarity and reduced fear once insulin is incorporated into daily life.

Interestingly, HbA1c levels were not significantly associated with insulin refusal in our study. This contrasts with Malaysian data [16], where poorer glycemic control was associated with greater willingness to initiate insulin. In our sample, patient decisions appeared to be shaped more by beliefs and perceptions than by objective indicators of glycemic control.

4.5 Limitations

It must be mentioned that this study has certain limitations. Its cross-sectional design captures patient attitudes at a single point in time, without accounting for changes over time or in response to clinical interventions. Additionally, reliance on self-reported data introduces the potential for recall and social desirability bias. The study population was drawn from a single tertiary care hospital, which may limit the generalizability of findings to other regions or healthcare settings.

Future research should employ longitudinal designs to explore how patient attitudes evolve over time and in response to diabetes education or therapeutic experiences. Expanding the sample to include diverse healthcare settings would enhance the representativeness and applicability of findings.

5. CONCLUSION

This study highlighted that psychological, demographic, socioeconomic, and clinical factors remain significant barriers to insulin acceptance. Tackling these challenges is essential for improving treatment adherence and overall diabetes management.

To do so, we recommend patient-centered educational programs that directly address common fears and misconceptions surrounding insulin therapy. Special attention should be given to high-risk groups—such as older adults, women, and those with limited education or lower income—through tailored interventions.

Healthcare providers play a critical role and should prioritize empathetic, clear communication and individualized counseling, especially when addressing concerns about injection pain, fear of hypoglycemia, or the belief that insulin marks disease progression or causes harm.

Finally, system-level support such as ensuring access to affordable insulin and integrating diabetes educators into routine primary care—can further strengthen these efforts and support patients throughout their treatment journey.

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العوامل المؤثرة في تقبّل العلاج بالإنسولين لدى مرضى السكري من النوع الثاني في مركز رعاية صحية ثالثي في الأردن

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الملخص

المقدمة: على الرغم من الدور الحيوي الذي يلعبه الإنسولين في ضبط مستويات سكر الدم، إلا أن العديد من المرضى يترددون أو يرفضون البدء بالعلاج بالإنسولين. ويعود هذا التردد إلى مجموعة من العوامل الديموغرافية والنفسية، والاجتماعية، والمالية، والسريرية. وعلى الرغم من توثيق هذه العوامل بشكل واسع عالميًا، إلا أن الأبحاث التي تناولتها في السياق الأردني ما تزال محدودة و تهدف هذه الدراسة إلى تحديد العوامل المؤثرة في رفض العلاج بالإنسولين لدى المرضى الأردنيين المصابين بالسكري من النوع الثاني. ومن خلال تحديد أهم العوائق، نأمل في دعم تطوير استراتيجيات تستهدف تحسين تقبّل العلاج بالإنسولين، وتعزيز التزام المرضى، والارتقاء بجودة الرعاية المقدمة لمرضى السكري في الأردن.

المنهجية: أُجريت دراسة مقطعية في مستشفى الجامعة الأردنية على عينة مكوّنة من 1010 مرضى بالغين مصابين بالسكري من النوع الثاني، تم اختيارهم باستخدام أسلوب العينة العشوائية المنتظمة. جُمعت البيانات من خلال مقابلات شخصية منظمة أُجريت من قبل طلاب الطب في السنة السادسة باستخدام استبيان مُعتمد ومقتبس من دراسة Ghadiri-Anari وآخرين (2013). تم تحليل البيانات باستخدام برنامجSPSS.

النتائج: أظهر المشاركون أن 27.4% رفضوا العلاج بالإنسولين و17.4% أبدوا ترددًا في البدء به. وارتبط رفض الإنسولين بشكل ملحوظ مع الجنس والعمر والمستوى التعليمي والدخل، في حين لم يظهر ارتباط معنوي مع مدة الإصابة بالسكري أو وجود تاريخ عائلي للمرض. وكان السبب الأكثر شيوعًا للرفض هو الاعتقاد بأن بدء الإنسولين يدل على تدهور الحالة المرضية (40%)، تلاه الخوف من هبوط السكر (34.8%)، ثم زيادة الوزن (27.9%). ومن الجدير بالذكر أنّ 72.4% من المرضى لم يعتبروا تكلفة الإنسولين عائقًا.

الاستنتاج: يتأثر رفض العلاج بالإنسولين لدى المرضى الأردنيين المصابين بالسكري من النوع الثاني بمجموعة معقدة من العوامل. إذ تلعب المتغيرات الديموغرافية مثل العمر والجنس والمستوى التعليمي دورًا مهمًا، بالإضافة إلى العوامل النفسية مثل الخوف من الإبر وهبوط السكر. وعلى الرغم من أن التكلفة لم تكن عائقًا رئيسيًا لمعظم المرضى، إلا أن انخفاض الدخل أظهر ارتباطًا معينًا بالرفض. تؤكد هذه النتائج الحاجة إلى تدخلات تتمحور حول المريض وحملات توعوية تهدف إلى معالجة المخاوف، وتصحيح المفاهيم الخاطئة، ودعم اتخاذ القرار المستنير. كما توصى بإجراء المزيد من الدراسات الطولية لاستكشاف كيفية تطور هذه المواقف مع مرور الوقت.

الكلمات الدالة: داء السكري من النوع الثاني، الإنسولين، تقبّل المرضى للرعاية الصحية، الأردن