Barriers to Insulin Therapy Among Adult Patients with Type 2 Diabetes Mellitus of the Department of Family and Community Medicine of Quezon City General Hospital: A Cross-Sectional Study

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Background: Diabetes is a chronic metabolic condition that represents a major public health issue worldwide, with Type 2 diabetes comprising 80-90% of all cases[1]. It is estimated that individuals with diabetes will increase from 451 million in 2021 to 693 million by 2045, with around 4.3 million individuals affected in the Philippines as of 2021[2,3,4]. While insulin therapy is vital for managing diabetes, acceptance among patients is frequently obstructed by concerns about side effects, potential disruptions to their lifestyle, and stigma associated with injections.

Objective: The objective of the study was to determine the barriers to insulin therapy among adult patients with Type 2 Diabetes mellitus of the Department of Family and Community Medicine of Quezon City General Hospital.

Methods: This is a cross-sectional study carried out between July and September 2024 involving 117 participants with Type 2 diabetes. Information was gathered through self-administered questionnaires consisting of the Insulin Treatment Appraisal Scale (ITAS) and the SCREEM-RES questionnaire.

Results: Majority of the participants (67.06%) were aged between 60 and 65, predominantly female (56%) and unemployed with a monthly family household income of less than 8,000 pesos. ITAS revealed negative perceptions towards insulin treatment, primarily due to fear and perceived loss of control. Family resources among the participants was revealed to be inadequate, as reflected in the SCREEM-RES questionnaire.

Conclusion: Age, education, employment status, household income, high negative attitude towards insulin and inadequate family resources are found to be barriers to initiating insulin. The study highlights the need for improved education to foster a supportive environment for insulin use and emphasizes the importance of involving patients in their treatment decisions for effective diabetes management and better long-term health outcomes.

Key words: Diabetes mellitus Type 2, insulin, fear

Introduction

Diabetes, a chronic, metabolic disease characterized by elevated levels of blood glucose, is a globally significant public health concern. The most prevalent type is Type 2 diabetes which is approximately 80-90% of all cases of DM.[1] By 2045, it is projected that there would be an increase from 451 million people currently affected to 693 million globally.[2,4] For the past few years, there has been a steady increase in the number of cases, particularly in the Philippines. According to the International Diabetes Federation, there were 4,303,899 total cases of diabetes in the Philippines in the year 2021 with 7.5% prevalence[3]. Insufficient management of blood glucose levels may result in various disorders, such as cardiovascular diseases. In addition, it accounts for the burden of expenses for people affected with diabetes. For people living with diabetes, access to affordable treatment including insulin is critical for survival. Insulin treatment is a crucial treatment option for managing Type 2 diabetes, however, its acceptance among patients remains varied and complex. Patient-related factors include concerns about side effects and misperception about the treatment.

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Despite recent advances in effective glucose-lowering therapies, there is still high prevalence in therapeutic inertia especially among diabetes patients.[10] Hence, understanding the factors influencing insulin acceptance and determining the barriers to hesitancy with insulin treatment is vital for optimizing treatment outcomes. Insulin has more side effects than oral hypoglycemic agents. In addition, social consequences include insulin interfering with daily activities as well as fear or experiencing stigma when injecting in public. By considering the cultural context and barriers experienced prior to insulin initiation, healthcare providers can develop targeted interventions to improve insulin initiation rates and enhance patient adherence.

Tailored strategies that address patients' cultural beliefs, provide comprehensive education, and foster supportive healthcare environments are essential for promoting insulin acceptance and optimizing diabetes management in diverse cultural settings.

This study aimed to determine the barriers to insulin therapy among adult patients with Type 2 Diabetes mellitus of the Department of Family and Community Medicine of Quezon City General Hospital

Specific objectives were to determine: the socio-demographic profile of adult patients with Type 2 diabetes mellitus; the perception toward insulin treatment among Type 2 Diabetes mellitus patients and the adequacy of family resources for insulin treatment among Type 2 Diabetes mellitus patients

Methods

A descriptive cross-sectional study was conducted among adult patients aged 19-65 years with Type 2 Diabetes mellitus who visited for routine consultations at the Outpatient Department of Family and Community Medicine at Quezon City General Hospital. Eligible participants were recruited with non-probability sampling method and informed about the purpose of the study and was given a consent form to sign.

The study was conducted from July to September 2024 at the Outpatient Department of Family and Community Medicine of Quezon City General Hospital. Tyoe 2 DM patients on routine consultation were recruited through random sampling method.

Included in the study are adult patients aged 19-65 years with Type 2 Diabetes mellitus who visited for routine consultations. Critically ill adult patients or those in a diabetes emergency, pregnant patients, and those allergic to insulin or its components were excluded. Patients with unstable comorbidities, including severe chronic obstructive pulmonary disease, congestive heart failure, hypertensive urgency or emergency, unstable angina, stroke, or psychiatric illness, and those who are illiterate were also excluded. Eligible participants were given thoroughly discussed informed consent forms before enrollment in the study.

Data were collected using self-administered questionnaires. The questionnaires consisted of three parts: the first part was to gather demographic information; the second part was to determine barriers to insulin treatment using the validated and translated Insulin Treatment Appraisal Scale (ITAS); and the third part was to determine family resource adequacy using the SCREEM-RES questionnaire. The ITAS is a 20-item self-administered questionnaire with 16 negative and 4 positive items. The negatively worded questions of the ITAS cover 5 domains of psychological insulin resistance: perceived personal blame, fear, self-pity/social stigma, perceived loss of control, and dependence. Responses are given on a 5-point Likert-type scale, ranging from "strongly disagree" to "strongly agree" (1-5). Scores for negatively worded items are summed, while for the four positively worded items, the total score is summed and then reversed. The total score, ranging from 20-80, is obtained by adding both positive and negative items together. A higher total score reflects more negative attitudes, while lower scores indicate more positive attitudes toward insulin.[7,8] The SCREEM-RES is a 12-item self-administered modified and simplified method to provide a measure of family resources. Each item is scored on a 0 to 3 basis using the following key: strongly agree = 3, agree = 2, disagree = 1, strongly disagree = 0. The scores for the all the items in the SCREEM-RES and its subscales are summed resulting in scores for the SCREEM-RES subscales (Social, Cultural, Religious, Economic, Educational and Medical) and a total score for the entire SCREEM-RES. Higher scores reflect more adequate family resources – in general or based on the 6 dimensions measured by the subscales, and better family resource adequacy to adapt in times of crisis; while lower scores reflect more inadequate family resources and poorer family resource adequacy to adapt in times of crisis. Scores 0 to 6 means the family has severely inadequate family resources; 7 to 12, moderately inadequate family resources; and 13 to 18, adequate family resources. SCREEM-RES has been validated in the Filipino population and has also been translated to Tagalog[9].

The sample size was determined to be 117 participants, calculated using Sloven's Formula with a 95% confidence interval and a 5% margin of error. Data entry and analysis were conducted using STATA 14 and descriptive statistics were computed to present frequency, percentage, distribution, mean, and standard deviation.

Participation in the study was voluntary, and no consequences placed to the participants upon non-participation nor any material gain from choosing to participate. Informed consent was thoroughly discussed to the participant prior to enrollment to the study. The information collected from this research were kept private. Participant's names were replaced by identification numbers. Only the researcher knew the number. All research related documents and records were kept in a secured storage locker with a lock and key. It was not shared or given to anyone except the researcher and the QCGH IERB in order to guarantee privacy and confidentiality. The research related documents and records were kept until the researcher has derived a conclusion. At the conclusion of the research, data files will be stored in a secured storage locker for 3 years. After 3 years, the research materials will be disposed of through shredding or any other method that will render physical storage data unusable and unreadable. The study was conducted following the approval of QCGH Research Ethics Committee.

Results

A total of 117 participants were eligible, recruited and enrolled in the study. During the course of the study, there were no recorded non-participation or drop outs.

The distribution of demographic profile of 117 respondents is illustrated in table 1. The majority of respondents are between 60-65 years old, corresponding to 67.06% of the total number of respondents.

Table 1. Socio-demographic characteristics of Type 2 diabetes mellitus patients of the Department of Family and Community Medicine of Quezon City General Hospital

Socio-demographic Profile				
Variable	Frequency (N=117)	Percentage (%)	Mean	SD
Age				
19-29	2	1.71	54.50	6.36
30-39	12	10.26	59.83	4.53
40-49	30	25.64	62.87	7.13
50-59	25	21.37	61.32	7.03
60-65	48	67.06	67.06	6.40
Gender	Frequency (N=117)	Percentage (%)	Mean	SD
Male	52	44.44	64.4	6.84
Female	65	55.56	63.32	7.52
Civil Status	Frequency (N=117)	Percentage (%)	Mean	SD
Married	18	70.94	63.64	7.14
Single	15	12.82	62.73	8.33
Widowed	19	16.24	65.37	6.16
Educational Attainment	Frequency (N=117)	Percentage (%)	Mean	SD
Primary	28	23.93	66.96	5.55
Secondary	66	56.41	64.33	6.44
Tertiary	14	11.97	55.21	5.77
Graduate School	3	2.56	54.00	1.73
No schooling	6	5.13	68.17	6.43
Employment Status	Frequency (N=117)	Percentage (%)	Mean	SD
Employed	19	16.24	55.68	5.32
Unemployed	98	83.76	65.38	6.34
Monthly Household Income	Frequency (N=117)	Percentage (%)	Mean	SD
<8,000	84	71.79	66.08	5.87
8,001-15,000	22	18.80	59.68	7.02
15,0001-30,000	8	6.84	54.88	6.24
30,001-50,000	0	0.00	-	-
>50,000	3	2.56	54.00	1.73

On the other hand, only 1.71% of the correspondents belong to the age group of 19-29 years old. In terms of gender, the majority are female (55.56%). Most of the participants finished secondary education (56.41, and are unemployed (83.76%), and earning less than P8,000. In summary, age, educational background, employment status and household income have significant contributions in their perception to insulin treatment.

Table 2 shows the degree of agreement of the respondents per item about insulin treatment. Based on rank, the item with the highest mean response is item number 10. The mean response is 4.11, with SD of 1.03. This means that the respondents generally agree that managing insulin injections takes a lot of time and energy. On the other hand, the item with the lowest mean response is item number 3. The mean is 1.74, with SD of 0.96. The respondents generally disagree that taking insulin helps to prevent complications of diabetes.

Among the 20 items, items number 10, 2, 8, 7 and 15 and 20 are the top 6 statements with the highest mean responses, respectively while items 12, 17 and 3 are the items that belong to the lowest mean responses.

Table 2.1 shows the perception of the respondents about insulin treatment based on the 5 domains of ITAS. An average score below 10 implies low perception. Fear and perceived loss of control obtained the highest mean score, leading to a high total score of 63.80, which means that the respondents have a high negative attitude towards insulin.

Among the 5 domains of ITAS - Fear and Perceived loss of control gained a high interpretation. This means that they are the major psychological reasons for resistance to insulin treatment.

Table 3 shows the inadequacy of family resources on insulin treatment among adult patients from different domains. It can be noticed that higher scores are in the social and cultural domains while the economic domain obtained the lowest score. The total average score of 12.96 means that they have moderately inadequate family resources.

Discussion

Socio-Demographic Factors

A total of 117 participants have completed the survey. It was shown that the majority of respondents are between 60-65 years old of the total number of respondents. On the other hand, ages between 19-29 years old corresponds to the minority of the respondents. Majority are female participants. Most participants are married, finished secondary education, unemployed and has a total monthly family income of less than Php 8,000.00. In a previous study, the baseline demographics indicated that a significant portion of the respondents were married females without employment, experiencing uncontrolled diabetes and grappling with complications associated with the disease. When all these factors were considered collectively, higher educational attainment and perceived capability to self-administer insulin emerged as the primary factors associated with the acceptance of insulin treatment among adult Type 2 diabetes patients[7]. A similar study consists of findings of close age groups ranging from 27 years old to 80 years old with a mean age of 61 years[18]. This means that all the demographic profiles of the respondents, except for gender and civil status, are barriers to initiating

Table 2. Perception of insulin treatment among adult patients with Type 2 diabetes mellitus of the Department of Family and Community Medicine of Quezon City General Hospital

Statement	Mean	SD	Verbal Interpretation	Rank
1. Taking insulin means I have failed to manage my diabetes with diet and tablets	3.17	1.59	Neither	9
2. Taking insulin means my diabetes has become worse.	3.88	1.62	Agree	2
3. Taking insulin helps to prevent complications of diabetes.	1.74	0.96	Disagree	20
4. Taking insulin means other people see me as a sicker person.	3.12	1.04	Neither	12
5. Taking insulin makes life less flexible.	3.32	1.33	Neither	7
6. I'm afraid of injecting myself with a needle.	3.21	1.60	Neither	8
7. Taking insulin increases the risk of low blood glucose levels (hypoglycemia).	3.70	1.22	Agree	4
8. Taking insulin helps to improve my health.	3.80	1.11	Agree	3
9. Insulin causes weight gain	2.98	1.36	Neither	13
10. Managing insulin injections takes a lot of time and energy.	4.11	1.03	Agree	1
11. Taking insulin means I have to give up activities I enjoy.	3.15	1.47	Neither	10.5
12. Taking insulin means my health will deteriorate.	2.03	1.24	Disagree	18.5
13. Injecting insulin is embarrassing.	2.69	1.44	Neither	16.5
14. Injecting insulin is painful.	2.77	1.29	Neither	14.5
15. It is difficult to inject the right amount of insulin correctly at the right time every day.	3.67	1.28	Agree	5.5
16. Taking insulin makes it more difficult to fulfill my responsibilities (at work, at home).	3.15	1.47	Neither	10.5
17. Taking insulin helps to maintain good control of blood glucose.	2.03	1.24	Disagree	18.5
18. Being on insulin causes family and friends to be more concerned about me.	2.69	1.44	Neither	16.5
19. Taking insulin helps to improve my energy level.	2.77	1.29	Neither	14.5
20. Taking insulin makes me more dependent on my doctor.	3.67	1.28	Agree	5.5
Composite Mean	63.80	7.14		

Table 2.1 Perception of insulin treatment based on 5 Domain of ITAS among adult patients with Type 2 diabetes mellitus of the Department of Family and Community Medicine of Quezon City General Hospital

5 Domains of Insulin Treatment Appraisal Scale	Mean	SD	Interpretation
Perceived personal blame	7.05	2.66	Low
Fear	14.68	3.32	High
Self-Pity/Social Stigma	9.62	2.01	Low
Perceived loss of Control	17.15	2.95	High
Dependence	3.94	1.17	Low
Total Score in ITAS	63.80	7.14	High negative attitude towards insulin

Table 3. Descriptive reporting on adequacy of family resources on insulin treatment among adult patients with Type 2 diabetes mellitus of the Department of Family and Community Medicine of Quezon City General Hospital

Resource Domain	Mean	SD
Social Help with Family Help from Community	2.42	0.13
Cultural Culture strengthens family Culture of Helping and Cooperation	2.53	0.11
Religious Faith and Religion helps family Help from Religious groups	2.06	0.18
Economic Family savings Family Income	1.69	0.01
Educational Adequate to understand illness Adequate to care for patient	1.99	0.07
Medical Access to medical care in the community Help from healthcare providers	2.27	0.03
SCREEM-RES Total Score	12.96	3.19

insulin treatment. Perception of insulin treatment does not equate to but somehow predicts patient's acceptance or refusal to undergo it. Such that finding out from our current study that age, educational attainment and employment status are seemingly significant to the perception on insulin treatment, it is worth noting that a local study done at the OPD Department of Family and Community Medicine of the UP PGH identified that insulin treatment acceptance was found to be high among those with high educational attainment[7]. Moreover, economic considerations are one of the possible factors, among others which is associated with non-adherence to insulin treatment[19]. Findings from this study are consistent with other similar studies, therefore, the demographic and social factors play a role in insulin treatment.[12]

Insulin Treatment Appraisal Scale (ITAS)

The ITAS was used in the study to determine the psychological barriers to insulin treatment of patients with Type 2 Diabetes mellitus. In the study, the perception of the respondents about insulin treatment were calculated and an average score below 10 means low perception. It revealed a high total score of 63.80, which means that the respondents have a high negative attitude towards insulin. Consistent with previous studies, patients with Type 2 diabetes mellitus have significantly stronger negative attitudes toward insulin treatment[15]. Among the 5 domains of ITAS, fear and perceived loss of control obtained the highest mean score. The table above shows the degree of agreement of the respondents per item about insulin treatment. Among the items listed in the table, the 5 items with the highest ranks, in decreasing order, are as follows: item number 10, 2, 7, 15 and 20. In a similar study, it was observed that the patients with type 2 diabetes mellitus were reluctant to start insulin treatment upon recommendation by their physician. There is an apparent diabetes related distress phenomenon, which refers to the patient's psychologic burden because of living with and managing their diabetes which includes their perception of loss of control of the disease. This affects some diabetic patient's willingness to accept insulin treatment. It is known that diabetes related distress can increase morbidity, mortality and socio-medical costs[15]. A similar study undertaken by Elkarim and Abdelaziz, the predominant obstacle to initiating insulin treatment was identified as the fear of hypoglycemia, closely trailed by the perception that insulin should only be considered as a last resort and once commenced, should not be discontinued. This could be attributed to the respondents that believed that perceived personal blame, item number 2[5]. Technical proficiency also becomes a variable in insulin treatment. Most of the participants agree that they believe that there is difficulty in injecting the right amount of insulin correctly at the right time every day. This is consistent with the study conducted by Piotie wherein it was identified that barriers to insulin treatment are directed to self-injection, glucose monitoring and side effects of insulin use[14]. Majority of the participants also believed that taking insulin means that their diabetes has become worse which is congruent to a study conducted by Piotie[14]. Individuals with Type 2 diabetes should be informed early in their treatment that they will likely need insulin eventually because of the characteristics of the condition rather than any personal failure.

Most of the participants generally agree that taking insulin increases the risk of low blood glucose levels (hypoglycemia). The result is also congruent to other studies conducted by Brod wherein participants perceived that insulin cause hypoglycemia. Adverse effects such as hypoglycemia can decrease the confidence in initiating insulin treatment[16].

Most of the participants believed that taking insulin makes them more dependent on their doctor. This item ranked 5th among the 20 items of the ITAS. This finding is consistent with a previous study. Among the 5 domains of the psychological insulin resistance, this statement falls under Dependence. Relying heavily on healthcare providers for insulin treatment decisions can postpone the start of treatment, as individuals may doubt their capability to handle their diabetes on their own. Patients who are excessively dependent on their healthcare providers might perceive the decision to begin insulin as a complicated process, resulting in delays in starting treatment even when they recognize its advantages. The notion that they need to check with their healthcare provider before beginning insulin can stop patients from taking the initiative in their diabetes care, ultimately delaying the commencement of necessary therapy.

SCREEM-RES

The study utilized the SCREEM-RES Questionnaire to evaluate the resources available to families for managing insulin therapy in patients with Type 2 Diabetes mellitus. Findings revealed that social and cultural resources were the most sufficient, with cultural, social, and medical resources being the most significant in offering support. These domains are particularly crucial during crises, as social and cultural backing greatly influences the distress felt by families and caregivers of individuals facing chronic conditions such as diabetes. Filipino families, recognized for their strong familial bonds and community connections, reported high levels of satisfaction with both family and cultural support, which alleviated feelings of social stigma or self-pity related to insulin administration. The study also highlighted the importance of access to medical care and support from healthcare workers, especially concerning the availability of hospitals. Furthermore, religion, a vital component of Filipino family life, was acknowledged as a key source of strength in challenging times, further enhancing the families' resilience in coping with the stress of chronic illness. According to Martini, religious beliefs and practices can decrease the stress and burden of caregiving[17]. Economic and education domains were the least among the 6 domains of SCREEM-RES. According to the Philippine Statistics Authority, in 2023, an average Filipino spent Php 11, 083 for healthcare goods and services. Compared to 2022 data, this was 8.3% higher. Most of the country's hospitals are privately owned; moreover; the social insurance arm, The Philippine Health Insurance Corporation (PhillHealth) only gives health benefits to regular paying members. Thus, the nation's healthcare system could hardly help its sick people and their family. This is moreover felt by patients and families of Diabetes who shoulder much, if not all their treatment. Based on the socio-demographic results of this study, 71.79% of the respondents had less than 8,000 monthly household income. This is one of the probable reasons why the economic domain is among the least family resources[9]. Education

resources, likewise, resulted to be the least among the 6 domains. Most of the respondents of the study have completed secondary education and this should have allowed them to understand the basic information about the illness and instructions for treatment, However, it is one among the least adequate resources maybe due to other factors such as inadequate communication and information sharing between family and healthcare providers. This may also reflect the family's need for more counseling and guidance from healthcare providers.

This study has certain limitations that need to be recognized. This research was carried out at a single center in a tertiary hospital located in Quezon City. Consequently, the findings of this study might be restricted to the local region and may not be directly applicable to other areas with more varied economic conditions. Second, the cross-sectional study design does not permit us to definitively establish a causal relationship with all identified barriers to insulin treatment. Third, clinical characteristics of participants were not included in the study such as duration of diabetes, frequency of consultations, other comorbidities present, family history of diabetes and caregiving status which may play a vital role in identifying barriers to insulin treatment. Lastly, response bias since the study employed self-administered questionnaires.

Conclusion and Recommendations

In conclusion, age, education, employment status, household income, high negative attitude towards insulin and inadequate family resources were found to be barriers to initiating insulin treatment. The study highlights the need for improved education to foster a supportive environment for insulin use and emphasizes the importance of involving patients in their treatment decisions for effective diabetes management and better long-term health outcomes. It is important to emphasize the positive impact of insulin therapy in managing diabetes from the moment of diagnosis. Addressing the psychological aspects of diabetes, such as fears, feelings of lost control, and misconceptions about insulin therapy, is essential. Counseling should focus on dispelling these concerns and improving patients' understanding of insulin's role in treatment.

Long-term studies are needed to identify key factors contributing to psychological barriers to insulin treatment and develop strategies to foster acceptance of insulin. Future research should also explore clinicians' perspectives on initiating insulin therapy, as these views can significantly influence treatment decisions and patient outcomes.

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