

Resistance to insulin among patients with type 2 diabetes at Duhok diabetes center

Manhal Ahmed Abdulkader

Abstract

The objective of this study is to assess the problem of psychological insulin resistant among adults with type 2 diabetes and to identify the attitudinal barriers associated with it. A total of one hundred fifty insulin-naïve-registered patients with type 2 diabetes were involved in this prospective cross-sectional study. Patients' interview was completed through use of a pre-tested two parts questionnaire with the national Kurdish language after forward-backward translation from the English language. Cronbach's alfa test was used for 5 points Likert scale part that involved the attitudinal barriers. A significant P-value considered when $P < 0.05$. The study depended on SPSS version 22 for data analysis. 56.3 % of patients were unwilling to start insulin when prescribed which represent the prevalence of Psychological Insulin Resistance (PIR) among patients with type 2 diabetes in Duhok. The following socio-demographic characteristics that had significant effects on a patients' perception towards insulin use in this study were: gender, education level, employment status, and family income. Most of the patients showed a negative attitude towards insulin giving a mean of 3.34 negative beliefs per subject. Of the most commonly expressed negative attitudes were injection fear, the permanent need for insulin therapy, and reduced flexibility or restrictiveness. In conclusion, negative perceptions toward insulin are common among patients with type 2 diabetes, especially for female, illiterate, unemployed and low-income patients. Interventions to raise awareness about such misconceptions are important to reduce PIR and to improve both insulin utilization and diabetes care.

Keywords: Diabetes Mellitus; Insulin; Type 2; Resistance; Psychological* Correspondence author: doctor.manhal@gmail.com

Manhal Ahmed Abdulkader

¹Pharmacology Department, College of Pharmacy, University of Duhok. Received 2 May 2017, Accepted 25 June 2017, Available online 15 July 2017.

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Introduction

Diabetes Mellitus (DM) is a big threat to human health especially if not treated correctly. Type 2 of this disease is the most common in which strict glycemic control is essential to prevent diabetes complication. One of the important steps to achieve the recommended glycemic level in type 2 diabetes is the rapid initiation of insulin therapy in poorly controlled patients after oral hypoglycemics failure [1]. In fact, more than 50% of patients with type 2 diabetes will need insulin within six years of diagnosis [2]. However, the delay in starting insulin when recommended is a major problem. In one population-based study, 50% of poorly controlled patients with type 2 diabetes did not start insulin at the recommended time when first prescribed [3,4]. In fact, in several cases there was a four to five years delay. Reluctance to start insulin when recommended has been termed Psychological Insulin Resistance (PIR). PIR is the main cause behind insulin underutilization making it as a last resort. The proportion of PIR varies among different countries. For example, in the western community, about 28% to 39% of insulin-naïve patients were reluctant to

insulin use [5], a figure much lower than in developing countries. In many Asian countries; insulin reluctance is more, where PIR value varies from 50 to 70% [6,7]. There was no previous study to investigate PIR among patients with diabetes locally. This study is the first national study highlighting the proportion of PIR and determining the multifactorial barriers towards insulin use among patients with type 2 diabetes.

Materials and Method

This study designed to be a prospective cross-sectional study to determine the proportion of PIR among selected patients with type 2 diabetes. Attitudes and barriers towards insulin therapy were also investigated. We conducted this study at the outpatient clinic of the main center for diabetes management in Duhok city in the Kurdistan Region of Northern Iraq. A total of one hundred fifty registered patients were enrolled conveniently; all are adults with type 2 diabetes, insulin-naïve with no visual deficits or impaired manual dexterity that may impair self-injection. Data collection was carried out by using a structured questionnaire of two parts; the first part includes socio-demographics and past medical history data. The second part

focused on the attitudinal barriers towards insulin; it involved the use of the Likert scale questionnaire of five points (1. Strongly disagree; 2. Disagree; 3. Not sure; 4. Agree; 5. Strongly agree) regarding 10 statements about the barriers and attitude towards starting insulin therapy if prescribed by the physician. The questionnaire was tested on 30 patients for validity after forward and backward translation from English to the local languages (Kurdish) by language expert and rechecked by a professional

medical expert. A Cronbach's alpha test value was 0.90 which indicates a high internal consistency among the tested items. Approval from the scientific research committee at Pharmacy College of the University of Duhok was also completed, as well as obtaining an oral consent form from the selected patients. Data was coded and analyzed by SPSS version 22. A p-value less than 0.05 considered to be significant according to the methodology of this research.

Results

In this research, we approached a total of 162 respondents, 150 of them agreed to participate giving a response rate of 92.6%. The respondents' ages were between 27 and 85 years. The mean age (SD) was 54.5 (9.9).

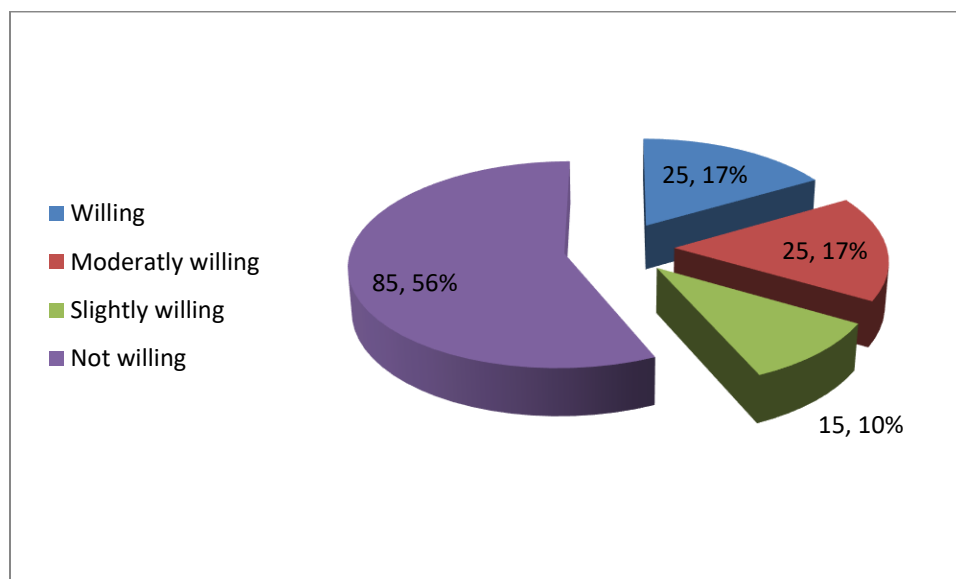


Figure 1: The Willingness of Patients to Start Insulin Whenever Prescribed. The proportion of Psychological Insulin Resistance (PIR) was 56%, this represented by those who are unwilling to start insulin when prescribed.

Table 1: Socio-demographic Characteristics and patients' willingness

Characteristics	n (%)	Willingness Willing	Resistance	P
Overall	150 (100%)	65 (43.3%)	85 (56.7%)	
Gender				
Male	58 (38.7%)	28 (48.3%)	30 (51.7%)	0.04
Female	92 (61.3%)	37 (40%)	55 (60%)	
Total	150	65 (43.3%)	85 (56.7%)	
BMI Category				
< 18.5	1 (1%)	0 (0%)	1 (1%)	0.08
18.5 - 24.9	33 (22%)	18 (54.5%)	15 (45.4%)	
25 – 29.9	66 (44%)	31 (47%)	35 (53%)	
30+	42 (28%)	12 (28.6%)	30 (71.4%)	
Total	142 (95%)	61(43%)	81 (57%)	
Missing	8 (5%)			
Education Level				
Illiterate	65(43%)	24 (36.9%)	41(63%)	0.036
Primary School	34(23%)	12 (35.2%)	22(64.7%)	
Secondary School	26(17%)	14 (53.8%)	11(42.3%)	
College	23(15%)	15 (65.2%)	9(39.1%)	
Total	148(99%)	65(44%)	83(56.1%)	
Missing	2(1%)			
Employment				
Employed	57(38%)	31(54.4%)	26(45.6%)	0.01
Unemployed	82(55%)	28(34%)	54(65.9%)	
Total	139(93%)	59(42.4%)	80(57.6%)	
Missing	11(7%)			
Family Income				
<500	31(21%)	7 (22.6%)	24(77.4%)	0.001
500 - 1000	70(47%)	25 (35.7%)	45(64.3%)	
1001- 3000	32(21%)	23 (71.9%)	9(28.1%)	
3000 <	4(3%)	2 (50%)	2(50%)	
Total	137(91%)	57(41.6%)	80(58.4%)	
Missing	13(9%)			

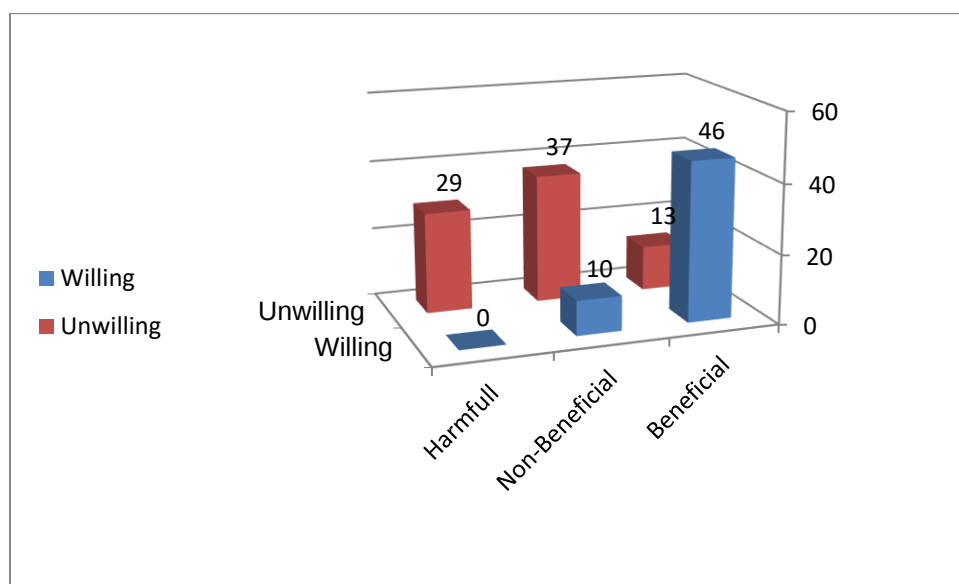


Figure 3.2: Patient's Perception towards Insulin and Willingness to Start it if prescribed. Majority of patients with positive thinking about insulin are willing to start it unlike unwilling patients as they think insulin is harmful or with no benefit.

Table 3.2: Likert Scale Results

Attitudinal Barriers		Mean	SD
1	Insulin therapy can cause problems	3.53	1.296
2	Insulin will lead to life restrictiveness	3.78	1.233
3	I've done everything (lack of fairness)	3	0.983
4	Hard to take the needle daily (needle fear)	3.8	1.112
5	Problems due to low blood sugar	3.39	0.966
6	Lack of self-confidence to handle insulin therapy requirement	3.26	1.169
7	Starting insulin means I had failed	3.26	1.057
8	Once started, must use it lifelong (permanent use)	3.62	1.039
9	Starting insulin means worsening of my diabetes	3.4	1.061
10	People will see me as a sick person if I start using Insulin	2.3	1.188

Cronbach's alpha = 0.901

Discussion

Even though about 12% of global health expenditure had is spent on diabetes, one person dies every second from this disease. Furthermore, those 34.6 million persons with diabetes in the Middle East and South Africa will increase to 71.2 million by the year 2040 following the global trend of increase in the prevalence of diabetes worldwide. This burden highlights the strong need for strict measures to reduce the mortality and morbidity from diabetes. Ensuring patient adherence to medications is at the top of these measures. Most patients with diabetes are facing obstacles when starting insulin and feeling hard to adhere to it when it prescribed. In this study which is the first in Kurdistan and Iraq to investigate PIR, we searched the etiology behind this resistance to use of insulin. More than half of type 2 diabetic patients attending the diabetes center of Azadi teaching hospital in Duhok refuse insulin. The proportion of PIR is 56.3% which is high and may reflect the poor perception towards such important medication. This proportion of PIR is near to that in Asia specifically in Malaysia. In the year 2011, the prevalence of PIR was found to be 50.6% by Nur Azmiah *et al.* [6]. At the

same year in Singapore, a similar study revealed that seven out of every ten type 2 diabetic subjects refuse to start insulin giving a 70.6% PIR [8]. Other studies at the year 2008 showed lower PIR among patients with diabetes from USA and UK. In one study at Massachusetts General Hospital in Boston in the USA, PIR was 33% [9]. In East London, a study for subjects with diabetes from Bangladesh to measure their perception towards insulin use revealed a PIR of 42.2% [10]. A much earlier study by Polonsky *et al.* in the year 2005 with a reasonable sample size of insulin-naïve type 2 diabetic patients reported a lower PIR of 28.2% [11]. All listed studies may show an increasing in PIR with time; however, this increasing trend of PIR is pretending and not real because it represents different samples from different countries. This variation in PIR among different countries could be mostly related to the difference in health care systems, culture, the level of education and variation in knowledge about the disease and its management.

Among the socio-demographics characteristics had been tested in this study, gender, education level, employment status, and family income

have significant effects on the patient's perception toward insulin. There were more females with diabetes than males (61%, n=92), 60% of them (n=55) were reluctant to start insulin, and this difference was statistically significant ($p = 0.04$). This higher prevalence of PIR among females is present in other previous studies (6,9,13). PIR was higher among unemployed (65.9%, n= 54) as compared to employed subjects with diabetes at $p = 0.01$. Another finding is that education level and family income, both are inversely related to the proportion of PIR among subjects with diabetes. A higher proportion of PIR was reported among those with low family income .77.4% (n= 24) of those with a monthly income of USD 500 > and 64% (n=45) of those with a monthly income of USD 500-1000 are reluctant to start insulin ($p = 0.001$). More than 60% of those who are illiterate or having only primary school education were resistant to start insulin ($p= 0.036$). The robust association between education and health outcomes clearly supports this finding which will be more obvious by knowing that literacy mediates the correlation between education and glycemic control

in such population having diabetes with a low family income [12].

Patients express concerns about insulin based on personal experiences or information they received. The obstacle from the patient's perspective that collected from this study is multifactorial. In this study, a set of barriers was analyzed using Likert scale method as explained earlier. The consistency of the scale evaluation through Cronbach's alpha test revealed a value of 0.90 which indicates a high internal consistency among the tested items. Most of the patients showed a negative attitude towards insulin. The mean for all the ten questions is 3.34 negative beliefs identified per subject which indicate a shift from the neutral [3] toward the agreement level. According to the results of this study, the most common factors oppose the start of insulin in a patient with type 2 diabetes are, the inability to take the needle every day (needle fear), life restrictiveness and permanency as shown in Table 2.

In fact, fear of a needle due to injection pain is quite common making insulin therapy burdensome and uneasy. This point is one of the main factors related to the etiology of PIR worldwide

(6,7,9,13,14). However, addressing the availability of a small size needle with a shorter length which is most probably less painful than expected will minimize needle phobia. Also, most insulin naïve patients' overestimates needle pain. And practicing insulin therapy will reduce such fear of injection as the pain is much more tolerable than expected. A drop-in fear of injection (from 47% among insulin-naïve patients to only 6% among insulin users) was observed in one study [15]. Such drop could be evidence for the exaggeration in the anticipated pain by the insulin naïve patient compared to the actual pain experienced when using insulin therapy. In one study to investigate the predictors for PIR among patients with type 2 diabetes, of the most commonly expressed negative attitudes were injection fear, the permanent need for insulin therapy, and reduced flexibility [9]. Such finding is parallel with the results of this study. In the year 2015, the Maha, Hala, and Rania study about PIR in type 2 diabetes, yielded a 100% agreement that life restrictiveness is a major concern against insulin use. In reality, insulin users may experience less flexibility in life and more difficulties in practicing their work and completing

their personal responsibilities [7]. However, the availability of a new technique for delivering insulin (prefilled insulin pens) could be more convenient and provide greater lifestyle flexibility [16, 17]. Also, the shorter needle of this pen may minimize needle pain.

Conclusion

PIR is common in patients with type 2 diabetes making them reluctant to start insulin when prescribed. Addressing the etiological factors of PIR is an important step to clarify the myths about such valuable medication. Developing a patient-focused approach to improving the knowledge and solving the false perception toward insulin is mandatory. That is the clinician job to modify the misconceptions towards insulin therapy to be viewed as a friend and not as a foe for a person with diabetes. The shift from neutral towards agreement about the negative barrier seen in this study or other related studies may be changed or counteracted by some interventions including continuous education programs about the aggressive nature of diabetes and the importance of insulin and its proven effectiveness in reducing the suffering of patients with diabetes. Also, the practical and emotional support from

health care providers will be valuable in reducing the problem of PIR. The practical value of the mentioned interventions is noticeable in this study through convincing patients who were initially reluctant to use insulin to start insulin by a simple, informative explanation and guidance undertaken during patients' interview for data collection.

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Conflict of interest

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