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Attitude towards Insulin Therapy among Patients with Type 2 Diabetes in Tripoli, Libya

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Published: 01 July 2015

Ibnosina J Med BS 2015;7(4):127-135

Received: 07 April 2014

Accepted: 25 February 2015

This article is available from: <http://www.ijmbs.org>

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Abstract

Background: In patients with type 2 diabetes mellitus (T2DM), failure to control of blood glucose with lifestyle modifications and oral hypoglycemic agents (OHA) leads to insulin therapy. **Objectives:** We aimed to 1) find out the prevalence of psychological insulin resistance among patients with T2DM and 2) explore the factors affecting and reasons behind their attitude towards insulin use. **Patients and methods:** In a cross sectional study, 1703 Libyan patients with T2DM on oral hypoglycemic agents (OHA) were studied. They were recruited from outpatient clinics of two hospitals and 5 primary health care centers in Tripoli, Libya over a period of six months. They were asked to complete a self-administered questionnaire. **Results:** From the total number of 1703 participants, 1611 (94.6%) reported unwillingness to accept insulin therapy should it be prescribed to them. Hesitant patients

reported more concerns about possible side effects that may develop from errors in insulin dose than acceptors (73.1% vs 46.7% respectively). 25.6% of the reluctant patients perceived that insulin may cause blindness. Concerns about painful injection of insulin and occurrence of hypoglycemia were expressed by 48.4% and 66.2% of the unwilling group respectively. **Conclusion:** Psychological insulin resistance is a common obstacle to initiation of insulin therapy in Libyan patients with T2DM. There is an urgent need for enhanced patient education to change the attitude of the patients towards insulin therapy.

Key words: Type 2 diabetes mellitus (T2DM); Insulin therapy; Psychological insulin resistance; Needle anxiety; Compliance.

Introduction

Type 2 diabetes mellitus (T2DM) is a progressive disease associated with a gradual loss of β -cell function regardless of therapy (1). By the time an individual is diagnosed with type 2 diabetes, they may have lost up to half of their β cells (2). Consequently, majority of patients require increasing number of medications and more than 50% of patients advance to a stage that requires insulin replacement by 6 years after diagnosis (1,3). Polonsky *et al.* coined the term “psychological insulin resistance” (PIR) to describe patients who are hesitant about or refuse insulin therapy because of their misconceptions about it (4). Features of psychological insulin resistance include fear of injection and self-testing, hypoglycemia, and weight gain; a perceived loss of control over one’s life; poor self-efficacy concerning insulin treatment; and perceived lack of positive outcomes related to insulin therapy (2,4). Patients’ explanations for avoiding insulin extend far beyond a simple fear of needles and often involve deeply held beliefs about insulin and the nature of diabetes (5). These negative attitudes toward insulin treatment contribute to unnecessarily long delays for initiating insulin treatment and, consequently, to extended periods of hyperglycemia and may increase the risk of development of long term complications (6,7).

It appears that clinicians’ method in introducing insulin to patients, in which insulin therapy may be used to frighten patients toward taking better care, may be a major contributor to PIR (5). The majority of PIR cases could be prevented if clinicians began to introduce the possible need for insulin early in treatment, avoid using insulin as a means for threatening or blaming patients, and helped patients see insulin as a possible friend rather than an enemy (5).

While it is anecdotally perceived that PIR is fairly common among Libyan patients, there has been no large studies in document this. We have therefore aimed to 1) ascertain the prevalence of PIR in a fairly large sample of Libyan patients with T2DM who refused insulin injection therapy when they are advised to change from OHA to insulin and to 2) explore the

reasons behind their refusal and the factors affecting their negative attitude towards insulin as a treatment choice.

Patients and Methods

In a cross sectional study, patients with T2DM on oral hypoglycemic agents (OHA) were studied. They were recruited from outpatient clinics of two teaching hospitals (Tripoli Medical Center and Tripoli Diabetes Center) and 5 primary health care centers in Tripoli, Libya over a period of six months. A total of 1703 Libyan patients with T2DM on OHA selected by convenient sampling. Ten junior doctors were trained to use an interviewer-administrated questionnaire to conduct an interview and collect the data from patients after obtaining a verbal informed consent. Patients with type 1 diabetes, patients with type 2 diabetes who were already on insulin, and patients who decline to give an informed consent, all were excluded from the study. The questionnaire was designed by the authors after reviewing the relevant literature (2,5-7). The patients’ socio-demographic data, diabetes history and their attitude towards insulin use if they asked to change from OHA to insulin injections were recorded. Questions to assess their knowledge about insulin and the reasons for refusing insulin use were also included. Responses were tabulated and SPSS (statistical package for social science) was used to analyze the data. Frequency and percentages were used to describe the data and person chi-square test was used to compare between categories and T student test for independent samples used to compare between acceptors and reluctant groups.

Results

Demographic characteristics

From the total number of 1703 patients with T2DM participated in this study, 1611 (94.6%) reported unwillingness to accept insulin if it was prescribed for them. There was no significant difference in the mean age of the acceptor and reluctant patients (58 versus 56 years respectively, $p=0.134$) and no differences existed in the gender distributions (males constituted 47.8% of acceptors and 51.7% of reluctant; $p=0.5200$) (Table 1). The maximal educational level achieved

Table 1. Baseline demographic of reluctant and acceptors of insulin use among the study population.			
Character	Reluctant N (%)	Acceptors N (%)	P value
Age (mean ± SD)	56±12	58±11	0.134
Sex			
Male	833 (51.7)	44 (47.8)	0.520
Female	778 (48.3)	48 (52.2)	
Education level			
Low	648 (40.3)	38(41.3)	0.009
Middle	350 (21.8)	16(17.4)	
High	610 (37.9)	15(16.3)	
Marital state			
Single	136 (8.4)	6 (6.5)	0.709
Married	1208 (75)	72 (78.3)	
Divorced	67 (4.2)	2 (2.2)	
Widow	200 (12.4)	12 (13)	
Duration of diabetes			
1-5years	559 (38.2)	32 (36)	0.912
5-10years	440 (30.1)	28 (31.5)	
>10years	464 (31.7)	29 (32.6)	

Table 2 Awareness of insulin therapy, among patients with type 2 diabetes.			
Variable	Reluctant N (%)	Acceptors N (%)	P value
Have you heard about insulin before?			
Yes	1529 (94.9)	87 (94.6)	0.808
No	82 (5.1)	5 (5.4)	
If yes, do you know how it works in the body?			
Yes	531 (34.7)	28 (32.2)	0.728
No	998 (65.3)	59 (67.8)	
If yes, how does it work?			
Correct answer	305 (57.4)	17 (60.7)	0.056
Incorrect answer	120 (22.6)	10 (35.7)	
No comment	106 (20)	1 (3.6)	
Error in insulin dose can cause side effects			
Agree	1177 (73.1)	43 (46.7)	0.001
Disagree	92 (5.7)	17 (18.5)	
Don't know	342 (21.2)	32 (34.8)	
Error in injection technique can cause side effects.			
Agree	1091 (67.7)	47 (51.1)	0.003
Disagree	131 (8.2)	14 (15.2)	
Don't know	388 (24.1)	31 (33.7)	

Table 3. Concerns about insulin therapy among type 2 diabetes patients.

Concerns about insulin use	Reluctant N (%)	Acceptors N (%)	P value
Do you have any concerns with injections?			
Yes	746 (46.3)	12 (13)	0.001
No	730 (45.3)	65 (70.7)	
No comment	135 (8.4)	15(16.3)	
Do you feel that insulin can cause complications such as blindness?			
Agree	412 (25.6)	20 (21.7)	0.001
Disagree	569 (35.3)	50 (54.3)	
Don't know	630 (39.1)	22 (24)	
Insulin use can cause weight gain.			
Agree	624 (38.7)	29 (31.5)	0.189
Disagree	507 (31.5)	37 (40.2)	
Don't know	480 (29.8)	26 (28.3)	

was inversely related to the perception of insulin use. 37.9% of reluctant group achieved a university level compared to only 16.3% of the acceptors achieving the same ($p=0.009$). Most of the study population were married and 12.4% were widow and there is no relation between the marital status and the willingness to insulin use ($p=0.709$) (Table 1).

Diabetes history and knowledge of insulin therapy

The study population encompassed a wide range of diabetes duration and 9% of them did not mention the duration of diabetes since diagnosis but there was no significant difference between reluctant and acceptors in relation to diabetes duration (Table 1). Exploring the difference between reluctant and acceptors in regard to their awareness to insulin therapy; similar percentage of reluctant and acceptors have heard of insulin therapy before ($p=0.808$), from them (who heard about insulin before) say that they know how it works (34.7% vs 32.2%) for reluctant and acceptors respectively but 22.6% and 35.7% from both groups respectively give incorrect answer about how insulin works in the body ($p=0.056$), 73.1% of the reluctant agreed that error in insulin dose can cause side effects comparing with 46.7% of the acceptors ($p=0.001$), also 67.7% and 51.1% agree that error in injection technique can cause side effects, for the both groups

respectively ($p=0.003$) (Table 2).

Patients' perceptions of insulin therapy

This study considered for some concerns about insulin therapy (Table 3). It was revealed that 46.3% and 13% of reluctant and acceptors respectively have worries with injections ($p=0.001$), 25.6% and 21.7% of them respectively agree that insulin can cause complications such as blindness ($p=0.001$), in the same order 38.7% and 31.5% agree that insulin injection can cause weight gain ($p=0.189$).

Both negative and positive perceptions about insulin therapy were investigated in this study (Tables 4 and 5). 48.4% and 20.7% of the reluctant and the acceptors agree that insulin therapy requires painful injection, 67.3% of refusal patients believed that the need of insulin use refers to an advanced phase of illness and 47.2% assumed that people can become addicted to insulin injection. 58.6% of the reluctant thought that people who require insulin "have not taken care of themselves in the past". From the total number of the reluctants, 38.4% reported that they believed that insulin injection is unnecessary because oral treatment is available. Compared with acceptor patients, refusal patients expressed significantly more concern about the daily troubles and embarrassment which

Table 4. Negative perceptions towards insulin therapy among type 2 diabetes patients.			
Negative perception about insulin	Reluctant N (%)	Acceptors N (%)	P value
Insulin use requires painful injection. Agree Disagree Don't know	779 (48.4) 598 (37.1) 234 (14.5)	19 (20.7) 60 (65.2) 13 (14.1)	0.001
Insulin use refers to an advanced phase of illness. Agree Disagree Don't know	1085 (67.3) 243 (15.1) 283 (17.6)	66 (71.7) 8 (8.7) 18 (19.6)	0.240
People can become addicted to insulin injection. Agree Disagree Don't know	760 (47.2) 428 (26.6) 423 (26.2)	55 (59.8) 17 (18.5) 20 (21.7)	0.056
Starting of insulin therapy signals a personal failure related to self-care. Agree Disagree Don't know	944 (58.6) 410 (25.5) 257 (16)	64 (69.6) 13 (14.1) 15 (16.3)	0.044
Insulin injection is unnecessary, oral treatment is available. Agree Disagree Don't know	618 (38.4) 666 (41.3) 327 (20.3)	34 (37) 48 (52.2) 10 (10.9)	0.041
Insulin injection involves a lot of daily trouble. Agree Disagree Don't know	807 (50.1) 551 (34.2) 253 (15.7)	17 (18.5) 60 (65.2) 15 (16.3)	0.001
Insulin injection cause embarrassment Agree Disagree Don't know	632 (39.2) 866 (53.8) 113 (7)	14 (15.2) 69 (75) 9 (9.8)	0.001
If you start insulin you can't leave it! Agree Disagree Don't know	891 (55.3) 334 (20.7) 386 (24)	52 (56.5) 13 (14.1) 27 (29.3)	0.231
Insulin may cause hypoglycemia. Agree Disagree Don't know	1067 (66.2) 254 (15.8) 290 (18)	68 (73.9) 5 (5.4) 19 (20.7)	0.027

caused by insulin injection. Side effects, particularly hypoglycemia were the topic of interest among the acceptors more than the reluctant (73.9% vs 66.2%). Positive perceptions recorded in both acceptors and

unwilling patients, as that insulin use helps one to feel better agreed by 73.9% of the acceptors and 63.6% of the reluctant, 78.3% of the patients willing to use insulin agree that insulin can effectively control blood

Table 5. Positive perceptions towards insulin therapy among type 2 diabetics.

Positive perceptions about insulin	Reluctant N (%)	Acceptors N (%)	P value
Insulin use helps one to feel better. Agree Disagree Don't know	1024 (63.6) 183 (11.4) 404 (25.1)	68 (73.9) 3 (3.3) 21 (22.8)	0.032
Insulin injection effectively control blood glucose level Agree Disagree Don't know	1234 (76.6) 149 (9.2) 228 (14.2)	72 (78.3) 4 (4.3) 16 (17.4)	0.224
Insulin is more effective than oral medication. Agree Disagree Don't know	1027 (63.7) 236 (14.6) 348 (21.6)	66 (71.7) 4 (4.3) 22 (23.9)	0.022
Insulin injection helps one feels more energetic. Agree Disagree Don't know	936 (58.1) 196 (12.2) 479 (29.7)	67 (72.8) 5 (5.4) 20 (21.7)	0.015

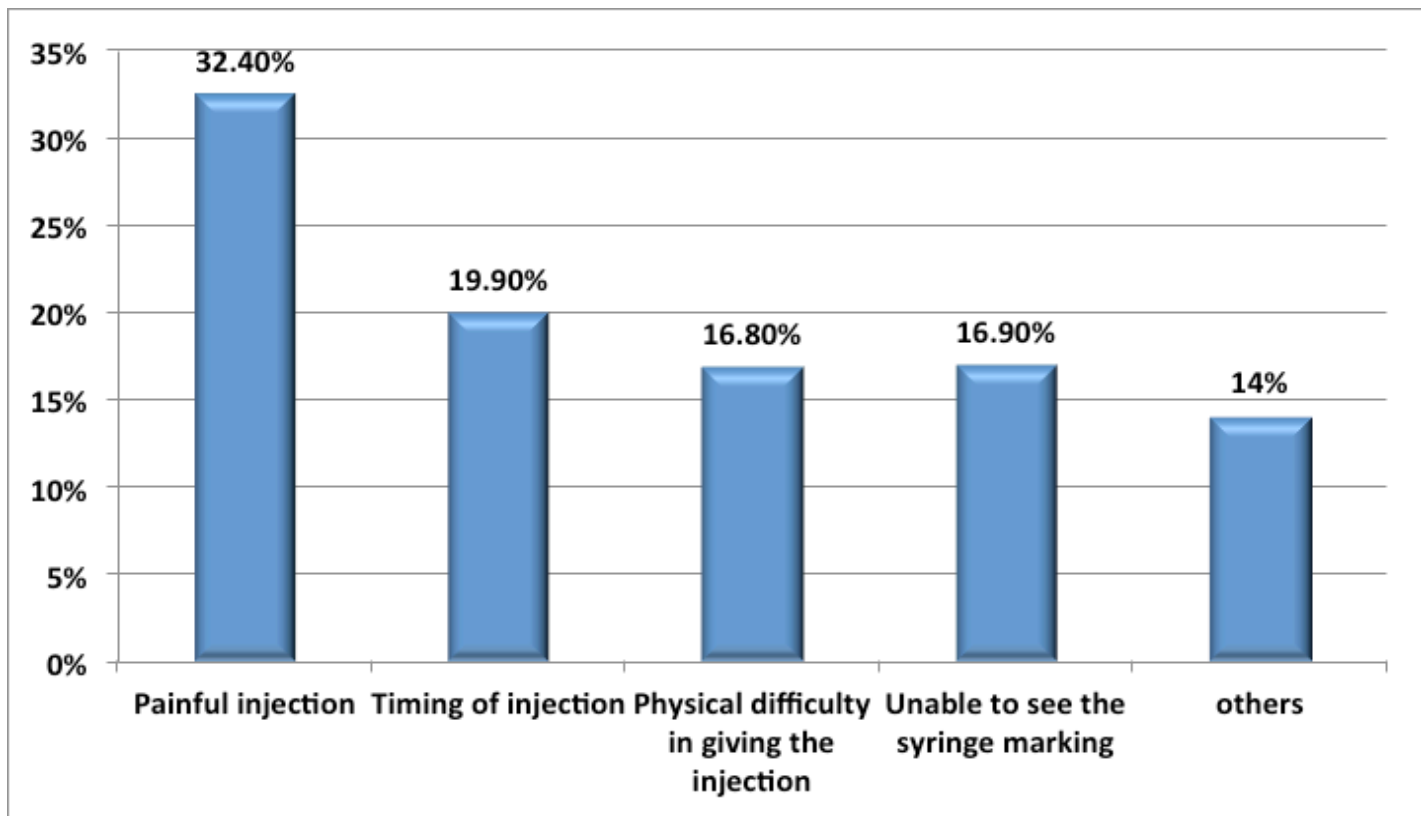


Figure 1. Closest reason for reluctant to start insulin

glucose level compared with 76.6% for reluctant, 71.7% and 63.7% of acceptors and reluctant believe that insulin is more effective than oral medication. When the reluctant group were asked to determine the closest reason for unwilling to start insulin; fear of pain from needle was the cause in 32.4%, inconvenience of timing of the injection (19.9%), physical difficulty in giving the injection (16.8%), poor vision and hence unable to see the syringe marking (16.9%), so our patients do not feel self-assured that they could handle the needs of insulin therapy, such as determining the proper timing and dosages (Figure 1).

Discussion

The present study provided clinically relevant insights into the realities of attitude toward insulin use among patients with T2DM on OHA attending both hospital and primary care clinics in Tripoli, Libya. The overwhelming majority of the patients (94.6%) refused insulin when it was offered in addition or a replacement to OHA. This can be attributed to insufficient resources and time, overcrowded clinics, low staff numbers, all may lead to few opportunities for health education and can be cited as barriers to change of the attitude of our patients, but although patients expressed a significant reluctance in this study, it is not yet known how often this leads to complete refusal when the patient is alone with his or her provider and an actual recommendation to begin insulin is made. Our figure (94.6%) was greater than that in similar studies. In one survey of insulin-naïve T2DM patients, only 24.7% of respondents reported willingness to take insulin if it is prescribed (8). Also in the United Kingdom Prospective Diabetes Study (UKPDS), 27% of patients initially refused insulin (9). A greater proportion (33%) of patients with T2DM was reported by Larkin *et al.* to be unwilling to accept insulin (10). The early reports from the international Diabetes Attitudes, Wishes, and Needs (DAWN) study indicated that the majority (54.9%) of insulin-naïve patients worry about the possibility of insulin therapy (11). Also in this regard Okazaki *et al.* (12), reported that 73% of T2DM patients beginning a diabetes education program where insulin was to be started were reluctant to do so at first. The highest rejection

rate of recommended insulin (82%) was observed in another study (13).

In the present study, both acceptors and reluctant appears to be comparable in their demographic characteristics. However, surprisingly, the reluctant group seems to have achieved a higher educational level. Almost an equal percentage from both groups had diabetes for a decade or longer, which in turn, suggesting that duration of illness did not influence the acceptance or rejection of insulin initiation. Although a high proportion of the reluctant patients had heard of the word “insulin”, 65.3% admitted not knowing how it works in the body, and among those who claimed to know this, 22.6% actually misconceived its action and function, this could be related to the lack of education about the role of insulin in diabetes management.

More than a half of acceptors and reluctant were aware that errors in dosage and technique of insulin administration might result in side effects. One of the leading barriers to insulin use among reluctant is the perception of pain from needle injection (32.4%). Although “true” needle phobia is extremely rare, some form of disliking of the injection may be present in up to 10% of patients. Needle phobia lies in an inherited vasovagal reflex of shock, initiated by needle break (14). In practice, this can be managed by reassurance and education with postural and muscle tension techniques (15). Fine needles used in insulin pen devices may also help as it has been shown that one reason patients favor pen devices over conventional syringes is decreased pain (15). Inconvenience with insulin injection was reported by both reluctant and acceptors, more reluctant (50.1% vs 18.5%) regarded insulin injection as a source of a lot of everyday trouble. These findings are consistent with those of other studies, who demonstrated that patients consider injecting insulin to be inconvenient (6,10,16,17). Both refusers and acceptors viewed insulin injection to indicate an advanced phase of illness and possessed groundless worries about ‘complications’; such as addiction and blindness. It has been shown that patients often refuse injection for fear of kidney failure or perforating their stomach, liver, or other internal organ (6,18). Indeed

some patients considered insulin therapy as a preface to death (19). Reluctant and acceptors' agreement about the statements 'insulin use helps one to feel better' (63.6% vs 73.9%), insulin is more effective than oral medication' (63.7% vs 71.7%), insulin use helps one feels more energetic' (58.1% vs 72.8%) indicate that acceptors are more satisfied with the therapeutic benefits of insulin therapy than reluctant. However, up to 37% of acceptors indicated that 'insulin injection is unnecessary, oral treatment is available', suggesting their wariness of the reason for insulin therapy.

The study is limited by its convenience sampling in a cross sectional design, that patients who are treated in private clinics were not included and the role of health care providers and family support in PIR was not elucidated.

In conclusion, within the boundaries of this study, that psychological insulin resistance is prevalent problem among Libyan patients with T2DM. Both acceptors and reluctant groups harbored negative perceptions of insulin therapy in different degrees. Several remediable misconceptions regarding insulin therapy were identified. There is an urgent need for increased emphasis on patient education and educational interventions. It is important to explore the potential barriers to treatment with each patient to encourage the patient to accept insulin treatment regimen. Education of patients about adequate self-monitoring of blood glucose, in combination with discussions of how to recognize, avoid, and treat the symptoms of hypoglycemia, may be helpful in addressing the fear of hypoglycemia as a potential barrier to insulin use.

Acknowledgment

The authors would like thank all the intern doctors who assisted in data collection and interviews as part of their internship training in community medicine posting.

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