

Willingness and Attitudes of Uncontrolled Type 2 Diabetics Toward Launching Insulin Therapy in Medina, Saudi Arabia

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ABSTRACT

Background: There are many factors influencing delayed insulin initiation including those caused by healthcare providers and its system, as well as the patients themselves.

Objectives: To determine the prevalence and factors affecting insulin refusal attitude among uncontrolled type II diabetic patients in Medina diabetic center, 2021.

Subjects and Methods: It was a descriptive, cross-sectional study, facility based carried out at Diabetic center in Medina, Saudi Arabia. It included a random sample of uncontrolled adult diabetic patients with Type II. Self-administered Arabic questionnaire was used for collecting data. It included socio-demographic data, duration of type 2 diabetes, and 19 statements regarding patients' willingness to start insulin therapy if it was recommended to them.

Results: The study included 312 patients out of 371 patients invited to participate in the study with a response rate of 84.1%. The age of about half of them (49%) ranged between 51 and 65 years. More than one third of the participants (39.5%) are ready to start insulin therapy once recommended by a physician. The overall attitude score of the participants ranged between 43 and 77 with a mean of 58.8 and standard deviation of 6.9. The median score was 58 (on a scale ranged between 19 and 95). Generally, 52.9% of patients had a positive attitude towards initiation of insulin therapy. Younger

patients (18-35 years) ($p < 0.001$), those living inside Medina city ($p = 0.033$) and higher educated patients ($p < 0.001$) were more likely to have higher rate of positive attitude towards insulin therapy than others.

Conclusion: Unwillingness to initiate insulin therapy is a common problem among type II diabetic patients attending Diabetic center in Medina. It is a result of multiple negative attitudes towards it rather than a single attitude.

Keywords: Insulin, Williness, Attitude, Type II diabetes, Saudi Arabia.

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INTRODUCTION

Type 2 diabetes used to be called non-insulin dependent diabetes or adult-onset diabetes, and accounts for at least 90% of all cases of diabetes.¹ It is characterized by insulin resistance and relative insulin deficiency, either or both of which may be present at the time diabetes is diagnosed.¹ The diagnosis of type 2 diabetes can occur at any age.¹ Type 2 diabetes may remain undetected for many years and the diagnosis is often made when a complication appears or a routine blood or urine glucose test is done.¹

Globally, 1 out of 11 adults have diabetes (415 million), also there are 5 million die from diabetes every year.² Saudi Arabia is now classified by the International Diabetes Federation to be among the top 10 countries globally with the highest prevalence of diabetes in 2015 (17.6%).² Even KSA has the highest prevalence rate of diabetes in the Middle East region.²

Insulin is typically recommended for patients with type 2 diabetes if they have failed to achieve adequate glycemic control despite treatment with multiple oral agents at maximum dose. Early initiation of insulin prevents future complications from arising.³

One of the main barriers is psychological insulin resistance (PIR), defined as psychological opposition towards insulin use and healthcare providers.⁴

About 50% of patients with poor control type II DM did not timely start insulin therapy and the initiation was usually three to five years after failure of oral hypoglycemic agents.⁴

There are many factors influencing delayed insulin initiation including those caused by healthcare providers and their systems, as well as the patients themselves. Also, lack of multi-disciplinary team work to solve patient refusal.⁴

Early use of insulin in the management of poorly controlled diabetes has been recommended to prevent and reduce the long-term diabetes complications. This study was carried out to determine the willingness to start insulin therapy among uncontrolled type II diabetic patients in Madinah, 2021.

PATIENTS AND METHODS

It was a descriptive, cross sectional, facility-based study carried out at Diabetic center in King Fahd Hospital, Madinah city, which is the capital of the Madinah region in East of Saudi Arabia. It has a population of 1543460 (2017 census).

Inclusion criteria were uncontrolled diabetic patients with Type II, aged over 18 years while the exclusion criteria were patients with Type 1 diabetes and those with Type 2 diabetes who were on insulin treatment. Data was collected in 1st May, 2021 and continued till the total collection of the required sample size (30 June, 2021).

Sample size was determined according to the following formulae.

$$n = z^2 (pq) / e^2 \text{ z=constant (1.96)}$$

P= prevalence of uncontrolled type 2 diabetes in Saudi Arabia (59%).⁵

$$e=\text{the confidence limits} = 5\% \quad n = 3.84 \times 59 \times 41 / 25 = 371$$

All patients who met the selection criteria were approached in the waiting area by the researcher and invited to participate in the study. Self-administered Arabic questionnaire was used for collecting data. It has been previously adopted in a study published in Pubmed and conducted in Riyadh, 2016 and proved to be valid and reliable.⁶ Permission to utilize the questionnaire was requested from the author through personal communication. Patients were asked to fill the questionnaire while waiting for their appointment in the waiting area of out-patient clinics, Diabetic center in King Fahd Hospital, Madinah. The researcher was available throughout the data collection period to clarify any difficulties. The questionnaire included socio-demographic data such as age, gender, residence, and level of education, duration of type 2 diabetes and statements regarding their willingness to start insulin therapy if it was recommended to them. The patients' responses were rated on a 5 - point likert scale from "strongly

agree" to "strongly disagree". The participants were asked to indicate to what extent they agreed with each statement. Total score of the responses to the 19 attitude statements were computed for each participant (19-95). Median score was computed (it was 58). Patients scored at median score of above were considered as having "positive attitude towards insulin therapy" whereas those scored below the median score were considered as having "negative attitude towards insulin therapy". Clearly informed consent was obtained from each participant. Also, the ethical clearance was obtained as well as privacy and confidentiality were maintained throughout the research steps. Statistical Package for Social Sciences (SPSS) software version 22 was used for data entry and analysis. Descriptive statistics (e.g. number, percentage) were applied. Analytic statistics using Chi Square tests to test for the association and/or the difference between two categorical variables were utilized. Statistical significance was considered at p-value ≤0.05 throughout the study.

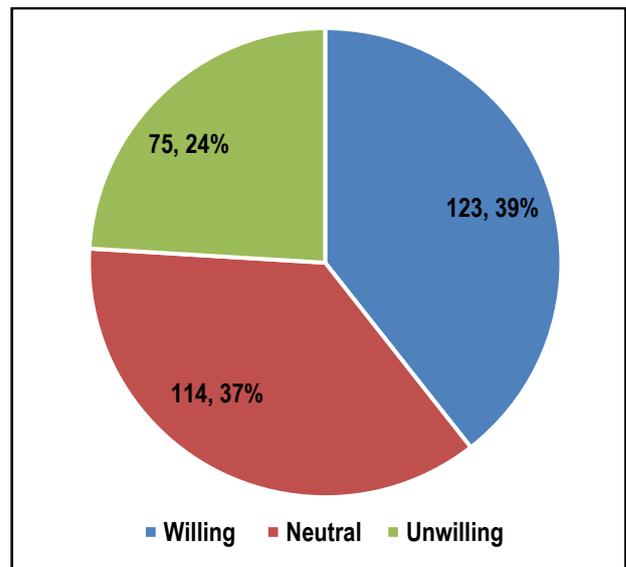


Figure 1: Willing of type II diabetic patients to start insulin therapy once recommended by a physician.

Table 1: General characteristics of the participants (n=312)

Character	Category	Frequency (n)	Percentage (%)
Age (years)	18-35	3	1.0
	36-50	99	31.7
	51-65	153	49.0
	>65	57	18.3
Gender	Male	186	59.6
	Female	126	40.4
Educational level	Primary school	27	8.7
	Intermediate school	99	31.7
	Secondary school	120	38.4
	University	66	21.2
Place of residence	Madinah city	285	91.3
	Outside Madinah	27	8.7
Duration of diabetes mellitus (years)	0-5	18	5.8
	6-10	129	41.3
	11-15	96	30.8
	>15	69	22.1

Table 2: Attitudes of the participants towards diabetes and insulin therapy

	Responses		
	Agree/ strongly agree	Neutral	Disagree/ strongly disagree
NEGATIVE ATTITUDE			
▪ If I need to use insulin, this means I failed to properly care for my diabetes previously.	87(27.9)	81(26.0)	144 (46.1)
▪ It would be better to delay insulin until there was no alternative.	144 (46.1)	108 (34.6)	60(19.3)
▪ Insulin may cause more diabetic complications in the long term.	51(16.3)	117(37.5)	144 (46.2)
▪ I will feel that my diabetes has become worse if I start to use insulin.	48(15.4)	111 (35.6)	153 (49.0)
▪ Lifestyle adaptations and restrictions in response to insulin therapy			
▪ Insulin would make my life difficult, such as in travelling or eating out.	144(46.1)	102(32.7)	66(21.2)
▪ I cannot pay as close attention to my diet as insulin treatment requires.	75(24.0)	120 (38.5)	117(37.5)
▪ I just do not have enough time for regular doses of insulin.	153(49.0)	60(19.2)	99(31.8)
Insulin injection-related concerns			
▪ I will not be able to use the proper injecting technique.	156(50.0)	84(26.9)	72(23.1)
▪ I am afraid of needle injections.	144(46.1)	108(34.6)	60(19.3)
▪ Regular injections would give me a feeling of dependence.	57(18.3)	114(36.5)	141(45.2)
▪ Injections in front of people would be embarrassing to me.	114(36.5)	75(24.0)	123 (39.5)
Fear of side effects			
▪ Insulin is likely to increase my weight.	105(33.6)	87(27.9)	120(38.5)
▪ Insulin can lead to serious problems with low blood sugar.	81(25.9)	123(39.4)	108(34.7)
Social influences and stigma			
▪ I do not want to start insulin because I heard some people had bad experience with insulin.	117(37.5)	81(26.0)	114(36.5)
▪ People will think that I am sicker if I use insulin.	111(35.6)	66(21.2)	135(43.2)
POSITIVE ATTITUDES TOWARDS INSULIN			
▪ Insulin can reliably prevent long term complications due to diabetes.	165(52.9)	114(36.5)	33(10.6)
▪ Insulin would help me to improve my diabetes control.	129(41.3)	132(42.3)	51(16.4)
▪ Insulin will allow me to have a less restrictive diet.	123(39.5)	141(45.1)	48(15.4)
▪ I am ready to start insulin therapy once recommended by a physician.	123(39.5)	114(36.5)	75(24.0)

Table 3: Factors associated with attitude of type II diabetic patients towards insulin therapy.

Variables	Attitude towards insulin therapy		χ ²	p-value
	Negative N (%)	Positive N (%)		
Age in years				
18-35 (n=3)	0 (0.0)	3 (100)	18.10	<0.001
36-50 (n=99)	36 (36.4)	63 (63.6)		
51-65 (n=153)	90 (58.8)	63 (41.2)		
>65 (n=57)	21 (36.8)	36 (63.2)		
Gender				
Males (n=186)	93 (50.0)	93 (50.0)	1.54	0.215
Females (n=126)	54 (42.9)	72 (57.1)		
Residence				
Madinah (n=285)	129 (45.3)	156 (54.7)	4.54	0.033
Outside Madinah (n=27)	18 (66.7)	9 (33.3)		
Educational level				
Primary school (n=27)	18 (66.7)	9 (33.3)	47.46	<0.001
Intermediate school (n=99)	33 (33.3)	66 (66.7)		
Secondary school (n=120)	81 (67.5)	39 (32.5)		
University (n=66)	15 (22.7)	51 (77.3)		
Duration of diabetes (years)				
0-5 (n=18)	12 (66.7)	6 (33.3)	3.72	0.294
6-10 (n=129)	63 (48.8)	66 (51.2)		
11-15 (n=96)	42 (43.8)	54 (56.2)		
>15 (n=69)	30 (43.5)	39 (56.5)		

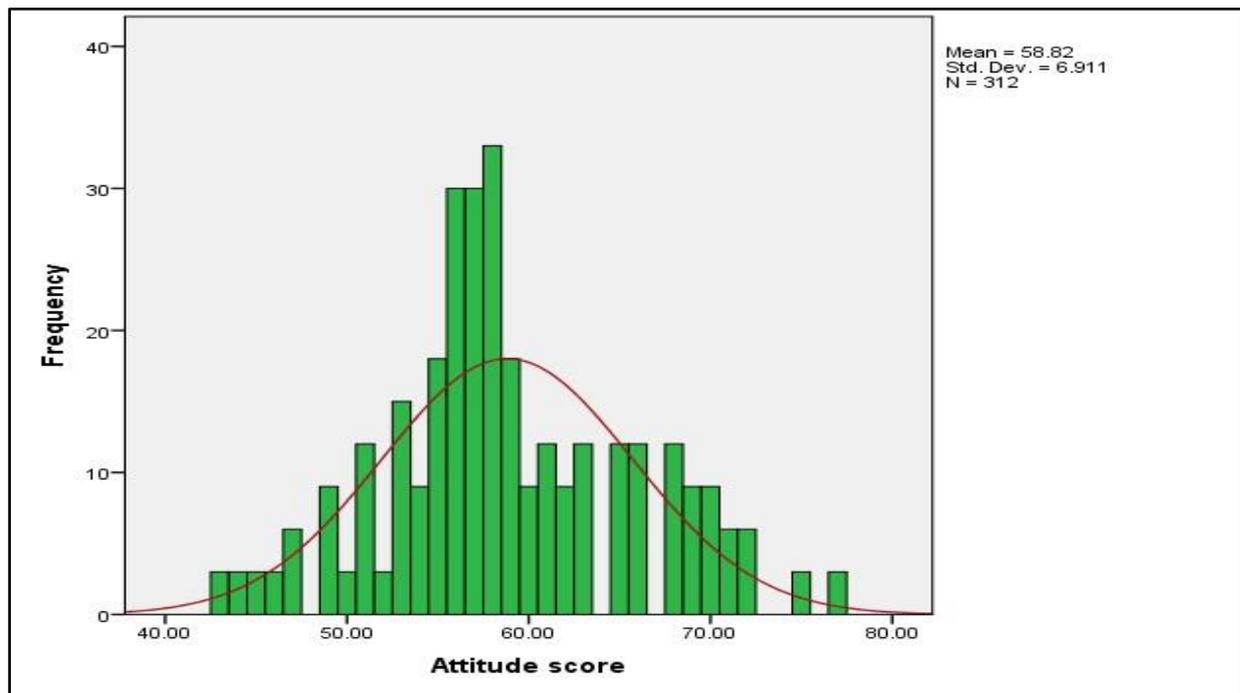


Figure 2: Distribution of the attitude score of the participants towards insulin therapy

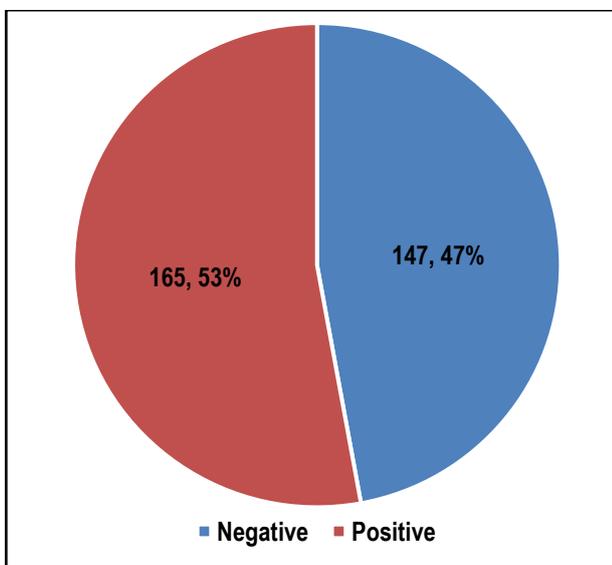


Figure 3: Attitude of type II diabetic patients towards insulin therapy

RESULTS

The study included 312 patients out of 371 patients invited to participate in the study with a response rate of 84.1%. Their general characteristics are summarized in table 1. The age of about half of them (49%) ranged between 51 and 65 years whereas that of 18.3% exceeded 65 years. Males represent 59.6% of the respondents. More than one-third of them (38.4%) were secondary school graduates whereas 21.2% were university graduated. The majority of the participants were residing in Madinah city (91.3%). Regarding the duration of type II diabetes mellitus, in 41.3% of them, it ranged between 6 and 10 years whereas in 22.1% it exceeded 15 years.

Attitudes towards diabetes and insulin therapy

As shown in table 2, approaching half of the patients (46.1%) either agreed or strongly agreed that it would be better to delay insulin until there was no alternative. On the other hand, about half of them (49%) either disagreed or strongly disagreed that they will

feel that their diabetes has become worse if they start to use insulin. More than one quarter of them (27.9%) either agreed or strongly agreed that if they need to use insulin, this means they failed to properly care for their diabetes previously. Only 16.3% either agreed or strongly agreed that insulin may cause more diabetic complications in the long term. Almost half of the patients (49%) either agreed or strongly agreed that they had no enough time for regular doses of insulin and 46.1% were either agreed or strongly agreed that insulin would make their life difficult, such as in travelling or eating out. About one-quarter of them (24%) were either agreed or strongly agreed that they cannot pay as close attention to their diet as insulin treatment requires. Half of type II diabetic patients were either agreed or strongly agreed that they will not be able to use the proper insulin injecting technique. Slightly less than half of them (46.1%) were either agreed or strongly agreed that they are afraid of needle injections. Almost one third of them (36.5%) were either agreed or strongly agreed that injection in front of people would be embarrassing to them. However only 18.3% were either agreed or strongly agreed that regular injections would give them a feeling of dependence. Almost one-third (33.6%) of type II diabetic patients either agreed or strongly agreed that insulin is likely to increase their weight and 25.9% agreed or strongly agreed that insulin can lead to serious problems with low blood sugar. About one-third of the respondents either agreed or strongly agreed that they do not want to start insulin because they heard some people had bad experiences with insulin (37.5) and people will think that they are sicker if they use insulin (35.6%). More than half of type II diabetic patients (52.9%) either agreed or strongly agreed that insulin can reliably prevent long term complications due to diabetes. Whereas 41.3% of them either agreed or strongly agreed that insulin would help them to improve their diabetes control.

More than one third of the participants (39.5%) either agreed or strongly agreed that insulin will allow them to have a less restrictive diet and they are ready to start insulin therapy once recommended by a physician. Figure 1

The overall attitude score of the participants ranged between 43 and 77 with a mean of 58.8 and standard deviation of 6.9. The median score was 58 (on a scale ranged between 19 and 95). It was abnormally distributed as evidenced by significant Shapiro-Wilk test, $p < 0.001$. Figure 2

Slightly more than half of the patients (52.9%) had a positive attitude towards initiation of insulin therapy as shown in figure 3.

As shown from table 3, all young patients (18-35 years) compared to 41.2% of those aged between 51 and 65 years and 63.2% of those aged over 65 years had positive attitude towards insulin therapy. The difference was statistically significant, $p < 0.001$. Diabetic patients living in Madinah were more likely to express positive attitude towards insulin therapy compared to those living outside Madinah (54.7% versus 33.3%). This difference was statistically significant, $p = 0.033$. University graduated type II diabetic patients were more likely to have positive attitude towards insulin therapy compared to primary or secondary school graduated patients (77.3% versus 33.3% and 32.5%, respectively). This difference was statistically significant, $p < 0.001$. Gender and duration of diabetes were not significantly associated with attitude towards insulin therapy among type II diabetic patients.

DISCUSSION

Reaching optimal glycaemic control is considered a challenge for both physicians and diabetic patients. Worldwide, only 33% to 50% of type II diabetic patients achieve a glycated haemoglobin (HbA1c) of less than 7%.⁷⁻¹⁰ The management of type II DM can be complicated as a result of its progressive nature as with the disease progresses, the function of pancreatic beta cells reduces, and oral hypoglycaemic agents alone become not enough to control blood glucose level. Therefore, Insulin therapy is usually needed.¹¹ Insulin is often used as a last step in the management of diabetes, although its valuable effect on glycaemic control and reduction of long-term complications has been evidenced.¹²⁻¹⁴ The delay in using insulin can lead to poor glycaemic control in most of type II diabetic patients.¹⁵

Numerous studies have demonstrated that the initiation of insulin therapy is often delayed for most of patients with poor glycaemic control.^{13,16-19} The factors that contribute to this delay can be related to physicians unwilling to prescribe it or patients refusal to take insulin.^{20,21} Therefore this study was carried out to determine the prevalence and determinants of insulin refusal among uncontrolled type II diabetic patients in Madinah city, Saudi Arabia. In the current study, 39.4% of type II diabetic patients were willing and 24% were unwilling to initiate insulin therapy once recommended by their physicians. In another recently conducted Saudi study, 34.6% of type II diabetic patients were unwilling to start using insulin.²²

Although an acceptable proportion of type II diabetic patients in this study had positive attitude towards insulin therapy, a considerable proportion of them agreed that they do not want to start insulin because they heard some people had bad experience with insulin and people will think that they are sicker if they use insulin. In addition, more than one quarter of them believed that insulin is likely to increase their weight and can lead to serious problems with hypoglycemia. Injection-related concerns were also reported by a good percentage of the participants. Quite similar results have been reported in another Saudi Study carried out in

Riyadh.²² The unwillingness percentage to initiate insulin therapy in the present study (24%) was lower than those reported in other studies carried out in Riyadh, KSA (34.6%)²², USA (28% and 33%)^{23,24}, Iran (77%)²⁵, Singapore (70.6%)¹¹ and Malaysia (50.7% and 74.2%).^{26, 27} The lower prevalence of unwillingness to initiate insulin therapy reported in this study compared to others, particularly those carried out in Iran, Singapore and Malaysia could be attributed to the variations in the background of patients, particularly the educational level as well as the variations in the health care system factors. Also, this difference could be due to different levels of misconceptions about diabetes and its management in different countries. In accordance with other studies^{11,26}, the present study observed that university graduated patients had more positive attitude regarding insulin therapy compared to those with less education. This could be attributed to the fact that patients with higher educational levels are expected to be more knowledgeable about diabetes and its possible complications and might therefore be more likely to accept the need to initiate insulin. Finding that patients from Madinah city had higher positive attitude towards insulin therapy than those living in rural areas outside Madinah city could be due to the fact that they might be more educated and more aware of diabetes and its management compared to those living in rural areas.

In this study, younger patients were more likely to express positive attitude towards insulin therapy. In other studies carried out in Riyadh, Saudi Arabia²² and Malaysia.²⁸ Patient's age was not significantly associated with attitude towards insulin therapy. The finding of our study could not be related to age itself but might be due to the fact that younger were more educated than older patients, and consequently more aware of the long term diabetic complications.

The commonest negative attitude to initiate insulin therapy among participants in this study was the belief that it would be better to delay insulin until there was no alternative. This finding is similar to what has been reported in another study conducted in five countries (USA, UK, Germany, Sweden, and Netherland) where the most frequent belief regarding insulin was that it should be the final treatment option in the diabetes management.²⁹ This common belief could be attributed to both physicians' concerns and lack of knowledge about initiation of insulin therapy and patients' psychological resistance and poor knowledge to initiate it in their management.^{29,30}

Some fears from insulin side effects such as weight gain and hypoglycaemia are reasonable. However, believing that insulin may cause more diabetic complications in the long term is a wrong belief. Fortunately, in the present study, only 16.3% of patients agreed with that belief. This wrong belief was common among type II diabetic patients in Malaysia (72%)²⁶ and Singapore (55%)¹¹ as they linked diabetic complications to insulin therapy rather than poor glycaemic control.

Lifestyle restrictions associated with insulin therapy, manifested in the form of having no enough time for regular doses of insulin, having difficulties in travelling or eating out as well as difficulties in paying close attention to their diet as insulin treatment requires, were agreed upon by a considerable proportion of patients in the present study. The same has been reported in other studies.^{11,22,27} From this study, some clinical practice implications were identified. First, unwillingness to initiate insulin therapy by patients is a result of multiple negative attitudes towards it rather than a single

attitude. The same has been proved by others in Singapore, USA²³, five countries (Sweden, Netherlands, UK, USA and Germany).²⁹ Therefore, treating physicians should identify these negative attitudes in order to address the patient's insulin unwilling. Second implication, patients who believe that insulin may result in more diabetic complications or should be used as a last step in the management of type 2 diabetes need to be educated that failure of oral therapy is not their fault but is due to the natural progression of the disease, and the early insulin therapy can lead to better control and consequently minimizing complications.

The limitations of this study are mostly related to its design where the results showed associations and not causal relationships. A single item was used to assess willingness to initiate insulin that reflected expectation not actual behaviour. Therefore, it is not sure whether this expectation will transfer into true refusal once the physician recommends.

CONCLUSION AND RECOMMENDATIONS

Unwillingness to initiate insulin therapy is a common problem among type II diabetic patients attending Diabetic center in King Fahd Hospital in Madinah as willingness to initiate insulin therapy once recommended by physicians was reported by only almost one third of them. Slightly more than half of the patients had a positive attitude towards initiation of insulin therapy. Younger patients, those living inside Madinah city and higher educated patients were more likely to express positive attitude towards insulin therapy as compared to their counterparts. Numerous concerns regarding insulin therapy were reported among uncontrolled type II diabetic patients. Unwillingness to initiate insulin therapy by patients is a result of multiple negative attitudes towards it rather than a single attitude. Based on this, the following are recommended:

1. Treating physicians should understand patients' attitudes towards initiation of insulin therapy as early as possible in the disease course to correct their information and counter their negative attitudes.
2. Treating physicians should provide strategies for travelling with insulin and provide information about insulin regimens that give more flexibility to minimize lifestyle changes
3. Further study is recommended to investigate the physicians' attitudes and beliefs towards initiating insulin therapy in type II diabetic patients.
4. Implementing continuous medical education activities for health care physicians in Diabetic center concerning insulin therapy in type II diabetes.
5. Further research is recommended to explore this important issue at different healthcare settings in rural and urban areas in Saudi Arabia.

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