

# Refusal of insulin therapy among poorly controlled type 2 diabetic patients in Taif city: Prevalence and reasons

<sup>1</sup>Dr. Hanadi Aljohani, <sup>2</sup>Dr. Noha Saleh Mohammed

<sup>1</sup>MBBS, R3 Family Medicine Resident

<sup>2</sup>Consultant of public health, Taif, Saudi Arabia

**Abstract:** Worldwide, 415 million of adult people live with diabetes (one out of eleven), also there are 5 million die from diabetes every year<sup>(1)</sup>. 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%)<sup>(1)</sup>. Even KSA has the highest prevalence rate of diabetes in the Middle East region<sup>(1)</sup>.

**Objectives:** To investigate the magnitude and determinants of the problem of refusing insulin therapy among poorly controlled type II diabetic patients despite of having the maximum dose of oral hypoglycemic medications.

**Subjects and Methods:** The study conducted at the diabetic centers, belonging to Ministry of Health, Taif city. Diabetic center has four clinics dealing with all problems of diabetic patients. It is a descriptive, cross sectional study, facility based included adult patients with type 2 diabetes during the study period will constitute the target population for the study. Self-administered Arabic questionnaire was used for collecting data. It included socio-demographic, duration of type 2 diabetes and last HbA1c reading, their willingness to start insulin therapy if it was recommended by doctor and their concerns and beliefs about. It is rated on a 5-point likert scale from “strongly agree” to “strongly disagree”. Statistical Package for Social Sciences (SPSS) software version 22 was used for data entry and analysis.

**Results:** One hundred fifty respondents were included in the study. The age of more than half of them (76%) were aged between 50 to less than 70 years, (54.7%) were male, (55.3%) were married, (62%) not working, (65.3%) live in Taif, and (52.7%) had less than secondary level of education. Majority of respondents 64 (442.7%) experience DM 5 to 10 years duration and the mean of last reading of HbA1c% was 9.461. More than half of respondents were unwilling to start insulin. Majority of respondents 84 (56%) have negative attitude, while 66 (44%) have positive attitude towards insulin therapy.

**Conclusion:** Respondents have negative attitude toward insulin therapy. So, it important to explore reasons for their reluctance to commence insulin can address his/her specific concerns and beliefs, and promote the future uptake of insulin therapy.

**Keywords:** type 2 diabetic patients, diabetic centers, insulin therapy, International Diabetes Federation.

## ABBREVIATIONS GLOSSARY:

Abbreviation	Description
KSA	Kingdom of Saudi Arabia
PIR	Psychological Insulin Resistance
DM	Diabetes Mellitus
MI	Myocardial Infarction
HbA1c	Glycated Haemoglobin
$\chi^2$	Chi Square Tests
SPSS	Statistical Package For Social Sciences
PHC	Primary health care

## 1. INTRODUCTION

### Background:

Worldwide, 415 million of adult people live with diabetes (one out of eleven), also there are 5 millions die from diabetes every year<sup>(1)</sup>. 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%)<sup>(1)</sup>. Even KSA has the highest prevalence rate of diabetes in the Middle East region<sup>(1)</sup>.

Type 2 diabetes represent at least 90% of all cases of diabetes and used to be called non-insulin dependent diabetes or adult-onset diabetes,<sup>(2)</sup>. It is characterized by insulin resistance and relative insulin deficiency, either or both of which may be present at the time diabetes is diagnosed<sup>(2)</sup>. The diagnosis of type 2 diabetes can occur at any age<sup>(1,2)</sup>. 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<sup>(2)</sup>.

If despite of treatment of type 2 diabetic patients with multiple oral agents at maximum dose, they have failed to achieve adequate glycemic control, insulin is typically recommended<sup>(3)</sup>. Early initiation of insulin prevents future complications from arising<sup>(3)</sup>.

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

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

There are many factors influencing delayed insulin initiation including those caused by healthcare providers and its system, as well as the patients themselves. Also, lack of multi-disciplinary team work to solve patient refusal<sup>(4)</sup>.

### Study Rationale:

- Poorly controlling of type II diabetes, despite taking maximum dose of oral anti-diabetic agents put the patients at risk of adverse complications (nephropathy, diabetic foot, stroke, myocardial infarction “MI”).
- Early initiation of insulin in the management of poorly controlled diabetes has been recommended to prevent and reduce the long-term diabetes complications.
- Up to the researcher knowledge, no study had been conducted for investigating the type II diabetic patient refusal of insulin in Taif.

### Aim of the study:

To investigate the magnitude and determinants of the problem of refusing insulin therapy among poorly controlled type II diabetic patients despite of having the maximum dose of oral hypoglycemic medications.

### Specific Objectives:

- To estimate the prevalence of insulin refusal among uncontrolled type II diabetic patients attending the diabetic center in Taif, 2018.
- To identify patients` determinants for refusing initiation of insulin therapy.

## 2. LITERATURE REVIEW

### Local study:

-Batais and Schantter (2016) conducted in Riyadh (Saudi Arabia) a cross-sectional study to investigate the prevalence and determinants of type 2 diabetic patients` refusal to use insulin. Almost one third of the participants (34.6%) refused to start insulin therapy. Keeping insulin as a last choice (57.1%), lifestyle restriction (48.8%), fear of hypoglycemia (45.1%), previous history of failure of care (44.6%), and worry about weight gain (40.7%) were the reported reasons for negative attitude towards insulin therapy. Multivariable logistic regression analysis revealed that only patients with tertiary education were less likely to be willing to initiate insulin therapy as compared to those who had only a primary education<sup>(5)</sup>.

#### International studies:

-In China, Fu and colleagues (2016) studied the association between socio-demographic and clinical characteristics of patients with type 2 diabetes, on oral anti-diabetics and their attitudes towards initiating insulin therapy. The most frequently reported negative attitude was fear of needle injections (70.1 %). On the other hand, the most frequently reported positive attitude was ability to manage insulin injection (67.5 %). Women were more likely to report fear of pain ( $p = 0.011$ ). Also, they had more an overall negative attitude towards initiating insulin ( $p = 0.02$ ). Patients with lower glycated haemoglobin (HbA1c) levels had a significantly more negative attitude towards initiating insulin <sup>(6)</sup>.

-Woudenberg et al (2012) explored the factors that were associated with psychological insulin resistance in patients with type 2 diabetes in primary care settings. Results showed that more than one-third of patients (39%) were unwilling to commence insulin therapy. Patients who refused taking insulin perceived higher as a result of failure to control their diabetes with oral therapy or lifestyle compared with those willing to use insulin (59 compared to 33%). Multiple linear regression analysis showed that depression and lifelong insulin therapy were significantly associated with insulin refusal <sup>(7)</sup>.

-Polonsky et al (2005) investigated the willingness of type 2 diabetic patients in Poland to use insulin if it was prescribed and explored their barriers to initiate it. The rate of Insulin therapy if prescribed unwillingness was 28.2%. Slight, moderate and very willing were reported by 24.0, 23.3%; and 24.4% of the respondents, respectively. More females were unwilling than males (32 versus 21.1%,  $p < 0.001$ ). Negative attitudes most frequently reported towards insulin therapy were insulin therapy permanence (45.0%), restrictiveness (45.2%), fear of hypoglycemia (43.3%), individual failure, and low self-efficacy (43.3%) <sup>(8)</sup>.

-Khan and his research team carried out a survey in 2008 to estimate the prevalence of refusing to initiate insulin therapy among Bangladeshi patients with Type 2 diabetes and identify the main reasons for that. They selected patients on maximum oral glucose-lowering medications and despite of that had poor glycemic control with  $HbA1c \geq 8\%$ . A qualitative analysis was applied as patients who refused insulin were invited to attend focus groups. Among patients who offered insulin, 57.5% started insulin immediately, 22.1% commenced insulin within 6 months and 20.3% refused to initiate insulin despite repeated counseling. Reasons for insulin refusal included perceptions that requirement for insulin was an indicator of a more serious stage of their status, believing that insulin lead to premature death, fear of weight gain and hypoglycaemia, independence on others to give insulin, poor perception of the benefits of improved glycaemic control on quality of life and cardiovascular risk and concern over frequent injections <sup>(9)</sup>.

-Ghadiri-Anari et al (2013) carried out a descriptive cross-sectional study aimed to identify the causes of refusing insulin therapy among patients with type 2 diabetes in Iran. They included type 2 diabetic patients on optimal oral anti-diabetics, who despite of that had an  $HbA1c \geq 8.0\%$ . Most of patients (77%) were being unwilling to accept insulin if prescribed. The most frequent reason for this refusal was fear of injection <sup>(10)</sup>.

-In Kubang Pasu district of Kedah, Malaysia (2015), a cross-sectional study was conducted among patients with type 2 diabetes at seven public health clinics. Insulin therapy refusal was common in Kubang Pasu (74.2%). The authors concluded that educational status and HbA1c level should be taken into consideration when counselling patients on insulin therapy initiation <sup>(11)</sup>.

### 3. METHODOLOGY

This chapter illustrated the result of the present study that emerged out of the data analysis which accomplished using the SPSS for Windows version 20.0. The purpose of this current study is to assess the reasons for refusal of insulin therapy among poorly controlled type 2 diabetic patients in PHC Centers.

#### Study Setting:

The study will be conducted at the PHC center, belonging to Ministry of Health, Taif city. There are 136 PHC center (20 inside the city and 116 outside). This study was conducted in PHC center inside Taif city.

Taif is one of the main city in the Kingdom of Saudi Arabia, located in the Western Region with an approximate population of 1,300,000 <sup>(12)</sup>.

#### Study design:

It will be a descriptive, cross sectional study, facility based.

**Study population:**

Adult patients with type 2 diabetes attending the PHC center(MOH) in Taif city during the study period will constitute the target population for the study, provided that they will have the inclusion criteria.

**Inclusion criteria:**

- Uncontrolled diabetic patients with Type 2 (HbA1c  $\geq$ 8%).
- Aged over 18 years.

**Exclusion criteria:**

- Patients with Type 1 diabetes.
- Patients with cognitive impairment.
- Patients with Type 2 diabetes who were on insulin treatment.

**Study duration:**

Data will be collected starting from 1<sup>st</sup> January, 2018 and will continue till the total collection of the required sample size.

**Sample size**

Minimal required sample size is calculated using EPI info7 soft wear. Based on prevalence of refusal of insulin therapy among poorly controlled type 2 diabetic patient in Riyadh city(34.6%)(5),power 80%and  $\alpha =0.05$ .

Target population =20110(NO of diabetic patients attending PHC centers in Taif city).

So minimal calculated size is 150 patient .

**Sampling technique:**

All patients who met the selection inclusion criteria will be approached in the waiting area by the researcher and will be invited to participate in the study .

**Study tools:**

- Interview Arabic questionnaire will be used for collecting data. It has been previously adopted in a study published in Pub-med and conducted in Riyadh, 2014 and proved to be valid and reliable <sup>(5)</sup>.
- Permission to utilize the questionnaire will be requested from the author through personal communication.
- It included socio-demographic data such as age, gender, residence, and level of education.
- Also, it includes the duration of type 2 diabetes and last HbA1c reading.
- Statements regarding their willingness to start insulin therapy if it was recommended to them. Their responses will be rated on a 5-point likert scale from “strongly agree” to “strongly disagree”. The participants will be asked to indicate to what extent they agreed with each statement. Total score of the responses to the19 attitude statements will be computed for each participant (19-95). Median score will be computed. Patients who will score at median score of above will be considered as having “positive attitude towards insulin therapy” whereas those who will score below the median score will be considered as having “negative attitude towards insulin therapy”.

**Data collection technique:**

Interview questionnaire will be used. Patients will be asked to fill the questionnaire while waiting for their appointment in the waiting area of out-patient clinics, PHC center in Taif city. The researcher will be available throughout the data collection period to clarify any difficulties.

**Variables:**

**Dependent variables:**

Attitude of patients with uncontrolled type II DM toward insulin refusal.

**Independent variables:**

Socio-demographic characteristics (age, gender, educational level, residence), duration of type II diabetes and last HbA1c reading.

**Data entry and analysis:**

- Statistical Package for Social Sciences (SPSS) software version 22 will be used for data entry and analysis.
- Descriptive statistics (e.g. number, percentage) will be applied for categorical variables
- Mean and standard deviation will be utilized for continuous variables
- Analytic statistics using Chi Square tests ( $\chi^2$ ) to test for the association and/or the difference between two categorical variables will be utilized.
- Statistical significance will be considered at p-value <0.05 throughout the study.

**Ethical considerations:**

- All necessary official permissions will be obtained. Letters from the PHC center in Taif, ethical committee and director of Joint program of family Medicine will be secured before data collection.
- The collected data will be kept strictly confidential.
- Permission to utilize the study tool will be obtained from the author through an e-mail communication.

**Budget:**

The study will be self-funded.

**4. RESULT**

**Socio-demographic characteristics of the respondents:**

Table 1 shows demographic data of the selected sample. It shows that majority of the respondents 114 (76%) were aged between 50 to less than 70 years, 82 (54.7%) were male, 83 (55.3%) were married, 93 (62%) not working, 98 (65.3%) live in Taif, 79 (52.7%) had less than secondary level of education.

**Table 1: Distribution of the sample according to their demographic data (N. 150)**

Variables		No.	%
<b>Age</b>	40-	24	16.0
	50-	57	38.0
	60 -	57	38.0
	70+	12	8.0
<b>Sex</b>	Male	82	54.7
	Female	68	45.3
<b>Marital Status</b>	Single	6	4.0
	Married	83	55.3
	Divorced	22	14.7
	Widow	39	26.0
<b>Working</b>	Yes	57	38.0
	No	93	62.0
<b>Living</b>	Taif	98	65.3
	Outside Taif	51	34.0
<b>Level of Education</b>	Less than Secondary	79	52.7
	Secondary	47	31.3
	University and higher	24	16.0

**Duration of type 2 diabetes and last HbA1c reading:**

Figure 1 shows the respondents answers according to Duration of type 2 diabetes. Majority of respondents 64 (42.7%) experience DM 5 to 10 years duration, while 60 (40%) experience DM 10 to 15 years duration, 17 (11.3%) experience DM more than 15 years, and only 9 (6%) experience DM less than 5 years duration

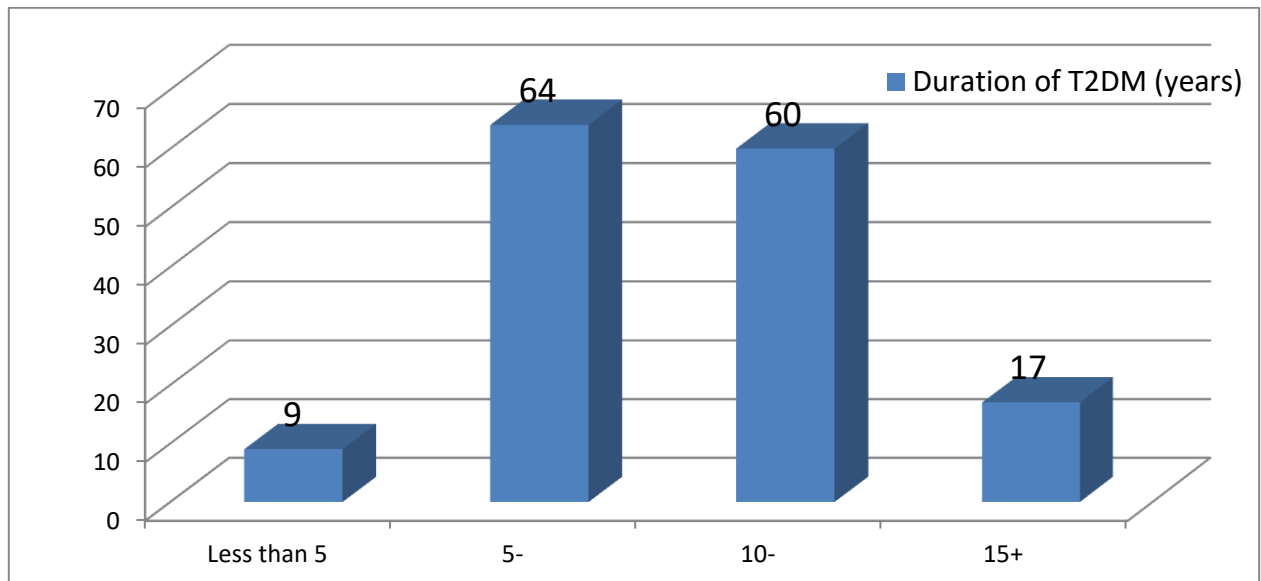


Figure 1: Distribution of respondents according to Duration of diabetes

Table (2) shows the mean, median, mode, standard deviation, maximum and minimum among respondents according to their last reading of HbA1c%. 8 was the minimum reading, 11.9 maximum reading, Std. Deviation.7981, median 9.3, mode 8.9, and the mean of reading was 9.461.

Table 2: Last reading of HbA1c% of respondents

Statistics	Mean	Median	Mode	Minimum	Maximum	Std. Deviation
	9.461	9.300	8.9	8.0	11.9	.7981

**Willingness to start insulin therapy if it was recommended by doctor:**

Figure 2 shows the respondents willing to start insulin if doctor recommended, more than half of respondents were unwilling to start insulin, 23 (15.3%) males and 29 (19.3%) females were strongly disagree and 19 (12.7%) males and 13 (8.7%) females disagree, while 31 (20.7%) males and 23 (15.3%) females were agree, only 1 (0.7%) male were strongly agree, 8 (5.7%) males and 3 (2%) females were neutral. 42 (28%) of males and 42 (28%) of females were unwilling (P=0.142).

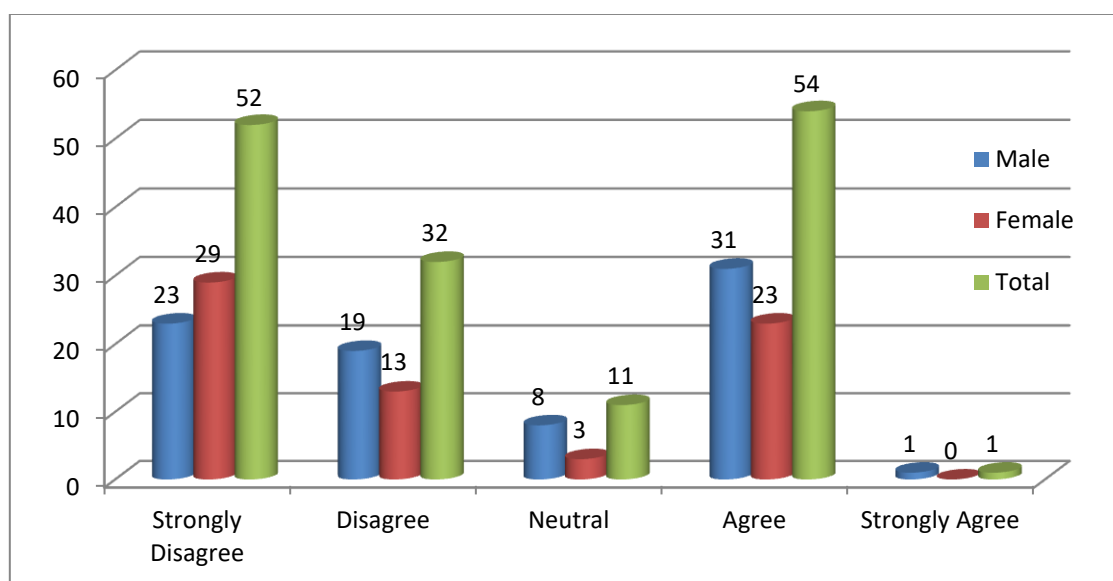


Figure 2: Distribution of respondents according to willing to start insulin if doctor recommended.

**Respondents' attitude regarding Insulin therapy:**

Table 3 shows respondents' answers about their attitude regarding Insulin therapy. 67 (44.7%) Disagree and 16 (10.7%) Strongly Disagree regarding afraid of needle injections, 68 (45.3%) Disagree and 15 (10.0%) Strongly Disagree about injection in front of people would be embarrassing him/her, 116 (77.3%) Disagree and 22 (14.7%) Strongly Disagree about regular injection would give him/her a feeling of dependence, 72 (48.0%) were Disagree, 9 (6.0%) Strongly Disagree for have no enough time for regular doses of insulin, 85 (56.7%) were Disagree and 16 (10.7%) Strongly Disagree about hearing some people had bad experience with insulin, 52 (34.7%) were Disagree and 4 (2.7%) Strongly Disagree about feeling that him/her diabetes has become worse if he/she start to use insulin, 70 (46.7%) were Disagree and 31 (20.7%) Strongly Disagree for insulin is likely to increase him/her weight, 51 (34%) were Disagree and 8 (5.3%) Strongly Disagree foe insulin can reliably prevent long term complications due to diabetes, and 53 (35.3%) Disagree and 2 (1.3%) Strongly Disagree about insulin can reliably prevent long term complications due to diabetes.

82 (54.7%) Agree and 11 (7.3%) Strongly Agree about not be able to use the proper injecting technique, 82 (54.7%) Agree and 35 (23.3%) Strongly Agree about insulin would make his/her life difficult, such as in travelling or eating out, 69 (46%) were Agree and 14 (9.3%) Strongly Agree about people will think that he/she sicker if use insulin, 46 (30.7%) Agree and 12 (8%) Strongly Agree for insulin would help him/her to improve his/her diabetes control, 84 (56%) Agree and 42 (28%) Strongly Agree for insulin can lead to serious problems with low blood sugar,

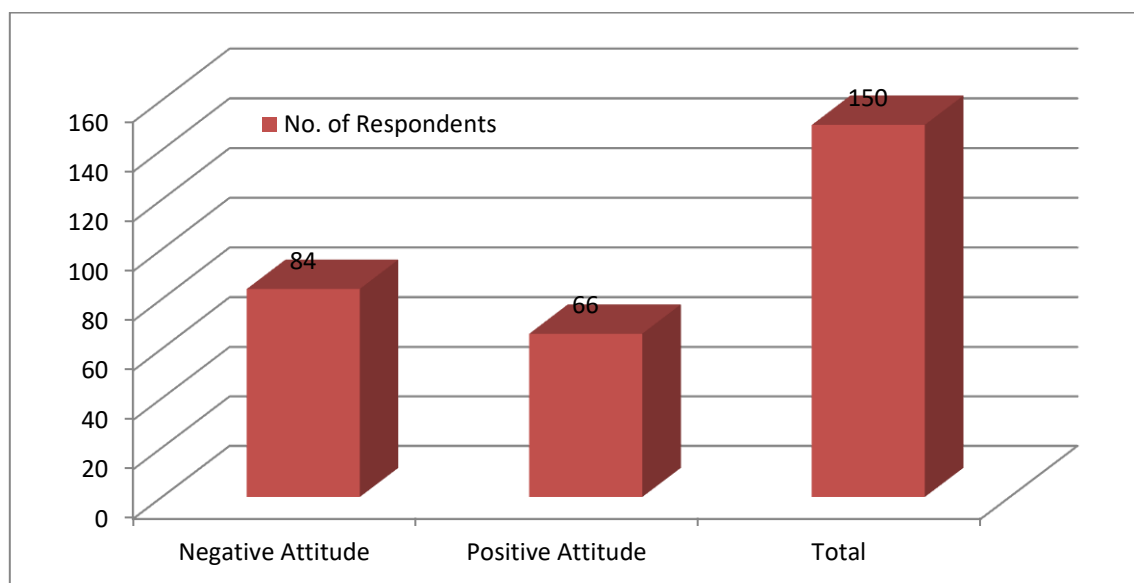
Majority of respondents answer neither agree nor disagree about insulin will allow me to have a less restrictive diet, cannot pay as close attention to his/her diet as insulin treatment requires, If he/she needs to use insulin, this means he/she failed to properly care for his/her diabetes previously, and it would be better to delay insulin until there was no alternative, 87 (58.0%), 64 (42.7%), 83 (55.3%) and 121 (80.7%) respectively.

**Table 3: Respondents attitude about Insulin Injection (N. 150)**

No.	Statement	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
		No.	%	No.	%	No.	%	No.	%	No.	%
1	I am afraid of needle injections	16	10.7	67	44.7	6	4.0	53	35.3	8	5.3
2	I will not be able to use the proper injecting technique.	10	6.7	36	24.0	11	7.3	82	54.7	11	7.3
3	Injections in front of people would be embarrassing to me.	15	10.0	68	45.3	9	6.0	54	36.0	4	2.7
4	Regular injections would give me a feeling of dependence	22	14.7	116	77.3	4	2.7	3	2.0	5	3.3
5	Insulin would make my life difficult, such as in travelling or eating out.	2	1.3	6	4.0	25	16.7	82	54.7	35	23.3
6	I just do not have enough time for regular doses of insulin	9	6.0	72	48.0	41	27.3	23	15.3	5	3.3
7	Insulin will allow me to have a less restrictive diet.	2	1.3	20	13.3	87	58.0	39	26.0	2	1.3
8	People will think that I am sicker if I use insulin.	3	2.0	50	33.3	14	9.3	69	46.0	14	9.3
9	I do not want to start insulin because I heard some people had bad experience with insulin	16	10.7	85	56.7	16	10.7	12	8.0	21	14.0
10	I cannot pay as close attention to my diet as insulin treatment requires.	3	2.0	46	30.7	64	42.7	32	21.3	5	3.3
11	Insulin would help me to improve my diabetes control.	3	2.0	40	26.7	49	32.7	46	30.7	12	8.0
12	I will feel that my diabetes has become worse if I start to use insulin.	4	2.7	52	34.7	41	27.3	42	28.0	11	7.3
13	Insulin can lead to serious problems with low blood sugar	1	.7	7	4.7	16	10.7	84	56.0	42	28.0
14	Insulin is likely to increase my weight.	31	20.7	70	46.7	30	20.0	6	4.0	13	8.7

15	Insulin can reliably prevent long term complications due to diabetes.	8	5.3	51	34.0	53	35.3	35	23.3	3	2.0
16	If I need to use insulin, this means I failed to properly care for my diabetes previously.	2	1.3	36	24.0	83	55.3	22	14.7	7	4.7
17	It would be better to delay insulin until there was no alternative.	1	.7	16	10.7	121	80.7	10	6.7	2	1.3
18	Insulin can reliably prevent long term complications due to diabetes.	2	1.3	53	35.3	39	26.0	27	18.0	29	19.4

Figure 3 shows the respondents' level of attitude about Insulin Injection by calculating the answers of each respondent in SPSS and then find the percentage. Total score of the responses to the 19 attitude statements was computed for each participant (19-95). Median score was computed. Patients who scored above median score (56) was considered as having "positive attitude towards insulin therapy" whereas those who scored at median score (56) and below was considered as having "negative attitude towards insulin therapy". Majority of respondents 84 (56%) have negative attitude, while 66 (44%) have positive attitude towards insulin therapy.



**Figure 3: Distribution of respondents according to their attitude towards insulin therapy.**

Majority of respondents have negative attitude about insulin therapy, (36) who aged between 60 and 70 years, male (56), (40) married, (56) not working, (55) live in Taif, and (48) have education less than Secondary level. So, There were factors found to be significantly associated with level of attitude, namely sex ( $p=.001$ ). While there were no significant associated with age ( $p=.167$ ), marital status ( $p=.153$ ), working ( $p=.123$ ), living ( $p=.551$ ), and level of education ( $p=.390$ ).

**Table 4: Association between characteristics of respondents and level of Attitude (150)**

Variables		Negative Attitude		Positive Attitude		P Value of chi square
		No.	%	No.	%	
Age	40-	11	7.3	13	8.7	.169
	50-	28	18.7	29	19.3	
	60 -	36	24	21	14	
	70+	9	6	3	2	
Sex	Male	56	37.3	26	17.3	.001*
	Female	28	16.7	40	26.7	
Marital Status	Single	3	2	3	2	.153
	Married	40	26.7	43	28.7	
	Divorced	15	10	7	4.7	
	Widow	26	17.3	13	8.7	



<b>Working</b>	Yes	28	18.7	29	19.3	.123
	No	56	37.3	37	24.7	
<b>Living</b>	Taif	55	36.7	43	28.7	.551
	Outside Taif	29	19.3	23	15.3	
<b>Level of Education</b>	Less than Secondary	48	32	31	20.7	.390
	Secondary	25	16.7	22	14.7	
	University and higher	11	7.3	13	8.7	

\* Significant be value < 0.05

## 5. DISCUSSION

Generally, in this study both positive and negative concerns and beliefs about diabetes mellitus and insulin therapy were the basis of the respondents' willing to start insulin if the doctor recommends it. So, there was a strong significant positive correlation between attitude of respondents with willing to start insulin ( $r = .056$ ,  $p = .494$ ). This is the same as result in study conducted by Batais, & Schantter, (2016) reported unwillingness to using insulin was common in about one third (34.6%) of Saudi participants with Type 2 DM<sup>(15)</sup>, while Wong, et al., (2011) found (70.6%) patients expressed unwillingness to use insulin therapy<sup>(16)</sup>. Tan, Asahar, & Harun, (2015) reported (74.2%) patients with T2DM refused insulin therapy<sup>(17)</sup>. Alsunni, Albaker, & Badar, (2014) found (57.5%) subjects had low misconception scores<sup>(18)</sup>. Ghadiri-Anari, Fazaalipoor, & Mohammadi, (2013) 77% of participant reported being unwilling to take insulin if prescribed<sup>(19)</sup>.

Initially, majority of respondents were unwilling to start insulin as a result of their negative attitude toward insulin therapy. Fear of injection has often been thought to be one of the most important barriers to insulin use. In this study, injection-related concerns were found to be more common in patients who were unwilling to use insulin, which was likewise described in other studies<sup>(16,19,20)</sup>.

The present study revealed Majority of respondents have negative attitude towards insulin therapy. The greatest differences in concerns and beliefs between respondents willing to use insulin therapy and those who were not, included fear of not be able to use the proper injecting technique, embarrassing to do injection in front of people, feeling of dependence with Regular injections fear of injection pain or needle. This result was similar to results found in other studies<sup>(15,17,19)</sup>.

In this study, concerns about the impacts of insulin use on the respondents' life also made them refused insulin. These worries were substantiated as almost 50% of diabetes patients on insulin felt that its use restricted their life<sup>(21,23)</sup>. Actually, more than half of insulin users had difficulties in fulfilling their work and personal responsibilities. Wong et al. (2011) suggested that this factor could reflect their lower self-efficacy, which was also reported by the respondents in this study<sup>(16)</sup>.

In our study fear of injection was the most important cause in all age, sex, educational level and duration of T2DM. This anxiety and fear of injection coming from needle size and use of thinner and shorter needles may reduce fear and making injection less painful<sup>(22)</sup>.

Patients' perceptions of social stigma for the self-injection of insulin in public can have a restrictive effect on disease-management efforts. The consequence of it may lead to a lack of motivation due to the inconvenience and embarrassment related to injections<sup>(17)</sup>. Patients may select suboptimal locations to inject themselves while away from home, such as in public toilets, and may also cause some patients to delay injections and avoid social activities.<sup>(20)</sup> Some patients worry that if they inject in public places they will be perceived as injecting illegal drugs<sup>(19)</sup>.

Insulin pens can be very helpful for overcoming this barrier by increasing patients' ability to inject discretely. Using only morning and or bedtime insulin regimens can also eliminate this barrier for some patients<sup>(19)</sup>. Other study reported that perceiving insulin as beneficial is a crucial factor for diabetes patients commencing on insulin to accept insulin therapy<sup>(22)</sup>.

These misconceptions could reflect the respondents' poor knowledge regarding diabetes mellitus and insulin therapy when they were first recommended for insulin<sup>(23)</sup>. Mohd Ali, and Jusoff, (2009) found that majority of their diabetes patients lacked understanding about diabetes, its management, and the effects of treatment<sup>(24)</sup>. So, early education at the point of diagnosis regarding the progressive nature of diabetes and inevitable use of insulin could alleviate their misconceptions.<sup>(25)</sup>

In this study, attitude toward insulin therapy found significantly associated with sex ( $p = .001$ ), While there were no significant associated with age ( $p = .167$ ), marital status ( $p = .153$ ), working ( $p = .123$ ), living ( $p = .551$ ), and level of education ( $p = .390$ ). This result was not matching with the result of Yilmaz, Ak, Cim, Palanci, & Kilinc, (2016) that show no any significant correlations between injection anxiety and age, sex, duration of diabetes mellitus<sup>(20)</sup>.

## 6. CONCLUSION

Respondents have negative attitude toward insulin therapy. So, it important to explore reasons for their reluctance to commence insulin can address his/her specific concerns and beliefs, and promote the future uptake of insulin therapy.

Respondents' concerns and beliefs regarding insulin therapy use are very much influenced by their knowledge, experience and support from others. Thus it is crucial to provide them with knowledge (through effective communication, support and educational activities), as well as positive experience for them to adopt favorable concerns and beliefs that promote insulin acceptance. In addition, delivering patient-centred care and good doctor-patient relationship will contribute to achieving long term treatment targets to both the patient and physician.

The most significant finding in this study is a lack of adequate information relating to insulin therapy which indicates to be the major factor respondents' refusal of insulin using as a treatment as their conception that insulin treatment considered as a final solution to diabetes mellitus could be related to resistance to the initiation of insulin therapy.

Insulin refusal is an important and urgent problem that should be addressed. Most patients with type 2 diabetes mellitus will eventually require insulin therapy, and healthcare providers involved with care of these patients should be trained in counseling patients who refuse insulin therapy.

## 7. RECOMMENDATIONS

1. Education regarding insulin therapy should be started early, even at diagnosis of type 2 diabetes.
2. Increasing insulin use should focus on injection-related concerns, education and correction of misconceptions.
3. Healthcare providers must be prepared with adequate information and counseling skill to ensure the delivery of diabetic education is effective and individualised to the patients' needs.

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