Assessment of psychological insulin resistance in patients on insulin therapy

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Introduction

Diabetes mellitus (DM) currently affects 415 million people worldwide, which is expected to increase to 642 million by the year 2040. The pathology behind is attributed to reduced insulin secretion, absence of an insulin effect, or both. Many diabetic patients are diagnosed on the basis of symptoms such as polyuria, polydipsia, and weight loss. Diagnosis is achieved by identification of elevated blood glucose levels, however in most instances it is the diabetes-related health problems that allow a diagnosis. Many international guidelines have recommended the early initiation of insulin therapy. But, Even with well-established effectiveness of insulin in the treatment of diabetes, several factors play a role in delay in the initiation of insulin treatment naïve patient and the poor adherence to the insulin in treated patients. This occurs due to the false perceptions regarding the insulin among the diabetic population. Psychological insulin resistance (PIR) refers to the negative attitude and beliefs towards insulin. It Is a multifactorial concept involving the patient's beliefs and knowledge about insulin, negative perceptions and attitudinal barriers, lifestyle adaptations, social stigmata and the fear of side effects or complications. ITAS (Insulin treatment appraisal scale) is a 20 point questionnaire which measures both positive and negative aspects of insulin therapy.[1]

Aims and Objectives

1. To assess the psychological insulin resistance among the diabetic patients on insulin therapy.
2. To correlate HbA1c levels with the positive and negative aspects of insulin therapy as in ITAS questionnaire.

Methodology

Study setting: This study will be done under the Department of General Medicine at Sri Manakula Vinayagar Medical College and Hospital (SMVMCH). SMVMCH is a tertiary care hospital located at Madagadipet, Puducherry.

Study Design: The design employed is a hospital based cross sectional study

Study Participants: Patients attending the outpatients department and in medical ward

Inclusion Criteria
- Age 13 years or greater
- Both type 1 and type 2 diabetes mellitus
- Patients on insulin therapy for more than 6 months
  Exclusion criteria
- Age less than 13 years.
- Patients who are on insulin therapy less than 6 months duration.
- Patients with significant cognitive impairment.

Study Duration: The duration of this study is 6 months.

Sample Size
The sample size was estimated to be 316 based on the previous studies. calculated in open epi software with n =28.2

Sampling Procedure
The study is questionnaire based cross sectional study and both inpatients and patients coming to OPD were included in the study.

Methodology
Patients who are coming to hospital both on outpatient basis and inpatient were included in the study. Patients clinical history regarding diabetic mellitus was taken and patients not satisfying the inclusion criteria were excluded from the study. Patient will be given a questionnaire to fill (ITAS) to know the psychological status about the insulin therapy. A 3 ml of blood will be taken to evaluate theHbA1c status of the patient. Patient's diabetic status and their psychological attitude towards the insulin was used correlated.

Statistical Analysis: Data entry and analysis done in SPSS version 22,

Spearman correlation was done between ITAS questionnaire and Hba1c value.

p-value <0.05 is considered statistically significant

Table 1:
ITAS questionnaire -20 point questionnaire with scoring from strongly disagree, disagree, neitheragree nor disagree, agree and strongly agree.

S.No.	ITAS question
1	Taking insulin means I have failed to managemy diabetes with diet and tablets
2	Taking insulin means my diabetes has become much worse.
3	Taking insulin helps to prevent complications of diabetes
4	Taking insulin means other people see me as a sicker person
5	Taking insulin makes life less flexible.
6	I'm afraid of injecting myself with a needle.
7	Taking insulin increases the risk of low blood glucose levels (hypoglycaemia)
8	Taking insulin helps to improve my health.
9	Insulin causes weight gain.
10	Managing insulin injections takes a lot of time and energy
11	Taking insulin means I have to give up activities I enjoy.
12	Taking insulin means my health will deteriorate
13	Injecting insulin is embarrassing.
14	Injecting insulin is painful
15	It is difficult to inject the right amount of insulin correctly at the right time every day.
16	Taking insulin makes it more difficult to fulfil my responsibilities (at work, at home)
17	Taking insulin helps to maintain good control of blood glucose.
18	Being on insulin causes family and friendst o be more concerned about me.
19	Taking insulin helps to improve my energy level
20	Taking insulin makes me more dependent on my doctor

Questions 3, 8,17 and 19 measures the positive aspect to the insulin therapy.

Results

Table 2: Demographic Details of the Study Population-

		Number	Percentage
Age	22year - 82 years (mean:54.8 +/- 10.8 SD)		
Gender	Male	193	61
	Female	123	38.9
BMI	<18.5	73	23.1
	18.5-25	98	31
	>25	145	45.9
Socioeconomic status	Upper-middle	39	12.34
	Middle	80	25.3
	Lower	198	62.65
Education	Illiterate	66	20.88
	School education	218	68.98
	Graduate	32	10.12

Table 3: Diabetes Trend in the Study Population

|		Number	Percentage
Diabetes disease Duration	<1 year	25	8
	2-5 year	142	45
	6-10 year	88	28
	>11 years	60	19
Duration of insulin therapy	<1 year	82	26
	2-5 year	154	49
	6-10 year	60	19
	>10 year	19	6
Insulin dosage	<20 units	85	27.7
	20-50 units	164	52.7
	>50 units	62	19.7
HbA1C	Not available	30	9.5
	5.5- 6.8	24	7.6
	6.8-9.0	77	24.6
	9.0-13	151	48.1
	>13	32	10.2

Table 4: spearman correlation done between hba1c and ITAS questionnaire

ITAS question	R	P value
1	0.168	0.009
2	0.191	0.003
3	0.234	<0.001
4	0.317	<0.001
5	0.374	<0.001
6	0.063	0.332
7	0.112	0.084
8	0.327	<0.001
9	0.138	0.033
10	0.321	<0.001

11	0.046	0.484
12	0.289	<0.001
13	0.274	<0.001
14	0.315	<0.001
15	0.197	0.002
16	0.266	<0.001
17	0.241	<0.001
18	0.057	0.378
19	0.397	<0.001
20	0.349	<0.001

Q.no.	Question	Strongly Disagree (%)	Disagree (%)	Agree nor disagree (%)	Agree(%)	Strongly Agree (%)
1	Taking insulin means I have failed to manage my diabetes with diet and tablets.	1.9	20.5	33.7	27.7	16.3
2	Taking insulin means my diabetes has become much worse	0.8	18.9	30.3	31.4	18.6
3	Taking insulin helps to prevent complications of diabetes	-	7.6	46.2	31.1	15.2
4	Taking insulin means other people see me as a sicker person	1.1	25	23.1	46.9	9.8
5	Taking insulin makes life less flexible	3	30.7	21.6	37.8	6.8
6	I'm afraid of injecting myself with a needle	28	42	12.1	14	3.4
7	Taking insulin increases the risk of low blood glucose levels (hypoglycemia)	4	40.5	16.7	23.1	5.3
8	Taking insulin helps to improve my health	1.5	14	28.4	47.3	8.7
9	Insulin causes weight gain	25.4	31.4	24.6	15.9	2.3
10	Managing insulin injections takes a lot of time and energy	0.4	9.1	30.3	48.9	11.4
11	Taking insulin means I have to give up activities I enjoy	3.4	26.1	22	35.2	12.9
12	Taking insulin means my health will detoriate	26.5	36	19.2	1.7	0.8
13	Injecting insulin is embarrassing	20.1	37.1	15.2	23.9	3.4
14	Injecting insulin is painful	24.2	32.2	11.7	25.8	6.1
15	It is difficult to inject the right amount of insulin correctly at the right time everyday	3.4	24.2	23.1	39.8	9.5
16	Taking insulin makes it more difficult to fulfill my responsibilities	3	19.7	26.9	39	11.4
17	Taking insulin helps to maintain good control of blood glucose	-	8	32.6	55.3	4.2
18	Being on insulin causes family and friends to be more concerned about me	0.4	19.3	23.1	47.7	9.5
19	Taking insulin helps to improve my energy level	0.4	12.5	25.9	49.6	12.1
20	Taking insulin makes me more dependent on my doctor	6	6.4	20.1	44.7	28.8

Bar Diagram Depicting the Insulin Dosage among the Study Population
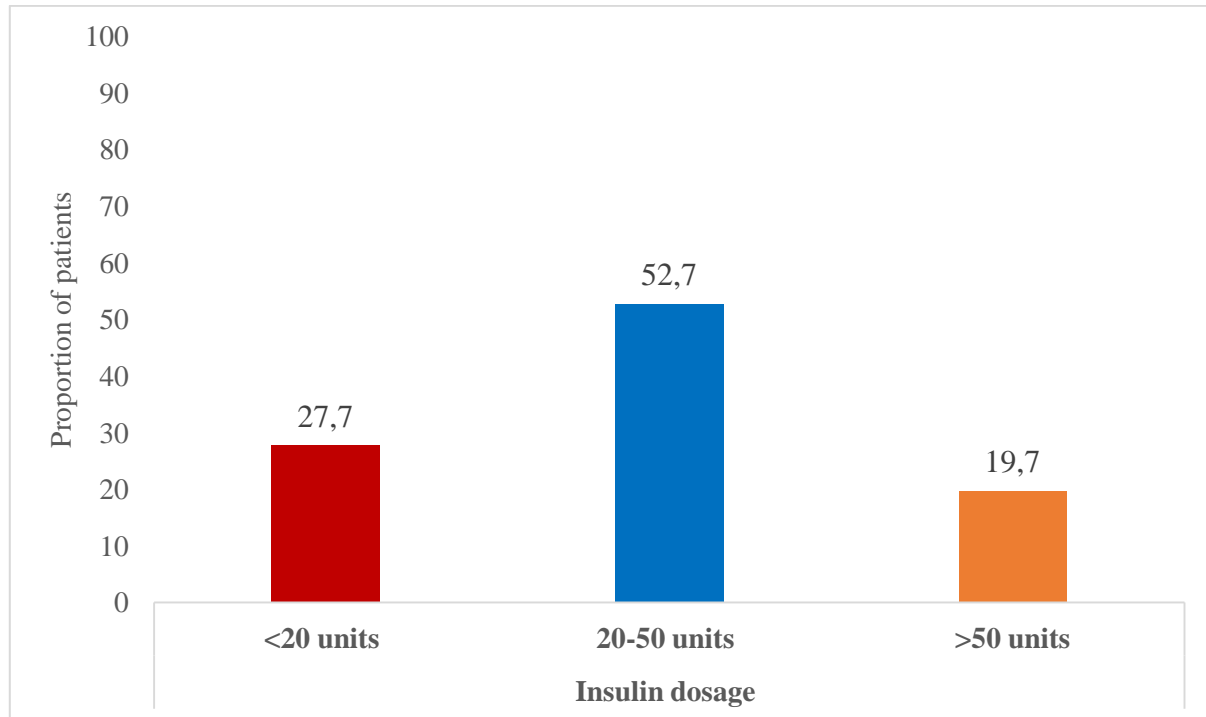
Discussion

In this present study, we evaluated the patients for positive attitudes (4questions) and negative attitude (16 questions) towards insulin therapy among 316 patients – majority of patients are males (61%) and had BMI >25 (45.9)with diabetes duration 2-5 years (45%)and HbA1C in range 9-13 (48.1%)

Patients Hb A1c levels showed significance with ITAS 3 complication prevention (p-value: 0.001), ITAS 8 health improvement (*p*-value :0.001) and ITAS 19 increase in energy levels (*p*-value :0.001)

When the patients are categorized based on the dosage of insulin levels, there is significance noted on with ITAS 3 complications prevention (*p* value: 0.01), and ITAS 19 (*p* value: 0.03) patients who considered that insulin prevents complications had better control of their blood sugar.

The study's findings concur with other previous studies by E. J. Ku et al[3], and signified that patient on insulin therapy with positive beliefs towards the insulin therapy had better control of their HbA1c status.

Hence positive reinforcement technique may have beneficial effects and help with better drug adherence, which will require future studies.

Conclusion

Psychological insulin resistance plays a major role in patient management in diabetic care. Early initiation and treatment with insulin have proven benefits in terms of complication prevention. Psychological insulin resistance can be prevented with its assessment before initiation of insulin therapy, or if poor adherence to insulin therapy is noted it can be evaluated-to identify the area of impact[4].ITAS questionnaire can prove to be a useful tool to assess the PIR and can therefore help with better drug adherence and prevention of complications.

Limitations

The questionnaire was not in the native language of the study group and so error during the translation is a limitation.

The compliance with oral antidiabetic drugs was not taken into account.

Reference

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