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Fear of Self-Injection and Perceived Social Support on Insulin Self-administration Practices among People with Type-2 Diabetes Mellitus

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ABSTRACT

Background: Diabetes mellitus is a disorder of carbohydrate metabolism in which the ability of the body to produce or respond to insulin is impaired and leads to improper maintenance of sugar levels in the blood. Diabetes is a significant cause of morbidity and mortality due to its complications. Insulin is widely used to treat Type 2 Diabetes mellitus (T2DM). Irrational fear of self-injection, insufficient knowledge of insulin administration practices, and poor social support prevent or postpone the initiation of insulin therapy among patients with T2DM.
Aim: The study aimed to assess the Fear of Self Injection and Perceived Social Support on Insulin Self-administration Practices among People with T2DM and its association with selected demographic and clinical variables.
Methods: A descriptive cross-sectional design was employed to recruit 100 participants with T2DM attending medicine outpatient departments of a tertiary care center. The participants were selected using simple random sampling technique. The data collection instrument included Diabetes fear of injecting and self-testing (D-FISQ) questionnaire, Multidimensional scale of perceived social support (MSPSS) and Insulin self-administration practices questionnaire.
Results: Most (69%) of them were male and 31 % of them were female. Only 6% of them had high level of fear during self-administration of insulin. Majority (66%) of them had good social support and 12% of the subjects had inadequate insulin administration practices. A statistically significant negative relationship between perceived social support and fear of self-injection (r = -0.404), and fear of self-injection and insulin self-administration practices (r = - 0.178), and positive relationship between perceived social support and Insulin self-administration practices (r=0.161) was observed.
Conclusion: Self administration of insulin practice was affected by fear of self-injection and social support. Increased fear of self-injection had a negative effect and good social support had a positive effect on the individual.
Keywords: *Type 2 Diabetes mellitus, Insulin, Fear of self-injection, Social Support, Insulin self-administration practices*

INTRODUCTION

Diabetes mellitus is a global health problem affecting about 422 million people worldwide, the majority living in low-and

middle-income countries, and each year 1.5 million deaths due to diabetes mellitus. Diabetes mellitus is a non communicable, silent killer disease and is recognized as one of the fastest growing threats to public health in almost all countries of the world. [1] Diabetes Mellitus is derived from Greek word, diabetes meaning siphon- to pass through and the Latin word mellitus meaning is sweet.[2] Diabetes mellitus is a chronic metabolic disease characterized by elevated blood glucose level resulting from problem in insulin secretion from the islets of langerhans in the pancreas, and its action or both.[3] The prevalence of diabetes is expected to increase from 415 to 642 million by 2040 with the most significant increase in populations shifting from low to middle-income levels. [4] These figures are quite alarming and indicate a significant cause for concern

Diabetes is a widespread health concern, with two main types: Type 1 Diabetes Mellitus (T1DM) and T2DM. In India, a staggering 77 million people aged 18 and above are affected by T2DM, and an additional 25 million are in the pre-diabetes stage, according to the World Health Organization (WHO).

Prolonged hyperglycemia can elevate the risk of developing macrovascular diseases such as cardiovascular (CV), cerebrovascular and peripheral artery disease, as well as microvascular complications like diabetic retinopathy, nephropathy, and neuropathy. Patients with type 2 diabetes mellitus (T2DM) who are treated with insulin therapy can achieve better control of their glycemic levels.[5]

However, these patients often experience significant fear and apprehension related to the process of administering injections. The lack of knowledge about insulin self-administration contributes to fear of injections. However, social support among T2DM patients positively impacts medication adherence. [6, 7]

Objective of the study

1. To assess the Fear of self-injection and Perceived social support regarding insulin self-administration practices among people with T2DM
2. To find the relationship between perceived social support (PSS) and fear of self-injection (FSI), perceived social support and insulin self-administration practices and fear of self-injection and insulin self-administration practices among people with T2DM
3. To determine the association between fear of self-injection, perceived social support and insulin self-administration practices and their selected demographic and clinical variables.

METHODS

A descriptive cross-sectional design was employed and a total of 100 participants with T2DM on self-administration of insulin were recruited by using a simple random sampling technique. Participants who could read and understand Tamil and English, above 18 years of age, clinically diagnosed with T2DM, and on self-administration of insulin or by family members using the conventional method of syringe for self-administration were included in the study. Patients who use insulin pen device were excluded from the study due to ease of administration and reduced pain perception associated with this method compared to the conventional method. [8]

Materials/Instruments

The data collection instrument has four parts. Part 1: Demographic and Clinical variables. The demographic information included age, gender, religion, educational status, occupation, marital status, and locality, type of family, family's monthly income, and number of members in the family. The clinical variables include the duration of T2DM, the duration of insulin self-administration, the type of insulin, the frequency of injection, the person responsible for insulin administration, and

whether the participant received teaching on insulin self-administration.

PART II - Diabetes fear of injecting and self-testing questionnaire (D-FISQ). It is a 6 item self-reported questionnaire, developed by Eline D. Mollema, et al., (2000). Each item is scored on a 4-point Likert scale from (0 = Almost never, to 3 = Almost always). A high score indicates more fear.[9] PART III- Multidimensional scale of perceived social support (MSPSS). Perceived Social Support (PSS) was assessed using MSPSS, developed by Zimet et al., 1988. The 12-item self-report measure provides a subjective assessment of social support from family, friends, and significant others. Each item is scored using a 7-point Likert scale (1 = very strongly disagree; 7 = very strongly agree). The subscale scores are calculated by summing related responses, with higher scores indicating a higher degree of PSS from that particular source. [10] PART IV- Questionnaire on Insulin self-administration practices was prepared by investigator, and it has 20 items that include the techniques. Content validity was done by experts in the field. The CVI of the tool is 0.86.

The investigator collected the demographic and clinical profile using the interview technique. The participants were given the questionnaires in their preferred language, either in English or Tamil.

STATISTICAL ANALYSIS

Descriptive statistics was done for all continuous variables using mean (SD) or median (IQR) based on normality and categorical data using frequency and percentage. Pearson correlation or Spearman correlation used to find the relationship between perceived social support and fear of self-injection, perceived social support and insulin self-administration practices and fear of self-injection and insulin self-administration practices among people with T2DM. Pearson Chi-square test or Fisher exact test used to find the association between categorical variables. A p value < 0.05 was considered as significant and SPSS version 21.0 was used for statistical analysis. The College of Nursing research committee approved the study. After a brief explanation of the study, written informed consent was obtained from all study participants. Privacy measures were implemented, and the data was stored in a password-protected separate database accessible only to the investigator. The anonymity and confidentiality of the participants were maintained and protected throughout the study.

RESULTS

Table 1 Distribution of participants based on their demographic variables N=100

S.no	Variables	n	%
1	**Age**		
	18-30 years	1	1
	31-45years	11	11
	46-60years	42	42
	Above 60 years	46	46
2	**Gender**		
	Male	69	69
	Female	31	31
3	**Religion**		
	Hindu	72	72
	Christian	6	6
	Muslim	22	22
4	**Educational status**		
	Primary	16	16
	Elementary	20	20
	Secondary	26	26
	Higher secondary	10	10
	Graduate	17	17

	Post graduate	11	11
5	**Occupation**		
	Home maker	29	29
	Agriculture	12	12
	Business	22	22
	Coolie worker	10	10
	Heath care professionals	6	6
	Retired	21	21
6	**Marital status**		
	Married	99	99
	Widow	1	1
7	**Locality**		
	Urban	49	49
	Rural	51	51
8	**Type of family**		
	Nuclear	44	44
	Joint	56	56
9	**Family's monthly income**		
	< 10,000	18	18
	10000 - 25000	39	39
	>25000	43	43
10	**Number of members in the family**		
	1-3	26	26
	4-6	46	46
	Above 6	28	28

Table 2 Distribution of participants based on their clinical variables N=100

S No	Variables	n	%
1	**Duration of T2DM**		
	Less than1year	2	2
	1 year - < 5 years	11	11
	5 years and above	87	87
2	**Duration of self-administration of insulin**		
	Less than 1 year	31	31
	1 year - < 5 years	22	22
	5 years and above	47	47
3	**Type of insulin**		
	Inj. Actrapid	29	29
	Inj. Mixtard	71	71
4	**Frequency of injection**		
	Twice a day	72	72
	Thrice a day	28	28
5	**Person responsible for insulin administration**		
	Self	81	81
	Family members	13	13
	Both	6	6
6	**Received teaching on self-administration of insulin**		
	Yes	98	98
	No	2	2

Figure 1 Distribution of participants based on their fear of self-injection N=100 (Mean =4.62± 6.057)

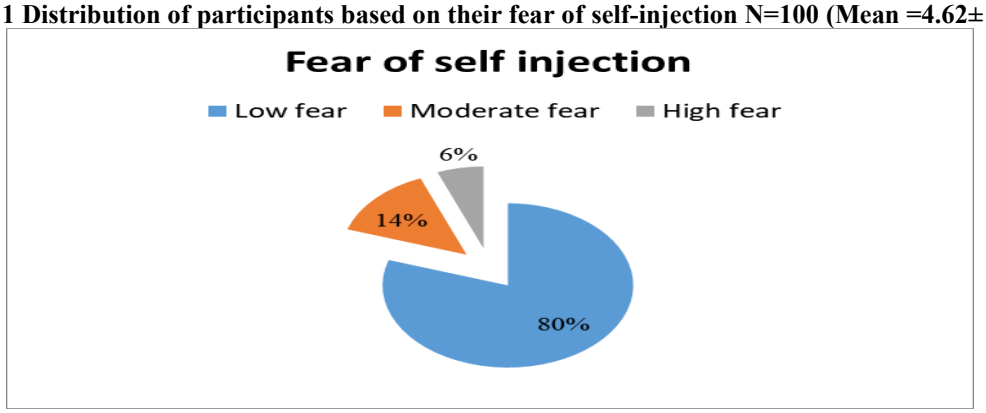

Figure 2 Distribution of participants based on their perceived social support N=100 (Mean =65.92±15.33)

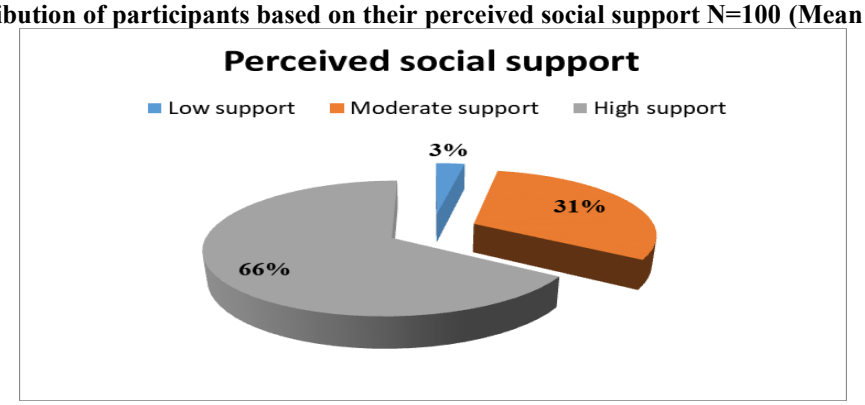

Figure 3 Distribution of the participants based on their Insulin administration practices N=100 (Mean =13.66±2.59)

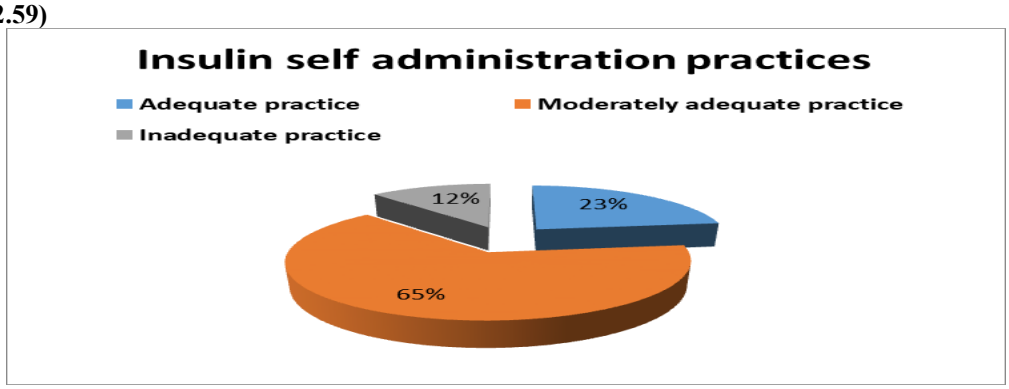

Figure 4 Relationship between perceived social support and fear of self-injection N=100

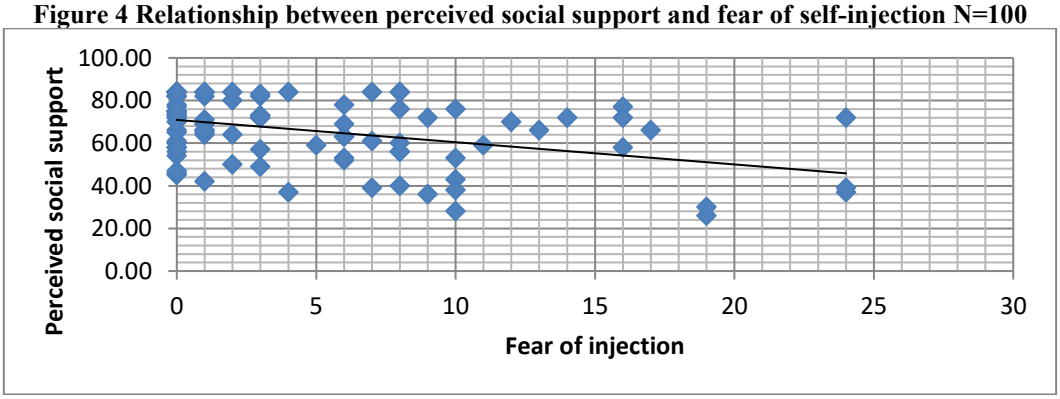

Figure 5 Relationship between perceived social support and Insulin self-administration practices N=100

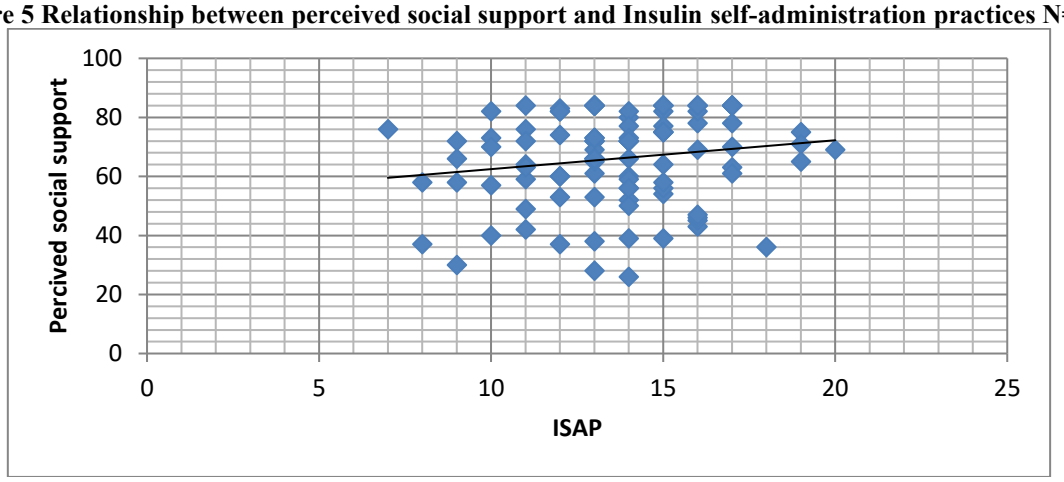

Figure 6 Relationship between fear of self-injection and insulin self-administration practices N=100

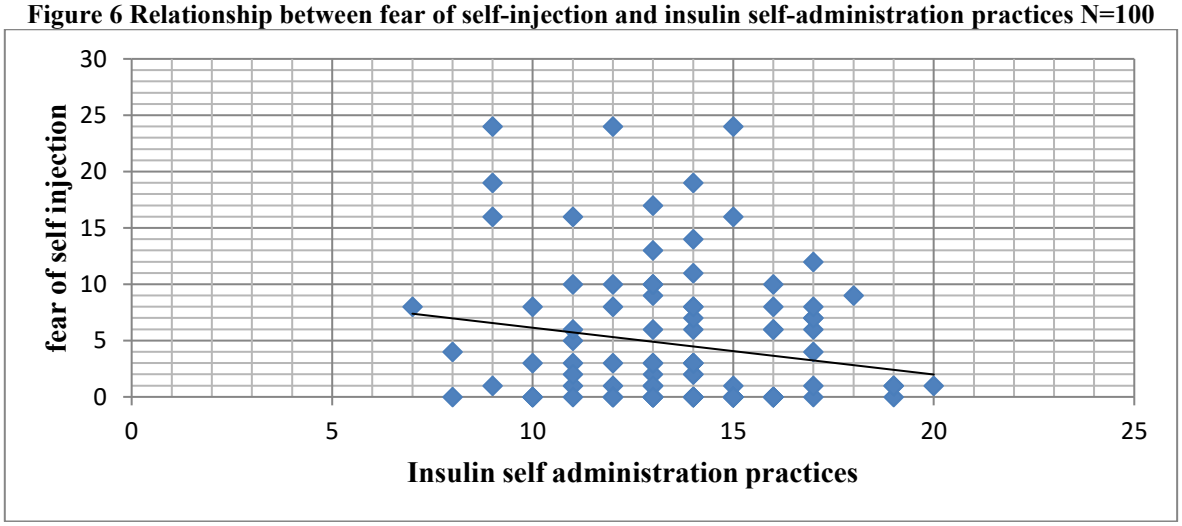

Table 3 Association between Fear of self-injection and their selected demographic variables N=100

Demographic Variables	Low fear		Moderate fear		High fear		χ^2	P Value
	n	%	n	%	n	%		
Age in years								
18-30	1	1	0	0	0	0		
31-45	8	8	2	2	1	1	3.642	0.725
46-60	31	31	7	7	4	4		
Above 60years	40	40	5	5	1	1		
Gender							7.278	0.026*
Male	60	60	7	7	2	2		
Female	20	20	7	7	4	4		
Religion								
Hindu	61	61	7	7	4	4	5.419	0.247
Christian	5	5	1	1	0	0		
Muslim	14	14	6	6	2	2		
Educational status								
Primary	13	13	2	2	1	1		
Elementary	14	14	3	3	3	3		
Secondary	22	22	3	3	1	1	5.207	0.877
Higher secondary	9	9	1	1	0	0		
Graduate	13	13	3	3	1	1		
Post -Graduate	9	9	2	2	0	0		
Occupation								
Home maker	21	21	5	5	3	3		

Agriculture	10	10	2	2	0	0	5.303	0.870
Business	19	19	2	2	1	1		
Labor	8	8	2	2	0	0		
Healthcare	4	4	1	1	1	1		
Retired	18	18	2	2	1	1		
Marital status								
Married	79	79	14	14	6	6	0.253	0.881
Widow	1	1	0	0	0	0		
Locality								
Urban	40	40	6	6	3	3	0.246	0.884
Rural	40	40	8	8	3	3		
Family's monthly income								
<10000	15	15	2	2	1	1		
10000-25000	28	28	9	9	2	2	4.591	0.332
>25000	37	37	3	3	3	3		
Type of family								
Nuclear	35	35	6	6	3	3	0.097	0.953
Joint	45	45	8	8	3	3		
Number of members in the family								
1-3	20	20	5	5	1	1		
4-6	36	36	6	6	4	4		
Above 6	24	24	3	3	1	1	1.950	0.745

Table 4: Association between Perceived social support and their selected demographic variables N=100

Demographic Variables	**Low support**		**Moderate support**		**High support**			
	n	%	n	%	n	%	χ^2	**P Value**
Age in years								
18-30	0	0	0	0	1	1	7.184	0.304
31-45	1	1	2	2	8	8		
46-60	2	2	10	10	30	30		
Above 60years	0	0	19	19	27	27		
Gender								
Male	0	0	23	23	46	46	7.083	0.029*
Female	3	3	8	8	20	20		
Religion								
Hindu	1	1	24	24	47	47	4.444	0.349
Christian	0	0	1	1	5	5		
Muslim	2	2	6	6	14	14		
Educational status								
Primary	1	1	3	3	12	12	7.182	0.708
Elementary	1	1	9	9	10	10		
Secondary	1	1	10	10	15	15		
Higher secondary	0	0	2	2	8	8		
Graduate	0	0	4	4	13	13		
Post -Graduate	0	0	3	3	8	8		
Occupation								
Home maker	2	2	8	8	19	19	13.362	0.204
Agriculture	0	0	6	6	6	6		
Business	1	1	4	4	17	17		
Labor	0	0	6	6	4	4		
Healthcare	0	0	0	0	6	6		
Retired	0	0	7	7	14	14		
Marital status								
Married	3	3	31	31	65	65	0.520	0.771
Widow	0	0	0	0	1	1		
Locality								
Urban	1	1	17	17	31	31	0.826	0.662
Rural	2	2	14	14	35	35		

Family's monthly income								
<10000	0	0	5	5	13	13		
10000-25000	2	2	13	13	24	24	1.568	0.344
>25000	1	1	13	13	29	29		
Type of family								
Nuclear	1	1	18	18	25	25	3.631	0.163
Joint	2	2	13	13	41	41		
Number of members in the family								
1-3	0	0	9	9	17	17		
4-6	1	1	15	15	30	30	2.980	0.561
Above 6	2	2	7	7	19	19		

Table 5: Association between Insulin self-administration practices with their selected demographic variables N=100

Demographic Variables	**Inadequate practice**		**Moderately adequate practice**		**Adequate practice**		**χ^2**	**P Value**
	n	%	n	%	n	%		
Age in years								
18-30	0	0	1	1	0	0	9.474	0.149
31-45	4	4	5	5	2	2		
46-60	2	2	28	28	12	12		
Above 60years	6	6	31	31	9	9		
Gender								
Male	7	7	48	48	14	14	2.063	0.357
Female	5	5	17	17	9	9		
Religion								
Hindu	6	6	49	49	17	17	7.095	0.131
Christian	0	0	5	5	1	1		
Muslim	6	6	11	11	5	5		
Educational status								
Primary	1	1	13	13	2	2		
Elementary	4	4	14	14	2	2	9.441	0.491
Secondary	3	3	13	13	10	10		
Higher secondary	1	1	6	6	3	3		
Graduate	1	1	12	12	4	4		
Post -Graduate	2	2	7	7	2	2		
Occupation								
Home maker	5	5	14	14	10	10		
Agriculture	1	1	10	10	1	1	19.256	0.037*
Business	3	3	15	15	4	4		
Labor	0	0	4	4	6	6		
Healthcare	0	0	6	6	0	0		
Retired	3	3	16	16	2	2		
Marital status								
Married	12	12	65	65	22	22	3.382	0.184
Widow	0	0	0	0	1	1		
Locality								
Urban	7	7	29	29	13	13	1.439	0.487
Rural	5	5	36	36	10	10		
Family's monthly income								
<10000	3	3	9	9	6	6		
10000-25000	3	3	27	27	9	9	3.033	0.552
>25000	6	6	29	29	8	8		
Type of family								
Nuclear	5	5	27	27	12	12	0.810	0.667
Joint	7	7	38	38	11	11		
Number of members in the family								

1-3	1	1	16	16	9	9	6.622	0.157
4-6	9	9	29	29	8	8		
Above 6	2	2	20	20	6	6		

DISCUSSION

Demographic and Clinical variables

Table 1 denotes that the majority (46%) of them belong to the age group above 60 years, and 42% of them were between 46-60years. Most (69%) of them were male and 31 % of them were female. Majority (72%) of them belong to Hindu by religion, 26% of them were had elementary education and 29% of were home maker. Most (99%) of them were married, 51% of them were residing in rural area, majority (56%) of them living in a joint family and furthermore,43% of participants had more than Rs. 25000/- as a monthly income and 46% of them had 4-6 members in their family. Whereas the study done by Arshad, I., Mohsin, S., I ftikhar, S., Kazmi, T., & Nagi, L. F. (2019), results shows that 39% of them were males and 61% were females.[11]

Table 2 shows that 87% of the participants were had duration of T2DM more than 5 years and 47% of them were administering insulin more than 5 years. Majority (71%) of the participants were taking Inj. Actrapid insulin, 72% of them administering insulin twice a day and 81% of them were administering insulin by themselves. Most (98%) of them received education regarding self-administration of insulin by health care professionals. The present study finding is similar with the study done by El-Radad, H.M., Sayed Ahmed, H.A. & Eldahshan, N.A (2023), that more than three-fourths (78.7%) of the participants had suffered with diabetes for 10 years or more.[12]

Fear of self-Injection, Social support and Insulin Self administration practices

Figure 1 indicates that 80% of the participants had low fear, 14% of them had moderate fear and only 6% of them had high fear during self-administration of insulin. A study done to assess Recognition of and steps to mitigate anxiety and fear of pain in injectable diabetes treatment, by Kruger, D. F., LaRue, S., & Estepa, P. (2015). The study results reveal that 34.7% of patients anticipated pain with insulin administration, it discourages the patient to initiate insulin therapy.[13] Figure 2 denotes that 66% of them were had high social support, 31% of them had moderate social support and only 3% of the participants had low social support. Similar results were found in the study done by Parviniannasab, A.M., Faramarzian, Z., Hosseini, S.A. et *al,* in south of Iran. The study results showed that social support reduces Diabetes distress and improve Resilience in patients with T2DM. Improved resilience will enhance the diabetes management self-efficacy.[14] Figure 3 illustrates that majority (65%) of them had adequate practices, 23% of them had moderately adequate practices and 12% of the participants had inadequate insulin administration practices. The present study result is supported by the study done in Southwest Ethiopia. The results are similar that majority (62.8%) were had adequate insulin self-administration practice.[15] Figure 4 denotes there is a negative relationship between perceived social support and fear of self-injection. (r = -0.404). Increased perceived social support decreases the fear of self-injection. A study done by Stenberg, J., Hjelm, K (2024), reveals that social support provided by a family members or close friend has a lesson the effect on distress, and is associated with better adherence to diabetes management.[16] Figure 5 denotes that there is a positive relationship between perceived social support and Insulin self-administration practices (r=0.161). Increased Perceived social support increases insulin self-administration practices. The study finding is congruent with the study done by Hasan, A. A., Ismail, A., & Noor, H. (2024). where there is a significant positive relationship between social support and self-care

behaviors among T2DM patients (r = 0.370, p = 0.001).[17] Figure 6 Illustrates there is a negative relationship between fear of self-injection and insulin self-administration practices (r = - 0.178). Increased fear of self-injection decreases insulin self-administration practices, this is supported by a study done by Alsaidan, A. A., Alsaidan, O. A., Mallhi, T. H., Khan, Y. H., Alzarea, A. I., & Alanazi, A. S. (2023). Al-Jouf region of Saudi Arabia, that 12% of patients with Diabetes expressed that fear of injection is potential barrier for insulin administration.[18] Table 3 denotes that there is a statistically significant association between fear of self-injection and gender (p<0.026). Women are always expressing their greater feelings of anxiety and sadness whereas a man maintains calm behavior always in response to the stress. Women are more emotional than men, specifically with respect to negative emotions which are experienced with more intensity and frequency. [19] Table 4 shows that there is a statistically significant association between Perceived social support and gender (p <0.029). Table 5 shows that there is statistically significant association between Insulin self-administration practices and occupation (p <0.037). A similar finding was reported in a study conducted by Nasir BB, Buseir MS, Muhammed OS, that sex, marital status, occupation, area of residence and educational status had a statistically significant association with patients' knowledge. Government employee and NGO employee had a higher knowledge. Inadequate knowledge leads to malpractice on insulin self-administration practices whereas increased knowledge improves insulin administration practices. [20]

CONCLUSION

Fear of self-injections and perceived social support influences insulin self-administration practices. Increased level of Fear of self-injection has negative correlation and High perceived social support has positive correlation with insulin self-administration practices.[21] Increased social support decreases fear of self-injection hence participants with T2DM who is administering insulin need to be supported from the family, friends and by others. Furthermore, providing support, education by diabetes educators also provide confident and a state of calm and absence of fear among patients with T2DM. It will improve the insulin administration practices among them.

Declaration by Author

Ethical Approval: Approved

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