



## **A study to assess the effectiveness of video assisted teaching program on knowledge and practice regarding use of insulin pen device in insulin administration among diabetic patients in selected hospital Mangaluru**

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### **Abstract**

**Background:** Insulin treatment is one of the standard regimens for controlling blood glucose in patients with diabetes mellitus (DM). Insulin pen devices allow for accurate, flexible, and less complicated delivery of insulin for the treatment of diabetes mellitus. However, patients must be well educated in their use, with continued communication between them and their health care provider to enable good glycemic control.

**Methodology:** The research design used in the study was pre-experimental one group pre-test, post-test 30 diabetic patients who are in use of insulin pen in insulin administration were selected by purposive sampling technique. The tool used for data collection was structured knowledge questionnaire, observational checklist. Administration of video assisted teaching program on knowledge and practice regarding use of insulin pen device was given.

**Results:** The findings of the assessment of level of knowledge regarding use of insulin pen device in insulin administration among diabetic patient reveals that 30% had inadequate knowledge 36.7% moderate knowledge and 33.3% had adequate knowledge. Video assisted teaching programme helped to gain more knowledge and practice level of diabetic patients regarding use of insulin pen device in insulin administration was evident through the increased posttest knowledge and practice level. 90% had adequate knowledge and 10% had moderate knowledge level. 50% had excellent practice and 50% had very good practice level. The mean post-test knowledge score ( $x_2=80.86$ ) was apparently higher than the mean pre-test knowledge scores ( $x_1=66.86$ ). The paired 't' value of 2.045 significant at 5% level. The overall mean post test practice test (22.76) was higher than the mean pre-test practice score (8.23). The calculated 't' value are much higher than tabulated value at 0.05 level of significance of posttest.

**Conclusion:** Thus the video assisted teaching programme was effective in improving knowledge and practice level of diabetic patients who are in use of insulin pen device in insulin administration.

**Keywords:** Video assisted teaching programme, insulin pen device, selected hospital

### **Introduction**

Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion, insulin action, or both. Insulin deficiency in turn leads to chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism. As the disease progresses tissue or vascular damage ensues leading to severe diabetic complications such as retinopathy, neuropathy, nephropathy, cardiovascular complications and ulceration. Thus, diabetes covers a wide range of heterogeneous diseases [1]. It is estimated that 366 million people had DM in 2011; by 2030 this would have risen to 552 million [2].

The treatment of diabetes mellitus (DM) has had some significant breakthroughs over the last few decades. The exogenous administration of insulin has been the only available treatment for millions of diabetics all over the world [3]. After Banting and Best discovered insulin in 1921, the possibility of obtaining an ideal blood sugar level control was more likely, offering diabetics a better survival

and quality of life [4].

The patients requiring insulin may have to take more than 60,000 injections throughout their life [5]. Insulin pens are another innovation designed to provide the patient with an easy-to-use, convenient, and accurate method of insulin delivery. Most pens function on simple mechanical principles and are durable. Not only have therapies for diabetes advanced significantly, but the technology for the delivery of insulin has also changed [6].

Insulin pen devices are unique in that they combine the insulin container and the syringe in a single unit. Advances in the technology of needle manufacturing continue to make needles more comfortable to use. With all these refinements combined, insulin pens improve the likelihood that patients will adhere more closely to recommended insulin dosing schedules [7]. In addition to being durable and easy to use, the reusable pens are designed for longer duration of use [8]. Once a disposable needle is screwed on to the pen and the pen is primed, the patient simply dials to the appropriate

dose, which can be seen in the device's display window and can be heard as audible clicks in many pen devices. The needle is inserted subcutaneously. The pen needle should remain in the subcutaneous tissue for 5 seconds after complete depression of the plunger.

Pens must be primed before each injection, and the needle removed immediately after each use. This is performed by instructing the patient to dial up 2 units and inject these units into the air (also called an "air shot"). This will displace any air in the needle and ensure an accurate injection. This air shot may need to be repeated when using a new pen or cartridge until a steady stream of insulin is observed. Insulin pens are manufactured with enough extra insulin to account for this air shot. An insulin pen must never be used by more than one individual, even if the pen needle is changed, because sharing of insulin pens can result in the transmission of hepatitis viruses, human immunodeficiency virus, or other blood-borne pathogens<sup>[9]</sup>.

### Objectives of the study

1. Assess the existing knowledge and practice regarding use of insulin pen device in insulin administration among diabetic patient.
2. Evaluate the effectiveness of video assisted teaching regarding use of insulin pen device in insulin administration among diabetic patients.
3. Find the association between knowledge and practice regarding use of insulin pen device in insulin administration with selected demographic variables.

### Hypothesis

**H<sub>1</sub>1:** The mean post test knowledge score will be significantly higher than mean pretest knowledge score.

**H<sub>1</sub>2:** The mean post test practice score will be significantly higher than mean pretest practice score.

**H<sub>1</sub>3:** There will be a significant association between knowledge and practice in use of insulin pen device in insulin administration with selected demographic variables.

### Methodology

Research Approach: Evaluative Approach

Research design: Pre-Experimental one group pretest post-test design

Setting: Indiana hospital, Mangalore

Sample size: 30 diabetic patients who are in use of insulin pen in insulin administration

Sampling Technique: Purposive sampling

### Tools for data collection

The tool for data collection is structured questionnaire which consisted of two parts:

**Section A:** Demographic variable questionnaire will be prepared by the investigator.

**Section B:** A structured interview questionnaire will be prepared to assess the knowledge and practice regarding use of insulin pen device on diabetic clients.

**Section C:** An observation checklist to assess the practice of insulin pen device in insulin administration.

### Method of data collection

Data was collected personally by the investigators with due permissions from the concerned authorities, and informed consent was obtained from the participants in a consent form. Knowledge and practice level in use of insulin pen device in insulin administration among diabetic patients by means of pretest and observational checklist was assessed. Video related to knowledge and practice of insulin pen device was showed. Post test and observational checklist was conducted after three days by using same knowledge questionnaire.

### Results

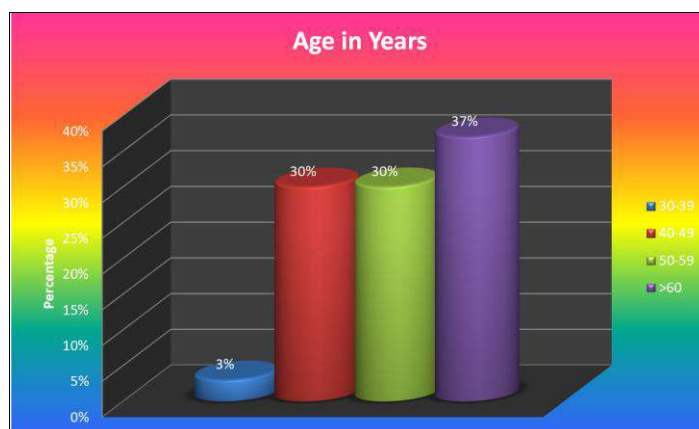
**Section 1:** Description of demographic characteristics of the diabetic patients who are in use of insulin pen device in insulin administration in selected hospital.

This part deals with distribution of participants according to their demographic characteristics. Data was analyzed using descriptive statistics and are summarized in terms of percentage.

**Table 1:** Frequency and Percentage Distribution of sample according to Demographic characteristics N=30

No	Demographic Variables	Frequency	Percentage (%)
1.	<b>Age in Years</b>		
	30-39	1	3
	40-49	9	30
	50-59	9	30
	>60	11	37
2.	<b>Gender</b>		
	Male	16	53
	Female	14	47
3.	<b>Education</b>		
	Primary school	2	7
	High School	14	47
	Pre University	11	37
	Graduate	3	10
4.	<b>Occupation</b>		
	Employed	14	47
	Unemployed	16	53
5.	<b>Income(Rs/month)</b>		
	5000-10000	3	10
	10000-20000	5	17
	20000-30000	15	50
	>30000	7	23

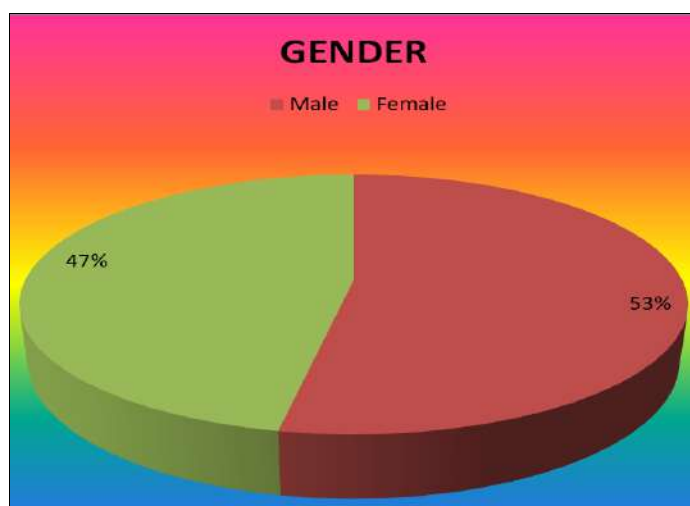
6.	<b>Exposure to mass media (daily)</b>		
	Reads Newspaper	9	30
	Watches TV	21	70
7.	<b>Duration of Diabetes(in years)</b>		
	<2	15	50
	2-5	5	17
	5-10	4	13
	>10	6	20
8.	<b>Family History of Diabetes</b>		
	Yes	23	77
	No	7	23
9.	<b>Which type of diabetes mellitus do you have?</b>		
	Type 1 (Insulin Dependent)	16	53
	Type2 (Non Insulin Dependent)	14	47
10.	<b>From how long you are on Insulin therapy?</b>		
	1-2 years	16	53
	2-3 years	4	13
	3-5 years	5	17
	>5 years	5	17
11.	<b>By whom you received diabetes education before?</b>		
	Nurse	12	40
	Physician	14	47
	Never	4	13
12.	<b>What method do you mainly use for testing your own blood sugar?</b>		
	Blood or urine test at doctor's office	21	70
	Blood glucose test strips by glucometer	9	30



**Fig 1:** Distribution of samples according to age

Data represented in the figure 3 shows that majority (37%) of the participants are in the age group of 60 years, 30% of the participants are in the age group of (50-59) and (40-49)

are same percentage given above and least 3% of the participants are in the age group of (30-39) years.



**Fig 2:** Distribution of samples according to gender

Figure 4 shows that highest (53%) of the samples were males and (47%) of the samples were females.

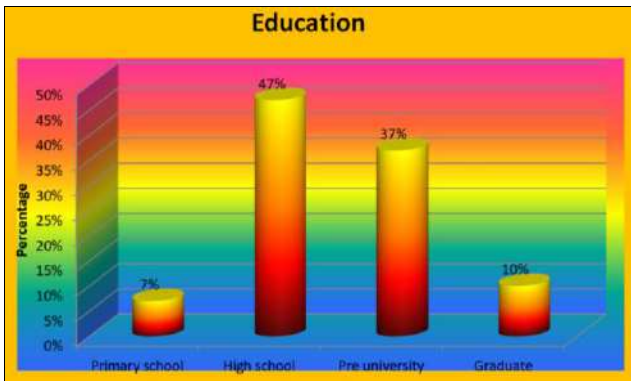


Fig 3: Distribution of samples according to education

Figure 5 shows that most of them are educated in high school (47%) and (37%) are educated in Pre University and 10% are educated till graduate and (7%) are educated till primary school.

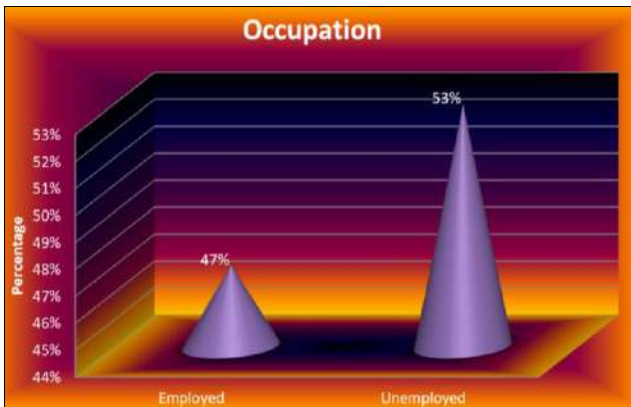


Fig 4: Distribution of samples according to occupation

Data represented in the figure 6 shows that highest (53%) of people were unemployed and (47%) of people were employed.

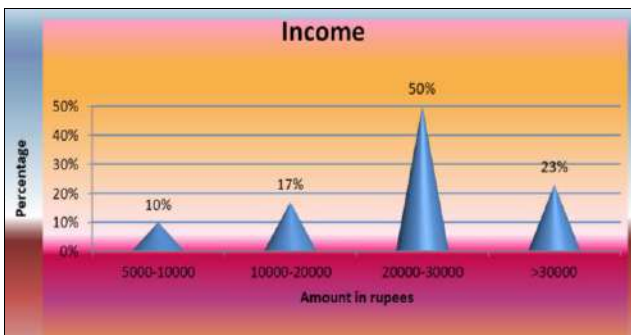


Fig 5: Distribution of samples according to family income

Data represented in the figure shows that majority (50%) of the participant's income is (20000-30000) rupees and (23%) of the participant's income is above 30000 rupees and (17%) of the participant's income is (10000-20000) rupees and least were (10%) of the participant's income is (5000-10000) rupees.

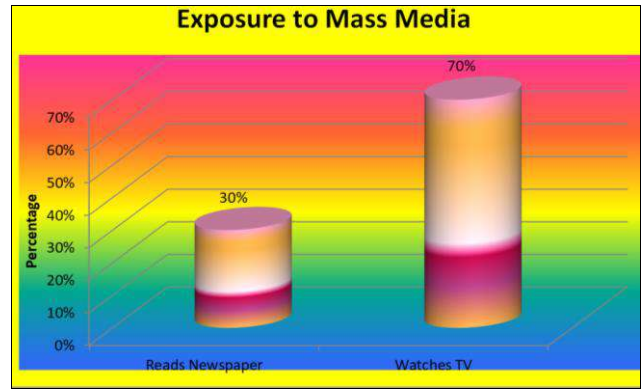


Fig 6: Distribution of samples according to exposure to mass media (daily)

Figure 8 shows that highest (70%) of participants were watches TV and (30%) of participants were reads newspaper.

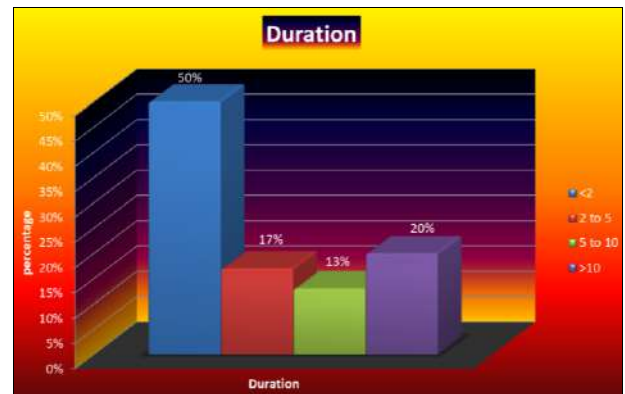


Fig 7: Distribution of samples according to duration of diabetes (in years)

Data represented in the figure 5 shows that highest (50%) of people in below 2years and (20%) of the people were above 10 years and (17%) of the people were in (2-5) years and least (13%) number of people were (5-10).

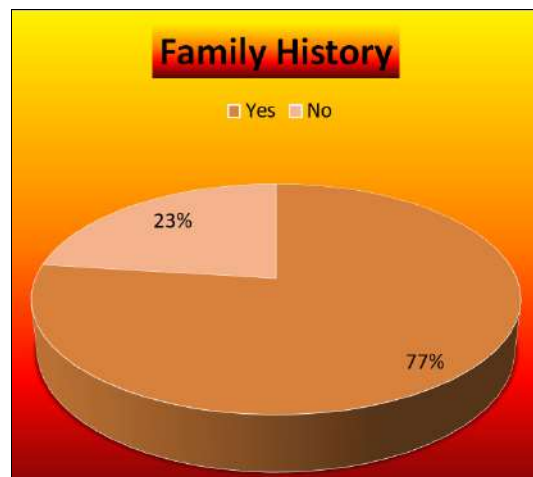
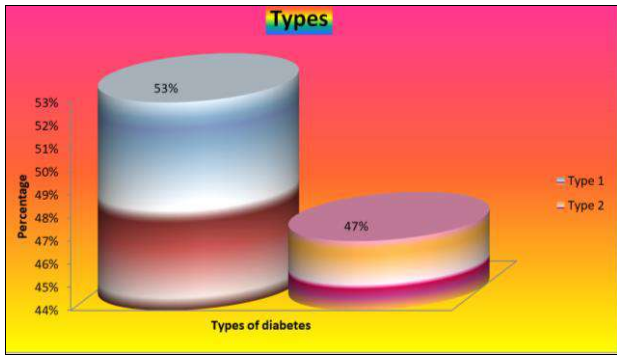


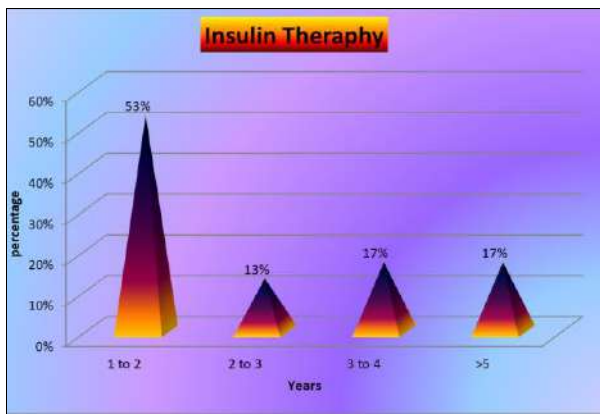
Fig 8: Distribution of samples according to family history of diabetes

Data represented in the figure 10 shows that highest (77%) of the people were having diabetes and lowest (23%) of the people were not having diabetes in their family.



**Fig 9:** Distribution of samples according type of diabetes

Data represented shows in the figure 11 is type 1 (insulin dependent) were (53%) and type 2 (Non-insulin dependent) were (47%).



**Fig 10:** Distribution of samples according to duration of insulin

Figure 12 shows that highest (53%) of the people were (1-2) years and slops down to (17%) of the people were (3-5) years and above 5years same percentage stands and least (13%) of the people were (2-3)years.

With regard in getting education regarding diabetes (47%) of the people were received from physician and (40%) of the people were received from nurse and (13%) of the people were not received from anyone. (Table 1) 70% of the participants checked their blood sugar level by blood or urine test at doctor office and (30%) through strips by glucometer.(Table 1)

**Knowledge of Diabetic Patients regarding use of insulin pen device in insulin administration**

**Table 4:** Range, Mean, Median and Standard Deviation of Pre and Post test Knowledge Scores of the Diabetic Patients on Self-administration of Insulin N=30

	Range	Mean	Median	Standard Deviation
Pre-test	49-80	66.86(X1)	68	14.38
Post-test	70-90	80.86(X2)	83	5.74

Maximum possible scores=91

Data in Table4 show that the post-test knowledge scores (70-90) were higher than the pre-test knowledge score (49-80). It is evident from the table that the mean post-test

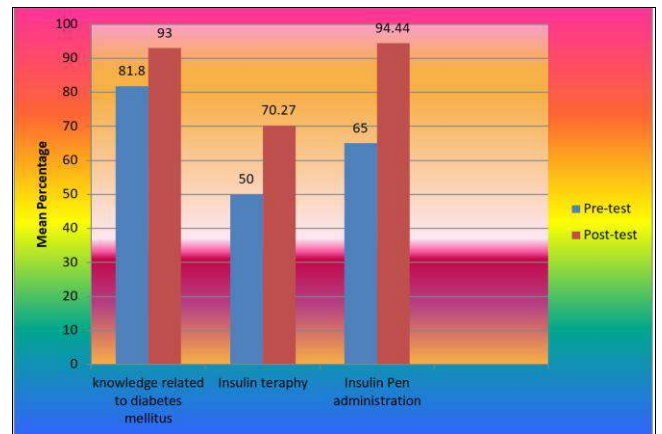
**Table 2:** Percentage distribution of existing Knowledge of diabetic patients regarding use of insulin pen device in insulin administration. N=30

Range of Score	Percentage of score	Level of knowledge	Number of Respondents	Percentage
0-36	0-40%	Inadequate	9	30%
37-63	41-70%	Moderate	12	40%
64-90	71-100%	Adequate	11	30%
Total			30	100

The findings of the assessment of level of knowledge regarding use of insulin pen device in insulin administration among diabetic patient reveals that 37% had moderate knowledge 33% had adequate knowledge and 9% had inadequate knowledge.

**Table 3:** Area wise Mean percentage of pre and post test knowledge scores N=30

Area	No. of items	Knowledge Score, Mean percentage		
		Pre-test (A)	Post-test (B)	Effectiveness (B-A)
Area I	4	81.18	93.00	11.82
Area II	2	50.00	70.27	20.27
Area III	7	65.00	94.44	29.44



**Fig 11:** Bar diagram showing area wise pre and post test knowledge scores of diabetic patient

The findings of area wise mean, mean percentage of knowledge score shows that total mean percentage of the pre-test practice scores was

knowledge score (x2=80.86) was apparently higher than the mean pre-test knowledge scores (x1=66.86).

**Table 5:** Frequency and Percentage Distribution of Diabetic Patients Level of Knowledge Scores N=30

Level of knowledge	Knowledge score (%)	Pre-Test		Post-test	
		Frequency	Percentage	Frequency	Percentage
Adequate	70-100	10	33.3	27	90
Moderate	50-69	11	36.7	3	10
Inadequate	<50	9	30	0	0

Data in the Table5 and show that the pre-test knowledge level of 10 (33%) diabetic patients on self-administration of insulin ranged between 80-100 which was considered very good, whereas 27(90%) of patients knowledge level was

very good in the post-test.

**Assessment of levels of practice of diabetes patients who are in use of insulin pen device in insulin administration.**

**Table 6:** Assessment of levels of practice of diabetes patients in Pre-test N=30

Level of practice score	Percentage score	Pre test	
		Frequency	Percentage
Poor	0-19%	0	0.00
Average	20-39%	24	80.00
Good	40-59%	6	20.00
Very Good	60-79%	0	0.00
Excellent	>79%	0	0.00

Section: Mean, Mean percentage and standard deviation for the practice in pre test and post test.

**Table 7:** Mean, Mean percentage and standard deviation for the practice of Diabetic Patients who are in use of insulin pen device in insulin administration in pre test and post test. N=30

Practice	Pre test			Post test		
	Mean	SD	Mean %	Mean	SD	Mean %
Insulin administration by insulin pen device	8.23	1.30	32.93	22.76	1.97	91.06

Section: Comparison of pre test and post test regarding use of insulin pen device in insulin administration among Diabetic Patients.

**Table 8:** Comparison of pre test and post test regarding use of insulin pen device N=30

Levels	Pre test	Percentage	Post test	percentage
Excellent	0	0.00	15	50.00
Very good	0	0.00	5	50.00
Good	6	20.00	0	0.00
Average	24	80.00	0	0.00
Poor	0	0.00	0	0.00

Section: Comparison of pre test and post test regarding use of insulin pen device in insulin administration by paired 't' test. N=30

Overall	Mean practice score	SD	Mean percentage	t-value	P value
Pre test	8.23	1.30	32.93	21.62	0.00
Post test	22.76	7.97	91.06	30.05	0.00

**Table 9:** Effectiveness of video assisted teaching programmed among client with diabetic mellitus N=30

	Mean	SD	Mean percentage	T value	P value
Overall pre test	8.23	1.30	33.93	21.62	P<0.05

The data represented in table shows that the tabulated t value for N=30 i.e. 20 degree of freedom was 2.05. The calculated 't' value are much more higher than tabulated value at 5% level of significance of post test. Hence it is

interpreted that practice of insulin pen device in insulin administration among subjects was effective after the video assisted teaching thus the H<sub>1</sub> is accepted.

**Table 10:** Association between Pre test knowledge score with demographic variables. N=30

Sl.no	Selected demographic variables	X <sup>2</sup>	Df	Interference
1.	Age	0.26	1	NS
2.	Gender	0.117	1	NS
3.	Education	0.002	1	NS
4.	Economic status	0.002	1	NS
5.	Duration of insulin therapy	0.71	1	NS
6.	Duration of diabetes	0.133	1	NS

**Table 11:** Association between pretest practice with demographic variables. N=30

Sl.no	Selected demographic variables	X <sup>2</sup>	Knowledge		
			D <sub>r</sub>	P value	Interference
1.	Age	1.862	2	0.394	NS
2.	Gender	0.080	1	0.928	NS
3.	Education	1.694	3	0.638	NS
4.	Family history	1.889	1	0.169	
5.	Duration of insulin therapy	0.249	1	0.115	NS
6.	Duration of diabetes	4.323	1	0.618	NS

### Significant difference between the mean pre test and mean post test knowledge scores on self administration of insulin

In order to find out significant difference between the mean pre test and mean post test knowledge paired 't' test was computed and data was presented in table 16. to test the

stastical difference following null hypothesis (H<sub>01</sub>) was stated.

**H<sub>01</sub>:** The mean post test knowledge scores of the diabetic subjects on use of insulin pen device will not be significantly higher than the mean pre test knowledge score at 0.05 level.

**Table 12:** Mean, Standard deviation of difference and 't' value on pre and post test knowledge score. N=30

Group	Mean		Mean Difference	Standard deviation difference	't' value
	Pre test	Post test			
Diabetes patient on insulin pen device	66.86	80.86	14	5.98	12.98 *

't'<sub>29</sub>=2.045 at 5% level

\* highly significant ( $p < 0.05$ )

The data in the table shows that the post test knowledge scores (80.86) was higher than the mean pretest knowledge scores (66.86). The computed 't' value ('t'<sub>29</sub> =12.98,  $p < 0.05$ ) showed that there is a significant difference between the mean pre test and mean post test knowledge score. The calculated 't' value 't'<sub>21</sub>=12.98,  $p < 0.05$  is greater

than the table value ('t'<sub>29</sub> =2.045 at 5% level). Hence null hypothesis was rejected and research hypothesis was accepted.

### Area wise between the mean pre test and mean post test knowledge scores

**Table 13:** Area wise paired 't' test showing the significant difference between the mean pre test and mean post test knowledge scores.

Area	Mean Knowledge score		Mean score Difference	Standard deviation difference	't' value
	Pre test	Post test			
Knowledge related to diabetes	17.86	20.46	14	1.76	2.08 *
Insulin therapy	20.8	24.9	4.1	3.11	6.03*
Insulin pen device	11.7	17	5.3	2.43	10.71*

't'<sub>29</sub>=2.045 at 5% level

\* highly significant ( $p < 0.05$ )

Data in the table shows that the mean post test knowledge scores in all the areas was higher than the mean pre test knowledge scores. The calculated 't' value in all the areas were greater than the table value ('t'<sub>29</sub> =2.045 at 5% level). Hence null hypothesis (H<sub>02</sub>) was rejected and research hypothesis was accepted. This shows that VATP was very effective in increasing the knowledge of the subjects in all areas.

### Conclusion

Insulin therapy is an important aspect of glycemic management. Insulin pen devices allow for accurate, flexible, and less complicated delivery of insulin for the treatment of diabetes mellitus. However, patients must be well educated in their use, with continued communication between them and their health care provider to enable good glycemic control. The knowledge and practice of diabetic patients were low regarding use of insulin pen device in insulin administration among diabetic patient.

There is a need in diabetes education to educate with regard to proper use of insulin pen device in insulin administration.

### Conflict of Interest

Not available

### Financial Support

Not available

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