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Effectiveness of planned teaching program on self administration of Insulin among insulin dependent diabetes mellitus patients in selected hospitals at Bathinda District

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Abstract
Background: Diabetes is a disorder characterized by hyperglycemia or elevated blood glucose (blood sugar). Our bodies function best at a certain level of sugar in the bloodstream. If the amount of sugar in our blood runs too high or too low, then we typically feel bad. Diabetes is the name of the condition where the blood sugar level consistently runs too high. Diabetes is the most common endocrine disorder. Sixteen million Americans have diabetes, yet many are not aware of it. Americans have a higher rate of developing diabetes during their lifetime. Diabetes has potential long-term complications that can affect the kidneys, eyes, heart, blood vessels, and nerves. Although doctors and patients alike tend to group all patients with diabetes together, the truth is that there are two different types of diabetes which are similar in their elevated blood sugar, but different in many other ways. Diabetes is correctly divided into two major subgroups: type 1 diabetes and type 2 diabetes. This division is based upon whether the blood sugar problem is caused by insulin deficiency (type 1) or insulin resistance (type 2). Insulin deficiency means there is not enough insulin being made by the pancreas due to a malfunction of their insulin producing cells. Insulin resistance occurs when there is plenty of insulin made by the pancreas (it is functioning normally and making plenty of insulin), but the cells of the body are resistant to its action which results in the blood sugar being too high[2].So this study to assess the Effectiveness of planned teaching on self-administration of insulin for patients with Insulin Dependent Diabetes Mellitus, receiving insulin through subcutaneous route in selected hospital of Bathinda District, Punjab.
Aims and Objectives: The study aimed at assessing the knowledge of patients regarding self- administration of insulin with Insulin Dependent Diabetes Mellitus, receiving insulin through subcutaneous route in selected hospital of Bathinda District, Punjab.
Material and Method: The Quantitative research approach is adopted and Pre-experimental one-group pre-test post-test design was used. The study sample size Total 200 Insulin Dependent Diabetes Mellitus Patients, receiving insulin through subcutaneous route in selected hospital of Bathinda District, Punjab. Non-probability convenient sampling method was used to select the sample for the study.
Results: Pre-Test Knowledge majority of 117(58.5%) had average knowledge scores and rest of 68(34.0%) had Below Average Knowledge and 15 (7.5%) Good Knowledge regarding self-administration of insulin. Post -Test Knowledge majority of 165(82.5%) had Good Knowledge scores and rest of 35(17.5%) had Average Knowledge and 0 (0 %) Below Average Knowledge regarding self-administration of insulin.
Pre-test knowledge mean score 1.74 Standard Deviation was 0.589. Post-test knowledge means score 2.83 Standard Deviation was 0.381 Mean differences And DF 199. The t calculated valve 21.491. There is a significant difference between Pre-test knowledge and Post-test knowledge scores ('t'= 21.491. $p<0.001$)
Conclusion: The insulin dependent diabetic patient has inadequate knowledge and hence by teaching strategy and the pamphlet which I distributed regarding insulin dependent diabetes was more effective for the clients. Thus, in future this kind of study can be replicated to the large group of samples and in the community setting also.

Keywords: diabetes mellitus, insulin dependent diabetes mellitus, self-administration of insulin

Introduction

Diabetes mellitus is a multisystem disease related to abnormal insulin production, impaired insulin utilization or both.

One of the greatest challenges faced by the modern world is Diabetes mellitus (DM). The physical, social and economic factors involved in the management of diabetes are a continuous strain for the health sector and the government agencies. It is expected that approximately 366 million people will be affected by Diabetes mellitus by the year 2030 [1].

Diabetes is a disorder characterized by hyperglycemia or elevated blood glucose (blood sugar). Our bodies function best at a certain level of sugar in the bloodstream. If the amount of sugar in our blood runs too high or too low, then we typically feel bad. Diabetes is the name of the condition where the blood sugar level

consistently runs too high. Diabetes is the most common endocrine disorder. Sixteen million Americans have diabetes, yet many are not aware of it. Americans have a higher rate of developing diabetes during their lifetime. Diabetes has potential long term complications that can affect the kidneys, eyes, heart, blood vessels, and nerves. Insulin dependent diabetes mellitus (IDDM), also known as type 1diabetes, usually starts before 15 years of age but can occur in adults also. Diabetes involves the pancreas gland, which is located behind the stomach .The special cells (beta cells) of the pancreas produce a hormone called insulin. Beta cells are sensitive to glucose concentrations, also known as blood sugar levels. When the glucose level is high, the beta cells secrete insulin into the blood; when glucose levels are low, secretion of insulin is inhibited. Their neighbouring alpha cells, by taking their cues from the beta cells, secrete glucagon into the blood in the opposite manner: increased secretion when blood glucose is low and decreased secretion when glucose concentrations are high. Glucagon, through stimulating the liver to release glucose by glycogenolysis and gluconeogenesis, has the opposite effect of insulin. The secretion of insulin and glucagon into the blood in response to the blood glucose concentration is the primary mechanism of glucose homeostasis [4].

Manash P. Baruah, Sanjay Kalra (2017), An Audit of Insulin Usage and Insulin Injection Practices in a Large Indian Cohort repoted58.96% were on human insulin and 35.70% were on analogue insulin. Pen devices were used by 66.08% of the population whereas 31.76% used insulin syringes. The prevalence of lipohypertrophy (LH) was 12.57%, which was significantly ($P < 0.001$) associated with wrong technique with regard to injection angle (10.45% vs. 23.02%), site of injection (7.00% vs. 30.51%), rotation of site of injection (0.88% vs. 17.66%), and reuse of needle (5.77% vs. 15.19%). LH was also significantly ($P < 0.05$) associated with the use of human (14.74%) compared to analogue insulin (8.24%).The current study highlights the unique patterns of insulin usage and associated high prevalence of LH among insulin users in India [15].

Rufiat Nasiruddin Kazi1, Mangala M. Bote, Kedar J. Raikar (2017) According to researcher Diabetes Mellitus has become a major public health problem in India and also the major cause of disability through complications such as blindness, renal failure, lower limb gangrene etc. People suffering from Diabetes related complications are many times unaware about the measures to curb the onset of the complications. The aim of the study was to assess knowledge, attitude and practices about diabetes and its complications in the diabetic patients. This was a cross sectional descriptive study conducted at an Urban Health Centre attached to the parent medical college in Mumbai. The knowledge, attitude and practices of the 116 participants who were registered at the non-communicable disease (NCD) OPD were assessed via a pre-designed, pre-tested interviewer administered questionnaire. Majority belonged the age groups of 40-60 years (69%), 63.8% were women, 91.4% were married and 44.4% were illiterate. 13.8% of the respondents had correct knowledge about the causes of diabetes and 62.9% could correctly identify the symptoms of diabetes. Knowledge regarding the complications in diabetics was found to be quite low with only 52.6% correctly identifying one or more complications. The most commonly known complication was neuropathy (83.6%) followed by nephropathy (57.3%). The attitude of the patients with respect to screening of complications was found to be poor and the same reflected in their practices. There is a lack of understanding of the basics of the disease, its prevention as well as prevention of complications in those suffering from the disease. Keywords: Diabetes mellitus, Knowledge, Complications [21].

Approximately 7.4 million Americans with diabetes use one or more formulations of insulin People with diabetes using insulin come from varied economic, racial, and ethnic backgrounds. Almost 20% of African Americans with diabetes use insulin, either alone or with oral medications, as do 14% of Caucasians and 17% of Hispanics with diabetes. Of adults with diabetes earning below the poverty level, approximately 24% use insulin, either alone or with oral medications [22].

According to American Diabetes Association says that People diagnosed with type 1 diabetes usually start with two injections of insulin per day of two different types of insulin and generally progress to three or four injections per day of insulin of different types. The types of insulin used depend on their blood glucose levels. Studies have shown that three or four injections of insulin a day give the best blood glucose control and can prevent or delay the eye, kidney, and nerve damage caused by diabetes[7]. Ali Abd Al-Latif G. Mohammed, Ali Neamah Hasan Al-Aaragi, Mohammed Abdulridha Merzah (2018) According to researcher Diabetes mellitus (DM) is a life-threatening disease whose complications can cause heart attack or stroke, blindness, and kidney failure.

The main objective of this study was to determine knowledge, attitude, and practices regarding DM among a sample of students at the Technical Institute of Karbala. This cross-sectional study was conducted in Al-Furat A-Awsat Technical University, Technical Institute of Karbala, Iraq. A total of 856 students were included in this study. Data were collected by direct interview with students using a questionnaire form. Total sample in this study was 856 students (52.3% male and 47.7% female), 58 DM (Type II) patients were included in this study. Nearly 60% of cases had good and acceptable knowledge scores, while 50% had good and acceptable scores for attitude and practice regarding DM. The overall scores were good and acceptable regarding knowledge, attitude, and practice.

A better educational program on diabetes should be conducted to improve awareness, attitude, and practice toward DM using mass media and health education in all Ministries

Thus the investigator felt the need to find out the effectiveness of planned teaching on self- administration of insulin for patients with diabetes mellitus, receiving insulin.

Statement of the problem
A study to assess the Effectiveness of planned teaching on self-administration of insulin for patients with Insulin Dependent Diabetes Mellitus, receiving insulin through subcutaneous route in selected hospital of Bathinda District, Punjab.

Objectives of the study
1. To assess the knowledge on self-administration of insulin through subcutaneous route among patients with insulin dependent diabetes mellitus before the planned teaching as measured by structured questionnaire.
2. To plan and implement the planned teaching.
3. To evaluate the impact of planned teaching on self-administration of insulin for patients with diabetes mellitus receiving insulin through subcutaneous route in terms of gain in knowledge.
4. To compare knowledge score with various demographic variables.

Hypothesis
1. **H1:** The mean post-test knowledge score of patient with diabetes mellitus attending Individual Planned Teaching on self administration of insulin through subcutaneous route will be significantly higher than the mean pre-test knowledge score.
2. **H2:** There will be significant association between knowledge on self-administration of insulin and selected socio demographic variables such as age, sex, education, economic status and duration of insulin therapy.

Methodology
Research approach: The Quantitative research approach is used in this study.
Research Design: Pre-experimental one-group pre-test post-test design is used.
Research Setting: The present study was conducted in selected hospital of Batinda District, Punjab.
Population: population consisted of all insulin dependent patients with diabetes mellitus on insulin therapy and are admitted in various wards of all hospitals of India.
Target Population: patients with diabetes mellitus on insulin therapy and is admitted in medical, surgical, orthopaedic, gynecology, and other wards of all hospitals of Bathinda District, Punjab.
Sample Size: 200 Insulin Dependent Diabetes Mellitus Patients, receiving insulin through subcutaneous route.
Sampling Technique: Non Probability Convenient Sampling Technique

Development of tool for data collection
It consists of two parts. The researcher prepared a self structured knowledge questionnaire is used as a tool for the study. The self structured knowledge questionnaires consist of two parts: Part A: It is designed to obtain general information of the respondents and it consists of twelve items related to the demographic variables of the insulin dependent diabetes mellitus. Part B: It consists of thirty items regarding knowledge of insulin dependent diabetes patients regarding the knowledge on self administration of insulin through subcutaneous route.

Validity: The self structured knowledge questionnaire tool and STP were given to seven experts along with blue print, objectives, hypothesis and criteria checklist of the study.

Reliability: After obtaining the formal administrative permission, the tool was administered to 20 samples selected as per the set criteria. The scores were calculated and then given for statistical analysis. The reliability was established by using split half method.

Data collection procedure: A formal permission was obtained from the selected hospitals of Bathinda District. Data was collected January to February. After identifying the samples objective of study were discussed and consent for the participation in the study was taken from the selected groups. The investigator herself administered the questionnaire for the pre- test.

Analysis of data: Both descriptive and inferential statistics analyzed on the basis of the objectives and hypothesis of the study. The knowledge of the patients regarding self administration of insulin with insulin dependent diabetes mellitus receiving insulin through subcutaneous route assessed before and after the administration of STP would be calculated using frequency, mean, and standard deviation and inferential statics used to analyze Paired ‘t’ and chi square test. The data was also presented graphically and in the form of table.

Results
The analyzed data was organized according to the objectives and hypotheses presented under the following sections
Section I: Demographic characteristics of the sample
Section II: Findings related to level of pretest and posttest knowledge regarding experimental group regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route.

Section III: Findings related to comparison of mean pretest and posttest knowledge experimental group regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route.

Section IV: Association of pretest and posttest levels knowledge regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route with their selected socio demographic variables.

Section I: Description of the Demographic Variables of Sample

- Majority of the subjects in Age (In Years) 20 – 40 years 109 (54 .5%) and 40- 60 years 74(37.0%), 60 - 80 years 17 (8.5%) followed by Age (In Years) Mean1.54 Standard deviation 0.64840.
- Majority of the Subjects Gender Male 116(58.0%) And Female 84(42.0%) followed by Gender Mean 1.42 Standard Deviation 0.495.
- Majority of the Subjects in Marital status Married 102 (51.0%) and Single 82(41.0%), Widow 8 (4.0%) Divorced 8(4.0%) followed by Marital status Mean 1.71 Standard Deviation 0.727
- Majority of the Subjects Education Status Secondary Education 86 (43.0%) Illiterate16 (8.0%) Primary Education 28(14.0%) Graduate 55(27.5%) Postgraduate 15(7.5%) Followed By Education Status Mean 3.13 Standard Deviation 1.012.
- Majority of the Subjects in occupation Office employee77 (38.5%) and Unemployed 26 (13.0%) Laborer / coolie 47(23.5%) Self-employed/Business 50(25.0%) Followed By occupation Mean 2.76 Standard Deviation 0.975.
- Majority of the Subjects in family income 10001 – 20000854(2.5%) < 10000 25(12.5%) and 20001 – 30000 39(19.5%) and 30001 – 40000 38(19.0%) and >40000 13(6.5%) Followed By Family Income Mean 2.65 Standard Deviation 1.120.
- Majority of the Subjects in Dietary Habits Non-vegetarian 102 (51.0%) Vegetarian 84(42.0%) Egg vegetarian 14(7.0%) Followed By Dietary Habits Mean 1.65 Standard Deviation 0.608.
- Majority of the Subjects in Family History of Diabetes Mellitus Yes116 (58.0%) No 84 (42.0%) Followed By Family History Of Diabetes Mellitus Mean 1.42 Standard Deviation 0.495.
- Majority of the Subjects in Duration of Illness Up to 5 years 78(39.0%) 6 – 10 years 35(17.5%), 11-15 years 52(26.0%) More than 15 years 35(17.5%) Followed by Duration of Illness Mean 2.22 Standard Deviation 1.144.
- Majority of the subjects in Are You on Insulin Therapy? Yes 152 (76.0%) No 48(24.0%) followed by Are You on Insulin Therapy? Mean 1.24, Standard deviation 0.428.
- Majority of the subjects' in Duration of insulin treatment? 1 – 5 years 66(33.0%) 11–15 years 39(19.5%) less than1 year 26(13.0%) 6 – 10 years 33(16.5%) more than15 years 36(18.0%) followed by duration of insulin treatment? Mean 2.97 standard deviation 1.331.
- Majority of the subjects in Who Is Injection Insulin for You? Self 117(58.5%) family members23 (11.5%) Hospital staff 51(25.5%) others 9 (4.5%) followed by Who Is Injection Insulin for You? Mean 1.76, standard deviation 0.983.
- If Self, Have You Been Trained to Administer Insulin? Yes 81 (40.5%), No119 (59.5%). If No, Would You Like To Be Trained To Administer Insulin? Yes 113(94.9%) No 6(5.042%).

Section II: Findings related to level of pretest and posttest knowledge regarding experimental group regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route.

Table 1: Level of Pre-Test Knowledge of experimental group regarding self-administration of insulin for patients N=200

Knowledge Groups	Mean	STD. Deviation	Mean Difference	DF	Paired 't' Test	Signification Status
Pre-test knowledge	1.74	0.589	1.09	199	21.491	Significant
Post-test knowledge	2.83	0.381				

Table 2: Level of Post-Test Knowledge of experimental group regarding self administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route.

		Pre -Test Level of Knowledge	
Level of knowledge	**Score**	**Frequency**	**Percentage**
Below Average Knowledge	< 15	68	34.0%
Average Knowledge	16-22	117	58.5%
Good Knowledge	23-30	15	7.5%
Total	0-30	200	100.0%

Table 3: Comparison of Pre-Test and Post-Test Knowledge Scores Of Experimental Group Regarding Self-Administration of Insulin

		Post-Test Level of Knowledge	
Level of knowledge	**Score**	**Frequency**	**Percentage**
Below Average Knowledge	< 15	0	0%
Average Knowledge	16-22	35	17.5%
Good Knowledge	23-30	165	82.5%
Total	0-30	200	100.0%

Since p<0.001, this mean there is significant difference between pre-test and post-test knowledge score.

Section III: Findings related to comparison of mean pretest and posttest knowledge experimental group regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route.

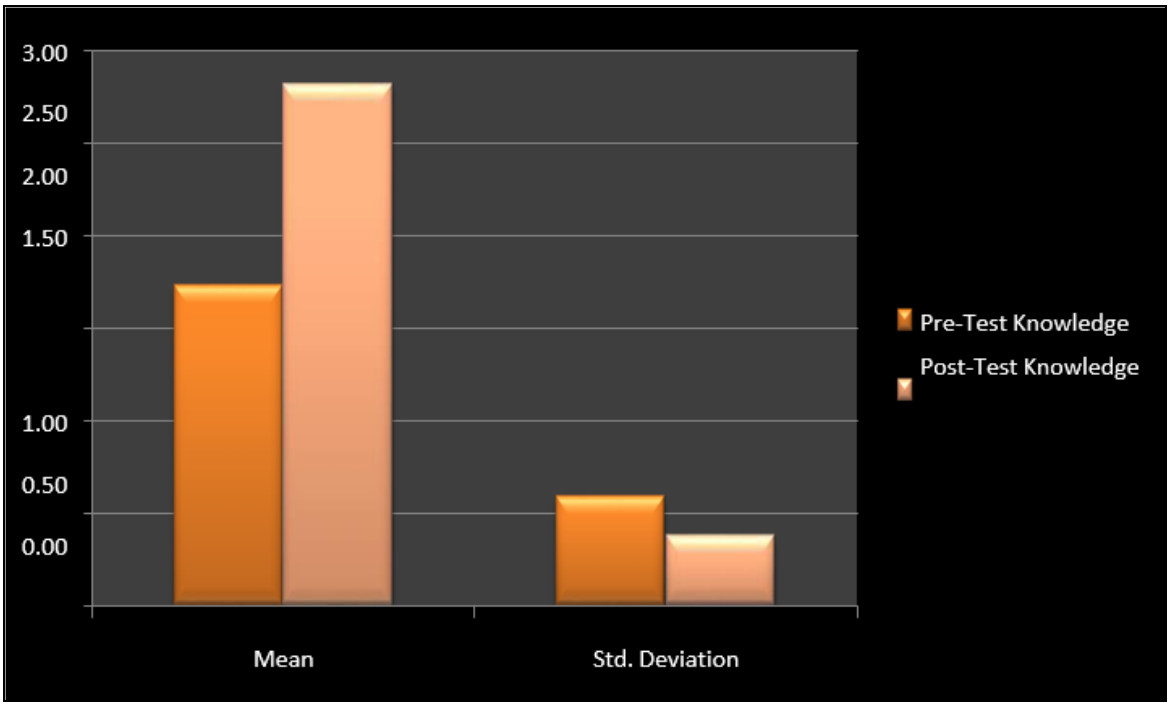

Fig 1: Mean difference of Pre-test and Posttest mean score

Section IV: Association of pretest and posttest levels knowledge regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route with their selected socio demographic variables.

The data presented in table shows association of post test knowledge score with demographic variables at 0.05significant level. In the experimental group it is elicited from the post test chi square value of the age was, χ^2 6.257, family history of diabetes mellitus χ^2 3.993, which was more than the table value at p>0.5 in experimental group. Hence, there is significant statistical association between the levels knowledge regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route with their Age in year and Family history of diabetes mellitus, this selected socio demographic variables.

The experimental group it is elicited from the post test chi square value of the Gender χ^2= 3.14, marital status χ^2= 4.584, education status χ^2= 5.457, occupation χ^2= 2.894, family income χ^2= 0.833, dietary habits χ^2= 1.428, duration of illness χ^2= 2.264, Are you on insulin therapy? X^2= 0.372, Duration of insulin treatment? X^2= 2.386, who is injection insulin for you? X^2= 0.425 which was less than the table value at p>0.5 in experimental group. Hence, there is no significant statistical association between the levels knowledge regarding self-administration of insulin for patients with insulin dependent diabetes mellitus, receiving insulin through subcutaneous route with their. Gender, Marital status, Education status, Occupation, Monthly income (in rupees), Dietary habits, Duration of illness, Are you on insulin therapy? , Duration of insulin treatment?, Who is injecting insulin for you? This selected socio demographic variables.

Table 4: Association of pretest knowledge

S.No	Socio demographic Variables		PRE TEST levels knowledge (n)=200			df	chisquare	Table valve	Significant status
			Below Average	Average	Good				
			F	F	F				
1	AGE (In years)	20 - 40	36	69	4	4	7.044	9.49 at 5% level	NS
		40 - 60	28	37	9				
		60 - 80	4	11	2				
2	Gender	Male	36	70	10	2	1.338	5.99 at 5% level	NS
		Female	32	47	5				
3	Marital status	Single	28	48	6	6	2.67	12.59 at 5% level	NS
		Married	34	60	8				
		Widowed	2	6	0				
		Divorced	4	3	1				
4	Education Status	Illiterate	1	13	2	8	13.387	15.51 at 5% level	NS
		Primary education	7	17	4				
		Secondary education	38	43	5				
		Graduate	16	36	3				
		Postgraduate	6	8	1				
5	Occupation	Unemployed	9	15	2	6	1.229	12.59 at 5% level	NS
		Labourer / coolie	17	28	2				
		Office employee	26	45	6				
		Self-employed/Busines s	16	29	5				
6	Family Income	< 10000	7	16	2	8	6.571	15.51 at 5% level	NS
		10001 – 20000	26	54	5				
		20001 – 30000	14	22	3				
		30001 – 40000	13	21	4				
		>40000	8	4	1				
7	Dietary Habits	Vegetarian	26	52	6	4	2.291	9.49 at 5% level	NS
		Non-vegetarian	36	59	7				
		Egg vegetarian	6	6	2				
8	Family History of Diabetes Mellitus	Yes	36	71	9	2	1.085	5.99	NS
		No	32	46	6				
9	Duration of Illness	Up to 5 years	32	40	6	6	7.653	12.59 at 5% level	NS
		6 – 10 years	7	23	5				
		11 – 15 years	18	32	2				
		More than 15 years	11	22	2				
10	Are You On Insulin Therapy?	Yes	52	89	11	2	0.067	5.99 at 5% level	NS

		No	16	28	4				
11	Duration of insulin treatment?	less than1 year	8	16	2	8	8.194	15.51 at 5% level	NS
		1 – 5 years	29	33	4				
		6 – 10 years	7	21	5				
		11 – 15 years	13	24	2				
		More than15 years	11	23	2				
12	Who Is Injectin Insulin For You?	Self	42	63	12	6	6.415	12.59 at 5% level	NS
		Family members	9	13	1				
		Hospital staff	14	36	1				
		Others	3	5	1				

Table 5: Association of posttest levels knowledge

S.NO	**Socio demographic Variables**		**Post Test Knowledge (n)=200**		**Levels**	df	chisquare	Table valve		Significant status
			Below Average Knowledge	Average Knowledge	Good Knowledge					
				F	F					
1	AGE (In years)	20 - 40years	0	21	88	2	6.257	5.99 atlevel	5%	S
		40 - 60years	0	8	66					
		60 - 80years	0	6	11					
2	Gender	Male	0	25	91	1	3.14	3.84 at level0	5%	NS
		Female	0	10	74					
3	Marital status	Single	0	11	71	3	4.584	7.82 at level	5%	NS
		Married	0	23	79					
		Widowed	0	0	8					
		Divorced	0	1	7					
4	Educationstatus	Illiterate	0	6	10	4	5.457	9.49 atlevel	5%	NS
		Primary education	0	5	23					
		Secondary education	0	14	72					
		Graduate	0	7	48					
		Postgraduate	0	3	12					
5	Occupation	Unemployed	0	3	23	3	2.894	11.07 level	t 5%	NS
		Labourer / coolie	0	9	38					
		Office employee	0	17	60					

		Selfemployed/Business	0	6	44						
6	Family income	< 10000	0	3	22	4	0.833	9.49		NS	
		10001 – 20000	0	15	70						
		20001 – 30000	0	7	32						
		30001 – 40000	0	7	31						
		>40000	0	3	10						
7	Dietary habits	Vegetarian	0	15	69	2	1.428	5.99 level	at	5%	NS
		Non-vegetarian	0	16	86						
		Egg vegetarian	0	4	10						
8	Family history of diabetes mellitus	Yes	0	15	101	1	3.993	3.84 level	at	5%	S
		No	0	20	64						
9	Duration of illness	Up to 5 years	0	11	67	3	2.264	7.82 level	at	5%	NS
		6 – 10 years	0	9	26						
		11 – 15 years	0	9	43						
		More than 15 years	0	6	29						
10	Are you on insulin therapy?	Yes	0	28	124	1	0.372	3.84 level	at	5%	NS
		No	0	7	41						
11	Duratio of insulin treatment?	Less than1 year	0	3	23	4	2.386	9.49 level	at	5%	NS
		1 – 5 years	0	12	54						
		6 – 10 years	0	8	25						
		11 – 15 years	0	5	34						
		More than15 years	0	7	29						
12	Who is injecting insulin foryou?	Self	0	20	97	3	0.425	7.82 level	at	5%	NS
		Family members	0	4	19						
		Hospital staff	0	10	41						
		Others	0	1	8						

Conclusion

The insulin dependent diabetic patient has inadequate knowledge and hence by teaching strategy and the pamphlet which i distributed regarding insulin dependent diabetes was more effective for the clients. Thus in future this kind of study can be replicated to the large group of sample and in the community setting also.

Acknowledgement

I express my gratitude and thanks towards all who have directly or indirectly helped me to complete this study and their support in each major step of the study.

Recommendation

1. A similar study can be conducted with larger sample.
2. A similar study can be carried out to assess the knowledge, attitude and practices of selfadministration of insulin.
3. A similar study can be carried different site and setting.
4. A study can be conducted with group i.e. experimental group and control group comparison.

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