

A Descriptive Study to Assess the Knowledge and Attitude Regarding Self Administration of Insulin Injection among Diabetes Mellitus Patients in Rural Area at Dehradun

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ABSTRACT

Diabetes mellitus is characterized by abnormally high levels of sugar (glucose) in the blood. When the amount of glucose in the blood increases, e.g., after a meal, it triggers the release of the hormone insulin from the pancreas. Insulin stimulates muscle and fat cells to remove glucose from the blood and stimulates the liver to metabolize glucose, causing the blood sugar level to decrease to normal levels.

In people with diabetes, blood sugar levels remain high. This may be because insulin is not being produced at all, is not made at sufficient levels, or is not as effective as it should be. The most common forms of diabetes are type 1 diabetes (5%), which is an autoimmune disorder, and type 2 diabetes (95%), which is associated with obesity. Gestational diabetes is a form of diabetes that occurs in pregnancy, and other forms of diabetes are very rare and are caused by a single gene mutation.

For many years, scientists have been searching for clues in our genetic makeup that may explain why some people are more likely to get diabetes than others are. "The Genetic Landscape of Diabetes" introduces some of the genes that have been suggested to play a role in the development of diabetes.

KEYWORDS: Diabetes Mellitus; Insulin Therapy; Self Administration; Diabetic Patients; Insulin Injection

INTRODUCTION

"A wonderful affection not very frequent among men, being a melting down of the flesh **and limbs into urine... life is short, disgusting and painful, thirst unquenchable, death is inevitable.**" Areatus, the Greek physician thus described the clinical features of Diabetes Mellitus, almost 4000 years ago.

Physicians have observed the effects of diabetes for thousands of years. For much of this time, little was known about this fatal disease that caused wasting away of the body, extreme thirst, and frequent urination. It wasn't until 1922 that the first patient was successfully treated with insulin.

According to Joyce. M. Black, the overall term Diabetes mellitus includes four subclasses:

- Insulin dependent Diabetes Mellitus
- Non-Insulin dependent Diabetes Mellitus
- Secondary Diabetes Mellitus
- Malnutrition related Diabetes Mellitus.

Successful self-management in Diabetes helps the patient feel better. Education is an important aspect of self-management, teaching the client on self-administration of insulin helps the patient helps to build self-confidence and pride of

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contribution in their management. The nurse has an important role to play in the management of Diabetes. The nurse has the responsibility of teaching the self-injection of Insulin to the patient and the family members or significant others and she has to begin this as soon as the need for the insulin has been established and use written or verbal instructions and demonstration techniques for teaching the patients.

Global Scenario: - The **International Diabetes Federation** estimated that the worldwide prevalence of diabetes mellitus in the year 2003 is 194 million.³ The **World Health Organization** (WHO) has projected that this number would increase to 300 million by the year 2025.⁴

Indian Scenario: - Prevalence of Diabetes Mellitus in India has been growing by leaps and bounds. In the last 20 years there has been a three-fold increase in the prevalence of Diabetes and today it is estimated that there are over 20 million diabetic patients in India. India's diabetic population now ranks first in the world⁵.

A recent national population-based study conducted by **Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan**

V, Das AK et al in six urban cities revealed astonishing results. This study suggested that the prevalence of diabetes among Chennai residents to be 13.5%, Bangalore – 12.4%, Hyderabad – 16.6%, Calcutta – 11.7%, New Delhi – 11.6% and Mumbai - 9.3%. Thus, it is clear that in the last two decades, there has been a marked increase in the prevalence of diabetes among urban Indians.⁶

Ramaiya KL, Kodali VRR, Alberti KGMM had mentioned that there is a wide urban – rural difference, the prevalence being 2.4% in rural and 11.6% in the urban population.⁷

Diabetes Mellitus is commonly divided into two main categories namely Type I diabetes earlier referred as Insulin – Dependent diabetes, and Type II diabetes also known as Non-Insulin Dependent diabetes. Although both are characterized by abnormalities in glucose metabolism, there are significant differences in etiology, pathology and treatment of the two conditions.⁸

Type II diabetes or Non-Insulin dependent diabetes occurs at a later age, usually after age of 40, and has a large hereditary component. It is caused by a combination of beta cell (of the islets of Langerhans) dysfunction and insulin resistance. Management of Type II diabetes in the majority of patients is with diet, exercise with or without Oral Hypoglycemic Agents. Even though the disease is prolonged and, in the process, certain diabetes complications are associated with the illness requiring insulin, Non- Insulin Dependent diabetes is often asymptomatic and ketoacidosis is rare.⁹

Type I diabetes is typically diagnosed at childhood, with peak incidence at puberty. It is characterized by complete Beta cell failure, requiring exogenous insulin replacement by injection for survival.¹⁰ There is evidence to suggest that Type I diabetes is a slow auto-immune disease, in which insulin producing beta cells of the pancreas are destroyed by the body's fight against infection. As in type II the resulting insulin deficiency leads to the accumulation of glucose in the blood stream, accompanied by the classical symptoms of polyuria (excessive urination), polydipsia (excessive thirst), weight loss, fatigue and tiredness. In addition, compensatory fat metabolism produces ketone bodies, leading to ketoacidosis and coma. The treatment of Type I diabetes is often complex. In addition to daily injection, it involves many other life style adjustments such as timing and nature of food consumption, regular exercise and blood glucose monitoring.¹¹ These life style changes place unique demands on the individuals as well as the family, as failure to follow any of these could lead to serious short term and long term consequences (hypoglycemia, ketoacidosis, heart disease, neuropathy, retinopathy, nephropathy). Both Type I and Type II diabetes could lead to macro and micro vascular complications, if not controlled adequately. The long-term prognosis of Type I diabetes is said to improve with a complex demanding and often intensive regimen and maintenance of lower blood glucose levels is said to reduce the risk of long-term complications by as much as 60%¹².

The maintenance of lower blood glucose level is dependent on many factors, including compliance or adherence to

treatment. Insulin has become cornerstone of diabetes treatment since its initial discovery.¹³ Insulin therapy in any form is effective in restoring normoglycemia, suppressing ketogenesis, and delaying or arresting diabetes complications in all patients with diabetes.¹³

Regular Insulin Therapy is lifesaving in Type I diabetes. Non-obese, early onset patients with Type II diabetes respond poorly to Oral Hypoglycemic Agents (OHA) due to hypo insulinaemia and low insulin reserve (latent autoimmune diabetes in adults) hence require Insulin Therapy. The commonest indication of regular Insulin Therapy in Type II diabetes is OHA failure, which can be primary in 30% or secondary in 5% - 10% Patients on OHA per year. Regular Insulin Therapy is also indicated in patients of diabetes associated with renal or hepatic disease, where OHA is contraindicated.¹⁴ Different type and species of insulin have different pharmacological properties. Human insulin is preferred, for use in pregnant women considering pregnancy, individuals with allergies or immune resistance to animal derived insulin, those initiating insulin therapy, and those expected to use insulin only intermittently.¹⁴

Conventional insulin administration involves subcutaneous injections with syringes marked in insulin units. These syringes must be matched with concentration of insulin in vials.¹⁵ Several alternative methods of insulin administration are available like jet injectors that inject insulin as a fine stream into the skin. Several pen-like devices and insulin containing cartridge are available, which are easy to operate, improve accuracy and more convenient. Several new insulin delivery systems are under development that may eliminate the need for needle-based introduction. This includes insulin pumps, insulin inhalers. Preliminary studies have shown very promising results but they are not yet available in India.¹⁶

Even after discovery of so many alternative devices and newer technologies, conventional Insulin Therapy with a needle and syringe is still one of the most popular, convenient, and cost- effective method for insulin administration. Subcutaneous insulin administration is the only insulin administration technique, which can be done at home environment and can be done by patients themselves.

RESEARCH DESIGN

The research design is concerned with the overall framework for conducting the study. A research design incorporates the most important methodological decision that a researcher makes in conducting a research study²³. The research design used for this study is descriptive and exploratory.

DEVELOPMENT AND DISCRIPTION OF TOOL

The tool was developed based on the following

- Review of related literature
- Preparation of blue print
- Consultation with subject experts
- Researcher's personal experience in Clinical Setting

The tool was initially prepared in English and was then translated to Hindi

RESULTS

Table: I-Frequency and Percentage distribution of sample according to their extended demographic variables
N=60

S. No		Frequency (f)	Percentage (%)	
1.	Age in years			
	1.1	>30	5	8.3%
	1.2	31-40	12	20.0%
	1.3	41-50	20	33.3%
	1.4	51-60	23	38.3%
2.	Gender			
	2.1	Male	44	73.3%
	2.2	female	16	26.7%
3.	Religion			
	3.1	Hindu	47	78.3%
	3.2	Muslim	11	18.3%
	3.3	Christian	2	3.3%
4.	Education			
	4.1	Primary	44	73.3%
	4.2	Secondary	13	21.7%
	4.3	Higher Secondary	2	3.3%
	4.4	Graduation and above	1	1.7%
5.	Occupation			
	5.1	Unemployed	32	53.3%
	5.2	Private	9	15.0%
	5.3	Government	5	8.3%
	5.4	Self employed	14	23.3%
6.	Marital Status			
	6.1	Married	52	86.7%
	6.2	Unmarried	1	1.7%
	6.3	Widow	7	11.7%
7.	Family Income			
	7.1	>5000	39	65.0%
	7.2	5001-7500	11	18.3%
	7.3	7501-10000	4	6.7%
	7.8	<10000	6	10.0%
8.	Family History of DM			
	8.1	Yes	22	35.5%
	8.2	No	38	61.3%
9.	Duration of DM Since Diagnosis			
	9.1	>3	24	38.7%
	9.2	4-6	13	21.0%
	9.3	7-9	9	14.5%
	9.4	<10	14	22.6%

Table - II: Overall knowledge of the Diabetic Patients on Self-administration of Insulin Injection
N=60

S. No	Knowledge	No. of subjects	Percent
1.	Inadequate	8	13.3%
2.	Moderate	49	81.7%
3.	Adequate	3	5.0%
4.	Total	60	100.0

Table - III: Mean, Mean percentage and the Standard Deviation of the diabetic patient's knowledge as per areas of self-administration of Insulin Injection

S. No	Areas	Mean	SD	Percentage of	
				Mean	SD
1.	General information	3.21	1.67	45.85	23.87
2.	Self-administration	11.23	2.61	48.82	11.34
3.	Overall	14.45	3.26	48.17	10.87

Table - VII: Association between the selected demographic variables of Diabetic Patients and their level of Knowledge regarding Self - administration of Insulin Injection

N=60

S. No	Demographic Variables	Below mean	Above mean	Total	Chi-Square value	Df	Table`-value	Inference	
1	Age (yrs)				4.166	3	2.35	Not significant	
	1.1	≤300	5	0					5
	1.2	31-40	12	0					12
	1.3	41-50	12	8					20
	1.4.	51-60	13	10					23
	Total	39	21	60					
2	Gender				2.532	1	6.31	Significant	
	2.1	Male	26	18					44
	2.2	Female	13	3					16
	Total	39	21	60					
3.	Education				3.841	3	2.35	Not significant	
	3.1	Primary	30	14					44
	3.2	Secondary	7	6					13
	3.3	Higher Sec.	2	0					2
	3.4	Graduate and above	0	1					1
	Total	39	21	60					
4	Occupation				0.408	3	2.35	Not significant	
	4.1	Unemployed	20	12					32
	4.2	Private	6	3					9
	4.3	Government	3	2					5
	4.4	Self- employed	10	4					14
	Total	39	21	60					
5.	Religion				5.11	2	2.92	Not significant	
	5.1	Hindu	30	17					47
	5.2	Muslim	9	2					11
	5.3	Christian	0	2					2
	Total	39	21	60					
6	Marital Status				2.133	2	2.92	Not significant	
	6.1	Married	32	20					52
	6.2	Unmarried	1	0					1
	6.3	Widow(er)	6	1					7
	Total	39	21	60					
7	Income				2.073	3	2.35	Not Significant	
	7.1	<2000	24	14					38
	7.2	2001-3000	9	2					11
	7.3	3001-4000	3	2					5
	7.4	>4001	3	3					6
	Total	39	21	60					
8	Duration of Diabetes Mellitus				5.702	3	2.35	Not significant	
	8.1	<3	17	7					24
	8.2	4-6	8	5					13
	8.3	7-9	8	1					9
	8.4	>10	6	8					13
	Total	39	21	60					
9	Family History of Diabetes Mellitus				5.702	3	2.35	Not significant	
	9.1	yes	14	8					22
	9.2	No	25	13					38
	Total	39	21	60					

DISCUSSION

A hallmark of professional behavior is the personal commitment to the ongoing acquisition of new knowledge. The study is focused on assessing the knowledge and attitude regarding self- administration of insulin injection among diabetes mellitus patients. It was aimed at the improvement of the knowledge of Diabetic patients, so that they can develop a positive attitude towards it.

The study attempted to test the following hypothesis:

- H₁: There will be a significant relationship between knowledge and attitude of Diabetes Mellitus patients regarding self-administration of insulin injection.
- H₂: There is a significant association between levels of knowledge with selected demographic variables.

Conclusion

The following conclusions were drawn from the present study.

- The Diabetic patients had an average knowledge regarding Self-administration of insulin injection.
- The Diabetic patients had a favorable attitude towards Self-administration of Insulin injection.
- The study findings reveal that there is a significant relationship between the knowledge and attitude of Diabetic patients.
- The study shows that there is no significant association between the knowledge level and selected demographic variables.
- The study findings indicate that there is no significant association between the attitude level and selected demographic variables, except for the family income. There is a significant association between the attitude of Diabetic patients and income.

RECOMMENDATIONS

On the basis of the study that had been conducted, certain recommendations are suggested for future students.

1. A similar study can be done on a larger sample
2. An experimental study can be done to assess the effectiveness of planned teaching programme on insulin therapy.
3. An Exploratory study may be conducted to identify the lack of awareness, knowledge, Attitudes and attitude of Diabetic patients regarding insulin self-administration.
4. A follow up study could be carried out to find the effectiveness of the study by evaluating the knowledge in the Diabetic patients.
5. Information Booklet of the present study could be used for educating the Diabetic patients.

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