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Original Article

TRAINING ON IMPROVING THE COMPETENCY LEVEL OF SELF-ADMINISTRATION OF INSULIN AMONG TYPE 2 DIABETES PATIENTS

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Abstract :
The study was conducted with the objectives to assess the effectiveness of training on self-administration of insulin among type 2 diabetes patients and to determine the relationship between knowledge and skill in self administration of insulin. An evaluative approach with quasi experimental research (one group pre-test post-test) design was adopted for the study. A study was carried out with 30 patients from Kasturba Hospital Manipal. Demographic proforma, knowledge questionnaire and observational checklist on self administration of insulin were used to collect the data. Patients were trained after the pre-test by lecture cum demonstration method and post test was implemented after eight days of training. The study observed that the majority of the sample was having a high school education (40%) males (66.67%) with mean age of 52.87±7.66 years. Most of them received information related to health from TV (63.33%). The duration of Diabetes was 5-10 years (30%) and astonishingly half of them have a family history of Diabetes (50%). The computed paired t was statistically significant in improving the knowledge ($t = 27.97$, $p < 0.001$) and skill ($t = 16.7$, $p < 0.001$) in self administration of insulin among type 2 diabetes patients. There was a weak positive statistical relationship ($r=0.4$, $p<0.05$) between knowledge and skill. Therefore, it is concluded that training was effective in enhancing both knowledge and skill in self administration of insulin. The nursing personnel need to take initiative in directing, teaching and educating patients about self administration practices which can be better understood by the patients, family members and the community at large.

Keywords : effectiveness, training, self administration of insulin, type 2 diabetes patients, lecture and demonstration.

Introduction :

Diabetes Mellitus, the commonest endocrine disorder affects developed as well as developing country. In 2011, 336 million population have diabetes and estimated to reach 552 million by 2030 globally. Low and middle-income countries have 80% diabetes burden. Diabetes will be the seventh leading cause of death in 2030[1].

WHO (2011) reports that the prevalence of diabetes is increasing in India. Diabetes accounts for 10% total metabolic factors with 2% of mortality in 2008 in India[2]. Though diabetes is prevalent in both urban (10-16%) and rural (5.33-6.36%), the incidence is increasing projected to double by 2030[3].

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A study on the prevalence of type diabetes in coastal Karnataka reports the overall prevalence of diabetes is 16% in which 11.2% are self reported and surprisingly 4.8% were not aware of having diabetes. Eleven villages were surveyed and have noticed that 18.8% males and 14.4% of females were affected[4].

Diet control, regular exercise and healthy lifestyle practices along with medication help to control diabetes. Oral hypoglycemic agents and insulin are the major treatment modalities for the effective control of glycemic index. The patient with diabetic is expected to take the medicines regularly. Taking oral medication is easy compared to insulin administration. There are different varieties of insulin that are used to treat people having diabetes. The kind of insulin that is required will depend on how much time is required for the insulin to work inside the body. They will have to inject insulin in the body using a syringe, pump or a pen[5].

Patients must know to draw insulin into the syringe, mix two insulins, selection and preparation of injection site, and correct injecting technique for safe administration of insulin[6]. Repeated practice is necessary if they have to safely administer accurate dose using sterile technique. But, diabetic patients are fearful of self injection and would prefer to postpone learning. The nurse must teach the skill of administration of insulin irrespective of expressing the difficulty or fear of insulin by patients[7].

A study reports that diabetic patients have fear of self administration of insulin and also self testing. Further study has noted that many of them were having moderate to server depression[8]. Though some diabetes patients inject themselves, most of the steps in performance of insulin administration were incorrect alarming that refresher training is required for all[9].

More than 60% of diabetes patients on insulin reported that insulin helps in better control of diabetes. The survey adds that more than half of the sample considered that they are more energetic and reduces the complications of diabetes[10]

The Diabetic patients who are on insulin need to be knowledgeable regarding the disease and insulin therapy and also they must have a competency and positive attitude towards Self-administration of insulin injection to overcome the barriers of insulin injection and to have good glycemic control. Therefore, a study was conducted to assess the effectiveness of training on improving the competency level of self-administration of insulin among diabetic patients receiving insulin, admitted in Kasturba Hospital, Manipal. The purpose was to improve the competency level of self –administration of insulin, which in turn will help in better glycemic control and avoid complications. Glycemic control and prevention of complication will reduce the cost of treatment and diabetes related mortality.

Methodology :

The objectives of the study were to assess the effectiveness of training on self-administration of insulin among type 2 diabetes patients and to determine the relationship between knowledge and skill in self administration of insulin.

Independent variable under the study was training on self administration of insulin, dependent variables were knowledge and skill of diabetic patients regarding self - administration of insulin injection, and demographic variables were age, education, gender, occupation, marital status, family income, duration of diabetes mellitus, family history of diabetes mellitus.

An evaluative approach with quasi experimental design was used to determine the improvement of knowledge status on self administration of insulin and skill in performing self administration of insulin after teaching. The study was conducted in Kasturba Hospital Manipal, Karnataka. Thirty sample was selected by using purposive sampling technique. Sampling criteria included type 2 diabetic patients with the age 30-65 years, diabetes patient on insulin, have no visual and hearing problem and able to do activities of daily living, and patients willing to self-administration of insulin. The data were collected using demographic proforma, knowledge questionnaire on self administration of insulin and observational checklist on self administration of insulin on day one as pre-test and training was given on self administration of insulin by one to one teaching (lecture and demonstration) on the same day. The patients were asked to re-demonstrate for next two doses. Post-test was done on day eight by using the same tool except demographic proforma.

Demographic proforma consisted of age of the subject, gender, education, occupation, family income, exposure to mass media, and family history of diabetes. Knowledge questionnaire on self administration of insulin consisting of 29 multiple choice questions about diabetes and insulin administration. Observation checklist was prepared for evaluating the skill in performing the self-administration of insulin. There were total 25 items in the checklist with eight critical steps. Content validity of the tools was established by the suggestions of expert in the field.

Keywords: effectiveness, training, self administration of insulin, type 2 diabetes patients, lecture and demonstration. - Latha T.

Internal consistency of the questionnaire was computed using split half technique and found to be reliable (r= 0.74). Inter rater reliability of observational checklist on self-administration of insulin found to be r= 0.96. The training on self administration of insulin was prepared by reviewing the literature, seeking the opinion of the experts and validated by experts.

Ethical consideration: permission was obtained from the Dean, Manipal College of Nursing Manipal and Head of the Department, Kasturba Hospital, Manipal, Manipal University. Informed written consent was taken from the participants.

Result :

Sample characteristics

A sample of 30 Diabetes patients on insulin were selected from medicine wards of Kasturba Hospital, Manipal by purposive sampling. The sample characteristics with respect to age, gender, education, occupation, income, exposure to mass media, duration of Diabetes, family history of Diabetes are presented in Table.1

Table 1: Frequency and Percentage Distribution of Diabetes Patients on Insulin n=30

SL No	Sample characteristics	f	%
1	Age in years		
	: 30-39	1	3.33
	: 40-49	9	30.00
	: 50-59	11	36.67
	: > 60	9	30.00
2	Gender		
	: male	20	66.67
	: female	10	33.33
3	Education		
	: primary school	7	23.33
	: middle school	4	13.33
	: high school	12	40.00
	: pre-degree	5	16.67
	: graduate	2	6.67
4	Occupation		
	: employed	19	63.33
	: unemployed	11	36.67
5	Income (Rs /month)		
	: < 3000	8	26.67
	: 3000-5000	8	16.67
	: 5000-10000	5	16.67
	: >10000	12	40.00
6	Exposure to mass media (daily)		
	: reads newspaper	11	36.67
	: watches TV	19	63.33
7	Duration of Diabetes (in years)		
	: <2	5	16.67
	: 2-5	8	26.67
	: 5-10	9	30.00
	: >10	8	26.67
8	Family history of Diabetes		
	: yes	15	50.00
	: no	15	50.00

The data presented in Table 1 showed that the majority (36.67%) were in 50-59 years of age with mean age of 52.87±7.66 years. The majority of the patients were male (66.67%), high school educated (40%). Employees are more (63.33%) and most of their family income is above rupees 10,000 (40%). Most of the patients received information related to health from TV (63.33%). The majority of the patients' Diabetes duration was 5-10 years (30%). Half of the sample were having a family history of Diabetes (50%).

Effectiveness of teaching

Table 2: Range, Minimum, Maximum, Mean, and Standard deviation of pre-test and post-test knowledge and skill scores of Diabetes patients n=30

	Range	Minimum	Maximum	Mean	Standard deviation
Knowledge					
Pre-test	9	10	19	13.8	2.52
Post-test	3	24	27	25.8	0.9395
Skill					
Pre-test	12	14	26,14	20.3	3.770
Post-test	5	28	33,28	31.67	1.3476

Note: Maximum possible score: knowledge – 29 and skill – 33

The data presented in Table 2 indicate that, the post-test mean knowledge score (25.8) is significantly higher than the pre-test mean knowledge score (13.8) and the post-test mean skill score (31.67) is significantly higher than that of the pre-test mean skill score (20.3). This difference in mean signifies the effectiveness of training on self administration of insulin among type 2 diabetic patients.

The pre-test mean knowledge and skill score and post-test knowledge and skill score were calculated. In order to find the difference between the two correlated means of pre-test and post-test scores, paired t was computed. The data are presented in Table 3.

Table 3: Mean, Mean difference, standard deviation and 't' values of pre-test and post-test knowledge and skill scores of the Diabetes patients on insulin. n=30

Sl No	Test	Mean	Mean difference	Standard deviation	t	p
Knowledge	Pre-test	13.8	12.03	2.36	27.97	0.001
scores	Post-test	25.8				
Skill scores	Pre-test	20.3	11.36	3.70	16.7	0.001
Post-test	31.67					

Table 3 shows that the computed paired t is significant for both knowledge (t =27.97, p< 0.001) and skill ('t' = 16.7, df 29, p< 0.001) is significant. This statistical analysis shows that the gain in knowledge and skill on self administration of insulin among type 2 diabetes patients were not by chance and the diabetes patients have improved skill in self-administration of insulin after teaching.

Relationship between knowledge and skill in self administration of insulin

Person's r was computed to find the relationship between knowledge and skill scores. Calculated value (r=0.4, p<0.05) shows a weak positive correlation between knowledge and skill. So, knowledge and skill in self administration of insulin are dependent on each other.

Investigators have noted some of the important findings during the study.

- Patients have expressed that they experience very minimal pain while self-administration of insulin compared to others prick them for injection.
- Though initially some patients were having fear of injection, they could do it successfully after teaching and they were confident in their skill.
- Some of them have articulated that self administration of insulin helps them to improve their quality of life since they need not to be dependent on other people for injection
- Teaching was successful to overcome some of the myths which they had regarding insulin administration.
- The majority of the diabetes patients valued that disposal of biomedical waste is a new concept to them and they were pleased to know the disposal of injection related waste.

Discussion :

A descriptive cross sectional study was conducted by Raj CKP and Angadi MM in Bijapur, Karnataka with 730 type diabetes patients aged above 20 years to assess the knowledge, attitude and practice of diabetes patient showed mean age was 56.64 ± 11.38 years, 67% were males[11]. Sr. Paracatty reported that 36 % of diabetic patient were in 56 – 65 years of age and 53% of them were male[12]. The present supports the finding revealing mean age was 52.87±7.66 years, 67% were males.

The present study showed poor skill on self-administration of insulin before training. However, the knowledge and skill have improved significantly after training. The study supports the research conducted by Thais SG, Ana EP, Vanderlei JH, et al on Insulin self-administration technique with a disposable syringe among patients with diabetes mellitus followed by the family health strategy. Investigators identified errors in most of the steps of the safe administration of insulin[13].

The outcome of this study shows that training on self administration of insulin was effective in improving knowledge (t =27. 97, p< 0.001) and skill ('t' = 16.7, p< 0.001). Sr. Paracatty T, reported that individualized planned teaching was effective (t=12.98, p<0.001) in improving the technique of self administration of insulin. The Author has confirmed that there is a positive correlation (r-0.74, p<0.05) between knowledge and skill of self administration of insulin where as present study has a weak positive correlation in the same area[12].

The present study has noticed that the sample were feared of insulin needle initially and were asking for better methods of insulin administration. Summers KH, Szeinbach SL, Lenox BM in a survey concluded that the overall preference for the insulin injection pen device appeared to be higher compared with the vial and syringe[14]. Most persons are fearful of self injection and would prepare postpone learning. Repeated practice is necessary if they have to safely administer accurate dose using sterile technique. This study supports the research conducted Mollema et al on diabetes fear of injecting and self testing

questionnaire. The study describes the psychometric properties of the diabetes fear of injecting and self testing questionnaire. Two groups of patients were studied[15].

Conclusion :

The study was conducted with the objectives of assessing the effectiveness of training on self-administration of insulin among type 2 diabetes patients and in determining the relationship between knowledge and skill in self administration of insulin. The study concluded that the diabetes patient had an average knowledge regarding self-administration of insulin injection and improved after training. The study findings reveal that there is the weak positive relationship between the knowledge and skill level of self administration of insulin.

Investigators have noticed some of the interesting findings during the study. Though initially some patients were having fear of injection, they could do it successfully after teaching and they were confident in their skill. Patients have expressed that they experience very minimal pain while self-administration of insulin compared to others prick them for injection and helps them to improve their quality of life since they need not to be dependent on other people for injection. Training was successful to overcome some of the myths which they had regarding insulin administration such as insulin injection taken for longer duration makes them tired, travelling is not advisable for the patient who is on insulin, etc. Majority of the diabetes patients valued that disposal of biomedical waste is new concept to them and they were pleased to know the disposal of injection related waste.

The findings of the study have greater implications for health care professionals in the areas of practice, administration education, and research.

The nurses play a key role in patient care from the day of admission to the day of discharge; nurse is with the patient, caring and consoling. So, the nurse is expected to give nursing care as well as health teaching regarding self practice of insulin administration.

Health care professional needs to take initiative in directing, teaching and educate the patients about self administration practices it can be better understood by the patients, family members and the community at large.

Hospital administrators can formulate a policy for a health education program for diabetic patients in order to improve the patient's knowledge and skill towards self-administration of insulin injection. However, more researches should be done related to insulin therapy and self administration in order to prevent the complications and reduce the rate of malpractice.

The study was performed among 30 diabetic patients who were on subcutaneous insulin in Kasturba Hospital, Manipal and there was no control group, limits generalization.

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