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Effectiveness of planned teaching program on knowledge regarding control of blood sugar level among type-2 diabetes mellitus patients

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Abstract

The world is experiencing a rapid epidemiological transition with a rising burden of non-communicable diseases or chronic diseases. Lifestyle-related diseases like Diabetes Mellitus (DM) have emerged as a major public health problem. Diabetes mellitus is a chronic disease of lifelong duration, and its management requires a fundamental change in the patient's lifestyle. **Aim:** To assess the pretest and post-test knowledge scores and compare them after administration of planned teaching program and to associate the pre-test knowledge scores with selected demographic variables. **Methods:** Quantitative research approach with pre-experimental one group pre-test post-test design was used to assess the knowledge of Type-2 Diabetes Mellitus Patients. Purposive sampling technique was used to select 50 sample items. Data was collected using Structured Interview Schedule. The tool was validated by 11 experts. Reliability of the tool was established by using Karl Pearson's correlation coefficient ("r" = 0.92) **Results:** p-value was calculated which showed a significant difference between the pre-test and post-test mean scores indicating that the planned Teaching Program was effective in increasing the knowledge scores. Association of the pre-test knowledge scores with selected demographic variables by chi-square test revealed significant as well as non-significant results. **Conclusion:** In the pre-test most of the study subjects had average knowledge while as in the post-test most of the subjects had excellent knowledge indicating that the Planned Teaching Program was effective in improving the knowledge scores.

Keywords: Effectiveness Planned Teaching Program, Type 2 Diabetes Mellitus, Blood Sugar.

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1. Introduction

The prevalence of chronic diseases is showing an upward trend in most countries, and for several reasons, this trend is likely to increase. As life expectancy is increasing & a greater number of people are living to older ages so there is a greater risk to chronic diseases of various kinds. With socio-economic &health development, the world is likely to face the threat of a pandemic of non-communicable diseases [1]. In 2008, about 63% of the total global deaths were due to non- communicable diseases.

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Out of 57 million global deaths, 36 million were due to non-communicable diseases.

The number of people with Type-2 diabetes mellitus is growing rapidly worldwide. This rise is associated with economic development, ageing populations, increasing urbanization, dietary changes, reduced physical activity, and changes in other lifestyle patterns. [3]

Diabetes mellitus is a chronic disease of lifelong duration, and its management requires a fundamental change in the patient's lifestyle [2]. It is one of the most psychologically and behaviorally demanding of the chronic medical illness. The outcome of diabetes mellitus treatment is highly dependent on the self-care behavior of the patient.[4] Currently, the number of cases of diabetes mellitus worldwide is estimated to be around 382 million,[5] of these more than 90% are type 2 diabetes mellitus. Its prevalence is increasing rapidly, & by 2030 this number is estimated to almost double [6].

It is estimated that about 175 million people with Diabetes Mellitus are undiagnosed [7] The greatest increase in prevalence is, expected to occur in Asia & Africa where most patients will probably be found by 2030[8] People with Diabetes mellitus are 25 times more likely to develop blindness, 30-40 times more likely to undergo Amputation, 2-4 times more likely to develop Myocardial Infarction & twice more likely to suffer a stroke than non- diabetics.[9] Diabetes mellitus costs the world economy at least US dollars 376 billion in 2010 or 11.6% of the total world healthcare expenditure by 2030, this number is projected to exceed US dollars 490 billion[10], Diabetes mellitus is a chronic disease for which control of the condition demands patient self-management.[11,12] Self-management behaviors include monitoring blood glucose levels, taking medication, maintaining a healthy diet and regularly exercising. For most patients, it is important to conduct daily foot examinations to assess for foot ulcers. However, despite the technological and scientific advances made toward the treatment of diabetes mellitus, the American Association of Clinical Endocrinologists reports that in America only 1 in 3 patients with type 2 diabetes mellitus is well controlled Only about one-third of patients report adherence to monitoring blood glucose levels[13]

Diabetes Mellitus is a life-long challenge that requires behavioral change & adequate self-care practices for better glycaemic control. Glucose control is almost entirely in the hands of the patient who lives with this condition. The patient's motivation to eat, exercise, take medication, test glucose levels & maintain a healthy body weight all play a significant role in the management of Diabetes Mellitus.[14] An evaluative research study was conducted to assess Knowledge, attitudes, and practice of diabetes in rural Bangladesh. Knowledge of diabetes and its risk factors was very limited in rural Bangladesh, even in persons diagnosed with type 2 DM. Only 50% reported that they knew physical inactivity was a risk factor. Of the 99 people with known diabetes, more than 50% (n = 52) never had their blood sugar levels checked since diagnosis. The study concluded that development of public health programs to increase knowledge of diabetes and its complications is required to assist people living in rural Bangladesh to control and management of diabetes. [15]

Objectives

1. To assess the pre-interventional knowledge score regarding control of blood sugar level.
2. To assess the post-interventional knowledge score regarding control of blood sugar level.
3. To assess the effectiveness of planned teaching program by comparing pre-interventional & post-interventional knowledge scores.
4. To associate the pre-test knowledge scores with their selected demographic variables. (Age, gender, education, occupation & duration of illness).

2. Materials and methods

Quantitative research approach with pre-experimental one group pre-test post-test design was used to assess the knowledge of Type-2 Diabetes Mellitus Patients regarding control of blood sugar level. The setting chosen for present study was selected wards (Endocrinology, Neurology, Plastic Surgery) of SKIMS hospital Kashmir. The purposive sampling technique was adopted to select the sample of 50 Type-2 Diabetes Mellitus patients. The structured Interview schedule was used to assess the pre-test and post-test knowledge. Content validity of the tool was established by12 experts who had specialization in various areas. Reliability of the tool was established by the administration of the tool to 5 Type-2 Diabetes Mellitus patients on two different occasions. The two scores obtained on two different occasions were compared and calculated by using Pearson's correlation reliability coefficient. Reliability computed was "r" = 0.94 and the tool were found to be reliable. The tool consisted of 40 items. Planned teaching program was prepared and validated; it included various sections about management of Diabetes Mellitus. A pilot study was conducted to determine the feasibility and research ability. Pre-test knowledge scores were assessed by Structured Interview Schedule after this Planned teaching Program was administered. Post-test knowledge scores were assessed on the 4th day after pre-test.

3. Results

On the basis of the research statement following hypothesis were formulated:

H_1: There is a significant increase in the post-test knowledge scores regarding control of blood sugar level among Type-2 Diabetes Mellitus patients at 0.05 level of significance.

H_2: There is a significant association between the pre-test knowledge scores regarding control of blood sugar level among Type-2 Diabetes Mellitus patients & the selected demographic variables. (Age, gender, education, occupation, income, duration of illness) at 0.05 level of significance.

Section 1: Comparison of pre-test and post-test knowledge score of study subjects regarding control of blood sugar level and statistical significance between pre-test and post-test score.

To test the significance, following Null hypothesis was formulated.

H_{01}: There is no significant increase in post-test knowledge scores regarding control of blood sugar level among Type-2 Diabetes Mellitus patients at 0.05 level of significance.

Table no 1: Frequency and percentage distribution of study subjects according to pre-test and post-test knowledge score regarding control of blood sugar level

N=50

Knowledge score	Pre-Test		Post-test	
	Frequency	%age	Frequency	%age
Below average (0-10)	7	14	0	0
Average (11-20)	30	60	5	10
Good (21-30)	12	24	17	34
Excellent (31-40)	1	2	28	56

The data presented in Table 1 shows that in the pre-test 14% of patients had below average knowledge while as in the post-test none of the subjects had below average knowledge, 60% of patients in the pre-test had average knowledge and in the post-test only 10% of patients had average knowledge, 24% of patients had good knowledge in the pre-test and it improved to 34% having good knowledge in post-test. In the pre-test, only 2% of patients had excellent knowledge and it changed to 56% of patients having excellent knowledge in the post-test.

Table no 2: Mean, standard deviation, paired "t" test between pre-test and post-test knowledge scores. N=50

Knowledge score	Mean ± standard deviation	Mean difference	P value
Pre-test score	16.74	14.380	0.000* (*significant)
Post-test score	31.12		

It is evident from the data presented in Table 2 that mean post test knowledge score (31.12) is higher than mean pre-test knowledge (16.74) score of study subjects with a mean difference (14.380) regarding control of blood sugar level was found to be significant at P <0.05 level.

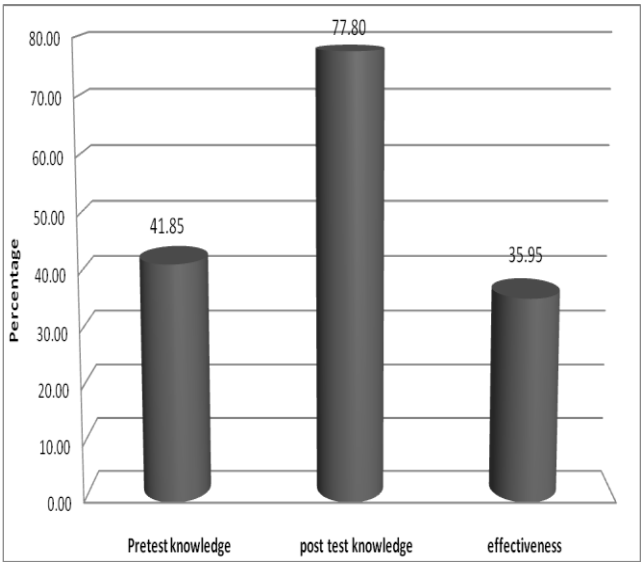

Fig no 1: Cylindrical diagram showing the effectiveness of planned teaching program

Table no 3: Area-wise comparison of pre-test and post-test knowledge scores of subjects regarding control of blood sugar level. N=50

Areas	Mean score		S.D.	Median score	Mean % age
Concept of Diabetes Mellitus	Pre-test	5.78	3.694	5.5	34.0
	Post-test	11.84	3.080	12	69.6
Role of diet in control of blood sugar level	Pre-test	5.28	1.970	5	58.7
	Post-test	8.16	1.113	9	90.7
Importance of exercise in control of blood sugar level.	Pre-test	2.88	1.154	3	36.0
	Post-test	6.10	1.515	6	76.3
Importance of exercise in control of blood sugar level.	Pre-test	2.80	1.050	3	46.7
	Post-test	5.02	1.059	5	83.7

The data shown in Table 3 shows that the pre-test knowledge score of study subjects regarding concept of Diabetes Mellitus is 5.78 while as in post-test knowledge the score increased to 11.84, regarding role of diet in control of blood sugar level the pre-test knowledge score is 5.28 and it increased to a score of 8.16 in the post test, regarding the importance of exercise in control of blood sugar level the pre-test knowledge score is 2.88 and the post-test knowledge score increased to 6.10 and in the area covering importance of medication in control of blood sugar level the pre-test knowledge score is 2.80 and it increased to a post-test post test score of 5.02.

The above findings support the research hypothesis (H_1) which states that there is a significant increase in the post-test knowledge scores regarding control of blood sugar level among Type-2 Diabetes Mellitus patients at 0.05 level of significance. Hence null hypothesis (H_{01}) was rejected. The mean difference was a true difference, not a chance. This indicates that the Planned Teaching Program (PTP) was significantly effective in improving the knowledge regarding control of blood sugar level among study Subjects.

Section 2: Analysis and interpretation of data to find out an association between pre-test knowledge scores of study Subjects regarding control of blood sugar level with selected demographic variables (age, gender, educational status, occupational status and duration of illness)

Paired t-test and the chi-square test were used to find out the association of pre-test knowledge scores of Type-2 Diabetes Mellitus patients with their selected demographic variables (Age, gender, educational status, occupational status and duration of illness).
To find out the association, following null hypothesis was formulated:

H_{02}: There is no significant association of pre-test knowledge scores of Type-2 Diabetes Mellitus patients regarding control of blood sugar level with their selected demographic variables (Age, gender, educational status, occupational status and duration of illness).

Table no 4: Association of pre-test knowledge scores of subjects with their selected demographic variables (age, gender, educational status, occupational status and duration of illness)

N=50

Demographic Variables		Excellent	Good	Average	Below Average	Chi-Square Test	P Value
Age	35-45 Years	1	4	13	2	6.345	0.705 NS
	46-50 Years	0	2	4	0		
	51-55 Years	0	0	4	1		
	56-65 Years	0	6	9	4		
Gender	Male	1	7	15	2	2.620	0.454 NS
	Female	0	5	15	5		
Educational Status	Illiterate	0	1	13	7	33.500	0.004 *
	Middle	0	1	4	0		
	Matric	0	3	5	0		
	12^{th}	0	1	5	0		
	Graduate	0	4	2	0		
	Post-Graduate	1	2	1	0		
Occupation	Business	0	2	7	1	12.317	0.196 NS
	Farmer	0	0	4	1		
	Govt Employee	1	6	5	0		
	Housewife	0	4	14	5		
Duration of Illness	Less than 1 Year	0	0	4	2	9.657	0.646 NS
	1-5 Years	1	4	14	3		
	6-10 Years	0	0	0	0		
	11-15 Years	0	5	7	1		
	16-20 Years	0	2	1	1		
	21-25 Years	0	1	4	0		
	More than 25 Years	0	0	0	0		

- = Significant: NS = Not significant

The data presented in Table 4 indicates that there was a statistically significant association of pre-test knowledge scores of subjects with a demographic variable as the Educational status of the patient (p=0.04) at 0.05 level of significance and no association was found with variables as age of the patient, gender, Occupational status, and duration of illness.
Hence, the researcher failed to reject the null hypothesis (H_{02}) which states that there is no significant association of pre-test knowledge scores of Type-2 Diabetes Mellitus Patients regarding control of blood sugar level with their selected demographic variables.

4. Discussion

The pre-test knowledge scores of the subjects revealed that majority of the subjects 30 (60%) had the average knowledge, 12(24%) had good knowledge, 7(14%) had below average knowledge score whereas only 1(2%) had excellent knowledge. The mean pre-test knowledge score was 16.74 with a standard deviation of 6.452 and mean percentage knowledge was 41.85%. These findings revealed that majority of the subjects had average knowledge regarding the control of the blood sugar level.
The post-test knowledge scores reveal that majority of the study subjects 28 (56%) had excellent knowledge, 17(34%) had good knowledge, 5(10%) had the average knowledge and none of the subjects had below average knowledge in the post-test. The mean post-test knowledge score was 31.12 with a standard deviation of 5.934 and mean percentage knowledge was 77.80%. These findings reveal that majority of the subjects were having excellent knowledge in the post-test and there is a higher post-test knowledge score.
The mean post-test knowledge score of the study subjects was (31.12) which is significantly higher than the mean pre test knowledge (16.74) score of study subjects with a mean difference of (14.380). The mean difference was

statistically significant. This indicates that the structured teaching program was effective in increasing the knowledge score of Type-2 Diabetes Mellitus patients regarding control of blood sugar level.

Hence, it is evident that post-test knowledge scores of study subjects were higher than the pre-test knowledge scores. The lack of knowledge among the patients can be due to lack of proper education by health care professionals especially nurses who have a major role to play in patient education. This suggests that there should be an in-service program for nurses regarding the management of diabetes and the control of the blood sugar level so that they may remain updated with the recent advances in the management of Diabetes mellitus. These in-service programs will also prepare better nurse educators. The Diabetic patients should be routinely educated about the control of the blood sugar level and also periodic health education programs should be conducted to educate the diabetic patients.

Findings of the present study revealed that there was a statistically significant association of the pre-test knowledge scores with the educational status of the study subjects while as no association was found between the pre-test knowledge scores of the study subjects with other demographic variables like age, gender, occupation, and duration of illness at 0.05 level of significance.

These findings are consistent with the findings of a study conducted by Safford MM (2005) [16] to assess the effectiveness of Structured Teaching Program on knowledge regarding Diabetes which showed that there was no significant association between pre-test knowledge and the demographic variables. This shows that the demographic variables probably do not have any significant impact on the knowledge scores. There is a significant association between the level of knowledge and the educational level. This may be attributed to a greater probability of obtaining knowledge from books and other sources such as mass media, good communication with the healthcare team, and they may grasp knowledge correctly.

Conclusion

The Type-2 Diabetes Mellitus patients lack adequate knowledge regarding control of blood sugar level and there is a need for educating the patients. The mean knowledge scores improved after implementation of the planned teaching program indicating that the planned teaching program was effective in increasing the knowledge scores.

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