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A Study to Evaluate the Effectiveness of Planned Teaching Program on Diabetic Management Regarding Knowledge and Practice Among Patients with Diabetes Mellitus at Selected Taluk Government Hospital, Kollegala

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Abstract

Diabetes mellitus is a chronic metabolic disorder with a growing global impact. Effective management of this condition requires not only medical intervention but also comprehensive patient education. This study was conducted to evaluate the effectiveness of different diabetes education methods on improving metabolic control, body mass index (BMI), and blood pressure among diabetic patients. The research aimed to empower individuals with diabetes by enhancing their knowledge and self-management skills. A quasi-experimental one-group pre-test and post-test design was employed. The study was carried out at the Government Taluk Hospital in Kollegal, following formal approval from relevant medical authorities. Participants were selected through convenience sampling based on predefined inclusion criteria. Prior to data collection, informed consent was obtained, and confidentiality was assured. Data were gathered using a self-administered questionnaire designed to assess participants' baseline knowledge and clinical parameters. The questionnaire required approximately 20–30 min to complete. Following the pre-test, participants attended a structured 30-min educational session tailored to diabetes management. 8 days after the intervention, a post-test was conducted to evaluate changes in knowledge and clinical outcomes. Educational handouts were also provided to reinforce learning. Statistical analysis was performed using frequency, percentage, mean, standard deviation, paired t-test, and Chi-square test to examine the significance of differences between pre- and post-intervention data and to explore associations between selected variables. The study's findings are expected to contribute valuable insights into the role of educational interventions in managing diabetes, potentially guiding future practices to improve patient outcomes through knowledge-driven care.

Keywords: Diabetes mellitus, patient education, metabolic control, quasi-experimental design, self-management

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INTRODUCTION

Diabetes mellitus presents numerous challenges for both patients and their families. These challenges may involve pain, frequent hospitalizations, lifestyle and occupational changes, physical limitations, and risks to life. Each of these factors can lead to psychological stress, which can further hinder effective diabetes management and reduce the patient's ability to lead a fulfilling and productive life [1].

According to the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus

(1998), diabetes mellitus is a group of metabolic disorders marked by high blood glucose levels (hyperglycemia), caused by defects in insulin production, insulin function, or both.

The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus (1998) defines diabetes mellitus as a collection of metabolic disorders characterized by increased blood sugar levels (hyperglycemia), which result from impairments in insulin secretion, insulin action, or both [2].

The Centers for Disease Control and Prevention (2003) estimated that over 194 million people worldwide were living with diabetes mellitus at that time. If effective measures are not taken, this number is expected to surpass 300 million by the year 2025 [3].

National Institute of Diabetes Mellitus and Digestive and Kidney Disease (2003) reported that Diabetes Mellitus is the fifth leading cause of deaths in United States killing 150,000 per year [4–6].

World Health Organization (WHO) estimated that by the year 2025 India alone would have 60 million people with Diabetes Mellitus. India is alarming that every 5th individual will be with diabetes mellitus [7, 8].

METHOD

This study aims to enhance the knowledge and practical skills of patients with diabetes mellitus in managing their condition. This section outlines the research design, study setting, target population and sampling method, sample selection criteria, as well as the instruments and tools used for data collection.

This study aimed to assess the effectiveness of a planned teaching program on diabetes management in improving the knowledge and practices of patients with diabetes mellitus at a selected Government Taluk Hospital in Kollegal. A total of 30 diabetic patients participated in the study. The pre-test was administered using self-administered questionnaires, followed by the implementation of the planned teaching program by the investigator. 8 days later, a post-test was conducted. The results demonstrated that the teaching program significantly enhanced the patients' knowledge and practice related to diabetes management.

This section outlines the research methodology, covering the research approach and design, study setting, variables, target population and sample, sampling method and sample size, sample selection criteria, tool description, validity and reliability, procedures for data collection, pilot study, and methods of data analysis.

Both descriptive and inferential statistical methods were utilized for data analysis. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic data and assess participants' knowledge and practice levels. Inferential statistics involved the use of a paired t-test to evaluate the effectiveness of the planned teaching program on diabetes management. Additionally, the Chi-square test was applied to determine the association between participants' knowledge and practice with selected demographic variables (Table 1).

RESULT

The study evaluated the effectiveness of diabetes education in improving participants' knowledge, metabolic control, BMI, and blood pressure. A total of 30 participants who met the inclusion criteria completed both the pre-test and post-test assessments.

Table 2 displays the frequency and percentage distribution of demographic characteristics of patients with diabetes mellitus, including age, gender, educational level, occupation, monthly income, religion, duration of illness, prior knowledge about diabetes mellitus, and sources of information.

Table 1. Statistical methods used for data analysis.

S.N.	Methods of data analysis	Remarks
1.	Description statistics frequency percentage, mean, standard deviation	To describe the demographic variables, to assess the knowledge and practice of diabetes
2.	Inferential statistics paired "t" test	Helps to compare paired observation by analyzing the effectiveness of planned teaching program on diabetic management regarding knowledge and practice of diabetes
3.	Chi-square test	To find out the association between knowledge and practice regarding diabetes with selected demographic variables

Table 2. Distribution of frequency and percentage of demographic variables among patients with diabetes mellitus (n=30).

S.N.	Demographic variables	Frequency	Percentage
1.	***Age (years)***		
	31–40 years	5	16.67
	41–50 years	8	26.67
	51–60 years	10	33.33
	61–70 years	7	23.33
2.	***Sex***		
	Male	20	66.7
	Female	10	33.3
3.	***Educational Status***		
	Primary School	10	33.33
	High School	8	26.67
	Hr. Secondary	2	6.67
	Under graduate	6	20.00
	Post Graduate	4	13.33
4.	***Occupation***		
	Unemployment	4	13.33
	Labor	8	26.67
	Home worker	4	13.33
	Business	8	26.67
	Professional	6	20.00
5.	***Monthly Family Income***		
	Rs. 1000–3000	11	36.66
	Rs. 3001–6000	4	13.33
	Rs. 6001–10,000	9	30.00
	Above Rs. 10,000	6	20.00
6.	***Religion***		
	Hindu	22	73.33
	Christian	6	20.00
	Muslim	2	6.67
	Others	-	-
7.	***Duration of Illness***		
	Less than year	6	20.00
	1–2 years	7	23.33
	2–3 years	4	13.33
	3–4 years	6	20.00
	More than 4 years	7	23.33

8.	***Previous Knowledge***		
	Yes	19	63.33
	No	11	36.66
9.	***Sources of information***		
	Family members	9	30.00
	Friends	6	20.00
	Health team	8	26.66
	Media	7	23.33
Total		*30*	*100.0*

Table 3. Distribution of pre-test and post-test knowledge and practice score of Means, SD on diabetic management among patients with diabetes mellitus (n=30).

S.N.	Area	Max Score	Pre-test		Post-test	
			Mean	***SD***	***Mean***	***SD***
1.	**K*nowledge*** Disease Condition	6	2.27	0.69	5.03	0.76
2.	Diet	6	2.30	0.79	4.63	0.76
3.	Exercise	6	2.30	0.79	4.83	0.53
4.	Glucose monitoring	6	2.33	0.76	4.70	0.60
5.	Insulin therapy	6	2.23	0.77	4.87	0.86
6.	Prevention of complication	5	2.03	0.61	4.10	0.76
Overall		*35*	*13.69*	*2.20*	*28.47*	*2.00*
1.	***Practice*** Medication	5	2.03	0.85	4.23	0.43
2.	Diet therapy	5	2.53	1.01	4.87	0.37
3.	Exercise	5	2.17	1.15	4.70	0.53
4.	Glucose monitoring	5	0.13	0.30	3.33	0.76
Overall		*20*	*7.07*	*1.86*	*17.57*	*2.82*

Table 4. Distribution of effectiveness of planned teaching program on diabetic management regarding Area wise and overall knowledge and practice scores of pre-test and post-test among patients with diabetes mellitus (n=30).

S.N.	Area	Max. Score	Pre-test		Post-test		Mean difference
			Mean	***SD***	***Mean***	***SD***	
1.	***Knowledge*** Disease Condition	6	2.27	0.69	5.03	0.76	2.76
2.	Diet	6	2.30	0.79	4.63	0.76	2.33
3.	Exercise	6	2.30	0.79	4.83	0.53	2.53
4.	Glucose monitoring	6	2.33	0.76	4.70	0.60	2.37
5.	Insulin therapy	6	2.23	0.77	4.87	0.86	2.54
6.	Prevention of complication	5	2.03	0.61	4.10	0.76	2.07
Overall		***35***	***13.69***	***2.20***	***28.47***	***2.00***	***14.78***
1.	***Practice*** *Medication*	5	2.03	0.85	4.23	0.43	2.2
2.	Diet therapy	5	2.53	1.01	4.87	0.37	2.34
3.	Exercise	5	2.17	1.15	4.70	0.53	2.53
4.	Glucose monitoring	5	0.13	0.30	3.33	0.76	3.2
Overall		***20***	***7.07***	***1.86***	***17.57***	***2.82***	***10.5***

The results revealed a significant improvement in both knowledge and practice scores following the educational intervention. The overall mean knowledge score increased from 13.69 (SD=2.20) in the pre-test to 28.47 (SD=2.00) in the post-test. Similarly, practice scores improved from a pre-test mean of 7.07 (SD=1.86) to a post-test mean of 17.57 (SD=2.82). Notable improvements were observed across all specific areas, including disease condition, diet, exercise, glucose monitoring, insulin therapy, and prevention of complications (Table 3).

The findings clearly indicate that the planned teaching program had a significant impact on improving both knowledge and practice among diabetic patients. Knowledge scores increased across all areas, with the overall mean rising from 13.69 to 28.47, a mean difference of 14.78. Similarly, practice scores improved markedly, with an overall mean increase from 7.07 to 17.57, a mean difference of 10.5. The highest improvement in practice was observed in glucose monitoring (mean difference =3.2), while knowledge gains were most notable in the area of disease condition (mean difference =2.76) (Table 4).

The paired t-test analysis demonstrated a highly significant improvement in both knowledge and practice scores following the educational intervention. The mean knowledge score increased from 13.69 to 28.47 (mean difference =14.78, t=31.277), while the mean practice score rose from 6.87 to 17.10 (mean difference =10.23, t=30.303). These results indicate the effectiveness of the planned teaching program in enhancing diabetes-related knowledge and self-care practices among patients (Table 5).

Table 5. Effectiveness of planned teaching program on overall knowledge and practice scores (n=30).

S.N.	Variables	Total score	Pre-test		Post-test		Mean difference	Paired 't' test
			Mean	*SD*	*Mean*	*SD*		
1.	Knowledge	35	13.69	2.20	28.47	2.00	14.78	31.277**
2.	Practice	20	6.87	1.61	17.10	1.24	10.23	30.303**

** *Highly significant at P<0.05 level.*

Figures 1 and 2 show that in the pre-test, most diabetic patients, 28 (93.3%), had inadequate knowledge, while 2 (6.7%) had moderately adequate knowledge, and none demonstrated adequate knowledge. In the post-test, 27 (90%) patients showed adequate knowledge, 3 (10%) had moderately adequate knowledge, and none had inadequate knowledge.

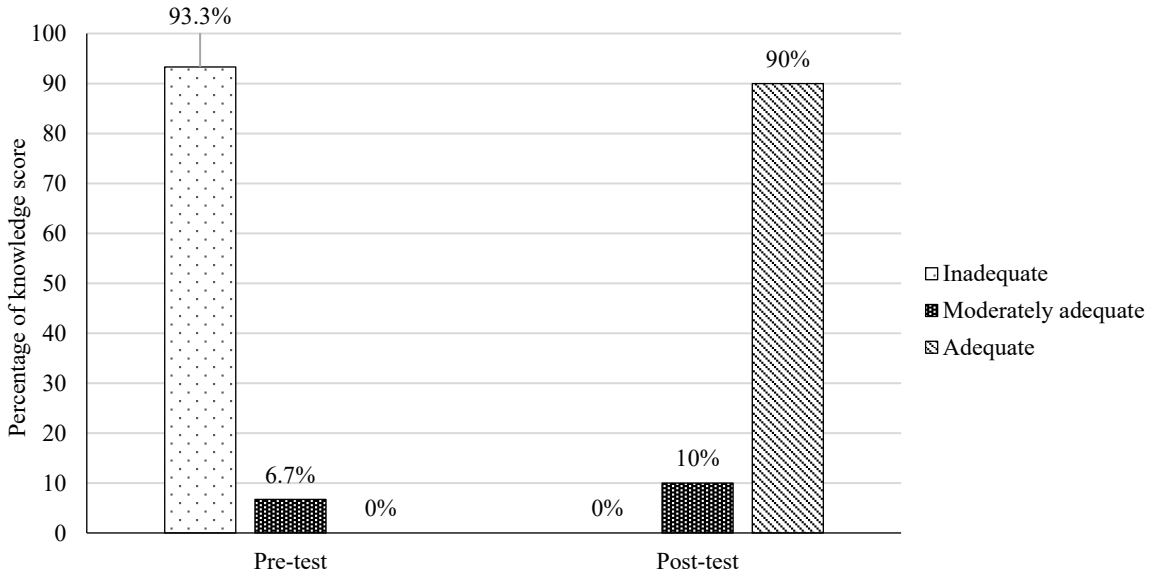

Figure 1. Distribution of the effectiveness of planned teaching program on diabetic management regarding knowledge and practice score of pre-test among patients with diabetes mellitus.

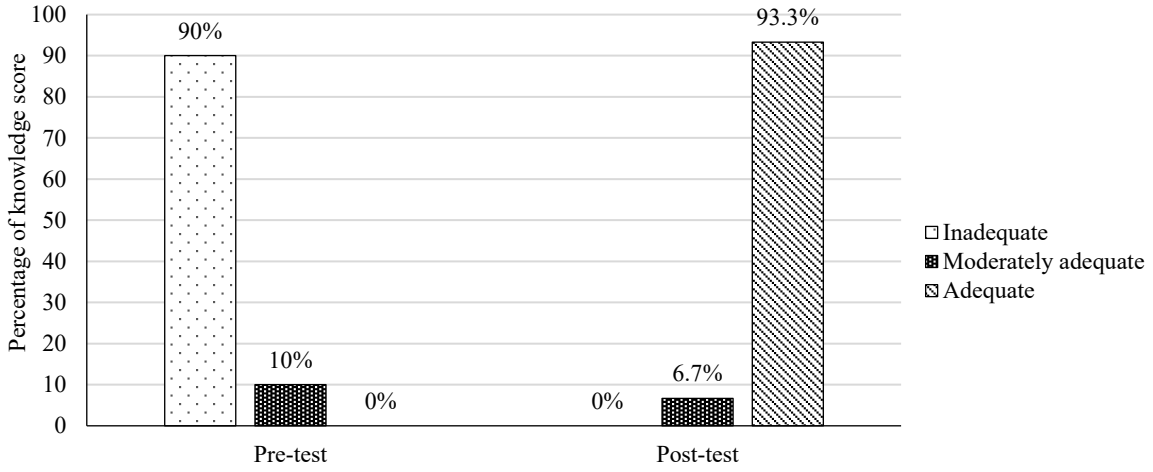

Figure 2. Distribution of the effectiveness of planned teaching program on diabetic management regarding knowledge and practice score of post-test among patients with diabetes mellitus.

The analysis revealed no statistically significant association between pre-test knowledge scores on diabetic management and any of the selected demographic variables, including age, sex, education, occupation, duration of disease, or previous knowledge about diabetes. All Chi-square values were found to be non-significant at the 0.05 level, indicating that demographic characteristics had no notable influence on baseline knowledge among the participants (Table 6).

The study found no significant association between pre-test practice scores on diabetic management and any of the selected demographic variables. Factors such as age, sex, education level, occupation, duration of the disease, and prior knowledge about diabetes did not show a statistically significant relationship with participants' self-care practices before the intervention. All Chi-square values were non-significant at the 0.05 level (Table 7).

DISCUSSION

This study aimed to assess the effectiveness of a planned teaching program on diabetes management in improving the knowledge and practices of patients with diabetes mellitus at a selected government taluk hospital in Kollegala.

A total of 30 diabetic patients were chosen for the study. The pre-test was carried out using self-administered questionnaires. Following the pre-test, the investigator conducted a planned teaching program. 8 days later, a post-test was administered. The study demonstrated that the teaching program significantly improved the patients' knowledge and practices [9].

The Primary Objective of the Study was to Evaluate the Knowledge and Practices Related to Diabetes Among Patients with Diabetes Mellitus

The investigator found that, during the pre-test, most patients with diabetes mellitus had low levels of knowledge and practice regarding diabetic management. Specifically, 28 patients (93.3%) demonstrated inadequate knowledge, while 27 patients (90%) showed inadequate practice. Additionally, 2 patients (6.7%) had moderate knowledge, and 3 patients (10%) had moderate practice. None of the patients exhibited adequate knowledge or practice [10].

The investigator analyzed the mean and standard deviation of knowledge scores on diabetic management from both the pre-test and post-test. In pretest, it shows that among six areas the highest mean score (2.30±0.79) is for the areas regarding diet and exercise, whereas lowest mean score (2.03±0.61) for prevention of complication of diabetes mellitus. The knowledge regarding glucose monitoring and insulin therapy was 2.33±0.77, whereas knowledge mean score on disease condition was 2.27±0.69 and overall knowledge mean was 13.69±2.20.

Table 6. Association between pre-test knowledge score on diabetic management with selected demographic variables among patients with diabetes mellitus (n=30).

S.N.	Demographic variables	Knowledge				df	Chi-square value	P-value at 0.05 level
		< *Median*		≥ *Median*				
		No. (17)	*%*	*No. (13)*	*%*			
1.	***Patients age (years)***					3	4.63^{NS}	P=0.201
	31–40 years	2	6.66	3	10.00			
	41–50 years	6	20.00	2	06.00			
	51–60 years	7	23.33	3	10.00			
	61–70 years	2	06.66	5	16.11			
2.	***Sex***					1	1.70NS	P=0.193
	Male	13	43.33	7	23.33			
	Female	4	13.33	6	20.00			
3.	***Education***					4	4.55 NS	P=0.337
	Primary school	5	16.66	5	16.66			
	High School	6	20.00	2	6.66			
	Hr. Sec. School	0	00.00	2	6.66			
	Graduate	3	10.00	3	10.00			
	Post Graduate	3	10.00	1	3.33			
4.	***Occupation***					4	7.55^{NS}	P=0.183
	Unemployment	3	10.00	1	3.33			
	Laborer	4	13.33	4	13.33			
	Home worker	1	3.33	4	13.33			
	Business	5	16.66	2	6.66			
	Professional	4	13.33	2	6.66			
5.	***Duration of disease***					4	2.12^{NS}	P=0.713
	Less than year	4	13.33	2	6.66			
	1–2 years	4	13.33	3	10.00			
	2–3 years	3	10.00	1	3.33			
	3–4 years	2	6.66	4	13.33			
	More than 4 years	4	13.33	3	10.00			
6.	**Previous knowledge**					1	0.008^{NS}	P=0.306
	Yes	4	13.33	3	10.00			
	No	13	43.33	10	33.33			

^{NS}*: Not significant.*

Post-test shows that among six areas, the highest mean score (5.03±0.76) is for the area regarding disease condition, whereas the lowest mean score (4.10±0.76) was obtained for Prevention of complication. The mean score obtained for diet was 4.63±0.76, for exercise 4.83±0.53, for glucose monitoring 4.70±0.60, and for insulin therapy it was 4.87±0.86.

The pre-test and post-test Practice mean score, SD on diabetic management: In the pre-test it is shown that among four areas the highest mean score is 2.53±1.01 for the areas regarding diet therapy, whereas lowest mean score was 0.13±0.30 for glucose monitoring. The practice means score for medication was 2.03±0.85, and for the exercise it was 2.17±1.15. The post-test shows that among four areas of practice, the highest mean score was 4.87±0.37 for the areas regarding diet therapy, whereas lowest mean score was 3.33±0.76 for glucose monitoring. The practice mean score obtained for medication was 4.23±0.43, and mean score for exercise was 4.70±0.53.

Table 7. Association between pre-test practice scores on diabetic management with selected demographic variables among patients with diabetes mellitus (n=30).

S.N.	Demographic variables	Practice				df	Chi – square value	P-value at 0.05 level
		< *Median*		≥ *Median*				
		No. (20)	*%*	*No. (10)*	*%*			
1.	***Patients age (years)***					3	4.63^{NS}	P=0.201
	31–40 years	2	6.66	3	10.00			
	41–50 years	6	20.00	2	06.00			
	51–60 years	7	23.33	3	10.00			
	61–70 years	2	06.66	5	16.11			
2.	***Sex***					1	0.300^{NS}	P=0.584
	Male	14	46.66	6	20.00			
	Female	6	20.00	4	13.33			
3.	***Education***					4	3.45^{NS}	P=0.486
	Primary school	6	20.00	4	13.33			
	High School	6	20.00	2	6.66			
	Hr. Sec. School	1	3.33	1	3.33			
	Graduate	3	10.00	3	10.00			
	Post Graduate	4	13.33	0	00.00			
4	***Occupation***					4	5.38^{NS}	P=0.372
	Unemployment	3	10.00	2	6.66			
	Laborer	7	23.33	1	3.33			
	Home worker	2	6.66	2	6.66			
	Business	6	20.00	2	6.66			
	professional	4	13.33	1	3.33			
5	***Duration of disease***					4	4.82^{NS}	P=0.306
	Less than year	4	13.33	2	6.66			
	1–2 years	4	13.33	3	10.00			
	2–3 years	4	13.33	0	00.00			
	3–4 years	5	16.66	1	3.33			
	More than 4 years	3	10.00	4	13.33			
6	**Previous knowledge**					1	0.373^{NS}	P=0.542
	Yes	11	33.66	8	26.66			
	No	6	20.00	5	16.66			

^{NS}*: Not significant*

The second Objective of the Study was to Assess How Effective the Planned Teaching program was in Improving Knowledge and Practice of Diabetic Management among Patients with Diabetes Mellitus

The overall pre-test and post-test knowledge and practice scores showed significant improvement. In the pre-test, the average knowledge score was 13.69 (SD=2.20) out of 35 questions, while in the post-test, the average score increased to 28.47 (SD=2.00) out of 35 questions. The mean difference was 14.74 and paired t-value was t=31.277**. It is statistically highly significant at P<0.05 level [11].

Whereas in pre-test, mean practice score was 6.87 (SD=1.61) out of 20 questions, and post-test mean practice score was 17.10 (1.24) out of 20 questions. The mean difference for practice was 10.23 and paired t-value was 30.303**. It is statistically highly significant at P<0.05 level.

This study was conducted to assess the effectiveness of an intensive diabetes education program for 60 patients facing long-term self-management challenges. The results demonstrated that the program was effective in improving glycemic control and reducing diabetes-related distress among these patients.

The hypotheses stated for this study was that there was a significant difference pre and post-test knowledge and practice regarding diabetes among patients with diabetes mellitus. The above findings support this hypotheses and it was accepted.

Third Objective of the Study was to Find Out Association Between Knowledge and Practice Regarding Diabetes with Selected Demographic Variables

The association between knowledge on diabetic management regarding knowledge among patients with diabetes mellitus with selected demographic variables is age, sex, education status, occupation, duration of illness and previous knowledge regarding diabetes. The obtained chi-square values were: for age 4.63, sex 1.70, educational status 4.55, occupation 7.55, duration of illness 2.12 and previous knowledge regarding diabetes 0.008 was not statistically significant at 0.05 levels. So, the research hypothesis was rejected.

The relationship between diabetic management practices and selected demographic variables among patients with diabetes mellitus. The obtained chi-square values were: for age 3.05, sex 0.300, education 3.45, occupation 5.38, duration of illness 4.82 and previous knowledge regarding diabetes 0.373 was not statistically significant at 0.05 levels [12].

This study was supported by research involving 90 diabetic patients to assess their basic knowledge of disease and glycemic control. Glycemic control and knowledge were assessed before and after the passive education program. The findings showed that, in the pre-test, the mean knowledge score was 8.3 out of 15, while in the post-test, it increased to 9.23, indicating an improvement in participants' knowledge after the intervention. The demographic characteristics considered in the study—such as age, gender, place of residence, education level, duration of illness, and type of treatment—did not show any significant impact on disease knowledge or glycemic control.

CONCLUSION

This study aimed to assess the effectiveness of a planned teaching program in improving knowledge and practices related to diabetic management among patients with diabetes mellitus. The result of this study showed that there is an improvement of knowledge and practice on diabetic management among patients with diabetes mellitus. This study concluded that planned teaching program is more effective on diabetic management.

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