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Research Article

Effectiveness of Planned Teaching Program on Self-care for Patients with Diabetes Mellitus in a Selected Community at Tumkur

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Abstract

Aim: The aim of this study is to find the Effectiveness of planned teaching program (PTP) on self-care for patients with diabetes mellitus in a selected community at Tumkur.

Materials and Methods: The investigation was quantitative. This study used a non-equivalent control group quasi-experimental design. The study took place at Kaivara. This study includes all Kaivara diabetics. Data were collected from 30 diabetics. This study used purposive sampling methods. Data analysis makes use of both inferential (paired and unpaired "*t*" tests) and descriptive (mean, standard deviation, frequency, and percentage) statistics.

Result: Group I patients had pre- and post-test knowledge scores of 18–60 and 84–101. For Group I, the mean knowledge score after the test (93.67) was higher than the mean score before the test (33.8). The "*t*" value for Group I ("*t*" = 22.10) demonstrated a notable change, demonstrating PTP increased diabetic patients' understanding. Group I patients' self-care practice scores also changed significantly. Group I patients' pre-test and post-test self-care practice scores were 22–56 and 63–75. Mean post-test score for self-care (70.53) was greater than pre-test. The Group I "*t*" value (16.19) demonstrated a significant difference, demonstrating that PTP increases diabetes mellitus patients' self-care practices. The mean post-test knowledge score on frequent check-ups, exercise, and food (97, 98.92, and 98.38) was significantly greater than the score on the pre-test following PTP. The mean percentage of self-care practice score for medications (96.67) and skin care (99.13) increased significantly for Group I.

Conclusion: The experimental and control groups had substantial differences in post-test self-care and knowledge scores, proving that individual-planned teaching program work.

Keywords: Planned teaching programs, self-care, diabetes mellitus, quasi-experimental

Introduction

The Greek word "diabetes" means "to go through" or a siphon, and the Latin word "mel" means "honey," which describes the pleasant smell of urine. These two words combine to form the name "diabetes mellitus."[1]

According to the World Health Organization (WHO) (1995), there are three forms of diabetes mellitus: Type 1 (insulin-dependent diabetes mellitus, or IDDM), Type 2 (non-insulin-dependent diabetic mellitus, or NIDDM), and gestational diabetes mellitus.[2]

Diabetes affects the world. About 200 Americans die daily from it, making it the sixth biggest cause of mortality in the US. Diabetes is a "contributing factor" for nearly 400 US deaths/day. About 600 Americans die daily from diabetes.[3]

Global diabetes prevalence was 4.0% in 1995 and is anticipated to rise to 5.4% by 2025. Higher in wealthy nations. Worldwide,

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300 million persons will have diabetes by 2025, up from 135 million in 1995. Emerging nations should lead this growth. From 51 to 72 million, developed countries will increase by 42%, while impoverished countries will increase by 170%, from 84 to 228 million. From 62% in 1995 to over 75% in 2025, more diabetics will live in developing countries. In 2025, the US, China, and India will have the most diabetes. Diabetics in developing countries are mostly 45–64 years old. Diabetes is most common in adults over 65 in developed countries.[4]

WHO declared India as the diabetes capital. People in India are more prone to diabetes. The Indian diabetes population is 30 million and estimated to reach 57 million by 2025.[5]

For diabetic patients to attain metabolic control, the choice of therapy and complaints is crucial. Although many individuals find that diet, exercise, and oral medications help control their diabetes, it is now known that insulin therapy is necessary for a significant portion of type 2 diabetic patients.[6]

It is beneficial to manage diabetes effectively. Complications from diabetes can be avoided. Despite diabetes, a long and healthy life is achievable. The goal of education is to empower people to take care of themselves without the assistance of medical professionals, which will lessen the strain and complexities on families, society, and the government.[7]

Objectives of the study

1. Identify the knowledge of patients with diabetes mellitus.
2. Assess the self-care practiced by the patients with diabetes mellitus.
3. Determine the effectiveness of the planned teaching program (PTP) on self-care.

Materials and Methods

Research approach

The quantitative research approach was used to achieve the main goal.

Research design

This study used a quasi-experimental, non-equivalent control group design for its research.

Setting of the study

This study was carried out by the investigator at Kaivara.

Population of the study

All of Kaivara's diabetes mellitus patients make up the study population.

Sampling technique

The sample for this study was chosen using the purposive sampling technique.

Sample size

Thirty patients with a diagnosis of diabetes mellitus made up the study's sample.

Statistics

Descriptive statistics

Mean, standard deviation, frequency, and percentage was used.

Inferential statistics

Paired and unpaired "*t*" test was used.

Results

Table 1 reveals that 53.33% of Group II patients and 60% of Group I patients were between the ages of 41 and 60. Male patients made up just 46.67% of Group I patients and 60% of Group II patients. About 86.67% of Group I patients and 100% of Group II patients were Hindus. Patients in Group II (60%) and Group I (53.33%) had completed at least 1 year of elementary school. A minority of patients (33.33%) and 26.67% in Group II reported monthly incomes between Rs. 2001 and Rs. 3000. The majority of patients in Groups I (93.33%) and II (73.34%) did not have a job.

Table 2 shows that 60% of Group I patients and 80% of Group II patients had condition for fewer than 5 years. The age for onset of diabetes was 40–60 years for 53.33% of Group I and 60% of Group II patients. Medical experts informed all patients about diabetes. Most patients (66.67% in Group I and Group II) had normal BMIs. Blood pressure drugs were taken by more than half of Group I (53.33%) and less than half of Group II (46.67%) of participants. Furthermore, 53.33% of Group I patients and 33.33% of Group II patients had elevated

Table 1: Distribution of patients according to the demographic data (*n*=15+15)

S. No	Variable	Group I		Group II	
		f	%	f	%
1	Age in years				
	21–40	1	6.67	1	6.67
	41–60	9	60.00	8	53.33
	Above 61	5	33.33	6	40.00
2	Sex				
	Male	7	46.67	9	60.00
	Female	8	53.33	6	40.00
3	Religion				
	Hindu	13	86.66	15	100.00
	Christian	1	6.67		
	Muslim	1	6.67		
4	Marital status				
	Married	15	100.00	15	100.00
5	Education				
	Illiterate	2	13.33	2	13.33
	Primary	8	53.33	9	60.00
	Secondary	5	33.33	3	20.00
	Diploma/graduate	-		1	6.67
6	Monthly income (in rupees)				
	>5001	4	26.67	5	33.33
	3001–4000	2	13.33	-	-
	2001–3000	5	33.33	4	26.67
	1001–2000	4	26.67	3	20.00
	<1000	-	-	3	20.00
7	Occupation				
	Unemployed	14	93.33	11	73.34
	Semi-skilled	1	6.67	2	13.33
	Self-employment	-	-	2	13.33

blood sugar. 46.67% of Group II patients were unaware of their blood sugar. In Group II, 60% of urine sugar tests were blue, compared to 26.67% in Group I. Most Group I (80%) and Group II (60%) patients acquired other health issues. The majority of patients in Group II (33.33%) and Group I (46.67%) had high blood pressure. While 86.67% of Group II patients did not have a family history of diabetes, the majority of Group I patients (73.33%) did.

Table 2: Distribution of patients according to the clinical information (*n*=15+15)

Sl. No.	Variable	Group I		Group II	
		f	%	f	%
1	Duration of diabetes mellitus				
	<5 years	9	60.00	12	80.00
	5–10 years	3	20.00	3	20.00
	>10 years	3	20.00	-	-
2	Age of onset of diabetes				
	below 20 years	1	6.67	1	6.67
	21–30 years	1	6.67	1	6.67
	31–40 years	3	20.00	1	6.67
	41–60 years	8	53.33	9	60.00
	Above 61 years	2	13.33	3	20.00
3	Source of information about diabetes				
	Health professionals	15	100.00	15	100.00
4	Body mass index				
	Within normal range	10	66.67	10	66.67
	Grade 1 overweight	3	20.00	5	33.33
	Grade 1 thinness	2	13.33	-	-
5	Blood pressure: Within normal limits				
	Without medicine	7	46.67	8	53.33
	With medicine	8	53.33	7	46.67
6	Blood sugar level checked within 3 months (in mg %)				
	Within normal limit	3	20	3	20
	Above normal	8	53.33	5	33.33
	Do not know	4	26.67	7	46.67
7	Urine sugar level				
	Blue	4	26.67	9	60.00
	Green	4	26.67	1	6.67
	Yellow	2	13.33	1	6.67
	Orange	3	20.00	-	-
	Red	2	13.33	4	26.67
8	Other health problems				
	Hypertension	7	46.67	6	40
	Eye problems	4	26.67	2	13.33
	Both hypertension and eye problems	1	6.67	1	6.67
	Eye and kidney problems	-		1	6.67
9	Family history of diabetes mellitus				
	Yes	11	73.33	2	13.33
	No	4	26.67	13	86.67

Table 3 displays data indicating that the patients' post-test knowledge score range (84–101) exceeded their pre-test knowledge score (18–60). In addition, the results show that the mean knowledge score after the test ($\bar{x}$ = 93.67) appears to be greater than the mean knowledge score before the test ($\bar{x}$ = 33.8).

Table 4 reveals, diet has the greatest mean pre-test score (65.45%) and urine sugar monitoring the lowest (0). Post-test scores are greatest for exercise (98.92%), regular check-up (98.38%), and lowest for drug (75.76%). After PTP, urine sugar monitoring (9.73%) and diabetic mellitus (9%) had higher knowledge deficits than medicines (1%) and exercise (1.08%).

Table 5 shows that Group I had the highest mean post-test scores in regular check-up (98.38%) and exercise (98.92%). When it comes to diet, Group II has the highest mean post-test score (64.27%) and the lowest mean post-test score (0%). Group I has the lowest mean drug post-test score (75.76%).

According to Table 6's data, patients' post-test self-care practice score range, which is 63–75, is greater than their pre-test score range, which is 22–56. In addition, the findings show that the mean self-care practice score after the examination is ($\bar{x}$ = 70.53) seemingly greater than the mean self-care practice score before the test ($\bar{x}$ = 41.67).

According to Table 7, the pre-test self-care practice score of patients is highest for skin care (72.5%) and lowest for urine sugar monitoring (0). Skin-care had the greatest mean post-test score (99.13) and exercise the lowest (84.33). After PTP, self-care deficit was 100% in urine sugar monitoring and 0.87% in skin care.

According to Table 8, Group I scored lowest on urine sugar monitoring (15%) and highest on skin care (99.13%) on the post-test. Blood sugar management has the highest mean post-test self-care practice score (78.6%), whereas urine sugar self-testing has the lowest mean score (0%).

Table 9 shows that the mean knowledge score at the end of the examination (93.67) is higher than the mean knowledge score at the beginning of the test (33.8). The knowledge scores before and after the test differ significantly, as indicated by the "*t*" value (t_{14} = 22.1, $P < 0.001$). Research hypothesis is accepted as a result of the rejection of null hypothesis H01. This implies that PTP raises patients' awareness of diabetes.

Table 3: Range, mean, median, and standard deviation of pre- and post-test knowledge score of patients in Group I and Group II (*n*=15+15)

Knowledge score	Group	Range	Mean	Median	Standard deviation
Pre-test	Experimental	18–60	33.80	30	11.50
	Control	17–50	30.00	29	8.15
Post-test	Experimental	84–101	93.67	94	6.21
	Control	17–50	30.00	29	8.15

Maximum score=102

Table 4: Area-wise pre and post-test knowledge score of patients in Group I (n=15)

Sl. No.	Area	Max. score	Mean % of knowledge score		Mean percentage of		Percentage of knowledge deficit after planned teaching program
			Pre-test	Post-test	Actual gain	Possible gain	
1	Diabetes mellitus predisposing factors signs and symptoms	20	53.35	91.00	37.65	46.65	9.00
2	Diet	11	65.45	97.00	31.55	34.55	3.00
3	Drugs	33	23.24	75.76	52.52	76.76	1.00
4	Exercise	12	15.00	98.92	83.92	85.00	1.08
5	Urine sugar monitoring	11	0.00	90.27	90.27	100.00	9.73
6	Regular check-up	8	58.38	98.38	40.00	41.62	1.62
7	Complications	8	23.38	94.13	70.75	76.62	5.87

Table 5: Area-wise post-test knowledge score of patients in Group I and Group II (n=15+15)

Sl. No.	Area	Maximum score	Mean percentage of knowledge score		Difference in mean percentage
			Group I	Group II	
1	Diabetes mellitus predisposing factors sign symptoms	20	91.00	48.35	42.65
2	Diet	11	97.00	64.27	32.73
3	Drugs	33	75.76	23.42	52.34
4	Exercise	12	98.92	9.41	89.51
5	Urine sugar monitoring	11	90.27	0.00	90.27
6	Regular check-up	8	98.38	45.00	53.38
7	Complications	8	94.13	14.13	80.00

Table 6: Range, mean, median, and standard deviation of pre- and post-test self-care practice of patients in experimental and control group (n=15+15)

Knowledge score	Group	Range	Mean	Median	Standard deviation
Pre-test	Group I	22–56	41.67	41	8.43
	Group II	24–52	41.67	44	6.90
Post-test	Group I	63–75	70.53	72	3.35
	Group II	24–52	41.67	44	6.90

Maximum score=78

According to Table 10, the mean self-care practice at the post-test (70.53) is significantly higher than the pre-test (41.67). Between the pre- and post-test, there was a significant difference in the self-care practice score ("t"$_{14}$=16.19, P = 0.001). The research hypothesis is accepted since the null hypothesis, H02, is rejected. This implies that PTP raises the self-care scores of diabetic patients.

Table 11 shows that Group I scored higher on the mean post-test knowledge than Group II (30). Group I's score was 93.67%. Patients in Group I and Group II had significantly different post-test knowledge ratings ("t"$_{28}$ = 23.27, P < 0.001). The research hypothesis is accepted since the null hypothesis, H03, is denied. This implies that PTP raises the knowledge scores of Group I diabetic patients.

Table 12 shows that Group I scored higher on the mean post-test self-care practice score (70.53) than Group II (41.67). Group I and Group II's post-test self-care practice scores differed significantly ('t'$_{28}$ = 14.06, P = 0.001). The research hypothesis is accepted since the null hypothesis, H04, is rejected. This implies that PTP raises the self-care practice ratings of Group I diabetic patients.

Discussion

Similar study conducted by Pradeepa and Mohan says that diabetes affects approximately 0% of new Guineans and 50% of Pima Indians. Diabetes diagnoses have skyrocketed worldwide in the previous two decades. The WHO predicted 300 million diabetes by 2025 from 135 million in 1995. India has the most diabetics worldwide. In the 1970s, 2.1% of urban Indians had diabetes; currently 12.1% do. Impairment of glucose tolerance is also widespread, and many will acquire Type 2 diabetes. Nearly every organ system can be affected by diabetes. The Chennai urban population study found that urban South Indians and Europeans have similar rates of diabetes retinopathy, nephropathy, and neuropathy. Premature coronary artery disease is more common and occurs at a younger age, although peripheral vascular disease is less common than in Europeans. A nutritious diet, more exercise, and weight loss are all part of the lifestyle changes that are required to prevent diabetes in pre-diabetics and to halt the diabetes pandemic in our nation.[8]

A study conducted by Mehrotra *et al*. mentioned that knowledge of diabetes mellitus is influenced by educational status. The mean ages of men and women diabetics were not significantly different (P > 0.1). Only 46.7% of participants knew the importance of blood glucose measurement. Patient awareness of microalbuminuria, lipid profile, and glycosylated hemoglobin was 24.1%, 15.5%, and 7.6%. Education improved knowledge. No correlation was discovered between occupation and knowledge.[9]

Another study conducted by Hilary *et al*. describes that diabetes prevalence in people worldwide was 4.0% in 1995 and rose to 5.4% by 2025. It is higher in developed nations. By 2025, there

Table 7: Area-wise pre- and post-test mean percentage of self-care practices of patients in Group I (*n*=15)

Sl. No.	Area	Maximum score	Mean % of self-care practice score		Mean percentage of		Mean percentage of self-care deficit after planned teaching programme
			Pre-test	Post-test	Actual gain	Possible gain	
1	Measures to control blood sugar	5	66.60	94.60	28.00	33.4	5.40
2	Diet	17	65.12	93.70	28.58	34.88	6.30
3	Drugs	12	66.67	96.67	30.00	33.33	3.33
4	Exercise	3	26.67	84.33	57.66	73.33	15.67
5	Skincare	8	72.50	99.13	26.63	27.50	0.87
6	Foot care	13	21.54	91.77	70.23	78.46	8.23
7	Self-testing of urine sugar	3	0.00	0.00	0.00	100.00	100.00
8	complication	16	60.81	91.69	30.88	39.19	8.31

Table 8: Area-wise post-test self-care practice score of patients with diabetes mellitus in Group I and Group II (*n*=15+15)

Sl. No.	Area	Maximum score	Mean percentage of self-care practice score		Difference in mean percentage
			Group I	Group II	
1	Measures to control blood sugar	5	94.60	78.60	16.00
2	Diet	17	93.70	68.24	25.46
3	Drug	12	96.67	67.75	28.94
4	Exercise	3	84.33	24.33	60.00
5	Skincare	8	99.13	68.38	30.75
6	Footcare	13	91.77	19.00	72.77
7	Self-testing of urine sugar	3	0.00	0.00	0.00
8	Complications	16	91.69	58.75	32.94

Table 9: Mean, mean difference, standard deviation, and "*t*" value between pre-test and post-test knowledge score of patients in Group I (*n*=15)

Group I	Mean knowledge score	Mean difference	Standard deviation	SE (d)	df	"*t*" value
Pre-test	33.8	59.87	10.49	2.71	14	22.10*
Post-test	93.63					

't'_{14}=4.14, P<0.001=4.14, *=significant

Table 10: Mean, mean difference, standards deviation, and "*t*" value between pre-test and post-test self-care practice score of patients in Group I (*n*=15)

Group I	Mean self-care practice score	Mean difference	Standard deviation	SE (d)	df	"*t*" value
Pre-test	41.67	28.86	6.9	1.78	14	16.19*
Post-test	70.53					

"$t"_{14}$=4.14, P<0.001, *=highly significant

Table 11: Mean, mean difference, standard deviation, and "*t*" value between post-test knowledge score of patients in Group I and II (*n*=15+15)

Group	Post-test mean knowledge score	Mean difference	Standard deviation	SE (d)	Df	"*t*" value
Group I	93.67	63.67	9.93	2.57	28	23.27*
Group II	30					

"$t"_{28}$=3.67, P<0.001, highly significant

Table 12: Mean, mean difference, standard deviation, and "*t*" value between post-test self-care practice score of patients in Group I and II (*n*=15+15)

Group	Mean post-test self-care practice	Mean diff	Standard deviation	Df	SE (d)	'*t*' value
Group I	70.53	28.86	8.48	2.19	28	14.06*
Group II	41.67					

"$t"_{28}$=3.67, P<0.001 * highly significant

will be 300 million adults with diabetes worldwide, up from 135 million in 1995. Most of this expansion will take place in developing countries. The developed countries will rise 42%, from 51 to 72 million, and the underdeveloped countries 170%, from 84 to 228 million. Therefore, from 62% in 1995 to more than 75% in 2025, more people with diabetes will reside in developing countries. India, China, and the U.S. will have the most diabetics in 2025. Diabetics in emerging countries are mostly 45–64 years old. Diabetes affects mostly adults over 65 in wealthy nations. This pattern will intensify by 2025. More women than males suffer from diabetes, particularly in developed nations. Diabetes in the future will be more urban.[10]

Most of the diabetic patients developed other health issues, Hypertension being one the prevalent one. The study that backed this finding was done by Bhaskar *et al*. Diabetes patients were older (mean ± SD 56 ± 16 vs. 43 ± 16 years), had higher body mass index (29 ± 5 vs. 24 ± 4 kg/cm[2]) and SBP (145 ± 23 vs. 131 v 18 mmHg, all $P < 0.001$). Subsequent analysis resolved these problems. The diabetic group had considerably higher SBP and increased with age. Conventional diabetes cutoffs lowered hypertension in adults under 50 compared to age-adjusted centiles. In the 18–29, 30–39, 40–49, 50–59, 60–69, and older than 70 diabetes group, 24%, 33%, 43%, 62%, 70%, and 74% exceeded 140 mmHg, while 35%, 44%, 43%, 45%, 40%, and 27% exceeded the 75$^{(th)}$ centile from the control group.[11]

Another study by Toljamo and Hentinen points out that most respondents completed insulin treatment on time but struggled with other self-care tasks. The data showed that 19% of respondents neglected self-care. Some used flexible (46%), regimen-adherent (16%), or self-planned (19%) care. Non-adherence had worse metabolic regulation than self-care. During logistic regression analysis, poor metabolic control, smoking, and living alone were connected to self-care neglect ($P = 0.003$, 0.009, and 0.014). Gender, concomitant disorders, and diabetic complications raised risk, but self-care did not.[12]

Conclusion

Planned instruction improves patients' knowledge and self-care in weak areas. The study found no correlation between patient knowledge and sex, monthly income, sickness duration, or disease onset age. Self-care practice score was unrelated to sex, education, monthly income, illness duration, or disease beginning age. Knowledge, education, and self-care routines were strongly linked.

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