



A QUASI-EXPERIMENTAL STUDY ON EFFECT OF DIABCARE SBT (SIMULATION-BASED TRAINING) MODULE ON SELF-CARE MANAGEMENT IN DIABETIC PATIENTS IN OPD OF SELECTED HOSPITALS IN A METROPOLITAN CITY

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Abstract

Background: Diabetes Mellitus is a group of metabolic disease characterized by increased level of glucose in the blood resulting from defects in insulin secretion, insulin action or both. There are two main type of diabetes, type1 and type2 diabetes mellitus.

Objectives: The primary goal of the study was to assess the effect of Diabcare SBT (simulation-based training) on self-care management in diabetic patients. **Methods:** A Quasi experimental study with 2 group post-test only design, non-probability convenient sampling technique was used and Modified Diabetic Self-Care Management Assessment Scale was used to collect data from out-patient department of a tertiary care hospitals with 60 newly detected diabetic patients recruited. **Results:** In experimental group 15th day self-care management score mean is 33 with SD 3.2483, on 30th day self-care management score mean is 34.933 with SD 2.7156 and level of significance (p)=0.0001. In control group 15th day self-care management score mean is 24.7 with SD 4.3164, ON 30th day self-care management score mean is 27.267 with SD 4.0932 and level of significance (p)=0.0137. On 15th day in control group and experimental group, self-care management total score mean 24.7 with SD 4.31 in control group and in experimental group self-care management total score mean 33 with SD 3.24 and level of significance (p)=0.01 hence, there is significant difference in self-care management among diabetic patients with and without Diabcare SBT.

Conclusion: the SBT Module did bring about change in reported self-care management among diabetic patients, hence it may be recommended as an effective method of health education among diabetics

Index Terms: SBT; self-care management; diabetes mellitus; Modified Diabetic Self-Care Management

I. INTRODUCTION

Diabetes Mellitus is a group of metabolic diseases characterized by increased level of glucose in the blood resulting from defects in insulin secretion, insulin action or both. There are two main type of diabetes, type1 and type2 diabetes mellitus

In 2021, according to **International Diabetes Federation (IDF)** 537 million adults (20-79 years) are living with diabetes worldwide, and from 77 million were in India. almost 1 in 2 (240 million) adults living with diabetes are undiagnosed; Diabetes caused 6.7 million deaths in 2021; Diabetes caused at least USD 966 billion dollars in health expenditure – 9% of total spending on adults; more than 1.2 million children and adolescents (0-19 years) are living with type 1 diabetes; 1 in 6 live births (21 million) are affected by diabetes during pregnancy; and 541 million adults are at increased risk of developing type 2 diabetes³². Studies suggested that diabetes cases are rapidly increasing in urban Indian adults. The risk factors peculiar for developing diabetes among Indians include high familial aggregation, central obesity, insulin, resistance, and lifestyle changes due to urbanization. The prevalence of diabetes in the population is 8.9% according to IDF. Poor medication adherence in type 2 diabetes is well documented to be very common and is associated

with inadequate Glycaemic control, increased mortality and morbidity and increased cost of patient care and managing complications of diabetes. Diabetes education has a vital role in self-management of diabetes and the nurse plays a significant role in promoting diabetes care by providing up-to-date, evidenced based care and support. Disease self-management is an essential component of care for patient with chronic diabetes. If patients don't have adequate knowledge and skill then, they cannot manage the disease and its effects on their lives, successfully. Diabetes education should be an integral part of treatment of diabetes, the desired outcome being a diabetic person, "equipped with diabetes knowledge and self-care practice and empowered to make informed decision to minimize health problems from diabetes.

Simulation activity is essentially experiential learning, involving higher levels of thinking in cognitive domain. Reinforcement of learning and thinking at level of analysis, synthesis and evaluation of Blooms taxonomy. patients are going through situations, true to life situations will enhance critical thinking.

PROBLEM STATEMENT

A Quasi-experimental study on effect of DiabCare SBT (Simulation-Based Training) module on self-care management in diabetic patients in OPD of selected hospitals in a metropolitan city.

OBJECTIVES

Primary Objective:

1. To compare self-care management in diabetic patients with and without DiabCare SBT

Secondary Objectives:

1. To associate self-care management in diabetic patients with demographic variables (Age, Education, Occupation) and clinical variables
2. To elicit opinion about DiabCare SBT from patients exposed to the module.

MATERIALS AND METHODS

RESEARCH APPROACH: The quantitative research approach is applied where observation of the relationship among variables is done.

RESEARCH DESIGN: A Quasi-experimental two group post-test only design was adopted.

RESEARCH SETTING: The setting is selected as the hospitals in a metropolitan city. The selected hospital is multidisciplinary hospital with diabetic OPD. Hospital selection was done on the basis of the feasibility in terms of permission and availability of sample on the basis of inclusion and exclusion criteria of the study.

RESEARCH VARIABLE: The independent variable is DiabCare SBT & the dependent variable is Diabetic self-care management.

POPULATION: The target population of the study are diabetic patients. The accessible population for study is patients with diabetes within 3 months of diagnosis in Out Patient Department.

SAMPLE SIZE: In this study, sample size consists of 60 newly diagnosed with diabetes who fulfils the inclusion criteria. the sample size calculated by RAO software online and cross checked with manual software.

SAMPLE TECHNIQUE: In this study non-probability convenient sampling technique is used.

CRITERIA FOR SELECTION OF SAMPLE:

INCLUSION CRITERIA:

- Patients aged between 20-60 years, visiting OPD within 3 months of detection of increased blood glucose level
- Type1 and type 2 diabetes
- Patients able to communicate in English or Hindi or Marathi

EXCLUSION CRITERIA

- Patients having psychological impairment.
- Not willing to participate.

TOOLS AND TECHNIQUE:

In this study, Self -report

assessment scale used to collect data for diabetes self-management and demographic data, interview for clinical data, self -reporting questions used to assess opinions.

SECTION A

It comprises of demographic variables of patients including items like age, gender, education, health habits, occupation.

SECTION B

Bio-physiologic measurement includes random blood sugar, HbA1c, blood pressure, comorbidities, body weight, Height, BMI.

SECTION C

The tool is the Modified Diabetes self-management assessment scale to evaluate the diabetes self-care activities associated with glycaemic control. Components of Modified Diabetes self-management assessment scale are Blood glucose testing, oral hypoglycaemic agents and insulin management, dietary choices.

SECTION D

Opinionnaire with close ended questions about DiabCare SBT from patients who underwent the simulation training.

VALIDITY: The content validity of the tool was obtained by giving it to experts from various fields. A total of 9 experts consisting of one diabetologist, one dietitian, one statistician, one diabetic nurse, one simulation trainer and four nursing experts have validated tool. Questionnaire and opinionnaire was validated.

RELIABILITY: The reliability of the tool was established by using Cronbach's alpha for internal consistency. Reliability calculated for self-care management in diabetes and it was >0.8 . thus, the tool to be found reliable for the study.

DATA COLLECTION: The permission to conduct the study was granted by the Ethical Review Committee for research in the desired hospital. Approval also taken from the concerned authorities and diabetologist.

The patient is exposed to several simulation scenarios and encouraged to act them out, experientially learning to make appropriate choices. Each submodule is followed by a debriefing session where the choices and rationale are discussed and correct choices reinforced. Patients working through structured, true-to life learning situation that mirrors real-life home and work scenarios that they would encounter, to learn about diabetic self-care. investigator has prepared environment and set-up for simulation-based training for true-to life learning situation. Real life situational scenarios will be given to patients and caregiver and they have to do acting in that situation how they will behave or respond to that particular situation and that will be apply in their day-to-day life.

EXPERIMENTAL GROUP

1st visit - Demographic data collected, Biophysiological measurement taken, **simulation-based training** given

15th day- Modified diabetic self-management assessment scale collected, Biophysiological measurement taken

30th day -Post-test of modified diabetic self-management assessment scale collected, Biophysiological measurement taken, opinionnaire about SBT collected

CONTROL GROUP

1st visit -Demographic data collected, Biophysiological measurement taken, **Standard care**

15th day-Modified diabetic self-management assessment scale, Biophysiological measurement taken

30th day -Post-test of Modified diabetic self-management assessment scale collected

DATA ANALYSIS:

The collected data was analyzed in terms of the objectives of the study using descriptive and inferential statistics.

DESCRIPTIVE STATISTICS:

- Demographic and clinical data plan to represent in terms of frequency and percentage
- The self-care management plan to analyse in terms of mean and standard deviation.

INFERENTIAL STATISTICS:

- Comparison of post self-care management in diabetic patients with and without DiabCare SBT.
- Comparison of post self-care management score between control group and experimental group by unpaired t test and p value.

RESULT AND DISCUSSION:**SECTION 1**

The analysis and interpretation of the **demographic data** of the diabetic patients. It is analysed in terms of frequency and percentage.

The data analysis of demographic variable of diabetic patients shows that 46.6% patients belongs to age group of 31 to 40 years, 43.3% belongs to age group of 41 to 50 years and 10% belongs to age group of 51 to 60 years in control group and 6.6% belongs to age group of 21 to 30 years, 16.6% belongs to age group of 31 to 40 years, 33.3% belongs to 41 to 50 years and 43.3% belongs to age group of 51 to 60 years in experimental group.

Regarding distribution of gender 56.6% are male and 43.3% are female in both the groups. with regard to distribution of education 33.3% people with primary education, 30% people with secondary education, 13.3% were graduates and 23.3% in other education category in control group. 13.3% people with primary education, 40% people with secondary education, 23.3% were graduates and 23.3% in other education category in experimental group. With regard to occupation of the subjects 43.3% are employee, 43.3% are doing business, 13.3% are retired in control group. 43.3% are employee, 43.3% are doing business, 20% are retired and 3.3% are studying in experimental group.

With regard to health habits data of the subjects 36.6% are smokers, 23.3% are chewing tobacco, 16.6% are others and 23.3% are with no bad health habits in control group. 30% are smokers, 20% are chewing tobacco, 3.3% are others and 46.6% are with no bad health habits in experimental group.

SECTION 2

The analysis and interpretation of the **Biophysiological measurement** data of the diabetic patients. It is analysed in terms of Mean \pm SD, F-Test df and p value. co-morbidity and body mass index (BMI) The major findings of the Biophysiological measurement data include the following.

Systolic blood pressure at Day 1 Mean \pm SD 126.20 \pm 14.27, Day 15 Mean \pm SD 126.70 \pm 14.58, Day 30 Mean \pm SD 125.90 \pm 12.59, F-Test=0.051 and df = 2,177 and P-value is 0.95. Diastolic blood pressure at Day 1 Mean \pm SD 74.63 \pm 12.67, Day 15 Mean \pm SD 73.60 \pm 12.48, Day 30 Mean \pm SD 72.53 \pm 11.83, F-Test=0.435 and df = 2,177 and P-value is 0.648. Random blood sugar at Day 1 Mean \pm SD 125.55 \pm 20.31, Day 15 Mean \pm SD 124.45 \pm 19.88, Day 30 Mean \pm SD 117.65 \pm 13.96, F-Test=3.287 and df = 2,177 and P-value is 0.04. Haemoglobin A1C at Day 1 Mean \pm SD 7.91 \pm 1.06, Day 15 Mean \pm SD 7.91 \pm 1.06, Day 30 Mean \pm SD 7.91 \pm 1.06, and df = 2,177 and P-value is 1. Height Mean \pm SD 160.37 \pm 8.30, and df = 2,177 and P-value is 1. Weight at Day 1 Mean \pm SD 64.82 \pm 11.84, Day 15 Mean \pm SD 64.52 \pm 10.51, Day 30 Mean \pm SD 64.32 \pm 10.61, F-Test=0.033 and df = 2,117 and P-value is 0.968. With regard to co-morbidity 30% patients with hypertension, 18.3% patients with renal disease, 16.7% patients with obesity, 35% patients with hypothyroidism and regarding to BMI 48.3% people with normal body mass index, 41.7% people with overweight, 10% patient were obese.

SECTION 3:

The **self-care management scores** of patients in experimental and control groups on the 15th & 30th days. The analysis and interpretation of the self-care management by using MDSMQ of the diabetic patients. It is analysed in terms of frequency and percentage. The major findings of the self-care management on the 30th data include the following. On the 30th day patients in control group had fair self-care management (20%) good self-care management (66.6%) and 13.3% had excellent self-care management, whereas in the experimental group 23.3% patients had good self-care management and 76.6% reported excellent self-care management. association of the self-care management with Demographic and Clinical variables, there is no significant association of the self-care management with Demographic and Clinical variables.

SECTION 4:

Opinionnaire taken from experimental group about effectiveness of simulation-based training. It consists of 5 close ended questions. For question one 90% responses are yes and 10% responses are no, for question two 86.6% responses are yes and 13.3% responses are no, for question three 70% responses are yes and 30% responses are no, for question four 76.6% responses are yes and 23% responses are no, For question five 96.6% responses are yes and 3.3% responses are no. so it shows that simulation-based training module were effective for self-care management.

DISTRIBUTION OF SCM SCORE ON 30TH DAY IN CONTROL AND EXPERIMENTAL GROUPS

SELF CARE MANAGEMENT SCORE				
	Control Group n=30		Experimental Group n=30	
	<i>F</i>	<i>%</i>	<i>F</i>	<i>%</i>
Poor (0-10)	0	0	0	0
Fair (11-20)	6	20	0	0
Good (21-30)	20	66.6	7	23.3
Excellent (31-42)	4	13.3	23	76.6

Below bar chart 20% patients are doing fair self-care management, 66.6% patients are doing good self-care management, 13.3% patients are doing excellent self-care management in control group. 23.3% patients are doing good self-care management, 76.6% patients are doing excellent self-care in management experimental group.

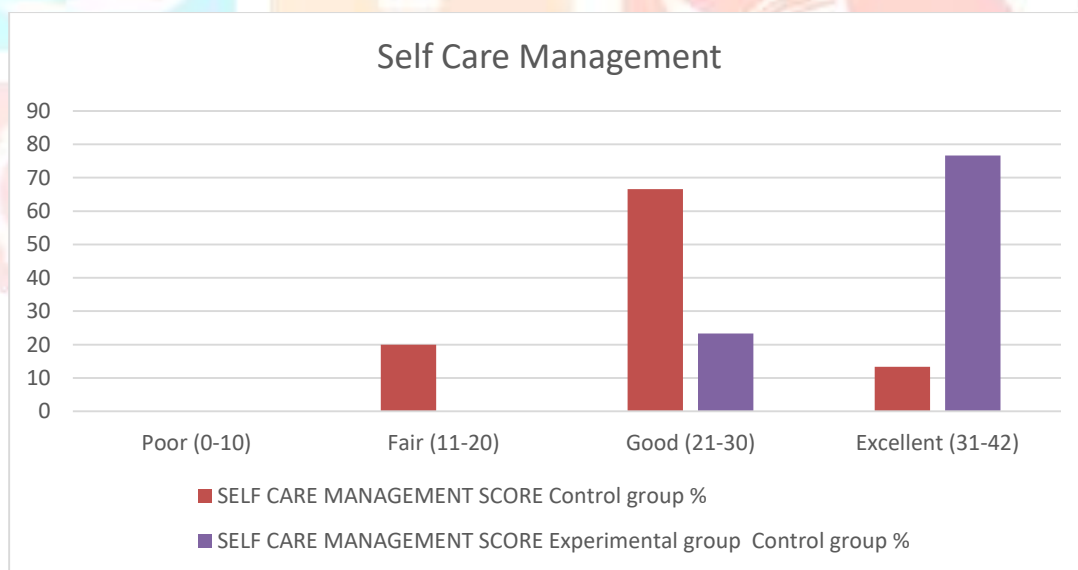


Fig: distribution of self-care management score in control group and experimental group

COMPARISON OF SELF CARE MANAGEMENT IN EXPERIMENTAL GROUP ON 15TH AND 30TH DAY

Experimental	N	Minimum	Maximum	Mean	Median	SD	Normal Distr.	p value (paired t test)
15 TH DAY TOTAL SCORE	30	25	38	33	34	3.2483	0.1151	0.0001
30 TH DAY TOTAL SCORE	30	27	39	34.933	35	2.7156	0.0925	

Above table represents comparison of self-care management on 15th day mean score is 33 ± 3.2483 and 30th day mean score is 34.933 ± 2.7156 , hypothesis was tested by using a paired t test. the t value at 0.0001 level of significance. so, there is significant difference in experimental group mean of the day 15th and 30th.

COMPARISON OF SELF CARE MANAGEMENT SCORE IN CONTROL GROUP ON 15TH AND 30TH DAY

CONTROL GROUP	N	Minimum	Maximum	Mean	Median	SD	Normal Distr.	p value (paired t test)
15 th DAY TOTAL SCORE	30	18	32	24.7	25	4.3164	0.1335	0.0137
30 TH DAY TOTAL SCORE	30	21	37	27.267	26.5	4.0932	0.107	

Above table represents comparison of self-care management on 15th day mean score is 24.7 ± 4.3164 and 30th day mean score is 27.267 ± 4.0932 , hypothesis was tested by using a paired t test. The t value at 0.0137 level of significance. So, there is significant difference in control group mean of the day 15th and 30th.

COMPARISON OF SELF CARE MANAGEMENT BETWEEN CONTROL AND EXPERIMENTAL GROUPS ON 15TH DAY

15 TH DAY TOTAL SCORE					p value (unpaired t test)
GROUPS	N	RANGE	MEAN±SD	MEDIAN(IQR)	
CONTROL GROUP	30	18-32	24.7±4.31	25(21-29)	0.01
EXPERIMENTAL GROUP	30	25-38	33±3.24	34(31-35)	

Above table represents comparison of self-care management on 15th day mean score is 24.7 ±4.31 and interquartile range is 25(21-29) in control group and mean score is 33 ±3.24 and interquartile range is 34(31-35) in experimental group. hypothesis was tested by using unpaired t test. the t value at 0.01 level of significance. so, there is significant difference in control group and experimental group mean of the day 15th. experimental group mean is more than control group so, self-care management is maximum in experimental group.

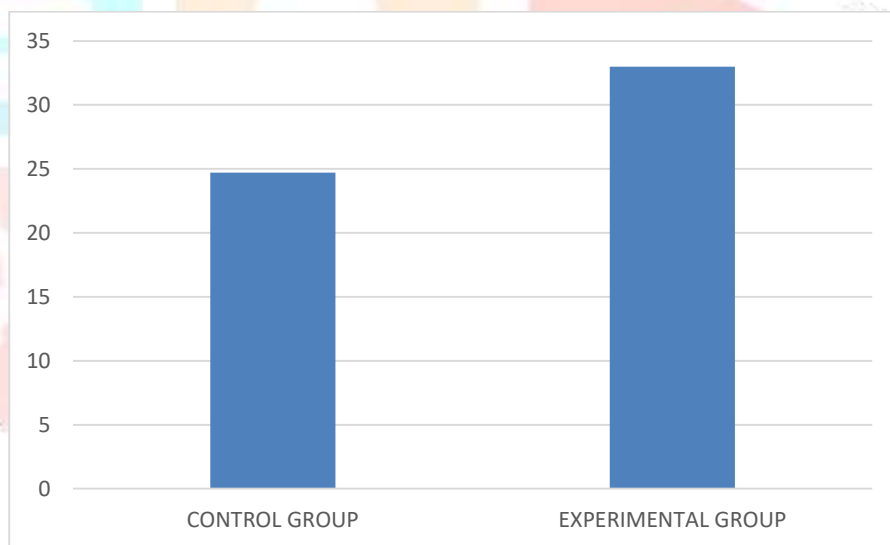


Fig: comparison of level of self-care management among experimental and control group on 15th day

COMPARISON OF SELF CARE MANAGEMENT SCORE BETWEEN CONTROL AND EXPERIMENTAL GROUPS ON 30TH DAY

30 th DAY TOTAL SCORE					p value (unpaired t test)
GROUPS	N	RANGE	MEAN±SD	MEDIAN(IQR)	
CONTROL GROUP	30	21-37	27.267±4.09	26.5(25-29)	0.01
EXPERIMENTAL GROUP	30	27-39	34.933±2.72	35(33-37)	

Above table represents comparison of self-care management on 30th day mean score is 27.267 ±4.09 and interquartile range is 26.5(25-29) in control group and mean score is 34.933± 2.72 and interquartile range is 35(33-37) in experimental group. hypothesis was tested by using unpaired t test. the t value at 0.01 level of significance. so, there is significant difference in control group and experimental group mean of the day 30th. experimental group mean is more than control group so, self-care management is maximum in experimental group.

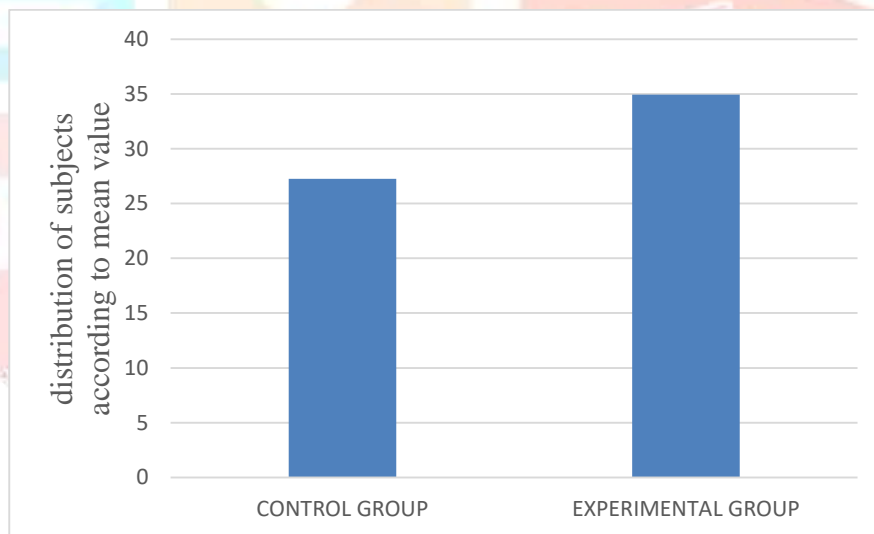


Fig: comparison of level of self-care management among experimental and control group on 30th day

CONCLUSION

The research study was conducted by the investigator with the purpose of to assess effectiveness of simulation -based training module on self-care management and the SBT Module is effective for self-care management.

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