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A STUDY TO EVALUATE THE EFFECTIVENESS OF DIABETES SELF MANAGEMENT PROGRAMME ON THE PHYSIOLOGICAL VARIABLES OF DIABETICS IN A SELECTED SETTING

Dr. Jeyadeepa R.*

West Bengal India.

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***Corresponding Author**
Dr. Jeyadeepa R.
West Bengal India.

ABSTRACT

Ancient Medical History had explained diabetes and how it affected people. Diabetes is a lifestyle disorder. To manage diabetes in an effective manner, the individuals have to take many decisions then and there regarding diet, exercise, medications, monitoring etc. Hence it is essential that knowledge on self-care plays an important role in diabetes management. The present study aimed at evaluating the effectiveness of diabetes self-management training program on the physiological variables of the diabetics. Quantitative approach was adopted in this study. It was conducted by using true experimental research design. The study was conducted in two centres. 200 diabetics from each centre were selected. Randomization was done to allot the samples to either control or experimental group. The data were collected by using a structured questionnaire and lab reportsfor the physiological variables were assessment. The selected participants were given self-management training programme. The physiological parameters assessed were fasting blood sugar, post prandial blood sugar, HbA1c, body mass index, blood pressure and cholesterol. The data were analysed by using both descriptive and inferential statistics. The results revealed that the intervention is effective in reducing BMI, PPBS, FBS, HbA1c and cholesterol. Even though the changes in the physiological variables noticed in the control group the rate of reduction is more in the experimental group which was statistically proved. Hence it can be concluded the treatment is effective when it is combined with self-management training.

KEYWORDS: Diabetic self-management training, programme, physiological variables.

INTRODUCTION

The concept of diabetes was explained in a slogan in Charaka Samhitham. It says that “death comes in the form of diabetes those who are obese, leading a sedentary life style and eats more especially sweets. This clearly states that diabetes is a known disorder since ancient times. Advancement in medical technology found ways to cure and care even deadly diseases like cancer, AIDS etc. But still we are unable to cure diabetes and the incidence and prevalence of diabetes is increasing day by day. Managing and controlling diabetes is also a challenge to the individual, family, community and to the country. Many studies proved that diabetes can be managed or controlled effectively if the individuals follow the prescribed life style along with medications. But still many people end up with complications. The morbidity and mortality rates are high. Asian countries contribute to more than 60% of the worlds, diabetic population. The adverse effects of limited physical activity and fatty foods are the major contributing factors. Asians have strong ethnic and genetic predisposition for diabetes. India and China will make up for 30% of the total number of diabetics in the world by 2025.[1] The mortality rate of people with diabetes is higher than people without diabetes. In 2001. The WHO estimated that 1,99,96000 disability adjusted life years worldwide. Among this around 80% of the disability adjusted years resulted from diabetes.[2] In India in 2000, people affected by diabetes were 32 million and it may reach 80 million by 2030. Diabetes can very well be controlled through medical care. Monitoring and lifestyle modifications. Diabetes is receiving more attention because of its human and fiscal costs, disability and death associated with this disorder. Studies also found that the rural and urban difference in the prevalence is also decreasing now a day.[1] The most serious consequences of diabetes were micro and macro vascular complications. Poor glycemic control was found to be the major cause of micro and macro vascular complications of diabetes in India. The individual and family find it difficult to cope when the diabetes end up with complication. Life style plays an important role in diabetes prevention and management. It makes people to change the day to day activities which were practiced by the individuals since birth. Some are able to cope with

this life style changes but many fail to adapt to a new life style. Changes in life style, food habit, physical activity and genetic variation lead to the secular trend in increase in the prevalence of diabetes in India. Lack of awareness, high socio economic status and careless attitude are also considered as contributing factors.

Diabetes management is highly individualized. If an individual is diagnosed to have diabetes it is mandatory that they should have the necessary knowledge, and skill in managing the disorder with right attitude. Studies identified that 7% to25% of diabetics only fully adhere to all aspects of treatment regimen including self care. Nearly 40-60%. Fail to adhere to dietary regimen, 70-80% did not follow the exercise regimen, 30-80% did not monitor the blood glucose regularly. Only 40% of the diabetics achieved desired glycemic control.[3] A survey done in South India to assess the self-care behaviours of diabetics revealed that only 29% adhere to diet regimen, 19.5%. With good exercise behavior, 70% monitor blood glucose regularly and 79.8% adhere to drug regimen.[4]

Diabetes self management intervention had emerged as a resource to assist individuals in managing the disorder in a systematic manner. It should be disseminated in such a way that people accept and adopt the changes in their daily life. A descriptive study to explore the self-care practices of poorly controlled diabetics from rural and urban settings revealed that most of them understood the techniques of self-management but only minimum member of people adopted the learned changes in their daily life. It was also found that there is a relationship between self-care practices and glycemic control. There was a mismatch between knowledge of self-care and self-care practices.[3] A study to assess the self-care activities of diabetics in the tertiary care hospital at South India revealed that poor self-care activities were the causes of poor glycemic control.

A study to evaluate the effectiveness of a brief structured education program based on the concept of self-efficacy on self-care and glycemic control revealed that the intervention group showed improvement in the self-monitoring of blood glucose domain, physical activity, HbA1C, diabetic knowledge and medication adherence. In the control group the improvement was noticed only in the diabetic knowledge.[5] A meta-analysis was done on 72 studies conducted on effectiveness of self-management training on type II diabetes. The longer follow up interventions with regular reinforcement are found to be effective in improving glycemic control. The interventions which involved patient collaboration were more effective than diabetic intervention in improving glycemic control, weight and lipid profiles. The study was concluded that self-management training was effective for a short period of time; further research is needed to assess the effectiveness of self-management on sustained glycemic control cardio vascular risk factors and QOL.

A survey conducted by the International Diabetes Federation reports that there is a massive increase in the prevalence of diabetes in the South East Asia region. The proportion of prediabetics and poor glycemic control and the chronic nature of the disorder is another threat to the community. The main aim of diabetes management is better glycemic control which prevents the complications related to diabetes. The treatment is effective only when the individual follows the treatment regimen strictly. The inculcation of self management skills on the affected individuals may be effective in managing diabetes and preventing its complications. Hence the present study is aimed at evaluating the effectiveness of diabetic self management training program on the physiological variables of diabetics. The study objectives were evaluate the effectiveness of diabetic self management training program on the physiological variables of diabetics and Correlate self care with the physiological variables. The hypothesis of the present study was: There is a significant difference in the physiological parameters between the experimental and control group.

METHODS

1. Study design

A true experimental research design was adopted to find the effectiveness of the diabetic self management training program on the physiological parameters of the diabetics in the selected settings. The schematic representation of the research plan is explained in Fig 1.

2. Settings and samples

The participants were selected based on the inclusion and exclusion criteria. Type 2 diabetic mellitus without any complications between 20-60 years of age group of both genders, who can read and write the local language were included as participants. Diabetics with minor or major complications, any associated illness, learning difficulties, who cannot read and write the local language were not included. As randomization procedure individuals who fulfill the inclusion criteria and attend the OPD on Monday, Wednesday and Friday were included in the experimental group. The participant who fulfill the inclusion criteria and extend the OPD on Tuesday, Thursday and Saturday were assigned to the control group. The samples were selected from two settings one in the KMCH, Palakkad and the other one is Kovai Dibetic Centre and Hospital at Coimbatore. Total 400 samples were selected from both the settings. 200 in the control group and 200 in the experimental group.

3. Ethical consideration

The study proposal was presented to the Institutional review board of the Saveetha University, Chennai. The study was approved by the ethics committee of the Saveetha University. (006/10/2013/IEC/SU dtd 15/10/2013).

4. Measurement / Instrument

The tool contains three parts. Section A was about the demographic variables which contains age, gender,

marital status, education, employment status, family income, per capita income and family size. Section B was the tool to assess the physiological parameters. The physiological parameters like weight, body mass index, FBS, PPBS, HbA1c and cholesterol were assessed.

5. Data collection

After obtaining formal permission from the hospital authorities' data were collected from the selected participants. The selected participants were explained about the procedure to be followed and obtained informed consent. The data were collected in the following phases. Pretest data collection from the control group, first post test for the control group, Second post test for the control group, pretest for the experimental group, self management training program for the experimental group, first posttest for the experimental group and second post test for the experimental group.

6. Intervention

The intervention was a planned teaching program on diabetes self management for 2 hours duration. The contents were organized in such a way that the participants could understood. The concepts included in the training program were brief introduction about diabetes and glucose regulation, concept of self management, dietary management, exercise, foot care, identification prevention and management of hyperglycemia and hypo glycemia, prevention of complications, care of vital organs, medications, measures to promote mental health, role of life style modification, cost of treatment and measures to reduce it. The power point presentation was prepared in the local language with pictorial explanations. Formative and summative evaluation was done to assess the participants understanding. Pilot study was conducted to assess the feasibility of the intervention. It was found that the tool and intervention were feasible to conduct the main study.

7. Data Analysis

The data were expressed as mean ± SE and as frequency distribution. Paired and unpaired t test were used for interpreting the data within and between the groups. The difference in the selected physiological parameters of control and experimental groups within and between the groups within and between the two centres were analysed by using one way ANOVA. A probability of 0.05 or less was taken as statistically significant. All statistics and graph plotting were done by using Sigma plot 12.0 (Systat, USA).

RESULTS

Demographic characteristics like age, gender, marital status, education, employment status, family history, percapita income, family size, duration of illness, history of smoking and alcoholism were assessed. Except employment status and per capital income the control and experimental group were similar. Majority of the participants in both the group were female aged above 50 years and married. Majority of their family income in both the group was less than Rs.10,000/- month. Most of them were non smokers and alcoholics. Most of their duration of illness was less than 5 years and none of them attended any training programe like this before.

The physiological parameters like weight, body mass index (BMI), blood pressure (BP), post prandial blood sugar (PPBS), fasting blood sugar (FBS), HbA1c and cholesterol. Self care also was assessed. Paired and unpaired t test was done to find the effect of the independent variable on the dependent variable and presented in table no 1. The calculated t value for the weight in the control and experimental group during the pre test was 4.809 which was significant at $P<0.001$ level. The calculated t value for the post test 1 + 2 was 6.53 and 7.74 respectively. Both were significant a $P<0.001$ level. Though there is a different noticed between the control and the experimental group in the pre test itself, it has to be appreciated that there was a slight increase in weight in the control group from pre test to post test 2, but in the experimental group there was a reduction in the weight from pre test to post test 2. Within the group difference in weight between tests noticed only in the experimental group. Similar findings were noticed in relation to BMI also. In relation to systolic and diastolic BP there was a significant difference noticed only in the experimental group. Hence it can be said that self management training program was effective on weight, BMI and BP.

The mean difference in the PPBS within the groups between the groups and between the tests was calculated. Though there was a reduction noticed within the group and between the groups there was a considerable reduction noticed in the experimental group after intervention. The calculated t values were higher in the experimental group them the control group. Similar result was noticed in relation to FBS also.

Effect of self-management training programme on HbA1C and cholesterol were assessed and presented in table no 2. The calculated t values revealed that there was a reduction in HbA1C noticed in both control and experimental group between tests. In the pre test there was no difference noticed between control group and experimental group in post test 1 and 2. The results reveal that the intervention is effective in bringing down the elevated HbA1C levels thus helps in promoting glycemic control. The effect of the intervention on cholesterol was assessed. It was found that there was no significant difference noticed in the control group between tests. In the experimental group there was a significant difference noticed between the tests. In post test 2 there was a significant difference noticed between control group and experimental group $t=4.9$ ($P<0.001$).

Since the participants were selected equally from two settings, it was aimed to assess the difference in the two centres. The results revealed that there was a significant difference in weight between pre test, post test 1 and 2 of

control group (t=2.790, t=2.554, P<0.001, t=2.47 and P<0.05). A significant difference was reported between BMI of the participants in both settings. A significant difference was noticed in systolic BP in both the settings for all tests. In pre test and post test 1 there was a significant difference noticed between the settings.

Figure No 2 shows the post prandial blood sugar of the diabetics in the control and experimental groups in the pretest, posttest 1 and posttest 2 in the two centres as a bar graph. The result reveals that the intervention was effective in both the settings in reducing the post prandial blood sugar levels of the diabetics. Figure No 3 shows the fasting blood sugar levels of the diabetics in the control and the experimental groups in the pretest, post test 1 and the post test 2 in the two centres. The result reveals that the intervention was more effective in the centre two than in the centre one in relation to fasting blood sugar. HbA1C levels of the diabetics in the control and experimental group of the two centres during the pretest, posttest 1 and the post test 2 were presented in the figure no 4. The result reveals that the intervention was more effective in the centre two than the centre one in reducing the HbA1c level. Similary the cholesterol values of the diabetics in the two centres were presented in the figure no 5. It was noticed that the intervention was more effective in centre two than the centre one.

Table 1: Paired and unpaired t test of PPBS, FBS of control and experimental group in the pretest, posttest 1 and posttest 2 N = 400.

S. No.	Para Meter	Group	Mean ± SE	Significance paired t test			Significance Unpaired t test		
				Pretest & Posttest 1	Posttest 1 & Posttest 2	Pretest & Posttest 2	Pretest	Post test1	Post test2
1	PPBS	Control gp pretest	294 ±62.8	12.632	6.01 P<0.001	13.43 P<0.001	2.71 P=0.007	5.39 P<0.001	14.49 P<0.001
		Control gp Posttest 1	247 ±52.8	P<0.001					
		Control gp Posttest 2	226 ±4.82						
		Expgp pretest	269 ±6.59	15.748	15.970 P<0.001	20.636 P<0.001			
		Expgp Posttest 1	208 ±4.96	P<0.001					
		Expgp Posttest2	143 ±3.08						
2	FBS	Control gp pretest	212 ±5.24	6.76 P<0.0	9.06 P<0.001	13.68 P<0.001	2.74 P<0.001	4.29 P<0.01	12.78 P<0.001
		Control gp Posttest 1	180 ±4.42	01					
		Control gp Posttest 2	152 ±3.42						
		Expgp pretest	192 ±4.7	7.86 P<0.0	19.71 P<0.001	19.69 P<0.001			
		Expgp Posttest 1	156 ±3.5	01					
		Expgp Posttest2	101 ±2.09						

Table 2: Paired and unpaired t test of Hb A1c and Cholesterol of control and experimental group in the pretest, posttest 1 and posttest 2N = 400.

S. No	Para Meter	Group	Mean ± SE	Significance paired t test			Significance Unpaired t test		
				Pretest & Posttest 1	Posttest 1 & Posttest 2	Pretest & Posttest 2	Pretest	Post test1	Post test2
3	HbA1c			2.99 P<0.003	8.51 P<0.001	3.97 P<0.001	0.984 P=0.326	3.955 P<0.001	11.08 P<0.001
		Control gp Posttest 1	8.3 ±0.12						
		Control gp Posttest 2	8.3 ±0.11						
		Expgp pretest	10.04 ±0.12	21.901 P<0.0	17.398 P<0.001	33.77 P<0.001			
		Expgp Posttest 1	8.28 ±0.11	01					
		Expgp Posttest2	6.85 ±0.07						
4	Choles Terol	Control gp pretest	177 ±3.17	2.79 P=0.006	0.510 P= 0.610	0.047 P=0.962	0.342 P=0.733	2.737 P=0.006	4.900 P<0.001
		Control gp Posttest 1	174 ±3.01						
		Control gp Posttest 2	177 ±6.65						
		Expgp pretest	176 ±3.44	13.064	12.33 P<0.001	17.50 P<0.001			
		Expgp Posttest 1	162 ±3.05	P<0.001					
		Expgp Posttest2	147 ±2.46						

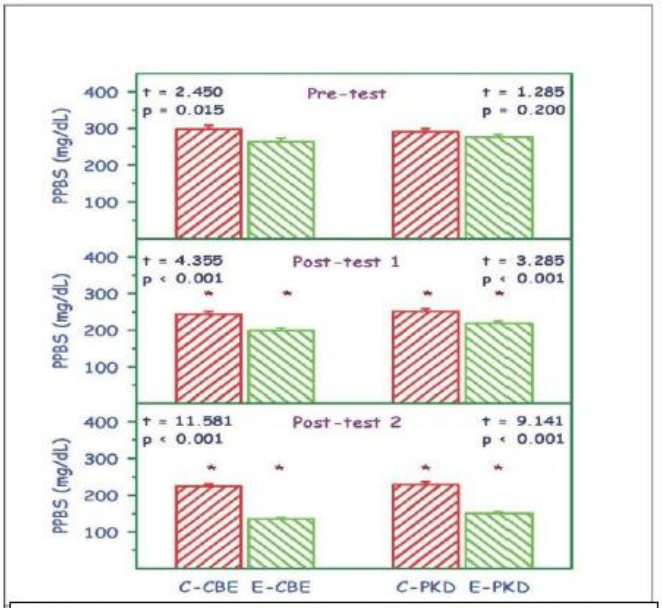


Fig No 2: PPBS levels of diabetics, control (c), and experimental (E) groups in two centres (CBE and PKD) in pre test, post test 1 and post test 2(mean ±SE, n= 100 each). The "t" and "p" values (unpaired "t" test) on the left side are comparing C –CBE and E – CBE and on the right side are comparing C – PKD and E – PKD. The "F: and "P" values comparing pre test, podt test 1 and post test 2 (one way ANOVA) for C – CBE are 22.661 and p<0.001, for E – CBE are 71.415 and p<0.001, C – PKD are 17.034 and p<0.001, and E – PKD are 84.874 and p<0.001. The * shows significant from pretest

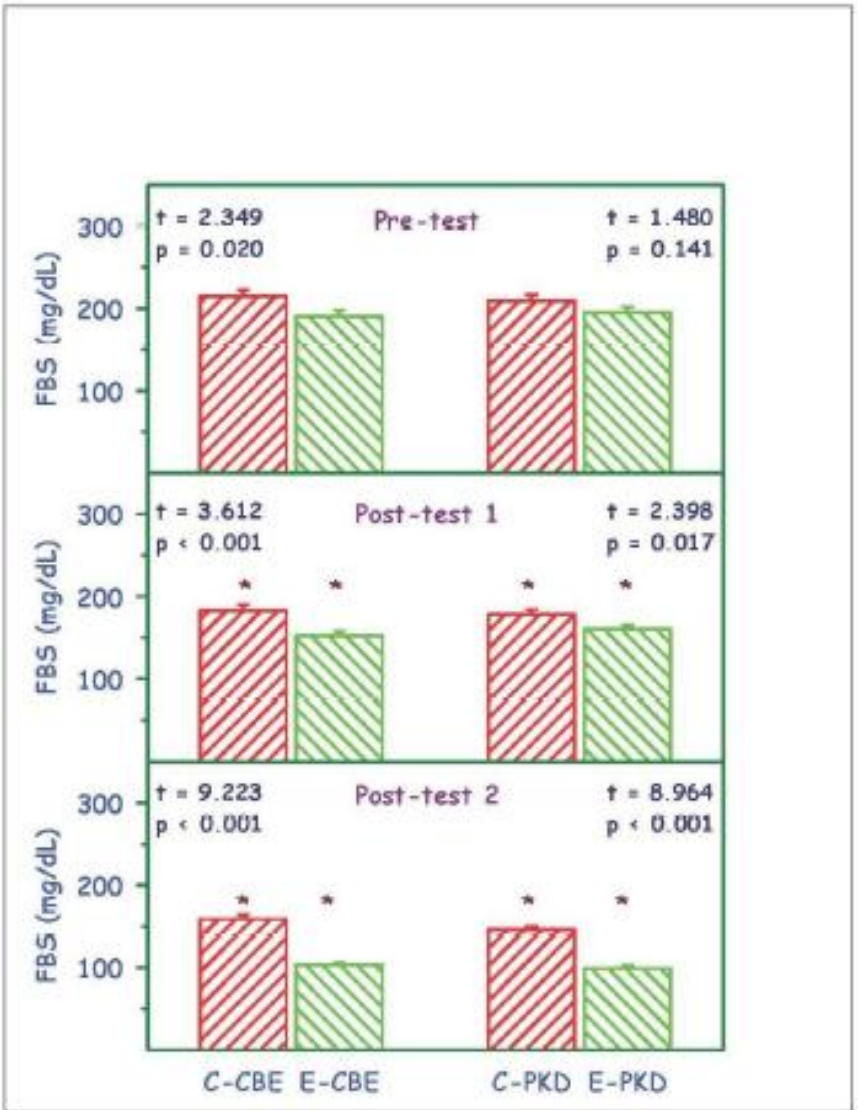
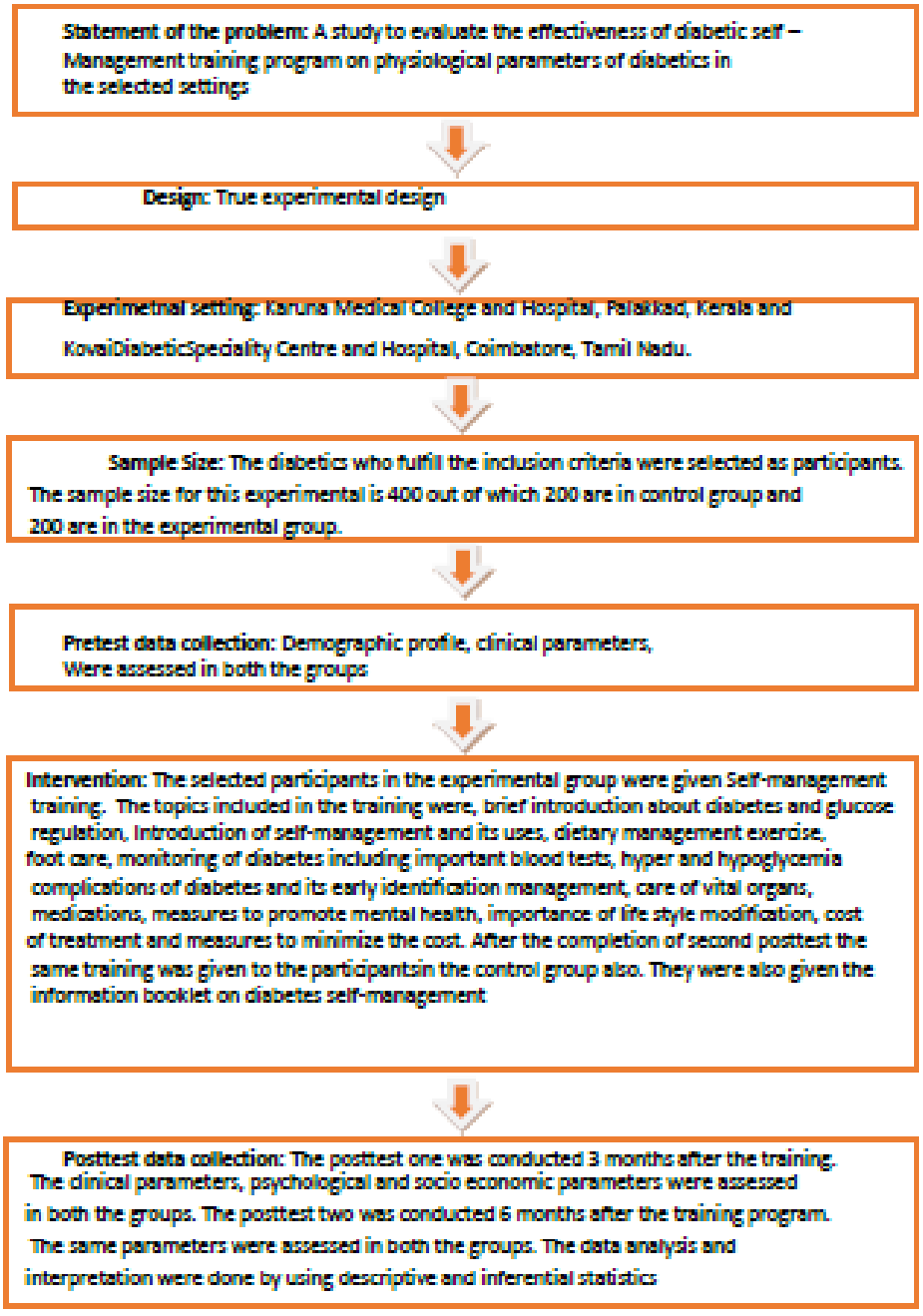


Fig No 3: FBS levels of diabetics, control (c), and experimental (E) groups in two centres (CBE and PKD) in pre test, post test 1 and post test 2(mean ±SE, n= 100 each). The "t" and "p" values (unpaired "t" test) on the left side are comparing C –CBE and E – CBE and on the right side are comparing C – PKD and E – PKD. The "F: and "P" values comparing pre test, podt test 1 and post test 2 (one way ANOVA) for C – CBE are 18.408 and p<0.001, for E – CBE are 64.510 and p<0.001, C – PKD are 28.674 and p<0.001, and E – PKD are 105.337 and p<0.001. The * shows significant from pretest

Fig No 1 - Schematic representation of research plan



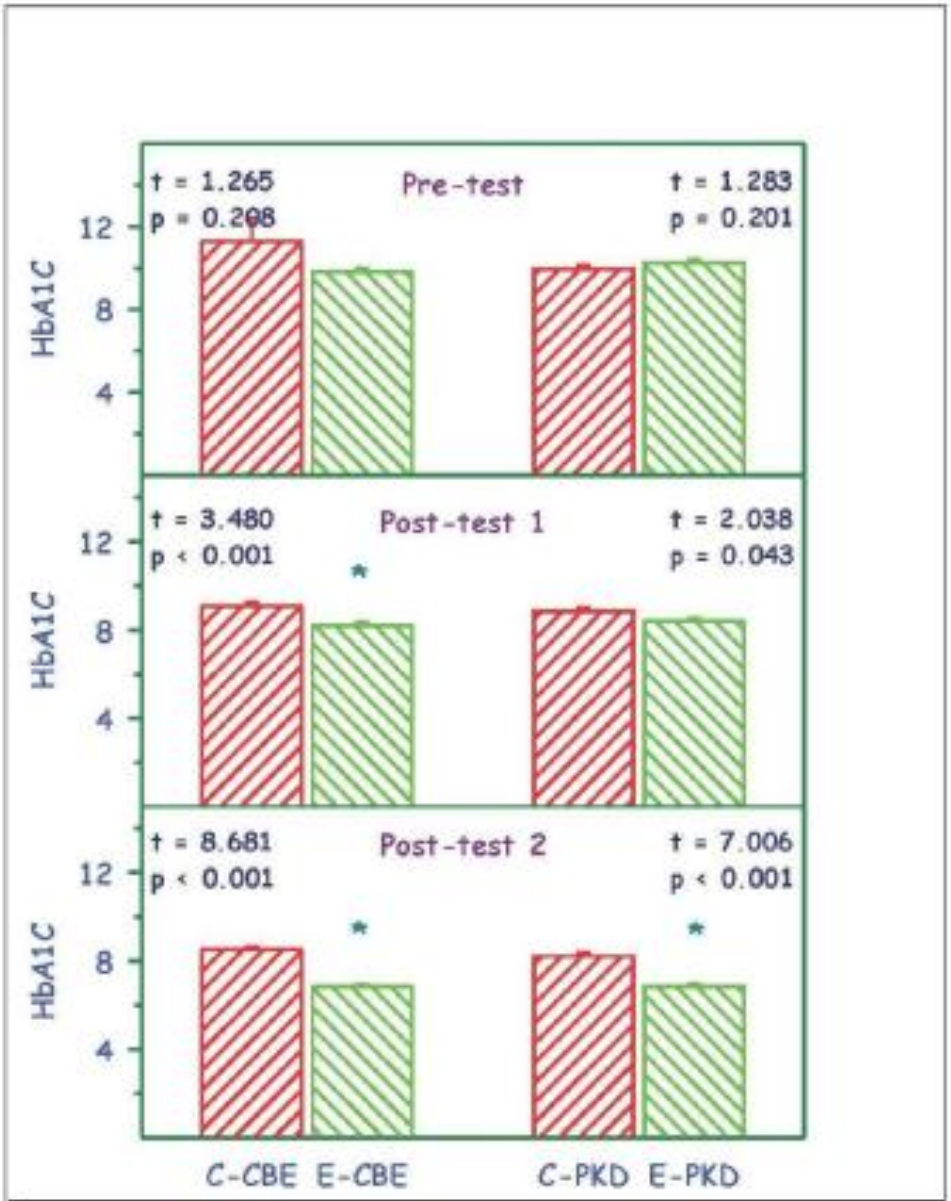


Fig No 4: HbA1c levels of diabetics, control (c), and experimental (E) groups in two centres (CBE and PKD) in pre test, post test 1 and post test 2(mean ±SE, n= 100 each). The "t" and "p" values (unpaired "t" test) on the left side are comparing C – CBE and E – CBE and on the right side are comparing C – PKD and E – PKD. The "F: and "P" values comparing pre test, podt test 1 and post test 2 (one way ANOVA) for C – CBE are 4.79 and p = 0.009, for E – CBE are 86.9 and p<0.001, C – PKD are 28.48 and p<0.001, and E – PKD are 166.02 and p<0.001. The * shows significant from pretest

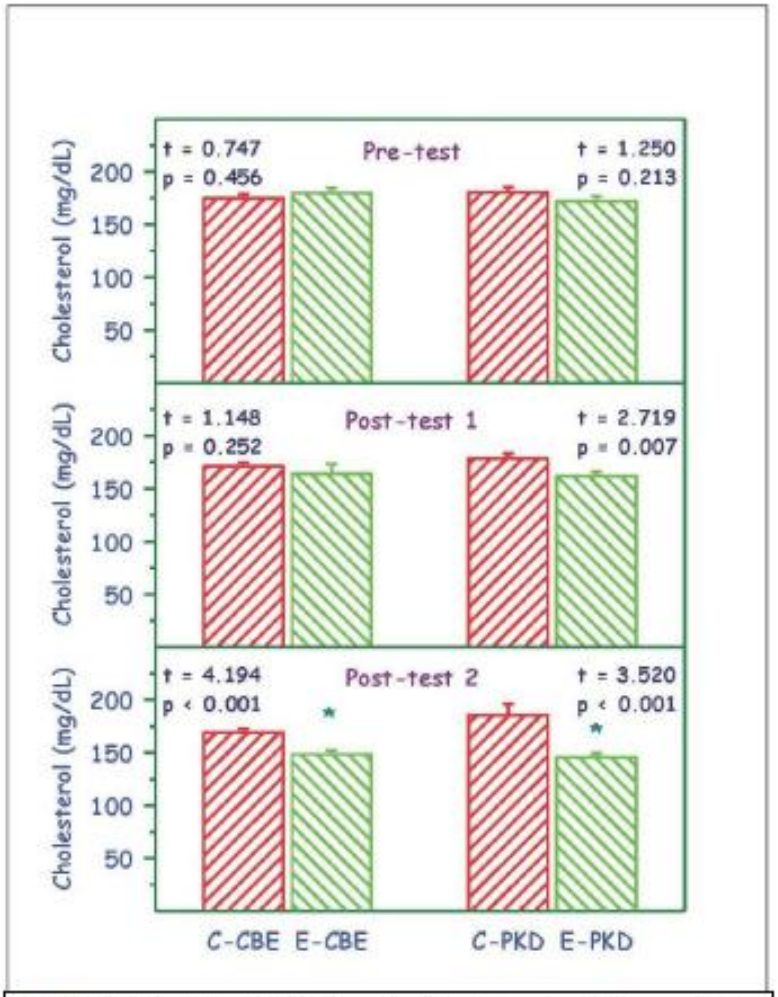


Fig No 5: Cholesterol levels of diabetics, control (c), and experimental (E) groups in two centres (CBE and PKD) in pre test, post test 1 and post test 2(mean ±SE, n= 100 each). The "t" and "p" values (unpaired "t" test) on the left side are comparing C –CBE and E – CBE and on the right side are comparing C – PKD and E – PKD. The "F: and "P" values comparing pre test, podt test 1 and post test 2 (one way ANOVA) for C – CBE are 0.553 and p = 0.576, for E – CBE are 5.840 and p = 0.003, C – PKD are 0.248 and p = 0.780, and E – PKD are 10.992 and p<0.001. The * shows significant from pretest

DISCUSSION

Many research studies support the findings of the present study. A meta analysis to assess the effectiveness of self-monitoring on glycemic control revealed that self monitoring reduces the HbA1C by 0.41%.[6] A cohort study conducted to find the association between self monitoring of glucose and glycemic control reported that regardless of diabetic type and therapy frequent self monitoring was associated with better glycemic control.[7] A study to evaluate the effect of patient empowerment program on glycemic control revealed that there was a reduction in HbA1C in the intervention group (Valmi et al).[8] Another study to find the effect of self care on glycemic control showed that there was a significant relationship between these two variables.

Self care is the essential component in the management of many illnesses. Since diabetes is a life time disorder people should be empowered in the management of diabetes. The present study shows that the diabetic self management training program was effective in maintaining the physiological parameters within normal limits.

CONCLUSION

Socio economic and technological advancements made our life easy nowadays. Present generation cannot imagine their life without these sophisticated facilities. Newton's third law says "for every action there is an equal and opposite reaction". When these developments make our life easy they also put us in the high risk category of many non communicable diseases. Diabetes

is one of the most dangerous non communicable disorders. Diabetes can never be cured but it can be controlled very well. It all required people to know and adopt what to do and what not to do. This study evaluated the effectiveness of the DSMTP on the physiological variables. It was statistically proved that the intervention was effective in maintaining the physiological variables within normal limits. Though the individuals are loaded with information they need to get right information from the right people for right practice with right attitude.

CONFLICTS OF INTEREST: Nil.

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