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A STUDY TO ASSESS THE EFFECTIVENESS OF HOME BASED EDUCATION PROGRAMME ON SELF MANAGEMENT AMONG INDIVIDUALS WITH DIABETES MELLITUS AT SELECTED VILLAGES IN KANCHEEPURAM DISTRICT, TAMIL NADU, INDIA

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ABSTRACT

Diabetes requires extensive self-care and comprehensive knowledge. Educating patients on all aspects of diabetes mellitus (DM) is now of foremost important to control DM equitably in India. The study was aimed to assess the effectiveness of home based education on self-management among patients with diabetes mellitus in selected villages at Kancheepuram district. The design was a true experimental - community based randomized controlled trial using a quantitative approach. The study was conducted in urban villages of maraimalai nagar and rural villages around mamandoor, who satisfied the sampling criteria and voluntarily consented were used to collect the data. 398 men and women (200study+198control) who had been undergoing treatment for DM were selected by purposive sampling. Fasting blood sugar above 126 mg/dl or higher were enrolled in the 3 month education program between August 2013 and November 2014. Video coaching, training 30 minutes weekly once, for 1 month (2 hours) and with stretching exercise for 5 days (30 minutes), daily at home for 3 months was given. The result of the study revealed that there was an absolute mean change in fasting blood sugar ($P<0.01$), hemoglobin A (1c) ($P<0.01$) and basal metabolic index (BMI) ($P<0.05$). It has been concluded that home based education program on self management among the patients with diabetes improved fasting blood sugar, hemoglobin A (1c) and basal metabolic index levels compared to control group as hypothesized.

KEYWORDS: **Home based education, glycemic control, diabetes mellitus, Fasting Blood Sugar, Hemoglobin A(1c)**

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INTRODUCTION

In the present days, sedentary life style and high caloric diet habits are found among individuals around the world. Diabetes Mellitus is a chronic illness growing worldwide. The international diabetes federation predicts that the number of people living with diabetes will to rise from 366 million in 2011 to 552 million by 2030.[1] One in Ten people in Tamil Nadu is diabetic, and two in twenty five are in the pre diabetic stage, the equivalent of 4.2 million and 3.5 million respectively.[2] Systolic hypertension is a strong risk factor in type2 DM. Patients with diabetes have an increased prevalence of silent ischemia that is thought to be related to diabetic neuropathy affecting the nerves that innervate the cardiovascular system.[3] Studies states future research should consider patient education within the context of overall diabetes care and good quality.[4] Resistance training, similar to aerobic training improves metabolic features and insulin sensitivity and reduces abdominal fat in Type 2 diabetes patients. Patients need to be involved in all aspects of their care, including decision-making around medical management, healthy eating, weight loss, physical activity and self monitoring.[5] Early intervention and avoidance are delay of progression to type2 diabetes is of enormous benefit to patients in terms of increasing life expectancy and quality of life, and potential in economic terms for society and health care payers. Lifestyle modification is the primary goal through a step wise approach.[6] Diabetic neuropathy is a common complication and fifty percent of subject after twenty years develops some form of diabetic neuropathy due to poor glycemic control.[7] Diabetic complications such as impairment of the immune system, periodontal disease, retinopathy, nephropathy, somatic and autonomic neuropathy, cardiovascular diseases and diabetic foot. Also included are the current management and treatments, and emerging therapies.[8] Patients often have difficulty in establishing or maintaining an effective programme to self manage their dietary behaviors, lack of family support is one of the factors for uncontrolled DM.[9] The objective of the study was to educate the patients individually in their home on all aspects of diabetes mellitus on self management in order to maintain normal blood sugar and healthy life. Among chronic diseases diabetes remains un diagnosed and unreported at higher rates in urban and rural areas. This study was done to create awareness and to reinforce patient's participation and compliance in management and self care of diabetes mellitus. There are various arguments home-based care has been suggested to enable patients, to a greater extent, to integrate diabetes management into the family's normal lifestyle from the time of diagnosis and thereby reduce the negative impact of the disease on the family.[10] The introduction of home blood glucose monitors and widespread use of glycoseylated hemoglobin as an indicator of metabolic control has contributed to self-care in diabetes and thus has shifted more responsibility to the patient.[11] Diabetes mellitus management includes life style modification, Medication, compliance to regular exercise. The traditional educational process requires mobility to access the health professional on multiple appointments.[12] Patients with diabetes need assistance, interpreting and managing symptoms, which are often annoying and potentially life – threatening.[13] Patient – centered care, patients and care providers option based intervention features had broad and specific impact on outcomes to potentially make programming more effective.[14]Aerobic exercise has consistently been shown to improve glucose control, enhance insulin sensitivity and improved cardiovascular risk factors such as visceral adiposity. For individuals with severe obesity, arthritis, physical disabilities, and are diabetes complications, even walking for 20-30 minutes may be challenging uncomfortable, and are painful to perform. It is evident that alternate forms of physical activity that produce metabolic improvements to aerobic exercise may beneficial in the management of this disease.[15] Nurses play an important role in patient education and modification of behavior. Maintaining hemoglobin AIC (HbA1c) within the normal range should be considered as the goal of treating diabetes. Effective care, treatment and control of diabetes mellitus depend on the participation of the patients and their families in self management programmes. Frequent sessions and incorporating dietitians had high positive rate outcomes in self management and weight control. Home health care provides mental and physical stress relief for patients at home environment. Home environment is credited with improving the clinical course of clients instructed in the home. Careful assessment of the home environment allows the nurse to identify problematic issues and enhances learning outcomes.[16] This study is important and significant because India has high prevalence and increasing incidence of DM.[17] Regular screening for early detection and care will definitely give an insight to the diabetic patients to adopt self care skills. Furthermore, home based education is important to bring behavior changes and will control DM.

MATERIALS AND METHODS

The investigator used a quantitative approach with true experimental design. Samples were selected from Maraimalai Nagar and 9 villages around Mamandoor In Kancheepuram district, Tamil Nadu. Maraimalai Nagar is an urban division and Mamandoor is a rural division on the outskirts of the Kancheepuram district, Tamil Nadu. The investigator used purposive sampling method to recruit 400 self – reported patients with diabetes mellitus. The inclusion criteria for the sample selection was all diabetic patient's both male and female in selected villages, diabetic patient'swho had been on treatment for more than 3 months with fasting blood sugar > 126mg/dL and post prandial blood sugar > 160mg/dL The exclusion criteria were pregnant women, those who are on regular yoga practice, those who have osteo arthritis and cardiac disease, those who take new medication. This study was carried out during the months of August 2013 and November 2014, based on morning and evening visits excluding Sundays. The participation rate was 100%. Daily around 6-8 patients were covered by the investigator. The study subjects were selected based on the following inclusion criteria Individuals diagnosed with DM (Type 1 and 2) who had fasting blood sugar > 126mg/dL and who were on usual medication for longer

than 3 months were included. The participants were aged 19 to 80 years and the ability to understand and to participate in the education programme and stretching exercise were also inclusion criteria for this study. Exclusion criteria were taking part in yoga, pregnant woman and those who were taking alternate treatments other than usual care. To prevent contamination, the control group was assigned in different villages by purposive sampling method. Ethical approval was obtained from the SRM University research committee which follows WHO standards and the 1964 Helsinki declaration and its later amendments. No.ECR/431/Inst/TN/2013. After explaining the benefit of education, to the study participant's informed consent was signed by the respondents and the study was executed by the researcher. Glucose assay was performed by standard one touch gluco- check instrument by the researcher HbA(1c) was tested in SRM central laboratory.

Tool for Data collection

The data collection tool used for this study comprised demographic variables which includes age, gender, marital status, educational qualification, occupation, duration of DM, heredity, monthly income type of DM, and type of housing, The clinical tests comprised includes fasting blood glucose, hemoglobin A(1c), height were checked by an inch tape and scale and weight was measured by ISO certified weighing scale.

Intervention of the study

After the baseline screening a nurse-led self-management video coaching on disease condition, low caloric diet, stretching exercise, regular medication, administration of insulin injection, regular eye check up, foot care, complications, foods to avoid, do's, don'ts and follow up was applied to the experimental group during a 3 month period. Stretching exercise was demonstrated for 30 minutes for 5 days with the patient's participation and they were asked to continue for 3 months. Nutritional counseling was done every 15 days, all patient's doubts and questions were clarified. A dietary menu plan was prescribed according to the BMI in addition to a usual medication. A diary was maintained by the patient and was monitored by the researcher. An educational booklet was provided to the experimental group. Monthly follow up was done and FBS was measured at the end of 4th week and 8th week, and 12th week for both groups. At the end of the study the control group were also educated. The data collected was analyzed using SPSS (Statistical package for social sciences) software version 20 and MS-EXCEL spreadsheet. Mean and standard deviations were calculated by using Two-way repeated measures ANOVA.

RESULTS

The demographic variables of patients with diabetes mellitus reveals majority of them were age group between 51-70 years (51.5%), and majority of them married (90.0%), duration of illness was higher, 2-5 years (58.5%), themajority of them living in pucca housing in both group.

Table 1
Comparison of follow-upwise fasting blood sugar
Between study group and control group n=398

	Follow-up								Mean difference	Two-way Repeated measures ANOVA
	Baseline		First month		Second month		Third month			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Study	175.49	41.64	166.59	38.92	155.00	35.71	140.13	28.33	35.36	Within group F=227.58 p=0.001*** Between group F=7.45 p=0.001***
Control	174.85	44.35	170.90	42.87	167.07	45.46	164.84	43.57	10.01	

****** Highly significant***
Results are given in mean and standard deviation

Table 1: Comparison of pretest and post-test fasting Blood glucose between experimental and control group. Assessing the result before intervention, the two groups were similar in fasting blood glucose (FBG). The study and control group had a FBG Value of (175.49, 9.7mmol/mol) (SD=41.64) and there was no statistical significant difference between the two groups. However, after the second month of the intervention and, 3rd month experimental groups showed a greater reduction of FBG value than the control group: the mean was (140.13, 7.8mmol/mol) (SD=28.33), with mean difference (35.36, 2mmol/mol) within group (F=227,P<0.001) FBG Value and control groups are having 2nd month mean (167.07, 9.3mmol/mol) (SD=45.46), and in 3rd month mean (164.84, 9.1mmol/mol), (SD=43.57) with mean difference (10.01,0.5mmol/mol). This difference is smaller than study group. It is statistically significant. It was confirmed using Two-way Repeated measures ANOVA.

Table 2
Comparison of HbA(1c) between pre test and post test N=398

HBA1c	Groups				Difference	Student paired t-test
	Pre-test		Post-test			
	Mean	SD	Mean	SD		
Study group	8.66	2.29	7.48	1.71	1.18	t=8.48 P=0.001***
Control group	8.58	2.26	8.48	2.51	0.10	t=0.47 P=0.63 not significant

****** Highly significant***
Results are given in mean and standard deviation

Table 2: comparison of HbA(1c) between pre test and post test. The study group had a value of (8.66%, 71.8mmol/mol) (SD=2.29) and the control groups had (8.58%, 71.1mmol/mol) (SD=2.26) with a mean difference of (0.08, 0.7mmol/mol) (t=0.34; p<0.74) and there was no statistical significant difference between the two groups. Whereas the results after 3 months of intervention indicated a significant improvement in the experimental group compared to the control group. In regard to Hemoglobin A(1c), the study group had (7.48%, 62mmol/mol) (SD1.71), whereas the control groups had (8.48%, 70.3mmol/mol) (SD=2.51) with a mean difference of (1.18%, 8.3mmol/mol), (t=8.48; p<0.001) between the study group and control group. The study group was statistically significant than the control group. This statistical significant was calculated using student independent t-test.

Table 3
Comparison of BMI between pre test and post test N=398

BMI	**groups**				Difference	Student paired t-test
	pre-test		post-test			
	Mean	SD	Mean	SD		
Study group	24.18	3.96	22.98	3.70	1.20	**t=3.87 P=0.001*** **
Control group	24.10	3.98	23.70	3.71	0.40	**t=1.96 P=0.05***

****** Highly Significant,*Significant***
Results are given in mean and standard deviation

Table 3: comparison of BMI between pre test and post test Assessing the results before intervention using student independent t-test showed that the two groups were similar in basal metabolic index. The study group had a mean 24.18 SD=3.96 BMI Value and the control group had a mean of 24.10 (SD=3.98), with a mean difference of 0.03 t=0.2., p<0.83 and there was no statistical significant difference between the two groups. Whereas post-intervention the body mass index indicated a significant improvement in the experimental group compared to the control group: BMI value 22.98 (SD=3.70) compared to, 23.70, SD=3.71) with a mean difference of 0.72 (t=1.96, P<0.05). Statistical significance was calculated using student independent t-test.

DISCUSSION

Diabetes is growing alarmingly in India. Many Urban and rural areas people are ignorant about DM, disease condition, management and prevention of complications. People living in remote areas are not having proper transport facilities to approach health care team due to lack of economy and supportive system. Most of the Indian population is living with high blood glucose. The diabetes educational process is a key aspect of DM management in all age groups. Perceptions of the patient, participation of the care givers, motivation of both, adopted teaching strategies are elements were education will improve DM control. The biologic role of any given protein in essential life processes, eg, insulin, depends on the positioning of its component amino acids.[18] Resistance training similarly to aerobic training improves metabolic features and insulin sensitivity and reduces abdominal facts in type2 diabetic patients.[19] Self management behavior and knowledge was improved in regular walks.[20] Diabetes knowledge was improved in patient education and counseling studies.[21] King used ten major concepts from the personal and interpersonal systems to support the Theory of Goal Attainment. Those concepts include human interactions, perception, communication, role, stress, time, space, growth and development, and transactions. To capture the essence of these interrelated concepts, King stated that “nurse and client interactions are characterized by verbal and nonverbal communication, in which information is exchanged and interpreted; by transactions, in which values, needs, and wants of each member of the dyad are shared; by perceptions of nurse and client and the situation; by self in role of client and self in role of nurse maximum glucose control can be achieved.[22] Government policies may help in creating guidelines on diabetes management, funding community programmes for public awareness about the diabetes risk reduction, availability of medicines and diagnostic services to all section of the community.[23] Management of diabetes relies on the patients active role in self-care which involves a range of complex tasks and a network of support It seems that the inter active contributive, counseling approach of the intervention is responsible for this diabetic control. Also the self report notes (diary) and continuous communication with the patient during follow up period support them through patient’s perception and behavior changes make the patients feel self confident and play an active role in disease management. It is believed that self management education improves health outcomes and reduces health care cost and reduces the hospital admission. This study had helped to provide care to the urban and rural population covered in the study. For instance 398

patients completed the study and study group individuals improved knowledge on their blood values, diet pattern and improvement in regular walks and stretching exercise. None of the participant had complication during the study. The present study was supported by previous study done by Zlbaeenezhad (2015) on effectiveness of educational intervention on gycemic control in patients with Type 2 diabetes reveals after 3 months follow up, HbA(1c) was significantly lower compared to baseline (8.09±0.31 versus 8.51±0.26; P<0.001).[24] The findings of another study demonstrated the effect of educational interventions on glycemic control in patients with type2 diabetes reveals after 6 month follow up HbA(1c), patient activation and self efficacy were improved for program me participant compared with usual care control subject (p<0.05). The intervention effectively improved the diabetic patients glycemic control.[25] Comparing the result of the present study with this result highlights the success of the self management education program. Government has to provide resources and facilities to all areas. Weekly education and follow up at patients home can help the individuals to have keen watch on their diet, physical activity, medication and control of DM. There was significant association found between the post test level of HbA(1c) and demographic variables like age, sex, housing. Other variables like occupation, duration, education status, marital status, heredity, monthly income, type of DM were not associated with post test level of HbA(1c) among patients with diabetes mellitus in both group.

CONCLUSION

Based on the findings of the study, it is concluded that the home – based education on self –management among diabetic patients is effective in reducing the glycemic indicators like fasting blood glucose, and hemoglobin A(1c), in type 1 and type 2 diabetic patients. The researcher concludes that home based education weekly reinforcement of nutritional counseling and increased exercises are essential at community level to improve self care and to avoid the complications of DM.

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