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EFFECTIVENESS OF BUERGER ALLEN EXERCISE ON THE LOWER EXTREMITY PERFUSION AMONG TYPE 2 DIABETES MELLITUS PATIENTS

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ABSTRACT

The present study was conducted to assess the effectiveness of Buerger Allen exercise on the lower extremity perfusion among Type 2 diabetes mellitus patients attending outpatient department at Department Of Atomic Energy hospital, at Kalpakkam.

Objectives: The objective was to assess the pre test level of lower extremity perfusion among Type 2 diabetes mellitus patients in experimental and control group.

Methods: The research approach adopted in this study is Quantitative evaluative Research and the research design adopted for the present study is quasi experimental design.

Results: The analysis depicted that in the experimental group, 76.7 % of the Type 2 Diabetes Mellitus patient's were having ABI for lower extremity values between the range 1.0-1.4, 23.3 % of the Type 2 Diabetes Mellitus were having values between the range 0.9to 0.99.

KEYWORDS: Buerger Allen Exercise, the Lower Extremity Perfusion and Type 2 Diabetes Mellitus

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INTRODUCTION

"People take ownership of sickness and decrease by saying things like my diabetes" Don't own it because it doesn't belong to you!

Stella Payton

Health is a dynamic condition resulting from a body's constant adjustment and adaption in response to stresses and changes in the environment for maintaining an inner equilibrium. Wellness is first the choice to assume responsibility for the quality of life. It begins with a conscious decision to shape a healthy lifestyle. Diabetes Mellitus is defined as a vascular and metabolic syndrome characterized by hyperglycemia either due to absolute relative defining of insulin and leading to both micro- and macro- vascular complications**.**

It is showed that Diabetes is an important risk for Lower extremity arterial disease (LEAD). LEAD in DM compound is the presence of peripheral vascular disease neuropathy and suspects for infections. Mortality rate is increased in patients with LEAD, particular of foot ulceration, or gangrene (P.J Palumbo.L Joesph Melto, 2010)**.** A study conducted

'Prevalence and incidence of chronic complications and mortality in a cohort of type 2 diabetic patients in Spain' to find out the prevalence and incidence of chronic complications and mortality in a cohort of type 2 diabetic patients .The aim of the study was to evaluate the prevalence, incidence of micro- and macro vascular complications, final events, and mortality in type 2 diabetic patients, followed over a period of 10 years in Spain. The study was done in 317 type 2 diabetic patients treated at a Primary Care Centre, followed for 10 years. Variables were described by means of ratios, mean values and standard deviation. The chi square test was used to compare ratios and the Student's 't' test to compare mean values. The result of the study showed that the prevalence of an increase in nephropathy (12 %), in retinopathy (6.2 %) and in neuropathy (2.1 %), a decrease in ischemic cardiomyopathy (6.2 %), an increase in peripheral vascular disease (5.6 %). Cerebrovascular, events and diabetic foot remaining unchanged. The highest incidence rates (1000 subjects/year) were nephropathy 43, neuropathy 39 and ischemic cardiomyopathy 32. The prevalence of cardiovascular risk factors increased over the follow-up; being high blood pressure the most noticeable (30 %). Overall mortality was 28 / 1000 subjects/year, being cardiovascular disease the main cause (31.2 %). The study concluded that the prevalence and incidence of chronic complications and risk factors are in Spain (Mundet X, Pou A, PiquerN et.al, 2010).

The clinical practices made the investigator fell that the nurses have important role in educating the patients regarding Buerger Allen exercise for improving the lower extremity perfusion among Type2 Diabetic patients. Therefore is a need to assess the effectiveness of Buerger Allen exercise on improving the lower extremity perfusion among diabetic patients.

STATEMENT OF THE PROBLEM

"A study to assess the effectiveness of Buerger Allen exercise on the lower extremity perfusion among Type2 diabetes mellitus patients attending outpatient department at Department Of Atomic Energy hospital, at Kalpakkam."

OBJECTIVES OF THE STUDY

- To assess the pre test level of lower extremity perfusion among Type 2 diabetes mellitus patients in experimental and control group.

- To assess the post test level of lower extremity perfusion among Type 2 diabetes mellitus patients in experimental and control group.

- To compare the pre and post test level of lower extremity perfusion among Type 2 diabetes mellitus patients between experimental and control group.

- To associate the post test level of lower extremity perfusion with the selected demographic variables in experimental group.

OPERATIONAL DEFINITION

- **Effectiveness:** Determining the improvement in lower extremity perfusion measured through Doppler, evidenced by increase in the Ankle Brachial Index (ABI).

- **Buerger Allen Exercise:** Refers to elevation, dependency and horizontal exercises for 12-15 minutes, 3 times a day with minimum interval of 4 hours for 7 days.

- **Lower Extremity Perfusion:** It refers to the flow of blood in the lower extremity of the body which is measured through Doppler to assess Ankle Brachial Index (ABI) among Type2 diabetes mellitus patients.

- **Type2 Diabetes Mellitus Patients:** It refers the patients who are diagnosed as Type2 diabetes mellitus with duration of disease more than 5years in the age group of 35 to 65 years male and female attending in the outpatient department DM and DAE Hospital Kalpakkam.

RESEARCH HYPOTHESES

- **H$_1$:** There is a significant difference between pre and post-test level of lower extremity perfusion among Type2 Diabetes Mellitus patients in experimental and control group.

- **H2:** There is a significant association in the post test level of lower extremity perfusion in experimental and control group with the selected demographic variables.

RESEARCH METHODOLOGY

The research approach adopted in this study is Quantitative evaluative Research approach in nature focusing on the effectiveness of Buerger Allen exercise on the lower extremity perfusion among Type2 diabetes mellitus patients. The research design adopted for the present study is quasi experimental design.

The study was conducted at Department of Atomic Energy Hospital, Kalpakkam. The population of the study includes all the Type 2 diabetes mellitus patients attending the outpatient department in Department Of Atomic Energy hospital, Kalpakkam, Kancheepuram District, Tamil Nadu.

The samples were Type 2 diabetes mellitus patients between the age group of 36 years and 65 years who fulfils the inclusion criteria.

The sample size is 60 Type 2 diabetes mellitus patient who fulfils the inclusion criteria. 30 were included as a part of control group while the rest were included in part of experimental group for assessing the effectiveness of Buerger Allen exercise.

Inclusion Criteria
The Study Included the Type 2 Diabetes Mellitus Patient With Below Criteria

- Age group of 35 to 60 years.

- Has only Type2 DM with more than 5years.

- Able to understand Tamil and English.

- Taking oral medication and injection.

- Willing to participate.

Exclusion Criteria

The Study Excluded the Type 2 Diabetes Mellitus Patient with Below Criteria

- Chronic diabetes mellitus with foot ulcer and gangrene.

- Critically ill patients.

- Renal disease, liver disease, fractures in hip and lower extremity fracture etc.

- Thrombosis or embolus.

- Rigid arteries.

The Tool Consists of Two Parts: Part I and Part II

Part I: Demographic Data

The demographic data of Type 2 diabetes mellitus patient consists of information regarding Age, sex, height, weight, BMI, dietary pattern, religion, marital status, educational status, occupation, nature of work, monthly income, type of family, duration of disease.

Part II: Ankle Brachial Index [ABI] Scale

The demographic variable was obtained with the help of questionnaire and the data on level of lower extremity perfusion was obtained through an ABI (ankle brachial index) for lower extremity. Each Type 2 diabetes mellitus patients in experimental group was demonstrated Buerger Allen exercise and provided Buerger Allen exercise at the duration of 12-15 minutes, frequency 3 times, and minimum interval of 4 hours for 7 days. Level of lower extremity perfusion of Type 2 diabetes mellitus patients in experimental and control group were assessed after 7days using ABI (ankle brachial index). Data collected was analyzed using descriptive and inferential statistics.

RESULTS

In experimental group, the age of Type 2 diabetes patients 7 (23.3 %) of them were found to be the age group between 36 and 45 years, the age of 17 (56.7 %) in the age group between 46 and 55 Years, 6 (20.0 %) in the age group between 56 and 65 Years, Considering the control group, the age of Type2 diabetes patients 10 (33.3 %) of them were found to be the age group between 36 and 45 years, the age of 15 (50.0 %) in the age group between 46 and 55 Years, 5 (16.7 %)in the age group between 56 and 65years. Regarding the sex 19 (63.3 %) are male patients and 11 (36.7 %) are female patients in experimental group; in control group also it is the same as in experimental group. Considering the weight in experimental group 4(13.3 %) are 41-50kgs;2 (6.7 %) are 51-60kgs;8(26.7 %) are 61-70kgs;16(53.3 %) are Above 70kgs;In Control group , 6(20 %)are 41-50kgs;2(6.7 %) are 51-60kgs;14(46.7 %) are 61-70kgs;8(26.7 %) are Above 70kgs. Considering the Height in experimental group 6(20 %) are 141-150cms; 12(40 %) are 151-160cms; 12(40 %) are 161-170cms; In Control group, 2 (6.7 %) are 141-150cms; 16(53.3 %) are 151-160cms; 9(30.0 %) are 161-170 cms; 3(10.0 %) are above 170cms.

Considering the Body Mass Index in experimental group 3(10 %) are >18.5; 2(6.7 %) are 18.5-25; 9(30 %) are 25-30; 16(53.3 %) are >30; In Control group, 6(20 %) are >18.5; 3(10 %) are 18.5-25; 10(33.3 %) are 25-30; 11(36.7 %) are >30. In experimental group, 3(10 %) patients are Vegetarian; 27(90 %) patients are Non-Vegetarian; In Control group also it is same as in the experimental group. Considering Religion in experimental group 11 (36.7 %) are Hindu; (30 %) are Muslim; 10 (33.3 %) are Christian; In Control group, 8 (26.7 %) are Hindu; 11 (36.7 %) are Muslim; 11 (36.7 %) are Christian. Regarding the marital status 25(83.3 %) are married; 5(16.7 %) are widow; considering the control group27 (90 %) are married; 3 (10 %) are widow. Considering Educational status in experimental group2 (6.7 %) are Illiterate;2(6.7 %) are Primary School; 3(10 %) are High School; 2 (6.7 %) are Higher secondary; 21 (70 %) are Graduate ;In Control group , 2 (6.7 %)are Illiterate;3 (10 %) are Primary School; 3 (10 %) are High School ; 3 (10 %) are Higher secondary; 19 (63.3 %) are Graduate.

In experimental group, 13(43.3 %) patients are Professional; 11 (36.7 %) patients are Clerical worker; 1 (3.3 %) patients are Helper; 5 (16.7 %) patients are House wife;. In Control group 10 (33.3 %) patients are Professional; 10 (33.3 %) patients are Clerical worker; 4 (13.3 %) patients are Helper; 6 (20 %) patients are House wife. In experimental group, 1

(3.3 %) patients are Heavy Workers; 24 (80 %) patients are Sedentary Workers; 5 (16.7 %) patients are Moderate Workers; In Control group 1 (13.3 %) patients are Heavy Workers; 20 (60 %) patients are Sedentary Workers; 6 (20 %) patients are Moderate Workers.

Considering the Monthly Family income in experimental group 1(3.3 %)are >Rs.10000/-;18(60 %) are Rs.10001/-to Rs.30000/-;4(13.3 %) are Rs.30001/- to Rs.50000/-;7(23.3 %) are >Rs.50001/-;In Control group , 4(13.3 %) are >Rs.10000/-;18(60 %) are Rs.10001/-to Rs.30000/-;4(13.3 %) are Rs.30001/- to Rs.50000/-;4(13.3 %) are >Rs.50001/-. Regarding Type of family 24(80 %) are Nuclear family and 6(20 %) are Joint family in experimental group; considering the control group26 (86.7 %) are Nuclear family and 4(13.3 %) are Joint family.

In experimental group,19 (63.3 %) patients are 5-10 years; 2 (6.7 %) patients are 11-15 years; 6 (20 %) patients are 16-20 years; 3 (10 %) patients are >20 years;. In Control group 21 (70 %) patients are 5-10 years; 3 (10 %) patients are 11-15 years; 3(10 %) patients are 16-20 years; 3 (10 %) patients are >20 years. There is significant association between age and demographic variables like duration of disease. There is no association with respect to other demographic variables. like Sex , Weight, Height, Body Mass Index, Religion, dietary pattern ,Educational status, Occupation, Marital status, Nature of Work, Monthly income, Type of family.
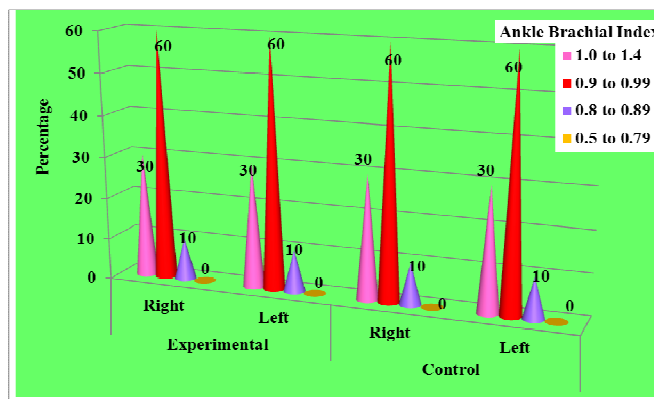

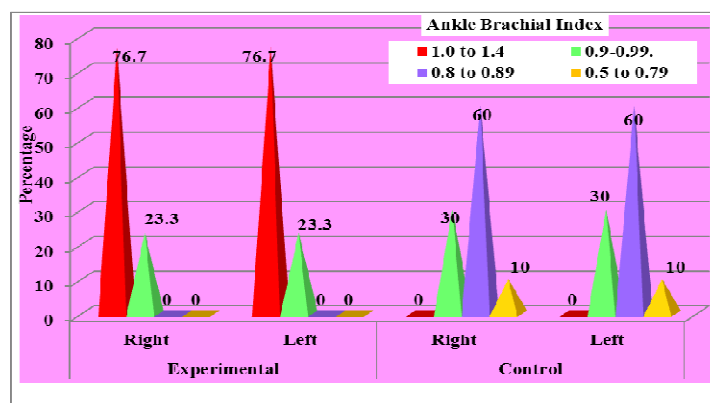**Figure 1: Pre Test Level of Lower Extremity Perfusion.**

Figure 2: Post Test Level of Lower Extremity Perfusion.

DISCUSSIONS

The Findings of the Study Based on the Objectives Are:

The first objective of the study was to assess the pre test level of lower extremity perfusion among Type 2 diabetes mellitus patient's in experimental and control group.

The analysis depicted that in the experimental group, 30 % of the Type 2 Diabetes Mellitus patient's were having ABI for lower extremity values between the range 0.9-0.99, 60 % of the Type 2 Diabetes Mellitus were having values between the range 0.8 to 0.89 and 10 % of them have values in the range of 0.5 to 0.79, in control group also it is the same as in experimental group. The analysis reveals that in the experimental group, the mean and SD ABI value for the right and left are 2.63 and 0.890 respectively, As far as Control group is concerned the mean and SD ABI value for the right and left are 2.63 and 0.890, Comparison of the value project't' value as 1.542, which is statistically not significant at p>0.5 level. A similar study, conducted by (Mundet, 2009) a study among 50 Type2diabetes mellitus patients with mean age of more than 35-65 years had revealed that before receiving buerger allen exercise, the level of lower extremity perfusion was not significant among the Type 2 diabetes mellitus patients of experimental and control groups.

The second objective of the study was to assess the post test level of lower extremity perfusion among Type 2 diabetes mellitus patients in experimental and control group.

The analysis depicted that in the experimental group, 76.7 % of the Type 2 Diabetes Mellitus patient's were having ABI for lower extremity values between the range 1.0-1.4, 23.3 % of the Type 2 Diabetes Mellitus were having values between the range 0.9to 0.99. Considering the control group, 30 % of the Type 2 Diabetes Mellitus patient's were having ABI for lower extremity values between the range 0.9-0.99, 60 % of the Type 2 Diabetes Mellitus were having values between the range 0.8 to 0.89 and 10 % of them have values in the range of 0.5 to 0.79. The analysis reveals that with respect to experimental group, the mean value (right) is1.50 with SD 0.731, the mean value (left) is 1.13 with SD 0.434, As far as Control group, the mean value (right) is 2.23 with SD 0.568, the mean value (left) is 1.80 with SD 0.610, Comparison of the value project 't' value as 8.930, which is statistically significant at p=0.0001 level. A study, conducted by (I.J.M Scheffers et .al,2010) on the effectiveness of Buerger Allen exercise among Type2diabetes mellitus patients also revealed that before receiving Buerger Allen exercise ,the level of lower extremity perfusion was significantly higher than Type2diabetes mellitus patients who were not receiving Buerger Allen exercise .The experimental group had significantly higher score than control groups.

The Third objective of the study was to compare the pre and post test level of lower extremity perfusion among Type 2 diabetes mellitus patients between experimental and control group.

The analysis reveals that with respect to experimental group, the comparison of the mean value (right) is2.63 with SD .890, the mean value (left) is2.63 with SD .890 of pre test and the mean value (right) is1.50with SD .731and the mean value (left) is1.13with SD. .434 of post test projects't' value as 8.930, which is statistically significant at p=0.0001 level.

In Control group, the comparison of the mean value (right) is 2.47 with SD .681, the mean value (left) is2.47with SD .681, of pre test and the mean value (right) is 2.23 with SD .568 and the mean value (left) is 1.80 with SD.610 of post test projects't' value as 1.542, which is statistically not significant at p>0.1 level. Hence the hypothesis (H1) stating that there is significant difference between the pre-test and post-test lower extremity perfusion scores in the experimental group is accepted.

A similar study, conducted by (Cyril Thomas, 2010) to explore the positive effect of Buerger Allen exercise of lower extremity perfusion among Type2diabetes mellitus patients. The result of the study revealed that the experimental group had significantly higher score than control group, and before exercise the level of lower extremity perfusion was not significantly different.

The fourth objective of the study was to associate the post test level of lower extremity perfusion with the selected demographic variables in experimental group.

The analysis reveals that in experimental group, there is statistically significant association between age and demographic variables like duration of disease. There is no association with respect to other demographic variables like Sex , Weight, Height, Body Mass Index, Religion, dietary pattern ,Educational status, Occupation, Marital status, nature of work, Monthly income, Type of family. Hence the hypothesis (H2) stating that there is significant association of post test level of of lower extremity perfusion among Type 2 diabetes mellitus patients with their selected demographic variables in experimental group is accepted with demographic variables like Sex, Weight, Height, Body Mass Index, Religion, dietary pattern, Educational status, Occupation, Marital status, nature of work, Monthly income, Type of family.

A study, conducted by (Shen Q,JiaWP, 2006) the age, sex, diabetic duration, and total cholesterol level were independent risk of diabetic peripheral vascular disease and the prevalence of PVD is common in DM as well as impaired glucose regulation (IGR) subjects.

CONCLUSIONS

The present study assessed the effectiveness of Buerger Allen exercise on the lower extremity perfusion among Type 2 diabetes mellitus patients. The results of the study concluded that Buerger Allen exercise was effective in improving the lower extremity perfusion among Type2 diabetes mellitus patients.

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