

A Quasi-Experimental Study to Assess the Effectiveness of Buerger Allen Exercise on Lower Extremity Perfusion among Patients with Type II Diabetes Mellitus in Selected Hospital Dudhi, Sonbhadra (U.P.)

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ABSTRACT

Background: In 2020, according to the international diabetes federation (IDF), 463 million people have diabetes in the world and 88 million people in the Southern Asia region of this 88 million people, 77 million belong to India. The prevalence of diabetes in the population is 8.9%. Peripheral Arterial Disease of the lower extremity is an important cause of morbidity and affects 10 million people in India. Buergerallen exercise (BAE) is one of the types of exercise performed to promote lower extremity perfusion (LEP) via reducing peripheral vascular disease (PVD) and promoting wound healing process among patients with diabetes mellitus (DM).

Method: This quasi-experimental study was conducted prospectively from July to October 2020 among 60 DM patients in which 30 were in experimental group and 30 were in control group were selected using non probability purposive sampling technique, formal permission was obtained from the concerned higher authorities and were assessed for LEP with a peripheral vascular disease (PVD) rating scale and Ankle Brachial Pressure Index (ABPI) rating scale. Then the Buerger Allen exercise was implemented among experimental group and it is continued for 2 times in a day, for 7 days in hospital no intervention given for control group. Then post-test was done on the 8th day of intervention for experimental group and control group using same tools. The conceptual framework developed for the study is based on the Modified general system model by Ludwig Von Bertalanffy, (1968).

Results: In the **Experimental group**, 16.66% and in the **control group** 50% were suffering with diabetes for 5-10 years and they had peripheral vascular disease. Post-test mean value of experimental group is 4.53 and standard deviation is 1.33 and post-test mean value of control group is 9.16 and standard deviation is 2.24. The calculated unpaired 't' test value (9.72*) is greater than that of the table value (2.0017). This shows that Buerger Allen Exercise is effective in improving lower extremity perfusion among experimental group, highly significant (P<0.05), as assessed by Peripheral Vascular Disease (PVD) rating scale. Post-test mean value of experimental group is .91 and standard deviation is .06 and Post-test mean value of control group is .7876 and standard deviation

is .06094. The calculated unpaired 't' test value (7.2523*) is greater than that of the table value (2.0017). This shows that Buerger Allen Exercise is effective in improving lower extremity perfusion among experimental group, significant (P<0.05), as assessed by Ankle Brachial Pressure Index (ABPI) rating scale.

Conclusion:

In this study two tools were used, peripheral vascular disease (PVD) rating scale and ankle brachial pressure index (ABPI) rating scale which shows that Buerger Allen exercise helped to improve the lower extremity perfusion among diabetes mellitus patients of experimental group.

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OBJECTIVES

1. To assess the pre-test and post-test lower extremity perfusion score among experimental group.
2. To assess the pre-test and post-test lower extremity perfusion score among control group.
3. To compare between post-test scores of experimental group and control group.
4. To assess the effectiveness of Buerger Allen Exercise on lower extremity perfusion among experimental group.
5. To assess the effectiveness of Buerger Allen exercise on lower extremity perfusion among experimental group and control group.
6. To find association between lower extremity perfusion and selected socio demographic variables among experimental group.
7. To find association between lower extremity perfusion and selected socio demographic variables among control group.

MATERIAL AND METHODS:

RESEARCH APPROACH-The quantitative experimental evaluative research approach

RESEARCH DESIGN- The study is Quasi experimental non randomized control group design.

POPULATION: TARGET POPULATION-In this study Type II diabetic patients are taken as target population.

ACCESSIBLE POPULATION- In this study Type II diabetic patients in Community Health Centre, Dudhi (U.P) are taken as accessible population.

RESEARCH SETTING: In this study Community Health Centre, Dudhi (U.P)

SAMPLE AND SAMPLE SIZE: In this study sample size was 60, in experimental group the subjects were 30 and in control group subjects were 30.

SAMPLE TECHNIQUE: The sampling technique used in this study is Non probability purposive sampling technique.

VARIABLES-

Independent variable-In this study independent variable is "Buerger Allen exercise" among patients with type II Diabetes Mellitus.

Dependent variable-In this study dependent variable is the "lower extremity perfusion" among patients with type II Diabetes Mellitus.

DESCRIPTION OF DATA COLLECTION TOOL:

TOOL- I

Modified structured PVD rating scale to clinically assess lower extremity perfusion

TOOL-II Modified ankle brachial index scale (ABPI)

It is divided in 2 parts-

PART-1

Self-Structured questionnaire to assess socio demographic variables

PART-II

Modified ankle brachial index scale (ABPI) by Winsor, in 1950, to assess lower extremity perfusion.

RESULTS AND DISCUSSION

PRESENT STUDY RESULT

The data were planned to be analysed in terms of the objectives of the study using descriptive and inferential statistics. In the **Experimental group**, 16.66% and in the **control group** 50% were suffering with diabetes for 5-10 years and they had peripheral vascular disease. Post-test mean value of experimental group is 4.53 and standard deviation is 1.33 and post-test mean value of control group is 9.16 and standard deviation is 2.24. The calculated unpaired 't' test value (9.72*) is greater than that of the table value (2.0017). This shows that Buerger Allen Exercise is effective in improving lower extremity perfusion among experimental group, highly significant ($P < 0.05$), as assessed by Peripheral Vascular Disease (PVD) rating scale. Post-test mean value of experimental group is .91 and standard deviation is .06 and Post-test mean value of control group is .7876 and standard deviation is .06094. The calculated unpaired 't' test value (7.2523*) is greater than that of the table value (2.0017). This shows that Buerger Allen Exercise is effective in improving lower extremity perfusion among experimental group, significant ($P < 0.05$), as assessed by Ankle Brachial Pressure Index (ABPI) rating scale.

COMPARATIVE STUDY RESULT

Priya N (2016) who conducted a study to assess effectiveness of buergerallen exercise on levels of lower extremity perfusion among diabetic patients admitted at Sri Narayana hospital and research centre, Vellore using ankle brachial pressure index scale and Peripheral vascular disease rating scale. Using PVD scale before the intervention of Buerger Allen Exercise the patients 18(45%) had mild, 17(42.5%) had moderate and 5(12.5%) had severe level of symptoms (Oedema, Pain, Temperature, Capillary refill, Skin colour, Peripheral pulse). After the Buerger Allen Exercise 9(22.5%) had normal, 21(52.5%) had mild, 10(25%) had a moderate level of symptoms and None of them had severe level of symptoms. Before the intervention of Buerger Allen Exercise, ABPI 0.80-0.89, 18(45%) patients had a mild level of PVD, ABPI 0.50 - 0.79, 22(55%) had a

moderate level of PVD. After the Buerger Allen Exercise, ABPI 0.90-1.2, 5(12.5%) patients had a normal level of Peripheral vascular disease (PVD), ABPI 0.80-0.89, 23(57.5%) had a mild level of Peripheral vascular disease (PVD), ABPI 0.50 - 0.79, 2(30%) had a moderate level of PVD.

MAJOR STUDY FINDING INCLUDE

A. Rathiga (2015) has conducted a study to assess the effectiveness of Buerger-Allen Exercise to improve lower extremity perfusion among patients with type 2 Diabetes Mellitus admitted in Chettinad hospital and research institute, Non-equivalent pre-test post-test control group design was followed to conduct the present study; were grouped in two groups, 30 patients in experimental and 30 patents in control group, experimental group were undergone with intervention of Buerger Allen exercise under supervision for 2 times a day for 5 days and in control group, subjects were under regular treatment. Demographic data and ankle brachial index scale were used to assess the lower extremity blood circulation. In experimental and control group 24(80%), 15 (50%) had lower extremity arterial disease and 6(20%), 15 (50%) were in border line. In experimental group there was a significant difference between the pre-test mean value 0.922 with SD 0.0562 and post-test mean value 0.980 with SD .0407 which projects that t value 9.108* was significant at the level of $p < 0.05$. The study concluded that Buerger

Allen exercise to be effective on improving the lower extremity.

Jency John (2015) A study was undertaken to investigate the level of lower extremity perfusion among patient with type 2 diabetes and assess the effect of Buerger Allen Exercise to improve lower extremity perfusion among patients with type 2 Diabetes Mellitus admitted at Chettinad Hospital and Research Institute, Chennai, India. Non-equivalent pre-test post-test control group design was followed to conduct the present study; divided 60 patients with type 2 diabetes mellitus were grouped in to two groups. Subjects in experimental group underwent intervention of buergerallen exercise under supervision for 2 times a day for 5 days and in control group, subjects were under regular treatment. Demographic data and ankle brachial index scale were used to assess the lower extremity blood circulation. In experimental and control group 24(80%), 15 (50%) had lower extremity arterial disease and 6(20%), 15 (50%) were in border line. In experimental group there was a significant difference between the pre-test mean value 0.922 with SD 0.0562 and post-test mean value 0.980 with SD .0407 which projects that t value 9.108* was significant at the level of $p < 0.05$. The findings of the present study revealed that there is a significant improvement in the lower extremity perfusion after doing Buerger Allen exercise.

TABLE: 1 DATA ANALYSIS RELATED TO THE EFFECTIVENESS OF BUERGER ALLEN EXERCISE ON LOWER EXTREMITY PERFUSION AMONG EXPERIMENTAL AND CONTROL GROUP

PART-I- Effectiveness of Buerger Allen Exercise on levels of lower Extremity perfusion assessed by Peripheral Vascular Disease (PVD) among Experimental group and control group.

TABLE 1.1

($n_1=30, n_2=30$), N=60

GROUP	POST-EST		SE	Df	Unpaired 't' value/Critical value at (0.05 level)/P value
	Mean	SD			
Experimental group	4.53	1.33	0.47	58	(9.72)/2.0017 (P<0.05) Highly significant
Control group	9.16	2.24			

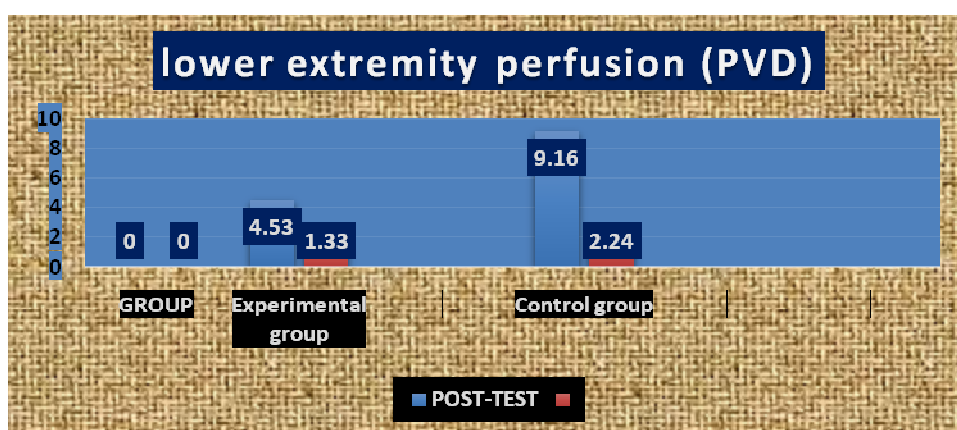


Fig 1:1 Bar diagram showing the effectiveness of Buerger Allen Exercise on Post-test scores for Lower Extremity Perfusion (PVD).

The above table 1.1 and Figure 1.1 shows that Post-test mean value of experimental group is 4.53 and standard deviation is 1.33 and post-test mean value of control group is 9.16 and standard deviation is 2.24. The calculated 't' test value (9.72*) is greater than that of the table value (2.0017). This shows that Buerger Allen Exercise is effective in improving lower extremity perfusion among experimental group. Hence the hypothesis H2 is accepted.

PART-II-Effectiveness of Buerger Allen Exercise on levels of lower Extremity perfusion assessed by Ankle Brachial Pressure Index scale (ABPI) among Experimental group and control group.

TABLE 1.2

(n₁=30, n₂=30), N=60

GROUP	POST-TEST		SE	Df	Unpaired 't' value/Critical value at (0.05 level)/P value
	Mean	SD			
Experimental group	0.91	0.06	0.01605	58	7.2523/2.0017 (P<0.05) Significant
Control group	0.7876	0.06094			

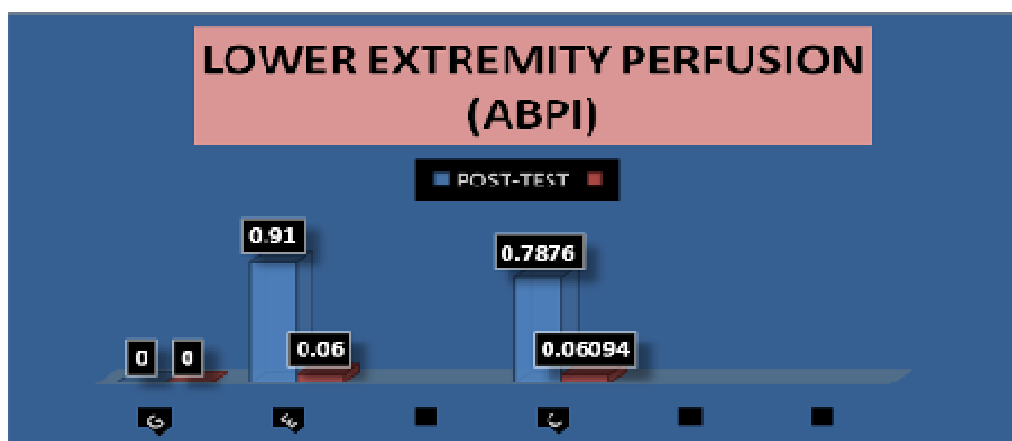


Fig 1.2 Bar diagram showing the effectiveness of Buerger Allen Exercise for Post-test scores on Lower Extremity Perfusion (ABPI).

The above table 1.2 and Figure 1.2 shows that Post-test mean value of experimental group is .91 and standard deviation is .06 and Post-test mean value of control group is .7876 and standard deviation is .06094. The calculated 't' test value (7.2523*) is greater than that of the table value (2.0017). This shows that Buerger Allen Exercise is effective in improving lower extremity perfusion among experimental group. Hence the hypothesis H2 is accepted.

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