

A Comparative Study to Evaluate the Effectiveness of Buerger Allen Exercise and Lower Extremity Strengthening Exercise among Subjects with Type II Diabetes Mellitus at Selected Hospital in Puducherry

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Abstract: Aim: A Comparative Study to Evaluate the Effectiveness of Buerger Allen Exercise and Lower Extremity Strengthening Exercise among Subjects with type II diabetes mellitus at selected hospital in Puducherry. Objectives: 1) To assess the level of lower extremity tissue perfusion among subjects with type II diabetes mellitus in group I, group II and control group in pretest. 2) To evaluate the effectiveness of Buerger Allen exercise on level of lower extremity tissue perfusion among subjects with type II diabetes mellitus in group I. 3) To evaluate the effectiveness of LESE on level of lower extremity tissue perfusion among subjects with type II diabetes mellitus between pretest and posttest in group II 4) To compare the effectiveness of Buerger Allen exercise and LESE on the level of lower extremity tissue perfusion among subjects with type II diabetes mellitus in group I, group II and control group. Materials and Methods: In a study 150 samples selected by using purposive sampling technique and assigned to the experimental group-I (n=50), group (n=50) and control group (n=50). The experimental group I was received Burger Allen exercise, group II received LESE. Results: Analysis of the results showed that Burger Allen exercise, LESE has a significance ($p<0.001$) on level of lower extremity tissue perfusion among type II diabetes and these findings are consistent with previous research studies. Conclusion: The Buerger Allen interventions were proven and highly effective in improving level of lower extremity tissue perfusion.

Keywords: Lower Extremity Strengthening Exercise, Ankle Brachial Index scale, Lower Extremity Tissue Perfusion, Burger Allen Exercise

1. Introduction

Health was a natural aspect of living well - both by definition and realization. The secret of "Jivem Shardah Shatam" - a hundred years of energetic, healthy, happy, and creative life - was attributed by the ancient Indians to total harmony with nature and life's spiritual legacy (**Kamakhya, 2017**).

Healthy life was an individual's valuable gift, if a person was healthy enough, he was the richest person in his own world. But there are certain disease conditions that affect the normal life pattern of many people in our world today like heart problems, neurological problems, orthopedic problems etc. among which diabetes mellitus projecting a higher prevalence rate in developing countries (**Sathya and Karthi, 2019**).

According to **World Health Organization (2021)** diabetes was a chronic, metabolic disease characterized by elevated levels of blood glucose mainly due to deficiency in the production and function of insulin or both. Further diabetes mellitus can be classified as type I and type II (non-insulin dependent) accounts for 5-10% of all cases of diabetes which leads to diabetes mellitus related complications such as and CVD, CKD, Neuropathy, Retinopathy. About 70,000 Indians died due to complications of diabetes mellitus in 2020.

International:

According to the International Diabetes Federation, 8.8% of the adult population had diabetes mellitus, with men having slightly higher rates 9.6%, than women 9.0%. Current global statistics shows that 463million and 374 million individuals have diabetes and impaired glucose tolerance, a pre diabetic condition. These numbers are estimated to increase to 700 million people with diabetes mellitus and 548 million people with impaired glucose tolerance by 2045, which represents 51% increase compared to 2019. The top three countries with the highest number of individuals with diabetes mellitus are in China 116.4 million, India 77.0 million and the United States of America 31.0 million. Among the ten countries India secured second place in diabetics population. This trend was expected to continue in 2030 and 2045, With China 140.5 and 147.2 million and India 101.0 and 134.2 million continuing to have the highest burden of diabetes mellitus. (**International Diabetes Federation 2019**)

National:

The largest nationally representative epidemiological survey conducted in India, the data from 15 states showed that the prevalence of diabetes ranged from to 8.7% in rural area and 5.8 to 15.5% in urban area. The prevalence varied from 4.3% in Bihar and 13.6% in Chandigarh. There was clear evidence of an epidemiological transition with a higher prevalence of diabetes in low socioeconomic status of urban area in more economically developed states. (**Indian council of medical research 2017**).

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Statement of the Problem:

A Comparative Study to Evaluate the Effectiveness of Burger Allen Exercise and Lower Extremity Strengthening Exercise among Subjects with type II diabetes mellitus at selected hospital in Puducherry.

Objectives:

- To assess the level of lower extremity tissue perfusion among subjects with type II diabetes mellitus in group I, group II and control group in pretest.
- To evaluate the effectiveness of Buerger Allen exercise on level of lower extremity tissue perfusion among subjects with type II diabetes mellitus in group I.
- To evaluate the effectiveness of LESE on level of lower extremity tissue perfusion among subjects with type II diabetes mellitus between pretest and posttest in group II.
- To compare the effectiveness of Buerger Allen exercise and LESE on the level of lower extremity tissue perfusion among subjects with type II diabetes mellitus in group I, group II and control group.

Hypotheses:

H1: There will be a significant improvement in the level of lower extremity tissue perfusion after implementation of burger Allen exercise in group I.

H2: There will be a significant improvement in the level of lower extremity tissue perfusion after implementation of LESE in group II.

H3: There will be a significant difference in the level of lower extremity tissue perfusion in group- I than in group - II in posttest.

H4: There will be a significant difference in level of knowledge on lower extremity tissue perfusion between pretest and posttest in group I, group II and control group.

2. Materials and Methods

In a study 150 samples selected by using purposive sampling technique and assigned to the experimental group-I (n=50), group (n=50) and control group (n=50). The experimental group I was received Burger Allen exercise, group II received LESE.

3. Results and Discussion

Table 1.1: Comparison of Mean and Standard Deviation of Pretest and Posttest Score of Left and Right Lower Extremity Tissue Perfusion among Subjects with Type II Diabetes Mellitus in Group I

Variables	Assessments				't' value	P value
	Pretest		Posttest			
	Mean	SD	Mean	SD		
Left LETP	5.52	1.79	6.58	1.54	12.124	0.001*** (S)
Right LETP	5.46	3.6	6.5	3.97	4.104	0.001*** (S)

Table 1.1 depicts the comparison of mean and standard deviation of pretest and posttest mean score of Buerger Allen Exercise of left and right lower extremity tissue perfusion among type II diabetes mellitus in group I. The pretest mean score of left LETP was 5.520 with the standard deviation of 1.79 and the posttest mean value was 6.580 with the standard deviation of 1.54. The pretest mean score of right LETP was

6.460 with the standard deviation of 3.60 and the posttest mean value was 6.500 with the standard deviation of 3.97. Thus, the difference in mean value of, Lowe Limb Tissue Perfusion was confirmed by paired 't' value of 4.104, was found to be statistically significant at $p < 0.001$.

Table 1.2: Comparison of Mean and Standard Deviation of Pretest and Posttest Score of Left and Right Lower Extremity Tissue Perfusion among Subjects with Type II Diabetes Mellitus in Group II

Variables	Assessments				't' value	P value
	Pretest		Posttest			
	Mean	SD	Mean	SD		
Left LETP	5.500	1.70	5.425	1.34	12.124	0.05*(S)
Right LETP	5.260	3.01	5.333	2.92	6.104	0.01**(S)

Table 1.2 depicts the comparison of mean and standard deviation of pretest and posttest mean score of LESE left and right lower extremity tissue perfusion among type II diabetes mellitus in group II. The pretest mean score of left LETP was 5.500 with the standard deviation of 1.70 and the posttest mean value was 5.425 with the standard deviation of 1.34. The pretest mean score of right LETP was with the standard deviation of 3.01 and the posttest mean value was 5.333 with the standard deviation of 2.92. Thus, the difference in mean value of left lower extremity tissue perfusion was confirmed by paired 't' value of 12.124 was found to be statistically significant at $p < 0.05$ and right lower extremity tissue perfusion was confirmed by paired 't' value of 6.104 was found to be statistically significant at $p < 0.01$.

Table 1.3: Comparison of Mean and Standard Deviation of Pretest and Posttest Score of Left and Right Lower Extremity Tissue Perfusion among Subjects with Type II Diabetes Mellitus in Control Group

Variables	Assessments				't' value	P value
	Pretest		Posttest			
	Mean	SD	Mean	SD		
Left LETP	5.620	1.89	6.540	1.56	14.134	0.420 (NS)
Right LETP	5.360	3.20	6.438	3.95	14.328	0.428 (NS)

Table 1.3 depicts the comparison of mean and standard deviation of pretest and posttest mean score of left and right lower extremity tissue perfusion among type II diabetes mellitus in control group. The pretest mean score of left LETP was 5.620 with the standard deviation of 1.89 and the posttest mean value was 6.540 with the standard deviation of 1.56. The pretest mean score of right LETP was 5.360 with the standard deviation of 3.20 and the posttest mean value was 6.438 with the standard deviation of 3.95. Thus, the difference in mean value of, risk for development of foot ulcer was confirmed by paired 't' value of 14.134, was found to be statistically significant at $p < 0.001$.

4. Conclusion

The Buerger Allen interventions were proven and highly effective in improving level of lower extremity tissue perfusion.

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