

Impact of Buerger-Allen Exercise on Lower Extremity Perfusion, Peripheral Neuropathy Symptoms and Risk for Foot Ulcer among Patients with Diabetes Mellitus: A Feasibility Study

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ABSTRACT

Introduction: Diabetes mellitus is associated with complications such as impaired circulation and peripheral neuropathy, increasing the risk of foot ulcer. Buerger-Allen exercise is a non-pharmacological intervention that may improve circulation and reduce these complications.

Aim: To evaluate the effectiveness of Buerger-Allen exercise on lower extremity perfusion, Peripheral Neuropathy Symptoms (PNS) and risk for development of foot ulcer among patients with Diabetes Mellitus.

Materials and Methods: A randomised controlled pretest-post test experimental design was adopted. The study was conducted on 10 patients (5 experimental and 5 control) selected using convenience sampling. Lower extremity perfusion was assessed using Ankle Brachial Index (ABI), PNS using Michigan Neuropathy Screening Instrument (MNSI), and risk for foot ulcer using modified NMAHS tool. The experimental group received Buerger-Allen exercise consisting of 45-degree leg elevation, 90-degree leg dependency, and horizontal resting position performed in cycles twice daily for 6 consecutive days, while the control group received routine care. Inferential statistics including paired t-test, independent t-test, and one-way Analysis of Variance (ANOVA) were used for data analysis. Based on the feasibility study findings, the calculated sample size for the final study was 70 participants including possible attrition rate.

Results: Posttest findings showed a statistically significant difference between experimental and control group in peripheral neuropathy symptoms (physical examination) ($t=3.35$, $p=0.01$). No statistically significant difference was observed in Right lower extremity perfusion ($t=1.19$, $p=0.26$), left lower extremity perfusion ($t=1.48$, $p=0.17$), peripheral neuropathy symptoms-History ($t=-2.12$, $p=0.06$), and risk for development of foot ulcer ($t=-1.86$, $p=0.09$). Within the experimental group, significant improvement was observed in the right lower extremity perfusion ($t=5.58$, $p=0.005$), left lower extremity perfusion ($t=5.94$, $p=0.02$), peripheral neuropathy symptoms-History ($t=6.5$, $p=0.003$), peripheral neuropathy symptoms-Physical examination ($t=11$, $p=0.001$), and risk for development of foot ulcer ($t=3.65$, $p=0.02$).

Conclusion: Based on the findings of the feasibility study, Buerger Allen exercise was found to be effective in improving lower extremity perfusion, reducing peripheral neuropathy symptoms, and decreasing the risk for development of foot ulcer among patients with diabetes mellitus. The intervention was feasible, safe, and easy to administer in the clinical setting.

Keywords: Ankle brachial index, Buerger-Allen exercise, Diabetes mellitus, Michigan neuropathy screening instrument.

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