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**A STUDY TO ASSESS THE EFFECTIVENESS OF BUEGER-ALLEN EXERCISES ON
LOWER EXTREMITY PERFUSION AMONG PATIENTS WITH DIABETES MELLITUS
ADMITTED AT NARAYAN MEDICAL COLLEGE AND HOSPITAL, JAMUHAR,
SASARAM.**

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ABSTRACT

Background

Diabetes mellitus is a long-term metabolic disorder that affects various organs and body systems. One of the common complications seen in diabetic patients is reduced blood circulation in the lower limbs. Inadequate blood supply may result in pain, numbness, delayed wound healing, infection, and foot ulcers. Bueger-Allen exercise is a simple therapeutic intervention used to improve circulation in the lower extremities through postural changes and leg movements. This exercise can be practiced easily in hospital and home settings.

Objectives

1. To evaluate lower extremity perfusion before implementation of Bueger-Allen Exercises.
2. To determine lower extremity perfusion after implementation of Bueger-Allen Exercises.

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3. To measure the effectiveness of Buerger-Allen Exercises among patients with diabetes mellitus.
4. To identify the association between post-test perfusion scores and selected demographic variables.

Methodology

A quantitative research approach with pre-experimental one group pre-test and post-test design was adopted for the study. The study was conducted among 60 patients with diabetes mellitus admitted at Narayan Medical College and Hospital, Jamuhar, Sasaram. Non-probability purposive sampling technique was used for selecting the samples. Data were collected using structured demographic variables and observational checklist for lower extremity perfusion assessment. Buerger-Allen Exercises were administered for a specific duration, and post-test assessment was conducted after intervention.

Results

The findings of the study revealed that the mean post-test lower extremity perfusion score was significantly higher than the mean pre-test score, indicating improvement in circulation after administration of Buerger-Allen Exercises. Statistical analysis showed that the intervention was effective in improving lower extremity perfusion among diabetic patients.

Conclusion

The study concluded that Buerger-Allen Exercises are effective in improving lower extremity perfusion among patients with diabetes mellitus. Regular practice of these exercises may help reduce complications associated with poor circulation and improve patient outcomes.

Keywords



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Buerger-Allen Exercise, Lower Extremity Perfusion, Diabetes Mellitus, Peripheral Circulation, Nursing Intervention.

INTRODUCTION

Diabetes mellitus is considered one of the most prevalent chronic health problems across the world. It develops when the body fails to produce sufficient insulin or cannot utilize insulin effectively. Persistent elevation of blood glucose levels gradually damages blood vessels and nerves, leading to several complications. Among these complications, impaired peripheral circulation is frequently observed in diabetic patients.

Poor circulation in the lower limbs affects tissue nutrition and oxygen supply. As a result, patients may experience cold extremities, tingling sensation, discoloration, cramps, pain during walking, and delayed healing of wounds. If proper care is not provided, these conditions may progress to diabetic foot ulcers and gangrene. Therefore, maintaining adequate blood flow in the lower extremities is an important aspect of diabetic management. Buerger-Allen exercise is a conservative and non-invasive intervention designed to enhance blood circulation to the legs and feet. The exercise consists of leg elevation, dependent positioning, and horizontal rest position accompanied by ankle movements. These postural variations assist in improving venous return and arterial supply. Since the exercise does not require expensive equipment, it can be practiced conveniently by patients under nursing guidance.

Nurses have an important responsibility in promoting preventive and rehabilitative care among diabetic patients. Educating patients regarding circulation-enhancing exercises may reduce complications and hospital admissions. Based on these considerations, the investigator conducted the present study to assess the effectiveness of Buerger-Allen exercises on lower extremity perfusion among patients with diabetes mellitus admitted at Narayan Medical College and Hospital, Jamuhar, Sasaram.

NEED FOR THE STUDY

The number of people affected with diabetes mellitus is increasing rapidly in both urban and rural populations. Peripheral vascular complications are among the leading causes of disability



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in diabetic patients. Inadequate perfusion of the lower limbs not only affects mobility but also increases the risk of infection and tissue damage.

Many patients depend mainly on medication and remain unaware of supportive non-pharmacological methods that can improve circulation. Buerger-Allen exercise is a simple and cost-effective measure that may enhance peripheral blood flow naturally. Evidence from earlier studies suggests that regular performance of these exercises can improve vascular supply and reduce discomfort in the lower limbs. Therefore, the investigator felt the need to assess the effectiveness of this intervention among diabetic patients.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of Buerger-Allen Exercises on lower extremity perfusion among patients with diabetes mellitus admitted at Narayan Medical College and Hospital, Jamuhar, Sasaram.

OBJECTIVES OF THE STUDY

1. To evaluate lower extremity perfusion before implementation of Buerger-Allen Exercises.
2. To determine lower extremity perfusion after implementation of Buerger-Allen Exercises.
3. To measure the effectiveness of Buerger-Allen Exercises among patients with diabetes mellitus.
4. To identify the association between post-test perfusion scores and selected demographic variables.

HYPOTHESES

H₁: Significant difference exists between pre-test and post-test scores
H₂: Significant association exists with demographic variables

OPERATIONAL DEFINITIONS



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Effectiveness

In this study, effectiveness refers to the extent to which Buerger-Allen Exercises improve lower extremity perfusion among patients with diabetes mellitus as measured by observational checklist scores.

Buerger-Allen Exercises

Buerger-Allen Exercises refer to a set of postural exercises involving elevation, dependency, and horizontal positioning of lower limbs performed to improve blood circulation.

Lower Extremity Perfusion

Lower extremity perfusion refers to the adequacy of blood flow to the lower limbs assessed through indicators such as skin color, temperature, capillary refill, pulse, and sensation.

Diabetes Mellitus

Diabetes mellitus refers to a chronic metabolic disorder characterized by elevated blood glucose levels due to insufficient insulin secretion or action.

RESEARCH METHODOLOGY

Research Approach

A quantitative research approach was adopted for the present study.

Research Design

Pre-experimental one group pre-test and post-test research design was used.

Variables



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Independent Variable: Buerger-Allen Exercises.

Dependent Variable: Lower extremity perfusion.

Setting of the Study

The study was conducted at Narayan Medical College and Hospital, Jamuhar, Sasaram.

Population

The population of the study consisted of patients with diabetes mellitus admitted in selected wards of Narayan Medical College and Hospital.

Sample

The sample consisted of 60 patients with diabetes mellitus who fulfilled the inclusion criteria.

Sampling Technique

Non-probability purposive sampling technique was used.

Inclusion Criteria

1. Patients diagnosed with diabetes mellitus.
2. Patients admitted in selected wards.
3. Patients willing to participate.
4. Patients available during the data collection period.

Exclusion Criteria

1. Patients with severe complications and critical illness.
2. Patients unable to perform exercises.
3. Patients with fractures or severe mobility restrictions.



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Description of the Tool

The tool used for data collection consisted of two sections:

Section A: Demographic Variables

It included age, gender, educational status, duration of diabetes, occupation, dietary habits, and history of complications.

Section B: Observational Checklist for Lower Extremity Perfusion

The checklist assessed skin color, skin temperature, capillary refill, edema, sensation, pulse, and pain.

Validity and Reliability

The tool was validated by experts in nursing and medical fields. Reliability was established using appropriate statistical methods.

Data Collection Procedure

Formal permission was obtained from the concerned authority of the hospital before data collection. Samples were selected according to inclusion criteria. Informed consent was obtained from participants. Pre-test assessment of lower extremity perfusion was conducted using observational checklist.

Buerger-Allen Exercises were demonstrated and administered to patients. The exercise consisted of:

1. **Elevation phase** – legs elevated at 45 to 90 degrees for 2 to 3 minutes.
2. **Dependency phase** – legs lowered below heart level until redness appeared.
3. **Resting phase** – legs placed horizontally for relaxation.



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The exercises were repeated according to protocol. Post-test assessment was conducted after completion of intervention.

Plan for Data Analysis

- Data were analyzed using descriptive and inferential statistics.
- Frequency and percentage distribution were used for demographic variables.
- Mean and standard deviation were used to assess perfusion scores.
- Paired t-test was used to determine effectiveness of Buerger-Allen Exercises.
- Chi-square test was used to determine association between variables.

RESULTS

Table 1: Frequency and Percentage Distribution of Demographic Variables

Demographic variable	Frequency (f)	Percentage (%)
Age (40-50 years)	18	30%
Age (51-60 years)	24	40%
Age (Above 60years)	18	30%
Male	36	60%
Female	24	40%
Duration of diabetes less than 5 years	20	33.3%
Duration(5-10 years)	28	46.7%
Duration(above 10 years)	12	20%



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Table 2: Comparison of Pre-test and Post-test Lower Extremity Perfusion Scores

Assessment	Mean	SD	Mean difference
Pre test	11.2	2.4	
Post test	18.6	2.1	7.4

Table 3: Effectiveness of Buerger-Allen Exercises Using Paired t-test

Variable	Calculated t- value	Table value	Significance
Lower extremity perfusion	12.45	2.00	Significance

DISCUSSION

The findings of the present study revealed that lower extremity perfusion improved significantly after administration of Buerger-Allen Exercises among patients with diabetes mellitus. The mean post-test score was higher than the pre-test score, indicating effectiveness of the intervention.

The study findings are consistent with previous research studies which reported that Buerger-Allen Exercises improve peripheral blood circulation, reduce edema, and enhance tissue oxygenation. Improvement in circulation may be due to postural changes that facilitate venous return and stimulate arterial blood flow.

The study also showed that diabetic patients with longer duration of illness were more prone to impaired circulation. Regular therapeutic exercises and early intervention may therefore help in preventing complications and improving quality of life.

Nurses play a vital role in patient education regarding diabetic foot care and circulation-enhancing exercises. Incorporation of Buerger-Allen Exercises into routine nursing care can



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contribute to better management of diabetic patients.

NURSING IMPLICATIONS

Nursing Practice

Nurses should encourage diabetic patients to perform Buerger-Allen Exercises regularly to improve circulation and prevent complications.

Nursing Education

Nursing students should receive adequate knowledge regarding therapeutic exercises and diabetic foot care management.

Nursing Administration

Hospital administrators should organize training programs and educational sessions regarding non-pharmacological interventions for diabetic care.

Nursing Research

Further studies can be conducted with larger samples and control groups to strengthen evidence regarding effectiveness of Buerger-Allen Exercises.

CONCLUSION

The present study concluded that Buerger-Allen Exercises were effective in improving lower extremity perfusion among patients with diabetes mellitus admitted at Narayan Medical College and Hospital, Jamuhar, Sasaram. The exercise improved blood circulation and may help in preventing complications such as ulceration and gangrene. Buerger-Allen Exercises are simple, safe, economical, and can be incorporated into routine nursing care and patient education programs.



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RECOMMENDATIONS

1. Similar studies can be conducted with larger sample size.
2. Comparative studies may be conducted between experimental and control groups.
3. Longitudinal studies can assess long-term benefits of Buerger-Allen Exercises.
4. Educational programs can be developed to increase awareness among diabetic patients.

REFERENCES

1. Black JM, Hawks JH. Medical Surgical Nursing. 8th ed. New Delhi: Elsevier; 2018.
2. Lewis SL, Bucher L, Heitkemper MM. Medical Surgical Nursing. 11th ed. Missouri: Mosby; 2019.
3. Brunner LS, Suddarth DS. Textbook of Medical Surgical Nursing. 14th ed. Philadelphia: Lippincott; 2018.
4. Potter PA, Perry AG. Fundamentals of Nursing. 10th ed. St. Louis: Elsevier; 2021.
5. Smeltzer SC, Bare BG. Brunner and Suddarth's Textbook of Medical Surgical Nursing. 13th ed. Philadelphia: Wolters Kluwer; 2017.
6. Polit DF, Beck CT. Nursing Research: Generating and Assessing Evidence for Nursing Practice. 11th ed. Philadelphia: Wolters Kluwer; 2020.
7. World Health Organization. Global report on diabetes. Geneva: WHO; 2021.
8. American Diabetes Association. Standards of Medical Care in Diabetes. Diabetes Care. 2022.
9. Basavanthappa BT. Nursing Research. 3rd ed. New Delhi: Jaypee Brothers; 2019.
10. Sharma SK. Nursing Research and Statistics. 4th ed. Haryana: Elsevier; 2020.