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A Study to Assess the Effectiveness of Buerger Allen Exercise in Improving the Peripheral Circulation among Patients with Diabetes Mellitus Admitted in Sharda Hospital, Greater Noida

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ABSTRACT

Diabetes as one of Non-communicable diseases has consumed a large share of money, material, time and human resources of health systems. Now, due to advancement in lifestyle and industrial process, prevalence of diabetes and its associated complications have been raised. Among these complications, diabetic foot considered as a common complication of diabetes. Nurses as a health care providers has a responsibility for prevention and early diagnoses of diabetes and its complications.[1]

A study was conducted to assess the effectiveness of Buerger Allen Exercise in improving the peripheral circulation among patients with diabetes mellitus admitted in Sharda Hospital, Greater Noida The research approach adopted for this study was quantitative research approach and Quasi-experimental pre- test and post-test control group was research design**.**There were 60 Patients admitted with diabetes mellitus selected by using simple random sampling technique and were randomly allocated in experimental and control group using lottery method. The correlation coefficient was 0.86. The results showed that from baseline to after 20 minutes of Buerger allen exercise mean score become 2.56 to 1.4 in experimental group and mean difference Inlow's score in experimental group were (1.1+0.017) is higher as compare to control group (0.2+0.005). it revealed that there was significant improvement in peripheral circulation after Buerger allen. This study showed that Buerger allen exercise become more effective along with hospital routine treatment in diabetic mellitus patient. Buerger allen exercise can be used for improvement in peripheral circulation among Diabetes mellitus patients.

Keyword: *Buerger allen exercise, Effective, Diabetic mellitus patient, Peripheral circulation*

Introduction

Healthy life is the valuable gift of an individual. But there are certain disease condition which affects the many of people, such as heart problems, neurological problems, orthopedic problems, metabolic disorders especially diabetes mellitus, etc., among which diabetes is the one of the important health issue in today's world which may affect the entire life pattern of an individual. It is a chronic, non-communicable, and expensive public health disease. Diabetes is a global public health problem; it is a chronic disease and is now growing as an epidemic in both developed and developing countries. Diabetes mellitus is the commonest form of diabetes constituting 90% the diabetes population.[2]

Both type 1 and type 2 diabetes cause the direct and indirect effects on the human vasculature thus become the major source of morbidity and mortality. Diabetes mellitus leads to macrovascular complications (coronary artery disease, peripheral arterial disease, and stroke) and microvascular complications (diabetic nephropathy, neuropathy, and retinopathy. Among these complications of diabetes mellitus, Peripheral neuropathy manifest in different forms, including sensory, focal/multifocal, and autonomic neuropathies. More than 80% of amputations occur after foot ulceration or injury, which can result from diabetic neuropathy.[3]

Diabetic neuropathies are nerve devastation disorder which is one of the complication of diabetes mellitus.

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These conditions are thought to result from diabetic micro vascular injury and macro vascular conditions that cause diabetic neuropathy. Others may have symptoms such as pain, tingling, or numbness ie, loss of feeling in the hands, arms, feet, and legs. Diabetes mellitus risk can rises with age and longer duration of diabetes. As the data collected in 2010, diabetic neuropathy affects approximately 132 million people as (1.9% of the population)and affects approximately 25% of individuals diagnosed with diabetes.[4]

Exercise training for prevention of peripheral vascular disease among diabetic patient helps in potential mechanisms like formation of collateral circulation and increased blood flow, improve micro circulation and endothelial functions, improving in muscle metabolism and oxygen extraction, protect from inflammation and muscle injury, preventing atherosclerosis and pro-thrombotic risk factors. Buerger - Allen exercise has shown an effect on improving peripheral circulation. Buerger - Allen exercise is an active postural exercise in which gravity alternatively fills and empties the blood vessels for preventing.[5]

Diabetic foot is a chronic and major disabling complication of diabetes. The incidence of peripheral arterial disease (PAD) is high in diabetic patients and found mostly in 50% of cases of diabetic foot. Peripheral artery disease as a complication of diabetes become worse due to lack of technical expertise, negative beliefs because of poor experience. Italy has one of the lowest prevalence rates of major amputations in Europe. The published prevalence rates of peripheral arterial disease vary widely between studies. A research article by Jude indicates that the incidence among diabetics is, 8–30%; Faglia estimates about 22% in newly diagnosed type 2 diabetes patients[2], and Prompers estimates about 50% in diabetic patients with foot ulcers.

Method

Simple Random sampling technique was used to select the sample size 60 Patients admitted with diabetes mellitus randomly allocated in experimental and control group by using lottery method. Control group was received standard treatment. Experimental group was received Bueregr allen exercise along with standard treatment. Informed consent was obtained from patient. The study excluded the patients with diabetic foot ulcer and gangrene, below 39 year, Juvenile diabetes mellitus and Gestational diabetes mellitus.

Data Collection Procedure

The research investigator met the head of the institution in order to establish support and cooperation to conduct the study successfully. The formal permission was taken from The Dean of the School of Nursing Science and Research, Sharda University, Greater Noida, U.P and The Medical Superintendent of Sharda Hospital, Greater Noida, U.P to collect data for main study. The main Study was conducted from 5th March 2018 to 7th April 2018 in Sharda Hospital, Greater Noida.

The method used for data collection was as follows

1. The research investigator introduced him to the subjects and establish the good rapport with them.
2. The written consent was obtained from each patient.

Ankle Brachial Index:

- No smoking 2 hour before test so to prevent vasoconstriction.
- Remove shoes, socks and long sleeves.
- Lie in supine position at the same level of heart in warm temperature, normal atmosphere.
- After lying down patient should relax for 10 minute the goal for the patient is to be relax so pressure measure be stable at resting baseline.
- This time is used to explain procedure and also check pedal pulse and sensation at the feet.

Steps of Procedure: Select the appropriate size cuff to check the blood pressure. Measure the cuff to the diameter of the limb, the cuff should be 20% larger to the limb diameter so to compress the all soft tissue evenly. Cuff should be put on straight and snugly but not be tight to ensure correct reading. Ankle cuff should be go actual ankle not midcalf to ensure the correct reading. All articles should be kept ready for the use to save the time. Allow the patient to take rest and be relax, not to talk. After rest period, take the first brachial pressure in the anticubital fossa at elbow to note upper systolic pressure reading. Find the brachial pulse with the finger and apply gel on the place to ensure correct reading. Use the enough gel (not too much little of too much). Obtain the good Doppler signal for sound and move the Doppler around slowly in order to find the best pulse. Be sure angle of Doppler with the tip of transducer facing towards blood flow. Angle must be

40-60 degree to the skin surface to find the best pulse. For holding the tip of the Doppler only over the artery, slowly inflate the cuff until sound disappear to find the best pulse. Inflate additional 20-30mmhg above that number super-systolic but not higher. Slowly deflate cuff around 20- 30mmhg at a time until Doppler sound reappear to check the systolic pressure. The pressure reading when the first sound appears is systolic pressure. Deflate cuff completely and record the systolic pressure. Remove the excess gel to ensure patient comfort. Move the next ankle pressure step to check the high systolic pressure of lower limb. When taking ankle pressure it is very important patient feet should be warm to ensure the circulation be adequate for test. Identify posterior tibial pulse by locating medial malleolus to check the location of peripheral pulse for reading. Posterior tibial pulse is 2-3 cm along and beyond it to ensure the correct location of peripheral pulse for reading. This pulse is deeper than dorsal pedal so it require more concentration to palpate. Once palpate the pulse put the electro conductive gel on this part and using Doppler to ensure good peripheral pulse. Obtain the good Doppler sound or signal to ensure correct peripheral. Inflate the cuff until the sound hearing is disappear and then inflate 20-30mmhg above that number super-systolic to check the lower limb pulse reading. Ankle cuff can be pain full so do not inflate higher unnecessary to prevent for pain. Slowly deflate cuff around 20-30mmhg at a time until Doppler sound appear to note the reading. Pressure reading when first sound appear is systolic pressure. Deflate cuff immediately to return into normal level. Record systolic pressure for that site. Remove the extra electro conductive gel to ensure patient comfort and start with Buerger allen exercise

Burger's Allen exercise: Buerger's Allen exercise: it refers an active postural exercise, which help in fills and empties the lower extremity blood vessels according to gravity alternatives.

Step 1–elevation: In this study the researcher desires to elevate lower extremities at 45 to 90 degree angle and hold in this position until the skin blanches, for about 2 minutes.

Step 2: Break for 1 min, In this study, it refers to no exercise for 1 min and complete rest.

Step 3-Dependency: In this study, it refers feet and legs are then lowered below the level of the rest of the body until redness appears (care should be taken that there is no pressure against the back of the knees); moves the finger for about 2 minutes.

Step 4: Break for 1 min, In this study, it refers to no exercise for 1 min and complete rest.

Step 5-Horizontal: In this study, it refers to legs are placed flat on the bed in a horizontal position and place the towel under the knees and ask the subject to apply pressure over the towel with his own capabilities and capacities for 2 minutes.

Step 6: Break for 1min, In this study, it refers to no exercise for 1 min and complete rest. The length of time for each position varies with the patient's tolerance and the speed with which color change occurs. Usually the exercises are prescribed for about 20 minutes. Three series of steps can be repeated for a frequency of 2 times a day.

Results And Analysis

Table:1: Pre and Post test scores of peripheral circulation of the DM patients in experimental group

Factors	Mean	N	Std. Deviation	t value	p value
M1B	2.5667[a]	30	.50401	5.385	<0.001**
M1A	2.5667[a]	30	.50401		
E3B	1.4333[a]	30	.40609	-4.014	
E3A	1.4333[a]	30	.40609		

Note: ** and * denotes significant at 1% level and 5% level.

The above value mentioned in table 4 indicates that p values of the above analysis are less than 0.001, which means alternative hypothesis (Ha1) was accepted at 1% level, therefore it was concluded that the Buerger allen exercise was effective in improving peripheral circulation of the diabetes mellitus patients in experimental group. Further, the mean score on first day become (2.5) & on third day it become (1.4) that indicates Buerger allen exercise was effective in improvement of peripheral circulation of the diabetes mellitus patients in experimental group.

Table:2: Pre test-Post test scores of peripheral circulation of the DM patients between experimental and control group

Particulars	Group Type	N	Mean	Std. Deviation	t value	p value
M1B	Experimental	30	2.5667	. 50401	.766	.447
	Control	30	2.6667	.50742		
M1A	Experimental	30	2.5667	.50401	.766	.447
	Control	30	2.6667	.50742		
E3B	Experimental	30	1.4333	.48609	-7.914	.000
	Control	30	2.4667	. 50232		
E3A	Experimental	30	1.4333	. 48609	-7.914	.000
	Control	30	2.4667	. 50232		
Mean Difference	Experimental	30	1.1+0.017			
	Control	30	0.2+0.005			

Note: ** & * significant at 1% level & 5 % level.

The above value mentioned in table 5 indicates that p values of the above analysis were less than 0.01&. 05, which means alternative hypothesis (Ha2) was accepted at 1% level & 5% level, therefore it was concluded that there was a significant difference between patients of experimental and control group with respect to Buerger allen exercise in improving peripheral circulation. Further, the mean difference score of experimental group (1.1+0.017) was higher as compare to control group (0.2+0.005) after Buerger allen exercise. This indicates that there was gradual improvement in peripheral circulation of the diabetes mellitus patients in experimental group after Buerger allen exercise.

Discussion

In this study the data was obtained from diabetes mellitus patients admitted in Sharda Hospital, Greater Noida a Quasi-experimental pre-test & post-test control group design was adapted and 60 patients were selected by using simple random sampling technique, fulfilling the inclusion and exclusion criteria. The subjects were evaluated by using structured participation information sheet, inform consent, demographic variables, ankle brachial index, Inlow's 6o sec diabetic foot assessment scale.

Conclusion

Diabetes mellitus is an complex metabolic disease. A non- pharmacological approach is needed to overcome that problem, simple, which is easy to do, has no notable side effects and most acceptable one to reduce Diabetes mellitus. The findings of the study revealed that the Buerger allen exercise effective in improving the peripheral circulation among patients with diabetes mellitus. Thus study suggest that Buerger allen exercise is a complimentary alternative therapy that helps the parents, family members and nurses for improving the peripheral circulation, cost effective way without shivering and complication. As this method can be performed for the elderly by themselves or other people, it can be recommended in health programs for them. Further comparative study could be conducted to evaluate the effectiveness of Buerger allen exercise with other non pharmacological measure and alternative therapy.

Keyword: Buerger allen exercise, Effective, Diabetic mellitus patient, Peripheral circulation

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