A STUDY TO ASSESS THE EFFECTIVENESS OF BUERGER ALLEN EXERCISE ON LOWER EXTREMITY PERFUSION AMONGDIABETES MELLITUS PATIENTS ADMITTED IN SELECTED HOSPITAL AT COIMBATORE

A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE DEGREE OF

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By

BINCY BABY

External Internal

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APPROVED BY THE DISSERTATION COMMITTEE ON ……

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APRIL2015

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SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING TO THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY,

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ABSTRACT

OBJECTIVES

1. To assess the lower extremity perfusion among diabetes mellitus patient in experimental group and control group.
2. To evaluate the effectiveness of Buerger's- Allen exercise inimproving the lower extremity perfusion among the experimental group.
3. To find out the association between interventional scores of Buerger's- Allen exercise with selected demographic variables in experimental group and control group.

An interventional study was conducted to evaluate the effect of buerger-allen exercise on lower extremity perfusion in patients with type II diabetes mellitus at risk of peripheral vascular disease. A Quasi experimental one group pretest-posttest group design was adopted. A purposive sample of 60 patients with type II diabetes mellitus patients at risk of peripheral vascular disease were selected for the study. The selected patients were assessed by Pain, Edema and Capillary Refill. The data was analyzed with descriptive and inferential statistical methods. The result revealed that there was a significant improvement in lower extremity perfusion after Buerger-Allen exercise. Hence, the study concluded that Buerger-Allen exercise was effective in improving the lower extremity perfusion in patients with type II diabetes mellitus at risk of peripheral vascular disease.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

"Prevent diabetes: protect our future."(WHO)

Health is a dynamic condition resulting from a body's constant adjustment and adaptation in response to stresses and changes in the environment for maintaining an inner equilibrium. Wellness is first and foremost a choice to assume responsibility for the quality of our life. It begins with a conscious decision to shape a healthy lifestyle. Wellness is a mind set, a pre-disposition to adopt a series of key principles in varied life areas that lead to high levels of well-being and life satisfaction.

Diabetes mellitus is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced. This high blood sugar produces the classical symptoms of polyuria, polydipsia, and polyphagia.

Diabetes mellitus type 2 (formerly noninsulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes) is a metabolic disorder that is characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency. This is in contrast to diabetes mellitus type 1, in which there is an absolute insulin deficiency due to destruction of islet cells in the pancreas. Type 2 diabetes makes up about 90% of cases of diabetes with the other 10% due primarily to diabetes mellitus type 1 and gestational diabetes. Obesity is thought to be the primary cause of type 2 diabetes in people who are genetically predisposed to the disease.

Rates of diabetes have increased markedly over the last 50 years in parallel with obesity: As of 2010 there are approximately 285 million people with the disease compared to around 30 million in 1985.Type 2 diabetes is typically a chronic disease associated with a ten-year-shorter life expectancy. This is partly due to a number of complications with which it is associated, including: two to four times the risk of cardiovascular disease, including ischemic heart disease and stroke; a 20-fold increase in lower limb amputations, and increased rates of hospitalizations. In the developed world,and increasingly elsewhere, type 2 diabetes is the largest cause of nontraumatic blindness and kidney failure. It has also been associated with an increased risk of cognitive dysfunction and dementia through disease processes such as Alzheimer's disease and vascular dementia.

Peripheral arterial disease (PAD) refers to any disease or disorder of the circulatory system outside of the brain and heart. Peripheral arterial disease (PAD) is narrowing or blockage of arteries with accumulation of fatty tissues and plaque, known as atherosclerosis commonly it is referred as poor circulation of blood flow to arms and legs. Although the term peripheral arterial disease can include any disorder that affects any of the blood vessels, it often is used as a synonym for “Peripheral Vascular Disease”. Commonly, the disease affecting the lower limb. Type 2 diabetes mellitus is a major factor causing peripheral vascular resistance which leads to PAD. It is a “silent killer” disease.

Any organ of the body can be affected by diabetes and among the micro vascular complications of diabetes, neuropathy results in significant disability and morbidity. About 60-70% of people with diabetes have some form of neuropathy and 75% develop

peripheral neuropathy. The highest rates of neuropathy are among people who had diabetes for the past 25 years. Peripheral vascular disease affects larger portion of the population. It is the major cause of morbidity and mortality and its burden are increasing worldwide. Despite this, many people are unaware of this condition. Health promotion enables people to make choices in lifestyle which will help to prevent or reduce disease and enhance quality of life.

As per the report of International Diabetes Federation (IDF), India is looming epidemic of diabetes, and known as the diabetes capital of the world. According to IDF, India has highest number of, 50.8 million people suffering from Diabetes Mellitus (DM), followed by China (43.2million) and US (26.8 million). The report projected 58.7 million DM case in India by the year of 2010- almost 7% of the adult population in the developing countries. More over 3.2 million deaths are due to DM. In Tamilnadu22-26% people are suffering with diabetes mellitus.

Diabetic neuropathies are neuropathic disorders that are associated with diabetes mellitus. These conditions are thought to result from diabetic microvascular injury involving small blood vessels that supply nerves (vasa nervorum) in addition to macrovascular conditions that can culminate in diabetic neuropathy. Relatively common conditions which may be associated with diabetic neuropathy include third nerve palsy, mononeuropathy, mononeuropathy multiplex, diabetic amyotrophy, a painful polyneuropathy, autonomic neuropathy, and thoracoabdominal neuropathy. People with diabetes can, over time, develop nerve damage throughout the body. Some people with nerve damage have no symptoms. Others may have symptoms such as pain, tingling, or numbness i.e., loss of feeling in the hands, arms, feet, and legs. Nerve problems can

occur in every organ system, including the digestive tract, heart, and sex organs. About 60 to 70 percent of people with diabetes have some form of neuropathy. People with diabetes can develop nerve problems at any time, but risk rises with age and longer duration of diabetes. The highest rates of neuropathy are among people who have had diabetes for at least 25 years. Diabetic neuropathies also appear to be more common in people who have problems in controlling their blood glucose, as well as those with high levels of blood cholesterol and blood pressure and those who are overweight.

Exercise training for prevention of peripheral vascular disease among diabetic patient helps in potential mechanisms like formation of collateral circulation and increased blood flow, changes in micro circulation and endothelial functions, changes in muscle metabolism and oxygen extraction, prevention of inflammation and muscle injury, cost effective, preventing atherosclerosis and prothrombotic 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 Peripheral vascular diseases (PVD) and promoting collateral circulation in lower extremities.

Buerger-Allen exercise:

Buerger-Allen exercise is a specific exercise intended to improve circulation to the feet and legs. The lower extremities are elevated to a 45 to 90 degree angle and supported in this position until the skin blanches (appears dead white). The 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); finally, the legs are placed flat on the bed for a few minutes. 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 so that the legs are elevated for 2 to 3 minutes, down 5 to 10 minutes, and then flat on the bed for 10 minutes.

The Buerger-Allen exercise is for improving the lower extremity perfusion in type II diabetic patients.

Buerger-Allen exercise helps in drain the blood from major arteries like popliteal artery, anterior tibial artery, perineal and dorsalispedis artery. Elevation of extremity counter act gravitational pull promotes venous return and prevents venous stasis, enhances the venous circulation especially in the foot and equally distributes the blood flow all over the body.

NEED FOR STUDY

When blood glucose (sugar) levels are too high for too long, or swing back and forth between highs and lows, people with type II diabetes mellitus put themselves at risk for serious complications and damage to their bodies. Peripheral vascular disease (PVD) is one of the medical complications that can strike when type II diabetes is not well managed. Peripheral vascular disease includes several conditions that affect the blood vessels. PVD occurs when peripheral blood vessels, those located away from the heart, become blocked or damaged in some way. Peripheral artery disease, or PAD, is one type of PVD; it affects arteries in the arms and legs.

Making lifestyle changes and adopting healthy habits to maintain good control over diabetes will also help to treat any existing PVD. In very serious cases, when a

blood vessel is severely blocked, for example, surgery may be needed to re-route blood flow around the blockage using a blood vessel grafted from elsewhere in the body. Blockages can also be treated with angioplasty, a procedure in which a catheter with a balloon device is inserted in the blood vessel and inflated to clear the vessel; in some cases, a tube called a stent is placed inside the blood vessel to keep it open and allow blood to flow efficiently throughout the body. Though PVD can be treated to relieve symptoms, prevention is really the best medicine. Carefully monitoring blood glucose levels and focus on healthy habits keep blood vessels clear.

Considering that prevalence of PVD is increases with age, it is important to note that changes resulting from PVD mostly occur concomitantly with dysfunctions secondary to the ageing process. Thus, it is possible to conclude that reduced general physical fitness and muscle function resulting from ageing occurs even more markedly in individuals with PVD.

Because of that, adoption of interventions that allow reversion of impairments associated with the ageing process and improvement of functional limitation of individuals with PVD has been recommended for the treatment. In this sense, the practice of exercise training has been increasing along the past decades, since this modality of exercises seems to help preventing and treating diseases, as well as providing improvements in physical fitness and health in the elderly.

Statistic shows that 12% individual are (8-12million) having diabetes in the US. PVD is an independent factor for cerebral vascular death. Approximately 4-8% patient with diabetes require amputation. PVD have at least 30% of risk of death from

myocardial infraction (MI) or cerebro vascular accident (CVA) within 5 years and risk of approximately 50% in 10 years. Statistics shows that 83% of hospital consultant episode for diabetes required hospital admission in England in 2011-2012 (59% men & 41% women). Among these 18% needed emergency admissions.

Peripheral vascular disease is a very common condition in the United States. It occurs mostly in people older than 50 years. Peripheral vascular disease is a leading cause of disability among people older than 50 years and in those with diabetes. About 10 million people in the United States have peripheral vascular disease, which translates to about 5% of people older than 50 years. The number of people with the condition is expected to grow as the population ages.

Many people seem to think that this is a normal part of aging, and that nothing can be done or that the only alternative is surgery. Today, however, surgery is only one of several effective treatments available for peripheral vascular disease. Treating peripheral vascular disease medically is the best way to prevent worsening of the condition or complications. This is especially true for patients with hypertension or diabetes, those with high fats or lipids in the blood, and those who smoke.

Around 22.9 % deaths per 100,000 in Australia and 13.5% of adults had peripheral vascular diseases in Australia In India the percentage of peripheral vascular disease among smokers and alcohol consuming patients are, Chennai 42%, Madurai 48%, Delhi 22%. Approximately 15 - 40 % people with PVD is having diminished ability for perform daily activities. A Study was conducted among 14 patients showing that the subcutaneous blood flow is increase in seven patients temporarily within 24 hour

by doing Buerger's Allen exercise. Buerger's Allen exercises an active postural exercise (gravity alternatively fills and empties the blood vessels) for preventing PVD and promoting collateral circulation in lower extremities.

Men are slightly more likely than women to have peripheral vascular disease. Peripheral vascular disease is more common in smokers, and the combination of diabetes and smoking almost always results in more severe disease. About half of people with peripheral vascular disease do not have symptoms. Of those who do, another half do not tell their health care providers.

Exercise training for prevention of peripheral vascular disease in patients with type II diabetes mellitusat risk of Peripheral Vascular Disease patient helps in potential mechanisms like formation of collateral circulation and increased blood flow, changes micro circulation and endothelial functions, changes in muscle metabolism and oxygen extraction, prevent inflammation and muscle injury, cost effective, preventing atherosclerosis and prothrombotic risk factors.

Considering the above factors and review of literature investigator felt that nurses has an important role in implementing the Buerger's Allen exercise for improving the lower extremity perfusion in patients with Type II diabetes mellitus at risk of peripheral vascular disease. So there is a need to assess the effectiveness of Buerger's Allen exercise on improving the lower extremity perfusion in patients with Type II diabetes Mellitus at risk of peripheral vascular disease.

1.2 STATEMENT OF THE PROBLEM

"A study to assess the Effectiveness of Buerger's Allen exercise on Lower Extremity Perfusion among Diabetes Mellitus patients admitted in selected hospital at Coimbatore".

OBJECTIVES

1. To assess the lower extremity perfusion among diabetes mellitus patient in experimental group and control group.
2. To evaluate the effectiveness of Buerger's- Allen exercise in improving the lower extremity perfusion among the experimental group.
3. To find out the association between interventional scores of Buerger's- Allen exercise with selected demographic variables in experimental group and control group.

HYPOTHESIS

H1: There will be a significant difference between the mean pre test and post test on the lower extremity perfusion in pain among clients with diabetes mellitus of experimental group.

H2: There will be a significant difference between the mean pre test and post test on the lower extremity perfusion in edema among clients with diabetes mellitus of experimental.

H3: There will be a significant difference between the mean pre test and post test on the lower extremity perfusion in capaillary refill among clients with diabetes mellitus of experimental.

H4: There will be a significant difference between the mean pre test and post test on the lower extremity perfusion in pain among clients with diabetes mellitus of control group.

H5: There will be a significant difference between the mean pre test and post test on the lower extremity perfusion in edema among clients with diabetes mellitus of control group.

H6: There will be a significant difference between the mean pre test and post test on the lower extremity perfusion in capaillary refill among clients with diabetes mellitus of control group.

H7: There will be a significant difference between the mean post test on the lower extremity perfusion in capaillary refill among diabetes mellitus in expremental and control group.

H8: There will be a significant association between the post test score on lower extremity perfusion in pain and edema among diabetes patients with selected demographic variables in expremental and control group.

OPERATIONAL DEFINITIONS

Effectiveness: In this study it refers to changes in tissue perfusion after implementing Buerger Allen exercise.

Lower extremity perfusion: In this study it refers to the increased blood circulation of the lower extremity as evidenced by capillary refill <2 sec, absence of pain and edema after administering the Buerger's Allen exercise among type2 diabetes mellitus patients.

Diabetes mellitus patients: In this study it refers to patient who are diagnosed as type2 diabetes mellitus and blood sugar level is more than the normal value and is controlled by administration of insulin injections as well as rehabilitative measure.

Buerger's Allen exercise: Buerger's Allen exercise is an active postural exercise, which helps in filling and emptying of the lower extremity blood vessels according to gravity alternatives. In this study it refers to three steps (elevation, dependency, horizontal) of active postural exercise to improve the collateral circulations of the lower extremities among diabetic patients.

ASSUMPTIONS

It is assumed that

1. Diabetic patients may have inadequate knowledge regarding Buerger's Allen exercise.
2. The effectiveness of the Buerger's Allen exercise may vary from individual to individual.

Delimitations:

1. The study was limited only to Type II diabetes mellitus patients who are literate
2. The size of the sample was small and the data collection was shorter period which limits generalization.

PROJECTED OUTCOMES

1. The study will help the nurses to assess the peripheral vascular perfusion in lower extremities in Type 2 diabetes mellitus patients.
2. This study will help the nurses to elicit the effectiveness of Buerger Allen exercise in lower extremity perfusion in Type 2 diabetes mellitus patients.
3. This study will help the nurses to adopt the use of Buerger Allen exercise as a complimentary therapy in Type2 diabetes mellitus patients
4. The findings of the study will help the nurses to motivate other nurses to implement Buerger Allen exercise as a complimentary therapy to improve the

lower extremity perfusion in patients with Type 2 diabetes mellitus at risk of peripheral vascular disease as evidenced by numerical rating scale, scales for edema and capillary refill.

CHAPTER II

REVIEW OF LITERATURE

Review of literature provides basic for future investigation, justifies the replication, throws light on the feasibility of the study and the constraints of data collection, related the findings from one study to another with a hope to establish a comprehensive body of scientific knowledge in a professional discipline from which valid and pertinent theories may be developed. The review of literature for this study was done from the published articles, text books, reports, medline research, etc.

Review of literature was organized as follows:

1) Studies related to diabetes mellitus.

2) Studies related to lower extremity perfusion and diabetes mellitus.

3) Studies related to Buerger's Allen exercise - supervised exercise Programme on improving of lower extremity perfusion among diabetic Patients.

1) STUDIES RELATED TO DIABETES MELLITUS

2008,RaghavYadava conducted a study to assess the association of diabetes retinopathy and other micro vascular complications in case of diabetes mellitus. The study included 129 diabetic patients and cases were divided into 3 groups according to their duration, type of diabetes mellitus and non-compliance to management. The result of the study shows that, prevalence of retinopathy in Type1 was 34.45in Type2 was 12.4% as compared with Type1 and Type2 which was 25.5%. The difference was statistically significant showed that diabetic retinopathy associated with all type of

diabetes mellitus. As duration increase prevalence of the diabetes retinopathy also increase. It was 8.9% in<5 years duration and 89.0% in 11-15 years and 100% in cases with >15 years of diabetes. The incidence of nephropathy and neuropathy are also more in all type of diabetes mellitus.

2005,SeenaRajashekar conducted a study to determine the influence of type 2 diabetes mellitus on the risk of dementia and Alzheimer's disease: The aim of the study was to find out both dementia and diabetes are frequent disorders in elderly people. Prospective population-based cohort study among 6,370 elderly subjects. At baseline study participants were examined for presence of diabetes mellitus. Non demented participants were followed up, on average of 2.1 years. Incident dementia was diagnosed using a three-step screening and comprehensive diagnostic workup. The study was estimated relative risks with proportional hazard regression, adjusting for age, sex, and possible confounders. The study showed that the follow-up, 126 patients became demented, of whom 89 had Alzheimer's disease. Diabetes mellitus almost doubled the risk of dementia (relative risk [RR] 1.9 [1.3 to 2.8]) Alzheimer's disease and (RR 1.9 [1.2 to 3.1]). Patients treated with insulin were at highest risk of dementia (RR 4.3 [1.7 to 10.5]). The study revealed that the diabetes is a risk for developing dementia (8.8%).The study suggested that diabetes may have contributed to the clinical syndrome in a substantial proportion of all dementia patients.

2007, William Lesley conducted a study to find out the prevalence and incidence of chronic complications and mortality in a cohort of type 2 diabetic patients **.**The aim of the study was to evaluate the prevalence, incidence of micro- and macro vascular complications, final events, and mortality in type 2 diabetic patients, followed over a

period of 10 years in Spain. The study was done in 317 type 2 diabetic patients treated at a Primary Care Centre, followed for 10 years. Variables were described by means of ratios, mean values and standard deviation. The chi square test was used to compare ratios and the Student's' test to compare mean values. The result of the study showed that the prevalence of an increase in nephropathy (12%), in retinopathy (6.2%) and in neuropathy (2.1%), a decrease in Ischemic cardiomyopathy (-6.2%), an increase in peripheral vascular disease (5.6%). Cerebrovascular, events and diabetic foot remainingunchanged. The highest incidence rates (1000 subjects/year) were nephropathy 43, neuropathy 39 and ischemic cardiomyopathy 32. The prevalence of cardiovascular risk factors increased over the follow-up; being high blood pressure the most noticeable (30%). Overall mortality was 28/1000 subjects/year, being cardiovascular disease the main cause (31.2%). The study concluded that the prevalence and incidence of chronic complications and risk factors are in Spain.

2006,Gianna.M.Rodrghuer conducted a study to show that depression is twice as much as diabetes in the general population and major depression present in at least 15% of patient with diabetes mellitus these depression is associated with poor glycemic control with health complications, increased health cost, and decreased health quality of life .A study is revealed that the diabetic men have erectile dysfunctions and the prevalence is 34-45%.risk factors include poor glycemic control, diabetes duration. The micro and macro vascular complication, psychological and situational factors are also affecting the erectile dysfunctions.

2) STUDIES RELATED TO LOWER EXTREMITY PERFUSION IN DIABETES PATIENTS

The second national health and nutritional examination survey in 2012 reported that the prevalence of the diminished or absents of the dorsalispedis artery pulse found in 16.2% of adult with the age of 35-54 years and 23.5% of those of 55-74 years .This rates are considerably higher than non-diabetes patient. According to national hospital discharge survey (NHDS) 16.2% of diabetes patient is having peripheral vascular disease which is 3.2% higher than non-diabetes patients. The study concluded that the prevalence of vascular disease is frequently more in diabetes patients as comparing with non-diabetes patients.

2010,Kerry.J.Steward conducted a study to quantify the distribution of the peripheral vascular disease in diabetics and non - diabetic patients attending angiography and to compare, severity and the outcome between both groups of patients. The study has conducted in 136 patients and 58(43%) patients were diabetic. This study was confirmed that diabetic patients have more worsened peripheral vascular disease and are at high risk lower extremity amputation than non-diabetes patients. Diabetes patients with peripheral vascular disease also had high mortality and died at a younger age than non-diabetes patient.

2009,EdwardB.JudeSamson conducted a study to show the prevalence of peripheral vascular diseases in diabetes and impaired glucose regulation subjects. The aim of the study was to investigate the prevalence of the PVD in the patients with DM and impaired glucose regulation (IGR) This study was conducted in 717 patients in with DM or IGR. The study revealed that overall prevalence of PVD was 12.2% in the

hyperglycemic population. The prevalence of PVD in diabetes patients were 15.1% significantly higher than of the IGR subjects (7.7%). The study was concluded that the age, sex, diabetic duration, and total cholesterol level were independent risk of diabetic peripheral vascular disease and the prevalence of PVD is common in DM as well as IGR subjects.

2001,Grout's conducted a study to determine the effect of Polyneuropathy on the foot microcirculation in type2 diabetes. The aim of the study was to investigate the influence of peripheral polyneuropathy (PNP) on skin microcirculation and foot swelling rate in the feet of the patients of type 2 diabetes mellitus. The study was conducted in 38 type 2 DM patients, 24 with PNP and 14without PNP and 16 healthy patients, first supine and subsequently sitting with the foot dependent for 50 minutes. The result shows patient with PNP has low capillary blood velocity. Compared with control group the percentage reduction in skin blood flux, after 10 minutes was higher in the patient with PNP and without PNP (3%, 18%, 26% respectively, $p<002$). The study was concluded that type 2 diabetes patients had polyneuropathy associated multiple abnormalities in the skin microcirculation on the foot, characterized by reduction in capillary blood flow and impaired fluid filtration.

2007,Shanthi Rani conducted a study in Chennai to assess the prevalence of PVD among DM patients. The purpose of the study was to find out the prevalence of the PVD among south Indian patients, this study was carried out in two colonies in Chennai. The study was done in three groups. (Normal, impaired and diabetes patients). The overall prevalence of the PVD is 3.2%, among these prevalence 6.3% is alone consisted

by diabetes patients. The study concluded that the prevalence of PVD was higher in (7.8%) in diabetic patient than with newly diagnosed DM patients.

3) STUDIES RELATED TO BUERGER'S ALLEN EXERCISE - SUPERVISED EXERCISE PROGRAMME ON IMPROVING LOWER EXTREMITY PERFUSION

2007,Treesak.C conducted a study to find out the effectiveness of the Buerger-Allen Exercise among PVD patients; the study was conducted among 13 patients. The study showed there is increased subcutaneous blood flow in patients during the exercise, the study also revealed that the increased angle pressure and toe pressure during the exercise. The overall benefits are seen in 7 patients after 24 hours. The study concluded that the Buerger's Allen exercise is effective for improving the lower extremity circulation.

2010, D.T Williams, A study was done to find out the influence of foot perfusion in diabetes exercise. Exercise has both positive and negative effect on post exercise tissue perfusion on the lower limb with peripheral vascular disease. The aim of the study was to measure changes in foot perfusion following a brief period of lower limb exercise in individuals with and without type 2 DM and non-critical PVD. The study was conducted among 61 patients. The result shows that post exercise, toe pressure and toe brachial pressure (TBI) increased in non-diabetic patient. But there was elevated transcutaneous oxygen tension (TcPO2) value in diabetic patient and decreased transcutaneous carbon dioxide (TcPCO2) decreased in all arterial disease. The study was concluded that the improvement in the TcPO2and decreased TcPCO2 level in foot site in

diabetes shows changes in cutaneous blood supply. The result suggested that brief exercise results in an improvement as cutaneous perfusion in non-critical PVD particularly patient with type 2 DM.

2010, Adam.J conducted to determine high intensity training for intermittent claudication in vascular rehabilitation. The aim of the observational study was investigating the safety and effectiveness of the high intensity interventional programme for the patient with peripheral vascular disease. This study was conducted among 47 patients the result shows that the rehabilitation score with participation in the program and more exercise sessions led to greater improvement. Moreover no adverse event occurred in the study patients. The study suggested patient with PVD can safely tolerate high intensity exercise programme.

2007,Kasemgup V conducted a study to determine the cost effective of exercise training to improve claudication symptoms in peripheral arterial disease. The aim of the study was to prove effectiveness of the exercise rehabilitation for the treatment of intermittent claudication, the primary symptom of PVD. The study was conducted comparing percutaneous transluminal angioplasty (PTA) and exercise rehabilitation. The effectiveness was assessed in the third and sixth months exercise programme. Initially first three months PTA was more effective than exercise rehabilitation but after six months the researcher found that the exercise was more effective than PTA and cost effective also. The study concluded that exercise rehabilitation for claudication treatment has national implication for future PVD care.

An article “India’s diabetes burden to cross 100 million by 2030” published in times of India regarding conservative approach to the management of lower extremity associated signs and symptoms (pain, edema, tenderness, cyanosis, coldness and stiffness) show the effectiveness of Buerger’s Allen exercise. The treatment involve encouragement of blood flow during the actively vasospastic phase by elevation of an active exercise part. The researcher recommended that Buerger’s Allen Exercise for the improvement of lower extremity blood supply. Another article regarding intermittent claudication also highly recommended the importance of Buerger’s Allen exercise (three 3 series of exercise repeat 6- 7 times in a day) among peripheral vascular disease.

CONCEPTUAL FRAME WORK

The conceptual framework used for the research study is based on general system theory introduced by, Ludwig Von Bertalanffy (1980). This theory is used as a universal theory that could be applied to many fields of study. Nurses are increasingly using system theory to understand the biological system and systems in families, communities, nursing and health care.

A system is a group of interrelated exclusive components and it is based on the eminence and extent of the input, throughput, output and feedback. Input consists of information, matter or force that enters the system In this research study, patients with complaints of lower extremity perfusion will be assessed using demographic variables and standardized numerical pain scale, modified tools for edema and capillary refill which act as an input.

After immersing the input it is processed in a way that is beneficial for the system. This information is known as throughput. In this study Buerger-Allen exercise will be implemented to each patient individually every day for three sessions, for a period of 15 minutes for 6 days) and lower extremity were assessed before and after intervention which act as throughput of the study.

Output from a system is force, stuff or information given out by the system as a result of its processes. The change in the velocity of lower extremity perfusion act as an output of the study.

Feedback is the mechanism by which a choice of output of a system is returned to the system as input. Feedback enables a system to itself by redirecting the output of a system into the system as input, thus forming a feedback.

The result reveals improvement in the velocity of lower extremity perfusion in patients with type II diabetes mellitus at risk of Peripheral Vascular disease, which act as the feedback for the nurse to implement this Buerger-Allen exercise in their routine care.

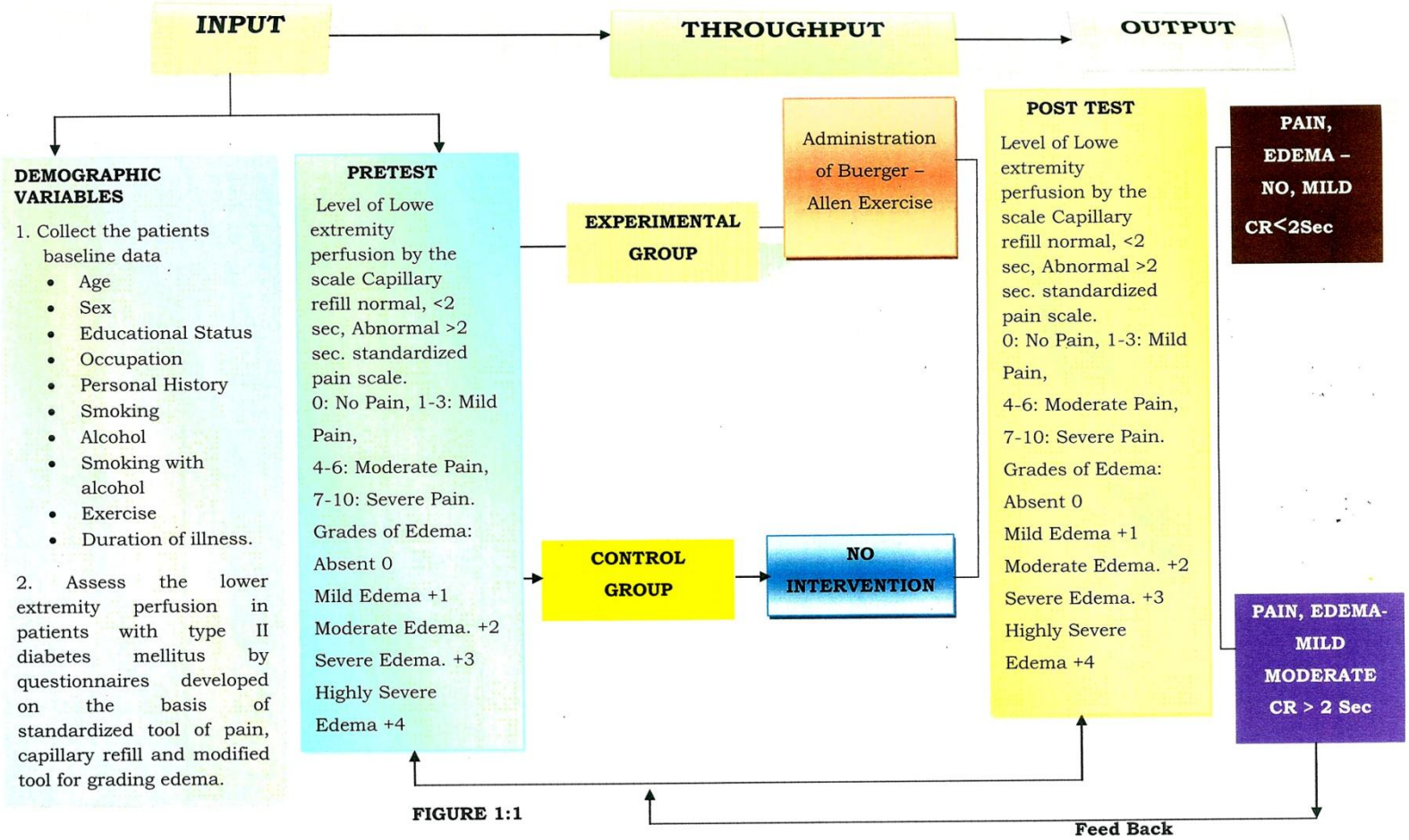

FIGURE 1:1

CONCEPTUAL FRAME WORK BASED ON MODIFIED GENERAL SYSTEM THEORY (Ludwig Von Bertalanffy - 1968)

22

CHAPTER 3

METHODOLOGY

Research methodology is a systematic, theoretical analysis of methods applied to the field of study. It is a way to systematically solve the problems. It indicates the general pattern for organizing the procedures for collecting valid and reliable data for investigation.

RESEARCH APPROACH

The choice of the research approach depends on the purpose of the study. Experimental research approach is used in this study.

RESEARCH DESIGN

Research design is an overall plan for obtaining answers to research questions or for testing the research hypothesis. Research design adopted for the present study is 'Quasi-experimental design' Pre test - post test control group design.

The present study could be diagrammed as:

E	O_1	X	O_2
C	O_1	-	O_2

Key:

E: Experimental group

C: Control group

X: Buerger - Allen exercise

O_1: Pre test

O_2: Post test

In this study Buerger Allen exercise was given to experimental group and post test was done. In control group pre-test and post-test was done without administering Buerger Allen exercise

VARIABLES

Variables are concepts at different level of abstraction that are concisely defined to promote their measurements or manipulation within study.

Dependent variable:

It is the outcome or response due to their effect of the independent variable, which researcher wants to predict or explain.

In this study the dependent variable is lower extremity perfusion.

Independent variable:

It is a stimulus or activity that is manipulated or varied by researcher to create the effect on the independent variable.

In this study the independent variable is Buerger Allen exercise.

Extraneous variables:

Extraneous variables used in this study are age, gender, occupation, personal history including smoking, alcohol, smoking with alcohol, exercise and duration of illness.

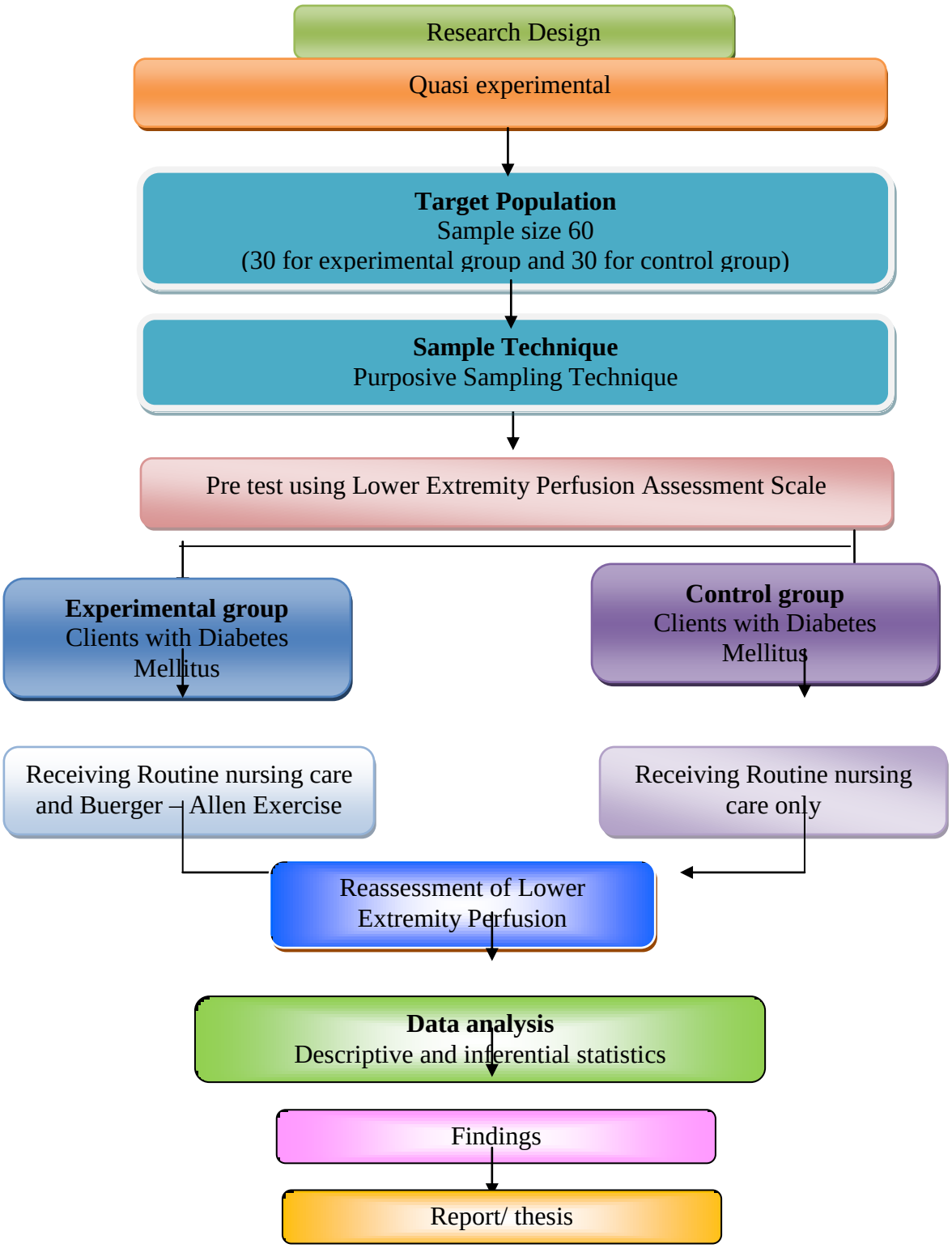

Figure 3.1: The schematic Representation of Research Methodology.

SETTING

The setting selected for the study is the Kongunadu Hospital with 350 beds. It is a multi-specialty hospital. It is situated 30 kms away from the college. It receives an average of 60 inpatients per day. The hospital received an average of 30 diabetic patients each day.

POPULATION

Population is the set of people or entities to which the results of a research are to be generalized.

In this study, target population comprises of Type 2 diabetes patient. The assessable population consists of Type 2 diabetes patients of Kongunadu Hospital, Coimbatore.

SAMPLE

Sample may be defined as representative unit of target population , which is to be worked upon by researchers during this study.

The samples of the study are Type 2 diabetes mellitus patients.

SAMPLING TECHNIQUE

Purposive sampling technique is used in this study**.**

SAMPLE SIZE

In this study, the sample size will be 60 Type 2 diabetes mellitus patients,30 samples for control group and 30 samples for experimental group

SAMPLING CRITERIA

Inclusion criteria:

Patients who are

- Willing to participate.
- Diagnosed as type 2 DM patients of both sexes
- Available at the time of data collection
- Able to understand Tamil and English.

Exclusion Criteria:

Patients who are

- Having chronic diabetes mellitus with foot ulcer and gangrene.
- Critically ill, unconscious, hypertensive and cardiac problem.

DESCRIPTION OF THE DATA COLLECTION TOOL:

Data collection is the gathering of information needed to address the research problem. The data collection consists of 2 parts.

PART A– DEMOGRAPHIC PROFILE:

Demographic profile:

Age, Gender, Educational Status, Occupation.

Personal history including:

History of smoking, alcohol, smoking with alcohol, exercise and duration of illness

PART B: LOWER EXTREMITY PERFUSION ASSESSMENT

Consists of questionnaires related to pain, edema and capillary refill in lower extremity.

PAIN ASSESSMENT - NUMERICAL PAIN RATING SCALE:

In order to measure the pain intensity Numerical Pain Rating Scale is used. This scale is used to assess pain intensity in persons who are able to self – report and is the best choice for adults. In numerical pain rating scale the numbers are marked from 0 to 10 encompassing 10 divisions at equal distance, namely 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. The divisions 1 to 10 portray the pain intensity in ascending order i.e. at 1 the pain intensity is at the lowest level and at level 10 the pain intensity is at its peak.

The participants are instructed to indicate the pain intensity, which they experienced while walking or exercising. The pain intensity was categorized as no, mild, moderate, severe.

The pain score is interpreted as follows:

0	:	No Pain
1-3	:	Mild Pain
4-6	:	Moderate Pain
7-10	:	Severe Pain

EDEMA ASSESSMENT SCALE

Edema is the swelling resulting from fluid accumulation in body tissues. It is most commonly found in the lower extremities (such as feet, ankles, and legs).

Clinically, there are two different types of edema - pitting and non-pitting. In order to measure the pitting edema, edema assessment scale is used.

Pitting Edema

Pitting edema can be demonstrated by applying pressure to the swollen area by depressing the skin with a finger. If this causes an indentation that stays for some time after the release of the pressure, this type of edema is referred to as pitting edema.

Pressure in any form, such as from the elastic in socks or tight clothing, can induce pitting with this type of edema. Pitting edema may also be caused by systemic diseases that affect the various organ systems of the body, or by local conditions involving the affected extremities. Pitting edema is mainly caused by complications of vital organs of the body, such as heart, liver, and kidneys. Malfunctioning of these organs can cause retention of fluid in the body.

The indentation made on the skin when pressure is applied to a pitting edema is due to the fluid leaking out of the capillaries into the subcutaneous tissue. The extent and duration of the indentation after applying pressure are good indications of the severity of the pitting edema.

Therefore, pitting edemas are graded by this simple examination. The table below explains the four grades of pitting edema.

Normal 0: Absence of pitting edema.

Risk of peripheral vascular disease:

Grade 1+ Edema – Mild Edema: A pit of 2 mm or less; presents as slight pitting with no distortion. Pitting disappears immediately.

Grade 2+ Edema – Moderate Edema: A deeper pit measuring between 2 mm and 4 mm. It will have no easily discernible distortion and the pitting will disappear in 10 – 15 seconds.

Grade 3+ Edema – Severe Edema: A noticeably deep pit measuring between 4 mm and 6 mm. The area affected will look distinctly fuller and swollen. The indentation will take as long as 1 minute before it disappears.

Grade 4+ Edema – Highly Severe Edema: A very deep pit is seen which will last between 2 to 5 minutes before it disappears. This indentation will measure 6 – 8 mm in depth and the body part affected by the edema will look gross and distorted.

CAPILLARY REFILL ASSESSMENT

The capillary nail refill test is a quick test done on the nail beds. It is used amount of blood flow to tissue.

The test is performed by applying pressure to the nail bed until it turns white. This indicates that the blood has been forced from the tissue. It is called blanching. Once the tissue has blanched, pressure is removed. While the patient holds their extremity above their heart, the health care provider measures the time it takes for blood to return to the tissue. Return of blood is indicated by the nail turning back to a pink color.

Preparation for the test:

Remove colored nail polish before this test. There will be minor pressure to the bed of your nail. This should not cause discomfort.

Reason to perform this test:

Tissues need oxygen to survive. Oxygen is carried to various parts of the body by the blood (vascular) system. This test measures how well the vascular system works in your hands and feet the parts of your body that are farthest from the heart.

Normal Results – 0 score:

If there is good blood flow to the nail bed, a pink color should return in less than 2 seconds after pressure is removed.

Abnormal Results – 1 score:

Blanch times that are greater than 2 seconds may indicate Peripheral vascular disease (PVD)

INTERVENTION

Buerger-Allen exercise:

Buerger-Allen exercise is a specific exercise intended to improve circulation to the feet and legs. The lower extremities are elevated to a 45 to 90 degree angle and supported in this position until the skin blanches (appears dead white). The 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); finally, the legs are placed flat on the bed for a few minutes. 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 so that the legs are elevated for 2 to 3 minutes, down 5 to 10 minutes, and then flat on the bed for 10 minutes.

The Buerger-Allen exercise is for improving the lower extremity perfusion in type II diabetic patients. At first, the lower extremity perfusion of the patient will be assessed through pretest questionnaires based on numerical pain rating scale, tools for assessing capillary and edema.

Then Buerger-Allen exercise is administered as intervention along with the routine nursing care for clients in Experimental group. After the intervention, post test with same questionnaires will be used for knowing the variations. Similarly for clients in Control group the routine nursing care is provided and the post assessment is done.

PRE-PROCEDURE

1. Make the patient comfort.

2.Explain the steps of procedure:

Intervention	Rational
Arrange the necessary article (pillows and chair)	For saving the time and promote comfort for the participants.
Step 1: Elevation of lower limb It is the first step in the Buerger Allen exercise, which lasts for 4 minutes. In this step patient raise the lower extremity by placing a chair and a pillow under the legs to a 45 degree angle above the level of heart.	This step helps in drain the blood from major arteries like popliteal artery, anterior tibial artery, peroneal and dorsalispedis artery. Elevation of extremity counteract gravitational pull promotes venous return and prevents venous stasis.
Step 2: Dependency In this step patient sits up, hangs the legs over the side of the bed and actively exercise the feet and toes (dorsiflexes, plantar flexes and circle the feet) it helps in the return of the blood to the lower extremity. This step last for 4 minutes.	This step helps and enhances the venous circulation, especially in the foot. The main mechanism behind this step is calf muscle pump.
Step 3: Horizontal In this last step patient lies in supine position at the level as heart, which lasts for 7minutes.	This step helps the by horizontal gravity alteration.

CONTENT VALIDITY

Content validity is considered with the scope or range of items used to measure the variable.

The content validity was done from May 12th to 17th. The prepared tool with the problem statement, objectives, operation definitions and criterion checklist was given to 5 experts to ensure content validity. Five experts were from the field of Medical surgical nursing and two experts from Medical specialty (Doctor). The criterion checklist contained four columns of relevant, needs modification, not relevant, and remarks / suggestions by the experts. As per the suggestions from experts I had modified certain demographic variables.0 Out of 9 items 100% agreement for 4 times, 70% agreement for 2 items, 3 items were modified on the basis of expert opinion.

Reliability

Reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to measure. The reliability coefficient was found using Chronbach's alpha. The reliability was found to be r = 0.83, which was statistically significant. This indicates the tool was valuable.

PILOT STUDY

A pilot study is referred to a scale preliminary try out of the method to be used in large study, which acquaints the researcher with problems that can be corrected in proportion of the large research study or is done to provide the researcher with an opportunity to try out the procedure, methods and tools of data collection.

A group of people similar to the study subjects should be tested in conditions similar to those used in the actual study.

After obtaining written permission from the Medical Superintendent, Kongunadu Hospital, Coimbatore, pilot study was conducted from 11 June to 21st June among Type2 diabetes mellitus patients .Oral consent was got from 10 patients,5in experimental group and 5 in control group. The objective of the study was explained to each subject. The tool was found feasible, practicable and no changes were made after the pilot study. The data was analyzed using descriptive and inferential statistics. The t-value 9.28 for the pilot study in all three categories, Pain, Edema and Capillary refill were found to be significant at 0.05 level. The investigator decided to carry out the actual data collection after the pilot study.

DATA COLLECTION PROCEDURE

The data was collected from July 27 to August 30. The study was conducted in Kongunadu Hospital. A formal letter was sent to the Medical Superintendent of the hospital and a written permission was obtained to conduct the study.

The informed consent was orally taken prior to the study from the subjects and the nature of the study was explained to the participants. The subjects of control group and experimental were assigned alternately. The control group and experimental group were assessed with questionnaires, before intervention and post-test with same questionnaires were done. The pain was assessed immediately by Numerical Pain Rating Scale, and modified tools for edema and capillary refill in lower extremity were used.

The respondents were co-operative. The data was thus collected and complied for data analysis.

SCHEDULE OF DATA COLLECTION

S.No.	Pretest	No of Patients in Experimental Group	No of Patients in Control Group	Post-Test after day 7
1	22.07.2014	1	1	29.07.2014
2	23.07.2014	1	2	30.07.2014
3	24.07.2014	1	1	31.07.2014
4	25.07.2014	1	2	01.08.2014
5	26.07.2014	2	1	02.08.2014
6	27.07.2014	1	1	03.08.2014
7	28.07.2014	1	2	04.08.2014
8	29.07.2014	2	1	05.08.2014
9	30.07.2014	1	2	06.08.2014
10	31.07.2014	2	1	07.08.2014
11	01.08.2014	1	1	08.08.2014
12	02.08.2014	2	2	09.08.2014
13	03.08.2014	1	1	10.08.2014
14	04.08.2014	2	2	11.08.2014
15	05.08.2014	1	1	12.08.2014
16	06.08.2014	2	1	13.08.2014
17	07.08.2014	1	2	14.08.2014
18	08.08.2014	1	1	15.08.2014
19	09.08.2014	2	1	16.08.2014
20	15.08.2014	1	1	22.08.2014
21	17.08.2014	2	2	24.08.2014
22	20.08.2014	1	1	27.08.2014
	TOTAL	30	30	

PLAN FOR DATA ANALYSIS

The investigator planned to analyze data by using both descriptive and inferential statistics.

- Sample characteristics in terms of frequency and percentage.
- Computation of mean and SD of the post test of control and experimental group.
- Paired 't' test to determine the mean difference in pain, edema and capillary refill between pre- test and post – test.
- Independent 't' test to determine the mean difference in pain, edema and capillary refill between post – test of Experimental and Control group.
- Chi-square to find the association between the pain scores, and edema score with the selected demographic variables.

PROTECTION OF HUMAN RIGHTS

The study was conducted after obtaining the approval from the research committee. The purpose and the other details of the study were explained to the respondents and consent was obtained from the Type 2 diabetes patients in oral form. Confidentiality was assured to the individuals regarding with the study results. Permission was sought from the hospital authorities. Thus the ethical issues are ensured in the study.

1. Assessment of pre test effectiveness by using data sheet, mean standard deviation
2. Effectiveness of interventional program will analyze by "t" Test.

Association with demographic variables will analyze by "χ^2" (Chi square).

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

Analysis and interpretation of data is the most important phase of the research, which involves the computation of the certain measures along with searching for pattern of relationship that exists among data groups. The purpose of analyzing the data collected in a study to describe the data in meaning full terms as the data collected does not answer the research questions or test research hypothesis. The data used is to be systematically analyzed so that trends and pattern of relationship can be detected.

The data were analyzed on the basis of study objectives using both descriptive and inferential statistics. The objective of the study were

OBJECTIVES

1. To assess the lower extremity perfusion among diabetes mellitus patient in experimental and control group.
2. To evaluate the effectiveness of Buerger's- Allen exercise inimproving the lower extremity perfusion among the experimental group.
3. To find out the association between interventional scores of Buerger's- Allen exercise with selected demographic variables in experimental group and control group.

Organization of the study findings:

The data were presented under the following headings

Section I: Data on demographic variables of Experimental and Control Group

Section II: Data on Assessment of Lower Extremity Perfusion among Diabetes patients in Experimental and Control Group.

Section III: Data on Effectiveness of Buerger's- Allen exercise on Lower Extremity Perfusion among diabetes patients.

Section IV: Data on Association between the Lower Extremity Perfusion score among diabetes patients with selected demographic variables in Experimental and Control Group

SECTION :1 DATA ON DEMOGRAPHIC VARIABLES OF EXPERIMENTAL AND CONTROL GROUP

Table:1.1

Frequency and Percentage Distribution of Diabetes Patients in Control Group and Experimental Group Based on Demographic Variables

N = 60

S.NO.	Demographic Variable		Experimental Group (N_1 = 30)		Control Group (N_2 = 30)	
			Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
1	Age in years	a) < 45	-	-	1	3
		b) 45 – 50	6	20	2	7
		c) 51 – 55	10	33	2	7
		d) 56 – 60	12	40	12	40
		e) 60 – 65	2	7	7	23
		f) > 65	-	-	6	20
2	Gender	a) Male	19	63	16	53
		b) Female	11	37	14	47
3	Education	a) Illiterate	0	0	1	4
		b) Secondary level	3	10	15	50
		c) Higher Secondary	14	46	7	23
		d) UG / PG	13	44	7	23
4	Occupation	a) Unemployment / House Wife	8	27	9	30
		b) Coolie	5	17	11	37
		c) Business	7	23	4	13
		d) Salaried	9	30	6	20
		e)Government Employee	1	3	-	-

Table:1.2

N = 60

S.NO	Demographic Variable		Experimental Group (N_1 = 30)		Control Group (N_2 = 30)	
			Frequency (n)	Percentage (%)	Frequency (n)	Percentage(%)
1	Smoking	a) Yes	19	63	14	47
		b) No	11	37	16	53
2	Alcohol	a) Yes	19	63	11	37
		b) No	11	37	19	63
3	Exercise	a) Yes	11	37	7	23
		b) No	19	63	23	77
4	Smoking and Alcohol	a) Yes	19	63	11	37
		b) No	11	37	19	63
5	Duration of Illness in years	a) <3	4	13	1	3
		b) 3 – 6	24	70	15	50
		c) >6	2	7	14	47

Table 1.1 describes the demographic data description of diabetic clients. Highlighting the majority clients in each category: 12 (40%) are between 56 – 60 years of age in Experimental group and 12 (40%) in Control group of same age group. Gender distribution reveals that majority are Male in both Experimental (19 i.e., 63%) and Control (16 i.e., 53%) group. In Experimental group 14 (46%) clients had Higher Secondary level of education while 15 (50%) had Secondary level of education in Control group. 9 clients among 30 in experimental group (30%) were salaried and 11 (37%) were coolie workers in control group.

Table 1.2 Assessment on personal history was based on the client's smoking habit, alcohol consumption, exercise practice and those with both smoking and alcohol habit and the duration of diatheses.

Table 1.2 reveals the personal history of diabetic clients. Among the clients in Experimental group 19 (63%) have the habit of Smoking, Alcohol and Both smoking and

Alcohol together respectively. 19 (63%) do not exercise while 11 (37%) clients do regular exercise. 24(70%) members have diabetes for the past 3 – 6 years. Among the clients in Control group 16 (53%)have the habit of Smoking alone, 19 (63%) have the habit ofonly Alcohol and Both smoking and Alcoholtogether respectively. 19 (63%) do not exercise while 11 (37%) clients do regular exercise. 15(50%) members have diabetes for the past 3 – 6 years and 14(47%) have for more than 6 years.

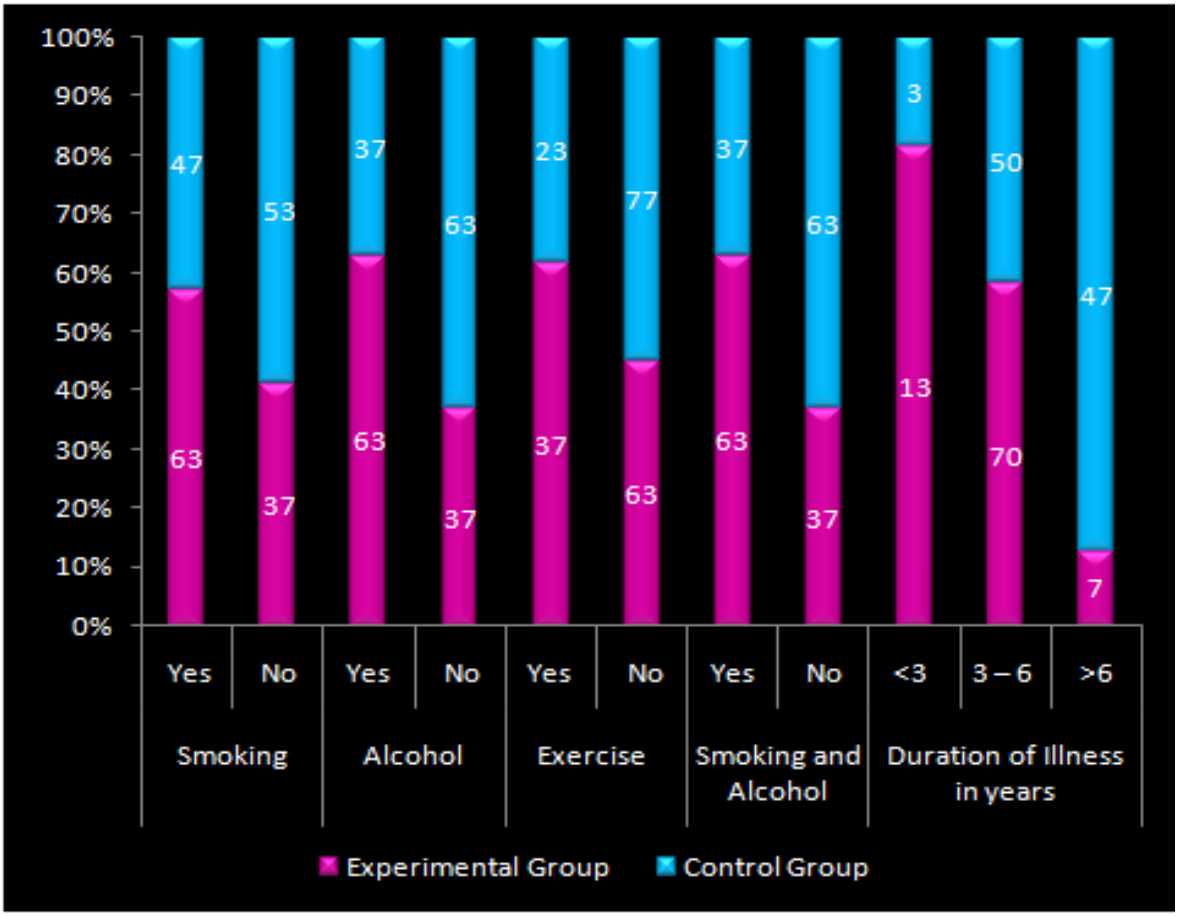

Fig 1.1: Staked column Bar Chart on Personal History of Diabetic Clients

Section II: DATA ON ASSESSMENT OF LOWER EXTREMITY PERFUSION AMONG DIABETES PATIENTS IN EXPERIMENTAL AND CONTROL GROUP.

Table 2.1

Frequency and Percentage Distribution of Lower Extremity Perfusion (LEP) among patients in Experimental Group

N =30

S.NO	LEP Assessment	Interpretation (Score)	Pre Test		Post Test	
			Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
1	Pain	No pain (0)	-	-	14	47
		MildPain (1 – 3)	3	10	16	53
		Moderate Pain (4 – 6)	25	83	-	-
		Severe Pain (7 – 10)	2	7	-	-
2	Relief from Pain after rest	Yes	-	-	15	50
		No	30	100	1	3
		Not Applicable *(if Pain is not present)*	-	-	14	47
3	Numbness and Tingling Sensation	Yes	29	97	1	3
		No	1	3	29	97
4	Capillary refill	Yes	30	100	-	-
		No	-	-	30	100
5	Cold when touched	Yes	29	97	-	-
		No	1	3	30	100
6	Edema	No Edema (0)	2	7	21	70
		Mild Edema (1)	4	13	8	27
		Moderate Edema (2)	16	53	1	3
		Severe Edema (3)	8	27	-	-

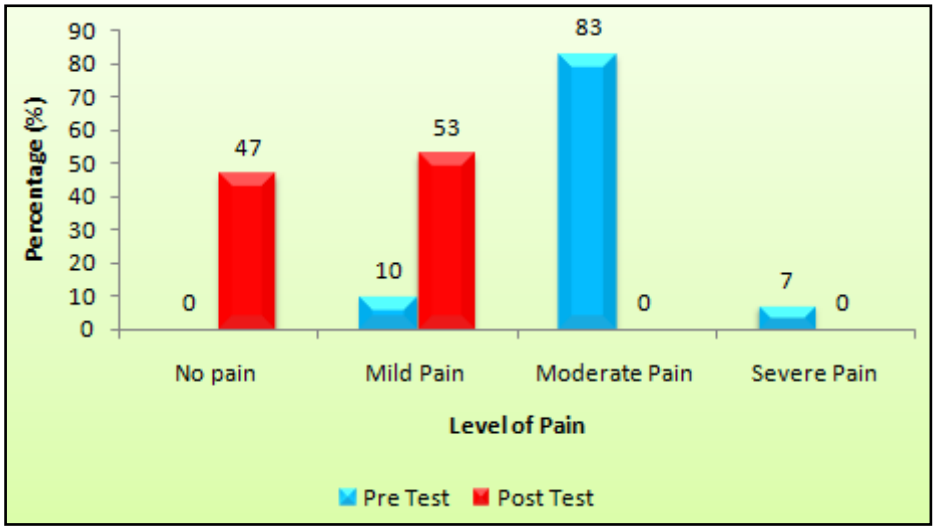

Fig 2.1: Comparative Bar Chart on Level of Pain among clients with Diabetes in Experimental Group

Table 2.1: Assessment on Lower Extremity Perfusion (LEP) with regard to pain among patients with diabetes in Experimental Group reveals that 83% of clients were on the highest at the moderate level of pain before intervention. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, it was identified that 16 (53%) had mild pain and 14 (47%) had no complaints of pain. This shows that of Buerger's-Allen exercise on Lower Extremity Perfusion helps in reliving the pain level of patients with diabetes.

It also added that all the 30 clients did not have relief from pain even after resting a while. On a contrast after the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, it was identified that 15 (50%) had relief from pain after a short rest, while 14 clients did not have pain at all, and only one client reported pain even after resting.

29 (97%) of the clients had numbness and tingling feeling in the lower legs and feet before intervention. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, it was identified that 29 (97%) of the clients had no sensations like numbness or tingling on feet. This proves the effectiveness of the treatment.

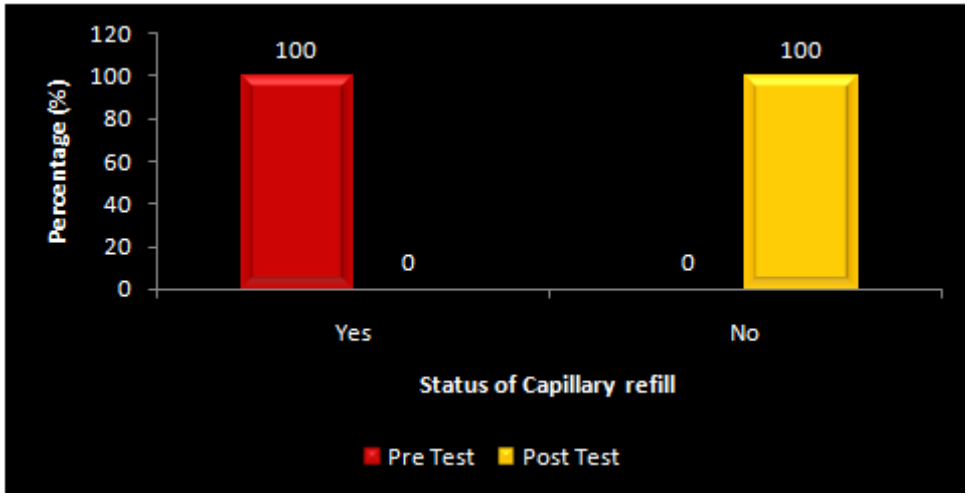

Fig 2.2: Comparative Bar Chart on Capillary refill among clients with Diabetes in Experimental Group

Table 2.1: Assessment on Lower Extremity Perfusion (LEP) with regard to capillary refill among patients with diabetes in Experimental Group reveals that before intervention, all the clients had complaints on pale fingers and toes, with discoloration or bluish after relieving pressure. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, it was identified that all the clients had good capillary refill. This shows that of Buerger's- Allen exercise on Lower Extremity Perfusion is effective in good capillary refill among the patients with diabetes.

29 (97%) of the clients had cold hands and feet before intervention. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, it was identified that non of the clients had cold feeling on feet. This proves the effectiveness of the treatment.

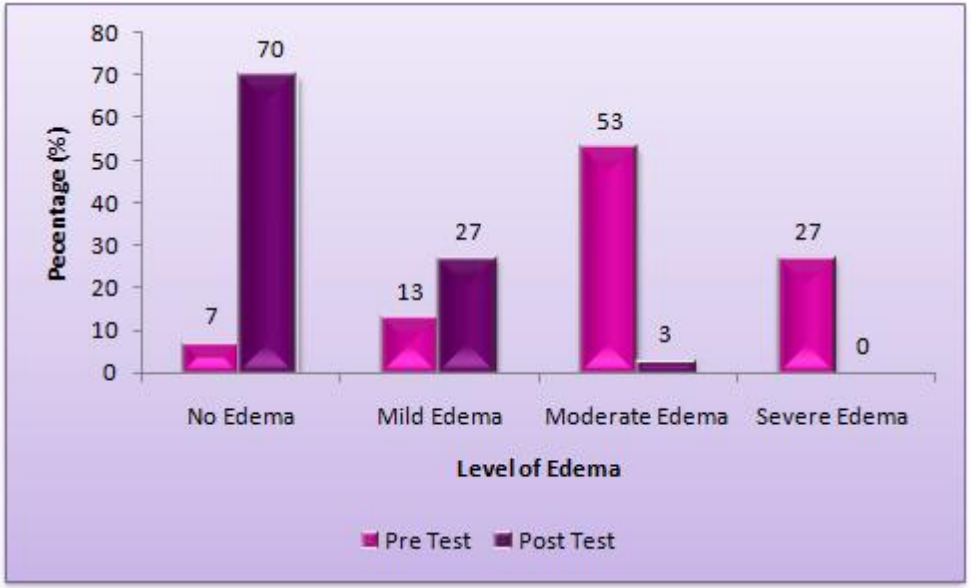

Fig 2.3: Comparative Bar Chart on Level of Edema among clients with Diabetes in Experimental Group

Table 2.1: Assessment on Lower Extremity Perfusion (LEP) with regard to level of Edema among patients with diabetes in Experimental Group reveals that before intervention, 16 (53%) clients were on the highest at the moderate level of edema. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, it was identified that 21 (70%) had no Edema and 8 (27%) had mild edema and only 1 (3%) of the client had moderate level of edema. This shows that of Buerger's- Allen exercise on Lower Extremity Perfusion helps in reliving the edema level of patients with diabetes.

Table 2.1a

Frequency and Percentage Distribution of Lower Extremity Perfusion (LEP) among patients in Control Group

N = 30

S.NO	LEP Assessment	Interpretation (Score)	Initial Assessment		Final Assessment	
			Frequency (n)	Percentage e(%)	Frequency (n)	Percentage e(%)
1	Pain	No pain (0)	5	16	6	20
		Mild Pain (1 – 3)	11	37	15	50
		ModeratePain(4 – 6)	12	40	9	30
		Severe Pain (7 – 10)	2	7	-	-
2	Relief from Pain after rest	Yes	13	43	12	40
		No	12	40	12	40
		Not Applicable *(if Pain is not present)*	5	17	6	20
3	Numbness and Tingling Sensation	Yes	16	53	12	40
		No	14	47	18	60
4	Capillary refill	Yes	16	53	14	47
		No	14	47	16	53
5	Cold when touched	Yes	17	43	10	67
		No	13	57	20	33
6	Edema	No Edema (0)	13	43	18	60
		Mild Edema (1)	4	13	11	37
		Moderate Edema (2)	11	37	1	3
		Severe Edema (3)	2	7	-	-

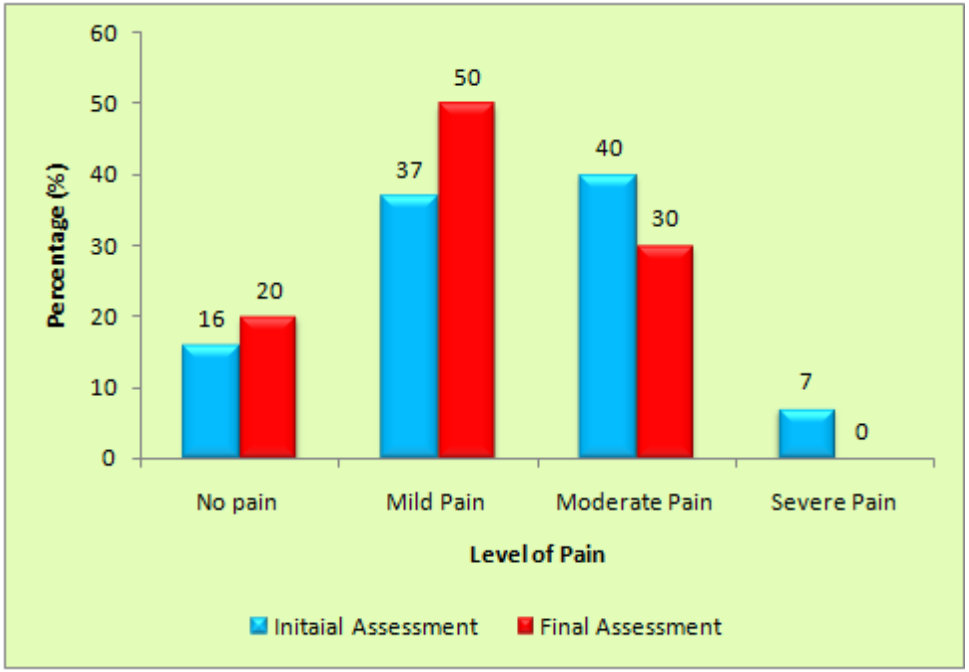

Fig 2.1a: Comparative Bar Chart on Level of Pain among clients with Diabetes in Control Group

Table 2.1a: Assessment on Lower Extremity Perfusion (LEP) with regard to pain among patients with diabetes in Control Group reveals that 40% of clients were on the highest at the moderate level of pain on initial assessment. After the routine care, it was identified that 15 (50%) had mild pain,6 (20%) had no complaints of pain and 9(30%) had moderate level of pain . This shows that routine care on Lower Extremity Perfusion has lower level of improvement from the reduction of pain level in patients with diabetes.

16 (53%) of the clients had numbness and tingling feeling in the arms or lower legs and feet on initial assessment. After the routine care, it was identified that 12 (40%) of the clients had no sensations like numbness or tingling on feet while 18(60%) had had numbness and tingling feeling. This proves the effectiveness of the treatment was better in Experimental group on comparison with the Control group.

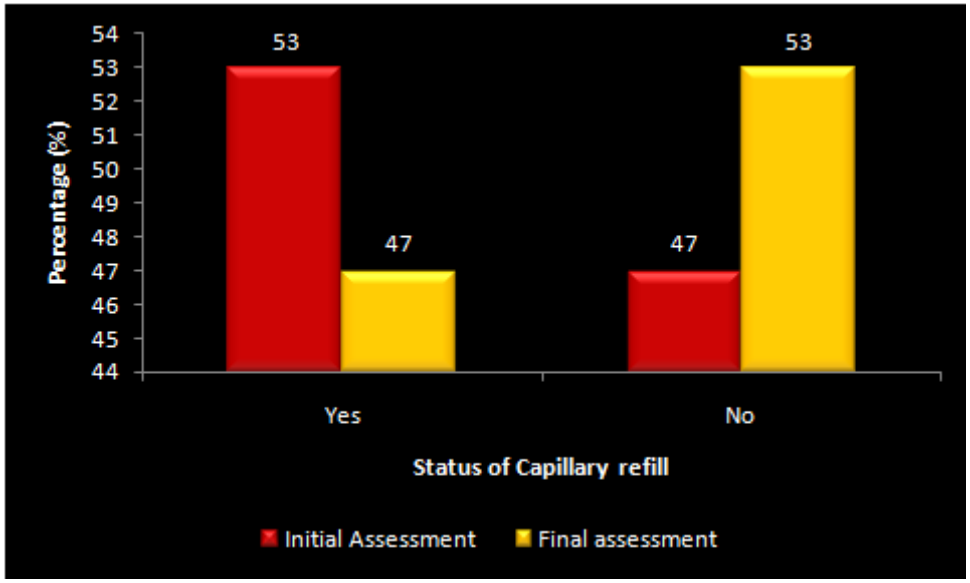

Fig 2.1b: Comparative Bar Chart on Capillary refill among clients with Diabetes in Control Group

Table 2.1a: Assessment on Lower Extremity Perfusion (LEP) with regard to capillary refill among patients with diabetes in Control Group reveals that on initial assessment, 16 (53%) clients had complaints on pale fingers and toes, with discoloration or bluish after relieving pressure. After routine care on Lower Extremity Perfusion, it was identified that 12 (40%) of the clients had good capillary refill while 18 (60%) still remained in same condition. This shows that routine care is not effective in good capillary refill among the patients with diabetes.

17 (43%) of the clients had cold hands and feet on initial assessment. After routine care on Lower Extremity Perfusion, it was identified that 10 (67%) of the clients had had cold feeling on feet and 20 (33%) had no cold feeling on feet.

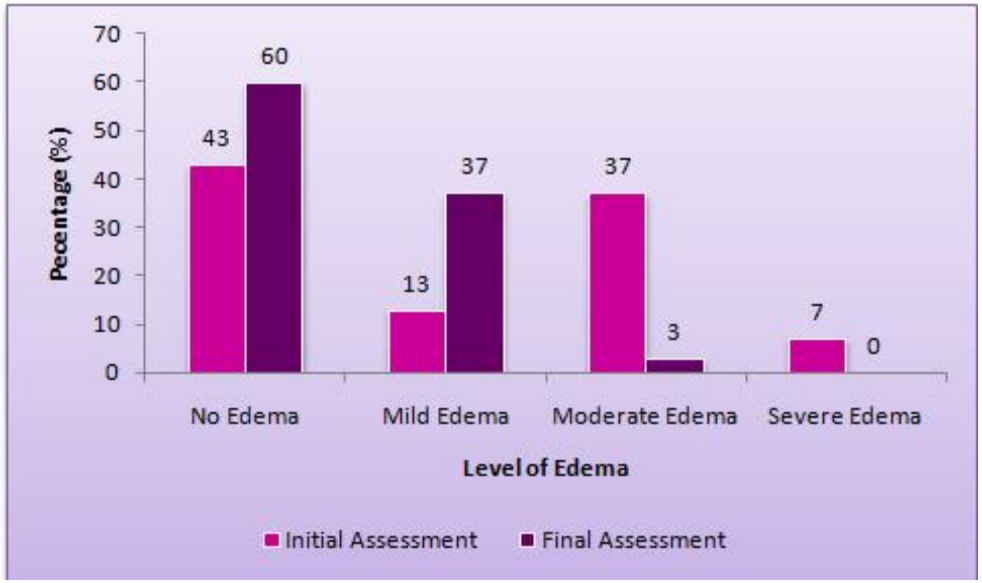

Fig 2.1c: Comparative Bar Chart on Level of Edema among clients with Diabetes in Control Group

Table 2.1a: Assessment on Lower Extremity Perfusion (LEP) with regard to level of Edema among patients with diabetes in Control Group reveals that on initial assessment, 13 (43%) clients were on the highest with no signs of edema. After routine care on Lower Extremity Perfusion, it was identified that 18 (60%) had no Edema, 11 (37%) had mild edema and only 1 (3%) of the client had moderate level of edema.

Section III: DATA ON EFFECTIVENESS OF BUERGER'S- ALLEN EXERCISE ON LOWER EXTREMITY PERFUSION AMONG DIABETES PATIENTS.

Table 3.1

Mean, standard Deviation, Mean Difference and 't' Value of Buerger's- Allen exercise onLower extremity Perfusion inPain among Experimental group

N = 30

	Mean	SD	Mean Difference	't' value
Pre Test	4.87	1.14	4.03	17.74**
Post Test	0.83	0.87		

**significant at p<0.001 level

Table:3 reveals that the mean pre test score was 4.87 with 1.14 as standard deviation and it decreased to 0.83 (SD = 0.87). This shows that the pain level among the clients with diabetes has decreased after the intervention. The mean difference 4.03 was statistically tested for significance in its difference. It revealed that the t value 17.74 was statistically significant at p<0.001 level. It is inferred that the hypothesis (H1) was accepted.

Table 3.2

Mean, standard Deviation, Mean Difference and 't' Value of Buerger's- Allen exercise onLower extremity Perfusion in Edema among Experimental group

N = 30

	Mean	SD	Mean Difference	't' value
Pre Test	2	0.83	1.67	9.18**
Post Test	0.33	0.54		

**significant at p<0.001 level

Table:3.2 reveals that the mean pre test score was 2.0 with 0.83 as standard deviation and it decreased to 0.33 (SD = 0.54). This shows that the pain level among the clients with diabetes has decreased after the intervention. The mean difference 1.67 was statistically tested for significance in its difference. It revealed that the t value 9.18 was statistically significant at 0.001 level. Thus the effect of Buerger's- Allen exercise on Edema among patients with diabetes in Experimental group was significant. Thus the hypothesis "$H1_2$: There will be a significant difference between the mean pre test and post test interventional scores on lower extremity perfusion (Edema) among clients with diabetes mellitus of experimental group after administering Buerger - Allen exercise", is accepted.

Table 3.3

Mean, standard Deviation, Mean Difference and 't' Value of Buerger's- Allen exercise on Lower extremity Perfusion in Capillary Refill among Experimental group

N = 30

	Mean	SD	Mean Difference	't' value
Pre Test	1	0	1	@Not estimated
Post Test	0	0		

[@] The Paired 't' value is not estimated since the Standard Deviations in both pretest and Posttest are 0.

Table :3.3 reveals that the mean scores in pre test is1 and post test is 0 with 0 as standard deviation in both pre and post assessment. There will be a significant difference between the mean pre test and post test interventional scores on lower extremity perfusion (Capillary refill) among clients with diabetes mellitus of experimental group after administering Buerger - Allen exercise", is accepted.

Table 3.4

Mean, standard Deviation, Mean Difference and 't' Value of Routine care on Lower extremity Perfusion in pain among Control group

N = 30

	Mean	SD	Mean Difference	't' value
Pre Test	3.23	2.16	0.83	8.60**
Post Test	2.4	1.85		

**significant at p<0.001 level

Table:3.4reveals that the mean pre-test score was 3.23 with 2.16 as standard deviation and it decreased to 2.4 (SD = 1.85). This shows that the pain level among the clients with diabetes has decreased after the routine care. The mean difference 0.83 was statistically tested for significance in its difference. It revealed that the t value 8.60 was statistically significant at 0.001 level. Thus the effect of routine nursing care on Pain among patients with diabetes in Control group was significant. Thus the hypothesis "$H1_4$: There will be a significant difference between the mean pre test and post test scores of routine nursing care on regarding the pain aspect of lower extremity perfusion among clients with diabetes mellitus of control group", is accepted.

Table 3.5

Mean, standard Deviation, Mean Difference and 't' Value of Routine care on Lower extremity Perfusion in Edema among Control group

N = 30

	Mean	SD	Mean Difference	't' value
Pre Test	1.07	1.05	0.63	5.19**
Post Test	0.43	0.57		

**significant at p<0.001 level

Table:3.5 reveals that the mean pre test score was 1.07 with 1.05 as standard deviation and it decreased to 0.43 (SD = 0.57). This shows that the edema level among the clients with diabetes has decreased after the routine care. The mean difference 0.63 was statistically tested for significance in its difference. It revealed that the t value 5.19 was statistically significant at 0.001 level. Thus the effect of routine nursing care on Edema among patients with diabetes in Control group was significant. Thus the hypothesis "$H1_5$: There will be a significant difference between the mean pre-test and post test scores of routine nursing care on regarding the edema aspect of lower extremity perfusion among clients with diabetes mellitus of control group", is accepted.

Table 3.6

Mean, standard Deviation, Mean Difference and 't' Value of Routine care on Lower extremity Perfusion in Capillary Refill among Control group

N = 30

	Mean	SD	Mean Difference	't' value
Pre Test	0.533	0.507	0.067	1.439 NS
Post Test	0.467	0.507		

NS - Not Significant at p=0.05 level of significance

Table:3.6 reveals that the mean pre-test score was 0.533 with 0.507 as standard deviation and it decreased to 0.467 (SD = 0.507). This shows that the Capillary refill among the clients with diabetes has decreased after the routine care. The mean difference 0.067 was statistically tested for significance in its difference. It revealed that the t value 1.439 was not statistically significant at 0.05 level. Thus the effect of routine nursing care on Capillary refill among patients with diabetes in Control group was not significant. Thus the hypothesis "$H1_6$: There will be a significant difference between the mean pre test and post test scores of routine nursing care on regarding the Capillary refill aspect of lower extremity perfusion among clients with diabetes mellitus of control group", is rejected.

Table 3.7

Effectiveness of Buerger's- Allen exercise on Lower Extremity Perfusion among patients with diabetes in Experimental group in comparison with the Control Group participants.

N = 60

S.NO	LEP Assessment	Experimental Group		Control Group		't' value
		Mean	SD	Mean	SD	
1	Pain	0.83	0.87	2.4	1.85	4.195**
2	Edema	0.33	0.54	0.43	0.57	0.695 NS
3	Capillary Refill	1	0.0001	0.467	0.507	5.03**

******significant at p<0.001 level **NS** - Not Significant at p=0.05 level of significance

Effectiveness of Buerger's- Allen exercise on Lower Extremity Perfusion among patients with diabetes in Experimental group and Control Group participants was compared with the post test scores. It reveals that Pain and Capillary refill are significant at 0.001 level and Edema is not significant at 0.05 level of significance. This implies that the research hypothesis 'There will be a significant difference between the mean post test

interventional scores on pain and capillary refill components of LEP among clients with diabetes mellitus of experimental and control group after intervention' is accepted. When considered with Edema, the research hypothesis $H1_7$: 'There will be a significant difference between the mean post test interventional scores on edema component of LEP among clients with diabetes mellitus of experimental and control group after intervention' is rejected.

Section IV: DATA ON ASSOCIATION BETWEEN THE LOWER EXTREMITY PERFUSION SCORE AMONG DIABETES PATIENTS WITH SELECTED DEMOGRAPHIC VARIABLES IN EXPERIMENTAL AND CONTROL GROUP

Table 4.1

Frequency, Prcentage and Chi-Square value between Lower Extremity perfusion in Pain among diabetes patients in Experimental Group

$N_1 = 30$

S.NO	Demographic Variable		Level of Pain		χ^2
			No pain	Mild Pain	
1	Age in years	a) 45 – 50 b) 51 – 55 c) 56 – 60 d) 60 – 65	3 7 6 0	3 3 6 2	19.031NS df = 3
2	Gender	a) Male b) Female	7 7	12 4	2.01 NS df = 1
3	Education	a) Illiterate b) Secondary level c) Higher Secondary d) UG / PG	0 3 7 4	0 0 7 9	4.8NS df = 3
4	Occupation	a) Unemployment / House Wife b) Coolie c) Business d) Salaried e) Government Employee	6 2 2 4 0	2 3 5 5 1	4.48NS df = 4
5	Smoking	a) Yes b) No	7 7	12 4	2.015 NS df = 1

S.NO	Demographic Variable		Level of Pain		χ^2
6	Alcohol	a) Yes b) No	7 7	12 4	2.015 NS df = 1
7	Exercise	a) Yes b) No	5 9	6 10	0.015 NS df = 1
8	Smoking and Alcohol	a) Yes b) No	7 7	12 4	2.015 NS df = 1
9	Duration of Illness in years	a) <3 b) 3 – 6 c) >6	3 21 2	1 3 0	4.73NS df = 2

NS - Not Significant at p=0.05 level of significance

$H2_1$: There will be a significant association between the post test scores on Lower Extremity Perfusion (Pain) and the selected demographic variables among clients with diabetes mellitus in the experimental group.

- Association between Age and level of pain reveals that the obtainedχ^2value 19.031with df=3 was not significant at 0.05 level. Thus it is inferred that there is no significant association between age and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Gender and level of pain reveals that the obtained χ^2value2.01with df=1 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Gender and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Educational status and level of pain reveals that the obtained χ^2value4.8 with df=3 was not significant at 0.05 level. Thus it is

inferred that there is no significant association between Educational status and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.

- Association between Occupational status and level of pain reveals that the obtained χ^2value4.48 with df=4 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Occupational status and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Smoking habit and level of pain reveals that the obtained χ^2value2.01 with df=1 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Smoking habit and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Alcohol consumption habit and level of pain reveals that the obtained χ^2value2.01 with df=1 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol consumption habit and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Exercising habit and level of pain reveals that the obtained χ^2value0.01 with df=1 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Exercising habit and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.

- Association between Alcohol and Smoking habit and level of pain reveals that the obtained χ^2value2.01 with df=1 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol and Smoking habit and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Duration of Illness and level of pain reveals that the obtained χ^2 value 4.73 with df=1 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Duration of Illness and pain level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.

Table 4.2

Frequency, Prcentage and Chi-Square value between Lower Extremity perfusion in Pain among diabetes patients in Control Group

$N_2 = 30$

S.NO	Demographic Variable		Level of Pain			χ^2
			No pain	Mild Pain	Moderate	
1	Age in years	a) <45	0	0	1	36.01 NS
		b) 45 – 50	0	1	1	df = 10
		c) 51 – 55	1	1	0	
		d) 56 – 60	1	5	6	
		e) 60 – 65	2	5	0	
		f) >65	2	3	1	
2	Gender	a) Male	4	6	6	2.14NS
		b) Female	2	9	3	df = 2
3	Education	a) Illiterate	0	1	0	4.533 NS
		b) Secondary level	2	7	6	df = 6
		c) Higher Secondary	1	4	2	
		d) UG / PG	3	3	1	
4	Occupation	a) Unemployment / House Wife	1	6	2	8.517 NS
		b) Coolie	2	6	3	df = 8
		c) Business	0	1	3	
		d) Salaried	3	2	1	
		e) Government Employee	0	0	0	
5	Smoking	a) Yes	4	5	5	2.321 NS
		b) No	2	10	4	df = 2
6	Alcohol	a) Yes	2	4	5	2.057 NS
		b) No	4	11	4	df = 2
7	Exercise	a) Yes	2	4	1	1.18 NS
		b) No	4	11	8	df = 2

S.NO	Demographic Variable		Level of Pain			χ^2
			No pain	Mild Pain	Moderate	
8	Smoking and Alcohol	a) Yes	2	4	5	2.057 NS
		b) No	4	11	4	df = 2
9	Duration of Illness in years	a) <3	0	0	1	22.53 NS
		b) 3 – 6	4	5	6	df = 6
		c) >6	2	10	2	

NS - Not Significant at p=0.05 level of significance

$H2_2$: There will be a significant association between the post test interventional scores on Lower Extremity Perfusion (Pain) and the selected demographic variables among clients with diabetes mellitus in the control group.

- Association between Age and level of pain reveals that the obtained χ^2value36.01 with df=10 was not significant at 0.05 level. Thus it is inferred that there is no significant association between age and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Gender and level of pain reveals that the obtained χ^2value2.14with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Gender and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Educational status and level of pain reveals that the obtained χ^2value4.5338 with df=6 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Educational

status and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.

- Association between Occupational status and level of pain reveals that the obtained χ^2value8.517 with df=8 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Occupational status and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Alcohol consumption habit and level of pain reveals that the obtained χ^2value2.057 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol consumption habit and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Exercising habit and level of pain reveals that the obtained χ^2value1.18 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Exercising habit and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Alcohol and Smoking habit and level of pain reveals that the obtained χ^2value2.057 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol and Smoking habit and pain level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.

Table 4.3

Frequency, Prcentage and Chi-Square value between Lower Extremity perfusion in Edema among diabetes patients in Experimental Group

$N_1 = 30$

S.NO	Demographic Variable		Level of Edema			χ^2
			No Edema	Mild Edema	Moderate	
1	Age in years	a) <45	1	0	0	17.513
		b) 45 – 50	4	1	0	NS
		c) 51 – 55	8	2	0	df = 10
		d) 56 – 60	7	4	1	
		e) 60 – 65	1	1	0	
		f) >65	0	0	0	
2	Gender	a) Male	13	6	0	2.15 NS df = 2
		b) Female	8	2	0	
3	Education	a) Illiterate	0	0	0	4.91NS
		b) Secondary level	3	0	0	df = 6
		c) Higher Secondary	8	0	0	
		d) UG / PG	10	2	1	
4	Occupation	a) Unemployment / House Wife	6	2	0	4.92 NS
		b) Coolie	3	2	0	df = 8
		c) Business	4	3	0	
		d) Salaried	7	1	1	
		e) Government Employee	1	0	0	
5	Smoking	a) Yes b) No	13	6	0	2.215 NS

S.NO	Demographic Variable		Level of Edema			χ^2
			No Edema	Mild Edema	Moderate	
6	Alcohol	a) Yes	13	6	0	2.215 NS
		b) No	8	2	1	df = 2
7	Exercise	a) Yes	8	2	1	2.215 NS
		b) No	13	6	0	df = 2
8	Smoking and Alcohol	a) Yes	13	6	0	2.215
		b) No	8	2	1	df = 2 NS
9	Duration of Illness in years	a) <3	3	1	0	3 NS
		b) 3 – 6	17	6	1	
		c) >6	1	1	0	df = 6

NS - Not Significant at p=0.05 level of significance

$H2_3$: There will be a significant association between the post test interventional scores on Lower Extremity Perfusion (Edema) and the selected demographic variables among clients with diabetes mellitus in the experimental group.

- Association between Age and level of edema reveals that the obtained χ^2value17.513 with df=10 was not significant at 0.05 level. Thus it is inferred that there is no significant association between age and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Gender and level of edema reveals that the obtained χ^2value2.215with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Gender and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.

- Association between Educational status and level of edema reveals that the obtained χ^2value4.91 with df=6 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Educational status and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Occupational status and level of edema reveals that the obtained χ^2value4.92 with df=8 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Occupational status and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Smoking habit and level of edema reveals that the obtained χ^2value2.215 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Smoking habit and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Alcohol consumption habit and level of edema reveals that the obtained χ^2value2.215 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol consumption habit and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.
- Association between Exercising habit and level of edema reveals that the obtained χ^2value2.215 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Exercising habit

and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.

- Association between Alcohol and Smoking habit and level of edema reveals that the obtained χ^2value2.215 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol and Smoking habit and edema level obtained after intervention among the diabetic clients of Experimental group. Thus the stated hypothesis is rejected.

Table 4.4

Frequency, Prcentage and Chi-Square value between Lower Extremity perfusion in Pain among diabetes patients in Control Group

S.NO	Demographic Variable		Level of Edema			χ^2
			No Edema	Mild Edema	Moderate	
1	Age in years	a) <45	0	1	0	27.74 NS
		b) 45 – 50	1	1	0	df = 10
		c) 51 – 55	2	0	0	
		d) 56 – 60	5	6	1	
		e) 60 – 65	6	1	0	
		f) >65	4	2	0	
2	Gender	a) Male	9	6	1	0.962 NS
		b) Female	9	5	0	df = 2
3	Education	a) Illiterate	0	1	0	5.61 NS
		b) Secondary level	9	5	1	df = 6
		c)Higher Secondary	3	4	0	
		d) UG / PG	6	1	0	
4	Occupation	a) Unemployment / House Wife	4	5	0	7.907 NS
		b) Coolie	8	2	1	df = 8
		c) Business	1	3	0	
		d) Salaried	5	1	0	
		e)Government Employee	0	0	0	

S.NO	Demographic Variable		Level of Edema			χ^2
			No Edema	Mild Edema	Moderate	
5	Smoking	a) Yes	9	4	1	1.69 NS
		b) No	9	7	0	df = 2
6	Alcohol	a) Yes	6	4	1	1.814 NS
		b) No	12	7	0	df = 2
7	Exercise	a) Yes	6	1	0	2.558 NS
		b) No	12	10	1	df = 2
8	Smoking and Alcohol	a) Yes	6	4	1	1.814 NS
		b) No	12	7	0	df = 2
9	Duration of Illness in years	a) <3	0	1	0	17.912 NS
		b) 3 – 6	7	6	1	df = 6
		c) >6	11	4	0	

NS - Not Significant at p=0.05 level of significance

$H2_4$: There will be a significant association between the post test interventional scores on Lower Extremity Perfusion (Edema) and the selected demographic variables among clients with diabetes mellitus in the control group.

- Association between Age and level of edema reveals that the obtained χ^2value27.74 with df=10 was not significant at 0.05 level. Thus it is inferred that there is no significant association between age and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Gender and level of edema reveals that the obtained χ^2value0.962 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Gender and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.

- Association between Educational status and level of edema reveals that the obtained χ^2value5.610 with df=6 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Educational status and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Occupational status and level of edema reveals that the obtained χ^2value7.907 with df=8 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Occupational status and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Smoking habit and level of edema reveals that the obtained χ^2value1.69 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Smoking habit and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Alcohol consumption habit and level of edema reveals that the obtained χ^2value1.814 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol consumption habit and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Exercising habit and level of edema reveals that the obtained χ^2value2.558 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Exercising habit

and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.

- Association between Alcohol and Smoking habit and level of edema reveals that the obtained χ^2value1.814 with df=2 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Alcohol and Smoking habit and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- Association between Duration of Illness and level of edema reveals that the obtained χ^2 value 17.912 with df=6 was not significant at 0.05 level. Thus it is inferred that there is no significant association between Duration of Illness and edema level obtained after intervention among the diabetic clients of Control group. Thus the stated hypothesis is rejected.
- With reference to table 2.1a lower extremity perfusion in capillary refill is not associated with demographic variables, since all the samples in exprimental group have the same score in post test. Hence the analysis for association is not proceeded.

CHAPTER V

DISCUSSION

This chapter deals with the findings of the study as per the objective and hypothesis.

DEMOGRAPHIC DATA:

The demographic data collected are Age, Gender, Educational Status and Occupational Status of Diabetic clients.

The findings of the study demonstrated that, the majority clients in each category 40% are between 56 – 60 years of age in Experimental group and 40% in Control group of same age group. Gender distribution reveals that majority are Male in both Experimental (63%) and Control (53%) group. In Experimental group 46% clients had Higher Secondary level of education while 50% had Secondary level of education in Control group. 9 clients among 30 in experimental group (30%) were salaried and 37% were coolie workers in control group.

Assessment on personal history was based on the client's smoking habit, alcohol consumption, exercise practice and those with both smoking and alcohol habit and the duration of illness. Among the clients in Experimental group 63% have the habit of Smoking, Alcohol and Both smoking and Alcohol together respectively. 63% do not exercise while 37% clients do regular exercise. 70% members have diabetes for the past 3 – 6 years. Among the clients in Control group 53% have the habit of Smoking alone, 63% have the habit of only Alcohol and Both smoking and Alcohol together

respectively. 63% do not exercise while 37% clients do regular exercise. 50% members have diabetes for the past 3 – 6 years and 47% have for more than 6 years.

The first objective of the study was to assess the lower extremity perfusion among diabetes mellitus patient in experimental and control group.

Lower extremity perfusion is assessed based on the following segments, such as Pain, relief from pain after rest, numbness and tingling sensation, capillary refill, sensing cold when touched and edema

Assessment on Lower Extremity Perfusion (LEP) with regard to pain among patients with diabetes in Experimental Group reveals that 83% of clients were on the highest at the moderate level of pain before intervention. After the initiation of Buerger's-Allen exercise on Lower Extremity Perfusion, 53% had mild pain.

Assessment on capillary refill among reveals that before intervention, 100% of the clients had complaints on pale fingers and toes, with discoloration or bluish after relieving pressure. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, all the clients had good capillary refill,97% Assessment on Lower Extremity Perfusion (LEP) with regard to level of Edema among patients with diabetes in Experimental Group reveals that before intervention, 53% of the clients were on the highest at the moderate level of edema. After the initiation of Buerger's- Allen exercise on Lower Extremity Perfusion, 70% had no Edema.

Assessment on Lower Extremity Perfusion (LEP) with regard to pain among patients with diabetes in Control Group reveals that 40% of clients were on the highest at the moderate level of pain on initial assessment. After the routine care, 50% had mild

pain. Assessment on Lower Extremity Perfusion (LEP) with regard to capillary refill among patients with diabetes in Control Group reveals that on initial assessment, 53% of clients had complaints on pale fingers and toes, with discoloration or bluish after relieving pressure.

2007, Shanthi Rani conducted a study in Chennai to assess the prevalence of PVD among DM patients. The purpose of the study was to find out the prevalence of the PVD among south Indian patients, this study was carried out in two colonies in Chennai. The study was done in three groups. (Normal, impaired and diabetes patients). The overall prevalence of the PVD is 3.2%, among these prevalence 6.3% is alone consisted by diabetes patients. The study concluded that the prevalence of PVD was higher in (7.8%) in diabetic patient than with newly diagnosed DM patients.

After routine care on Lower Extremity Perfusion, 60% of clients still remained in same condition. Assessment on Lower Extremity Perfusion (LEP) with regard to level of Edema among patients with diabetes in Control Group reveals that on initial assessment, 43% clients were on the highest with no signs of edema. After routine care on Lower Extremity Perfusion, it was identified that 60% had no Edema.

The second objective of the study was to evaluate the effectiveness of Buerger-Allen exercise in improving the lower extremity perfusion among the experimental group.

The mean pre-test score on pain was 4.87 with 1.14 as standard deviation and it decreased to 0.83 (SD=0.87). The mean difference 4.03 was statistically tested for significance in its difference. It revealed that the t value 17.74 was statistically significant at 0.001 level. Thus the effect of Buerger's- Allen exercise on Pain among

patients with diabetes in Experimental group was significant. Thus the hypothesis $H1_1$ was accepted

The mean pre-test score on edema was 2.0 with 0.83 as standard deviation and it decreased to 0.33 (SD=0.54). The mean difference 1.67 was statistically tested for significance in its difference. It revealed that the t value 9.18 was statistically significant at 0.001 level. Thus the effect of Buerger- Allen exercise on Edema among patients with diabetes in Experimental group was significant. Thus the hypothesis $H1_2$ was accepted

The mean scores on capillary refill in pre-test and post-test have same score with 0 standard deviation. Thus proving that there exists no change in score before and after intervention. This shows that the intervention was effective in relieving the capillary refill. Thus the hypothesis $H1_3$ was accepted

The Effectiveness of Buerger- Allen exercise on Lower Extremity Perfusion among patients with diabetes in Experimental group and Control Group participants was compared with the post test scores. It reveals that Pain and Capillary refill are significant at 0.001 level and thus the hypothesis $H1_7$ was accepted. Edema is not significant at 0.05 level of significant, thus the hypothesis $H1_7$ was rejected.

The study findings are supported by GriffBrien(1996) who conducted an experimental study to evaluate the effectiveness of Bueger-Allen exercise in improving lower extremity perfusion. The mean level was 1.5 and 1.5.The findings revealed that Buerger-Allen exercise was effective in improving lower extremity perfusion.

The third objective of the study was to find out the association between interventional scores of Buerger-Allen exercise with selected demographic variables in experimental group and control group.

The study findings showed that the association between level of pain among the diabetic clients of Experimental group with the demographic variables Age (χ^2value 19.031with df=3), Gender (χ^2value2.01with df=1), Educational Status (χ^2value4.8 with df=3) Occupational Status (χ^2value4.48 with df=4) smoking habit (χ^2value2.01 with df=1), alcohol consumption (χ^2value2.01 with df=1), exercise practice (χ^2value0.01 with df=1) and those with both smoking and alcohol habit (χ^2value2.01 with df=1) and the duration of illness (χ^2 value 4.73 with df=1) was not significant at 0.05 level. Thus the hypothesis $H2_1$ was rejected.

The study findings showed that the association between level of pain among the diabetic clients of Control group with the demographic variables Age (χ^2value36.01 with df=10), Gender (χ^2value2.14with df=2), Educational Status (χ^2value4.5338 with df=6) Occupational Status (χ^2value8.517 with df=8) smoking habit (χ^2value2.321 with df=2), alcohol consumption (χ^2value2.057 with df=2), exercise practice (χ^2value1.18 with df=2) and those with both smoking and alcohol habit (χ^2value2.057 with df=2) and the duration of illness (χ^2 value 22.53 with df=6) was not significant at 0.05 level. Thus the hypothesis $H2_2$ was rejected.

Association between level of edema among the diabetic clients of Experimental group with the demographic variables Age (χ^2value17.513 with df=10), Gender

(χ^2value2.215with df=2), Educational Status (χ^2value4.91 with df=6) Occupational Status (χ^2value4.92 with df=8) smoking habit (χ^2value2.215 with df=2), alcohol consumption (χ^2value2.215 with df=2), exercise practice (χ^2value2.215 with df=2) and those with both smoking and alcohol habit (χ^2value2.215 with df=2) and the duration of illness (χ^2 value 3.00 with df=6) was not significant at 0.05 level. Thus the hypothesis $H2_3$ was rejected.

The study findings showed that the association between level of Edema among the diabetic clients of Control group with the demographic variables Age (χ^2value 27.74 with df=10), Gender (χ^2value0.962 with df=2), Educational Status (χ^2value5.610 with df=6) Occupational Status (χ^2value7.907 with df=8) smoking habit (χ^2value1.69 with df=2), alcohol consumption (χ^2value1.814 with df=2), exercise practice (χ^2value2.558 with df=2) and those with both smoking and alcohol habit (χ^2value1.814 with df=2) and the duration of illness (χ^2 value 17.912 with df=6) was not significant at 0.05 level. Thus the hypothesis $H2_4$ was rejected.

The findings are supported by Roger .C (1998)who conducted an experimental study to assess the effectiveness of Buerger-Allen exercise in reducing pain, edema and in improving capillary refill in lower extremities. She concluded that there is significant association between demographic variables and the level of pain, edema and capillary refill.

CHAPTER – VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents a brief account of the present study. Conclusions are drawn from the findings and the implications of the result are stated. It also includes recommendations, implications for the nursing practice, nursing education, nursing administration and nursing research.

Summary of the study

The present study is to assess the effectiveness of Buerger's Allen exercise on lower extremity perfusion among diabetes mellitus patients admitted in selected hospital at Coimbatore.

The objectives of the study were

1. To assess the lower extremity perfusion among diabetes mellitus patient in experimental group and control group.
2. To evaluate the effectiveness of Buerger's- Allen exercise in improving the lower extremity perfusion among the experimental group.
3. To find out the association between interventional scores of Buerger's- Allen exercise with selected demographic variables in experimental group and control group.

A purposive sample of 60 diabetic clients were chosen for the study.

The data collection tool consisted of 2 parts.

Part I:

This section involves the presentation of demographic data of diabetic clients under two segmentations as Experimental Group (N_1 = 30) and Control Group

(N_2 = 30). The demographic data collected are Age, Gender, Educational Status and Occupational Status of Diabetic clients.

PART B: LOWER EXTREMITY PERFUSION ASSESSMENT

Consists of questionnaires related to pain, edema and capillary refill in lower extremity.

PAIN ASSESSMENT - NUMERICAL PAIN RATING SCALE:

Numerical Pain Rating Scale is used to assess pain intensity in persons who are able to self – report and is the best choice for adults. In numerical pain rating scale the numbers are marked from 0 to 10 encompassing 10 divisions at equal distance, at 1 the pain intensity is at the lowest level and at level 10 the pain intensity is at its peak.

EDEMA ASSESSMENT SCALE

Edema is the swelling resulting from fluid accumulation in body tissues. It is most commonly found in the lower extremities (such as feet, ankles, and legs).

Clinically, there are two different types of edema - pitting and non-pitting. Therefore, pitting edemas are graded by the four grades of pitting edema.

Normal 0: Absence of pitting edema.

Risk of peripheral vascular disease:

Grade 1+ Edema – Mild Edema: A pit of 2 mm or less; presents as slight pitting with no distortion. Pitting disappears immediately.

Grade 2+ Edema – Moderate Edema: A deeper pit measuring between 2 mm and 4 mm. It will have no easily discernible distortion and the pitting will disappear in 10 – 15 seconds.

Grade 3+ Edema – Severe Edema: A noticeably deep pit measuring between 4 mm and 6 mm. The area affected will look distinctly fuller and swollen. The indentation will take as long as 1 minute before it disappears.

Grade 4+ Edema – Highly Severe Edema: A very deep pit is seen which will last between 2 to 5 minutes before it disappears. This indentation will measure 6 – 8 mm in depth and the body part affected by the edema will look gross and distorted.

CAPILLARY REFILL ASSESSMENT

The capillary nail refill test is a quick test done on the nail beds. It is used amount of blood flow to tissue.

The test is performed by applying pressure to the nail bed until it turns white. This indicates that the blood has been forced from the tissue. It is called blanching. Once the tissue has blanched, pressure is removed. While the patient holds their extremity above their heart, the health care provider measures the time it takes for blood to return to the tissue. Return of blood is indicated by the nail turning back to a pink color.

Normal Results – 0 score:

If there is good blood flow to the nail bed, a pink color should return in less than 2 seconds after pressure is removed.

Abnormal Results – 1 score:

Blanch times that are greater than 2 seconds may indicate Peripheral vascular disease (PVD)

The collected data were analyzed by using both descriptive statistics (Mean, Standard deviation, Frequency and Percentage) and inferential statistics (paired 't' test, independent 't' test and chi – square) and results were calculated.

Major Study Findings

- The findings of the study demonstrated that, majority clients in each category 40% are between 56 – 60 years of age in Experimental group and 40% in Control group of same age group. Gender distribution reveals that majority are Male in both Experimental (63%) and Control (53%) group. In Experimental group 46% clients had Higher Secondary level of education while 50% had Secondary level of education in Control group. 9 clients among 30 in experimental group (30%) were salaried and 37% were coolie workers in control group.
- In Experimental group 63% have the habit of Smoking, Alcohol and Both smoking and Alcohol together respectively. 63% do not exercise while 37% clients do regular exercise. 70% members have diabetes for the past 3 – 6 years. Among the clients in Control group 53% have the habit of Smoking alone, 63% have the habit of only Alcohol and Both smoking and Alcohol together respectively. 63% do not exercise while 37% clients do regular exercise. 50% members have diabetes for the past 3 – 6 years and 47% have for more than 6 years.

- The t value 17.74 was statistically significant at 0.001 level. Thus the effect of Buerger's- Allen exercise on Pain among patients with diabetes in Experimental group was significant.
- The t value 9.18 was statistically significant at 0.001 level. Thus the effect of Buerger's- Allen exercise on Edema among patients with diabetes in Experimental group was significant.
- The mean scores on capillary refill in pre -and post-test have same score with 0 standard deviation. Thus proving that there exists no change in score before and after intervention. This shows that the intervention was effective in relieving the capillary refill
- With regard to the effectiveness of Buerger's- Allen exercise on Lower Extremity Perfusion among patients with diabetes in Experimental group and Control Group participants was compared with the post test scores. It reveals that Pain and Capillary refill are significant at 0.001 level and Edema is not significant at 0.05 level of significance.
- The study findings showed that the association between level of pain and edema with the demographic variables was not significant at 0.05 level among both experimental group and control group clients.

CONCLUSION

The main conclusion drawn from this study was the practice of Buerger Allen exercise was helpful in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion. This result can potentially employ as one of the complementary therapy in the reduction of pain edema and capillary refill among the diabetic patients on Lower Extremity Perfusion.

Implication of the study

According to Tolsma (1995), the section of the research report that focuses on nursing implication usually includes specific suggestions for nursing practice, nursing education, nursing administration and nursing research.

Nursing Practice

- Nurses are key persons of the health team who plays a major role in health promotion, maintenance and prevention of complications.
- The study findings will help the community health nurse to know the importance of Buerger Allen exercise in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion.
- The study findings will encourage the clients to know the importance of Buerger Allen exercise as a complementary therapy in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion.
- The nurse can plan for health programme on alternative and complementary treatment in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion.

Nursing Education

- The nursing students will learn to perform Buerger Allen exercise.
- The student nurses will update their knowledge regarding the method in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion
- Nursing curriculum has to focus on enhancing comfort for the patients.

Nursing Administration

- The public health nurse will be take part in the health policy making, developing protocols, standing orders related to designing the health education programme and strategies on Buerger Allen exercise as a complementary therapy in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion.
- The nurse can organize an In-service education program on Buerger Allen exercise.
- The present study proposes to help the nurse to plan for the complementary therapy for reducing pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion

Nursing Research

- Research can be conducted on complementary treatment for reducing pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion
- The study findings can be added to the research review regarding the effectiveness of Buerger Allen exercise in reduction of pain, edema and capillary refill among the diabetic patients on Lower Extremity Perfusion.
- The study findings can be kept as the baseline data and further research can be conducted in same setting and expand the study in different fields.

Limitations

- The study was limited to the Type 2 Diabetes Mellitus patients a Kongunadu Hospital, Coimbatore.
- Study was conducted only in selected hospital in Coimbatore. Hence generalization is possible only to the selected settings.

Recommendations

- The same study can be replicated on large sample to generalize the findings.
- Effectiveness of Buerger Allen exercise can be compared with other complementary therapies to find its effectiveness.
- The same study can be conducted in different settings.
- The comparative study can be conducted between adults and older groups.
- The same study can be conducted with different demographic variables.

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“A STUDY TO ASSESS THE EFFECTIVENESS OF BUEGER’S ALLEN EXERCISE ON LOWER EXTREMITY PERFUSION AMONG DIABETES MELLITUSPATIENTS ADMITTED IN SELECTED HOSPITAL AT COIMBATORE".

PART – A

DEMOGRAPHIC VARIABLE

Sample No:

1. Age :
2. Gender :
3. Educational status :
4. Occupation :

Personal History

Do you have the habit of

5 Smoking :

6 Alcohol :

7 Exercise :

8 Smoking with Alcohol :

9 Duration Of Illness :

PART B

Mark tick in brackets of Yes or No to the following questions:

1. Do you experience aching, cramping or pain in your , legs, thighs or

buttocks when you walk or exercise?..... Yes ( )No ( )

If yes,Pain score:

2. Does the pain subside with rest? ……..... Yes ( )No ( )

3. Do you have numbness and tingling in the lower legs and feet? .....

Yes ( )No ( )

4. Are your toes pale, discolored, or bluish after relieving pressure .....

Yes ( ) No ( )

5. Are your feet cold to the touch? ……. Yes ( ) No ( )

6. Do you have edema in your legs ?……. Yes ( ) No ( )

If yes, grade of edema:

பகுதி– அ

1. வயது :

2. பால் :

3. உணவு கட்டுப்பாடு :

4. தொழில் :

:

5. புகைப்பிடித்தல் :

6. கல்வித்தகுதி :

7. உடற்பயிற்சி :

8. மருந்துகள் உட்கொள்ளும் விவரம் :

9. நோய்கண்டறிந்த விவரம் :

பகுதி– ஆ

கீழ்க்கண்டவினாக்களில்சரி/தவறு இடுக.

1. உடலில்வலி அல்லது ஏதேனும் இழுத்து பிடிப்பது போல உணர்ந்தத உண்டா? நடக்கும்பொழுதோ அல்லது உடற்ப்பயிர்ச்சியின் போதோ?

   ஆம் ( ) இல்லை( )

   பதில் சரி என்றால்,வலியின்அளவுகோல்எண்:

2. உங்கள் பதில் முதல் கேள்விக்கு ஆம் என்றால் அந்த உபாதைகள் ஓய்வில் இருக்கும்போது தெரியவில்லையா?

   ஆம் ( ) இல்லை ( )

3. உங்கள் கால் பாதங்களில் உணர்ச்சி இல்லா தன்மை மற்றும் முற்கள் குத்துவது போன்ற உணர்ச்சி ஏற்படுகின்றதா?

   ஆம் ( )இல்லை( )

4. விரல்களின் நிறம் வெளிறியோ அல்லது நீல நிறமாகவோ மாறி காணப்படுகின்றதா?

   ஆம் ( )இல்லை ( )

5. பாதங்கள் தொடும் போது குளிர்ந்து உணரப்படுகின்றதா?

ஆம் ( )இல்லை ( )

6. கால்களில் நீர் கோர்வை ஏற்படுகின்றதா? ஆம் எனில்

விவரிக்கவும் :

ஆம் ( ) இல்லை ( )

பதில் ஆம் எனில், நீர் கோர்வை அளவு:

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Dr. A. GUNASINGH EMMANUEL, M.A., B.L., Ph.D.,
Chairman & Correspondent

Date :

Ref : ECN/DASS. Pern/2014-15.

To Dr. R. Karthikeyan M.B.B.S; M.S.
Reg No: 86537.
Consultant Surgeon / M.D.
Kongunadu Hospitals - Cbe.

Respected Sir,

Bincy Baby is a student of Ellen College of Nursing Coimbatore is studying in M.Sc (Nursing). She is conducting **"A Study to asses the effectiveness of Buerger – Allen exercise on lower extremity perfusion among diabetes mellitus patients admitted in a selected hospital at Coimbatore."**

This is for her research work to be submitted to the Tamilnadu Dr.M.G.R. Medical University in partial fulfillment of the university requirement for the award of M.Sc (Nursing) degree.

As a part of her study, she would like to collect data from the Diabetic patients from your well authorized hospital. Project will be furnished by the student personally. The norms, ethics and policies in the unit will be followed by the student.

Thanking You.

Yours faithfully

PRINCIPAL

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Consultant Surgeon Medical Director
KONGUNAD HOSPITALS (P) LTD.
No : 116, 1... ...oad
COIMBATORE - 641 012

ELLEN COLLEGE OF NURSING

(Recognized by Government of Tamilnadu and Indian Nursing Council, New Delhi
Affiliated to the Tamilnadu Dr. M.G.R. Medical University, Chennai)

HOSPITAL ADDRESS : 285, Sathy Main Road, Gandhipuram, Coimbatore - 641 012. Ph : 0422 - 2521212, 2525920 Fax : 0422 - 4373090
COLLEGE ADDRESS : Navakkarai, Madukkarai (PO), Coimbatore - 641 105. Ph : 0422 - 2656999, 2656767, Fax : 0422 - 2656400
Website : www.ellencollegeofnursing.org E-mail : ellencollegeofnursing@gmail.com

Dr. A. GUNASINGH EMMANUEL, M.A., B.L., Ph.D.,
Chairman & Correspondent

Date :

Ref : ECN/DASS. Pern/2014-15.

To Dr. R. Karthikeyan M.B.B.S; M.S.
Reg No: 86537.
Consultant Surgeon / M.D.
Kongunadu Hospitals - Cbe.

Respected Sir,

Bincy Baby is a student of Ellen College of Nursing Coimbatore is studying in M.Sc (Nursing). She is conducting **"A Study to asses the effectiveness of Buerger – Allen exercise on lower extremity perfusion among diabetes mellitus patients admitted in a selected hospital at Coimbatore."**

This is for her research work to be submitted to the Tamilnadu Dr.M.G.R. Medical University in partial fulfillment of the university requirement for the award of M.Sc (Nursing) degree.

As a part of her study, she would like to collect data from the Diabetic patients from your well authorized hospital. Project will be furnished by the student personally. The norms, ethics and policies in the unit will be followed by the student.

Thanking You.

Yours faithfully

PRINCIPAL

Dr. R. KARTHIKEYAN M.B.B.S., M.S (General Surgery)
86537
Consultant Surgeon Medical Director
KONGUNAD HOSPITALS (P) LTD.
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APPENDIX D

Name List of Experts who validated the Tool

MRS.RAJALAKSHMI M.Sc (N).,
Assistant Professor,
HOD, Medical Surgical Nursing,
Infant Jesus College of Nursing, Kerala.

MRS.S.BALAMANI M.Sc (N).,
Assistant Professor,
Annai Meenakshi College of Nursing,Coimbatore.

MRS.S.RUSSIA DEVI, M.Sc(N).,
Assistant Professor,
Kongunadu College of Nursing, Coimbatore.

MRS.J.ELZI MANGALARANI
Associate Professor,
Texcity College of Nursing, Coimbatore.

MRS.LAKSHMI
Associate Professor,
Vijaya College of Nursing, Coimbatore.

DR.K.KARTHIKEYAN M.B.B.S., M.S.,
Cosultant Surgeon,
Kongunadu Hospital, Coimbatore.

DR.BHUVANAPRIYA M.B.B.S., PG.Dip.,
Consultant Dialectologist,
Kongunadu Hospital, Coimbatore.

APPENDIX G

PHOTOS ON INTERVENTION