EFFECTIVENESS OF POST MASTECTOMY EXERCISES ON LYMPHEDEMA AND RANGE OF MOTION AMONG PATIENTS UNDERGONE MASTECTOMY

Dissertation submitted To

THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY

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IN PARTIAL FULLFILLMENT OF REQUIREMENT FOR THE AWARD OF DEGREE OF

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A STUDY TO ASSESS THE EFFECTIVENESS OF POST MASTECTOMY EXERCISES ON LYMPHEDEMA AND RANGE OF MOTION AMONG PATIENTS UNDERGONE MASTECTOMY IN SHANMUGA HOSPITAL AT SALEM 2014 – 2015.

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ABSTRACT

Lymphedema is a main complication of post mastectomy patients and decreases range of motion of the upper extremity. It is essential to teach regarding the post mastectomy exercises to mastectomy patients to reduce complications.

A Study was conducted to assess the effectiveness of post mastectomy exercise on reduction of lymphedema and improving range of motion among patients undergone mastectomy in Shanmuga hospitals, Salem. The objective of the study was to determine the effectiveness of post mastectomy exercises. The hypothesis formulated was there is significant association between the post mastectomy exercises on reducing lymphedema and improving range of motion among patients undergone mastectomy. The review of literature provides a strong foundation for the study.

The research design used for this study was pre experimental one group pre test post test design with 30 samples who fulfilled the inclusion criteria. Purposive sampling technique was used to select the samples. The tool was taken from American Lymphology Association, Elvaru, - STJ Range of Motion position and Range of Motion reliability. An inch tape and goniometer was used to assess the pre test and post test level of lymphedema and range of motion. Post mastectomy exercises were taught to the patients and instructed to perform 30 minutes morning and evening for 5 post operative days. The post test was conducted at the end of the 5^{th} day by using same tool.

The analysis revealed that the paired 't' test value of lymphedema 18.231 was very highly significant at $p<0.0001$ level. The paired 't' value of shoulder flexion was 21.625, shoulder abduction was 24.920, shoulder internal and external rotation was 30.936, shoulder horizontal abduction was 16.773 very highly significant at $p<0.0001$ level. The study findings revealed that the post mastectomy exercises reduced lymphedema and improved the range of motion among patients undergone mastectomy.

CHAPTER I

INTRODUCTION

"An ounce of prevention is worth a pounds of care"

Health is a fundamental human right and multifactorial. Health in the broad sense of the word does not merely mean the absence of disease or provision of diagnostic, curative and preventive services. It also embodied in the WHO definition that health is a state of complete physical, mental, social and spiritual well being and not merely the absence of disease or infirmity. The factors which influence health lie both within the individual and externally in the society. To attain the different perspective comprehensive health efforts should begin in preventive level.

The word cancer is derived from the greek word "canker" which means crab, like crab it invades the body tissue and destroys the normal cells. The word cancer is synonymous to an abnormal cell division without control and able to invade other tissues. Cancer cells can spread to other parts of the body through blood and lymph. Cancer is one of the leading causes of death in India, with about 2.5 million cancer patients, 1 million new cases added every year and with a chance of the disease rising fivefold by 2025. Breast cancer is one of the most common cancer in women with most cases occurring in women over the age of 50 years. In developed countries around one eight women develop breast cancer at some stage in their life. Breast cancer is the second leading cancer among women in India. The average incidence rate varies from 22 to 28 per 1,00,000 women per year in urban areas, 6 per 1,00,000 per year in rural areas. Breast cancer develops from a cancerous cell which develops in the lining of a milk duct or milk gland in one of the breast. If breast cancer is diagnosed at an early stage, there is a good chance of a cure.

"Prevention is better than healing because it saves the labor of being sick." Hence preventive and promotive aspects of health are given more importance than the curative aspects. A mastectomy is an operation to remove a woman's breast,

usually because it has been affected by breast cancer. It is also used to remove non cancerous breasts in order to reduce the risk of breast cancer developing in women who are at high risk. This is known as a prophylactic mastectomy. The breast is the emotional symbol of a woman's pride in her sexuality and motherliness. For many women, mastectomy is a common form of breast cancer treatment, and it constitute threats to self esteem, female beauty, sexuality and feminity. Restoration of physical appearance is very important for the women who had undergone mastectomy. Muscular tension, preventing scar tissue development, loss of strength, function of shoulder decrease in the overall fitness often accompanies after surgery. The nurses are responsible for emphasizing the favorable aspects of the patients with constant hope and encouragement. This has led to increased attention to the quality of life issues and thus rehabilitation of these patients are mandatory.

Lymph is a clear, colorless fluid that contains water and a few blood cells. The lymphatic system is part of the immune system it helps to protect and maintain the fluid of body by filtering and draining lymph and waste products away from each body region. It bathes the tissue of the breast and then passes through the lymph nodes, where it is filtered and eventually travels back into the blood stream. There are several areas or chains of lymph nodes that drain the breast. They are located on both sides of chest bone (internal mammary chain), under arms (axillary chain), and above collarbone (supraclavicular chain).

Lymphedema is an excessive accumulation of high protein fluid (lymph) in the interstitial spaces due to a disruption in the normal lymphatic transport. Often during a lumpectomy or mastectomy, some or all of the lymph nodes under the arm may be removed. The lymph nodes under the arm are also called the axillary lymph nodes. They drain the lymphatic vessels from the upper arms, the majority of the breast, the neck and the under arm regions. The lymph nodes help to filter extra fluid, bacteria and by products of infections. Whenever the normal drainage pattern in the lymph nodes is disturbed or damaged (as often happens during surgery to remove the lymph nodes), severe swelling of the arm may occur. Radiation may also damage lymph nodes and cause swelling of the arm. This swelling, caused by an abnormal collection of too much fluid is called lymphedema. The swelling can be

noticed in the arm, chest and breast area on the side of surgery. After the removal of the lymph nodes of the arm, a woman is at higher risk of lymphedema for the rest of her life.

Lymphedema may occur immediately following surgery, or months or years later. There are several types of lymphedema. The acute, temporary and mild type of lymphedema occurs within a few days after surgery and usually lasts a short period of time. The acute and more painful type of lymphedema can occur about four to six weeks following surgery. However, the most common type of lymphedema is slow and painless and may occur 18 to 24 months or more after surgery. Lymphedema can also occur in the trunk, in addition to the limbs. For example, radiation therapy to the chest wall is associated with the development of edema specifically in the irradiated breast.

Mastectomy associated lymphedema decreases the range of motion of the shoulder in flexion, abduction, internal or external rotation, horizontal abduction. Range of motion is the measurement of movement around a specific joint or body part. In order for a joint to have full range of motion it must have good flexibility. Post mastectomy exercises performed regularly in the post operative period reduces the risk of complications of mastectomy.

NEED FOR THE STUDY

Cancer is a leading cause of death world wide accounting for 7.6 million deaths. Deaths from cancer world wide are projected to continue rising, with an estimated 13.1 million deaths by the year 2030. Breast cancer is one of the most common cancer diagnosed in women and perceived as a fatal problem. It is also the principle cause of death from cancer among women globally. Despite the high incidence rates, in western countries, 89% of women diagnosed with breast cancer are still alive 5 years after their diagnosis which is due to detection and treatment. The various modes of cancer treatment are surgery, radiotherapy and chemotherapy. The goal is to cure the disease or considerably prolong life while improving the patients quality of life. Mastectomy is the surgical removal of one or both breasts,

partially or completely. Decision to do mastectomy is based on various factors including breast size, number of lesions, biologic aggressiveness of a breast cancer, the availability of adjuvant radiation and the willingness of the patient. Type of mastectomy includes simple mastectomy, modified radical mastectomy, skin-sparing mastectomy, subcutaneous mastectomy and extended radical mastectomy.

In most cases, recovery from a mastectomy is straight forward and without complications. It is normal to experience certain side effects such as short term pain, swelling, scar, seroma formation, lymphedema, wound infection and decrease in range of motion. Lymphedema is a faced complication of cancer treatment and one that negatively impacts survivorship and decreases the range of motion of their upper extremity. Upper extremity lymphedema is a well-described complication of breast cancer treatment. Risk factors for lymphedema development include axillary lymph node dissection, obesity, increasing age, radiation and postoperative complications. A recent meta analysis reports the incidence of breast cancer related lymphedema as high as 65%-70% after modified radical mastectomy.

Current criteria for the staging and grading of lymphedema vary in the literature and are subjective. These variations typically reflect the diverse characteristics of swelling that occurs in different body segments or the varying intent of the assessment. For example, the International Society of Lymphology describes four broad stages of lymphedema that can be used to classify lymphedema during and after cancer treatment. The National Cancer Institute, Common Terminology Criteria for Adverse Events (CTCAE) that trigger adverse event reports in clinical trials includes one section that addresses lymphatic complications. Many cancer treatment centers routinely assess patients using Common Terminology Criteria for Adverse Events criteria. Nurses should consult the multidisciplinary treatment team to determine which of the various grading and staging criteria are most appropriate for use in their work environment and consistently use the selected criteria to evaluate patients.

A safe form of exercise is an essential part of a fitness program for people with lymphedema. Exercise includes many different types of physical

movement. The three main types of exercise are aerobic, strength and flexibility. Exercise plays an important role in prevention of complications by releasing muscular tension, preventing scar tissue development and restoring strength and flexibility to joints and muscles that have been affected by the surgery. Commonly performed post mastectomy exercises are wall hand climbing, rope turning, rod or broomstick lifting, pulley tugging. These exercises could be performed by the patients themselves without the help of any complex device and it does not need any particular preparation in the part of the performer or any expensive device.

Miranda Junior. F, (2010) had conducted a study to evaluate a cohort of patients in the Department of Physical Therapy for lymphedema treatment in USA. The goal was to evaluate specific risk factors associated with the severity of lymphedema among the 30 post mastectomy patients. Two groups were evaluated 16 post mastectomy women with lymphedema of the upper limb and 14 post mastectomy women without lymphedema. The women with lymphedema had head rotation to the right side of the shoulder, protrusion of the left shoulder, and trunk inclination angle smaller on the operated side, besides bilateral elevation of the scapula when compared to the group with patients without lymphedema. The study findings revealed that the changes in range of motion were also smaller on the operated side in terms of flexion, abduction, and external rotation of the shoulder for all women, and for those with lymphedema, elbow extension and wrist flexion had a smaller range of motion when compared to women without lymphedema.

Kendall. A. R, (2014) had done a study to demonstrate the complications, as well as their influence on the daily of lives of women after treatment of breast cancer among 50 post mastectomy patients. Morbidity of the upper limb was high due to axillary lymph node dissection, increasing the chances of lymphedema and decreased sensation of the axilla. Unawareness lead to poor practice of exercises and it lead to complications among 30 women and reduced their quality of life.

Inadequate knowledge is more hazardous than ignorance because an ignorant person may seek help but a person with inadequate knowledge may not be

able to identify the deficiency. This may lead to poor self care resulting in serious consequences. During the clinical posting, the investigator noticed that many of the women were affected by breast cancer undergone mastectomy facing complications after conducting extensive review of research and based on suggestion given by the experts investigator felt that there is a great need of teaching post mastectomy exercises for the patients who undergone mastectomy to reduce the post mastectomy complications.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy in Shanmuga hospital at Salem.

OBJECTIVES

1. To assess the pre test level of lymphedema among patients undergone mastectomy
2. To assess the pre test level of range of motion among patients undergone mastectomy
3. To determine the effectiveness of post mastectomy exercises in reducing lymphedema among patients undergone mastectomy
4. To determine the effectiveness of post mastectomy exercises in improving range of motion among patients undergone mastectomy

OPERATIONAL DEFINITION

Effectiveness: Refers to the desired outcome of post mastectomy exercises on lymphedema and range of motion.

Post mastectomy exercises: Refers to exercises performed after mastectomy such as wall hand climbing, rope turning, rod or broomstick lifting and pulley tugging.

Lymphedema: Refers to the blockage of the lymph vessels of the limbs in patients undergone mastectomy resulting in difference of arm circumference above 1.5 cm between the affected and un affected arm.

Range of motion: Refers to the movements of the shoulder such as shoulder flexion, shoulder abduction, shoulder internal and external rotation, shoulder horizontal abduction.

Patients undergone mastectomy: Refers to women who diagnosed as breast cancer and admitted to surgery for removal of breast.

HYPOTHESIS

There is a significant association between post mastectomy exercises and lymphedema, range of motion among patients undergone mastectomy.

DELIMITATIONS

- The study was delimited to 30 samples.
- The study duration was delimited to 4 weeks.

CHAPTER II

REVIEW OF LITERATURE

Research findings should be an extension of previous knowledge and theory as well as guide for future research activity. In order to built an existing work, it is essential to understand what is already known about a topic. A thorough review of literature provides a foundation to the base of knowledge. The investigator gained insight and selected problem from an extensive review. This chapter is designed to include the review of literature and the conceptual frame work adapted for the study.

PART I - REVIEW OF RELATED LITERATURE

The post mastectomy exercises are taught to the patients to prevent post operative complications and improve the range of motion of the upper extremity and to maintain the maximum level of well being. It is intended for nurse practitioners to help and prepare the patients undergone mastectomy in reducing lymphedema and improving range of motion. The exercises are gaining more importance and gradually becoming successful for its benefits in reducing the ill effects of surgery.

This chapter is organized systematically and classified in the following manner.

- ♣ Literature related to post mastectomy
- ♣ Literature related to post mastectomy exercises
- ♣ Literature related to post mastectomy exercises on lymphedema
- ♣ Literature related to post mastectomy exercises on range of motion
- ♣ Literature related to post mastectomy exercises among patients undergone mastectomy

PART II- CONCEPTUAL FRAME WORK

PART I

REVIEW OF RELATED LITERATURE

Many women with breast cancer have some kind of surgery, even though other kinds of treatment are also done. The commonly performed surgeries are breast biopsy, lymph node biopsy or removal, breast conservation surgery (lumpectomy), mastectomy and breast reconstruction. Any of these surgeries can affect the activities of daily living such as movement of shoulder and arm, like dressing, bathing and combing hair. Pain and stiffness can cause weakness and limit movement of the arm and shoulder. The most commonly faced complication of the mastectomy was lymphedema and decreased ranged of motion.

It is important to perform exercises after any type of breast surgery to get the arm and shoulder movement again. Exercises help to decrease side effects of surgery and help to get back usual activities. If the patient have radiation therapy after surgery, exercises are even more important to keep the arm and shoulder flexible. Because of this, it is important to develop a regular habit of performing exercises to maintain arm and shoulder mobility after surgery and radiation treatments for breast cancer.

Literature related to mastectomy

Feather. B. L, et al., (2010) had conducted a quantitative research among 2000 post mastectomy patients. The knowledge level on educational needs and social support services were assessed through mailing the questionnaire. Among them 11% were gained information from formalised support group and 88% indicated that they gained information from television 93% of patients gained knowledge through the video cassette recorder from the community. The study concluded that the health care professionals were the most successful in motivating women to participate in support groups.

Tood. T. M, et al., (2007) had done a study on increasing use of contralateral prophylactic mastectomy for breast cancer patients in United States. There were 152,755 unilateral breast cancer patients participated in the study. Among them 4,969 patients had chosen contralateral prophylactic mastectomy. The study concluded that the use of contralateral prophylactic mastectomy was doubled within the recent years.

Literature related to post mastectomy exercises

Gho. S. A, & Steele. J. R, (2013) had done a cross sectional study on associations and the influences of exercise among 50 breast cancer patients. An online survey was done regarding their treatment, demographic background, current exercise levels, treatment side effects and self report is collected. Results showed that lumpectomy patients were less likely to report muscle aches, hot flushes and weight gain than mastectomy patients. The study concluded that the sufficient levels of exercise were consistently associated with fewer side effects and should be encouraged.

Scaffidi. M, et al., (2012) had conducted an observational prospective study on effectiveness of early rehabilitation among breast cancer surgery patients in reducing the onset of complications in the upper limb among 83 patients in Italy. Among them 23 patients did not receive physiotherapy during hospitalization and 60 patients received early rehabilitation treatment. The study concluded that the early assisted mobilization and home rehabilitation plays a crucial role in reducing the occurrence of post operative side effects of the upper limb.

Bernardine. M, et al., (2011) had conducted a study to assess the effectiveness of implementing an instructional scheme for mastectomy women regarding post mastectomy exercises. There were 44 female patients were selected at the oncology clinic of General hospital in Egypt, pre experimental one group pre test post test research design was used. The study findings showed that there was significant improvement in patients knowledge on the importance of arm exercises following implementation of the instructional scheme from 53.7% to 100%. Non

compliance with exercises also significantly declined following the implementation of the instructional scheme.

Francisco. M, (2010) had done a study on exercise program for post mastectomy patients. The subjects for the focus group interview consisted of 11 patients, 13 recovering patients and 20 nurses from 3 hospitals were selected. A self checklist including shoulder mobility, hand strength, arm volume and subjective comments on how they feel was used before and after the exercise program. The results showed that the exercise program was useful for post mastectomy patients. The study findings revealed that the exercise program had improved breast cancer patients quality of life and their physical well being.

Pinto. U, et al., (2005) had conducted a pre and post test study on effectiveness of exercise program on quality of life in female post mastectomy patients. Seroma is a debilitating complication following mastectomy, affecting the arm functions and quality of life of breast cancer patients. There were 32 female post mastectomy patients participated in an individualized exercise program for 8 weeks. Arm circumference, arm volume and quality of life were measured before and after the program. Analysis showed a statistically significant improvement in the affected upper-limb circumference and volume and in the quality of life scores at the end of the exercise program. The individualized exercise program led to improvement in affected upper-limb volume and circumference and quality of life of post mastectomy patients.

Miguel. A, et al., (1999) had done a study to assess the effectiveness of exercise in reducing breast and chest-wall pain and improving in quality of life among breast cancer patients. A randomized controlled trial was conducted to determine the feasibility and potential efficacy of an exercise program. The study enrolled 10 breast cancer patients with moderate to severe breast and chest wall pain at 3 to 6 months after completion of all adjuvant treatments. These patients participated in a 12 weeks comprehensive health improvement program. The results shown that significant improvements in quality of life and reduction in symptoms.

The study suggested that patients with breast cancer were benefited from an exercise program.

Literature related to post mastectomy exercises on lymphedema

Zanolla. R, et al ., (2013) had conducted a study to compare the result of three different methods of post mastectomy lymphedema treatment among 60 mastectomy patients. Among 60 woman, 20 woman were received pneumatic massage with differentiated pressure and 20 woman received manual lymphatic massage and for 20 women did not receive any test. The measurement of circumference on seven points of both arms the self scoring mood questionnaire, visual analogue scale were evaluated before and at the end of giving massage and 3 months after the treatment. The results shown that stastically significant reduction in lymphedema with uniform pressure pneumatic massage and with manual lymphatic massage reduces the lymphedema among mastectomy patients.

Sisman. H & Sahin. B, et al., (2012) had done a descriptive study to evaluate the educational and exercise program for the prevention and progression of post mastectomy lymphedema of the arm and shoulder. There were 55 mastectomy patients were selected for this study. The exercise training and written educational material were given to the patients. The results showed that the degree of lymphedema was found lower in the patients those exercised as compared to those patients did not do exercises. The study concluded that the risk of development and progression of mastectomy related lymphedema was reduced with education and exercise provided by trained nurses at an early stage.

Randheer. S, et al., (2011) had conducted a prospective study to assess the effectiveness of comprehensive decongestive therapy among 25 post mastectomy lymphedema patients in jipmer at puducherry India. Each patient received an intensive phase of therapy for 8 days from trained physiotherapist which included manual lymphatic drainage, multi layered compression bandaging exercises and skincare and follow up for 3 months. Changes in volume of the edematous limb were assessed with a geometric approximation by circumference measurements of

limb and by water displacement volume ultrasound. The results shown that reduction in limb volume after intensive therapy was 31.3%. The study concluded that comprehensive decongestive therapy combined with long term self management was effective in treating post mastectomy lymphedema.

Tewari. N, et al., (2011) had conducted a randomized controlled trial comparing sentinel node biopsy with axillary clearance among 87 breast cancer patients in Royal Adelaide hospital cancer centre, Australia. The women were assessed by volumetric and circumferential arm measurements. Correlation between volume estimations and measurements were made, taking into account the width of measuring tape and body mass index. The result shown that there was a highly significant correlation between circumferential and volumetric arm measurements. The study concluded that using a narrow tape circumferential arm measurement was an appropriate method for assessing arm volume.

Gautham. A. P, et al., (2009) had done a study to access the effectiveness of home based exercise program on lymphedema and quality of life among post mastectomy patients at Manipal university in India. There were 38 female post mastectomy lymphedema patients participated in an individualized home based exercise program for 8 weeks. Arm circumference arm volume and quality of life were measured before and after the program. Analysis showed that a statistically significant improvement in the affected upper limb circumference volume by using paired “t” test. The study concluded that the individualized home based exercise program led to improvement in affected upper limb volume and circumference and quality of life of post mastectomy lymphedema patients.

Sarah. J. P, (2009) had conducted a study to improve the quality of life for women with lymphedema. The general knowledge of 40 women with breast cancer about arm lymphedema was assesed. The study findings revealed that the majority (95%) aged less than 45 years old. All the studied subjects had inadequate knowledge about arm lymphedema related to breast cancer, self care practices and suffer from poor quality of life at pre program which improved after post program. The study concluded that there was statistical significant relationship between the educational level and residence in relation to self care practices and total quality of life.

Scarrott. D. M, (2009) had conducted a study to assess and evaluate the effectiveness of pre discharge educational guidelines for 50 women on knowledge and self care practices regarding arm lymphedema prevention after mastectomy in Ain Shams University hospitals, Egypt. The study findings showed that the patient had inadequate knowledge about arm lymphedema and self- care practice regarding prevention of arm lymphedema and it was improved after guidelines test. Majority of the patients had adequate level of knowledge and self care practices on arm morbidity minimized during the follow up period with a significant difference between pre and post guidelines test.

Shang. Y. M, et al., (2009) had conducted a study to investigate the level of awareness of lymphedema prevention and the frequency of the post mastectomy patients. The study included 40 women who had undergone one side radical mastectomy and women received post mastectomy radiation. All patients had a clinical manifestation of upper limb lymphedema at the side of surgery. The study shown that the patients with the risk of lymphedema display a low level of education that indicates problems with access to professional information on the topic of lymphedema prevention.

Czerniec. S. A, et al., (2008) had done a study to determine the relationship between physical methods of measuring lymphedema and self reported swelling.Their reliability and standard error of measurements in Australia. There were 33 women with lymphedema and 18 women with unilateral arm lymphedema were selected. Secondary to breast cancer was measured by self report, bioimpedance spectroscopy, perometer truncated cone method. The results shown that the physical measurement tools were highly reliable with high concordance and self report was moderately reliable. The study concluded that lymphedema assessment methods are concordant and reliable but not interchangeable.

Waranakulasuriya. K, et al., (2007) had conducted a study among 22 breast cancer survivors in order to assess the problems of patients with lymphedema. Only 3 patients (14%) used complex decongestive therapy and most of the patients (82%) had therapy only once a year of twenty days. Fourteen patients (63%)

described their lymphedema as permanent and increasing in time and only 3 patients (14%) as periodically retreating. Four of the patients (18%) suffered from pain with the average intensity of 9 on Karnofsky performance scale. Study also emphasized the importance of physiotherapy in post mastectomy patients to reduce lymphedema.

Mirolo. B. R, et al., (2007) had conducted a comprehensive lymphedema management program. The study included 25 patients with moderate to severe lymphedema who had developed after surgery or radiotherapy for carcinoma of breast. Intensive treatment for 4 weeks were given and followed by a self management for 12 months on massage, compression bandaging, sequential pneumatic compression and containment of garment use. The results had shown that significant reduction in lymphedema and improvement in quality of life. The study concluded that the combination of multimodal physical therapy and education for self management reduces lymphedema and adverse effects.

Taylor. R, et al., (2006) had done a study to determine the reliability and validity of arm volume measurements for assessment of lymphedema among breast cancer surgery patients, in Australia. There were 66 samples were included in this study. Among them 41 were in experimental group and 25 samples were in control group. Two measures were used to assess lymphedema circumferential tape measurements and water displacement. Inter rater reliability was calculated by analysis of variance, use of means and correlation co efficient. The results shown that volumes from circumferential measurements had high validity. Thus the study concluded that volumes calculated from anatomic landmarks are reliable, valid and more accurate than those obtained from circumferential measurements based on distance from fingertips.

Bunce. I. H, et al., (2004) had done a prospective cohort study on post mastectomy lymphedema treatment and measurement among 25 women who had lymphedema after mastectomy. Patients received multimodal therapy including education on self management techniques such as massage, exercise, bandaging and sleeve for 4 weeks. The results showed that the excess limb volume decreased 40% immediately after treatment and 50% at 6 month follow up and remaining stable of 12 months. The study concluded that multimodal therapy reduced the lymphedematous limb volume and it can be maintained through exercise and sleeve wearing.

Liao. S. F, et al., (2004) had conducted a prospective study to assess the effectiveness of complex decongestive physiotherapy for patients with chronic cancer associated lymphedema in Taiwan. The study included 30 women who had unilateral upper or lower limb chronic lymphedema after breast or pelvic cancer, All patients received complex decongestive physiotherapy once in a day for 21 days. The results were evaluated with measurement of circumference calculated volume and ratio of the limb volume. The result shown that after the intensive complex decongestive physiotherapy the limb circumference calculated volume and edema ratio were significally reduced compared with their pre treatment values. The study concluded that the intensive complex decongestive physiotherapy was effectively able to reduce the limb volume of patients with chronic cancer associated lymphedema.

Hungler. V, (2003) had done a pilot study among 22 breast cancer survivors in order to assess the problems of patients with lymphedema. Only 3 patients (14%) used complex decongestive therapy and most of the patients (82%) had therapy only once a year for 20 days. Among them 14 patients (63%) described their lymphedema as permanent and increasing in time and only 3 patients (14%) as periodically retreating, 4 of the patients (18%) suffered from pain with the average intensity of 9 on Karnofsky performance scale. The study also emphasized the importance of physiotherapy in post mastectomy patients to reduce lymphedema.

Pillai. P. R, et al., (2003) had conducted a study on incidence of lymphedema in Indian patients undergoing axillary dissection for breast cancer. There were 231 breast cancer patients undergone mastectomy were selected for the study. The arm circumference at 3 different sites of the hands were measured pre and post operatively, based on the difference it was classified as mild, moderate, and severe. The study concluded that combination of axillary dissection and radiation predispose to lymphedema and it can be prevented by early biopsy and proper surgical technique, post operative arm care, exercises and massage therapy.

Literature related to post mastectomy exercises on range of motion

Stan. D. L, et al., (2010) had examined the feasibility of Pilates program among post mastectomy breast cancers survivors with the impact on physical and psychological parameters. There were 26 breast cancer survivors included in this study and 12 weeks of pilates exercises were given to them. The results statistically shown improvement in shoulder abduction, internal rotation, neck rotation and neck flexion and improved quality of life, mood and body image. The study concluded that the Pilates program improves the range of motion and quality of life among breast cancer survivors after mastectomy.

Philip. R. A, et al., (2009) had conducted a prospective study on efficacy of physical therapy for patients undergone mastectomy. There were 90 post mastectomy patients selected in this study. Among them 40 patients received postoperative physical therapy and a group of 41 similar patients did not receive physical therapy. Preoperative and postoperative data were obtained for each patient from goniometric measurements of shoulder abduction, flexion and external rotation, upper extremity circumferential measurements and patient self-report on 10 functional assessment items. Goniometric measurements demonstrated that postoperatively the group receiving physical therapy had better shoulder range of motion and less difficulty with all functional assessment items. The results suggested that patients receiving post mastectomy physical therapy achieve better functional outcomes than those who do not receive it.

Luther. M. U, et al., (2009) had conducted a study to assess the effectiveness of aerobic exercise using a flex band on the improvement of physical functions and body image in breast cancer women undergone mastectomy. In this study 26 women were selected among them 15 were in experimental group and 11 were in control group. The experimental group participated in an aerobic exercise program for 3 times a week, for 6 weeks and the control group received no exercise treatment during the research period. Group analysis revealed that the experimental group women had significantly more improved cardiopulmonary functions, range of motion of the affected shoulder joint, and body image compared to the control group. Thus the study concluded that aerobic exercise using a flex band may be an

effective rehabilitative measure for mastectomy women with respect to cardio pulmonary functions, range of motion and body image.

Cristina. A. P, (2007) had conducted a study to assess the benefit of women from physical therapy after surgery. There were 20 women who underwent surgery for breast cancer, felt pain and weakness in the upper arm and shoulder included in this study. The physiotherapy started about 2 weeks after surgery and continued at 3 and 6 months after surgery. The study results shown that the physical therapy focusing on mobility, strength and scar massage reduced shoulder pain and weakness when compared to women who were given only written suggestions for arm and shoulder exercises.

Lewiz. M, et al., (2004) had done a study to assess the feasibility, physical capacity and health benefits of a multidimensional exercise program was evaluated for cancer patients during advanced stages of disease who are undergoing adjuvant or high dose chemotherapy for 23 patients between 18 and 65 years of age. The supervised program included high and low intensity activities which include physical exercise, relaxation, massage and body awareness training. The study findings shown achievement of an improved level of physical activity after exercise programme. It is concluded that an exercise program, which combines high and low intensity physical activities, may be used to prevent and minimize physical inactivity, fatigue, muscle wasting and energy loss in cancer patients undergoing chemotherapy.

Voogd. A. C, et al., (2003) had done a study to explore measurements of arm circumference and shoulder abduction as an indicator of quality of life after axillary lymph node dissection for invasive breast cancer in Notherland. There were 465 women selected for this study who underwent axillary lymph node dissection the differences in arm circumference and shoulder abduction were collected through questionnaire based on the severity of physical disability and effect on their daily life and well being. The result shown that there was a difference in arm circumference of one or more or difference in abduction of 20 per 36 patient. The study concluded that the measuring arm circumference and shoulder abduction during control visits identifies only some of the women whose daily life and well being was affected by side effects of axillary lymph node dissection.

PART II

CONCEPTUAL FRAMEWORK

The development of conceptual model is a fundamental process required before conducting a research. The conceptual frame work in nursing research can help to provide clear concise idea knowledge about research. The conceptual model is made up of concepts which are the mental images of phenomenon. These concepts are linked together to express their relationship between them. It provides the guideline to attain the objectives of the study based on the theory. Conceptual models deal with concepts that are used as building blocks and provide a conceptual perspective regarding interrelated phenomena which are closely structured.

It is schematic representation of the steps, activities and outcome of the study. The conceptual framework for this study was based on Imogen king's goal attainment model (1971). The central focus of Imogen king's frame work is man as a dynamic human being whose perception of objects, persons and events influence his behavior, social interaction and health. Imogene king's conceptual frame work includes three interacting systems which each system having its own distinct group of concepts and characteristics. These systems include personal systems, interpersonal systems and social systems.

The personal system refers to an individual. The concepts within the personal system and fundamental in understanding human beings are perception, self, body image, growth and development, time and space. Imogene king (1981) viewed perception as the most important variables because perception influences behavior king summarized the connections among the concepts in the following statement. An individual's perception of self, objects and events in his or her life. As individuals grow and develop through the life span, experience with changes in structure and function of their bodies over time influence their perception of self, interpersonal systems involve individuals as small or large groups.

The theory is based on the concepts of the personal and interpersonal systems including interaction, perception, transition and action. A basic theory for conceptual framework, which is aimed to assess the effectiveness of post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy. This involves interaction between the researcher and the patients undergone mastectomy. The seven major concepts are described as follows.

Perception

Perception is the person's representation of the reality. It influences all other behavior of a person and it is more subjective and unique to each person. The researcher perceives that the patients undergone mastectomy had lymphedema and decreased range of motion and the post mastectomy patients perceives the need to reduce lymphedema and improve range of motion through post mastectomy exercises.

Judgement

The judgement is a decision made by the researcher and patients undergone mastectomy. Here the researcher judges that the patients undergone mastectomy lack of exercises. So, the investigator planned to provide post mastectomy exercises.

Action

This refers to the changes that have to be achieved. The researcher's action is to implement post mastectomy exercises in order to improve the range of motion and reduce lymphedema and the patients undergone mastectomy are ready to perform the post mastectomy exercises.

Goal setting

Here the researcher plans to train about the selected post mastectomy exercises such as wall hand climbing, rope turning, rod or broomstick lifting and

pulley tugging for reducing lymphedema and improve the range of motion among patients undergone mastectomy.

Reaction

Reaction means decision to act. In this study the researcher taken the tool from American lymphology association to assess the existing level of lymphedema with inch tape and Elvaru-STJ Range of Motion position and Range of Motion reliability tool to measure the range of motion with goniometer among patients undergone mastectomy.

Interaction

Interaction is a process of perception and communication between person and environment and between person to person, represented by verbal and nonverbal behaviors that are goal directed. Here the researcher gave test on post mastecomy exercises such as wall hand climbing, rope turning, rod or broomstick lifting and pulley tugging.

Transaction

The transaction was purposeful interaction that leads to goal attainment between the researcher and the patients undergone mastectomy. Here, the researcher assesses the effectiveness of post mastectomy exercises among patients undergone mastectomy by post test using inch tape and goniometer.

Positive outcome was reduction in lymphedema and increase in range of motion which has to be reinforced further. Negative outcome was no reduction in lymphedema and no increase in range of motion which needs to be reassessed for further test.

King’s conceptual framework and theory of goal attainment provides a useful structure for the current researcher by using post mastectomy exercises in training the selected post mastectomy exercises.

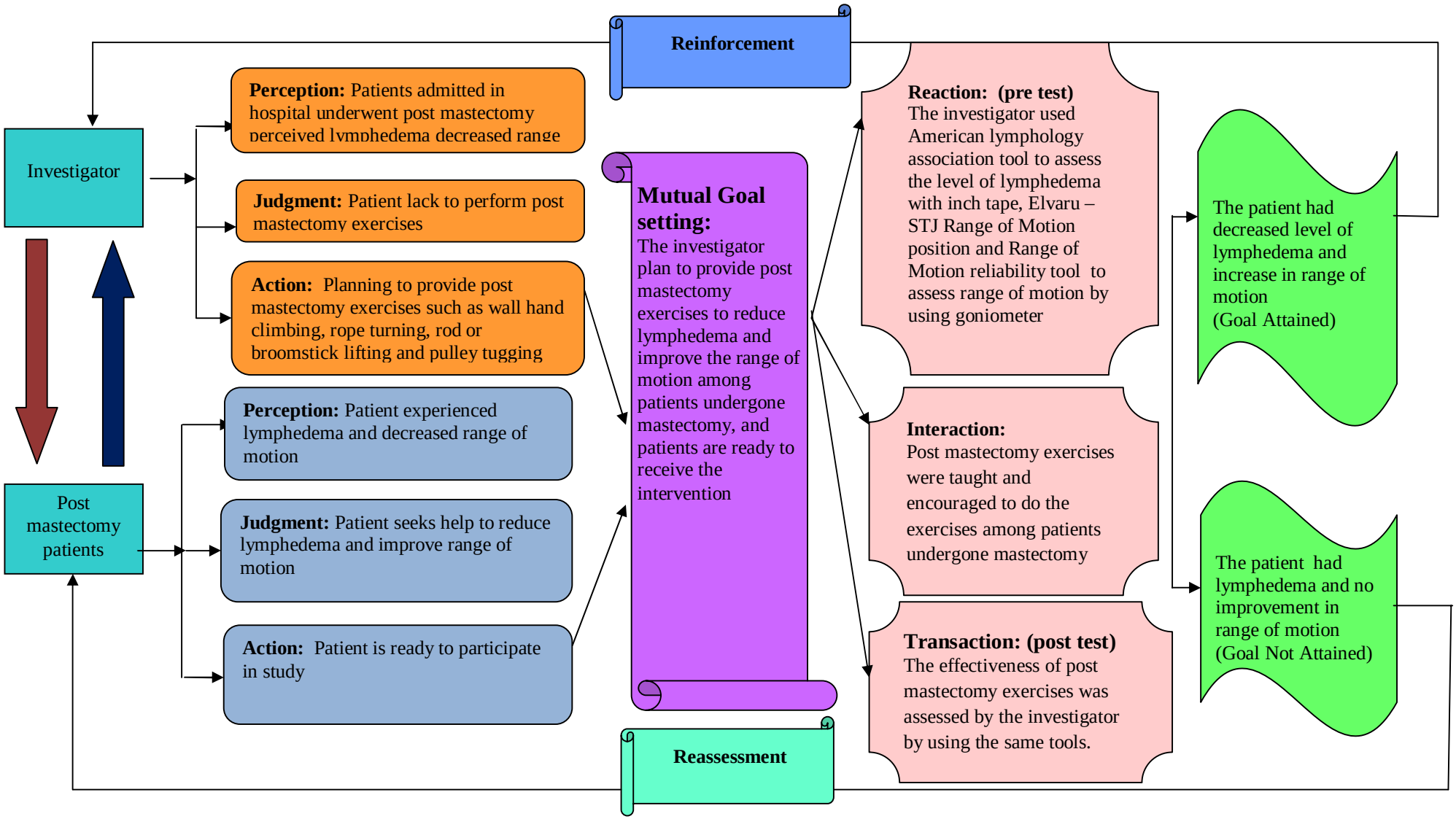

Fig 1: MODIFIED KING'S GOAL ATTAINMENT THEORY (1971).

CHAPTER–III

METHODOLOGY

The methodology of any investigation is vital importance. The success of any research depends largely upon the suitability of method, the tools and the techniques that the researcher follow to gather adequate data. This chapter includes research design, setting of the study, population, sample, sample size, sampling technique, criteria for sample selection, description of the tool, pilot study and data collection.

RESEARCH APPROACH

Quantitative research approach was used to assess the effectiveness of post mastectomy exercises in reducing lymphedema and improving range of motion among patients undergone mastectomy

RESEARCH DESIGN

The design used for this study was pre experimental one group pre test post test design.

RESEARCH VARIABLES

Independent variables: It refers to post mastectomy exercises on lymphedema and range of motion.

Dependent variables: It refers to lymphedema and range of motion among patients undergone mastectomy.

SETTING OF THE STUDY

This study was conducted in Shanmuga hospital at Salem. The hospital is a corporate venture situated in the mid salem city in the pollution free environment.

It is 350 beded multispeciality hospital present with various super specialities. The unique building consist of 5 floors and has a separate block for oncology providing comprehensive cancer control measures for the whole desire by using methods for early detection, provides facilities for diagnosis and assessing of cancer by histopathological, uptological, clinical pathological, bio chemical, radiological, endoscopical, immunological and isotopical methods and provides necessary facilities for fundamental and clinical research in relation to cancer. It is well equipped and renders specialized care to all cancer patients through surgery, radiation and day care centers. All types of cancer patients were admitted and treated.

POPULATION

The population consists of patients undergone mastectomy who are admitted in Shanmuga hospital at Salem.

SAMPLE

The sample consists of patients undergone mastectomy those who fulfill the inclusion criteria.

SAMPLE SIZE

The sample size consists of 30 patients who undergone mastectomy in Shanmuga hospital Salem.

SAMPLING TECHNIQUE

Purposive sampling technique was used to select the samples among paients undergone mastectomy at Shanmuga hospital, Salem.

CRITRIA FOR SAMPLE SELECTION

Inclusion criteria

- The women who undergone mastectomy had lymphedema and decreased range of motion.
- The women who undergone mastectomy stays in hospital for a week.
- The women who are willing to participate in the study.

Exclusion criteria

- The women who are having any mental illness
- The women who are using any supportive measures in reducing lymphedema

DESCRIPTION OF THE INSTRUMENT

The tool used for this study was taken from American Lymphology Association for assessing lymphedema and Elvaru, - STJ Range of Motion position and Range of Motion reliability for assessing the range of motion by using inch tape and goniometer.

Part: I

The demographic variables consist of the age, marital status, educational status, occupation, nature of work, family income, type of family and co morbid illness

Part: II

Section-A

The lymphedema was measured by using inch tape, it involves the arm circumference measures to estimate volume differences between the affected and unaffected arms. Sequential measurements are taken at four points on both arms by using inch tape. Measurements in the arm are made at four points such as metacarpal-phalangeal joints, the wrists, 10 cm distal to the lateral epicondyles and 15 cm proximal to the lateral epicondyles. A difference of more than 1.5 cm between the affected and unaffected arm was considered clinically significant.

The scoring was interpreted as follows

Classifications of lymphedema using the American Lymphology Association tool

- ❖ Mild 1.5-3.0 cm;
- ❖ Moderate 3.1-5.0 cm;
- ❖ Severe > 5.0 cm

Section-B

The device goniometer was used to measure the range of motion in shoulder. Expected range of motion in shoulder based on Elvaru, - STJ Range of Motion position and Range of Motion reliability:

- ♣ Shoulder Flexion: 120°
- ♣ Shoulder Abduction: 90°
- ♣ Shoulder Internal and External Rotation: 70° internal rotation; 90° external rotation.
- ♣ Shoulder Horizontal Abduction: 45°

PART-III

Post mastectomy exercises such as wall hand climbing, rope turning, rod or broom stick lifiting, pulley tugging were taught to patients undergone mastectomy for 10 minutes on the 1st post operative day and instructed to the patient to perform daily morning and evening for 30 minutes for 5 days. The post test was assessed at the end of the 5th day using the same tools.

VALIDITY

The content validity of the tool was validated by experts from the field of Medicine and Nursing graduate. The tool was used after consulting with the experts.

RELIABILITY

Reliability of the tool was established by using cronbach's method. The reliability score obtained was r = 0.86 and 0.89 which showed that the tool was reliable for conducting the study.

ETHICAL CONSIDERATION

The study was conducted after the approval of dissertation committee. A formal permission was obtained from Dr. P.S. Panneerselvam, M.S.,M.N.A.M.S., F.I.C.S., F.A.I.S founder and chairman of Shanmuga hospital Salem. Patients undergone mastectomy who had lymphedema and decreased range of motion were clearly explained about the study purpose and procedures. The formal written consent was taken from the samples. The usual assurance of anonymity and confidentiality was obtained.

PILOT STUDY

The pilot study was conducted to test the feasibility appropriateness and practicability. The pilot study was conducted among 3 post mastectomy patients in the same hospital from the duration of 12-05-14 to 18-05-14. A formal permission

was obtained from Dr.P.S. Panneerselvam, M.S.,M.N.A.M.S., F.I.C.S., F.A.I.S founder and chairman of Shanmuga hospitals Salem and also the written consent was obtained from the patients undergone mastectomy. The participants were selected by purposive sampling method.

A brief introduction was given about the purpose of the study and explained to the patients. The pretest was conducted by using self administered questionnaire for collecting demographic variables, inch tape was used to assess lymphedema and goniometer to measure range of motion of shoulder for 10 minutes. The post mastectomy exercises were taught to the patient for 10 minutes on the first day and instructed the patient to perform 30 minutes morning and evening for 5 days. At the 5^{th} day the investigator assessed the effectiveness of post mastectomy exercises. The result of the study shown that the post mastectomy exercises reduced the lymphedema and improved in range of motion of the shoulder. The study was feasible to conduct the main study.

DATA COLLECTION PROCEDURE

The investigator used self instructed questionnaire tool to collect the demographic data, inch tape goniometer to assess the effectiveness of post mastectomy exercises on reducing lymphedema and improving range of motion among patients undergone mastectomy in shanmuga hospital at salem. A formal permission was obtained from Dr.P.S. Panneerselvam, M.S.,M.N.A.M.S., F.I.C.S., F.A.I.S founder and chairman of the Shanmuga hospital. The data collection procedure was scheduled from19.05.14 to 19.06.14. The study carried out with total of 30 post mastectomy patients, who fulfilled the inclusion criteria. Purposive sampling technique was used to select the samples.

The investigator introduced herself to the patient and explained the purpose of the study to ensure better co-operation. About 40 post mastectomy patients were assessed for lymphedema among them 30 were selected based on the availability of samples. Approximately 7 to 8 samples were selected per week. A standardized American Lymphology association tool was used to assess the pre test

level of lymphedema and Elvaru, - STJ Range of Motion position and Range of Motion reliability tool was used to assess the range of motion. The post mastectomy exercises was taught by the investigator for the period of 10 minutes and instructed the patient to perform for every day 30 minutes in morning and evening. The investigator assessed the effectiveness of post mastectomy exercises at the end of the 5^{th} day by using same tool.

DATA ANALYSIS

The data obtained was analyzed using both descriptive and inferential statistics. Frequency and percentage distribution was used to determine the demographic variables. Mean, standard deviation was used to compute pre test and post test level of lymphedema and range of motion. Paired 't' test was used to assess the effectiveness of post mastectomy exercises in reducing lymphedema and improving range of motion.

A STUDY TO ASSESS THE EFFECTIVENESS OF POST MASTECTOMY EXERCISES ON REDUCTION OF LYMPHEDEMA AND IMPROVING RANGE OF MOTION AMONG PATIENTS UNDERGONE MASTECTOMY.

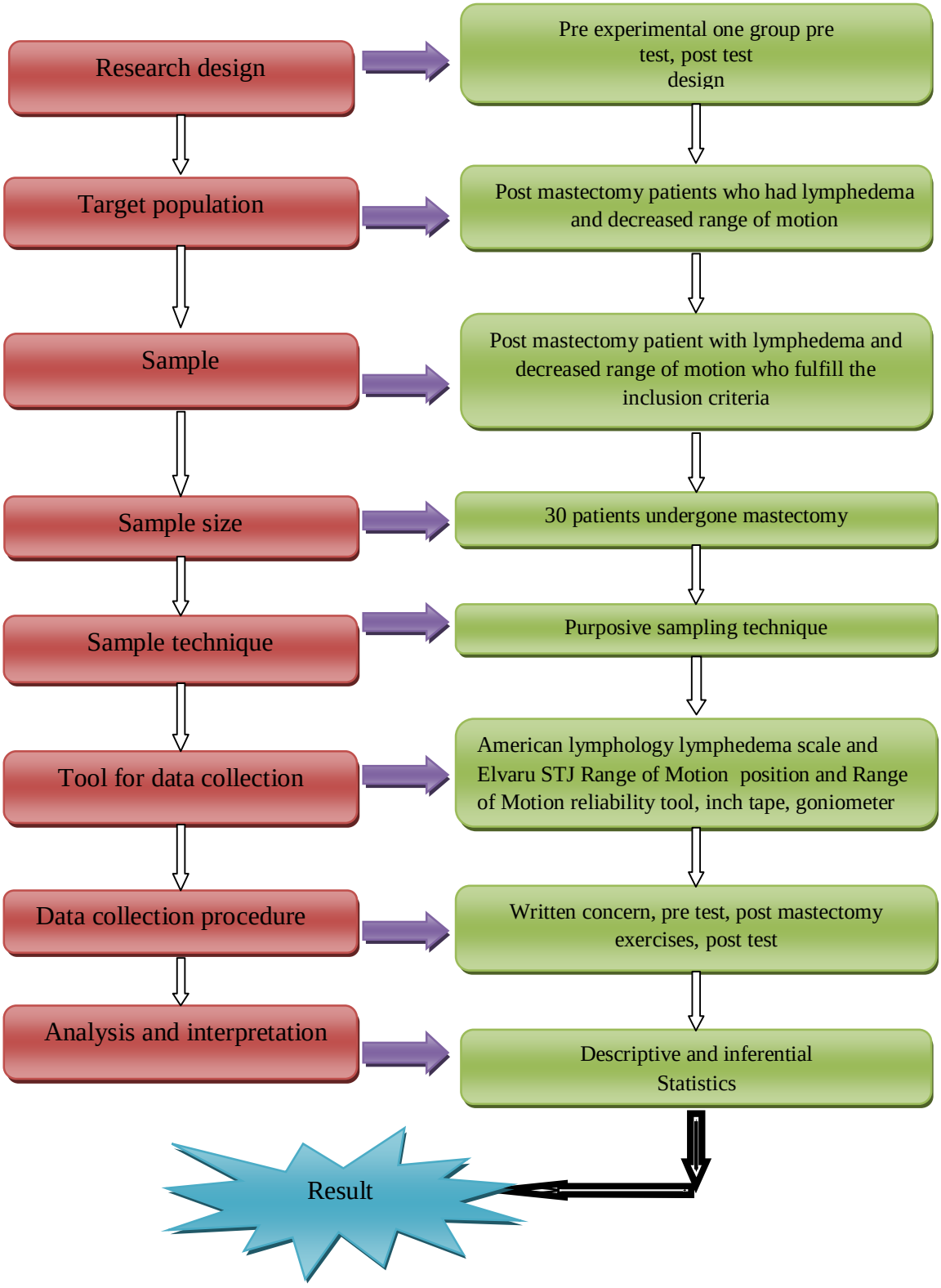

Fig.2: Schematic representation of research methodology adapted in this study.

CHAPTER-IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the description of the study subjects, classification, analysis and interpretation of data collected to assess the effectiveness of post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy in shanmuga hospitals, Salem.

Abdellah and Levin (1979) have stated that interpretation of tabulated data can bring to light the real meaning of the study. Data collected to assess the effectiveness of post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy in Shanmuga hospitals, Salem. The collected data was analyzed based on objectives and hypothesis of the study. The findings are based on the descriptive and inferential statistical analysis are presented under the following sections:

Section A: Frequency and percentage distribution of demographic variables among patients undergone mastectomy

Section B: Frequency and percentage distribution of pre test and post test level of lymphedema among patients undergone mastectomy

Section C: Frequency and percentage distribution of pre test and post test level of range of motion among patients undergone mastectomy

Section D: Comparison of mean and standard deviation of pre and post test level of lymphedema among patients undergone mastectomy

Section E: Comparison of mean and standard deviation of pre and post test level of Range of motion among patients undergone mastectomy

SECTION A

Table 1: Frequency and percentage distribution of demographic variables of patients undergone mastectomy

N=30

S.No.	Demographic variables	Frequency	Percentage
1	**Age in years**		
	20-30	0	0.00
	31-40	4	13.33
	41-50	16	53.33
	>50	10	33.33
2	**Marital status**		
	Single	0	0.00
	Married	25	83.33
	Divorcee	0	0.00
	Widower	5	16.67
3	**Educational status**		
	No formal education	9	30.00
	School education	17	56.67
	Graduates	4	13.33
4	**Occupation**		
	Unemployed	15	50.00
	Private employee	4	13.33
	Government employee	2	6.67
	Own business	9	30.00
5	**Nature of work**		
	Mild work	18	60.00
	Moderate work	12	40.00
	Heavy work	0	0.00
6	**Family monthly income**		
	Rs. <10,000	9	30.00
	Rs.10001-20,000	15	50.00
	Rs.20001-30,000	6	20.00
	Rs.>30,000	0	0.00
7	**Type of family**		
	Nuclear	23	76.67
	Joint	6	20.00
	Extended	1	3.33
	Living alone	0	0.00
8	**Any co-morbid illness**		
	Diabetes mellitus	7	23.33
	Hypertension	12	40.00
	Renal disease	10	33.33
	Heart disease	1	3.33
	Others	0	0.00

Table 1 represents the frequency and percentage distribution of demographic variables among patients undergone mastectomy. In regard to the age none of them were in the age group of 20-30 years, 4 (13.33%) patients were in the age group of 31-40 years, 16 (53.33%) were in the age group of 41-50 years, 10 (33.33%) patients were in the age group of above 50 years. In accordance with marital status none of them were single and divorced, 25 (83.33%) were married, 5 (16.67%) were widower.

With regard to the educational status 9 (30.00%) patients had no formal education, 17 (56.67%) had completed school education, 4 (13.33%) were graduates. In concern with the occupation 15 (50.00%) were unemployed, 4 (13.33%) were private employee, 2 (6.67%) were government employees, 9 (30.00%) were doing own business. With regard to the nature of the work 18 (60.00%) were mild workers, 12 (40.00%) were moderate workers and there were no heavy workers. In regard to family income 9 (30.00%) were earning below Rs.10,000, 15 (50.00%) were earning Rs.10001 between Rs.20,000, 6(20.00%) were earning Rs.20001-30,000, none of them were earning above 30,000.

In regard to type of family 23 (76.67%) belongs to nuclear family, 6 (20.00%) belongs to joint family, 1(3.3%) belongs to extended family, none of them were living alone. In presence of co-morbid illness 7(23.33%) were diabetic, 12(40.00%) were hypertensive,10(33.33%) had renal diseases, 1(3.33%) had heart disease.

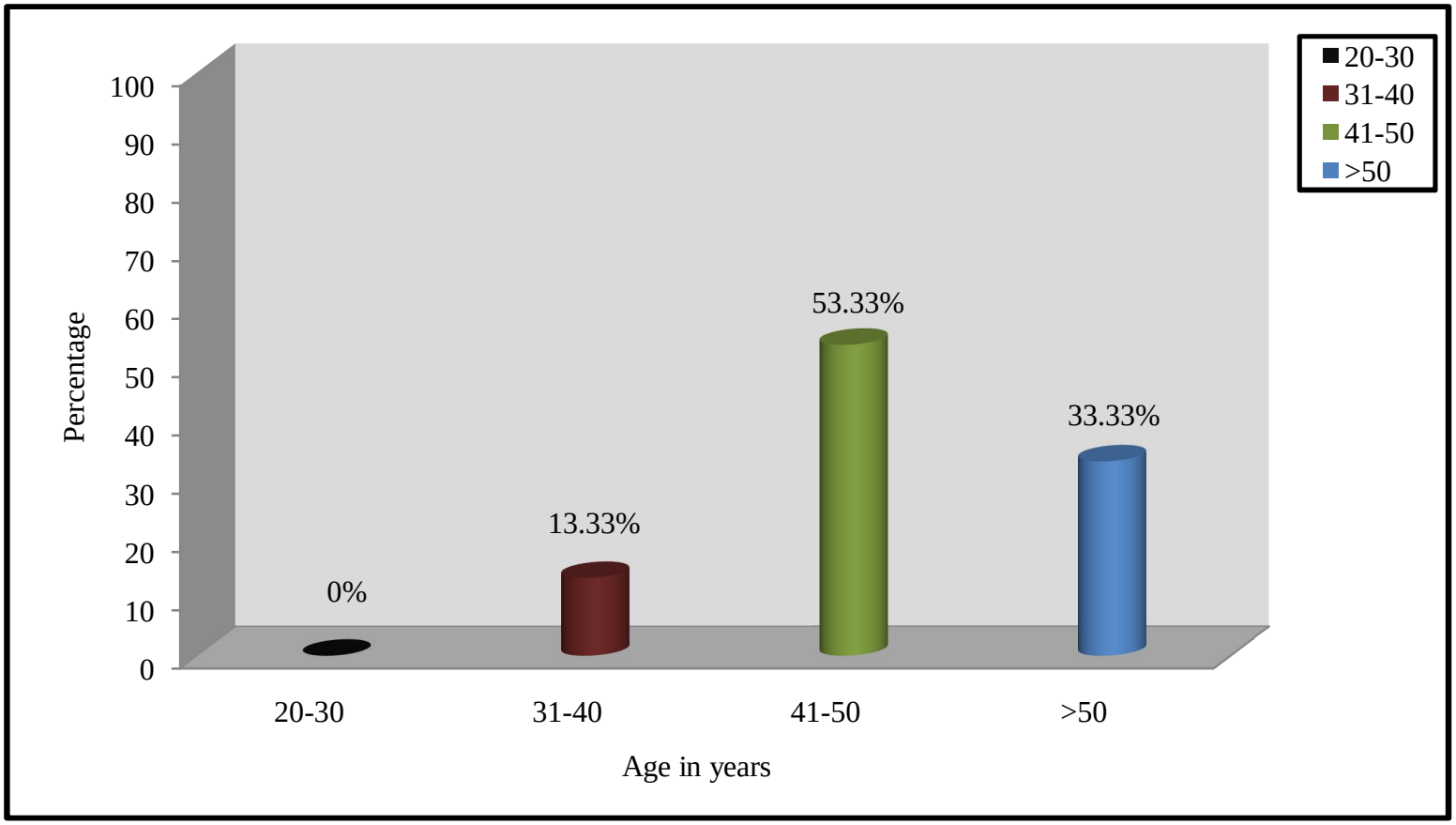

Fig.3: Percentage distribution of age among patients undergone mastectomy

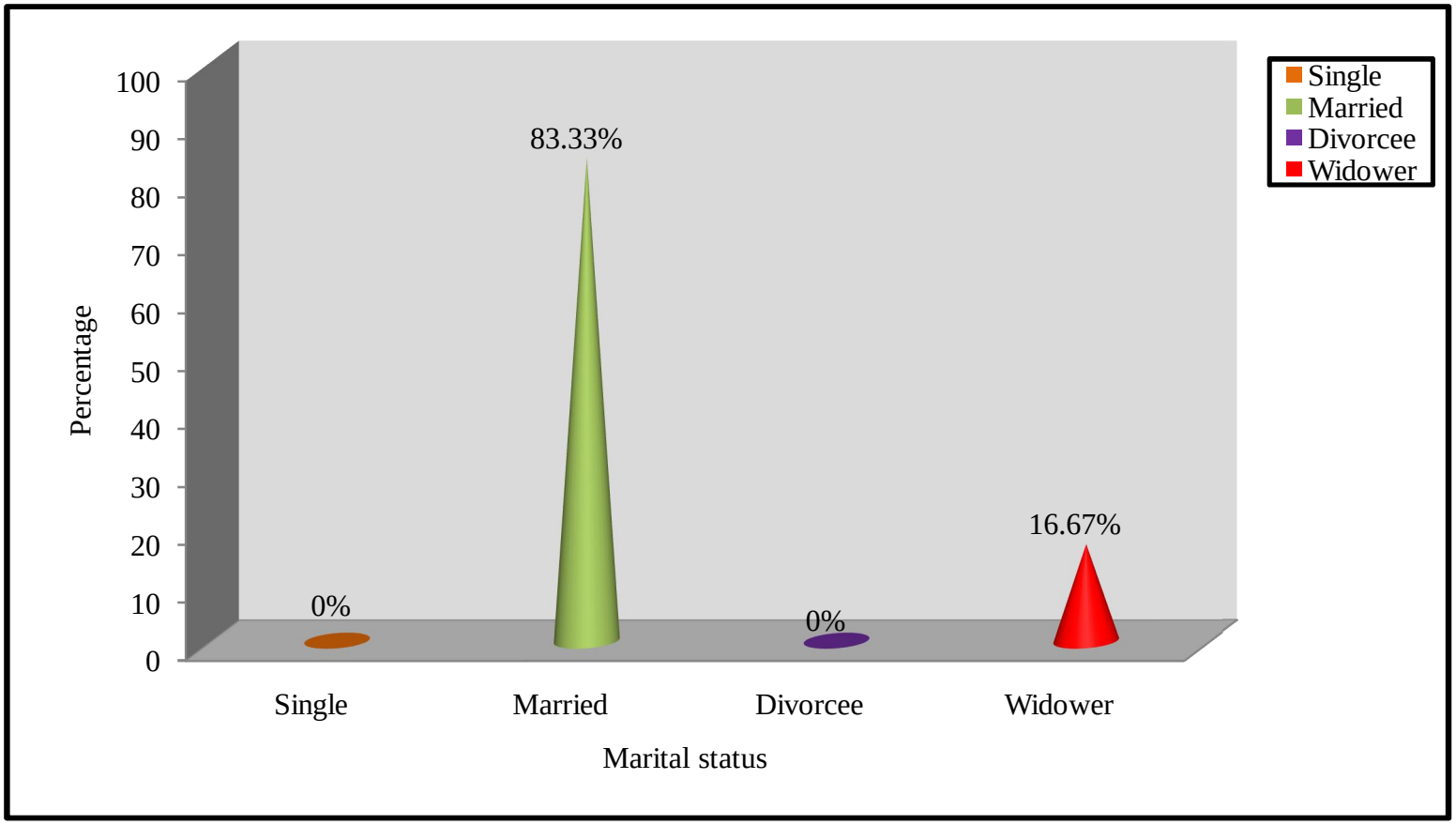

Fig.4: Percentage distribution of marital status among patients undergone mastectomy

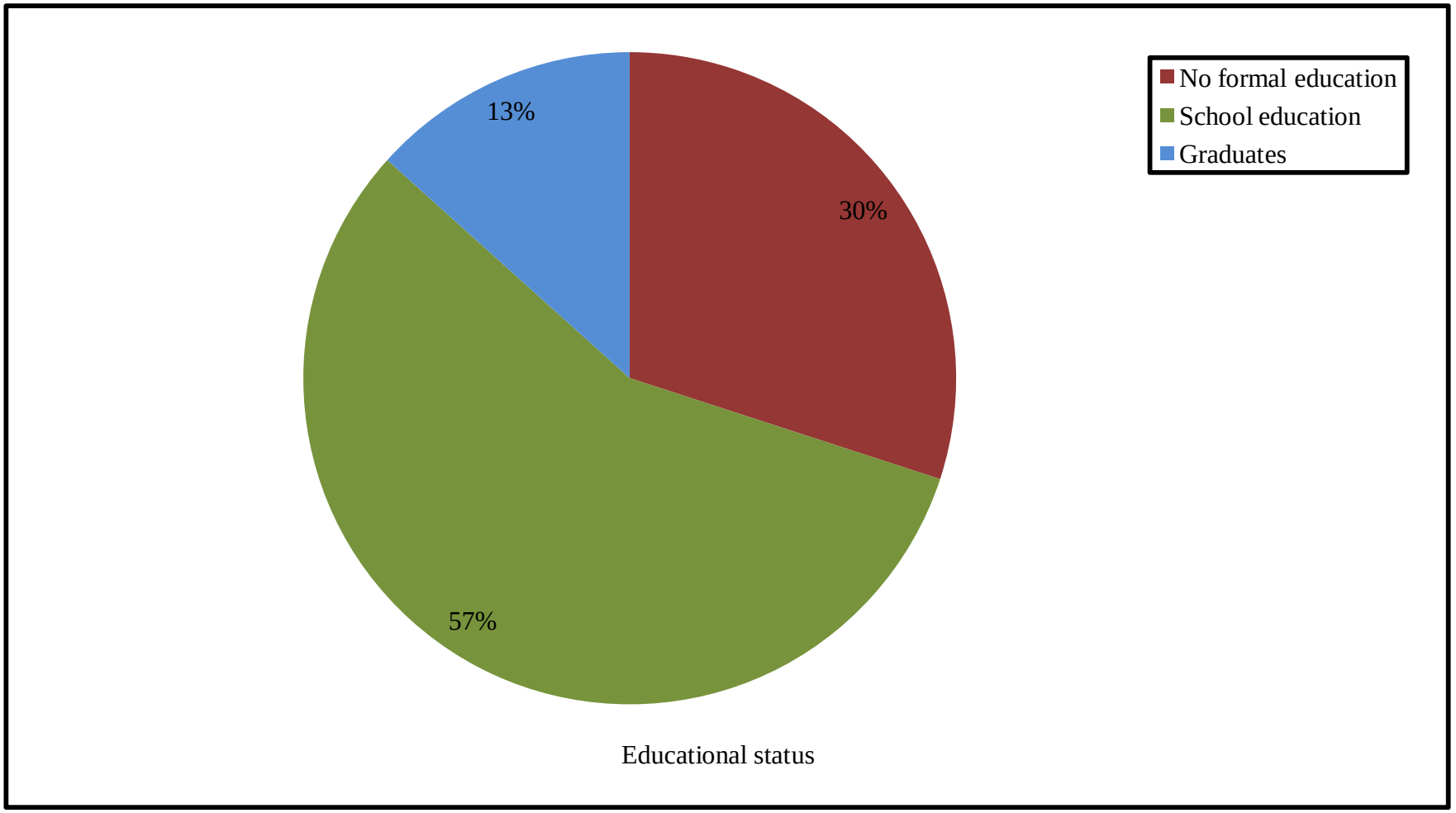

Fig.5: Percentage distribution of educational status among patients undergone mastectomy

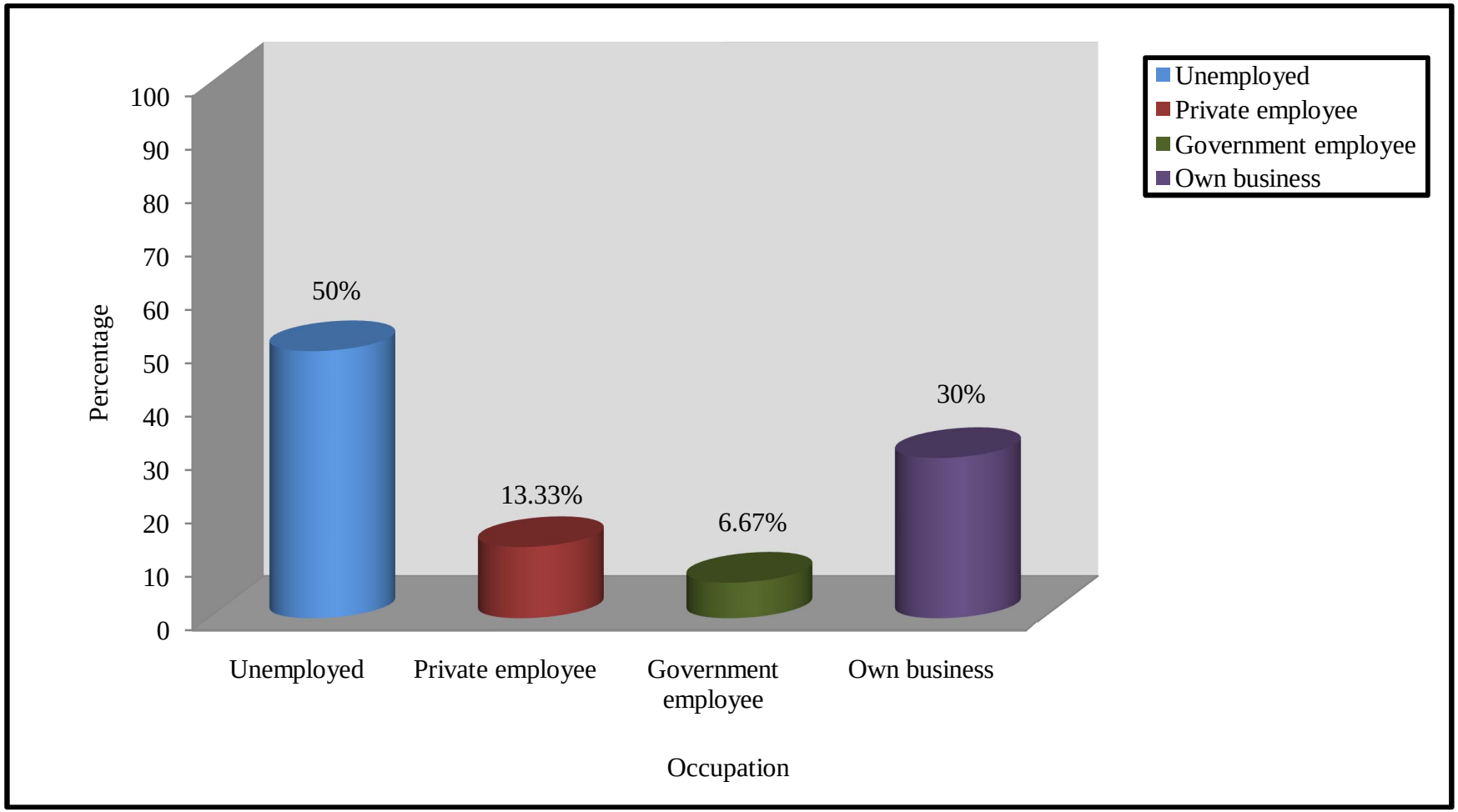

Fig.6: Percentage distribution of occupation among patients undergone mastectomy

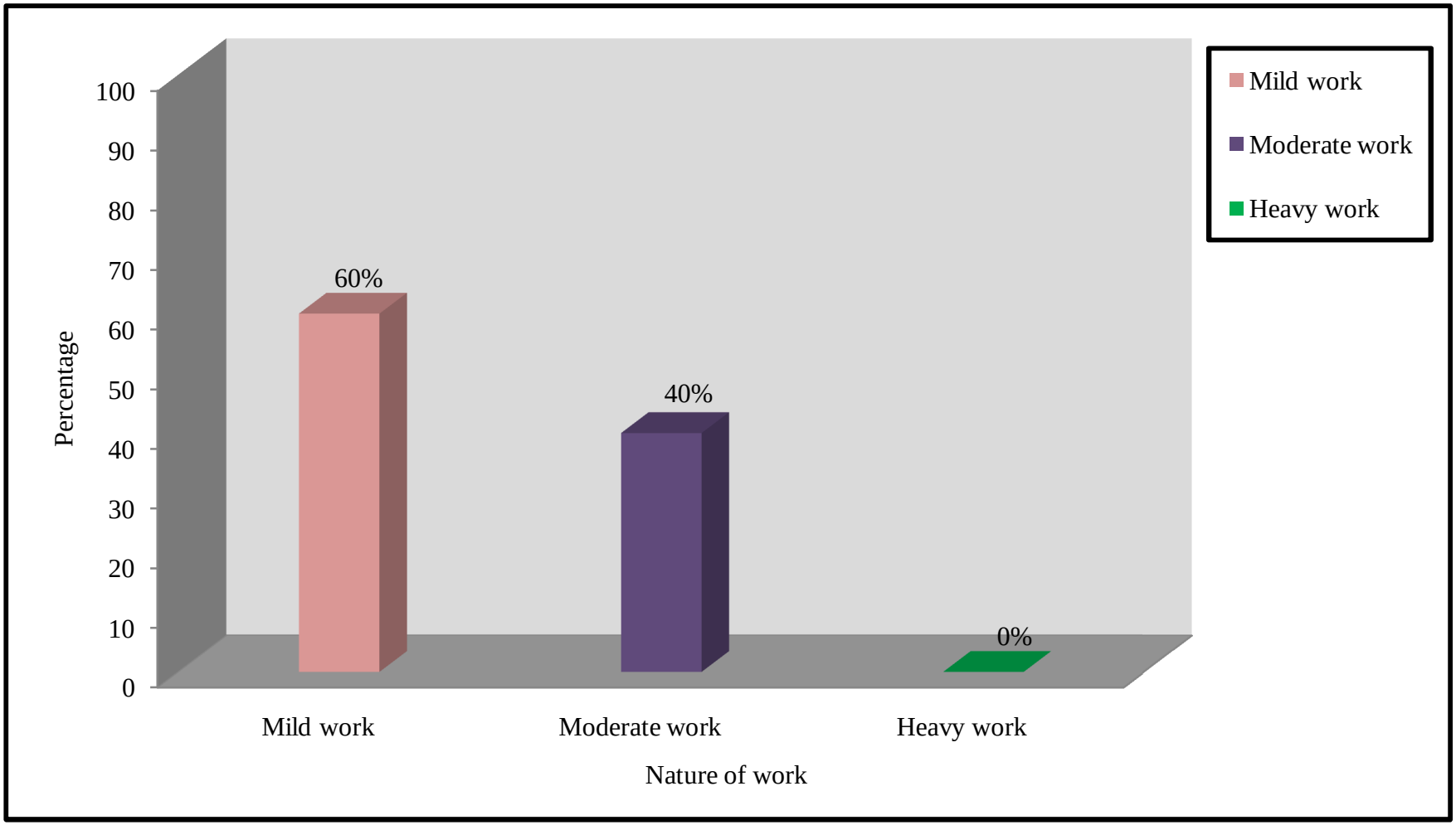

Fig.7: Percentage distribution of nature of work among patients undergone mastectomy

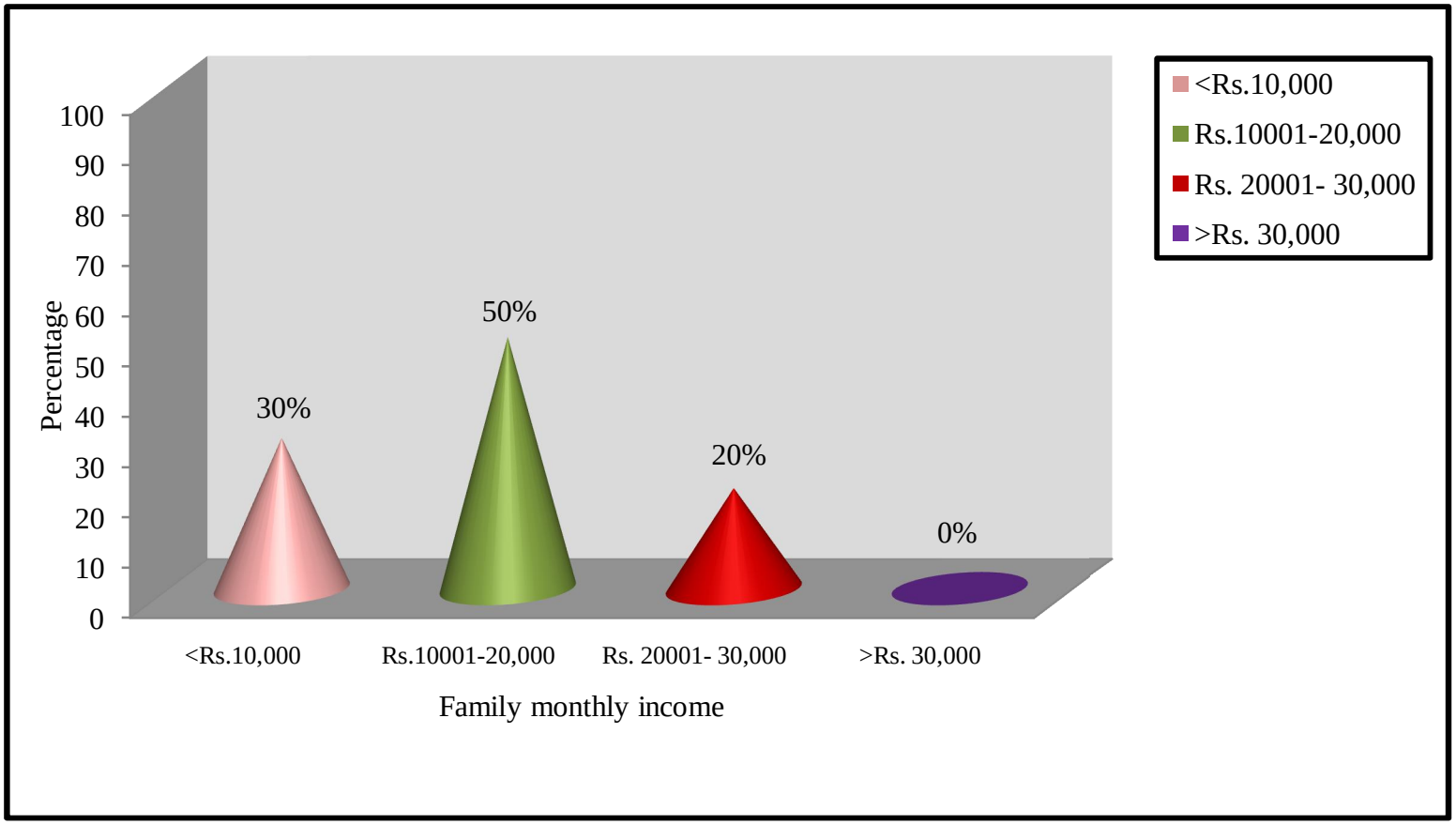

Fig.8: Percentage distribution of family monthly income among patients undergone mastectomy

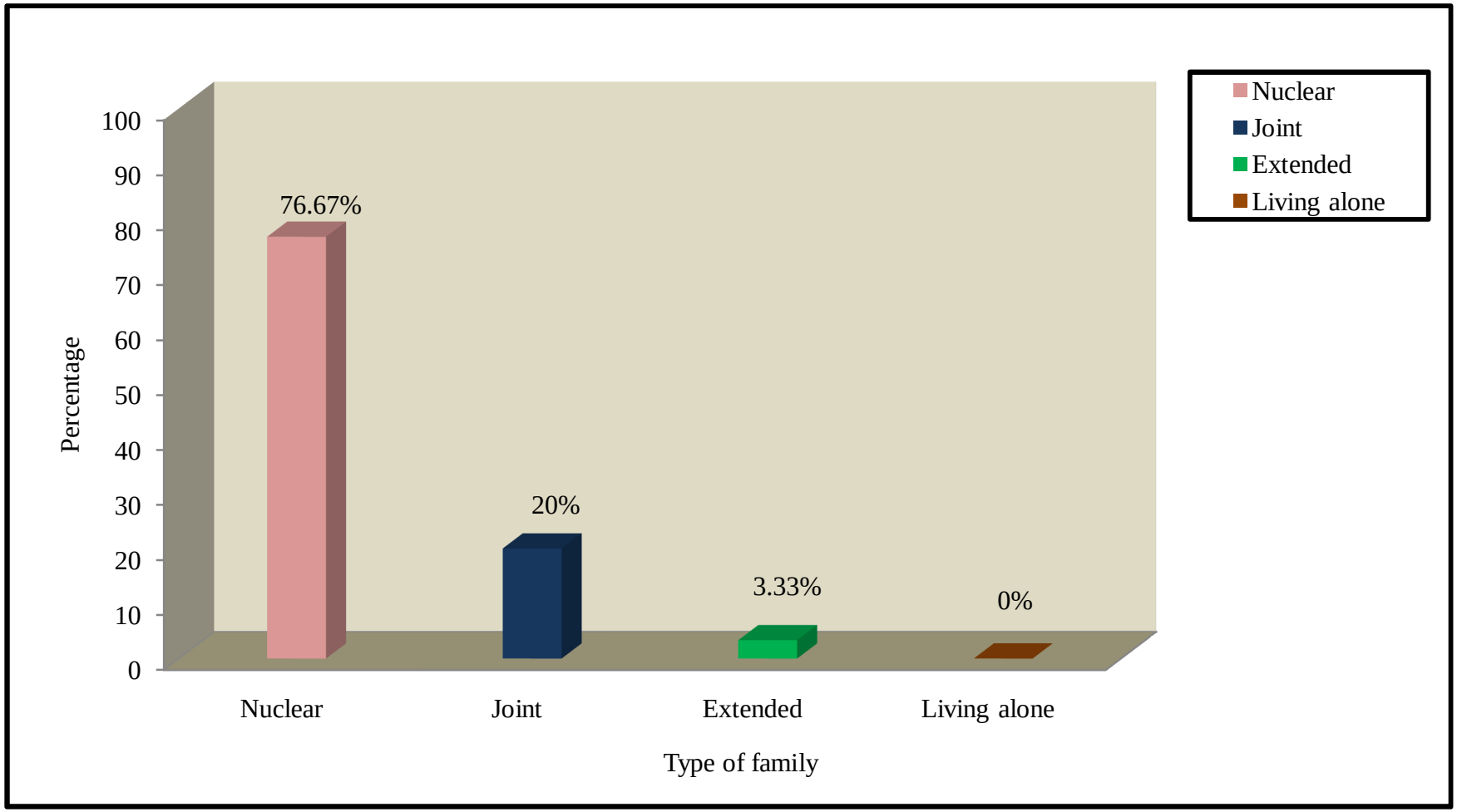

Fig.9: Percentage distribution of type of family among patients undergone mastectomy

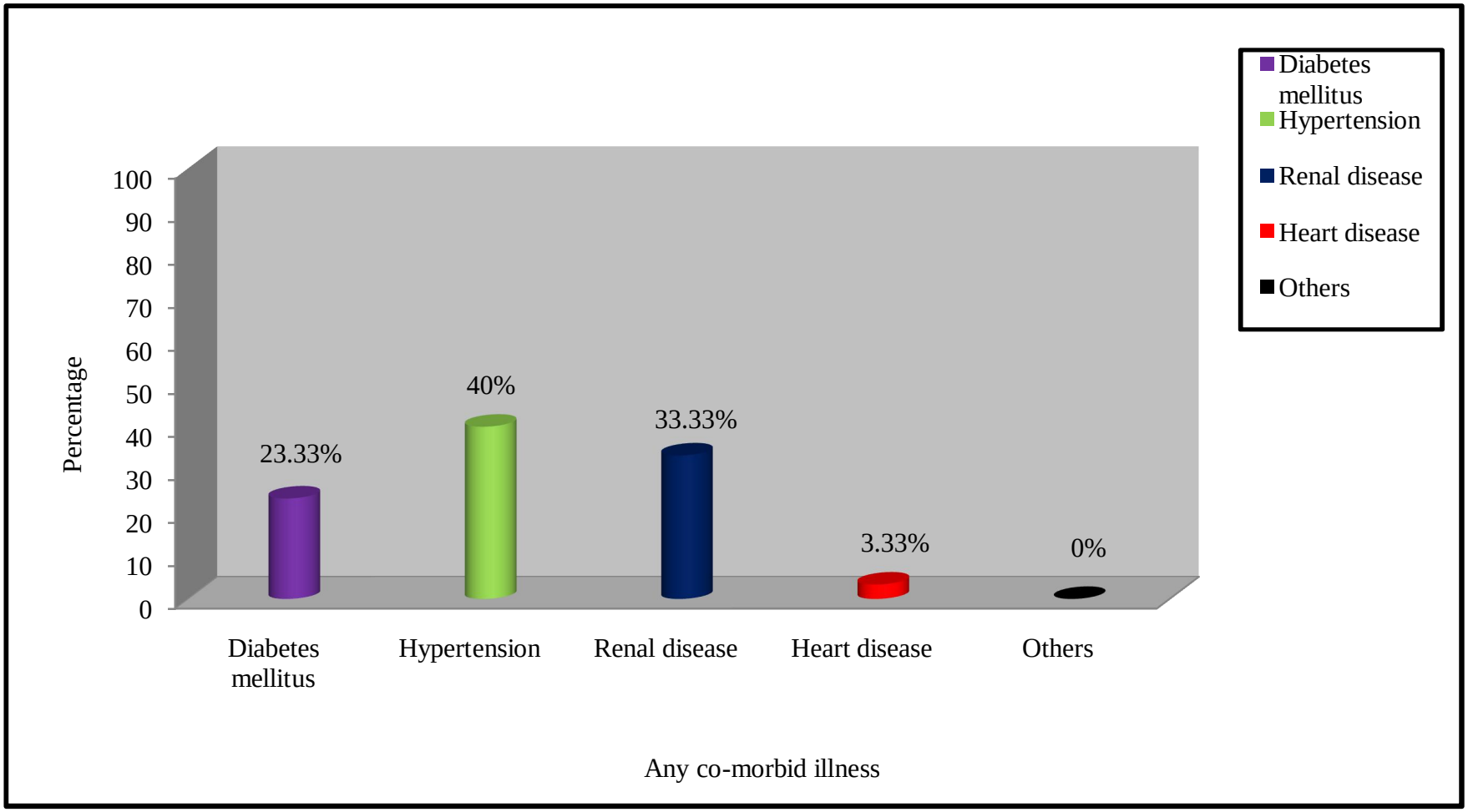

Fig.10: Percentage distribution of any co-morbid illness among patients undergone mastectomy

SECTION B

Table 2: Frequency and percentage distribution of pre test and post test level of lymphedema among patients undergone mastectomy

N = 30

Level of lymphedema	Nil		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%
Pre test	0	0	29	96.67	1	3.33	0	0
Post test	30	100.0	0	0	0	0	0	0

Table 2 shows the frequency and percentage distribution of level lymphedema among patients undergone mastectomy. The total number of samples was 30. In pretest 29 (96.67%) had mild level of lymphedema 1(3.33%) had moderate level of lymphedema and none of them had severe lymphedema. In post test none of them had mild, moderate or severe lymphedema.

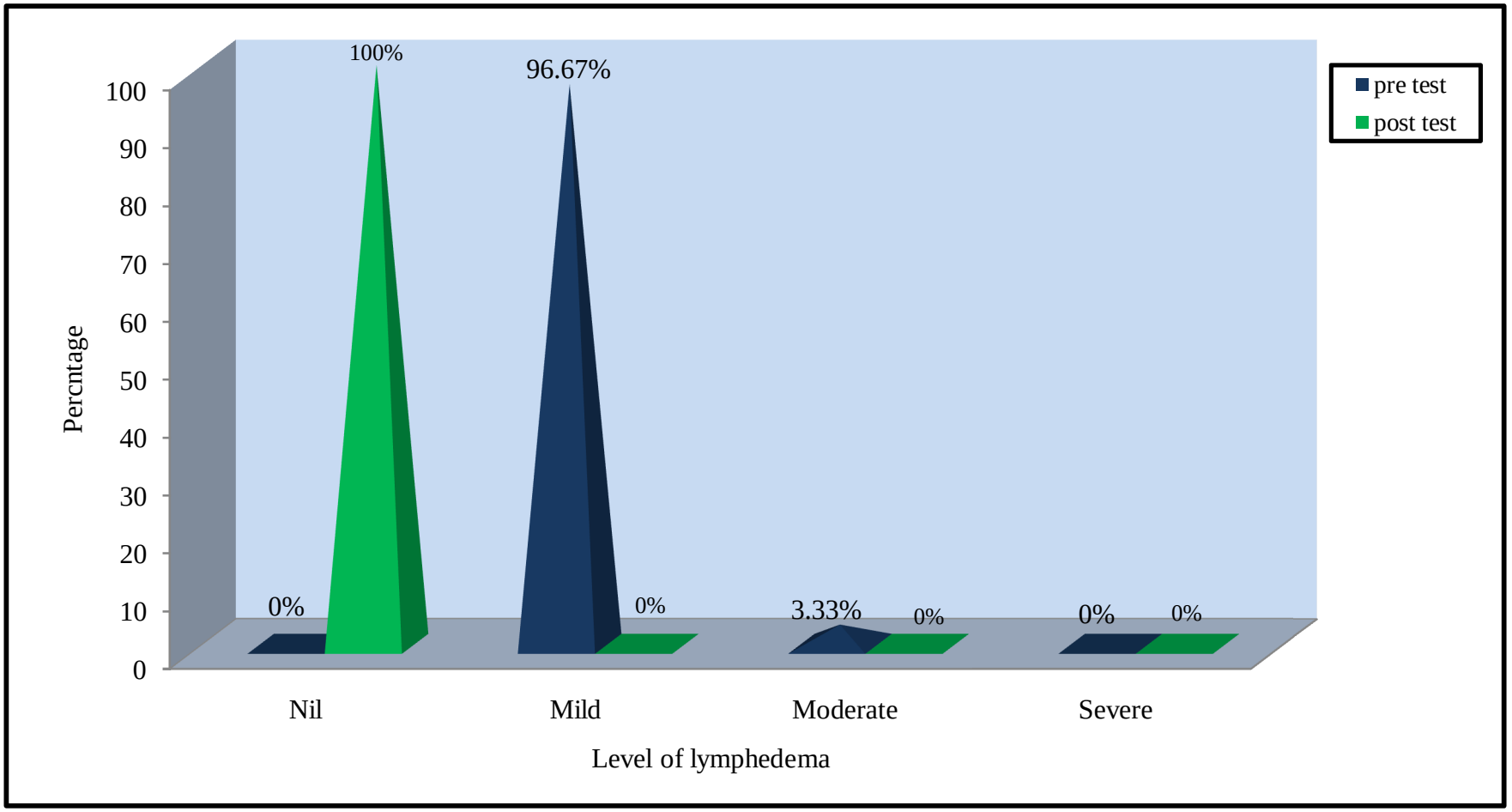

Fig.11: Percentage distribution of pre test and post test level of range of motion among patients undergone mastectomy

SECTION C

Table 3: Frequency and percentage distribution of pre test and post test level of range of motion among patients undergone mastectomy

N=30

Range of Motion	Assessment	<Normal		Normal	
		No.	%	No.	%
Shoulder Flexion	Pre test	30	100.0	0	0
	Post test	0	0	30	100.0
Shoulder Abduction	Pre test	30	100.0	0	0
	Post test	0	0	30	100.0
Shoulder Internal and External Rotation	Pre test	30	100.0	0	0
	Post test	0	0	30	100.0
Shoulder Horizontal Abduction	Pre test	30	100.0	0	0
	Post test	0	0	30	100.0

Table 3 represents the frequency and percentage distribution of pre test and post test level of range of motion among patients undergone mastectomy. In pre test 30 (100%) patients had below normal range of shoulder flexion, shoulder abduction, shoulder internal and external rotation, shoulder horizontal abduction and none of them had normal range of motion. Whereas in the post test 30 (100%) had normal range of motion of the shoulder flexion, shoulder abduction , shoulder internal and external rotation and shoulder horizontal abduction and none of them had below normal range of motion.

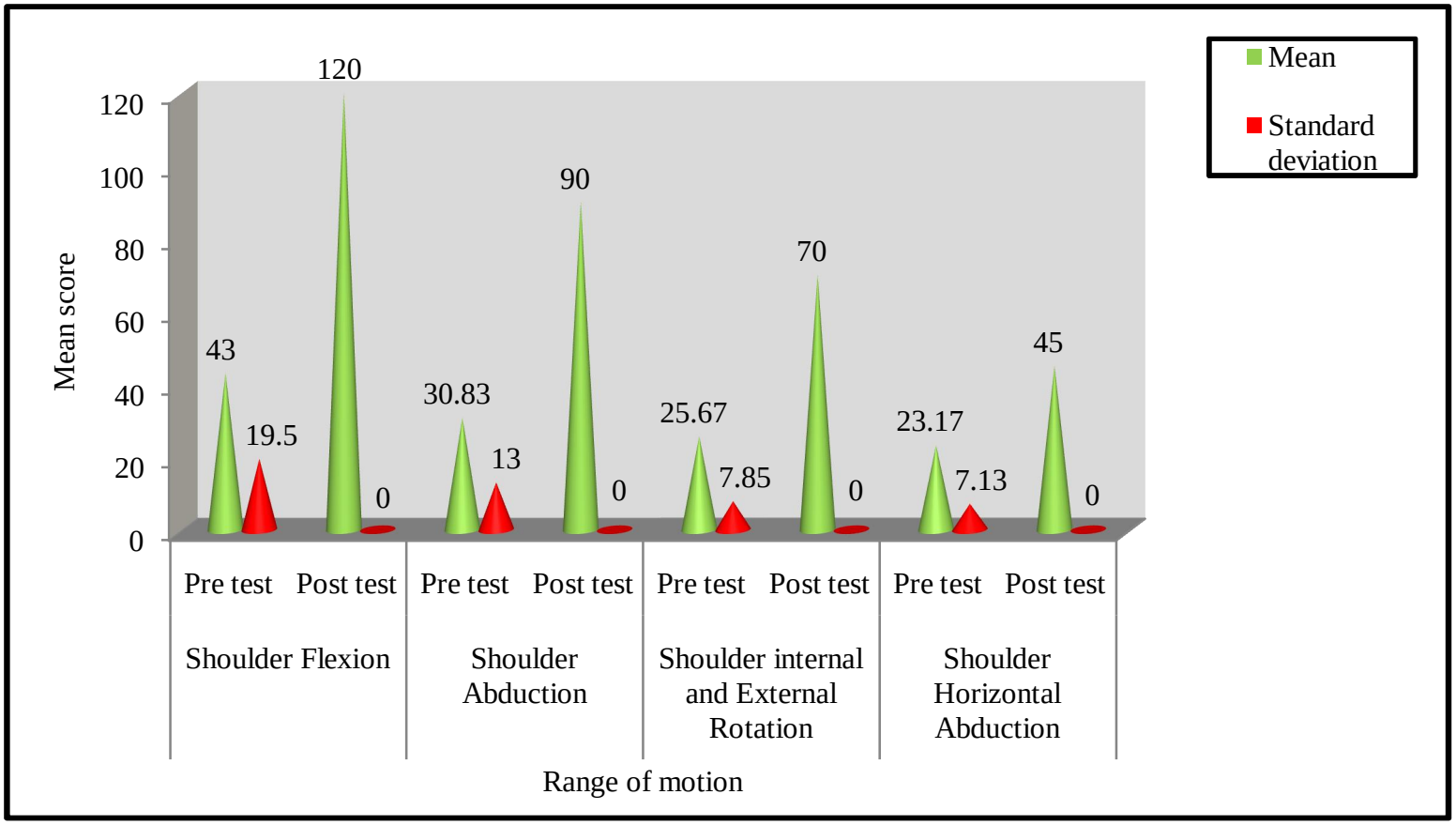

Fig.12: Percentage distribution of pre test and post test level of range of motion among patients undergone mastectomy

SECTION D

Table 4: Comparison of mean and standard deviation of pre and post test level of lymphedema among patients undergone mastectomy

N=30

Lymphedema	Mean	S.D	Paired 't' Value
Pre test	1.62	0.48	18.231***
Post test	0.00	0.00	

***p<0.001, S – Significant

Table 4 depicts the comparison of mean and standard deviation between pre and post test level of lymphedema among patients undergone mastectomy. The pre test mean score of level of lymphedema was 1.62 with the standard deviation of 0.48. In post test mean score was 0.00 with standard deviation of 0.00. The paired 't' value 18.231 was very highly significant at p<0.0001 level. The difference between pre and post test score was decreased from 1.62 to 0.00. Thus it indicates the effectiveness of post mastectomy exercises on reduction of lymphedema among patients undergone mastectomy.

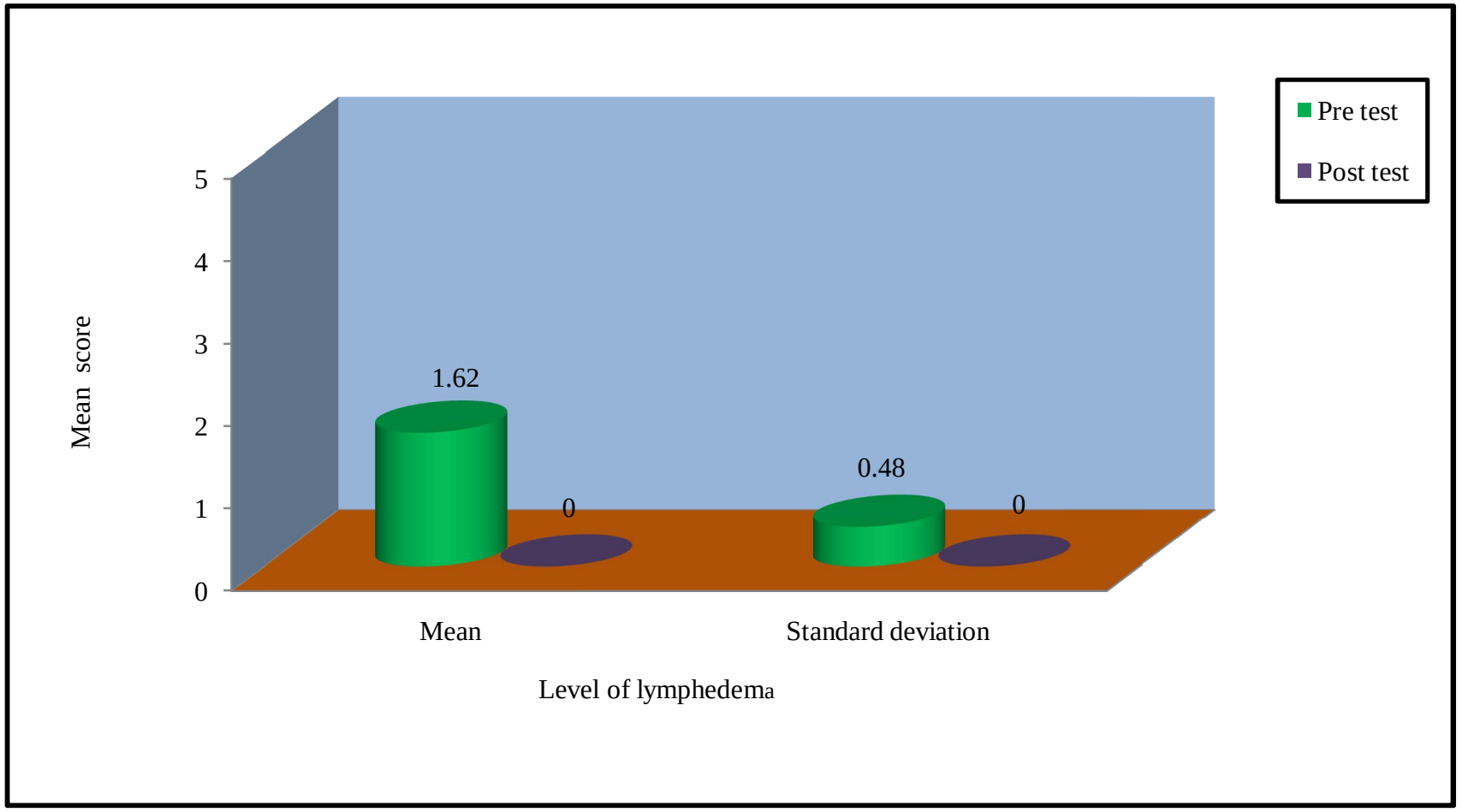

Fig.13: Comparison of mean and standard deviation between pre and post test level of lymphedema among patients undergone mastectomy

SECTION E

Table 5: Comparison of mean and standard deviation of pre and post test level of Range of motion among patients undergone mastectomy

N= 30

Range of Motion	Assessment	Mean	S.D	Paired 't' Value
Shoulder Flexion	Pre test	43.0	19.50	21.625***
	Post test	120.0	0.00	
Shoulder Abduction	Pre test	30.83	13.00	24.920***
	Post test	90.00	0.00	
Shoulder Internal and External Rotation	Pre test	25.67	7.85	30.936***
	Post test	70.00	0.00	
Shoulder Horizontal Abduction	Pre test	23.17	7.13	16.773***
	Post test	45.00	0.00	

***p<0.001, S – Significant

Table 4 depicts the comparison of mean and standard deviation between pre and post test level of range of motion among patients undergone mastectomy. The pre test mean score of level of shoulder flexion was 43.0 with standard deviation of 19.50 and in post test mean score was 120.0 with standard deviation of 0.00. The paired 't' value 21.625 was very highly significant at p<0.0001 level. The increase between pre and post test score was increased from 43.0 to 120.0. Thus it indicates the effectiveness of post mastectomy exercises on improving shoulder flexion among patients undergone mastectomy and the pre test mean score of level of shoulder abduction was 30.83 with standard deviation of 13.00 and in post test mean score was 90 with standard deviation of 0.00. The paired 't' value 24.920 was very highly significant at p<0.0001 level. The increase between pre and post test

score was increased from 30.83 to 90. Thus it indicates the effectiveness of post mastectomy exercises on improving shoulder abduction among patients undergone mastectomy.

The pre test mean score of level of shoulder internal and external rotation was 25.67 with standard deviation of 7.85 and in post test mean score was 70.00 with standard deviation of 0.00. The paired ‘t’ value 30.936 was very highly significant at $p<0.0001$ level. The increase between pre and post test score was increased from 25.67 to 70.00. Thus it indicates the effectiveness of post mastectomy exercises on improving shoulder internal and external rotation among patients undergone mastectomy and the pre test mean score level of shoulder horizontal abduction was 23.17 with standard deviation of 7.13 and in post test mean score was 45.00 with standard deviation of 0.00. The paired ‘t’ value 16.773 was very highly significant at $p<0.0001$ level. The increase between pre and post test score was increased from 23.17 to 45.00. Thus it indicates the effectiveness of post mastectomy exercises on improving shoulder abduction among patients undergone mastectomy.

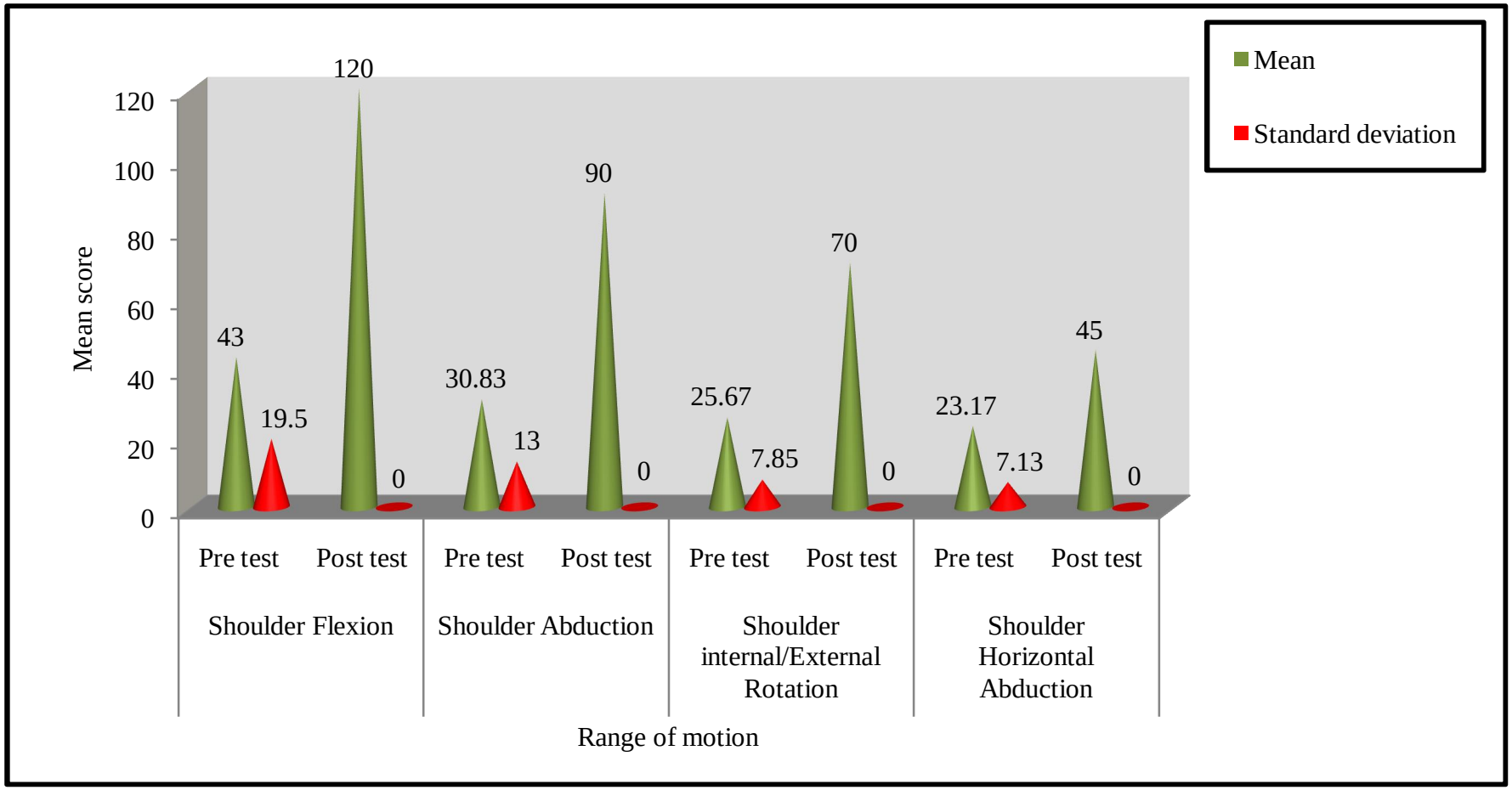

Fig.14: Comparison of mean and standard deviation between pre and post test level of range of motion among patients undergone mastectomy

CHAPTER V

DISCUSSION

This chapter deals with discussion of the results obtained from the statistical analysis. A Study aimed to assess the effectiveness of post mastectomy exercises on reducing lymphedema and improving range of motion among patients undergone mastectomy in Shanmuga hospital at Salem.

The hypothesis formulated was there was a significant association between the post mastectomy exercises in reducing lymphedema and increase in range of motion among patients undergone mastectomy. The review of literature included in this study provides a strong foundation for this study.

The conceptual frame work used for this study was based on Kings goal attainment model. The research design selected for this study was pre experimental one group pre test post test design. The sample consist of patients undergone mastectomy with lymphedema and decrease in range of motion in Shanmuga hospital, Salem. Purposive sampling technique was used to select the samples. The tool was taken from American lymphology association and Elvaru- STJ Range of motion position and Range of motion reliability tool with inch tape and goniometer. Post mastectomy exercises such as wall hand climbing, rope turning, rod or broom stick lifting, pulley tucking in reduction of lymphedema and increase in range of motion were taught by the investigator and instructed the patient to perform for 30 minutes daily morning and evening for 5 post operative days. The post test was assessed at the end of 5th day using the same tool.

The data collected were analyzed using descriptive and interferential statistics. The distribution of demographic variables among patients undergone mastectomy with regard to the age, majority16 (53.33%) of them were in the age group of 41- 50 years. In accordance with marital status 25 (83.33%) were married and with regard to the educational status 17 (56.67%) patients had completed school education. In concern with the occupation 15 (50.00%) were unemployed, With

regard to the nature of the work majority 18 (60.00%) of them were mild workers In regard to family income 15 (50.00%) were earning Rs.10001 between Rs.20,000 and with regard to type of family 23 (76.67%) belongs to nuclear family, In presence of co-morbid illness majority 12(40.00%) had hypertension.

The first objective of the study was to assess the pre test level of lymphedema among patients undergone mastectomy

In pre test 29 (96.67%) patients had mild level of lymphedema 1(3.33%) patient had moderate level of lymphedema and none of them had severe lymphedema.

The study correlates with the study of Kosir, M. A., et al., (2001) to measure the onsent and acute lymphedema among 30 breast cancer survivors in USA. Arm volume strength and flexibility were measured preoperatively and post operatively. The results shown that there were 2 women with 10% or greater change in limb volume at 3 months. The study concluded that the warning symptoms of lymphedema arises within 3 months of modified radical mastectomy. This may assist clinical evaluation of symptoms in the postoperative period and support early referral to lymphedema experts.

The second objective of the study was to assess the pre test level of range of motion among patients undergone mastectomy

The pre test level of range of motion, 30 (100%) patients had below normal range of shoulder flexion, shoulder abduction, shoulder internal and external rotation, shoulder horizontal abduction and none of them had normal range of motion.

The study correlates with the study done by Haddad. C. A, et al., (2013) to assess the posture and joint movements of the upper limbs of patients after mastectomy and lymphadenectomy among 30 women in Portuguese. There were 16 post mastectomy women with lymphedema of the upper limb and 14 post mastectomy women without lymphedema were participated. Patients postures and

range of motion of the shoulder, elbow, wrist were tested statistically. The results shown that the posture and range of movements of the shoulder is decreased with post mastectomy patient with lymphedema. The study concluded that women undergone mastectomy with lymphedema had asymmetries and modifications in posture and deficits in the range of motion in the shoulder on the operated side.

The third objective of the study was to determine the effectiveness of post mastectomy exercises in reducing lymphedema among patients undergone mastectomy.

In post test 30(100%) patients had no lymphedema and none of them lies in the category of mild, moderate or severe lymphedema.

The study depicts with the study done by Scand. J, et al., (2000) conducted a study to assess the effectiveness of combined method of physiotherapy for post mastectomy lymphedema in 39 breast cancer patients at swedborg. The physiotheraphy techniques such as massage, isometric exercises and an elastic sleeve were combinely used for 6 months. The results showed that 11.13 % decrease in volume of edema at first weak of treatment. During the 4 weeks of treatment there was no significant increase in volume and the lymphedema was declined sharply. The study concluded that there was a correlation between the physiotheraphy techniques as massage, isometric exercises and an elastic sleeve with reduction in the volume of arm among lymphedema patients

The fourth objective was to determine the effectiveness of post mastectomy exercises in improving range of motion among patients undergone mastectomy

In post test after test 30 (100%) patients had normal range of motion of the shoulder flexion, shoulder abduction, shoulder internal and external rotation and shoulder horizontal abduction and none of them had below normal range of motion.

The study correlates with the study done by Kilgour, R.D, et al., (2007) to assess the effectiveness of self administered, home based exercise rehabilitation

program for women following a modified radical mastectomy and axillary node dissection among 27 women in Canada, There were 16 women randomly selected for home based exercise rehabilitation in experimental group and 11 women received usual care in control group. The home based rehabilitation program consisted of shoulder flexibility and stretching exercises. The result showed that statistically significant increase in shoulder flexion and abduction in experimental group. The study concluded that the home based rehabilitation exercise program is an effective way to improve shoulder mobility and range of motion among the post mastectomy patient.

CHAPTER VI

SUMMARY, CONCLUSION, NURSING IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

The heart of the research project lies in reporting the findings of the study. This is the most creative and demanding the part of the study. This chapter gives a brief account of the present study including the conclusion drawn from the findings, recommendations, limitations of the study, suggestions for the study and nursing implications. The present study was to assess the effectiveness of post mastectomy exercises in reducing lymphedema and improving range of motion among patients undergone mastectomy in Shanmuga hospitals,Salem.

SUMMARY

Exercises plays a major role in improving the quality of life especially in post operative patients. The post mastectomy exercises reduces the complications of mastectomy such as lymphedema and improve the range of motion. The study was done to evaluate the effectiveness of post mastectomy exercises on reduction of lymphedema and improving the range of motion among patients undergone mastectomy in Shanmuga hospitals, Salem.

The objectives of the study were as follows,

1. To assess the pre test level of lymphedema among patients undergone mastectomy.
2. To assess the pre test level of range of motion among patients undergone mastectomy.
3. To determine the effectiveness of post mastectomy exercises in reducing lymphedema among patients undergone mastectomy.
4. To determine the effectiveness of post mastectomy exercises in improving range of motion among patients undergone mastectomy

The hypothesis formulated was there was significant association between the post mastectomy exercises in reducing lymphedema and improving range of motion among patients undergone mastectomy. The review of literature included in this study provides a strong foundation for this study. The conceptual frame work used for this study was based on Kings goal attainment model.

The research design selected for this study was pre experimental one group pre test post test design. The sample consist of patients undergoing mastectomy with lymphedema and decrease in range of motion in Shanmuga hospital at salem. Purposive sampling technique was used to select the samples. The tool was taken from American lymphology association and Elvaru- STJ Range of motion position and Range of motion reliability tool with inch tape and goniometer. Post mastectomy exercises such as wall hand climbing, rope turning, rod or broom stick lifting, pulley tucking in reduction of lymphedema and increase in range of motion were taught by the investigator and instructed the patient to perform for 30 minutes daily morning and evening for 5 post operative days. The post test was assessed at the end of 5th day using the same tool.

The data collected was analyzed using descriptive and inferential statistics. Frequency and percentage distribution was used to determine the level of lymphedema and range of motion among patients undergone mastectomy. The distribution of demographic variables among patients undergone mastectomy were collected through self administered questionnarie.

The data analysis revealed that there was significant relationship between the post mastectomy exercises on reducing lymphedema and improving range of motion among patients undergone mastectomy. In regard to the age majority 16 (53.33%) were in the age group of 41-50 years, In accordance with marital status 25 (83.33%) were married.

With regard to the educational status majority 17 (56.67%) had completed school education and in concern with the occupation 15 (50.00%) were unemployed, With regard to the nature of the work 18 (60.00%) were mild workers, In regard to family income majority 15 (50.00%) were earning Rs.10001 between Rs.20,000, In regard to type of family 23 (76.67%) of the patients belong to nuclear family, In presence of co-morbid illness majority 12(40.00%) of the patient had hypertension.

The pre test mean score of lymphedema was 1.62 with standard deviation of 0.48 and in post test mean score was 0.00 with standard deviation of 0.00. The paired 't' value 18.231 was very highly significant at $p<0.0001$ level. The difference between pre and post test mean score was decreased from 1.62 to 0.00. Thus it indicates the effectiveness of post mastectomy exercises on improving range of motion among patients undergone mastectomy. The paired 't' value of shoulder flexion was 21.625, shoulder abduction was 24.920, shoulder internal and external rotation was 30.936, shoulder horizontal abduction was 16.773 very highly significant at $p<0.0001$ level. The study findings revealed that the post mastectomy exercises reduced lymphedema and improved the range of motion among post mastectomy patient.

CONCLUSION

The present study was to assess the effectiveness of post mastectomy exercises. The study finding revealed that there was significant reduction in level of lymphedema and improving range of motion after giving post mastectomy exercises. Based on the statistical findings it was evident that provision of such kind of exercise will motivate the patients undergone mastectomy and help them to reduce lymphedema and improve range of motion. Therefore post mastectomy exercises were very important to provide the quality nursing care which helps to meet the needs of the patients undergone mastectomy for their well being.

NURSING IMPLICATION

The finding of the study has implications in various areas of nursing services, nursing education, nursing administration and nursing research.

NURSING SERVICES

An education can be provided to nurses to teach the patient about the post mastectomy exercises and its effectiveness which will be beneficial not only for the patients but also for the nurse to gain knowledge regarding exercises. It reduces the lymphedema and improves range of motion it also improves the quality of life of the patients. The nurse can teach this exercises to post mastectomy patients but also to other patients who are undergoing surgery and the exercises can be taught before and after surgery. It improves the skill of nursing care enlighten the knowledge on post mastectomy exercises. Nurse can utilize the technique such as individual and group teaching to educate about post mastectomy exercise in practice to reduce lymphedema and range of motion.

NURSING EDUCATION

The findings of the study have some implications for nursing education. The nursing students can impart this knowledge of post mastectomy exercises to improve their quality of care and also in providing effective nursing care to the patient. Encourage the students for effective utilization of research based practice regarding exercises among post operative patients and also for other types of patient. Educate the students to make use of available literature to prevent post operative complications. Periodic seminars and group discussion can be arranged regarding the post mastectomy exercises among patients with lymphedema and decreased range of motion.

NURSING ADMINISTRATION

Nursing administration can formulate policies that will include all nursing staff to be actually involved in teaching post operative exercises in their

irrespective of hospital and staff and college. In nursing administration the post mastectomy exercises can be included in training programme to educate, to direct, to motivate the staff towards not only on mastectomy patients also to other post operative patients. Nursing administrator have responsibility as supervisor on creating awareness programme regarding post mastectomy exercises by free distribution of booklets, hand outs and charts regularly in patients undergoing mastectomy. The separate nursing education department can be organized for teaching exercises for educating registered nurses.

NURSING RESEARCH

Extensive research can be done in various methods by teaching the post mastectomy exercises from pre operative period and for reduction of lymphedema and improve range of motion. This study can be used for the reference purposes. The study can be done in various post operative patients. The study can be a base line for further studies to built upon and motivate the other investigator in this area in different aspects. The latest journal updates and current research findings can be updated to the nursing staff through provision of web services.

RECOMMENDATIONS

- The same study can be conducted with large samples.
- The study can be conducted in various post operative patients.
- A longitudinal study can be done using post test after one month, six months, and after one year to assess the effectiveness of exercises.
- A comparative study can be done among patients with breast cancer undergoing chemotherapy or radiation therapy.

LIMITATIONS

During the period of study when teaching the exercises on the first day the investigator felt difficulty, patients were not able to do all the exercises due to restricted movements of limbs. The study sample size was small and samples were selected by non random method limiting the generalizability.

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APPENDIX – A

PART-I

DEMOGRAPHIC VARIABLES

1. Age in years
   a) 20-30
   b) 31-40
   c) 41-50
   d) >50
2. Marital status
   a) Single
   b) Married
   c) Divorced
   d) Widower
3. Educational status
   a) Illiterate
   b) Primary
   c) Secondary
   d) Higher secondary
   e) Post graduate and above
4. Occupation
   a) Unemployed
   b) Private employee
   c) Government employee
   d) Own business

5. Nature of work
    a) Mild work
    b) Moderate work
    c) Heavy work
6. Family monthly income
    a) <10000
    b) 10001-20000
    c) 20001-30000
    d) >30000
7. Type of family
    a) Nuclear
    b) Joint
    c) Extended
    d) Living alone
8. Any co-morbid illness
    a) Diabetic mellitus
    b) Hypertension
    c) Renal disease
    d) Heart disease
    e) Others

PART-II

Physiological parameters

Section – A Level of lymphedema

S.No	Sequential measurements	Affected arm		Unaffected arm		Level of lymphedema	
1	Metacarpal-phalangeal joint						
2	Wrist						
3	10 cm distal to the lateral epicondyles						
4	15 cm proximal to the lateral epicondyles						

Section – B Range of motion

S.NO	RANGE OF MOTION IN SHOULDER	EXPECTED ANGLE OF MOTION
1	SHOULDER FLEXION	120°
2	SHOULDER ABDUCTION	90°
3	SHOULDER INTERNAL AND EXTERNAL ROTATION	70°
4	SHOULDER HORIZONTAL ABDUCTION	45°

பகுதி I

மக்கள் தொகை மாறிகள்

பின்வரும் கேள்விகளுக்கு பொருத்தமான விடையின் எதிராக ஒரு டிக் (✓) குறியிட்டு பதில் அளிக்கவும்:

1. வயது (ஆண்டுகளில்)
    1. 20-30
    2. 31-40
    3. 41-50
    4. >50
2. திருமண நிலை
    1. திருமணமானவர்
    2. மணமாகாதவர்
    3. விவாகரத்து ஆனவர்
    4. விதவை
3. கல்வித்தகுதி
    1. எழுதப்படிக்க தெரியாதவர்
    2. பள்ளி கல்வி முடித்தவர்
    3. பட்டதாரி
4. தொழில்
    1. வேலையற்றவர்
    2. தனியார் பணியாளர்
    3. அரசு ஊழியர்
    4. சொந்த தொழில் செய்பவர்

5. வேலை இயல்பு
    1. மிதமான வேலை
    2. இயல்பான வேலை
    3. கனவேலை
6. குடும்ப மாத வருமானம்
    1. <ரூ.10000
    2. ரூ.10001- ரூ.20000
    3. ரூ.20001- ரூ.30000
    4. >ரூ.30000
7. குடும்ப வகை
    1. தனிக்குடும்பம்
    2. கூட்டு குடும்பம்
    3. விரிவாக்கப்பட்ட குடும்பம்
    4. தனியாக வசிப்பவர்
8. மற்ற நோய்கள்
    1. இரத்த அழுத்த நோய்
    2. நீரிழிவு நோய்
    3. மற்றவை
    4. ஏதும் இல்லை

APPENDIX- B

CERTIFICATE OF ETHICAL CLEARANCE

MADHA COLLEGE OF NURSING
ETHICAL COMMITTEE

College Campus :
Madha nagar,
Somasgalam road,
Kundrathur,
Chennai -69

Chairman of Committee:

Dr. S. Madan kumar. M.D., Dip. A & E
Director,
Madha Medical College & Research Institute,
Thandalam.

Members:

Dr. K. Gajendran. M.D., D.V.,
Principal,
Madha Medical College & Research Institute, Thandalam.

Dr. A. Dhanikachalam. M.S., Mch
Medical superintendent,
Madha General Hospital,
Madha Medical College & Research Institute, Thandalam.

Dr. V. Vijai Krishnan. M.P.T,
Principal,
Madha College of Physiotherapy,
Kundrathur.

Dr. B.Tamilarasi, M.Sc (N), P.hD.,
Principal,
Madha College of Nursing, Kundrathur.

Mrs. Grace Samuel, M.Sc (N),
Vice Principal,
Madha College of nursing, Kundrathur.

Date: 15.03.2014

CERTIFICATE OF ETHICAL CLEARANCE

This is to certify that the research proposal, **"Effectiveness of post mastectomy exercises on Lymphedema and range of motion among post mastectomy patients in Shanmuga hospital at Salem",** submitted by Ms. Priya. C. student of I year M.Sc Nursing (Medical Surgical Nursing) is hereby approved and granted ethical clearance by the Ethical Committee of the institute.

This clearance is valid for the period of 2 years.

15/3/14

PRINCIPAL
MADHA COLLEGE OF NURSING
MADHA NAGAR, KUNDRATHUR,
CHENNAI - 600 069
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APPENDIX – C

LIST OF EXPERTS FOR CONTENT VALIDITY

Mrs. JAYASRI, R.N., R.M, M.Sc.(N).,

Principal,

MIOT College of Nursing,

Manapakkam, Chennai – 600089

Mrs. HEMA SURESH, R.N., R.M, M.Sc.(N).,

Principal,

ACS college of nursing,

Dr. MGR Educational and Research Institute University,

Poonamalle high road, Chennai -600077

DR.PANEERSELVAM. P.S, M.S.,M.N.A.M.S.,F.I.C.S., FAIGES

Founder **–** Chairman**,**

Shanmuga hospital,

24, Saradha college road, Salem - 7

CERTIFICATION FOR CONTENT VALIDITY

This is to certify that the content and the tool to the statement of the problem **"A study to assess the effectiveness of the post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy in selected hospital"** prepared by **Ms.Priya.C M.sc (N) II year** student currently pursuing her M.sc (N) degree programme for the partial fulfillment of her dissertation at **Madha College of Nursing, Kundrathur, Chennai-69** is found to be valid to the best of my knowledge.

18/3/2014.

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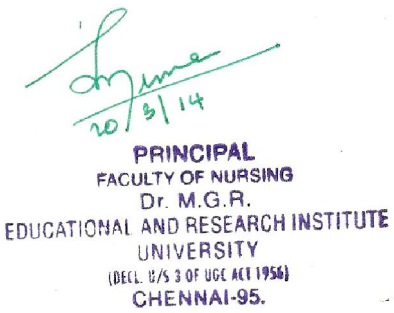
Manapakkam, Chennai - 600 089.

CERTIFICATION FOR CONTENT VALIDITY

This is to certify that the content and the tool to the statement of the problem **"A study to assess the effectiveness of the post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy in selected hospital"** prepared by **Ms.Priya.C M.sc (N) II year** student currently pursuing her M.sc (N) degree programme for the partial fulfillment of her dissertation at **Madha College of Nursing, Kundrathur, Chennai-69** is found to be valid to the best of my knowledge.



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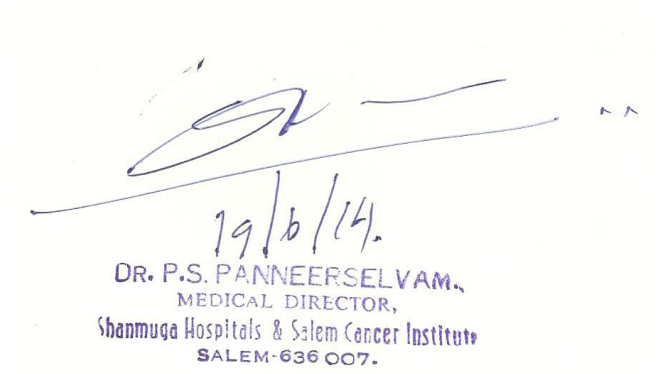


APPENDIX – D

SHANMUGA HOSPITALS
SHANMUGA HOSPITALS COMPLEX
24, Saradha College Road, Salem - 7. Tamilnadu.
Ph: 2319469, 2315293, 2315654 Fax: 0427 - 2314465 / 2315654

Date : 19/6/14

PERMISSION LETTER

From,

The Medical Director,
Shanmuga hospital,
Salem – 7.

Ms. Priya. C, M.Sc (N) II year, Madha college of nursing, Kundrathur, Chennai – 69 is permitted to do project work (A study to assess the effectiveness of post mastectomy exercises on lymphedema and range of motion among patients undergone mastectomy in Shanmuga Hospital, Salem- 7) from 19.05.14 to 19.06.14 in Shanmuga Hospital at Salem.

Medical Director, 19/6/14
DR. P.S. PANNEERSELVAM.,
MEDICAL DIRECTOR,
Shanmuga Hospitals & Salem Cancer Institute
SALEM-636 007.
Shanmuga hospital,
Salem.s

APPENDIX – E

Letter seeking consent of the subjects for the participation in the research study

I am voluntarily willing to participate in the study conducted by Ms. Priya.C, on "**A STUDY TO ASSESS THE EFFECTIVENESS OF POSTMASTECTOMY EXERCISES ON LYMPHEDEMA AND RANGE OF MOTION AMONG POST MASTECTOMY PATIENTS".** I will also co-operate with the researcher in providing necessary information. I was explained that the information provided would be kept in confidential and used only for above mentioned study purpose.

Signature of the Investigator **Signature of the patient**

Place: Place:

Date: Date:

APPENDIX – F

CERTIFICATION FOR ENGLISH EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation, " **A study to assess the effectiveness of postmastectomy exercises on lymphedema and range of motion among post mastectomy patients in shanmuga hospital at salem., 2014-2015",** prepared by Miss. Priya.C II year M. Sc (N)., student of Madha College of Nursing, Kundrathur, Chennai, for the dissertation edited for English language appropriateness.

A.R. Vij

A.R. VIJAYAKUMAR., M.A., B.Ed.,
B.T.Asst. (English).
Govt Boys Hr. Sec. School.
Arni. T.V. Malai. Dt.632 301.

CERTIFICATION FOR TAMIL EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation, " **A study to assess the effectiveness of postmastectomy exercises on lymphedema and range of motion among post mastectomy patients in shanmuga hospital at salem., 2014-2015",** prepared by Miss. Priya.C II year M. Sc (N)., student of Madha College of Nursing, Kundrathur, Chennai, for the dissertation edited for Tamil language appropriateness.

கா. ரூபசுந்தரி எம்.ஏ., எம்.எட்.,
தமிழாசிரியை
அரசு ஆண்கள் மேல்நிலைப்பள்ளி
ஆரணி. தி.மலை.மா-632301.

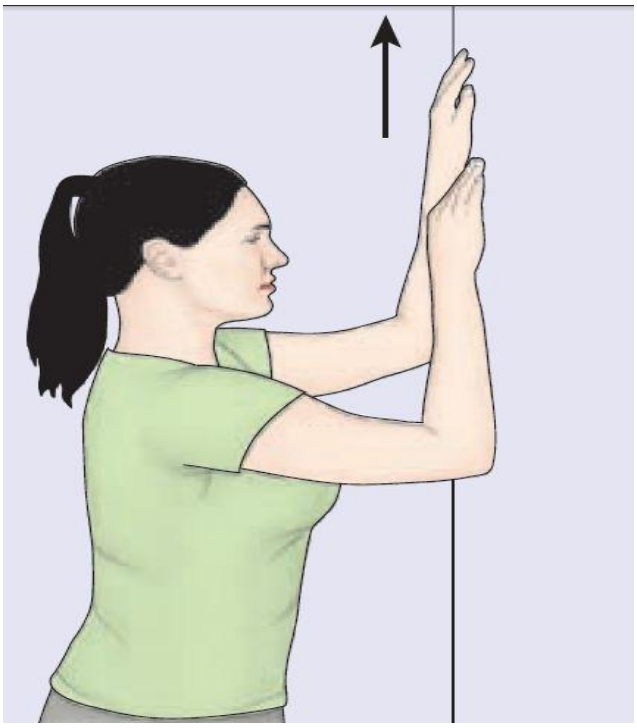
APPENDIX-G

POST MASTECTOMY EXERCISES

GENERAL GUIDELINES:

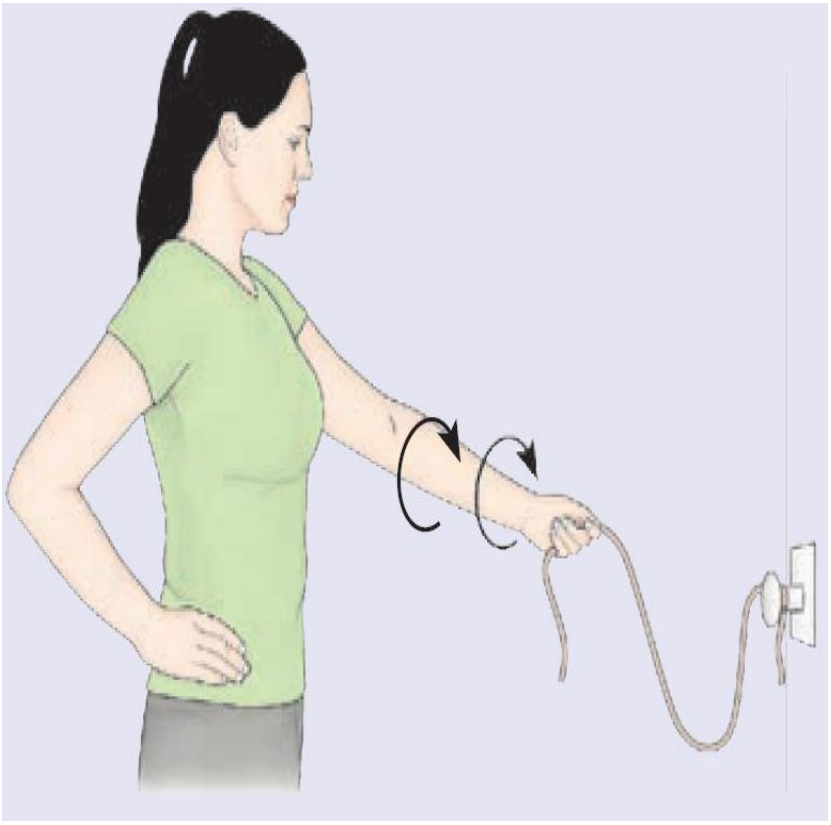
- You will feel some tightness in your chest and armpit after surgery. This is normal, and the tightness will decrease as you do your exercises.
- Many women have burning, tingling, numbness, or soreness on the back of the arm and/or on the chest wall.
- This is because the surgery can irritate some of your nerves.
- These feelings might increase a few weeks after surgery. But keep doing your exercises unless you notice unusual swelling or tenderness.
- It may be helpful to do the exercises after a warm shower when muscles are warm and relaxed.
- Wear comfortable, loose clothing when doing the exercises.
- Do the movements slowly until you feel a gentle stretch.
- It is normal to feel some pulling as you stretch the skin and muscles that have been shortened because of the surgery.
- Do not bounce or make any jerky movements when doing any of the exercises. You should not feel pain as you do them, only gentle stretching.
- Do each exercise daily morning and evening for 5 post operative days. Try to do each exercise correctly. If you have trouble with the exercises, inform immediately
- Be sure to take deep breaths, in and out, as you do each exercise.

Wall hand climbing exercises:



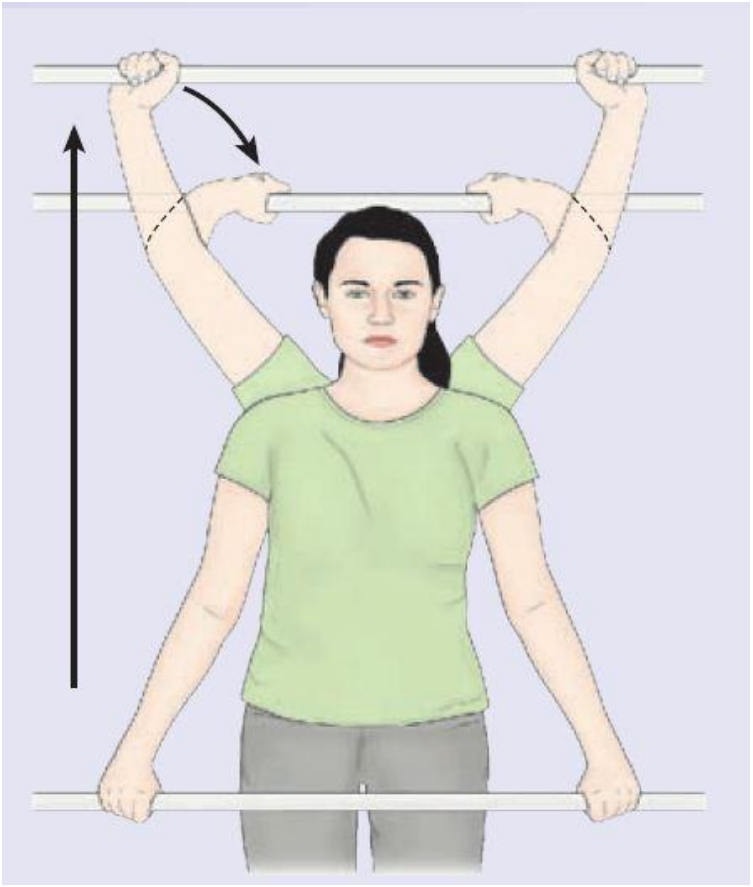
Stand facing the wall with feet apart and toes as close to the wall as possible. With elbows slightly bent, place the palms of the hand on the wall at shoulder level. By flexing the fingers, work the hands up the wall until arms are fully extended. Then reverse the process, working the hands down to the starting point.

Rope turning exercise:



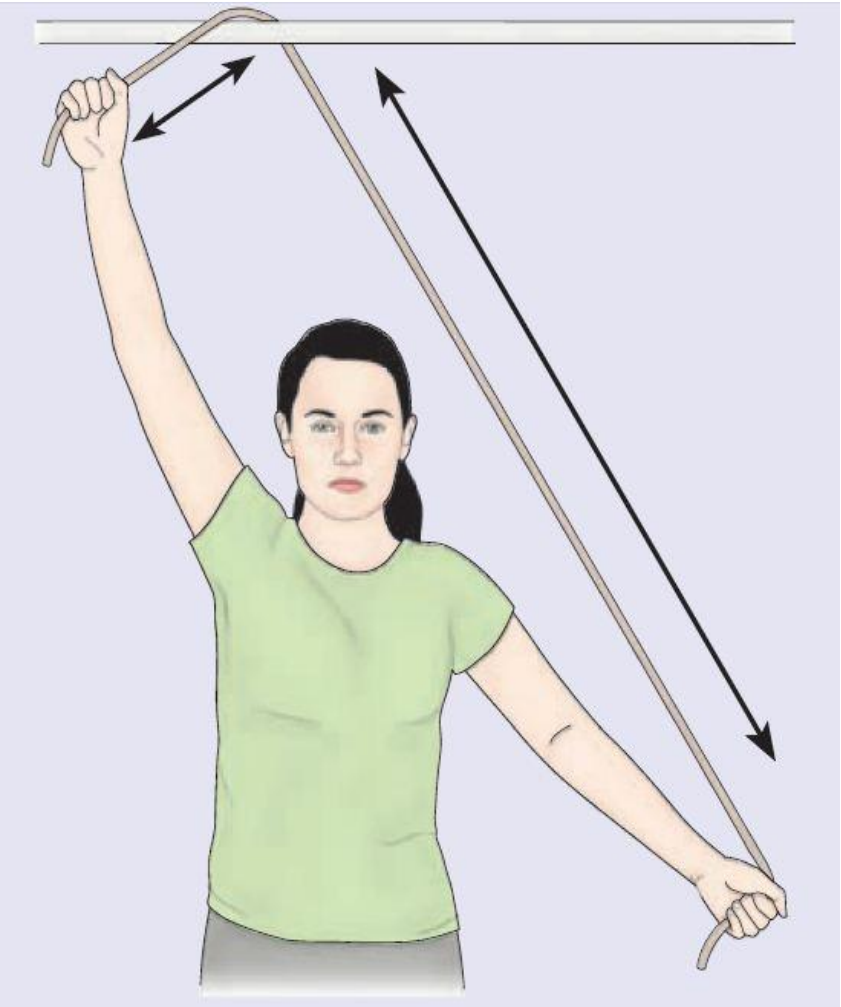
Tie a light rope to a doorknob. Stand facing the door. Take the free end of the rope in the hand on the side of surgery. Place the other hand on the hip. With the rope-holding arm extended and held away from the body (nearly parallel with the floor), turn the rope, making as wide swings as possible. Begin slowly at first; speed up later.

Rod or broomstick lifting exercise:



Grasp a rod with both hands, held about 2 feet apart. Keeping the arms straight, raise the rod over the head. Bend elbows to lower the rod behind the head. Reverse maneuver, raising the rod above the head, then return to the starting position.

Pulley tugging exercise:



Toss a light rope over a shower curtain rod or doorway curtain rod. Stand as nearly under the rope as possible. Grasp an end in each hand. Extend the arms straight and away from the body. Pull the left arm up by tugging down with the right arm, then the right arm up and the left down in a see-sawing motion.