A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED NURSING INTERVENTION ON EXERCISE AND BODY MECHANISM TO REDUCE MUSCULO SKELETAL DISORDERS AMONG NURSES IN SELECTED HOSPITALS AT SALEM

A Dissertation submitted to

The Tamilnadu Dr. M.G.R. Medical University, Chennai - 32

in partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN NURSING

By

Reg. No: 301411204

MEDICAL SURGICAL NURSING

SHANMUGA COLLEGE OF NURSING,

24, SARADA COLLEGE ROAD, SALEM – 636007

OCTOBER -2016

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APPROVED BY DISSERTATION COMMITTEE

Research Guide : _____

Prof. DINA RANI, M.Sc (N)., Ph.D(N).,
Professor cum Principal,
Shanmuga College of Nursing,
Salem-636007.

Clinical Speciality Guide : _____

Mrs. SHEEJA C., M.Sc (N).,
Associate Professor,
Department of Medical Surgical Nursing,
Shanmuga College of Nursing,
Salem-636007

Viva Voce & Date:

1. Internal Examiner: _____

2. External Examiner: _____

OCTOBER - 2016

DECLERATION

I, **Mr. Vinoth Kumar P.,** hereby declare that this dissertation entitled **"A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED NURSING INTERVENTION ON EXERCISE AND BODY MECHANISM TO REDUCE MUSCULO SKELETAL DISORDERS AMONG NURSES IN SELECTED HOSPITALS AT SALEM"**. has been prepared by me under the guidance and direct supervision of **Prof. Dina Rani, M.Sc.(N), Ph.D (N).,** Professor cum Principal, and Clinical Specialty Guide **Mrs.Sheeja C., M.Sc.(N),** Associate Professor, Department of Medical Surgical Nursing, Shanmuga College of Nursing degree under **The Tamilnadu Dr. M.G.R. Medical University, Chennai-32.** This dissertation represents independent work of mine, had not been previously formed and this will not be used in further for award of any other degree/diploma.

Place: Salem
Year: October 2016.

Mr. VINOTH KUMAR .P
II-Year, M.Sc. (N) Student,
Shanmuga College of Nursing,
Salem-636007.

CERTIFICATE BY GUIDE/HOD AND PRINCIPAL

This is to certify that the dissertation entitled **"A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED NURSING INTERVENTION ON EXERCISE AND BODY MECHANISM TO REDUCE MUSCULO SKELETAL DISORDERS AMONG NURSES IN SELECTED HOSPITALS AT SALEM"** is a bonafide work done by **Mr. VINOTH KUMAR.P.,** Shanmuga College of Nursing, Salem, in partial fulfillment of the University rules and regulation for the award of **MASTER OF SCIENCE IN NURSING** under our guidance and supervision during the academic year 2015-2016.

Name & Signature of the

Clinical specialty Guide : ……..

Name and signature of the

Research guide cum Principal : ……..

ACKNOWLEDGEMENT

First and foremost, I am thankful to the GOD for his abundant blessings and graces throughout the study.

I wish I could mention every one of them who are willingly helped me to complete this dissertation. My sincere gratitude to our Chairman, **Dr.P.S.Paneerselvam, M.S, M.N.A.M.S, F.A.I.S.,** for his guidance, support, encouragement and for providing the facilities to conduct the study successfully.

I feel pleasure to extend my gratitude and sincere thanks to my Research Guide **Prof. Dina Rani, M.Sc(N), Ph.D (N).,** Professor cum Principal, Shanmuga College of Nursing Salem, For her expert guidance, valuable suggestion and encouragement throughout the study.

I extend my sincere thanks to my Clinical Specialty Guide **Mrs.Sheeja C., MSc (N).,** Associate professor , Medical surgical Nursing for her endless effort, constant guidance, highly instructive suggestions and advice which enlightened my path to complete this work systematically.

I express my sincere gratitude to **Prof. C. Kavitha., M.Sc(N), Ph.D(N).,** Head of the Department Child Health Nursing and **Mr.Selvaraj., M.Sc(N).,** Head of Department Mental Health Nursing for support and timely suggestion for the completion of my study.

My special thanks to **Dr.K.S. Pushpalatha, M.Sc (N), M.Phil, Ph.D (N).,** for her expert guidance, valuable suggestions, encouragement and support during the initial part of my study.

I honestly pay my sincere thanks to the entire **Faculty of Shanmuga College of Nursing** for their timely co-operation.

My sincere gratitude to **Dr.R. Murugavel, M.S.,** general surgery for their intensive support and corporation.

I extend my deepest gratitude to all the **Experts who have** contributed their valuable selection in validating the tool and independent variable.

I extended my sincere thanks to the **study participants** for their kind co-operation, participation and support.

I extend my thanks to **Librarian, Shanmuga College of Nursing** for providing necessary books relevant to the study.

My special thanks to my Classmates especially **Mrs. Rajalakshmi and Prathibha Chandran**, for their support, suggestion and assistance which helped me in completion of my study.

I extend my sincere thanks to **Mr.Joseph, Mr. Uthaya Kumar, Mrs. Jayanthi and Mrs. Jayashri, Classic Data Line**, Saradha College, Salem, for his co-operation in typing and executing this manuscript.

I also take this opportunity to express my sincere appreciation to my parents **Mr. Purushothaman. M and Mrs. Kaliselvi.S,** the quarry of my courage and my constant motivators, whose wise words shower the seeds of confidence in me to face the obstacles during the study period.

There are still other to whom I am indebted to express my gratitude for the help they have rendered.

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Mr. Vinoth Kumar.P

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RESEARCH ABSTRACT

Mr. VINOTH KUMAR. P.*, Prof Dina Rani, and Mrs. Sheeja C.*****
***M.Sc (N) II Year Student,**- Principal *** Associate Professor, Medical Surgical Nursing Department, Shanmuga College of Nursing, Salem at the time of doing study in October 2016.**

ABSTRACT: Background: Musculoskeletal disorders represent a significant occupational problem among nurses, however, data on musculoskeletal health of nurses. This study sought to determine the life time, 12 month period and point prevalence of work related musculoskeletal disorders, the associated job risk factors and the coping strategies towards reducing the risk among nurses from selected hospital in Salem, Tamilnadu. **Method:** A quasi experimental pretest and posttest with control group and experimental group design was used. The aim of the study was to compare the effectiveness of exercise and body mechanism to reduces musculoskeletal disorders among nurses. The study was conducted in Shanmuga Hospital. Research got permission from concerned authority to obtain consent from each samples. The samples size was 30, 15 in control group, 15 in experimental group and they were selected by purposive sampling technique. Musculoskeletal disorders was assessed by the tool visual analogue pain rating scale to assess the intensity of musculoskeletal pain among nurses, Likert's three point rating scale to assess the body mechanism among nurses. Intervention was demonstrated to experimental group instructed to follow till 30^{th} day. The post test assessment was conducted on 30^{th} day. **Result:** The findings shows that there is significant difference between post test score of MSDs among control group and experimental group nurses. There is significant association between post test score of MSDs among nurses with in experimental group. There is significant association between pre test score on musculoskeletal disorders among the nurses of experimental group with their present work place $P < 0.05$ level. **Conclusion:** Both exercise and body mechanism was found to be effective in reducing musculoskeletal disorders level among nurses.

Keywords: Effectiveness; Exercise, Body mechanism, MSDs(musculoskeletal disorders).

INTRODUCTION: The term musculoskeletal disorders (MSDs) encompass a gamut of inflammatory and degenerative condition that affect the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels with consequent ache, pain, or discomfort. The significant effects of MSDs include difficulty in performing manual tasks, difficulty in exerting forces and restriction of movement due to pain or loss of function.

STATEMENT OF THE PROBLEM:

"A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED NURSING INTERVENTION ON EXERCISE AND BODY MECHANISM TO REDUCE MUSCULO SKELETAL DISORDERS AMONG NURSES IN SELECTED HOSPITALS AT SALEM"

OBJECTIVES: (1) To prepare and validate the exercise and body mechanism to reduce musculoskeletal disorders among nurses with in experimental group. **(2)** To assess and compare the mean pretest and mean post test score on musculoskeletal disorder among the nurses between control group and experimental group. **(3)** To assess and compare the mean pretest and mean posttest score on musculoskeletal disorder among the nurses within experimental group. **(4)** To assess the maintenance of body mechanism among the nurses between control group and experimental group. **(5)** To find association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI,total year of experience in nursing service, present work place)

HYPOTHESES: H_1 : There is a significant difference between mean pre test score and mean post test scores on musculoskeletal disorder among the nurses between control group and experimental group. **H_2 :** There is significant difference in mean pre test score and mean post test scores on musculoskeletal disorders among the nurses with in experimental group. **H_3:** There is a significant association between pre test score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI, Total year of experience in nursing service, Present work place)

METHODS: (1) MUSCULOSKELETAL DISORDERS

In this study musculoskeletal disorder refers to pain felt by the nurses with one year during repetitive work and movement of the body. It is mainly felt in joints such as neck, shoulder, elbow, wrist, upper back, lower back, hip, thigh, knee, and ankle is measured by using the Visual Analogue Scale. The score is interpreted as No pain: 0, mild pain: 1-3, moderate pain: 4-6, and severe pain: 7-9 and worse pain: 10. **BODY MECHANISM:** In this study it refers to the level of the proper maintenance of position to relieve musculoskeletal disorder among nurses during sitting, standing, lifting and shifting. Postural maintenance was assessed during any nursing activities by observation method. **EXERCISE**: In this study exercise refers to those activities performed by the nurses which help to strengthen the muscles. Mainly neck glide, shoulder shrug, shoulder circles, elbow bend to straighten, forearm rotation, elbow flexion and extension, fore arm and wrist stretch, shoulder blade squeeze for upper back Hamstring curls for lower back and thigh, straight leg raise for knee, dorsiflexion for ankle.

A quantitative study with evaluative approach, quasi experimental pretest-posttest with control group research design was used. Gate Control Theory of pain was used as conceptual framework. The study was conducted in Shanmuga Hospital at Salem. Researcher got permission from concerned authority and obtained consent from each samples. The samples size was 30, 15 in each group, they were selected by purposive sampling technique. Sample were selected for control group and experimental group.

Demographic variables were collected. Intervention was demonstrated to experimental group, the follow up can done on 7th and 15th days. The tool used as Visual analogue pain rating scale. Likert's three point rating scale. The post test assessment was conducted on 30th day of observation.

FINDINGS:

SECTION-I: The following analysis shows the details of the demographic variables. In the regarding age 15(100%) samples belongs to 21-31 years. In experimental group majority of samples in 21-31 years of age group 14(93%). Regarding gender in control group 15(100%) samples are female. In experimental group 12(80%) samples in females, 3(20%) samples were male. Considering BMI in the control group 1(7%) samples belongs to the underweight, 14(93%) samples belongs to the normal weight. In experimental group 12(80%) samples belongs to the normal weight,3(20%) belongs to the overweight. Regarding total years of experience in nursing service among control group 15(100%) samples belongs to the 1-4years, in experimental group 11(73%) samples belongs to the 1-4years,3(20%) samples belongs to the 5-8years,1(7%) sample belongs to the 9-12years of nursing services. Regarding present work place in control group 11(73%)sample belongs to the medical ward, 1(7%)sample belongs to the surgical ward,0(0%)sample belongs to the pediatric ward,1(7%)sample belongs to the accident and emergency ward,2(13%)sample belongs to the ICU, 1(7%)sample belongs to the other department. In experimental group 4(27%) samples belongs to the medical ward, 6(40%) samples belong to the surgical ward, 0(0%) samples belongs to the pediatric ward, 0(0%) samples belongs to the accident and emergency ward, 3(20%) samples to the belongs to the intensive care unit, 2(13%) of samples belongs to the other department in nursing.

SECTION-II: Analysis and comparison of mean pre test and post test, score on musculoskeletal disorders among the nurses between the control group and experimental group.

This section deals with the analysis of mean pre –test and mean posttest musculoskeletal disorders was measured through the visual analogue pain rating scale.

Table:1 Analysis and comparison of mean pre test and post test, score on musculoskeletal disorders among the nurses between the control group and experimental group.

n_1=15, n_2=15

Group	Control group		Experimental group		Df	Unpaired 't' value
	Mean	SD	Mean	SD		
Pre test	40	776	54	551	18	
Post test	42	543	18	240		2.76*

*-level of significance at P<0.05; t_{18}=2.101

The above table: 1. **s**hows data regarding mean, standard deviation and unpaired 't' value among samples .The table also shows that there are only two assessments in both pre test and post test score of control group and experimental group. The mean pre test control group score was 40 and experimental group score was 54. The unpaired 't'value among samples in pre test 1.22(t_{18} =2.101) at df =18 (P<0.05 level of significance). Since the mean pre test level of MSDs between control group and experimental group score is less than the table value .So the alternate hypothesis $H_1$was rejected.

In mean post test control group mean score was 42 and experimental group mean score was 18.The unpaired 't' value among samples are 2.76(t_{18} =2.101) at df

=18 (P<0.05 level of significance). Since the mean post test level of MSDs between control group and experimental group score is higher than the table value. So the alternate hypothesis H1was accepted and null hypothesis $H_{0(1)}$ was rejected.

SECTION-III: Mean pre test, Mean Posttest, Standard Deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group.

This section deals with the mean pre test, mean posttest, standard deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group.

Table:2 Mean pre test, mean posttest, standard deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group.

n_1=15,n_2=15

Group	Pre test and Post test score on experimental group		Df	Paired 't' value
	Mean	SD		
Pre test	54	551	9	6.27*
Post test	18	240		

*-Level of significance at P<0.05; t_9=1.833

The above table: 2. shows the data regarding pretest and posttest mean , standard deviation and paired 't' value among samples within the experimental group.

The mean pre test experimental group score was 54and post test experimental group score was 18. The paired 't' value among samples are 6.27*(t_9=1.833) at df =9 (P<0.05 level of significance). Since the mean pre test and post test level of MSDs with in experimental group score is higher than the table value. So the alternate hypothesis $H_2$was accepted.

SECTION-IV: Item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

This section deals with the item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

Table:3 Item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

n1=15, n2=15

Area of MSDs	LEVELS OF MSDs									
	Control group					Experimental group				
	No	Mild	Moderate	Severe	Worse	No	Mild	Moderate	Severe	Worse
Neck	93%	7%	-	-	-	100%	-	-	-	-
Shoulder	87%	13%	-	-	-	93%	7%	-	-	-
Elbow	100%	-	-	-	-	93%	7%	-	-	-
Wrist	93%	7%	-	-	-	100%	-	-	-	-
Upper back	59%	27%	7%	7%	-	87%	13%	-	-	-
Lower back	53%	20%	7%	20%	-	67%	33%	-	-	-
Hip	53%	27%	13%	7%	-	87%	13%	-	-	-
Thigh	73%	20%	7%	-	-	100%	-	-	-	-
Knee	54%	33%	13%	-	-	87%	13%	-	-	-
Ankle	80%	20%	-	-	-	100%	-	-	-	-

The above table: 3. **s**hows that result in individual area wise musculoskeletal pain in post test control group having 1(90%) pain in neck, 2(13%) mild pain in shoulder, 1(7%) mild pain in wrist, 4(27%) mild pain in upper back,1(7%) moderate pain in upper back,1(7%) severe pain in upper back, 3(20%) mild pain in lower back, 1(7%) moderate pain in lower back, 3(20%) severe pain in lower back, 4(27%) mild pain in hip,2(13%) moderate pain in hip, 1(7%) severe pain in hip, 3(20%) mild pain in thigh, 1(7%) severe pain, 5(33%) mild pain in knee, 2(13%) moderate pain in knee,3(20%) mild pain in ankle. In post test experimental group shows that result 15(100%) no pain in neck, 14(93%) no pain in shoulder, 1(7%) mild pain in shoulder, 15(100%) no pain in wrist, 2(13%) mild pain in upper back, 13(87%) no pain in upper back, 5(33%) mild pain in lower back, 10(67%) no pain in lower back, 2(13%) mild pain in hip, 13(87%) no pain in hip, 15(100%) no pain in thigh, 2(13%) mild pain in knee, 15(100%) no pain in ankle.

SECTION–V: Frequency distribution of body mechanism among nurses between control group and experimental group.

The body mechanisms maintained by the nurses were observed by the researcher with the help of observational checklist. Three observations were made for 30 samples. It shows that in body mechanism maintenance among 30 samples, the researcher found that control group never maintain the body mechanism. According to the third observation in experimental group 1, sample never maintain the body mechanism, 4, samples maintain body mechanism in some times, 10 samples of experimental group maintain body mechanism in always. The researcher felt that improper body mechanism may be the precipitating factor for inducing the musculoskeletal disorders.

Section-VI: Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI, Total year of experience in nursing service, Present work place).

This section shows the chi-square values of selected demographic variable of nurses in experimental group. And also the researcher hypotheses were analyzed to the level of significance at $P< 0.05$.

Section-VI(a): Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their Body Mass Index.

This section shows the chi-square value of Body Mass Index with the mean pre test score of musculoskeletal disorders among samples of Experimental group.

Table-4 Chi-square value of Body Mass Index with the mean pre test score of musculoskeletal disorders among samples of Experimental group. $n_2=15$

S.No	Demographic variable	Staff nurses with MSDs			df=6	Chi square value
		Mild	Moderate	Severe		
1.	Under weight	0	0	0	12.6	3.913Ns
2.	Normal weight	2	5	5		
3.	Over weight	2	1	0		
4.	Obesity	0	0	0		

Level of significant at $P <0.05$, NS-not significant

The above table: 4. describe the chi-square value among the nurses with MSDs. Among Underweight no any sample, Normal weight 2 sample with mild MSDs, 5 samples normal weight with moderate MSDs,5 samples normal weight with severe MSDs,2 samples Over weight with mild MSDs, 1 samples over weight with moderate MSDs. The calculated chi square value was 3.913 (d.f=9), P value at 0.05 level and the table value was12.6.Since 'P' value was higher than calculated value, statistical hypothesis $H_{0(2)(b)}$ was accepted. So there is no association between the BMI of sample with the MSDs.

Section-VI(b): Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their total years of experience in the nursing services.

This section shows the chi-square values of demographic variable total years of experience in nursing services. And also the researcher hypotheses were analyzed to the significance at 0.05 levels.

Table-5 Chi-square value of years of experience in nursing services with the mean pre test score of musculoskeletal disorders among samples of Experimental group.

n2=15

S.No	Demographic variable	Staff nurses with MSDs			df=6	Chi square value
		Mild	Moderate	Severe		
1.	1-4 years	3	3	5	12.6	8.326Ns
2.	5-8 years	0	3	0		
3.	9-12 years	1	0	0		
4.	12years	0	0	0		

Level of significant at P <0.05, NS not significant

The above table: 5. describes the chi-square values among the staff nurses with MSDs. Among 1-4 years of experience 3 samples with mild pain, 3 samples have moderate pain, 5 samples have the severe pain. Among 5-8 years of experience 0 samples have mild MSDs, 3 samples have moderate MSDs, no samples belongs to severe MSDs. Among 9-12 years of experience 1 sample belongs to mild MSDs. The calculated chi square value was 8.326 (d.f=6), P value at 0.05 level and the table value was12.6.Since 'P' value was higher than calculated value, statistical hypothesis Ho2 (b) was accepted. So there is no association between the total years of nursing services among the sample with the MSDs.

4.5 Section-VI(c): Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their present work place.

This section shows the chi-square values of demographic variable present work place. And also the researcher hypotheses were analyzed to the significance at 0.05 levels.

Table-6 Chi-square value of present work place with the mean pre test score of musculoskeletal disorders among samples of Experimental group.

n2=15

S.No	Demographic variable	Staff nurses with MSDs			df=6	Chi square value
		Mild	Moderate	Severe		
1.	Medical ward	4	0	0	12.6	30.13*
2.	Surgical ward	0	6	0		
3.	ICU	0	0	3		
4.	Other	0	0	2		

*Level of significant at P <0.05

The above table: 6. describe the chi-square values among the staff nurses with MSDs. Among 4 samples belongs to medical wad with mild MSDs, 6 samples belongs to surgical ward with moderate MSDs. 3 samples belongs to work in ICU with severe MSDs, 2 samples work in other department with severe MSDs. The calculated chi square value was 30.13* (df=6), P value at 0.05 level and the table value was12.6.Since 'P' value was lower than calculated value, statistical hypothesis $H_{0(2)(b)}$ was rejected. So there is a significant association between the present work place in sample with the MSDs.

DISCUSSION

The above findings of the study shows that there is a significant difference between mean pre-test and mean post-test score on musculoskeletal disorders among the nurses between control group and experimental group. There is a significant difference between mean pre-test and mean post-test score on musculoskeletal disorders among the nurses within experimental group. In chi squire there is a significant association between pretest score on musculoskeletal disorders among the nurses of experimental group with their present work places.

LIMITATIONS

1. The study was limited to only qualified nurses within one year experience with musculoskeletal disorders. 2. The study was limited to selected hospital in Salem.

CONCLUSION

The present study indicated that using of exercise and body mechanism is reduced musculoskeletal disorders among nurses. Awareness of nurses and health personnel can improve the practice of exercise and body mechanism to reduce the musculoskeletal disorders among nurses.

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CHAPTER I

INTRODUCTION

Man needs his difficulties because they are necessary to enjoy success

- A.P.J.Abdul Kalam

Health is a state of complete physical, mental and social well- being and not merely the absence of disease or infirmity. **(WHO - 1948)**

Nurses, especially nurse practitioners, have the skills and opportunity to reframe, the delivery of 1 degree care. Some studies have demonstrated that primary care, delivered by nurse resulted in improvement and outcomes and driven health care. Nurses have always played a major role in patient safety. As professionals with the patient round the clock, nurses are positioned to prevent medication errors, ensure patients receive the correct therapy and provide safe guards from problem such as fall or skin breakdown, during that times nurses come across problems such as MSDs. Most frequent problem encountered are in lower & upper back, neck, and shoulder regions associated with frequent patient handling. **(Cameron SJ 2008 AP-June)**

Nursing being oneamong the biggest health care profession, globally dominated by female population. Nursing practice has changed around the world owing to technological advancements. Today nursing is not limited to just delivering expert physical skill to the sick, but also most nursing personnel themselves become affected by complex interactive factors including physical, social, cultural, economical and political situation. The tedious shift work of nurses disrupts the circadian rhythm, causing several acute and chronic health problems including many musculoskeletal problems, especially low back pain. **(Ando S, Ono Y, Shimaoka M and Hiruta S, 2000)**

Nurses suffer from varying degree of musculoskeletal disorders, which result in frequent absenteeism. There are about 1.5 million registered nurses employed in the health sector of India. Detailed study of the musculoskeletal disorders occurring in Indian nurses including (n=627), frequency of musculoskeletal disorders, body part affected, restrain to normal activities, duration of pain in various regions of the body, doctor visits, duty changed, etc. One year prevalence of low back pain was found to be maximum (67%) followed by pain in the neck (47.0%) and ankle/feet (36.0%). MSDs were found to be more widespread among the nurses of middle age group (31-40 years), closely followed by adults (21-25years). Among the subjects studied, married subjects were found to face more problems due to upper body MSDs and single nurses suffered more from lower body MSD. The study highlighted younger age group being at higher risk. **(Deepti Majumdar, Pal MS and Majumdar D 2014)**

The term musculoskeletal disorders (MSD) is referred to injury or pain in the body's joints, ligaments, muscles, nerves, tendons, and structure that supports the limbs, neck, and back. MSDs can arise from a sudden exertion (e.g., lifting a heavy objects, repetitive strain, or from repeated exposure to force, vibration, or awkward posture). Injuries or pain in the musculoskeletal system caused by acute traumatic events like a car accident or fall are not considered musculoskeletal disorders. MSDs can affect many different parts of the body including lower back, neck, shoulder, and extremities (arms, legs, feet, and hands).Example of MSDs include carpal tunnel syndrome, epicondylitis, tendinitis, back pain, tension neck syndrome, and hand arm vibration. Investigation have demonstrated that musculoskeletal disorders (MSDs) represent one of the leading causes of occupational injury, disability, absenteeism and

incapacity among workers in developed and industrially developed countries. **(Shoko Ando 2000)**

The major risk factors associated with musculoskeletal disorders includes repeated unidirectional twisting of trunk (repetitive movement), work in static postures for longer period (prolonged static postures), awkward work postures, less flexibility and less core strength (muscle imbalances) and lack of aerobic exercise. Repetitive forces lead to micro trauma which triggers the inflammatory process and results in swelling. In nurses, damage exceeds the rate of repair due to insufficient rest periods. These postures that persist can give rise to muscle necrosis, discomfort, pain or disability which facilitates the development of musculoskeletal disorders. Even in optimal postures, muscle tension increase causing muscle ischemia and joint hypo mobility, because the nurses have to stay in this postures for prolonged periods of time. This alters the biomechanics resulting in tightness of one group of muscles and weakness in the opposite group of muscles. There is also a lack of awareness regarding correct posture, prolonged static postures, inadequate facilities and lack of exercise, to induce the musculoskeletal disorders among nurses. **(Sang D. Choi, 2010)**

One major contributing factor for musculoskeletal disorders is decreased flow of nutrients and oxygen to muscles. Aerobic exercise improves oxygen transport by increasing blood flow to the tissue and thereby increasing their efficiency, and muscle power. **(Dodda Kiran Kumar 2014)**

Among healthcare workers, MSDs represent a major occupational problem and a significant cause of morbidity. Many studies have an association between MSDs and workplace factors. Some studies have

shown that physical and psychological demands might causes health care workers to leave their profession. The high prevalence of musculoskeletal disorders among nurses may have even large societal impact in the future, as nursing shortages become major health care delivery issues in many developed countries. For managing and reducing the risk of MSDs among high risk group of work force such as nurses, estimation of reducing MSDs is mandatory. **(Mamta Israni, 2013)**

1.1 NEED FOR THE STUDY

In all industries combined, 2007 injury data shows those nearly 12 out of 100 nurses in hospital and 17.3 out of 100 nurses working in nursing homes. Reports shows that work related musculoskeletal disorders, including back injury incidence rate (in, 1,000s) among nursing profession from 1992-1998. Work place intervention programs can be effective in reducing musculoskeletal disorders. A 2 years inception cohort study investigated risk factors for 320 nurses, who incurred 416 back injuries, at a large teaching hospital. Result showed that back injury that occurs while lifting patients, 29% of nurses had restored to the use of analgesics to relive their musculoskeletal pain in the preceding six months. 27% of injured nurses had evidence of prolapsed intra vertebral lumbar disc-lesions. **(Bureau of Labor Statistics, 2007)**

The intervention program to promote health related physical fitness in nurses, assess the effects of exercise in nurses; many studies have reported the high incidence of musculoskeletal disorders in nurses. (Exercise program to improve the general physical fitness of nurses). In this study quasi-experimental control group and experimental group pre test and post test design was adopted. The experimental group engaged in three-month intervention program consisting of treadmill exercise. Before

intervention, the control group had significantly better grasp strength, flexibility and durability of muscles than the experimental group ($P<0.05$). After the intervention the experimental group performed significantly better ($P<0.05$) on body mass, grasp strength, flexibility, durability of abdominal and back muscles, cardiopulmonary function. **(Yuan Sc and Chang Yo, 2000)**

Conducted a study to assess the effect of a transfer technique education program alone or combined with physical fitness training compared with control group, who followed their usual routine. Eleven clinical hospital wards were clusters randomized to either intervention group (six wards), control group (five wards). The intervention cluster was individually randomized to transferring technique (55 Nurses) and transferring technique + physical fitness training (50 Nurses), control group (76 Nurses). Implementing transfer technique along or in combination with physical fitness training among a hospital staff , when compare to control group, shows any statistical difference according to self reported low back pain, pain level disability and sick level at a 12 month follow up. However the individual randomized intervention sub group (transferring technique/ physical training) significantly low back pain level was decreased ($P=0.001$). Although weakened by a high withdrawal rate, teaching transfer technique to nurses in a hospital setting it is very effective. Other priority such as physical training may be taken into consideration. The current study has support the finding of other studies like introduce transfer technique, alone has no effect in targeting LBP. However, physical training seems to have an influence in minimizing the LBP consequences and may be important in the discussion of how to prevent LBP among nursing personnel. (**Ebbehj NE and Wiese N, 2008)**

Assessment of relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic, has been established in South Africa. A cross sectional quantitative descriptive survey was conducted in two stages namely, the prospection cross sectional survey of nurses and the retrospective review of records. A random sample 231 nurses was selected and all the nurses invited to fill in the self administrated musculoskeletal questionnaires. Result shows that life time prevalence of musculoskeletal disorders among the nurses had affected more than two body regions. There was no significant relationship between age, gender and smoking, but there was strong correlation between WMSD and physical exercise, work task and workload. **(Babusisi we Thaundi Evan Kumalo, 2014)**

A study conducted to assess that MSD represents a significant occupational problem among hospital staff prevalence and risk factors (over work task, kind of work, physical stress, mental stress, work in night shift, personal factors extra professional activity, ageing, hereditary) in teaching hospital of Mona stir (Tunisia), used the questioners, strong prevalence of MSD in hospital staff. We recommend that education program on prevention and coping strategies for MSD be mandatory for them in order to reduce the rate of MSD among this professional categories associations between the age, gender, postures and discomfort position. **(Anis Jelland, Hanene Lajili, 2013)**

The researcher personally observed most of the nurses undergoing MSDs due to work task, and lack of knowledge regarding exercise and body mechanism. The researcher also suffered with the MSDs and uses the same intervention, this stimulated the researcher to select the current topic. The increasing rate of MSDs affecting physiological and psychological factors of nurses and also increase financial burden to manpower. The high

prevalence of MSDs among nurses may have even large social impact in the future as nursing shortage become major health care delivery issue in many developing countries. So the researcher felt the need to do a study, for reducing the MSDs is mandatory.

1.2 STATEMENT OF THE PROBLEM

"A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED NURSING INTERVENTION ON EXERCISE AND BODY MECHANISM TO REDUCE MUSCULO SKELETAL DISORDERS AMONG NURSES IN SELECTED HOSPITALS AT SALEM"

1.3 OBJECTIVES

1. To prepare and validate the exercise and body mechanism to reduce musculoskeletal disorders among nurses with in experimental group.
2. To assess and compare the mean pretest and mean post test score on musculoskeletal disorder among the nurses between control group and experimental group.
3. To assess and compare the mean pretest and mean posttest score on musculoskeletal disorder among the nurses within experimental group.
4. To assess the maintenance of body mechanism among the nurses between control group and experimental group.
5. To find association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (Body Mass Index(BMI), Total year of experience in nursing service, present work place)

1.4 RESEARCH HYPOTHESES (Level of significance $P<0.05$)

H_1 : There is a significant difference between mean pre test score and mean posttest scores on musculoskeletal disorder among the nurses between control group and experimental group.

H_2 : There is significant difference in mean pre test score and mean post test scores on musculoskeletal disorders among the nurses with in experimental group.

H_3: There is a significant association between pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (Body Mass Index (BMI), total year of experience in nursing service, Present work place)

$H_{3(a)}$ There is a significant association between pre test score on musculoskeletal disorder among the nurses of experimental group with their body mass index.

$H_{3(b)}$ There is a significant association between pre test score on musculoskeletal disorder among the nurses of experimental group with their Total years of experience in the nursing service.

$H_{3(c)}$ There is a significant association between pre test score on musculoskeletal disorder among the nurses of experimental group with their present work place.

1.5 OPERATIONAL DEFINITION

1.5.1. EFFECTIVENESS

Effectiveness is the quality of being able to bring about an effect. In this study it is referred to the mean pre test and mean post-test score on the musculoskeletal disorders between control group and experimental group.

1.5.2. MUSCULOSKELETAL DISORDERS

MSDs are injury or pain in the body's joints, ligaments, Nerves, Tendons and structures that support limbs, Neck, and Back, caused by lifting heavy object or they can raises from making the same motions repeatedly (repetitive strain) or from repetitive exposure to force vibration or awkward posture within one week to one year.

In this study musculoskeletal disorder refers to pain felt by the nurses with one year during repetitive work and movement of the body. It is mainly felt in joints such as neck, shoulder, elbow, wrist, upper back, lower back, hip, thigh, knee, and ankle is measured by using the Visual Analogue Scale. The score is interpreted as No pain: 0, mild pain: 1-3, moderate pain: 4-6, and severe pain: 7-9 and worse pain: 10.

1.5.3. BODY MECHANISM

Body mechanism the application of kinesiology to use of the body in daily life activities and to the prevention and correlation of problem related to posture, (or) the study of the action of muscles in producing motion or postures of the body.

In this study it refers to the proper maintenance of position to relieve musculoskeletal disorder among nurses during sitting, standing, lifting and shifting. Postural maintenance was assessed during nursing activities by observation method with help of likert's three point rating scale.

1.5.4. EXERCISE

Physical exercise is any bodily activity to enhance or maintain physical fitness and overall health and wellness. It is performed for various reasons include strengthening a muscles and releasing of endorphins that act as pain reliving measures etc.

In this study exercise refers to those activities performed by the nurses which help to strengthen the muscles. Mainly neck glide, shoulder shrug, shoulder circles, elbow bend to straighten, forearm rotation, elbow flexion and extension, fore arm and wrist stretch, shoulder blade squeeze for upper back Hamstring curls for lower back and thigh, straight leg raise for knee, dorsiflexion for ankle.

1.5.5 PLANNED NURSING INTERVENTION ON EXERCISE AND BODYMECHANISM

It refers to systematically organized teaching program which include information booklet, demonstration related to body mechanism and exercise to reduce the musculoskeletal disorders. The planned nursing intervention was given to 15 samples in 2 groups (7-8 members per group) for 1hour.

Intervention for exercise and body mechanism

- Definition of exercise, types of exercise, definition of body mechanism, importance of body mechanism, principles of body mechanism, proper body alignment and proper body mechanism during nursing activities.

1.5 .6 Demographic variables

a) Age in years

It refers to the duration of life that one has existed. In this study 21-50 years of nurses having the musculoskeletal disorders are selected.

b) Gender

In this study it refers to the gender of the samples having the musculoskeletal disorders such as male or female.

c) BMI

An approximate measure of whether someone over or underweight calculated by their weight in kilograms divided by the square of their height in meters. Such as

- Underweight = <18
- Normal weight = 18.5- 24.9
- Overweight = 25-29.9
- Obesity = 30 or greater

d) Total year of experience in the nursing service:

In this study it refers to total years of working experience as a nursing staffs in a hospital set up such as 1-4 years, 5-8 years, 9-12 years, above 12 years.

e) Present work place:

Nurses working in a particular department such as Medical ward, Surgical ward, pediatric ward, Accident and emergency care unit, ICU and other department like OT, Dialysis unit.

1.6 ASSUMPTIONS

- Planned nursing intervention on exercise and body mechanism can be an effective tool to reduce the musculoskeletal disorders among nurses.
- Most of the nurses have inadequate knowledge regarding exercise and body mechanism.
- The nurses were not aware about the occupational related musculoskeletal disorders.

1.7 ETHICAL CONSIDERATION

- Ethical clearance was obtained from research committee members of Shanmuga College of nursing and concerned authorities of Shanmuga Hospital.
- Informed written consent was obtained from the individual samples after explain the purpose of the study.
- All information kept confidential and will be used only for the present studies.

1.8 DELIMITATION

This study is delimited to

- The age group of 21- 50 years.
- 30 samples only. In which 15 for control group and 15 for experimental group.
- This study is delimited to conduct data collection within a period of 4-6weeks.

1.9 CONCEPITUAL FRAME WORK

Polit and Hungler., (1999) state that conceptual framework is interrelated concepts and abstractions that are assembled together in some national scheme by virtue of their relevance's to common scheme. The present study is aimed to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce the musculoskeletal disorders among nurses.

Conceptual framework of this study was derived from Gate Control Theory of Pain.

1.9.1 Gate control theory of pain:

The gate control theory of pain was first postulated by **Mellsac and Wall in 1965**. The theory suggested that pain, to pass through the gate there must be unopposed passage in for nociceptive information arriving at the synapses in the substantiagelatinosa. Pain gate is also receiving impulses produced by stimulation of thermo receptor or mechano receptor transmitted via large diameter myelinated 'A β'fibers which inhibit and super impose the small diameter impulses. Many non pharmacological procedure such as application of heat or ice, massages, vibiration TNS and

movement stimulated the nerve endings connected with large diameter fibers which can produce a reduction of pain by closing the pain gate.

In this study based on the principles of Gate Control Theory of Pain, the following conceptual framework was developed. Method to reduce musculoskeletal pain among nurses by practicing the exercise and body mechanism.

1.9.2 Stimulation of pain receptors:

The pain impulses will be carried out by the small diameter, slow conducting 'A δ& 'C', fibers. Impulses travelling through small diameter fibers will open the 'pain gate' and the person feels pain.

In this study, the researcher considers that improper maintenance of body mechanism and lack of exercise can be a stimulating factor resulting in decreasing muscles strengthening and nurses also felt the pain. Exercise was practiced by the samples so that muscles would strengthen and musculoskeletal pain would reduce. When exercise is done the body's pain relief chemicals, ie, the endorphins are released. Endorphins act as pain reliving measure.

1.9.3 Pathway of pain Impulses:

Normally pain impulses are travelled through small short conducting 'A δ & C' fibers. Impulses from stimulations such as massage hot and cold application of TENS etc. Will be quickly conducted by large mylinated 'A, β' fibers.

In this study lack of exercise and improper body mechanism may result in impulses traveling through small short conducting fibers. So with exercise impulses will be quickly conducted by large mylinated 'Aβ' fibers which future relives musculoskeletal pain.

1.9.4 Gating Mechanism:

Pain impulses are transmitted through the spinal nerves upper extremities and lower extremities sympathetic nerves which are traveled through 'A1 δ & 'C' small diameter and slow conducting amylinated fibers and reach the pain gate, thus the staff nurses perceive musculoskeletal pain.

When exercise and body mechanism is performed regularly, the impulses travel through the fast conducting mylinated 'Aβ' fibers which snapper impose small fibers and close the pain gate. The β endorphine which is released from the nurses perceives less musculoskeletal pain.

SUMMARY

This chapter deals with the content of introduction about musculoskeletal disorders, need for the study, statement of problem, objective, hypothesis, operational definition, assumption, delimitation, ethical consideration and conceptual framework.

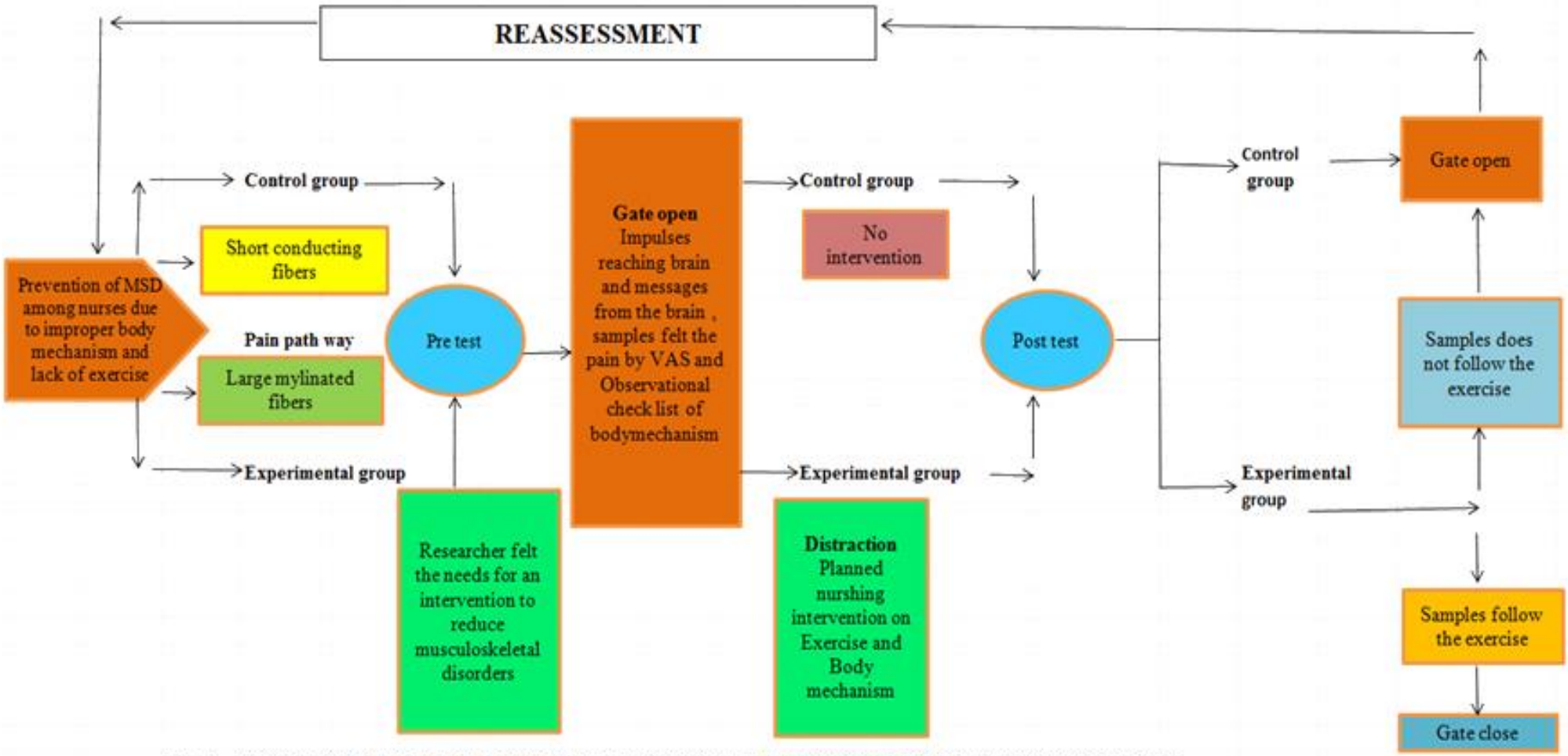

Fig - 2 - 1: CONCEPTUAL FRAMEWORK BASES ON GATE CONTROL THEORY OF PAIN BY MELZACK AND WALL (1965) FOR FINDING THE EFFECTIVENESS OF EXERCISE AND BODY MECHANISM TO RELIVIE THE MSDs

CHAPTER II

REVIEW OF LITERATURE

A review of relevant literature was conducted to generate a picture of what is known and what is not known about a particular situation. Relevant literature refers to those sources that are important in providing in-depth knowledge about study and selected problems. It helps the researcher to gain insight and collect maximum information for laying the foundation of the study.

Review of literature is a critical summary of researcher on a topic of interest generally prepared to put a research problem in context or to identify gaps and weakness in prior studies so as to justify a new investigation. **(Polit and Hungler, 2008)**

Section-I: Studies related to incidence and prevalence of work related musculoskeletal disorders.

Section-II: Studies related to exercise to relive the musculoskeletal disorders.

Section-III: Studies related to body mechanism to relive the musculoskeletal disorders.

Section-IV: Studies related to application of conceptual framework on Gate Control Theory of pain.

2.1 SECTION-I: STUDIES RELATED TO INCIDENCE AND PREVALENCE OF RELIEVING WORK RELATED MUSCULOSKELETAL DISORDERS.

Roberta F.C Moreira, Tatiana O. Sato, (2010), A cross sectional study aimed to conducted for analyzing MSS presented by hospital nurses. Nordic musculoskeletal disorders questioners were used 245 nurses

selected as a sample. Result show that low back pain (57%), shoulder pain (52%), neck pain (48%), sick leave takes a samples due to musculoskeletal disorders (Cl=1.2- 29%). The MSS symptoms shows need for preventive programs in the hospital environment in order to control more severe MSS in nursing profession.

Shyang- Guang, Chin- Tun Hung' Lee- Wen Pai, (2013), A cohort study conducted 3914 nursing samples was selected randomly from the 90,022 in the study both gender was participated women and men, In 2004-2010 number of musculoskeletal disorders in the population 1145 (65.79%- 76.24%) significantly higher among the nurses than the reference (all P<0.001) there was increased the musculoskeletal disorders level in the year of 2005-2010 (33.65%- 33.65%) result of the study nurses were more susceptible to MSD.

Mitchell. T., et. Al., (2008), conducted a cross –sectional survey among 897 under graduate nursing student and 111 recently graduate nurses having the musculoskeletal disorders in especially lower back pain samples are fill the Nordic musculoskeletal questioners. The result revealed that 60% had that low back pain providing the increased causes for occupational exposure.

Choobineh A, Moverhed M, Kumashiro M, (2010), A cross sectional study was conducted in operating room nurses to determine prevalence of musculoskeletal disorders, 375 nurses selected as a samples and using Nordic questioner, result shows that lower back symptoms were found to be the most prevalent problem in nursing 60.6% perceived physical demand in the work place were significantly associated with musculoskeletal disorders symptoms.

2.2 SECTION-II: STUDIES RELATED TO EXERCISE TO RELIEVING THE MUSCULOSKELETAL DISORDERS.

Su-Chean, Ching- Hslaing (2014), A quasi experimental pretest and post test research study was conducted in nurses for analyzing the effect of physical stretching fitness on decreasing musculoskeletal disorders among clinical nurses. Here selected as 512 nursing samples and using 6 indicators and Nordic musculoskeletal questioners used for data collection, independent -t test and chi-square test used for testing the data analysis. The result shows that significantly improve in experimental group nurses flexibility (2.12,$P<0.001$), so it suggest that back strength (2.44, $P<0.001$) pulmonary strength (3.69,$P<0.001$) and nurses should follow the exercise and it will helps to reduce the risk of musculoskeletal disorders.

Annemarie L. Yng Svensson., et.al., (2005), conducted a cluster randomized control study on physical training program, patient transfer technique and stress management to achieve low back pain for 776, samples are assistant nursing students. It was concluded that the low back pain was lower in experimental group than control group.

Kietrys et al., (2007), Investigated the effect of exercise at work (neck, shoulder and upper back) on 72 computer operators over a period of 4 weeks. They concluded that most subject found the resistance and the stretching exercise easy to do, performed them 1 to 2 time daily and said they reduced discomfort.

Omer et al, (2003-2004), also carried out a study on the effectiveness of training and exercise programs in the management of MSDs. They trained the participants in mobilization, strengthening and relaxation exercise, and found that these exercise reduced reported experience of musculoskeletal pain and depression levels within participant in the short term.

Miranda et al (2001), conducted studies how work related factors and physical exercise could be as a predictor of shoulder pain. How an outcome of the study was that physical exercise had more value than damaging effects on the shoulder.

Jepsen and Thomsen, (2008), conducted study to examine the effects of stretching exercise on the prevention of upper limb disorder in the right arm among computer operators. They study of 184 computer operator; all the samples completed the questioners and neurological examination. The physical therapist instruct to stretching exercise based on neurodynamic principles. Result shows that end of program self reporting pain level and neurological findings shows significant changes present and more improvement present in the exercise.

Moore, (1998), conducted a study at pharmaceutical manufacturing facility which examined the effect of a workplace stretching program. It consisted of 36 stretching sessions over a 2 month period and involved 60 employees. The exercise in neck, shoulder, arm, trunk, hip, back and legs. Results of exercise in the work place may benefit to employee by increased flexibility and potentially preventing work related musculoskeletal disorders.

2.3 SECTION-III: STUDIES RELATED TO BODY MECHANISM TO RELIEVE THE MUSCULOSKELETAL DISORDERS

Kochitty et al., (2015) study was conducted to assess the knowledge and practice regarding body mechanism among critical care nurses, associated with post test findings of demographic data 100% of nurses having the back pain related to improper postures. The pre test score body mechanism among samples poor knowledge regarding body mechanism 61.7%, Average knowledge among body mechanism 38%, good

knowledge among body mechanism 0%, after teaching the post test score was poor1.7%, averages 98.3%, good 0% significantly shows the improvement in the post test. The pre test mean 7, post test mean 16.5 (df) 59 it shows significantly increased the body mechanism maintenance among samples. Good body mechanism maintenance helps to reduce the back pain level of samples.

Josephini A Engels, (1996) prevalence of musculoskeletal disorders complaints of the area, back, neck and legs among nurses. Questionnaire survey method sample collection was done. The result shows that 846 complaints of them musculoskeletal disorders due to working pressure (70%) and the same level (70%) samples complaints of no opportunity to take brake is causes for musculoskeletal disorders and (47%) samples working in awkward postures causes for the musculoskeletal disorders.

Nata'lia da Rosa fonseca, (2010) this cross- sectional study identified factors associated to musculoskeletal disorders in nurses and technician, 318 randomly selected female workers answered a questionnaire administered by an interview, with questions related to physical and psychosocial demands at work, individual characteristics and activities outside work. Multivariate analysis revealed that Musculoskeletal disorders in neck, shoulder, upper back and lower back are associated to physical demand. (Material handling, poor back postures).

Azize Karahan, N Bay Raktar, (2010) this exploration study was designed to identify the usage of body mechanism in clinical settings and the occurrence of low back pain in nurses. The sample was composed of 56 nurses who work on the medical, surgical, emergency and intensive care units in hospital. Data collected through observation and interview was evaluating using percentage chi-square and Mann-Whitney U test. Result shows that majority of the nurses (87.5) experienced low back pain in

working hours. According to the observation (53.6%) of nurses use body mechanism in correctly during sitting, (58.7%) of them during standing, but (82%) use the body mechanism incorrectly during lifting of the weight. Researcher noted most of nurses not use the body mechanism correctly its reason for low back pain.

N.M Daraiseh, S. N. Cronin, (2010) conducting study for nursing persons (n=263) employed in three hospital. Staffs completed questioner's investigation musculoskeletal symptoms in multiple body regions. The prevalence rate is significantly associated with the smoking, body mass index, work experience and unawake postures.

2.4 SECTION-IV: STUDIES RELATED TO APPLICATION OF CONCEPTUAL FRAMEWORK ON GATE CONTROL THEORY OF PAIN

Catherine. W., Roberge and Melanie McEwen., (1998) did a retrospective non experimental , ex facto design study to find the effects of commonly used two main local anesthetics on management of pain during intra operative period for inguinal herniorraphy. The Gate control theory of pain was applied for this study .The findings revealed that when compared with lidocine, bupivacine was proved to be superior in the length of hospital stay decreased when local anesthesia was given intra operatively.

Megel, et.al., (1998) did a study for children between the age group of three to six years old and musical therapy was given to experimental group during immunization and assessed the blood pressure and heart rate. The frame work used for the study was gate control theory. The result found that there was no significant difference in blood pressure, heart rate and pain but the total distress was less for the experimental group.

Ferrell- Torry, Andrea, Glick, Orpha J, (1993) conducted a study for the hospital cancer patients. Purpose of this exploratory study was to examine the effects of therapeutic massages on pain perception, anxiety and relaxation. In hospital the patient experienced a pain. Third minute of therapeutic massage was administrated on two consecutive evenings to nine hospital male patient. The subject self reported of pain (VAS) as well as anxiety and relaxation were recorded the before and after immediate intervention. The objective physical measures of heart rate, respiratory rate, and blood pressure were obtained before, immediate after, and, finally, 10 minute after the massage intervention. After the massage therapy significantly reduce the pain level (average=60%) and anxiety (average=24%) while enhancing their feelings of relaxation by average of 58%. Physiological measures blood pressure, heart rate, respirator rate tended to decreases from baseline, therapeutic massages is a beneficial nursing intervention that promotes relaxation and alleviates the perception of pain and anxiety in hospitalized cancer patients.

SUMMARY

This chapter dealt with the review related to incidence and prevalence of musculoskeletal disorders, management of musculoskeletal disorders, exercise and body mechanism to relieving the musculoskeletal disorders and conceptual frame work based on Gate Control Theory of Pain.

CHAPTER - III

RESEARCH METHODOLOGY

Methodology of research organizes all the component of study in a way that is most likely to valid answer to the problem that has been posted. **(Burn and Groove, 2000)**

In this chapter the researcher intended to discuss, the research design, research setting, population, sample, sampling technique, selection and development of the tool, validity of the tool and reliability of the tool followed by preparation of independent variables, pilot study, result of the study, data collection procedure and plan for data analysis.

3.1 RESEARCH APPROACH

The research approach is the procedure for conducting a research enquiry. It helps to know what to assess and analyze. **(Polit and Hungler, 2009)**

In this study Quantitative Evaluative research approach was utilized.

3.2 RESEARCH DESIGN

Research design selection is based on the purpose of the study, which is to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce the musculoskeletal disorders among nurses. Quasi experimental pre test –post test with control group design was used.

PRE TEST		INTERVENTION	POST TEST		
GROUP	**DAY-1**	**DAY-2**	**DAY-7**	**DAY-15**	**DAY-30**
E	O	X	O1	O2	O3
C	O	-	-	-	O3

Figure-3.1: Schematic representation of Research design

KEY

E : Experimental group

C : Control group

O : Pre-test assessment of musculoskeletal disorders among the nurses.

i) Demographic variables.

ii) Visual analogue pain scale.

iii) Likert's three point rating scale.

X: Administration of Planned nursing intervention on exercise and body mechanism.

O1 & O2 : Considered by researcher for follow-up to encourage the nurses to do exercise and maintaining body mechanism.

O3: Post –test assessment of musculoskeletal disorders among nurses.

3.3 SETTING OF THE STUDY

It can be described as the physical location and condition in which data collection takes place. **(Polit and Hungler, 2009)**

The study was conducted in Shanmuga Hospital at Salem, which is near to Shanmuga College of Nursing. Shanmuga Hospitals consists of 3

floors and occupy the 350 bedded multispecialty hospitals. All facilities are available in the hospital. Nearly 70 nurses are working in Shanmuga Hospital and they have the 3 shifted duty, 50 of them are senior nurses and 20 of them are junior nurses.

3.4 DESCRIPTION OF VARIABLES

A concept which can take on different quantitative values is called as variables. **(Kothari C R, 2002)**

The variable in this study are,

3.4 (a) Dependent variable:

The dependent variable is the variable; the researcher is interested in understanding, explaining and proceeding. **(Polit and Hungler, 2008).**

In this study dependent variable was the musculoskeletal disorder.

3.4 (b) Independent variable :

The independent variable is believed to care or influence the behavior and ideas. **(Polit and Hungler, 2008)**

In this study the independent variable is planned nursing intervention on exercise and body mechanism to reduce the musculoskeletal disorders among nurses.

3.4 (c) Extraneous variable :

The variables which are present in the research environment and interfere with research findings by acting as unwanted independent variable are known as extraneous variable. **(Woods and Khan, 2009)**

The extraneous variables in this study are age, gender, body mass index, total years of experience in nursing services and present work place.

3.5 POPULATION

Population is the entire set of individuals or objects having the same common characteristics. **(Polit and Hungler, 2008)**

The population of the study consists of registered nurses with at least one year work experience in Shanmuga Hospital.

3.6 SAMPLE

Sampling is the process of selecting a portion of the population to represent the entire population. Population is the subset of population element. **(Polit, and Beck, 2004)**

In this study samples refers to the nurses working in Shanmuga Hospital at Salem, and who full filled the inclusive criteria.

3.6.1 SAMPLING CRITERIA

Inclusive criteria

1. Nurses between the age group 21-50 years.
2. Nurses working in direct patient care provided areas.
3. Nurses who are available during the study.
4. Samples felt the pain during work period within one year.
5. Nurses who are having minimum of one year experience.

Exclusive criteria

1. The nurses undergoing treatment for any physical problem.
2. The nurses underwent previous surgery and neurological problem.
3. The samples not willing to participate in study.
4. Nurses undergoing any similar research study

3.6.2 SAMPLING TECHNIQUE

Sample technique is a method of selection of samples to represent the entire population. **(Polit and Beck, 2004)**

In this study the researcher selected the samples by using non-probability purposive sampling technique.

3.6.3 SAMPLE SIZE

Sample size was 30 subjects among which,

- 15 subjects in experimental group.
- 15 subject in control group.

3.7 DESCRIPTION, INTERPRETATION, VALIDITY AND RELIABILITY OF THE TOOLS

The instrument selected in research must be vehicle that obtains best data for drawing conclusion to the study. **(Treece and Treece, 1996)**

The tool was developed based on the information gathered from relevant literature review and it was sending for content validation. According to the suggestion given by the experts necessary changes were made. The modified tools are,

Tool I: Demographic Variables

Tool II: Visual analogue pain rating scale to assess the intensity of musculoskeletal pain among staff nurses.

Tool III: Likert's three point rating scale to assess the body mechanism among staff nurses

Tool I: Demographic Variables:

It was developed by the researcher based on review of literature and opinions. It deals with demographic data of samples are age, gender, body

mass index, total year of experience in the nursing services, present workplace. The collected information was statistically analyzed by descriptive statistics by using frequency and percentage distribution.

Tool II: Visual analogue pain rating scale to assess the intensity of musculoskeletal pain among nurses

It will be used to assess the level of intensity of musculoskeletal pain and the rating scale used as a visual analogue scale. The scale is interpreted as no pain-0, mild pain1-3, moderate pain4-6, severe pain7-9, worse pain-10. But statistical purpose the researcher select upper limit score for calculation, no pain-0, mild pain-3, moderate pain-6, severe pain-9, worse pain-10. Based on the score level the score was graded as musculoskeletal disorders.

Tool III: Likert's three point rating scale to assess the body mechanism among nurses

The researcher makes a general observation of body mechanism among the staff nurses without their knowledge. Three observation are made for each sample the scale was interpreted as, always maintain (2), some time maintain (1), never maintain (0).

3.8 VALIDITY AND RELIABILITY OF THE TOOL

The content validity refers to the degree to which an instrument measures, what is supposed to measures. **(Polit and Hungler, 1999)**

3.8.1 Validity:

The tool was developed on the information collected from review of literature, suggestion and recommendation from experts. The content

validity of the demographic data and visual analogue pain scale, likert three point scale to assess the body mechanism among staff nurses this obtaining expert opinion (three nursing experts and one physical therapist, one medical expert).100% of acceptance was given to all items in all tool and there were no modification.

3.8.2 Reliability:

The reliability samples were selected from Gopi Hospital, at Salem. To check the reliability, selected tool was administered to five samples. The reliability was checked by test retest method for tool-I (r=0.98) and tool-II (r=0.98), inter rater method used for tool-III (r=1) which indicates that the tool was reliable.

3.9 PREPERATION OF INDEPENDENT VARIABLE

EXERCISE: The researcher practiced the exercise program and which was obtained from physical therapist and prepared booklet for teaching. After pre test on 2nd day planned nursing intervention was started for nurses in two groups, first group 7 samples, second group 8 samples participated in this demonstration. They were interestingly participated and done the return demonstration about exercise for and body mechanism.

3.10 PILOT STUDY AND ITS FINDINGS

Pilot study is a small scale version or a trial run done in a preparation for major study. **(Polit and Hungler, 1999)**

The setting selected for pilot study was Gopi Hospital. The researcher selected 6 staff nurses with MSDs as study samples by non probability purposive sampling.

Pilot study started on 16.03.16 and completed on 01.04.16. Pre test was done on 16.03.16 and then intervention on exercise and body mechanism was given for 1 hour to experimental group on the same day. Post test was done on 15th day. The study was conducted among 6 samples, 3 in control group and 3 in experimental group. After permission received from the concerned authority, an informed written consent was obtained from the samples after explains the purpose of study. The samples were selected by non-probability purposive sampling technique.

The result of pilot study shows that within the control group 67% of samples have moderate MSDs, 33% of samples have severe MSDs and 100% of experimental groups have moderate MSDs. After intervention, in the post test, experimental group shows 67% of samples come under no MSDs, and 33% have mild MSDs, but in control group there is no any changes. Further un paired 't' value was computed to find out the significant difference between the pre test and post test score of MSDs for control group and experimental group at 0.05 level of significance.

It was observed that pre test score was 1.91Ns df=2.101, post test score was 3.703* df (9) =2.101. Findings revealed that there was a significant difference in the mean post test score of MSDs between control group and experimental group. There was no significant difference in the pre test score between control group and experimental group. Pilot study findings showed that there was no significant association between Age, Gender, BMI, and Experience with the level of MSDs.

No modification were done after the pilot study at any level.

3.11 DATA COLLECTION PROCEDURE

Talbot, (1995) refers to data collection as gathering of information from sampling units.

Informed and obtaining written consent from the competent authorities, to conduct the study, data collection was started from 05.04.16 to 04.05.16 at Shanmuga Hospital, Salem. Initially the researcher got written permission after explaining the procedure and purpose of the study. By using non probability purposive sampling technique 30 samples were selected. Among them 15 samples were selected as a control group, 15 samples were selected for experimental group. The researcher introduced to the samples and explain the purpose of the study. Informed written consent was obtained from the samples. Data collection was done first for the control group then for the experimental group. The data was collected between 12 pm to 3 pm, duration of data collection was 4 weeks. The samples selected under inclusive criteria nurses working in Shamuga Hospital, The tool was given to 50 samples and 30 samples only had musculoskeletal disorders were selected for the study, and among the 30 samples were segregated as 15 control and 15 experimental group. The pretest was done for 30 samples on day-I. On the second day planned nursing intervention on exercise and body mechanism and taught to experimental group. The experimental group was divided in two group's 7in one group, 8 in another group and exercise and body mechanism was demonstrated to the groups separately for two hours. Followed by the researcher made 3 observation for the study, day 7^{th} was the first observation, day 15^{th} was the second observation and the first two observations are considered as follow-ups. Third observation of 30^{th}day was considered for posttest.

3.12 PLAN FOR DATA ANALYSIS

Talbot, (1995) designed data analysis as evaluation of information and its pertinence to the study variable. Data analysis helps the researcher to organize, summarizes, evaluate, interpret and communicate the

numerical facts. Collected data were organized, tabulated and analyze by using descriptive statistics (Mean, S.D, Mean score %) and inferential statistics (Unpaired t-test, Paired t-test, Chi-square test).

SUMMARY

This chapter deals with the methodology approach. It included research design, setting of the study, variables, population, sample, and sampling technique, description and interpretation of tools, plan for pilot study, data collection procedure and plan for data analysis.

CHAPTER - IV

DATA ANALYSIS AND INTERPRETATION

Data analysis is a process of organizing and synthesizing data in such a way that researcher questions can be answered and tested (Polit, & Hungler, 1999).

Statistical procedure enables the researcher to organize, analyze, interpret, evaluate and communicate numerical information meaningfully.

This chapters dealt with the descriptive and inferential analysis of the data collection from 30 nurses with musculoskeletal disorders to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce the musculoskeletal disorders among nurses.

4.1 PRESENTATION OF DATA

The data were entered in master code sheet for tabulation and statistical processing .The obtained data were analyzed, organized and presented under the following headings:

Section-I: Frequency and percentagewise distribution of samples based on their demographic variables.

Section –II: Analysis and comparison of mean pre test and mean post test score on musculoskeletal disorders among the nurses between the control group and experimental group.

a) Percentagewise comparison of sample based on their pre test and post test level of musculoskeletal disorders between control group and experimental group.

b) Mean pre test, Mean Posttest, Standard Deviation and Un paired ‘t’ test score of musculoskeletal disorders among the nurses between the control group and experimental group.

Section-III: Analysis and comparison of mean pre test and mean post test score on musculoskeletal disorders among nurses within experimental group.

a) Percentagewise comparison of sample based on their pre test and post test level of musculoskeletal disorders within experimental group.
b) Mean pre test, Mean Posttest, Standard Deviation and paired ‘t’ test score of musculoskeletal disorders among the nurses within experimental group.

Section -IV: Item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

Section-V: Frequency distribution of maintained body mechanism among nurses between control group and experimental group.

Section -VI: Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI, Total years of experience in the nursing service, Present work place).

4.1.1 SECTION-I: Frequency and percentagewise distribution of samples based on their demographic variables

This section deals with the details of analysis about the distribution of samples according to the frequency and percentage. The selected variables are body mass index, year of experience in nursing service, present work place.

Table-4.1: Frequency and percentagewise distribution of samples based on their demographic variables

n_1=15, n_2=15

S.NO	DEMOGRAPHICVARIABLES	CONTROL GROUP		EXPERIMENTAL GROUP	
		(f)	%	(f)	%
I	**Age in years**				
a)	21-30 years	15	100%	14	93%
b)	31-40years	-	0%	1	7%
c)	41-50years	-	0%	0	0%
II	**Gender**				
a)	Male	0	0%	3	20%
b)	Female	15	100%	12	80%
III	**Body Mass Index**				
a)	Under weight	1	7%	0	0%
b)	Normal weight	14	93%	12	80%
c)	Over weight	0	0%	3	20%
d)	Obesity	0	0%	0	0%
IV	**Total year of experience in the nursing service**				
a)	1-4 years	15	100%	11	73%
b)	5-8 years	0	0%	3	20%
c)	9-12 years	0	0%	1	7%
d)	12 years and above	0	0%	0	0%
V	**Present work place**				
a)	Medical ward	11	73%	4	27%
b)	Surgical ward	1	7%	6	40%
c)	Pediatric ward	0	0%	0	0%
d)	Accident and emergency	1	7%	0	0%
e)	Intensive care unit	2	13%	3	20%
f)	Other	0	0%	2	13%

The above table 4.1 shows 30 samples were included in the control group and 15 in the experimental group. In the control group regarding the age 15(100%) samples belongs to 20-31years,0 (0%)samples were in the age group of 31-40 years, 0(0%)sample belongs to age group 41-50years. In the experimental group regarding the age 14(93%) samples in the age group 21-30years, 1(7%) sample belongs to age group 31-40 years, and 0 (0%) sample belongs to 41-50years of age.

In the control group regarding the gender0 (0%) samples were male and 15(100%) samples are female. In the experimental group 3(20%) sample were male, and 12(80%) of samples were female.

Considering BMI in the control group 1(7%)samples belongs to the under weight,14(93%)sample belongs to the Normal weight,0(0%)sample belongs to the over weight,0(0%) sample belongs to the obesity. In experimental group no samples belong to the underweight, 12(80%) samples belong to the normal weight, 3(20%) samples belong to the overweight and no sample belongs to the obesity.

Regarding total years of experience in nursing services among the control group 15(100%) samples belongs to the 1-4years,0(0%)samples belongs to 5-8years, 0(0%)sample belongs to 9-12years,0(0%)sample belongs to the 12 years and above nursing services. In experimental group 11(73%)samples belongs to the 1-4years,3(20%)sample belongs to the 5-8years,1(7%)sample belongs to the 9-12years,0(0%)sample belongs to12 years and above nursing services.

Regarding present work place in control group 11(73%)sample belongs to the medical ward, 1(7%)sample belongs to the surgical ward,0(0%)sample belongs to the pediatric ward,1(7%)sample belongs to the accident and emergency ward,2(13%)sample belongs to the ICU, 1(7%)sample belongs to the other department. In experimental group

4(27%) samples belongs to the medical ward, 6(40%) samples belong to the surgical ward, 0(0%) samples belongs to the pediatric ward, 0(0%) samples belongs to the accident and emergency ward, 3(20%) samples to the belongs to the intensive care unit, 2(13%) of samples belongs to the other department in nursing.

4.1.2: SECTION –II: Analysis and comparison of mean pre test and post test, score on musculoskeletal disorders among the nurses between the control group and experimental group.

This section deals with the analysis of mean pre –test and mean posttest musculoskeletal disorders was measured through the visual analogue pain rating scale.

This is further divided in to following subheading:

a) Percentage wise comparison of sample based on their pre test and post test level of musculoskeletal disorders between control group and experimental group
b) Section Mean pre test, Mean Posttest, Standard Deviation and Un paired 't' test score of musculoskeletal disorders among the nurses between the control group and experimental group**.**

4.1.2: SECTION –II (a) : Percentage wise comparison of sample based on their pre test and post test level of musculoskeletal disorders between control group and experimental group

This section deals with the Percentage wise comparison of sample based on their pre test and post test level of musculoskeletal disorders between control group and experimental group.

Table-4.2 Percentage wise comparison of sample based on their pre test and post test level of musculoskeletal disorders between control group and experimental group

n_1=15, n_2=15

Category of MSDs	Pre test Control group		Pretest experimental Group		Post test control group		Post test experimental group	
	f	%	f	%	F	%	f	%
No	0	0%	0	0%	0	0%	7	47%
Mild	8	53%	4	27%	7	47%	8	53%
Moderate	6	40%	6	40%	6	40%	0	0%
Severe	1	7%	5	33%	2	13%	0	0%
Worse	0	0%	0	0%	0	0%	0	0%
Over all Percentage	100%		100%		100%		100%	

The above table 4.2 shows that frequency percentages of control group 0(0%) sample belongs to no MSDs, 8(53%) sample belongs to mild MSDs, 6(40%)samples belongs to moderate MSDs, 1(7%)samples belongs to severe MSDs and 0(0%) sample belongs to worse MSDs.

In pre test experimental group frequency percentage shows 0(0%) sample belong to no MSDs, 4(27%)sample belongs to mild MSDs, 6(40%) samples belongs to moderate MSDs, 5(33%) sample belongs to severe MSDs, and 0(0%) of sample belongs to worse MSDs.

In control group post test frequency percentages shows 0(0%) sample belongs to no MSDs, 7(47%)sample belongs to mild MSDs, 6(40%)samples belongs to moderate MSDs, 2(13%) samples belongs to severe MSDs and 0(0%) samples belongs to worse MSDs.

In experimental group post test frequency percentages shows 7(47%) sample belong to no MSDs, 8(53%) sample belongs to mild MSDs, 0 (0%) samples belongs to moderate MSDs, 0(0%) sample belong to severe and worse MSDs.

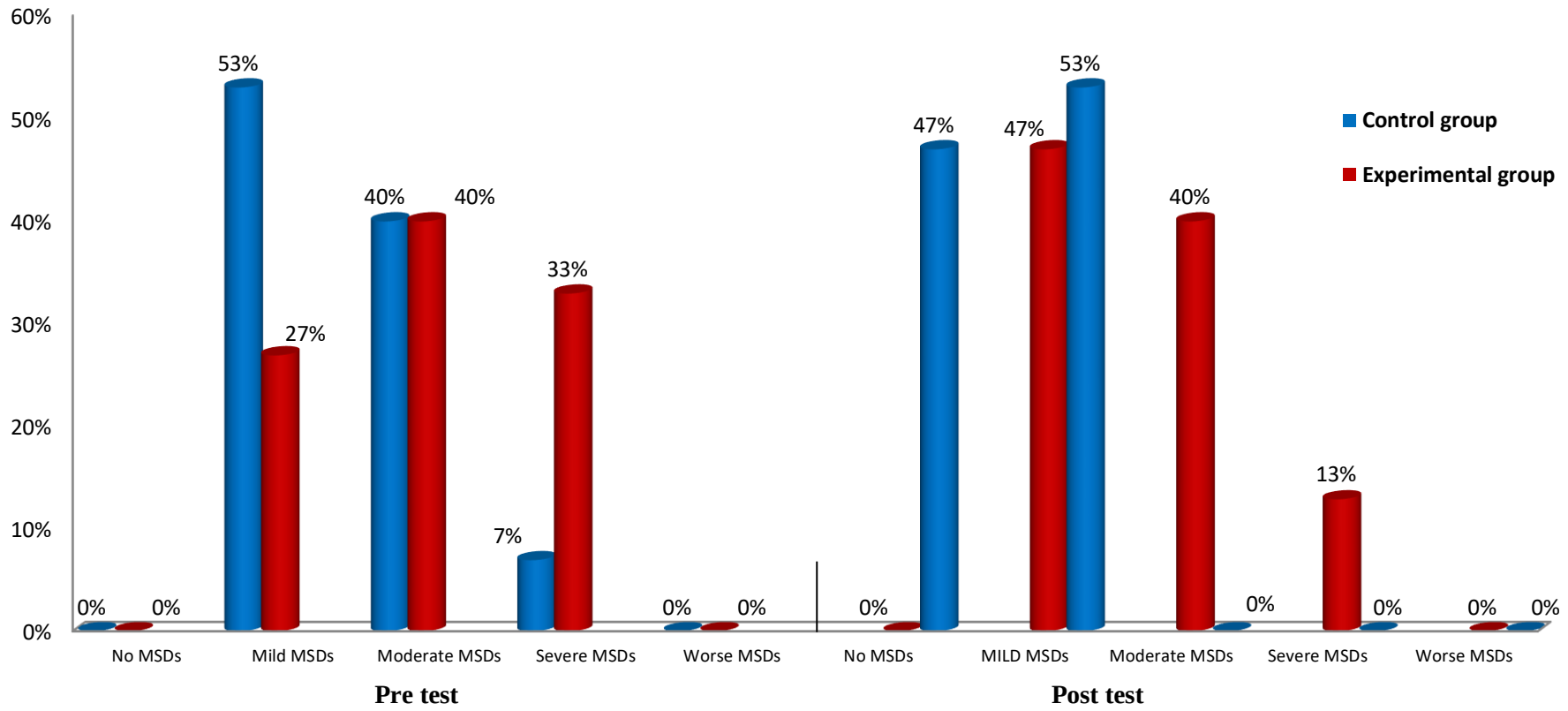

Fig-4.1: Bar diagram shows the mean pre test and mean post test level of MSDs among samples between control group and experimental group

The above bar diagram 4.1 shows that frequency percentages of control group 0(0%) sample belongs to no MSDs, 8(53%) sample belongs to mild MSDs, 6(40%)samples belongs to moderate MSDs, 1(7%)samples belongs to severe MSDs and 0(0%) sample belongs to worse MSDs.

In pre test experimental group frequency percentage shows 0(0%) sample belong to no MSDs, 4(27%)sample belongs to mild MSDs, 6(40%) samples belongs to moderate MSDs, 5(33%) sample belongs to severe MSDs, and 0(0%) of sample belongs to worse MSDs.

In control group post test frequency percentages shows 0(0%) sample belongs to no MSDs, 7(47%)sample belongs to mild MSDs, 6(40%)samples belongs to moderate MSDs, 2(13%) samples belongs to severe MSDs and 0(0%) samples belongs to worse MSDs.

In experimental group post test frequency percentages shows 7(47%) sample belong to no MSDs, 8(53%) sample belongs to mild MSDs, 0 (0%) samples belongs to moderate MSDs, 0(0%) sample belong to severe and worse MSDs.

4.1.2: SECTION –II (b): Mean pre test, Mean Posttest, Standard Deviation and Un paired 't' test score of musculoskeletal disorders among the nurses between the control group and experimental group.

This section deals with the Mean pre test, Mean Posttest, Standard Deviation and Un paired 't' test score of musculoskeletal disorders among the nurses between the control group and experimental group. Hypotheses was analyzed to know the significant at $p<0.05$ level.

Alternate hypothesis H_1: There is a significant difference between mean pre test and mean post test score on musculoskeletal disorders among the nurses between control group and experimental group.

To test hypothesis H_1 the following null hypothesis $H_{0(1)}$ was formulated

Statistical hypothesis $H_{0(1)}$: There is a no significant difference between mean pre test and mean post test score on musculoskeletal disorders among the nurses between control group and experimental group.

Table 4.3: Mean pre test, Mean Posttest, Standard Deviation and Un paired 't' test score of musculoskeletal disorders among the nurses between the control group and experimental group.

n_1=15, n_2=15

Group	Control group		Experimental group		df	Unpaired 't' value
	Mean	SD	Mean	SD		
Pre test	40	776	54	551	18	2.76*
Post test	42	543	18	240		

*significant at P<0.05 , t_{18} = 2.101

The above table 4.3 shows data regarding mean, standard deviation and unpaired 't' value among samples .The table also shows that there are only two assessments in both pre test and post test score of control group and experimental group.

The mean pre test control group score was 40 and experimental group score was 54. The unpaired 't' value among samples in pre test 1.22(t_{18} =2.101) at df =18 (P<0.05 level of significance). Since the mean pre test level of MSDs between control group and experimental group score is less than the table value .So the alternate hypothesis $H_1$was rejected.

In mean post test control group mean score was 42 and experimental group mean score was 18.The unpaired 't' value among samples are 2.76(t_{18} =2.101) at df =18 (P<0.05 level of significance). Since the mean post test level of MSDs between control group and experimental group

score is higher than the table value. So the alternate hypothesis $H_1$was accepted and null hypothesis $H_{0(1)}$ was rejected

The following table reveals the result obtained to examine the effectiveness of exercise and body mechanism to reduce the musculoskeletal disorders among nurses in selected hospital.

4.1.3: Section-III: Analysis and comparison of mean pre test and mean post test score on musculoskeletal disorders in nurses with in experimental group.

This section deals with the Analysis and comparison of mean pre test and mean post test score on musculoskeletal disorders in nurses with in experimental group.

This is further divided in to following subheading,

a) Percentage wise comparison of sample based on their pre test and post test level of musculoskeletal disorders with in experimental group.
b) Mean pre test, Mean Posttest, Standard Deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group.

4.1.3: Section-III(a): Percentage wise comparison of sample based on their pre test and posttest level of musculoskeletal disorders with in experimental group.

This section deals with the Percentage wise comparison of sample based on their pre test and posttest level of musculoskeletal disorders with in experimental group.

Table 4.4: Percentage wise comparison of sample based on their pre test and posttest level of musculoskeletal disorders with in experimental group.

n_2=15

Category of MSDs	Pre test Experimental Group		Post test Experimental Group	
	f	**%**	**F**	**%**
No	0	0%	7	47%
Mild	4	27%	8	53%
Moderate	6	40%	0	0%
Severe	5	33%	0	0%
Worse	0	0%	0	0%
Over all percentages		100%		100%

The above table 4.4 **s**hows that pre test experimental group score was 0(0%) samples belongs to no MSDs, 4(27%) sample belongs to mild MSDs, and 6 (40%) sample belongs to moderate MSDs, 5 (33%) sample in worse MSDs.

In experimental group post test score 7(47%) sample belongs to no MSDs, 8(53%) sample belongs to mild MSDs, 0(0%) sample belongs to moderate MSDs, 0(0%) sample in worse MSDs.

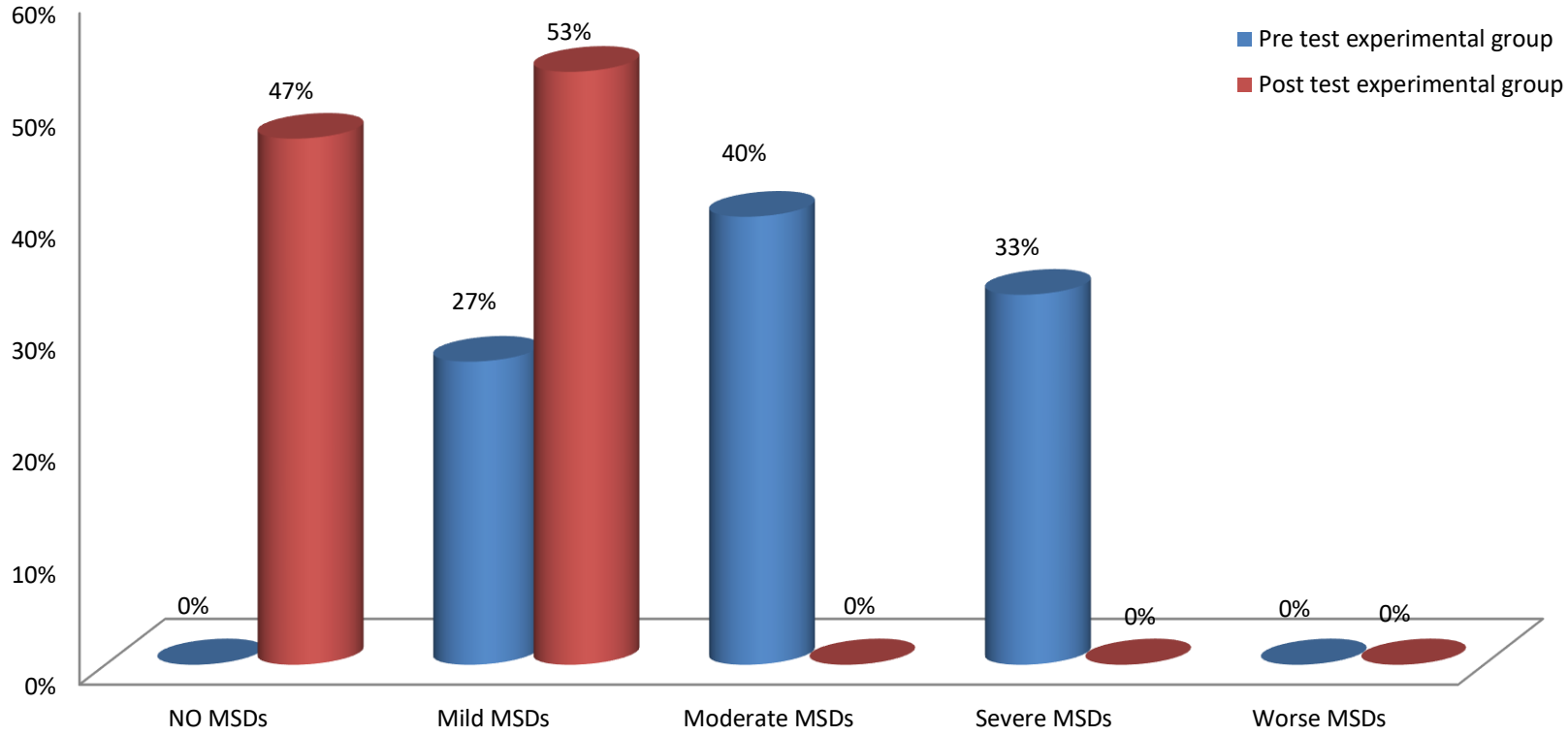

Fig4.2: Bar diagram shows the comparison of pretest and posttest percentage level of MSDs among Samples

The above bar diagram 4.2 shows that pre test experimental group score was 0(0%) samples belongs to no MSDs, 4(27%) sample belongs to mild MSDs, and 6 (40%) sample belongs to moderate MSDs, 5 (33%) sample in worse MSDs.

In experimental group post test score 7(47%) sample belongs to no MSDs, 8(53%) sample belongs to mild MSDs, 0(0%) sample belongs to moderate MSDs, 0(0%) sample in worse MSDs.

4.1.3: Section-III (b): Mean pre test, Mean Posttest, Standard Deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group.

This section deals with the Mean pre test, Mean Posttest, Standard Deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group. Hypotheses was analyzed to know the significance at $p<0.05$ level.

Alternative hypothesis:

H_2: There is significant difference in mean pre test and mean post test scores on musculoskeletal disorders among the nurses with in experimental group.

To test hypothesis H_2 the following null hypothesis $H_{0(2)}$ was formulated

Null hypothesis:

$H_{0(2)}$: There is no significant difference in mean pre test and mean post test scores on musculoskeletal disorders among the nurses with in experimental group.

Table-4.5 Mean pre test, Mean Posttest, Standard Deviation and paired 't' test score of musculoskeletal disorders among the nurses with in experimental group.

n_1=15,n_2=15

Group	Pre test and Post test score on experimental group		df	Paired 't' value
	Mean	SD		
Pre test	54	551	9	6.27*
Post test	18	240		

*Level of significant at P<0.05; t_9=1.833

The above table 4.5 shows the data regarding pretest and posttest mean difference, standard deviation and paired 't' value among samples within the experimental group.

The mean pre test experimental group score was 54and post test experimental group score was 18. The paired 't' value among samples are 6.27*(t_9=1.833) at df =9 (P<0.05 level of significance). Since the mean pre test and post test level of MSDs with in experimental group score is higher than the table value. So the alternate hypothesis $H_2$was accepted.

There is significant difference in mean pre test and mean post test scores on musculoskeletal disorders among the nurses with in experimental group so $\mathbf{H_{0(2)}}$ may be rejected.

4.1.4 Section-IV: Item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

This section deals with the item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

Table 4.6 : Item wise comparison of sample based on their post test level of musculoskeletal disorders between the control group and experimental group.

n_2=15, n_2=15

Area of MSDs	LEVELS OF MSDs									
	Control group					Experimental group				
	No	Mild	Moderate	Severe	Worse	No	Mild	Moderate	Severe	Worse
Neck	93%	7%	-	-	-	100%	-	-	-	-
Shoulder	87%	13%	-	-	-	93%	7%	-	-	-
Elbow	100%	-	-	-	-	93%	7%	-	-	-
Wrist	93%	7%	-	-	-	100%	-	-	-	-
Upper back	59%	27%	7%	7%	-	87%	13%	-	-	-
Lower back	53%	20%	7%	20%	-	67%	33%	-	-	-
Hip	53%	27%	13%	7%	-	87%	13%	-	-	-
Thigh	73%	20%	7%	-	-	100%	-	-	-	-
Knee	54%	33%	13%	-	-	87%	13%	-	-	-
Ankle	80%	20%	-	-	-	100%	-	-	-	-

The above table 4.6 shows that result in individual area wise musculoskeletal pain in post test control group having 1(90%) sample belongs to sever pain in neck, 2(13%) sample belongs to mild pain in shoulder,0(0%) sample belongs to no pain in elbow, 1(7%) sample belongs to mild pain in wrist, 4(27%) sample belongs to mild pain in upper back,1(7%) samples belongs to moderate pain in upper back,1(7%) sample belongs to severe pain in upper back, 3(20%)samples belongs to mild pain in lower back, 1(7%) sample belongs to moderate pain in lower back, 3(20%) samples belongs to severe pain in lower back, 4(27%) sample belongs to mild pain in hip,2(13%) samples belongs to moderate pain in hip, 1(7%) sample belongs to severe pain in hip, 3(20%) sample belongs to mild pain in thigh, 1(7%) sample belongs to severe pain, 5(33%) samples belongs to mild pain in knee, 2(13%) samples belongs to moderate pain in knee,3(20%)samples belongs to mild pain in ankle.

In post test experimental group shows that result in individual area wise musculoskeletal disorders, 15(100%) belongs to no pain in neck, 14(93%) samples belongs to the no pain in shoulder, 1(7%) sample belongs to mild pain in shoulder, 15(100%) samples belongs to no pain in wrist, 2(13%) samples belongs to the mild pain in upper back, 13(87%) samples belongs to no pain in upper back, 5(33%) samples belongs to mild pain in lower back, 10(67%) samples belongs to no pain in lower back, 2(13%) samples belongs to mild pain in hip, 13(87%) samples belongs to no pain in hip, 15(100%) samples belongs to no pain in thigh, 2(13%) samples belongs to mild pain in knee, 15(100%) samples belongs to no pain in ankle.

4.1.5 SECTION–V: Frequency distribution of maintained body mechanism among nurses between control group and experimental group.

This section deals with the body mechanisms maintained by the nurses were observed by the researcher with the help of likert's three point rating scale (observational check list) by researcher. Three observations were made for 30 samples and described below.

TABLE-4.7: FREQUENCY DISTRIBUTION OF MAINTAINED BODY MECHANISM AMONG NURSES BETWEEN CONTROL GROUP AND EXPERIMENTAL GROUP

n_1=15, n_2=15

Pre test frequency distribution of body mechanism				**Post test frequency distribution of body mechanism**								
GROUP	**PRE TEST**			**DAY-7**			**DAY-15**			**DAY-30**		
	Never	Some time	Always	Never	Some time	Always	Never	Some time	Always	Never	Some time	Always
Control group	15	0	0	15	0	0	15	0	0	15	0	0
Experimental group	12	3	0	4	1	10	0	6	9	1	4	10

The above table 4.7 shows frequency of body mechanism maintained by samples in pre test control groups 15 samples never maintained body mechanism, in experimental group 12 samples never maintained body mechanism, 3 samples some time maintained body mechanism.

In 7th day observation in control group all the samples (15) never maintained body mechanism, in experimental group 4 samples never maintained body mechanism, 1 sample some time maintained body mechanism, 10 samples always maintained body mechanism.

In 15th day observation in control group all the samples (15) never maintained body mechanism, in experimental group 6 samples some time maintained body mechanism, 9 samples always maintained body mechanism.

In 30th day observation is conservation as a post-test in control group all the samples (15) never maintained body mechanism, in experimental group 1 sample never maintained body mechanism, 4 samples some time maintained body mechanism, 10 samples always maintained body mechanism.

The researcher felt that improper body mechanism may be the precipitating factor for inducing the musculoskeletal disorders.

4.1.6: Section-VI: Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI, Total years of experience in nursing service, Present work place)

This section deals with association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI, Total year of experience in nursing service, Present work place)

This is further divided in to following subheading:

a) Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their Body Mass Index.

b) Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their total year of experience in nursing service

c) Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their Present work place.

4.1.6: Section-VI: a) Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their Body Mass Index.

This section shows the chi-square values of demographic variables BMI. And also the researcher hypotheses were analyzed to the level of significance at $P < 0.05$.

Alternate hypothesis H_3 There will be significant association between the mean pre test score of MSDS among samples with their Body mass index.

To test the alternate hypothesis $H_{3(a)}$, statistical hypothesis $H_{0(3)(a)}$ was formulated.

Null hypothesis:

$H_{0(3)}$ There is no significant association between the mean pre test score of musculoskeletal disorders among samples of experimental group with their Body mass index.

Table-4.8: Chi-square value of Body Mass Index with the mean pre test score of musculoskeletal disorders among samples of Experimental group

n_2=15

S.No	Demographic variable	Staff nurses with MSDs			df	Chi square value
		Mild	Moderate	Severe		
1.	Under weight	0	0	0	6	3.913Ns
2.	Normal weight	2	5	5		
3.	Over weight	2	1	0		
4.	Obesity	0	0	0		

Level of significant at P <0.05, NS-not significant

The above table describes the chi-square value among the nurses with MSDs. Among Underweight no any sample, Normal weight 2 sample with mild MSDs, 5 samples normal weight with moderate MSDs,5 samples normal weight with severe MSDs,2 samples Over weight with mild MSDs, 1 samples over weight with moderate MSDs.

The calculated chi square value was 3.913 (d.f=9), P value at 0.05 level and the table value was12.6.Since 'P' value was higher than calculated value, statistical hypothesis $H_{0(3)(a)}$ was accepted. So there is no association between the BMI of sample with the MSDs.

Section-VI(b): Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their total years of experience in the nursing services.

This section shows the chi-square values of demographic variable total years of experience in nursing services. And also the researcher hypotheses were analyzed to the significance at P < 0.05 level.

Alternate hypothesis H_3: There will be significant association between the mean pre test score of MSDS among samples with their years of experience in nursing services.

To test the alternate hypothesis $H_{3(b)}$, statistical hypothesis $H_{0(3)(b)}$ was formulated.

Null hypothesis $H_{0(3)(b)}$:

$H_{0(3)(b)}$ There is no significant association between the mean pre test score of musculoskeletal disorders among samples of experimental group with their years of experience in nursing services.

Table-4.9: Chi-square value of years of experience in nursing services with the mean pre test score of musculoskeletal disorders among samples of Experimental group.

n_2=15

S.No	Demographic variable	Staff nurses with MSDs			df	Chi square value
		Mild	Moderate	Severe		
1.	1-4 years	3	3	5	6	8.326Ns
2.	5-8 years	0	3	0		
3.	9-12 years	1	0	0		
4.	12years	0	0	0		

Levels of significant at P <0.05, NS not significant

The above table 4.9 describes the chi-square values among the staff nurses with MSDs. Among 1-4 years of experience 3 samples with mild pain, 3 samples have moderate pain, 5 samples have the severe pain. Among 5-8 years of experience 0 samples have mild MSDs, 3 samples have moderate MSDs, no samples belongs to severe MSDs. Among 9-12 years of experience 1 sample belongs to mild MSDs.

The calculated chi square value was 8.326 (df=6), at P < 0.05 level and the table value was12.6.Since 'P' value was higher than calculated value, statistical hypothesis $Ho_{2\,(b)}$ was accepted. So there is no association between the total years of nursing services among the sample with the MSDs.

Section-VI(c): Association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their present work place.

This section shows the chi-square values of demographic variable with their present work place. And also the researcher hypotheses were analyzed to the significance at P < 0.05 level.

Alternate hypothesis H_3 There will be significant association between the mean pre test score of MSDS among samples with their present work place.

To test the alternate hypothesis $H_{3(c)}$, statistical hypothesis $H_{03(b)}$ was formulated.

Null hypothesis $H_{0(3)(a)}$:

$H_{0(3)(c)}$ There is no significant association between the mean pre test score of musculoskeletal disorders among samples of experimental group with their present work place.

Table-4.10: Chi-square value of present work place with the mean pre test score of musculoskeletal disorders among samples of Experimental group.

n_2=15

S.No	Demographic variable	Staff nurses with MSDs			df	Chi square value
		Mild	Moderate	Severe		
1.	Medical ward	4	0	0	6	30.13*
2.	Surgical ward	0	6	0		
3.	ICU	0	0	3		
4.	Other	0	0	2		

* Levels of significant at P<0.05

The above table 4.10 describe the chi-square values among the staff nurses with MSDs. Among 4 samples belongs to medical wad with mild MSDs, 6 samples belongs to surgical ward with moderate MSDs. 3 samples belongs to work in ICU with severe MSDs, 2 samples work in other department with severe MSDs.

The calculated chi square value was 30.13* (df=6), at P<0.05 level and the table value was12.6.Since 'P' value was lower than calculated value, statistical hypothesis $H_{0(2)(b)}$ was rejected. So there is association between the present work place in sample with the MSDs.

SUMMARY

This chapter dealt with the analysis and interpretation of data collected through self reporting checklist and observational check list .The pre test and post test assessed by the pain scale in control group and experimental group. Each objective and research hypothesis was tested by inferential statistics. It was referred that there was significant difference in the score of MSDs and no significant association of any demographic variable.

CHAPTER V

DISCUSSION

The aim of the study was to assess the effectiveness of exercise and body mechanism to reduce musculoskeletal disorders among staff nurses between control group and experimental group in selected hospital at Salem.

5.1 Objective-1: To prepare and validate the exercise and body mechanism to reduce musculoskeletal disorders among nurses with in experimental group.

The researcher practiced the exercise program and which was obtained from physical therapist and prepared booklet for teaching. After pre test on 2nd day planned nursing intervention was started for nurses in two groups, first group 7 samples, second group 8 samples participated in this demonstration. They were interestingly participated and done the return demonstration about exercise for and body mechanism.

The tool was developed on the information collected from review of literature, suggestion and recommendation from experts. The content validity of the demographic data and visual analogue pain scale, likert's three point scale to assess the body mechanism among staff nurses this obtaining expert opinion (three nursing experts and one physical therapist, one medical expert).100% of acceptance was given to all items in all tool and there were no modification.

This result was supported by the following study,

Ewer. T., et.al., (2009) did a study to compare general physical exercise program and multimodal, secondary prevention program to relieve

the musculoskeletal disorders among the nurses. Sample size was 235 and was concluded that general physical exercise and postural maintenance program proved to be superior then multimodal program to relive musculoskeletal disorders.

5.2 Objective-2: To assess and compare the mean pretest and mean post test score on musculoskeletal disorder among the nurses between control group and experimental group.

In this study, exercise and body mechanism were taught to the samples with musculoskeletal disorders shows that frequency percentages of control group 0(0%) sample belongs to no MSDs, 8(53%) sample belongs to mild MSDs, 6(40%)samples belongs to moderate MSDs, 1(7%)samples belongs to severe MSDs, and 0(0%) sample belongs to worse MSDs. In pre test experimental group frequency percentage shows 0(0%) sample belong to no MSDs, 4(27%)sample belongs to mild MSDs, 6(40%) samples belongs to moderate MSDs, 5(33%) sample belongs to severe MSDs, and 0(0%) of sample belongs to worse MSDs. In control group post test frequency percentages shows 0(0%) sample belongs to no MSDs, 7(47%)sample belongs to mild MSDs, 6(40%)samples belongs to moderate MSDs, 2(13%) samples belongs to severe MSDs, and 0(0%) samples belongs to worse MSDs.

In experimental group post test frequency percentages shows 7(47%) sample belong to no MSDs, 8(53%) sample belongs to mild MSDs, 0 (0%) samples belongs to moderate MSDs, and 0(0%) sample belong to severe and worse MSDs. The unpaired ‘t’ value among samples in pre test 1.22(t_{18} =2.101) at df =18 (P<0.05 level of mean pre test control group score was 40 and mean experimental group score was 54. There was

no significance). Since the mean pre test level of MSDs between control group and experimental group score is less than the table value .So the alternate hypothesis H1was rejected. In mean post test control group score was 42 and experimental group score was 18. The unpaired 't'value among samples are 2.76(t_{18} =2.101) at df =18 (P<0.05 level of significance). Since the mean post test level of MSDs between control group and experimental group score is higher than the table value. So the alternate hypothesis H1was accepted.

Ninna Dufour et al(2010), did comparative study to find the effectiveness of 2 active therapies, group-Based Multidisciplinary Biopsychosocial Rehabilitation and Intensive Individual Therapist-Assisted Back Muscle Strengthening Exercise) in chronic low back pain, the design used for the study was stratified randomized single-blinded clinical trial. The sample size was 286 who have low back pain. It was a program for 12 weeks and each patient was exposed to various activities which consisted physical therapy, occupational therapy and education for 12 hours in total. The result showed that there was improvement in exercise and decreased pain level.

5.3 Objective-3: To assess and compare the mean pretest and mean posttest score on musculoskeletal disorder among the nurses with in experimental group.

In this study pretest experimental group score was 0(0%) samples belongs to no MSDs, 4(27%) sample belongs to mild MSDs, 6(40%) sample belongs to moderate MSDs, and 5(33%) sample in worse MSDs. In experimental group post test score 7(47%) sample belongs to no MSDs, 8(53%) sample belongs to mild MSDs, 0(0%) sample belongs to moderate MSDs, 0(0%) sample in worse MSDs.

Hayden.et.al.,(2005), conducted a systemic review to find the effectiveness of exercise therapy in adult with nonspecific acute, sub-acute and chronic low back pain and compare exercise therapy with no treatment and concluded that exercise proved to be effective in reducing the musculoskeletal disorders without no treatment or any alternative.

5.4 Objective-4: To assess the maintenance of body mechanism among the nurses between control group and experimental group.

In this study researcher observed the maintenance of body mechanism among 30 samples, the researcher found those control groups never maintain the body mechanism. In experimental group 1(7%),sample never maintain the body mechanism in third observation , 4(27%)samples maintain body mechanism in some times in third observation,10(67%) samples of experimental group maintain body mechanism in always in third observation. The researcher felt that improper body mechanism may be the precipitating factor for inducing the musculoskeletal disorders.

Asha K. Thomas (2011), conducted a study o musculoskeletal disorders especially back pain occurs in females mostly among adult girls mainly due to day activity and poor posture. The pre experimental study was conducted by using one group pretest posttest research design in selected nursing hostel at Salem. Result shows in the study pre test score of samples before strengthening exercise was 5.50 and the mean posttest level of low back pain among the samples after the practice of back strengthening exercise was 0.03. There is no association with demographic variables such age and class.

5.5 Objective-5: To find association between the pretest score on musculoskeletal disorder among the nurses of experimental group with their selected demographic variable. (BMI, Experience, present work place)

In this study association was analyzed by using chi square between pre test score musculoskeletal disorders among the nurses of experimental group with their selected demographic variable.

The findings shows that there is significant association was found between the pretest score on musculoskeletal disorder among the nurses of experimental group with their present work place p value=30.13* significant table value 12.6 at $p<0.05$ level.

SUMMARY

This chapter dealt with the discussion of the researcher findings with supportive study based on each objective.

CHAPTER VI

SUMMARY, MAJOR FINDINGS, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

This chapter is divided into two sections. In the first section the summary of the study, findings and conclusion are presented. In this second section the implication is highlighted in various areas of nursing practice, nursing education, nursing administration, nursing research, limitation, suggestion and recommendation of further study is presented.

6.1 SUMMARY OF THE STUDY

The objective of the study is to evaluate the effectiveness of exercise and body mechanism to reduce the musculoskeletal disorders among nurses in selected hospital at Salem.

Gate control theory of pain was selected as conceptual framework to assess and effectiveness of exercise and body mechanism to reduce the musculoskeletal disorders among staff nurses. An evaluate approach, a quasi experimental pretest and post test with control group design was used for the study. The samples were selected by non-probability purposive sampling technique. The total samples were 30, 15 in control group, 15 in experimental group.

The tool selected for the present study was likert's three point rating scale to assess the body mechanism among the nurses, demographic variables, and visual analogue pain rating scale to assess the intensity of musculoskeletal pain.

The tools were validated by 5 experts. The reliability of the tool was established by using the formula of test -retest method for self report check

list, reliability of the tool I Demographical variable was 1 and the reliability of tool II was 0.98. Reliability of the tool –III was 0.98. The pilot study was conducted with 6 samples, 3 in control group, 3 in experimental group in Gopi Hospital Salem.

Data collection was started from 05.04.16 to 04.05.16 at Shanmuga Hospital, Salem. Initially the researcher got written permission after explaining the procedure and purpose of the study. By using non probability purposive sampling technique 30 samples were selected. Among them 15 samples were selected as a control group, 15 samples were selected for experimental group. The researcher introduced to the samples and explain the purpose of the study. Informed written consent was obtained from the samples. Data collection was done first for the control group then for the experimental group. The data was collected between 12 pm to 3 pm, duration of data collection was 4 weeks. The samples selected under inclusive criteria nurses working in Shamuga Hospital, The tool was given to 50 samples and 30 samples only had musculoskeletal disorders were selected for the study, and among the 30 samples were segregated as 15 control and 15 experimental group. The pretest was done for 30 samples on day-I. On the second day planned nursing intervention on exercise and body mechanism and taught to experimental group. The experimental group was divided in two group's 7in one group, 8 in another group and exercise and body mechanism was demonstrated to the groups separately for two hours. Followed by the researcher made 3 observation for the study, day 7^{th} was the first observation, day 15^{th} was the second observation and the first two observations are considered as follow-ups. Third observation of 30^{th}day was considered for posttest.

Finally, the collected data were analyzed by using descriptive and inferential statistics to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce musculoskeletal disorders among nurses and also the data was interpreted based on objectives and hypothesis of the study.

6.2 MAJOR FINDINGS OF THE STUDY

6.2.1 Demographic variables:

In the control group regarding the age 15(100%) samples belongs to 20-31years,0 (0%)samples were in the age group of 31-40 years, 0(0%)sample belongs to age group 41-50years. In the experimental group regarding the age 14 (93%) samples in the age group 21-30years, 1 (7%) sample belongs to age group 31-40 years and 0 (0%) samples belongs to 41-50years of age.

In the control group regarding the gender0 (0%) samples were male and 15(100%) samples are female. In the experimental group regarding 3(20%) sample were male, and 12(80%) of samples were female.

In the control group 1(7%) samples belongs to the underweight, 14(93%) sample belongs to the Normal weight,0(0%)sample belongs to the over weight,0(0%) sample belongs to the obesity. In experimental group no sample belongs to the underweight, 12(80%) samples belong to the normal weight, 3(20%) samples belong to the overweight, 0 (0%) samples belong to the obesity.

Regarding total years of experience in nursing services among the control group 15(100%) samples belongs to the 1-4years,0(0%)samples belongs to 5-8years, 0(0%)sample belongs to 9-12years,0(0%)sample belongs to the 12 years and above nursing services. In experimental group 11(73%)samples belongs to the 1-4years,3(20%)sample belongs to the

5-8years,1(7%)sample belongs to the 9-12years,0(0%)sample belongs to12 years and above nursing services.

Regarding present work place in control group 11(73%)sample belongs to the medical ward, 1(7%)sample belongs to the surgical ward,0(0%)sample belongs to the pediatric ward,1(7%)sample belongs to the accident and emergency ward,2(13%)sample belongs to the ICU, 1(7%)sample belongs to the other department. In experimental group 4(27%) samples belongs to the medical ward, 6(40%) samples belong to the surgical ward, 0(0%) samples belongs to the pediatric ward, 0(0%) samples belongs to the accident and emergency ward, 3(20%) samples to the belongs to the intensive care unit, 2(13%) of samples belongs to the other department in nursing.

6.2.2 Findings related to effectiveness of planned nursing intervention of exercise to reduce the musculoskeletal disorders among samples:

The overall mean post-test practice score percentage in control group was 100% of samples having that MSDs and it is decreased MSDs level in experimental group 53%. In post-test with $t_{30}=2.76^{*}$, which is more than the table value of $p<0.05$ level of significance.

6.2.3 Likert's three point rating scale to assess the body mechanism among nurses

The control group analysis shows that:

- 100% of the samples were never maintaining the body mechanism.

In experimental group analysis shows that:

- 7% of the samples never maintain the body mechanism.
- 27% of the samples some time maintain the body mechanism.
- 67% of the samples always maintain the body mechanism.

6.2.4 Finding related to association and their selected demographic variables:

1. There was no significant association between the mean pre test score on musculoskeletal disorders among the nurses of experimental group with their Body Mass Index. (χ^2=3.913<table value 12.6) at P< 0.05 level)
2. There was no significant association between the mean pre test score on musculoskeletal disorders among the nurses of experimental group with their years of experience in nursing services. (χ^2=8.326<table value 12.6) at P< 0.05 level)
3. There was significant association between the mean pre test score on musculoskeletal disorders among the nurses of experimental group with their present workplace. (χ^2=30.13*<table value 12.6) at P< 0.05 level)

6.3 IMPLICATION

The findings of the study have implication in various areas of nursing practice, nursing education, nursing administration, and nursing research.

6.3.1 Nursing practice:

The most important role of the nurses is to provide awareness to the nurses regarding musculoskeletal disorders and importance of exercise and correct body mechanism to relive the musculoskeletal disorders.

MSDs are common as the nurses spend most of times in the bed side, without exercise and proper body mechanism. Awareness regarding MSDs and the importance of exercise and maintain a correct postures is very useful for the staff nurses as it help them to bring to practice there by

reducing the risk of getting MSDs. Showing this kind of intervention can be helpful to have self motivation among the nurses.

6.3.2 Nursing Education:

The nursing curriculum should emphasize on imparting health information to the staff nurses regarding exercise performance and proper postural maintenance to prevent the risk of MSDs. The practice of exercise will increase the muscle strengthening and MSDs will be relieved.

6.3.3 Nursing Administration:

Nursing administrator should take initiation in providing education to staff nurses about maintenance of correct body mechanism. Nursing administrator should plan and organize exercise class for the nursing student and staff nurses and encourages them to implement in the hospital setup. Planning for such a program require efficient team work between the faculties and the staff nurses thereby reducing the sick leave by staff due to musculoskeletal disorders.

6.3.4 Nursing Researcher:

Research is a foundation for an evidence based nursing practice. So nursing personnel and student, hospital staffs to should be encouraged to conduct research studies regarding MSDs in the hospital setting with both experimental and control group and also regarding various other exercises. Also new research methods, and its quality simplicity cost effectiveness is needed.

6.4 RECOMMENDATIONS

1. A similar study can be conducted in different occupational setting for MSDs.
2. A comparative study can be conducted on large samples in different settings.
3. A study can be replicated to a large sample for generalization.
4. A comparative study can be conducted in the student nurses and staff nurses in hospital.
5. A comparative study can be conducted in ward staff and ICU staff in same hospital.

6.5 LIMITATIONS

1. The study was limited to only qualified nurses within one year experience with musculoskeletal disorders.
2. The study was limited to selected hospital in Salem.
3. The study limited to 30 samples in Shanmuga Hospital only.

6.6 CONCLUSION

The present study indicated that exercise and body mechanism to reduce the musculoskeletal disorders among staff nurses. Awareness of staff nurse about exercise and body mechanism helps to prevent the occupational related MSDs.

SUMMARY

This chapter dealt with Summary, implication, recommendation, limitation and conclusion of the study.

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ANNEXURE- I-A

LETTER SEEKING PERMISSION TO CONDUCT RESEARCH STUDY

From

Mr.Vinoth Kumar .P,
II-Year M.sc.(N) student,
Shanmuga College of Nursing,
24,Saradha College Road ,
Salem-636 007.

To The chairman,
Shanmuga Hospital,
Salem-636 007.

Through

The Principal,
Shanmuga College of Nursing,
24,Saratha College Road ,
Salem -636 007.

Respected Madam/Sir

Sub: Request for permission to conduct research study-Reg.

I,Mr.Vinoth Kumar.P II year M.Sc.(N), Shanmuga College of Nursing, Salem as a partial fulfillment of M.Sc.(N) Programme . I have under taken the following research study ,which has to be submitted to the Dr.M.G.R. Medical university, Chennai.

STATEMENT OF THE PROBLEM

" A Study to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce musculoskeletal disorders among nurses in selected hospital at salem".

So I kindly request you to permit to conduct the research study in our hospital and provide necessary facilities and I plan the data collection period for 6 weeks. Hereby I am stating, my presence will not interfere the hospital routine ,Please do the needful.

Yours faithfully,

P.Vinoth Kumar

Place: Salem-7

Date: 17/3/16

PRINCIPAL
SHANMUGA COLLEGE OF NURSING
24, SARADHA COLLEGE ROAD
SALEM-636 007

18/3/16

ANNEXURE I-B

LETTER SEEKING PERMISSION TO CONDUCT RESEARCH STUDY

From

Mr.Vinoth Kumar .P,
II-Year M.sc.(N) student,
Shanmuga College of Nursing,
24,Saradha College Road ,
Salem-636 007.

To The chairman,
Gopi Hospital,
Salem-636 007.

Through

The Principal,
Shanmuga College of Nursing,
24,Saratha College Road ,
Salem -636 007.

Respected Madam/Sir

Sub: Request for permission to conduct research study-Reg.

I,Mr.Vinoth Kumar.P II year M.Sc.(N), Shanmuga College of Nursing, Salem as a partial fulfillment of M.Sc.(N) Programme . I have under taken the following research study ,which has to be submitted to the Dr.M.G.R. Medical university, Chennai.

STATEMENT OF THE PROBLEM

" A Study to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce musculoskeletal disorders among nurses in selected hospital at salem".

So I kindly request you to permit to conduct the research study in our hospital and provide necessary facilities and I plan the data collection period for 6 weeks. Hereby I am stating, my presence will not interfere the hospital routine ,Please do the needful.

Yours faithfully,

P.Vinoth Kumar

Place: Salem-7

Date:

PRINCIPAL
SHANMUGA COLLEGE OF NURSING
24, SARADHA COLLEGE ROAD
SALEM - 636 007

Salem Gopi Hospitals Pvt. Ltd.,
Salem-7.

ANNEXURE - II

LETTER SEEKING PERMISSION ON CONTENT VALIDITY OF TOOL AND INDEPENDENT VARIABLE

From

Mr. Vinoth Kumar. P
II Year M.Sc (N) student,
Shanmuga College of Nursing,
24 - Saradha College Road, Salem – 7.

To
Through

The Principal,
Shanmuga College of Nursing,
24 - Saradha College Road, Salem – 7.

Respected Madam/Sir,

Sub : Expert opinion on content validity of the tool

I Mr. VinothKumar.P II year M.Sc (N), Shanmuga college of nursing, Salem as a partial fulfillment of M.Sc (N) Programme. I have under taken the following research study, which has to be submitted to The Tamil Nadu Dr.M.G.R. Medical university, Chennai. I am conducting **"A Study to evaluate the effectiveness of planned nursing intervention on exercise and body mechanism to reduce musculoskeletal disorders among nurses in selected hospital at Salem".**

So I humbly request you to kindly sign the certificate stating that you have validated the tool.

Your kind co-operation and your judgment will be very much appreciated.

Thanking you in anticipation,

Your's faithfully,

P. Vinoth Kumar

Place :

Date :

Enclosures :

1. Statement of the problem and objectives
2. Tools
3. Independent variables
4. Evaluation criteria for content validity of tools and independent variables
5. Content validity certificates

ANNEXURE - III

LIST OF EXPERT WHO VALIDATED THE TOOL

1. **Dr. R. Murugavel, MS,**

   Medical Superintendent,

   Shanmuga Hospital,

   Salem-7.

2. **Dr. S. Mathana Gopalan, B.P.T.,**

   Consultant physiotherapist

   Udhaya physiotherapy Center,

   Valappadi.

3. **Mrs. Geetha M.Sc (N),**

   Principal Vivekanandha Nursing College,

   Sankagri.

4. **Mrs. Neela M.Sc (N),**

   Vice-Principal,

   Swami Vivekanandha College of Nursing

   Dharmapuri.

5. **Mrs. Ruckmani M.Sc (N),**

   Associate Professor,

   Aravind College of Nursing,

   Namakkal.

ANNEXURE - IV

EVALUATION CRITERIA FOR VALIDITY OF TOOLS

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

TOOL - I

I DEMOGRAPHIC VARIABLE OF THE SAMPLES

S. No	Items	Levels of acceptance		Remarks
		% of Agree	% of Disagree	
1.	**Age in years** a) 21 – 30 Year b) 31 -40 Year c) 41 -50 Year			
2.	**Gender:** a) Male b) Female			

3.	**Body Mass Index (Weight in Kilogram\Height in meter)** a)Under Weight <18.5 b) Normal Weight18.5-24.9 c) Over Weight 25-29.99 d) Obesity 30 or Grater			
4.	**Total years of experience in the Nursing Service:** a) 1 – 4 Years b) 5 – 8 Years c) 9 – 12 Years d) 12years and above			
5.	**Present workplace**: a) Medical Wards b) Surgical wards c) Pediatric wards d) Accident and Emergency e) Intensive Care Unit f) Others			

TOOL – II: EVALUATION CRITERIA CHECKLIST OF TOOL REQUESTING SUGGESTION AND OPENION FROM EXPERTS

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

VISUAL ANALOGUE RATING SCALE TO ASSESS THE INTENSITY OF MUSCULOSKELECTAL PAIN AMONG NURSES

AREA OF PAIN	INTENSITY OF PAIN						LEVELS OF ACCEPTANCE		REMARKS
	No pain	Mild pain	Moderate pain	Severe pain	Worse pain	Remarks	% of Agree	% of Disagree	
NECK									
SHOULDER									
ELBOW									
WRIST									
UPPER BACK									
LOWER BACK									
HIP									
THIGH									
KNEE									
ANKLE									
MSD SCORE									

SCORE KEY

No pain	-	0
Mild pain	-	1-3
Moderate pain	-	4-6
Severe pain	-	7-9
Worst pain	-	10

TOOL – III: EVALUATION CRITERIA CHECKLIST OF TOOL REQUESING SUGGESTION AND OPINION FROM EXPERTS

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

LIKET THREE POINT RATING SCALE TO ASSESS THE BODY MECHANISM AMONG NURSES

Sample Number	Always Maintain Body mechanics	Some time maintain Body mechanics	Never maintain Body mechanics	Levels of acceptance		Remarks
				% of Agree	% of Disagree	
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

KEY SCORE: Never - 0 Sometimes -1 Always -2

ANNEXURE - V

PERCENTAGES OF AGREE / DISAGREE OF CONTENT VALIDITY OF THE TOOLS

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

TOOL - I

I DEMOGRAPHIC VARIABLE OF THE SAMPLES

S. No	Items	Levels of acceptance		Action taken Modified / Retained/ Deleted
		% of Agree	% of Disagree	
1.	**Age in years** a) 21 – 30 Year b) 31 -40 Year c) 41 -50 Year	100%	-	Retained
2.	**Gender:** a) Male b) Female	100%		Retained

3.	**Body Mass Index (Weight in Kilogram\Height in meter)** a)Under Weight <18.5 b) Normal Weight18.5-24.9 c) Over Weight 25-29.99 d) Obesity 30 or Grater	100%	-	Retained
4.	**Total years of experience in the Nursing Service:** a) 1 – 4 Years b) 5 – 8 Years c) 9 – 12 Years d) 12years and above	100%	-	Retained
5.	**Present workplace**: a) Medical Wards b) Surgical wards c) Pediatric wards d) Accident and Emergency e) Intensive Care Unit f) Others	100%	-	Retained

TOOL – II: EVALUATION CRITERIA CHECKLIST OF TOOL REQUESTING SUGGESTION AND OPENION FROM EXPERTS

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

VISUAL ANALOGUE RATING SCALE TO ASSESS THE INTENSITY OF MUSCULOSKELECTAL PAIN AMONG STAFF NURSES

Area of Pain	Intensity of Pain						Levels of Acceptance		Action Taken Modified / Retained/ Deleted
	No pain	Mild pain	Moderate pain	Severe pain	Worse pain	Remarks	% of Agree	% of Disagree	
NECK							100%		Retained
SHOULDER							100%		Retained
ELBOW							100%		Retained
WRIST							100%		Retained
UPPER BACK							100%		Retained
LOWER BACK							100%		Retained
HIP							100%		Retained
THIGH							100%		Retained
KNEE							100%		Retained
ANKLE							100%		Retained
MSD SCORE									

SCORE KEY

No pain	-	0
Mild pain	-	1-3
Moderate pain	-	4-6
Severe pain	-	7-9
Worst pain	-	10

TOOL - III : EVALUATION CRITERIA CHECKLIST OF TOOL REQUESTING SUGGESTION AND OPENION FROM EXPERTS

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

LIKET THREE POINT RATING SCALE TO ASSESS THE BODY MECHANISM AMONG NURSES

Sample Number	Always Maintain Body mechanics	Some time maintain Body mechanics	Never maintain Body mechanics	Levels of acceptance		Action taken Modified / Retained/ Deleted
				% of Agree	% of Disagree	
1.				100%	-	Retained
2.				100%	-	Retained
3.				100%	-	Retained
4.				100%	-	Retained
5.				100%	-	Retained
6.				100%	-	Retained
7.				100%	-	Retained
8.				100%	-	Retained
9.				100%	-	Retained
10.				100%	-	Retained
11.				100%	-	Retained
12.				100%	-	Retained
13.				100%	-	Retained
14.				100%	-	Retained
15.				100%	-	Retained

KEY SCORE: Never - 0 Sometimes -1 Always -2

ANNEXURE - VI

SELF REPORTING CHECK LIST ON EXERCISE

Respected Sir/Madam,

I kindly request you to give me your valuable suggestion on the content of the tool (Developed by researcher). Kindly go through the tool and give your response in the column given in the criteria table against each question. Criteria for each question can be concluded as a agree /disagree /to be deleted …, which will help in modification of the tool.

Exercise Performance				**Levels of Acceptance**		**Action Taken Modified / Retained/ Deleted**
S.NO	**Area of exercise**	**Done**	**Not done**	**% of Agree**	**% of Disagree**	
1.	NECK			100%	-	Retained
2.	SHOULDER			100%	-	Retained
3.	ELBOW			100%	-	Retained
4.	WRIST			100%	-	Retained
5.	UPPER BACK			100%	-	Retained
6.	LOWER BACK			100%	-	Retained
7.	HIP			100%	-	Retained
8.	THIGH			100%	-	Retained
9.	KNEE			100%	-	Retained
10.	ANKLE			100%	-	Retained

SCORE KEY: Not done - 0 .Done - 1

ANNEXURE - VII

CONTENT VALIDITY CERTIFICATE

I hereby that I have validated the tool of Mr. Vinoth Kumar.P, M.Sc(N), II year, Shanmuga College of Nursing, Who is undertaking the study on **"A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED NURSING INTERVENTION ON EXERCISE AND BODY MECHANISM TO REDUCE MUSCULO SKELETAL DISORDER AMONG NURSES IN SELECTED HOSPITAL AT SALEM".**

Date :

Place :

Signature of expert

Name :

Designation :

ANNEXURE VIII

TOOL – I

DEMOGRAPHIC VARIABLE OF THE SAMPLES

INSTRUCTIONS

The participant should read questions and put (√) mark in the appropriate place provided. All the information will be used for the research purpose only.

1. Age in years

   a) 21 – 30 Years ( )

   b) 31 -40 Years ( )

   c) 41 -50 Years ( )

2. Gender:

   a) Male ( )

   b) Female ( )

3. Body Mass Index (Weight in Kilogram\Height in meter)

   a) Under Weight <18.5 ( )

   b) Normal Weight18.5-24.9 ( )

   c) Over Weight 25-29.99 ( )

   d) Obesity 30 or Grater ( )

4. Total years of experience in the Nursing Service:

   a) 1 – 4 Years ( )

   b) 5 – 8 Years ( )

   c) 9 – 12 Years ( )

   d) 12 years and above ( )

5. Present workplace:

a) Medical Wards ( )

b) Surgical wards ( )

c) Pediatric wards ( )

d) Accident and Emergency ( )

e) Intensive Care Unit ( )

f) Others ( )

TOOL - II

VISUAL ANALOGUE PAIN RATING SCALE TO ASSESS THE INTENSITY OF MUSCULOSKELECTAL PAIN AMONG STAFF NURSES

INSTRUCTIONS

The participant should read the pain (Who have the pain within one year during work) assessment rating scale and put (√) mark in the place provided. All the information will be used for the research purpose only.

AREA OF PAIN	INTENSITY OF PAIN					
	NO PAIN	MILD PAIN	MODERATE PAIN	SEVERE PAIN	WORSE PAIN	REMARKS
NECK						
SHOULDER						
ELBOW						
WRIST						
UPPER BACK						
LOWER BACK						
HIP						
THIGH						
KNEE						
ANKLE						
MSD SCORE						

SCORE KEY

No pain - 0

Mild pain - 1-3

Moderate pain - 4-6

Severe pain - 7-9

Worst pain - 10

TOOL – III

LIKERT'S THREE POINT RATING SCALE TO ASSESS THE BODY MECHANISM AMONG STAFF NURSES

INSTRUCTION

The researcher will observe and put (√) in the appropriate place provided. All the information will be kept confidential and will be used for the research purpose only

Sample Number	Always maintain body mechanics	Some time maintain body mechanics	Never maintain body mechanics
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

KEY SCORE

Never - 0
Sometimes - 1
Always - 2

ANNEXURE - IX

SELF REPORTING CHECKLIST ON EXERCISE

The researcher will observe and put (√) in the appropriate place provided. All the information will be kept confidential and will be used for the research purpose only

S. NO	AREA OF EXERCISE	DONE	NOT DONE
1.	NECK		
2.	SHOULDER		
3.	ELBOW		
4.	WRIST		
5.	UPPER BACK		
6.	LOWER BACK		
7.	HIP		
8.	THIGH		
9.	KNEE		
10.	ANKLE		

SCORE KEY

Not done - 0

Done - 1

ANNEXURE – X

STRUCTURED TEACHING PROGRAMME ON EXERCISE AND BODY MECHANISM TO REDUCE THE MUSCULOSKELETAL DISORDERS

Title of the content	:	Exercise and Body mechanism
Duration	:	1Hour
Size of the group	:	15 Members (7-8 Members in each group)
Group	:	Staff nurses
Content guided by	:	Mrs. Sheeja, M.Sc. Nursing Associate Professor SCON

Previous knowledge of the group:

The group will have minimal knowledge regarding Exercise and Body mechanism to reduced the musculoskeletal disorders. This STP will be improve the knowledge about Exercise and Body mechanism to reduced the musculoskeletal disorders among staff Nurses in Shanmuga Hospital, Salem.

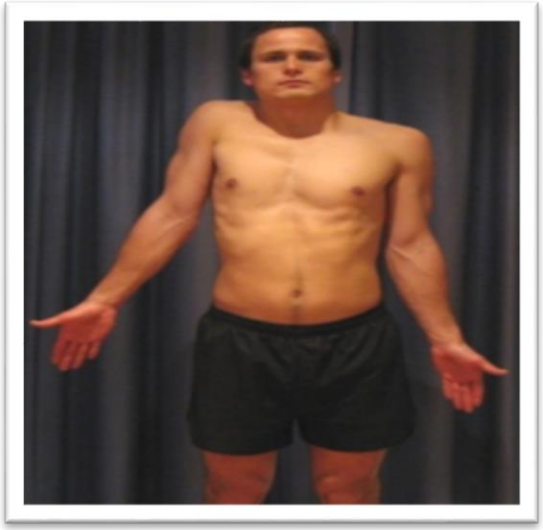
Objectives:

The group will be able to

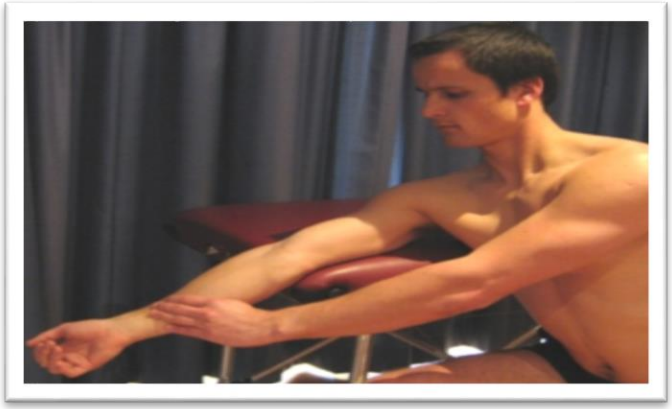
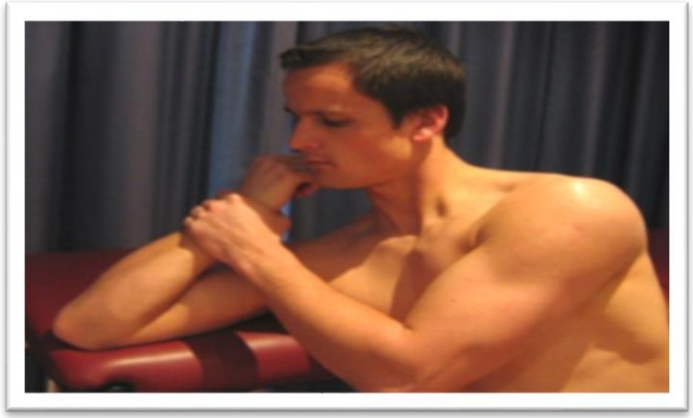
- orient the topic
- define the exercise
- list out the types of exercise
- define the body mechanism
- list out the rules of body mechanism
- state the important of body mechanics.
- describe the principles of body mechanics.
- explain the proper body alignment
- describe the proper body mechanism during procedure.

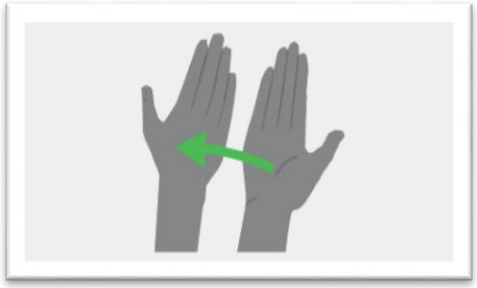
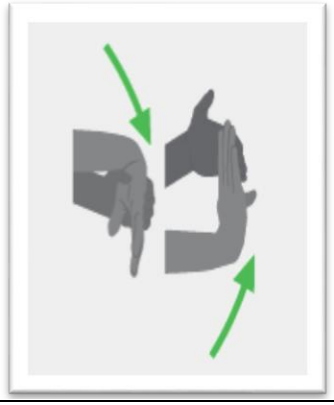
EXERCISE AND BODY MECHANISM

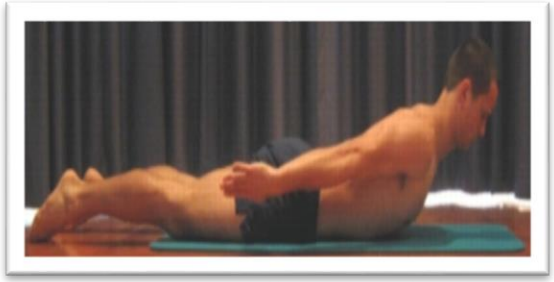
OBJECTIVES	CONTENT	PICTURES
The topic will be introduced to the group members. The group will be able to define exercise. The group will be able to list out the types of exercise.	**A) EXERCISE** **I INTRODUCTION** **Musculoskeletal disorders** (MSDs) are injuries or pain in the body's joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck and back. Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons, including strengthening muscles and the cardiovascular system, honing athletic skills, weight loss or maintenance, and merely enjoyment. It may also help prevent stress and depression, help to promote or maintain positive self-esteem, improve mental health generally, and can augment an individual's sex appeal or body image, which has been found to be linked with higher levels of self-esteem. **II DEFINITION** Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure	

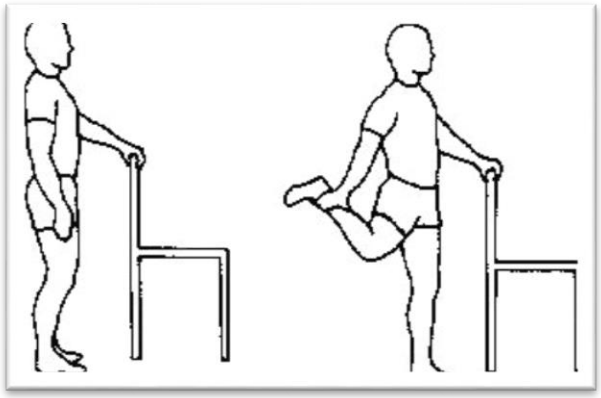
OBJECTIVES	CONTENT	PICTURES
	III Exercises to reduce musculoskeletal discomfort for people doing a repetitive work **1 NECK EXERCISE** **Neck glide** Start with neck straight. Slowly slide your chin forward. Hold for five seconds and return to starting position. Do ten times **2.Shoulder shrug** Sit or stand up straight, bring shoulders up towards ears. Hold for count of 3 second. Relaxant repeat twice.	 

OBJECTIVES	CONTENT	PICTURES
	3.Shoulder circles Sit or stand up straight, circle shoulders backwards three times, with arms relaxed by the side. **Elbow Exercise** **4.Elbow Bend to straighten** Bend and straighten your elbow as far as you can go without pain and provided you feel no more than a mild to moderate stretch. Repeat 10-20 times. **5.ForearmRotation** Begin with your elbow at your side and bend to 90 degrees .turn your palm up and down as far as you can go without pain and provided you feel no more than a mild to moderate stretch .Repeat 10-20 times.	 

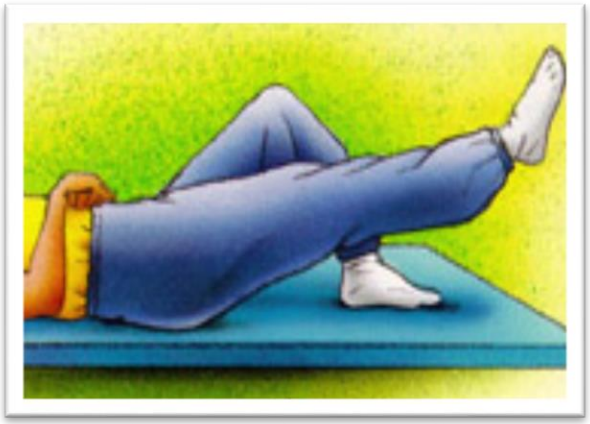
OBJECTIVES	CONTENT	PICTURES
	6. Elbow Extension Place your elbow on the edge of a bench or table .Straighten your elbow using your other hand as far as you can go without pain and provided you feel no more than a mild to moderate stretch. Repeat 10-20 times. **7.Elbow flexion** Place your elbow on a bench or table .Bend your elbow using your other hand as far as you can go without pain and provided you feel no more than a mild to moderate stretch .Repeat 10-20 times.	 

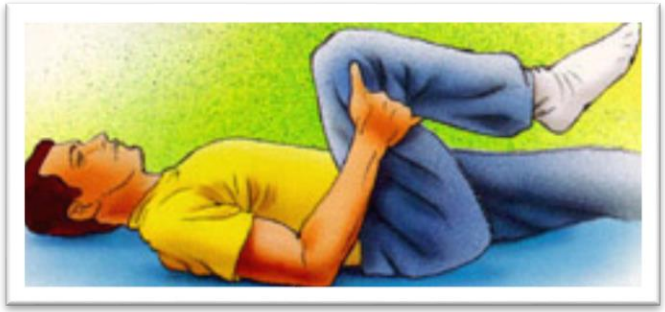
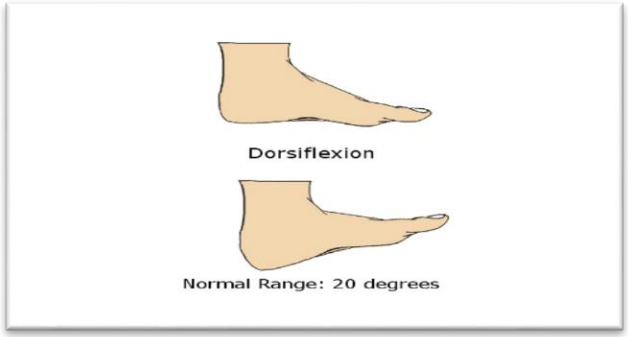
OBJECTIVES	CONTENT	PICTURES
	8.Forearm and wrist stretch 1. With hand open and facing down, move wrist from side to side, until stretch is felt at each extreme. 2. Hold each for slow count of 10. 3. Repeat 3 – 5 times. **9.Wrist Rotate Exercise** 1. With elbow held close in to side of body, slowly rotate palm upwards and then downwards until stretch is felt at each extreme. 2. Hold each for slow count of 10. 3. Repeat 3 – 5 times. **10.Wrist Bend Exercise** 1. Holding upper part of hand with other hand, slowly bend wrist down and then upwards until stretch is felt at each extreme. 2. Hold each for slow count of 10. 3. Repeat 3 – 5 times.	  

OBJECTIVES	CONTENT	PICTURES
	11.Forearm Exercise 1. Sitting with elbows out and palms together, slowly rotate palms down until stretch is felt. 2. Hold for slow count of 10. 3. Repeat 3 – 5 times. **Upper back** **12. Shoulder Blade Squeeze** Begin this exercise standing or sitting with your back straight. Your chin should be tucked in slightly and your shoulders should be back slightly. Slowly squeeze your shoulder blades together as hard and far as possible provided it is pain free. Hold for 5 seconds and repeat 10 times. **13. Darts** Begin this exercise lying on your stomach with your arms by your side. Squeeze your shoulder blades together and slowly lift your arms and chest off the ground, keeping your neck straight (figure 3). Hold for 2 seconds at the top of the movement then slowly return to the starting position. Perform 3 sets of 10	  

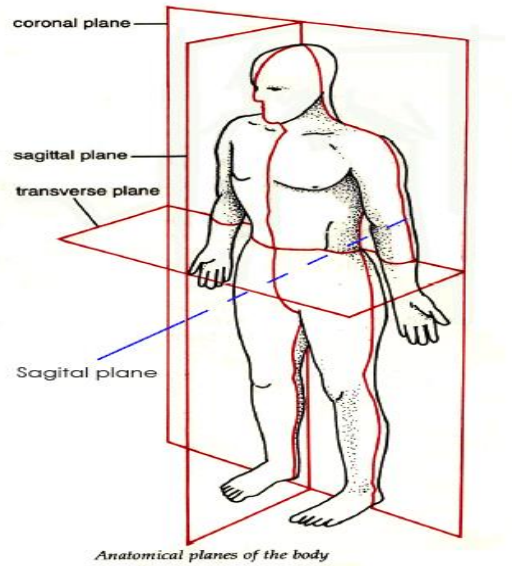
OBJECTIVES	CONTENT	PICTURES
	repetitions provided it is pain free. This exercise may be performed with palms facing up or down. **14. Arms above Head in Lying** Begin this exercise lying on your stomach with your shoulders blades squeezed together and arms by your side in the position demonstrated. Slowly move your arms above your head, keeping your arms above the ground at all times and then return to the starting position. Perform 3 sets of 10 repetitions provided it is pain free. **LOWER BACK AND THIGH STRETCHING** **15.Hamstring curls (backs and thighs).** • Face and hold onto the back of a chair. • Lift your right foot and move it up toward your backside, but don't go further than a 90-degree angle (your legs will be in the shape of the number four). Hold for three to five seconds, lower the leg, repeat, and	 

OBJECTIVES	CONTENT	PICTURES
	switch sides. • Be sure to keep your knees close together. **16.Single-leg dips (thighs, hips, and buttocks).** Sit on the floor with your knees bent and feet flat on the floor. Place your hands on the floor behind you. Raise your hips up and support yourself on your hands and feet. Then lift one leg off the floor**.** Bend your elbows and lower body toward the ground. Tap the floor with your glutes and then press back up and straighten your arms .Return to the starting position and switch legs.	 

OBJECTIVES	CONTENT	PICTURES
	Knee exercise **17.Short Arcs** Lying flat on your back or sitting up with your leg horizontal on a flat surface such as a bed. Place a rolled up towel (approx 10cm diameter) under the knee. Pull your toes towards you and clench you thigh muscles. Slowly lift your foot up off the bed until your knee is straight (keep your knee resting on the towel). Hold for 3-5 sec and slowly lower repeat 10-20 times, 3x daily 18. **Straight Leg Raises** • Lie on your back with one leg straight and one knee bent. • Tighten abdominal muscles to stabilize low back. • Slowly lift leg straight up about 6 to 12 inches and hold 1 to 5 seconds. • Lower leg slowly. • Repeat 10 times.	 

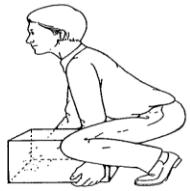
OBJECTIVES	CONTENT	PICTURES
	19. Single Knee to Chest Stretch • Lie on your back with both knees bent. • Hold thigh behind knee and bring one knee up to chest. • Hold 20 seconds. Relax. • Repeat 5 times on each side. **Ankle Strengthening Exercises** **20. Dorsiflexion** • Working only on your ankle by pointing your foot backwards to your nose (while performing this workout, keep your knees straight). • Continue until you feel discomfort or can't tilt it back any further. • Hold this position for 15 seconds. • Return to neutral position. **21.Plantar flexion** • Moving only your ankle, point your foot forward (while keeping knees straight). • Continue this workout until you feel discomfort.	  

OBJECTIVES	CONTENT	PICTURES
The group will be able to define the body mechanism.	• Hold for 15 seconds and return to neutral position. **B)Proper body mechanics for nurses** **Introduction** Nursing is a job that need a lot of bending our back ,flexing our arms and legs and pushing and pulling patients .because of this many nurses are at risk for developing physical strain and back injuries or even fractures. one way to prevent these from happening is to practice proper body mechanics. **Definition** Body mechanics is a broad term used to denote an effort coordinated by the muscles, bone and nervous system .it can either be good or bad and can be directly related to the occurrence of back pain.	

OBJECTIVES	CONTENT	PICTURES
The group will be able to list out the rules of body mechanism. The group will be to state the importance of body mechanism.	**Rules** • Keep the lower portion of your back in its normal position at all times. • Move as close to the patients bed as you can • Don't twist your body .always do a side step or a pivot • Set your feet into a comfortable and solid wide base of support when lifting. • Keep your abdominal muscle contracted ,bow slightly using the hip and squat. • Keep the head up right and hold your shoulder up • Pushing up from the knee s and using your own momentum would help you lift the patient. **Important of body mechanics** To Avoid • Musculoskeletal strain • Injuries to member of the staff • Injury to the client • Fatigue	 *Anatomical planes of the body* 'Brukner and Kahn, 2005'

OBJECTIVES	CONTENT	PICTURES
The group will be able to describe the principles of body mechanism.	**Principles of body mechanics** • Stable center of gravity • Keep your center of gravity low. • Greater balance is met with a low center of gravity. • Flex your knees and keep your body straight rather than bending. **Base of support Maintain a wide base of support** 1.Having a wide base of support gives your body more stability. 2.Spread your feet apart to a reasonable distance. 3.Flex your knees to move the center of gravity closer to the base of support. **Maintain the proper body alignment** 1. Body alignment refers to the way the joints, tendons, ligaments and muscles are arranged when initiating a position. 2. A line of gravity passing through your base of support maintain your balance.	

OBJECTIVES	CONTENT	PICTURES
	3. Equal activity balance in upper and lower part of the body would reduce your risks of having back injury. 4.When your stronger muscle group are involved ,greater amount of work can be safely done 5.Keep the back upright when performing the intervention **MOVING LIENT** **Pushing** 1. Stay close to the subject being pushed. 2. Place one foot in front of the other. 3. Place the hand on the subject, flex your elbows and leaned to the subject. 4.Place the weight from your flex our to the extensor portion of leg 5.Apply pressure with the use of your legs muscles 6.To prevent fatigue provide alternate rest periods.	  

OBJECTIVES	CONTENT	PICTURES
	Proper Technique Traditional Lift 1.Get close to the object 2.Widen your BOS 3.Contract Transverse Abdominis & PFM 4.Keep your back straight and squat with the legs 5.Use arms to lift object to waist level 6.Rise to an upright position using the legs **Pulling** 1.Stay close to the subject being pulled 2.Place one foot in front of the other 3.Hold the subject flex your elbows and lean your body away from the subjects. 4.shift your weight away from the subject 5.avoid any unnecessary movement 6.To prevent fatigue provide alternate rest period. **Summary** This STP explains the definition and types of exercise; definition, rules ,importance and principles of body mechanics; proper body alignment.	   

OBJECTIVES	CONTENT	PICTURES
	Conclusion: This STP gives the detail knowledge about the exercise and body mechanism to reduce the musculoskeletal disorders among the nurses. This will be beneficial for all staff nurses in Shanmuga Hospital, Salem.	

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9. www.wikipedia.com
10. www.humankinitics.com

CONSENT FORM

I, Mr. VINOTH KUMAR.P, II year M.Sc Nursing student of Shanmuga College of Nursing, as a part of my M.Sc Nursing programme have selected a research on "A study to evaluate the effectiveness of planned nursing intervention on body mechanics and exercise to reduce musculoskeletal disorders among nurses in selected hospital at Salem". For which I would like to include you as the study samples. I ensures you that the details collected will be kept confidential and will be utilized for only this research purpose.

Yours faithfully,

(Mr.Vinoth Kumar.P)

The researcher has explained me in detail about the study and its benefits and no risk. I came to know that I can withdraw from study at anytime. She ensured that the information collected from me will be kept confidential and it is used only for this study. I am willing to be a sample for this study.

Yours faithfully,

Nurses Name :

Signature:

ANNEXURE - XI

INFORMATION BOOKLET ON EXERCISE AND BODYMECHANISM

Guide:

Prof. Mrs. Dina Rani, M.Sc, (Ph.D) (N)

Principal

SCON, Salem.

CO-Guide:

Mrs. Sheeja Singaravelan, M.Sc.(N)

Associate Professor,

SCON, Salem.

By

Mr. Vinoth Kumar. P

II Year M.Sc. Nursing SCON, Salem

A) EXERCISE

OBJECTIVES

The group will be able to

- orient the topic
- define the exercise
- list out the types of exercise
- define the body mechanism
- list out the rules of body mechanism
- state the important of body mechanics.
- describe the principles of body mechanics.
- explain the proper body alignment
- describe the proper body mechanism during procedure.

I INTRODUCTION

Musculoskeletal disorders (MSDs) are injuries or pain in the body's joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck and back. Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons, including strengthening muscles and the cardiovascular system, honing athletic skills, weight loss or maintenance, and merely enjoyment. It may also help prevent stress and depression, help to promote or maintain positive self-esteem, improve mental health generally, and can augment an individual's sex appeal or body image, which has been found to be linked with higher levels of self-esteem.

II DEFINITION

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure.

III Exercises to reduce musculoskeletal discomfort for people doing a repetitive work

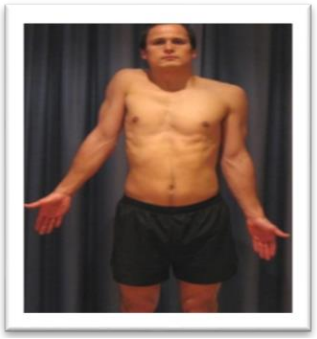
1 NECK EXERCISE

Neck glide

Start with neck straight. Slowly slide your chin forward. Hold for five seconds and return to starting position. Do ten times

2. Shoulder shrug

Sit or stand up straight, bring shoulders up towards ears. Hold for count of 3 second. Relaxand repeat twice.



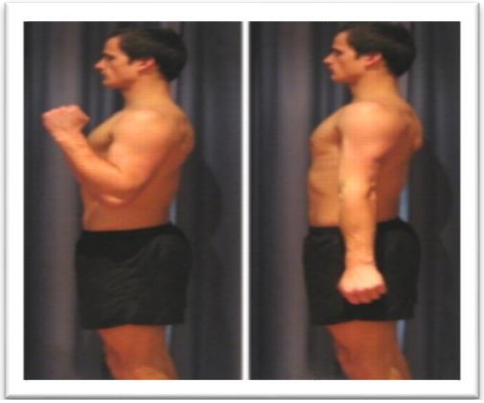
3. Shoulder circles

Sit or stand up straight, circle shoulders backwards three times, with arms relaxed by the side.

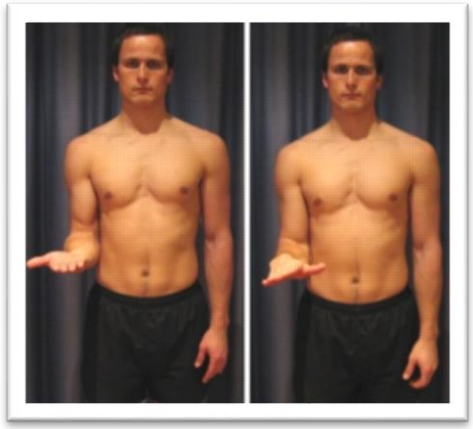
Elbow Exercise

4. Elbow Bend to straighten

Bend and straighten your elbow as far as you can go without pain and provided you feel no more than a mild to moderate stretch. Repeat 10-20 times

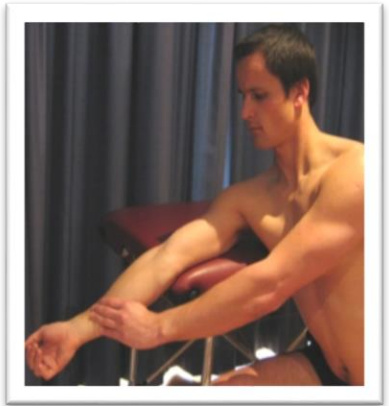


5. Forearm Rotation



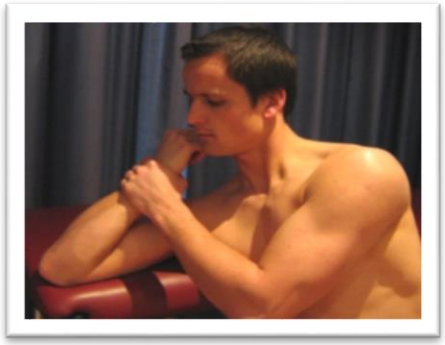
Begin with your elbow at your side and bend to 90 degrees .turn your palm up and down as far as you can go without pain and provided you feel no more than a mild to moderate stretch .Repeat 10-20 times

6. Elbow Extension



Place your elbow on the edge of a bench or table .Straighten your elbow using your other hand as far as you can go without pain and provided you feel no more than a mild to moderate stretch. Repeat 10-20 times

7. Elbow flexion



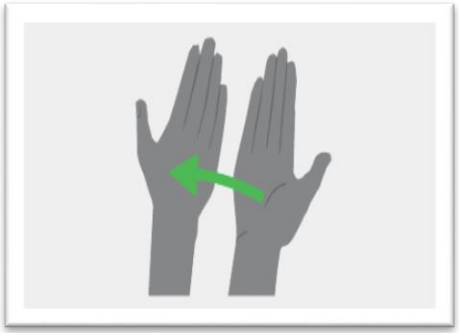
Place your elbow on a bench or table .Bend your elbow using your other hand as far as you can go without pain and provided you feel no more than a mild to moderate stretch .Repeat 10-20 times

8. Forearm and wrist stretch

1. With hand open and facing down, move wrist from side to side, until stretch is felt at each extreme.
2. Hold each for slow count of 10.
3. Repeat 3 – 5 times.

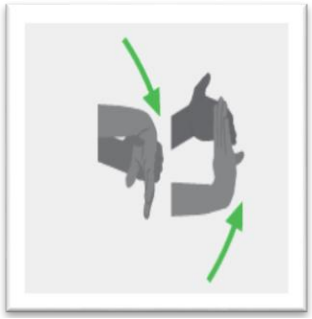
9. Wrist Rotate Exercise

1. With elbow held close in to side of body, slowly rotate palm upwards and then downwards until stretch is felt at each extreme.
2. Hold each for slow count of 10.
3. Repeat 3 – 5 times.



10. Wrist Bend Exercise

1. Holding upper part of hand with other hand, slowly bend wrist down and then upwards until stretch is felt at each extreme.
2. Hold each for slow count of 10.
3. Repeat 3 – 5 times.



11. Forearm Exercise

1. Sitting with elbows out and palms together, slowly rotate palms down until stretch is felt.
2. Hold for slow count of 10.
3. Repeat 3 – 5 times.

Upper back

12. Shoulder Blade Squeeze

Begin this exercise standing or sitting with your back straight. Your chin should be tucked in slightly and your shoulders should be back slightly. Slowly squeeze your shoulder blades together as hard and far as possible provided it is pain free . Hold for 5 seconds and repeat 10 times.

13. Darts

Begin this exercise lying on your stomach with your arms by your side. Squeeze your shoulder blades together and slowly lift your arms and chest off the ground, keeping your neck straight (figure 3). Hold for 2 seconds at the top of the movement then slowly return to the starting position. Perform 3 sets of 10 repetitions provided it is pain free. This exercise may be performed with palms facing up or down.

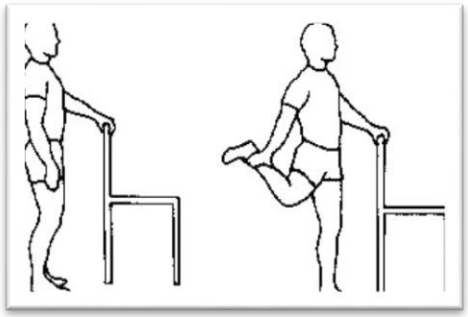
14. Arms Above Head in Lying

Begin this exercise lying on your stomach with your shoulders blades squeezed together and arms by your side in the position demonstrated . Slowly move your arms above your head, keeping your arms above the ground at all times and then return to the starting position. Perform 3 sets of 10 repetitions provided it is pain free.

LOWER BACK AND THIGH STRETCHING

15. Hamstring curls (backs and thighs).

- Face and hold onto the back of a chair.
- Lift your right foot and move it up toward your backside, but don't go further than a 90-degree angle (your legs will be in the shape of the number four). Hold for three to five seconds, lower the leg, repeat, and switch sides.
- Be sure to keep your knees close together.



16. Single-leg dips (thighs, hips, and buttocks).

Sit on the floor with your knees bent and feet flat on the floor. Place your hands on the floor behind you. Raise your hips up and support yourself on your hands and feet. Then lift one leg off the floor**.**

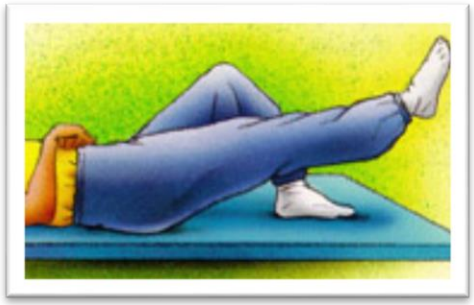
Bend your elbows and lower body toward the ground. Tap the floor with your glutes and then press back up and straighten your arms .Return to the starting position and switch legs.

Knee exercise

17. Short Arcs

Lying flat on your back or sitting up with your leg horizontal on a flat surface such as a bed. Place a rolled up towel (approx 10cm diameter) under the knee. Pull your toes towards you and clench you thigh muscles. Slowly lift your foot up off the bed until your knee is straight (keep your knee resting on the towel). Hold for 3-5 secs and slowly lower repeat 10-20 times, 3x daily

18. Straight Leg Raises



- Lie on your back with one leg straight and one knee bent.

- Tighten abdominal muscles to stabilize low back.
- Slowly lift leg straight up about 6 to 12 inches and hold 1 to 5 seconds.
- Lower leg slowly.
- Repeat 10 times.

19. Single Knee to Chest Stretch

- Lie on your back with both knees bent.
- Hold thigh behind knee and bring one knee up to chest.
- Hold 20 seconds.
- Relax.
- Repeat 5 times on each side.

Ankle Strengthening Exercises

20. Dorsiflexion

- Working only on your ankle by pointing your foot backwards to your nose (while performing this workout, keep your knees straight).
- Continue until you feel discomfort or can't tilt it back any further.
- Hold this position for 15 seconds.
- Return to neutral position.

21. Plantar flexion

- Moving only your ankle, point your foot forward (while keeping knees straight).
- Continue this workout until you feel discomfort.
- Hold for 15 seconds and return to neutral position.

B) Proper body mechanics for nurses

Introduction

Nursing is a job that need a lot of bending our back ,flexing our arms and legs and pushing and pulling patients .because of this many nurses are at risk for developing physical strain and back injuries or even fractures. one way to prevent these from happening is to practice proper body mechanics.

Definition

Body mechanics is a broad term used to denote an effort coordinated by the muscles, bone and nervous system .it can either be good or bad and can be directly related to the occurrence of back pain.

Rules

- Keep the lower portion of your back in its normal position at all times.
- Move as close to the patients bed as you can
- Don't twist your body .always do a side step or a pivot
- Set your feet into a comfortable and solid wide base of support when lifting.
- Keep your abdominal muscle contracted, bow slightly using the hip and squat.
- Keep the head up right and hold your shoulder up
- Pushing up from the knee s and using your own momentum would help you lift the patient.

Important of body mechanics

To Avoid

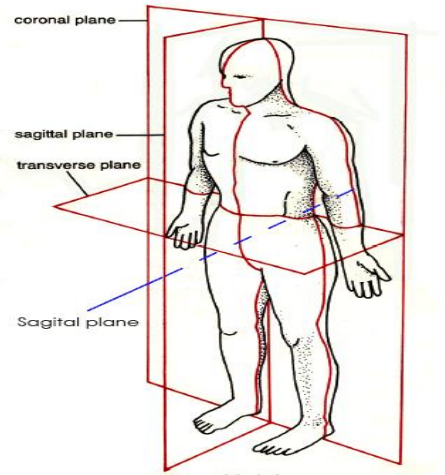
- Musculoskeletal strain

- Injuries to member of the staff
- Injury to the client
- Fatigue

Principles of body mechanics

- Stable center of gravity
- Keep your center of gravity low.
- Greater balance is met with a low center of gravity.
- Flex your knees and keep your body straight rather than bending.

Base of support Maintain a wide base of support



Anatomical planes of the body
'Brukner and Kahn, 2005'

1. Having a wide base of support gives your body more stability.
2. Spread your feet apart to a reasonable distance.
3. Flex your knees to move the center of gravity closer to the base of support.

Maintain the proper body alignment

1. Body alignment refers to the way the joints, tendons, ligaments and muscles are arranged when initiating a position.
2. A line of gravity passing through your base of support maintain your balance.
3. Equal activity balance in upper and lower part of the body would reduce your risks of having back injury.
4. When your stronger muscle group are involved, greater amount of work can be safely done
5. Keep the back upright when performing the intervention

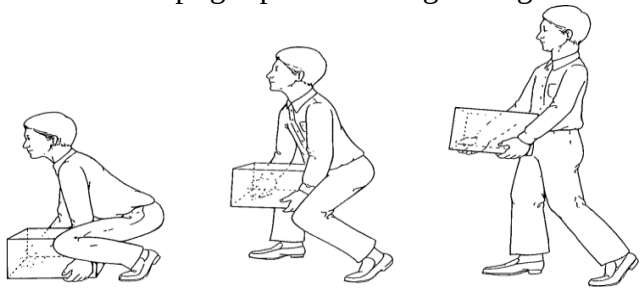
MOVING LIENT

Pushing

1. Stay close to the subject being pushed.
2. Place one foot in front of the other .
3. place the hand on the subject, flex your elbows and leand to the subject.
4. place the weight from your flexour to the extensor portion of leg
5. apply pressure with the use of your legs muscles
6. to prevent fatigue provide alternate rest periods.

Proper Technique Traditional Lift

1. Get close to the object
2. Widen your BOS
3. Contract Transverse Abdominis & PFM
4. Keep your back straight and squat with the legs
5. Use arms to lift object to waist level
6. Rise to an upright position using the legs



Pulling

1. Stay close to the subject being pulled
2. Place one foot in front of the other
3. Hold the subject flex your elbows and lean your body away from the subjects.
4. shift your weight away from the subject
5. avoid any unnecessary movement
6. To prevent fatigue provide alternate rest period.

SUMMARY

This STP explains the definition and types of exercise; definition, rules ,importance and principles of body mechanics; proper body alignment.

CONCLUSION

This STP gives the detail knowledge about the exercise and body mechanism to reduce the musculoskeletal disorders among the nurses. This will be beneficial for all staff nurses in Shanmuga Hospital, Salem.

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