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**Isha Sharma**  
Research Scholar, Department  
of Nursing, Desh Bhagat  
University, Punjab, India

**Dr. S. Victor Devasirvadam**  
Principal, Faculty of Nursing,  
Desh Bhagat University,  
Punjab, India

## **Back strengthening exercises in reducing mechanical low back pain among staff nurses**

**Isha Sharma and Dr. S. Victor Devasirvadam**

### **Abstract**

This abstract explores the efficacy of back strengthening exercises in mitigating mechanical low back pain among staff nurses. Mechanical low back pain is a prevalent issue in the nursing profession, often attributed to the physical demands of patient care. The study investigates the impact of a structured regimen of back strengthening exercises on pain reduction and functional improvement among staff nurses. The results of the study reveal that the mean pretest level of mechanical low back pain among staff nurses was 4.46. The mean post-test level of mechanical low back pain among nurses after the practice of back strengthening exercises was 1.22. There was significant reduction in the level of back pain after the practice of back strengthening exercises which reveals that the exercises was highly effective. There is no significant association between the pretest level of mechanical low back pain and the selected demographic variables.

**Keywords:** Mechanical low back pain, staff nurses, back strength

### **Introduction**

Human body is supported and erected with a well maintained back trunk. Human back is the large posterior area of the human body rising from the top of the buttocks to the back of the neck and shoulders. The intricate anatomy of the back provides support for the back trunk of the body. The upper back has the most structural support with the ribs attached firmly to each level of the thoracic spine and has very limited movement in back bending and forward bending. The lower back is the site of frequent problems. Back pain (also known as "dorsalgia") is the pain felt in the back that may originate from the muscles, nerves, specific condition that refers to complaints of acute or chronic pain and discomfort in or near the lumbosacral spine.

### **Need and significance of the study**

Back pain is an extremely common problem affecting the human race across the globe cutting the geographical boundaries, race, and culture. About 80-90% of human population suffer from some form of backache, mild or severe in their lifetime.<sup>3</sup> Back pain is common in medical personnel, especially among nurses. Incorrect posture or faulty body mechanics put tremendous strain on the muscles and ligaments of the lower back causing back pain. Back strengthening exercises were found to be effective in reducing low back pain and improving functional performance among nursing students. During the clinical experience, the researcher met staff nurses with the complaints of back pain due to various activities and prolonged standing related to patient care during their duty hours. These staff nurses were finding it difficult to perform their routine nursing care such as shifting, turning and lifting the patients (mostly bedridden) due to their back ache problems. Although the nurses are taught in their fundamental classes regarding maintenance of proper body mechanics, they seldom care to follow that during their busy work schedule. Back pain among nurses affects the quality of nursing care. Moreover, maintenance of the health of these nurses is also relevant. Hence, the researcher found the problem as significant and hence selected the topic for the study.

**Corresponding Author:**  
**Isha Sharma**  
Research Scholar, Department  
of Nursing, Desh Bhagat  
University, Punjab, India

**Statement of the problem**

Effect of back strengthening exercises in reducing mechanical low back pain among staff nurses at Park Hospital, Patiala, Punjab.

**Objectives**

1. To assess the pre test level of mechanical low back pain among staff nurses using numeric pain rating scale.
2. To assess the post test level of mechanical low back pain among staff nurses using numeric pain rating scale.
3. To evaluate the effect of back strengthening exercises in terms of reduction in the intensity of mechanical low back pain using numeric pain rating scale.
4. To find the association between the pre test level of mechanical low back pain among staff nurses with selected demographic variables.

**Operational definitions**

**Effect:** Effect refers to significant reduction in back pain.

**Mechanical low Back pain:** Mechanical low back pain refers to the pain expressed by staff nurse in the lumbar area during their work and while doing their daily patient care involving turning, lifting, shifting of patients.

**Staff nurses:** Staff nurses refer to Diploma/Degree nurses who work in Park Hospital, Patiala, Punjab on full time basis.

**Back strengthening exercises:** Back strengthening exercises refers to those physical activities that the samples in the study have to perform twice a day to strengthen their back and to reduce the pain at the back. It includes Pelvic Tilt, Sit up, Knee chest, Double knee and Straight leg raise.

**Pelvic tilt:** lying supine, the patient tightens the stomach muscles and then rocks the pelvis, flattening the low back.

**Sit up:** Lying supine with the abdominal muscle tightened, the patient raises their head and shoulder and reaches towards the knees holding the position for a count of 5.

**Knee-chest:** Lying supine with the abdominal muscles tightened, the patient raises their head and shoulder and brings one knee up toward the nose holding the position for a count of 5.

**Double knee:** The same as knee chest except that the patient brings both knees up at the same time.

**Straight leg raise:** The patient lies supine with one knee bent and held to their chest with their hands. The patient then lifts the other leg keeping the knee straight and the ankle flexed.

**Hypothesis**

**H<sub>1</sub>:** There is a significant reduction in the intensity of mechanical low back pain among staff nurses after practicing back strengthening exercises.

**H<sub>2</sub>:** There is a significant association between the pre-test level of mechanical low back pain and selected demographic variables.

**Review of literature**

The literature reviewed for the present study is organized in the following headings;

- Studies related to prevalence of mechanical low back pain among nurses.
- Studies related to causes & risk factors of mechanical low back pain
- Studies related to effect of back strengthening exercises in reducing low back pain.

**Methodology****Research Approach**

In the present study the investigator wished to assess the effect of back strengthening exercises in reducing back pain among staff nurses of Inhome hospital. Hence the research approach adopted for this study is an evaluative approach in quantitative approach. Evaluative approach helps to explain the effect of independent variable on the dependent variable.

**Research Design**

One group pre-test post-test design.

Q1 X Q2

Q1- pre-test (pre assessment of mechanical low back pain using numeric pain scale)

X- Intervention (demonstration of back strengthening exercises)

Q2- post-test (post assessment of mechanical low back pain using numeric pain scale).

**Variables****Independent Variable**

Back strengthening exercises is the independent variable in this study.

**Dependent Variable**

Mechanical low back pain is the dependent variable in this study.

**Setting of the study**

Setting refers to the physical locations and conditions in which data collection takes place. In this study the setting refers to Park Hospital, Patiala, Punjab. It is a 100 bedded multispecialty hospital with orthopedics, Cardiology, Pediatrics, Nephrology, Neurology, Ophthalmology, ENT, Obstetrics and Gynecology departments.

**Population**

The population for the study was all staff nurses with mechanical low back pain who are working in different departments of Inhome Hospital.

**Sample and sampling technique****Sample**

Sample is the small proportion of the population selected for observation and analysis. Here, samples refer to 50 staff nurses with mechanical low back pain who are working in different departments of Park Hospital, Patiala, Punjab.

**Sampling Technique**

The sampling technique used in the study is simple random sampling.

**Sample size**

Sample size consists of 50 staff nurses with mechanical low back pain who works in Inhome Hospital.

**Inclusion Criteria**

1. Staff nurses with back pain.
2. Those belonging to age group between 25 and 45 yrs.
3. Nurses with more than 2 years of experience.
4. Those who are willing to co-operate with the study.

**Exclusion Criteria**

Nurses with other musculoskeletal disorders in which back strengthening exercises are contraindicated.

**Tool****Development of the Tool**

The investigator has involved in the following steps in preparing the tool:

The tool developed for the study were general questionnaire related to subjective experience of back pain by the staff nurse, Numeric pain rating scale intended to assess the existence and severity of back pain, Observation checklist for assessing technique of back strengthening exercises practiced by staff nurses

**Description of the Tool**

**Tool 1:** General Questionnaire related to subjective experience of back pain by the staff nurse to identify the population.

**Tool 2: Section A:** Demographic profile which includes age, gender, religion, educational qualification, marital status, area of work, years of experience, body mass index, number of children, type of family, monthly family income.

**Section B:** Structured knowledge questionnaire related to low back pain.

**Tool 3:** Numeric pain rating scale intended to assess the existence and severity of back pain.

**Tool 4:** Observation checklist for assessing technique of back strengthening exercises practiced by staff nurses.

**Content Validity**

Content validity of the instruments was assessed by obtaining opinion from Medical Surgical Nursing experts and medical experts. Selection of experts was done based on their clinical experience. Validity of the tool was obtained by giving it to specialists in General Medicine and to four nursing experts.

**Reliability of the tool**

Test retest method was used to establish the reliability of the tool. Karl Pearson's correlation coefficient formula was used, which was found to be  $r = 0.75$ . Thus the tool was found reliable.

**Data Collection Process**

**Phase 1:** After ethical clearance, consent was taken from the authorities and study participants. General questionnaire related to subjective experience of back pain was given to all staff nurses in Inhome hospital who fulfill the inclusion criteria. Staff nurses who experience mechanical low back

pain were selected as samples by simple random sampling method. The demographic data was collected and a structured knowledge questionnaire related to back pain was given to the samples. The Numeric pain rating scale was given to the samples to assess the intensity of back pain.

**Phase 2:** Back strengthening exercises was demonstrated and taught to the subjects as two groups with 25 samples in each group. The exercises was practiced by the samples for 30 minutes daily for a period of 15 days. These exercises were practiced by the samples under researcher's supervision for 8 days, half an hour before getting on to clinical duty. With the help of an observation checklist the researcher assessed the techniques followed by the staff nurses. They were instructed to practice the exercises for the remaining 7 days at home.

**Phase 3:** After 15 days, a post assessment of the pain level was done using numeric pain rating scale.

**Plan for data analysis:** Data was analyzed using descriptive and inferential statistics. The pretest level and post-test level of mechanical low back pain back pain was assessed and its mean, mean percentage and standard deviation was computed. The effectiveness of back strengthening exercise was analyzed using "z"-test. Chi square test was used to find the association between the pre-test level of mechanical low back pain and the selected demographic variables.

**Ethical consideration**

An informed consent was taken from the samples before conducting the study. The privacy and confidentiality of the samples were strictly maintained throughout and after the study. The researcher demonstrated and supervised the practice of back strengthening exercises only after obtaining a certificate from the physiotherapy department and it was ensured that exercises were taught and practiced in the right way. Thus, the samples were protected from harm and discomfort, minimizing the harm and maximizing the benefit.

**Results**

The results of the study were grouped under the following sections:

**Section 1:** Information related to subjective experience of mechanical low back pain about 74% of the staff nurses had not taken leave from work because of mechanical low back pain but 26% have missed 1-5 days of work because of it.

- Nearly 66% of the samples suffered from the current back pain problem over a period of less than one week, 12% over a period of 1-2 weeks and another 16% of the samples over a period of more than 4 weeks. Only 6% had back pain over 2-4 weeks.
- Out of the total samples, 42% of the samples reported that their work involves heavy lifting often. It was reported as moderate by 40% of samples.
- About 60% staff nurses had moderate back pain and 28% had mild back pain during last week.
- Among the total samples, 50% of the staff nurses experienced pain episodes sometimes during the past 3 months.

- Almost 58% of the samples perceive their back pain problem to have a moderate risk., 22% with a very large risk and another 6% were not much aware about the risk.
- About 42% of the samples got complete relief from back pain with medications, 26% got moderate relief and 12% got little relief from pain by using pain medications. Whereas, 14% samples had no effect on pain with the use of pain medications.
- 54% samples found it difficult to lift heavy weights off the floor but could manage if the weights are conveniently positioned. 20% could lift weights but with pain. And another 16% nurses could lift only very light weights. 4% of the samples could not lift anything at all.

## Section 2

This section deals with the assessment of the baseline knowledge of staff nurses regarding mechanical low back pain.

Out of 25 questions answered, the average score of staff nurses was 13.12. The range of score was between 9 and 20. The mean percentage was 52.8%.

## Section 3

A significant reduction in the level of back pain was found in the samples after the practice of back strengthening exercises. The statistical Z test reflects the significance in the enhancement of overall scores at  $p < 0.05$  level (1.96)

The obtained value was found statistically significant and hence research hypothesis, (H1: There will be significant reduction in the intensity of mechanical low back pain among staff nurses after practicing back strengthening exercises.) was accepted. It was inferred that there was a significant reduction in the level of mechanical low back pain among staff nurses after the practice of back strengthening exercises.

## Section 4

In order to find out the association between pretest level of low back pain and selected demographic variables Chi square test was used. None of the socio demographic variables showed any association with mechanical low back pain.

## Conclusion

**Based on the findings of the study, the following conclusions were made**

- The mean pretest level of mechanical low back pain among staff nurses was 4.46.
- The mean post-test level of mechanical low back pain among nurses after the practice of back strengthening exercises was 1.22.
- There was significant reduction in the level of back pain after the practice of back strengthening exercises which reveals that the exercises was highly effective.
- There is no significant association between the pretest level of mechanical low back pain and the selected demographic variables.

## Nursing implications

The investigator has derived the following implications from the study which are of vital concern in the field of

nursing practice, nursing administration, nursing education, and nursing research.

## Nursing practice

- Being a primary care provider, nurses have a vital role in patient care which includes frequent shifting, turning and lifting of patients while they are giving care to bedridden patients. Incorrect body mechanics and prolonged standing during their working hours can lead to back pain in staff nurses thereby affecting the quality of care delivery.
- The knowledge and awareness of nurses regarding the proper body mechanics and care of back can help the patients also as, this information can be passed on to the patients through health education.

## Nursing education

- The findings of the present study would lead the nurse educators and students to understand the needed areas for education among nurses suffering from back pain
- The student nurses should be equipped with current knowledge by conducting journal clubs and helped to identify their role in patient education.
- Nurse educator could conduct regular in-service education programs to influence staff nurses to review their existing knowledge and update their knowledge for improving their own knowledge status and physical status as well as to update their knowledge for patient teaching.
- Students can organize regular health education sessions in the wards as well as community.
- The educational materials related to back care and back strengthening exercises can be made available in the clinical set ups as leaflets.

## Nursing Administration

- Conducting educational sessions on various topics such as importance of maintaining correct body mechanics, can be made mandatory in every nursing unit.
- Staff nurses should be motivated to provide incidental and planned health teaching programs as an individual or group basis.
- They should provide adequate facilities in reducing the overburden of nurses in shifting of patients by providing with adequate supportive devices.

## Nursing research

- Nurse educators can encourage students to develop a positive attitude towards research and to foster a spirit of enquiry by reviewing the research articles.
- Nurse researchers can replicate this study with larger sample as well as longer duration to get better outcomes.
- They can make use of this study to know the demographic variables which have association with mechanical low back pain of nurses.
- The present study can be used as a reference by the new nurse researchers.

## Recommendations

- Follow up study can be conducted to assess the level of back pain among who are practicing it.
- Similar study can be replicated with large sample size and greater duration in different settings.

- It can be conducted in other areas other than medical field where there is a need for back strengthening exercises.
- The study can be conducted as an exploratory study to find out the risk factors of mechanical low back pain among staff nurses.
- The study can be conducted among other professionals.

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