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Effect of Segmental Stabilization Exercises with Ergonomic Modification in Nurses with Mechanical Back Pain

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ABSTRACT

Introduction and Aim: Mechanical low back pain is the second leading cause of absenteeism from work. Recurrent low back pain represents a major challenge for both the medical community as well as for the industrial sector. The purpose of the study is to find out the effect of segmental stabilization exercises with ergonomic modification on in nurses with mechanical back pain.

Materials and Methods: True experimental study design with 80 Nurses was selected and was divided into two groups with 40 Nurses in each group. There were dropouts of 6 nurses due to their commitments, so the study concludes with 37 nurses in each group. The experimental group receives Segmental stabilization exercises for the low back with ergonomic advice, whereas the control group receives segmental stabilization exercises alone. General introductions about the ergonomics were detailed to both the groups. The study was carried out for 8 weeks of duration. Pain, functional disability, and Transverse Abdominis muscle activity were assessed before and after the interventions. Statistical analysis: Data were analyzed using SPSS 20.1.

Results: Pain was found to be 6.38±0.638, Transverses Abdominis muscle activity as 6.93±1.01and the functional disability was found at 16.00±1.00.

Conclusion: The study concludes that stabilization exercises with ergonomic modification have improved significantly than the control group.

Key Words: Low back pain, Nursing professionals, Ergonomic advices, Functional disability, Transversus Abdominis muscle activity.

INTRODUCTION

Nurses encompass autonomous and collaborative care for all age groups. Nurse's offers care and comfort; often, they end up with discomfort at the back for their efforts (1). Work-related musculoskeletal disorders occur in various occupations, and it is a major problem in the health care and socioeconomic status of the country. Low back pain (LBP) is the second leading cause of absenteeism from work (2). It has been reported that 60% – 80% of the general population suffers from LBP at some time during some point in their lives (3). Nurses have a lifetime prevalence of 56% and 90% (4).

Nursing is one of the health care professions who do repeated activities that involve more of lumbar spine movements. Activities such as Bed making, Turing bedridden patients, Transferring patients in the stretcher, or in toilet produce more significant stress in the low back (5). Functional disability is the most common dysfunction following LBP, and it is considered to be the third most common cause of disability (6). Bed making increases the risk of back injury because of the bending & stretching involved in putting sheets onto a bed (7). 83% of back injury occurs due to lifting and transferring patients. 40.1% of nurses reported back pain in Australia due to manual handling (8).

LBP occurs due to repetitive activities performed

by the nurses during clinical care. The repetitive task, high force, direct pressure, and awkward joint and prolonged constrained postures are aided as primary risk factors, making workers particularly vulnerable to musculoskeletal injury. Nurses required to lift and transport various equipment, in a different environment are injured frequently (9).

Various studies have advocated that poor working environment and inappropriate lifting procedures are the major causative factors for low back pain in nurses (10). Multiple studies showed that nurses who have poor knowledge of back hygiene also have no positive impact on the working health of the nurses (11). Many prevalence studies have identified that nurses have more incidence of LBP occurrence when compare to the general population. They have a higher rate since they involve more patient handling services (12).

Studies on the work-related back pain have found that 40% of nurse's get injure their back as a result of transferring the patient (13). The lifetime incidence of the low back injuries in nurses varies from 35%-85% (14). Occupational back pain among nurses has been the subject of research studies by many investigators in various countries (15-17).

Management concepts for LBP in nurses have been adopted by various researchers from back health education programs or Back schools to medications or physiotherapy measures (18). Back schools create awareness about back pain. There are limited numbers of studies focused on workplace ergonomics and work-related problems; however, the results are not confirmatory (19).

Chronic back pain may cause the weakness of the deep muscles like multifidus and the transverse abdominis, and they are the muscle which provides stabilization of the segments of the vertebra (20). Stabilization exercises are the best form of exercises that are widely useful for chronic back pain. These exercises are the focus on core strengthening, mobility control with control of the muscle activity, which is become very important in LBP (21).

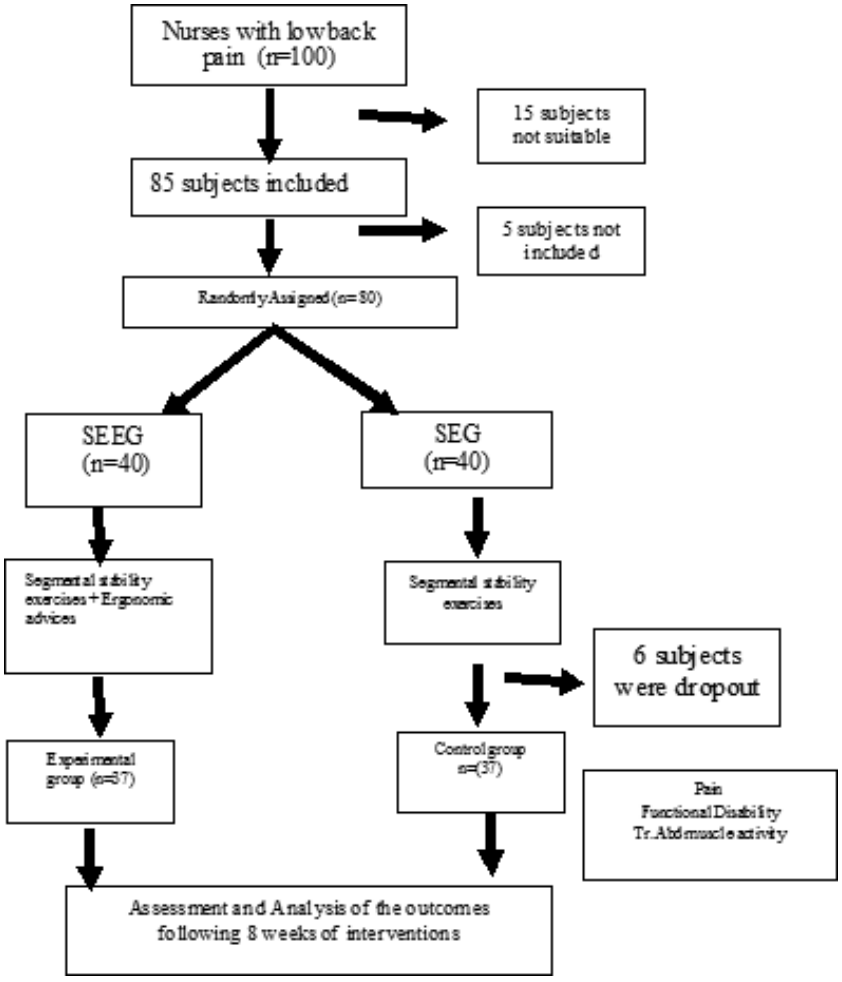
Since there is a gap in the knowledge of the effect of exercises on the LBP, this study identifies the effect of segmental stability exercises with the ergonomic modification on nurses with low back pain. The study hypothesized that there would be no significant differences found on segmental stability exercises with ergonomic modification.

MATERIALS AND METHODS

True experimental study design with a group of 100 nurses was evaluated for the study in a multispecialty centre. The nurses were given a detailed description of the study, and those who volunteered were involved in the research. Assessment of the volunteers was done by the clinical orthopedics and the senior physiotherapist. Those who were eligible for the study under the selection criteria were included in the study. 85 volunteer nurses were shown eligible for the study; in the group of 85 volunteer nurses, 80 were selected and divided into two groups. The experimental group includes 40 nurses and a control group, which includes 40 nurses. The nurses were divided using lottery method, and the researcher doesn't know about the division of the participants. Written consent was obtained from every individual nurses. The study was approved by the Institutional ethical committee. The participants included were female nurses with the age group of 25—45 years, working more than 5 years as nurse, Complains of low back pain and having a recurrence of at least twice in the last 6 months, and any medical problem or surgical cause of low back pain are not included, low back pain with radiation or sensory deficits were not involved in the study. A blinded assessor evaluates the study parameters pain using numerical pain rating scale, functional disability using Oswestry disability index and transverse Abdominis muscle activity using pressure biofeedback unit. An assessor is not part of the study. The participants were blinded from the treatment groups. Experimental group receives segmental stability exercises with ergonomic modifications was given called as stability exercises ergonomic group (SEEG) which was explained by Franca et al., 2012 (22) which includes pelvic bridging, 3 point kneeling, 4 points kneeling 2 points kneeling, clocking of pelvis, cobra exercises, planks, crunches, and prayers stretch. Each exercise session consists of 5 minutes of Warm up, 30 minutes of regular exercise program and 5 minutes to cool down. Frequency of exercise program is 3 times per week which was followed by detailed ergonomic advice on how to stand erect, maintenance of posture, proper lifting techniques with work station modifications like chair height alteration, medicine table usage were advised. The control group who receives only segmental stability exercises only, which was called

as stability exercises group (SEG) same exercises followed like an experimental group; they have not given any note on ergonomic interventions. Both the group receives a video session on the maintenance of correct body postures, lifting techniques, standing and walking techniques, and prevention of low back injuries for 30 minutes with description. During the study, six nurses were dropout because of an increase of symptoms in two nurses, two got relocated to another hospital, one got married, and one walked out of the study without reason. So the study completed with 37 nurses in each group.

STUDY FLOW CHART



RESULTS

Descriptive statistics were used to analyze the demographic data and inferential statistics used to analyze the difference between the experimental group and the control group. The analysis was done using SPSS 20.1. The basic demographic interpretations were detailed in Table I, and the interpretations and analysis of the outcome measures were shown in Table II.

Table I: Demographic Analysis of the participants

S.N	Characteristics	Percentage (%)	Mean ±S.D
1	Age		
	25—30 years	29%	27.38 ±1.60
	31—35 years	30%	32.91 ±1.31
	36—40 years	19%	38.43 ±1.22
	41—45 years	22%	43.34 ±1.36
2	Food habit		
	Vegetarian	31%	40.55 ±3.36
	Eggaeterian	29%	32.33 ±6.55
	Non Vegetarian	40%	32.50 ±4.93
3	Educational Qualification		
	GNM	47%	38.47 ±5.02
	Bsc Nursing	33%	30.22 ±5.91
	Msc Nursing	20%	32.21 ±2.64
4	Ergonomic Knowledge		
	Yes	54%	33.48 ±5.70
	No	46%	36.44 ±6.50
5	Management		
	Medical	21%	37.67 ±5.16
	Physiotherapy	15%	34.00 ±5.54
	Self Medicine	30%	33.41±6.75
	Ayurveda	10%	33.50 ±5.71
	Rest	16%	37.77 ±6.13
	Others	8%	29.83 ±4.26

Table II: Analysis of the Outcomes with the level of significance

Outcome measure	No of participants	Pre Mean ±S.D		Post Mean ±S.D		Student t value & level of significance
		SSEG	SSG	SSEG	SSG	
Pain evaluation	37	6.19 ±0.62	6.30±0.57	0.84±0.76	1.78±0.48	6.38±0.638 $p < 0.0001$
Tr Ab Muscle Activity	37	6.49± 1.32	6.54±1.12	1.11±0.94	2.73±1.07	6.93±1.01 $p < 0.0001$
Functional Disability	37	16.03±1.71	15.98±1.48	6.08±0.83	9.81±1.15	16.00±1.00 $p < 0.0001$

DISCUSSION

This study aim was to identify the effect of segmental stability exercises with the ergonomic modification on nurses with low back pain. Low back pain is frequent in working populations, which is very common as a result of repetitive tasks. Repetition of activity results in frequent stretching of the tissue, which traumatize the muscles, ligaments, and the surrounding tissues. Many studies have been performed in various occupational settings, indicating a strong association between musculoskeletal disorders and work-related factors (23). Nurses are one of the common professions suffer from various musculoskeletal disorders (24).

Pain is predominant in low back pain patients, which intern causes muscle weakness (25), it was evident that following an episode of back pain with more than two weeks of duration. Nursing professionals are more prone to have various musculoskeletal disorders. Training on safe lifting procedures and body mechanics education will help in reducing pain (26). Studies show that weekly exercise program directed to nursing personnel can modify physical capacity and reduce occurrence of musculoskeletal symptoms (27).

Segmental stabilization exercises play a major role in the reduction of chronic low back pain. Training deep trunk muscles with the isolation of movements adding demands to the task and to train the coordination of the deep and superficial trunk muscles could help in reducing the low back pain28. Segmental stabilization exercises are designed to improve the strength of the trunk muscles and also aids in activate the trunk muscles (29). This exercise not only improves muscle strength but also helps in the improvement of Endurance of back muscles (21).

Ergonomic modification finds that plays a bigger role in the prevention of recurrence of low back pain. Studies have identified that ergonomic programs with the postural aspects for patient's lifting and handling can prevent back impairment and improve patient management skills (30). Multiple studies show that ergonomic devices help in the prevention of back pain, which strongly supports the present study. There was no long term follow up for the study, the time duration for the exercises was much limited, adding sophisticated techniques like EMG studies, Ultrasound measurement or force platforms which help to monitor the muscle function much accurately.

In conclusion, 8 weeks of segmental stability exercises with the ergonomic modifications in low back pain patients reduces pain, improves the functional disability and muscle endurance. However, the exercises were effective in both the groups as well, and the addition of the ergonomic modification will have an added role in the reduction of the symptoms.

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Conflict of Interest: NIL

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