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Sandipkumar. Parekh and Ekata Mehta

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RESEARCH ARTICLE

EFFECTIVENESS OF ERGONOMIC ADVICE AND PHYSIOTHERAPY INTERVENTION IN INDIAN NURSES WITH LOW BACK PAIN

Sandipkumar. Parekh¹ and Ekata Mehta²

¹MPT(Ortho) Parul University, Limda

²Interns in Parul Institute of Physiotherapy

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ABSTRACT

Background: Musculoskeletal disorders represent a significant occupational problem among nurses. It is established that nurses suffer from varying degrees of musculoskeletal disorders (MSD) in different regions of the body which results in frequent loss of work days. Nursing is a profession with high incidence and prevalence of back pain. Exclusive to this systematic review is the examination of different intervention strategies adopted to curb the occurrence of work related musculoskeletal disorders among nurses, specifically physical exercise/therapy.

The aim of this study was to determine the effect of such an ergonomic and ergonomic plus physiotherapy treatment on functional and symptomatic parameters of moderately disabled nurses with chronic low back pain.

Study Design: Experimental design.

Methods: 30 patients (nurses) were selected randomly from the hospital and were divided into two equal groups. Both Group A & B were given ergonomic intervention for 4 weeks. And Group A was given Physiotherapy intervention for 4 session/week, up to 4 weeks.

Outcome Measure: VAS (Visual Analogue Scale), Oswestry low back pain disability.

Result: In Group-A (Physiotherapy plus ergonomic) and Group-B (ergonomic), all data was expressed as mean \pm SD and was statistically analysed using paired 't' test and independent 't' test to determine the statistical difference among the parameters at 0.5% level of significance. Statistical data of VAS & Oswestry low back pain disability scores showing that, Group-A is significantly different from Group-B with $p < 0.05$; i.e. 95% of significance.

Conclusion: In this study conclude that Physiotherapy plus ergonomic intervention to give greater improvement in pain, and functional performance in chronic low back pain among nurses.

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INTRODUCTION

Nurses are part of the multi-disciplinary medical team at hospitals and other medical centers that are susceptible to WMSD.^{1,2} The lower back has been identified as the most vulnerable anatomical site of WMSD among the nursing fraternity.^{1,3}

Nursing, the biggest health care profession, is globally dominated by female population. It also involves helping the patient to adjust to unalterable situations such as personal, family and economic conditions, teaching him and others at home and community to take care of one another.^{4,5}

Work related musculoskeletal disorders (WMSD) are an important occupational health issue among all health care

workers. WMSD is a collective and descriptive term for the symptom caused or aggravated by work and characterized by discomfort, impairment, disability or persistent pain.^{1,6}

Non-specific low back pain is defined as low back pain that is not attributable to a recognisable, specific pathology. As more than 84% of the worldwide population will experience LBP at least once during their lifetime, this disease is now recognised as a major public health problem.^{7,8} Recent data have shown that in the past decade the proportion of physician visits attributed to LBP has not changed, but the cost of treating LBP has increased substantially. In about 10 – 15% of patients, acute LBP will develop into chronic LBP.⁷ Whilst this percentage is small, this group consumes the most resources through the direct and indirect costs associated with the consequent loss of productivity and earnings.^{7,9}

*Corresponding author: Sandipkumar. Parekh
Parul University, Limda

Whilst the risk factors for developing LBP amongst nurses have been clearly identified, there are a limited number of studies that evaluate the knowledge of nurses regarding the prevention and self-treatment principles for LBP.⁷ As both clinical evidence and patient preferences should be taken into account when treating this problem, an increased knowledge of intrinsic risk factors for nurses will aid in the better management of the symptom or medical condition.^{7,8}

Most nurses mention that patient transfer, standing for a long time, and activities that are physically demanding are the main causes of their low back pain (Mohseni-Bandpei *et al.*, 2005). According to earlier studies, more than 40% of the nurses' injuries result from patient transfer of which 75.9% cause low back pains (Fujishiro *et al.*, 2005).¹⁰

Studies in other countries show that the control and treatment of low back pain are not similar in different countries, and physicians and health experts adopt different treatment methods. One of these methods is back health education programs or Back School, which consists of programs such as education and increasing awareness about chronic low back pain, structure and function of the spine, preserving the correct posture of the spine, and performing special back Exercises. A few studies have focused on the nurses' physical conditions, workplace ergonomics, received instructions, and their effects on work problems and musculoskeletal and occupational injuries (Alexandre, de Moraes, CorrêaFilho, & Jorge, 2001; Menzel, Brooks, Bernard, & Nelson, 2004; Nakhæi *et al.*, 2006).¹⁰

The most anatomical site was the lower back. WMSD among the nurses were 44.1%.¹¹ there is variability in the prevalence rates of LBP reported in the nursing literature.^{12,13} A numbers of prospective studies have further confirmed the high incidence, and prevalence, of back pain in the nursing profession internationally.^{12,14}

Prevention of LBP: While measures to reduce the risk of LBP in nursing through the banning of dangerous lifting techniques, the provision of lifting aids and ergonomic interventions are necessary and most welcome, LBP continues to be a problem in this profession.¹²

Intervention commonly used are manual therapy, trunk coordination, strengthening, and endurance exercises, patient education and counselling, Centralization and directional preference exercises and procedures, lower-quarter nerve mobilization procedures, progressive endurance exercise and fitness activities¹⁷

Regarded throughout the world as one of the most strenuous physically and emotionally demanding work, nursing involves typical shift work that disrupts the circadian rhythm, causing several acute and chronic health problems in nursing personnel⁴

Nursing is established as a high-risk occupation for musculoskeletal disorders and, in particular, low back pain (LBP).¹² As per the high incidence of LBP in nurses we need to

decrease the incidence by giving physiotherapy treatment and ergonomic advice to make the nurses comfortable and get rid of the musculoskeletal disorder. And prevent abesentisum during their work due low back pain Aim of this study was to determine the effect of such an ergonomic and ergonomic plus physiotherapy treatment in nurses with low back pain.

MATERIAL AND METHODOLOGY

Study Design: Comparative study

Study setting: District Vadodara

Sample Method: Convenient sampling method

Sample size: Study will be done on 30 subjects who will fulfil the inclusion and exclusion criteria in Indian nurses.

Inclusion Criteria

- Age and Sex: 30 to 50 years.
- Only Nurses
- Working hour minimum 35 to 40hours per week

Exclusion Criteria

- History of hospitalization in last 6months.
- Any abdominal surgery.
- worsening neural signs, had any neurological or orthopaedic condition that would interfere with treatment, or were awaiting surgery
- Any kind of congenital condition.
- Severe symptomatic disease

Outcome Measure/Evaluation Tool

VAS
Standard Nordic Questionnaire
Oswestry low back pain disability

METHODOLOGY

Group A (15 Nurses) Ergonomic Interventions plus physiotherapy intervention, *Group B* (15 Nurses) Ergonomic intervention.

Subjects will be explained about the Research and treatment protocol. Inform consent form will be signed by the subject before the treatment start. Subjects will be screened using an Assessment Form and Outcome measure before and after the Program (After 4 week).

Both group received ergonomic interventions.

Procedure

Group A: Physiotherapy interventions plus ergonomic intervention^{18, 30}

Each subject received physiotherapy treatment 4 sessions a week for four weeks. Manual therapy treatment involved symptom management according to the discretion of the

treating physiotherapist, who chose from spinal mobilization/manipulation, soft tissue massage, but not electro physical modalities.

Each subject participated in specific trunk muscle training both on an individualized level on four occasions per week and through a standardized home-exercise program. This program was conducted according to the protocol described by Richardson and colleagues (Richardson and Jull 1995). Subjects were instructed to maintain the home program indefinitely. Compliance with the home program was not assessed. Outcomes were assessed pre and post to the whole treatment protocol of 4 week.

Group B: Ergonomic advice^{17, 19, 20}

Each subject received ergonomic advice 4days a week. Patient education and counselling:

1. Promote extended bed-rest or
2. Provide in-depth, pathos-anatomical explanations for the specific cause of the patient’s low back pain. Patient education and counselling strategies for patients with low back pain should emphasize on Ergonomic advice:
 - banning of dangerous lifting techniques the provision of lifting aids
 - Techniques for manual patient handling

If you must manually move a patient:

- Adjust height of bed to waist height
- Assure bed/gurney is locked
- Do not twist, pivot your whole body
- Bend your legs, not your back
- Neutral spine
- Know your own limitations
- Get help

Important body mechanics

- Wear slip resistant shoes
- Lower your body to get close to an object
- Bend from hips and knees, not back
- Get helps if the person or object is too heavy
- Do not reaches above head, use a stool or ladder for high objects

Important Considerations

- Manual lifting of patients should be minimized or eliminated
- Ask for help
- Training and evaluation for competence
- Make suggestions to management for areas of improvement
- Evaluate/inspect equipment prior to use
- ALWAYS report injuries

Statistical Analysis

All statistical analysis was done using SPSS 17.0 software for windows. Descriptive analysis was obtained by mean & standard deviation.

The collected data were subjected to paired “t” test individually for experimental group A and experimental group B

RESULT

This study was to analyze In Group-A and Group- B, all data was expressed as mean ± , SD and was statistically analyzed using paired ‘t’ test and independent ‘t’ test to determine the statistical difference among the parameters at 0.05% level of significance. Paired‘t’ test was used to examine the changes in dependent variables from baseline to after completion of intervention in each group. The pre-test mean value, of VAS, Oswestry low back pain disability in Group-A was 5.2667, and 17.933post-test is 2.1333and 7.9333, ‘t’ value = 16.328, and 8.885, p<0.01.The pre test mean value, of VAS, Oswestry low back pain disability respectively in Group-B is 5.80, and 26.86 post-test is 3.66and 19.26, ‘t’ value = 12.91, and 8.40, p<0.05.

Table 1 Comparison of Pre and Post-test values of VAS and Oswestry low back pain disability in Group A and Group B.

	Group A			Group B		
	mean	SD	p value	mean	SD	p value
VAS	pre 5.2667	0.96115	0	16.328	4.8	1.14642
	post 2.1333	0.99043		3.6	1.40408	0
Oswestry low back pain disability	pre 17.933	6.40833	0	8.885	16.93334	7.2783
	post 7.9333	5.14735		12.73334	5.7426	0.001

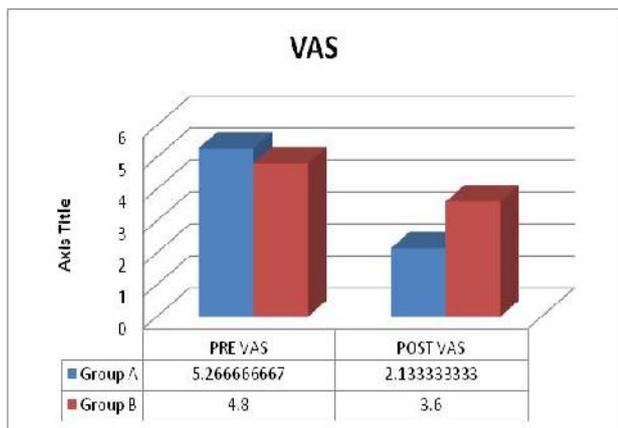
Oswestry low back pain disability in Group A and Group B.

Table 2 Comparison of Pre test and Post test differences in VAS and Oswestry low back pain disability scores in Group A and Group B.

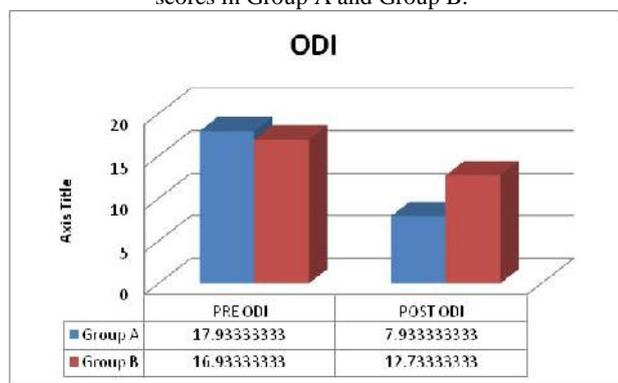
		Mean	SD	T value	P value
VAS	Group A	3.1333	0.74322	6.244	0
	Group B	1.2	0.94112		
Oswestry low back pain disability	Group A	10	4.3589	3.867	0.001
	Group B	4.2	3.83964		

The independent ‘t’ test is done to calculate the significance of difference in VAS scores between Group-A and Group-B. The mean of differences in VAS scores between pre and post- test in Group-A is . 3.1333 (SD=.74322) and in Group B is 1.2000 (SD=.941), t= 6.244.

The independent ‘t’ test is done to calculate the significance of difference in Oswestry low back pain disability between Group-A and Group-B. The mean of differences in Oswestry low back pain disability between pre and post- test in Group-A is 10.0000 (SD=4.35890) and in Group B is 4.2000 (SD=3.83964), t=3.867. Thus from above statistical data of VAS, Oswestry low back pain disability, Group- A is significantly different from Group-B with p<0.05; i.e 95% of significance. Hence we reject the null hypothesis.



Graph 1 Showing the Pre-test and Post-test differences in VAS scores in Group A and Group B.



Graph 2 Showing the Pre-test and Post-test differences in ODI scores in Group A and Group B.

DISCUSSION

Work related musculoskeletal disorders (WMSD) are an important occupational health issue among all health care workers. WMSD is a collective and descriptive term for the symptoms caused or aggravated by work and characterized by discomfort, impairment, disability or persistent pain. Yassi and Lockhart systematic review concluded a causal relationship between nursing tasks and lower back pain.

This study was done on nurses having occupational low back pain. This was the comparative study between ergonomic intervention work over back pain is more effective or physiotherapy plus ergonomic advice.

These findings show that a combined physiotherapy treatment consisting of manual therapy, specific exercise training, and neurophysiology education is effective in producing functional and symptomatic improvement in chronic low back pain in nurses.

Regarded throughout the world as one of the most strenuous and physically and emotionally demanding work, nursing involves typical shift work that disrupts the circadian rhythm, causing several acute or chronic Low back pain³.

The results of the study are in favour of GROUP A Physiotherapy plus ergonomic intervention. In this study, low

back pain has been relieved after physiotherapy plus ergonomic intervention. The current results suggest that the combined physiotherapy treatment is probably more effective than the ergonomic,^{18,29}. This was primarily evidenced by the fact that most of the effects of sole treatments reported in the literature are small, particularly in those studies that involved subjects with high initial disability levels.

This result of study coincides with the study of Moseley L (2002)¹⁹: Combined physiotherapy and education is efficacious for chronic low back pain.

Group B which had undergone only ergonomic intervention also showed significant effectiveness in pain relief coinciding to various research works showing similar results³¹.

Nevertheless even when both groups (A & B) were effective in chronic low back pain, Group A had greater effectiveness in pain relief and improved functional performance in nurses. Researches proved that physiotherapy plus Ergonomic intervention more effective.

CONCLUSION

In this study, we conclude that Physiotherapy plus ergonomic intervention to give greater improvement in pain, and functional performance in chronic low back pain among nurses.

Limitations of study

- The study was not conducted on a large scale and study sample was considerably less.
- There was no electrotherapy modality included in the intervention program.
- Psychological and environmental factors were not taken into consideration.
- Both genders were included as subjects in the study.

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