

Original Article

A COMPARATIVE STUDY BETWEEN ERGONOMIC ADVICES VERSUS ERGONOMIC PLUS PHYSIOTHERAPY INTERVENTION IN LOW BACK PAIN AMONG FARMERS

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ABSTRACT

Background: In most countries, agriculture is recognized as one of the most hazardous industries. There is a host of injuries and illnesses in agriculture that have been consistently identified through epidemiological and community-based studies as in need for controlling due to their high reporting rates among agricultural workers. Low-back pain is a common and important clinical and public health problem. Low back problems affect the spines flexibility, stability, and strength, which can cause pain discomfort and stiffness. The prevalence of occupational low-back pain varies between industries and occupations and there is an association with heavy physical work, static work postures such as prolonged sitting, vibration and psychosocial factors such as work dissatisfaction.

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 farmers with chronic low back pain.

Study Design: Experimental design.

Methods: 30 patients (farmers) were selected randomly from the population using simple random sampling procedure (Lottery Method) and were divided into two equal groups. Both Group A & B were given ergonomic intervention for 4 weeks. And Group B was given Physiotherapy intervention for 2session/week, up to 4 weeks.

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

Results: In Group-A (Ergonomic) and Group-B (Physiotherapy plus 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-B is significantly different from Group-A 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 farmers.

KEYWORDS: Low back pain, ergonomic, physiotherapy intervention, Farmers.

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INTRODUCTION

The agriculture sector employs about half the world's entire workforce, with an estimate of 1.3 billion workers (ILO, 2003)¹. In most countries, agriculture is recognized as one of the most hazardous industries. There is a host of injuries

and illnesses in agriculture that have been consistently identified through epidemiological and community-based studies as in need for controlling due to their high reporting rates among agricultural workers. These include musculoskeletal disorders, respiratory disease;

noise induced hearing loss, pesticide-related illnesses, and increased reporting of cancer cases^{2,3}. However, it has been consistently shown that musculoskeletal disorders (MSDs) are the most common of all occupational non-fatal injuries and illnesses for farm workers, especially those who are involved in labor-intensive practices.^{4,5,6}

Agricultural workers involved in labor-intensive practices are exposed to a multitude of MSD risk factors. The literature has shown three main risk factors that are of utmost priority in agriculture (Meyers et al., 2000, 1997, 2001). These include: lifting and carrying heavy loads (over 50 lb); sustained or repeated full body bending (stoop); and very highly repetitive hand work (clipping, cutting)^{7,8,9}.

Stooped postures have probably been with us since the first human ancestors began walking upright. In the modern world, it might appear that stooped postures are confined to work in developing countries or less mechanized workplaces. However, nothing could be further from the truth. Stooped postures are commonly found in agricultural, construction, mining, and other workplaces all around the world. Further, work requiring stooped postures are strongly associated with high incidence of low back disorders (LBDs).¹⁰

Nwuba and Kaul¹¹ also examined the working posture of the Nigerian hoe farmer. They reported that workers developed strains in the low back, which were injurious to their health. In agricultural works, the most common musculoskeletal disorder is the low back pain. Low back problems are common in farmers, and appear to be associated with the amount of posture require back flexion and carrying and lifting of heavy loads during performance of different agricultural task¹².

The prevalence of low back pain (LBP) in farmers has been reported to be around 50%, which is higher than other manual laborers (about 37%)¹³. Postures especially severe flexion or lateral twist and bending have been found to be significantly related to low back pain.¹⁴

Gangopadhyay et al.^{15,16} also suggested that working in a squatting and stooped (awkward) posture for a prolonged period of time may lead to musculoskeletal disorder especially low back

pain among the different group of workers. Low-back pain is a common and important clinical and public health problem. Low back problems affect the spines flexibility, stability, and strength, which can cause pain discomfort and stiffness¹⁷. The prevalence of occupational low-back pain varies between industries and occupations and there is an association with heavy physical work, static work postures such as prolonged sitting, vibration and psychosocial factors such as work dissatisfaction.¹⁸

Sick leave and disability due to LBP is a common, cross national problem. Because the disability rates and costs due to long term sick leave are increasing in many industrialized countries, the International Social Security Association (ISSA) initiated a multinational study to identify successful medical, ergonomic, and social security interventions for the return-to-work of workers long term sick listed due to LBP.¹⁹

Ergonomics is the science of designing the job, equip-ment, and workplace to fit the worker, while main-taining the efficiency of people in the workplace. The use of ergonomics keeps workers safe, comfortable, and productive. Improving work posture, reduced force, and less repetition prevents injuries. Due to the labor-intensive nature of farming, ergonomics can be of great value in reducing the risk of injuries. Remember that old habits do die hard and many farming practices have been passed down from generation to generation. Following a few simple ergonomic guidelines can prevent injuries that develop because of continuous physical activity over a long period of time.²⁰

Chronic low back pain is a multifactorial phenomenon and it is not surprising that many therapeutic approaches exist. Some approaches are ineffective²¹ but Physiotherapy(manual therapy , specific muscle training,)cognitive behavioral therapy and multidisciplinary pain management programs have all been supported. Distinct approaches tend to target distinct effects. For example, manual therapy (mobilisation and/or manipulation of the lumbar spine) is effective in reducing pain^{21,22,23} (Andersson et al 1999, Cherkin et al 1998, Triano et al 1995), and specific exercise programs which aim to restore normal function of the trunk muscles are effective in reducing disability and

increasing performance at least in mildly disabled patients (Mannion et al 1999, O'Sullivan et al 1997).^{24,25}

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 farmers with chronic low back pain.

MATERIALS AND METHODS

Study design: Experimental Study(Comparative)
Study Setting : In around District Vadodara, Gujarat, India.

Sample Size & Technique: Convenient Sampling Method, Study will be done on 30 subjects who will fulfill the inclusion and exclusion criteria in farmers.

Inclusion Criteria:

- Age and sex : 30 to 50 years. Male.
- History of low back pain of greater than two months.
- Working hour minimum 30 hour per week .

Exclusion Criteria:

- History of hospitalization in last one year
- Acute low back pain.
- 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.

Methods: Group A (15 Farmers) Ergonomic interventions, Group B (15 farmers) Ergonomic pulse physiotherapy interventions. 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^{16,26,27,28,29}

1. The break may consist of frequent short breaks, such as 5 minutes after every hour.
2. The workers may carry saplings/crops on their back instead of head and explore the possibility of appropriate backpack.

3. Alternate low-repetition tasks with tasks that require repetitive motion, such as in picking or weeding, for adequate recovery from the repetitive motion task.

4. Strain on the lower back and legs are reduced by sitting down while working. Standing causes legs to swell (more than walking does). The best jobs are ones that allow workers to do different types of work, changing from sitting, to standing, to walking and back again.

5. Squat with heels on the ground. Keep your back relatively straight, feet apart about a foot and toes pointed outward.

6. When lifting, keep the loads between hand level and shoulder level. Avoid lifts from the floor or over shoulder level.

7. When carrying objects more than a few feet, it is best to utilize dollies, pallet trucks, or utility carts. Use roller conveyors for bags or boxes of vegetables or highly used chemicals. This will reduce the amount of lifting.

8. Bend the knees at a right angle. Keep knees even with or slightly higher than your hips (use a footrest or stool if necessary). Avoid crossed legs.

9. Try to avoid sitting in the same position for more than 30 minutes.

Group B: Physiotherapy interventions.

Each subject received physiotherapy treatments twice 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 two 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.

- VAS(Visual Analogue Scale)
- Oswestry low back pain disability questionnaire

STATISTICAL ANALYSIS:

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

RESULTS AND TABLES

This study is 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 0.5% 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 is 5.53, and 26.20 post-test is 4.86 and 23.86, 't' value = 3.16, and 4.39, p<0.05. 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 3.66 and 19.26, 't' value = 12.91, and 8.40, p<0.05.

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 .6667 (SD=.81650) and in Group B is 2.1333 (SD=.63994), t= 5.476. 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 2.3333 (SD=2.05866) and in Group B is 7.6000 (SD=3.50102), t=5.022.

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.

Table 1: Comparison of Pre and Post-test values of VAS scores in Group A and Group B.

VAS	Group A			Group B		
	Mean	SD	p value	Mean	SD	p value
Pre	5.53	0.74322	p<0.05	5.8	0.7746	p<0.05
Post	4.86	0.63994		3.67	0.48795	
t value	3.16			12.91		

Table 2: Comparison of Pre and Post-test values of Oswestry low back pain disability scores in Group A and Group B.

Oswestry low back pain disability	Group A			Group B		
	Mean	SD	p value	Mean	SD	p value
Pre	26.2	3.48876	p<0.05	26.86	2.77403	p<0.05
Post	23.86	2.64215		19.26	1.90738	
t value	4.39			8.4		

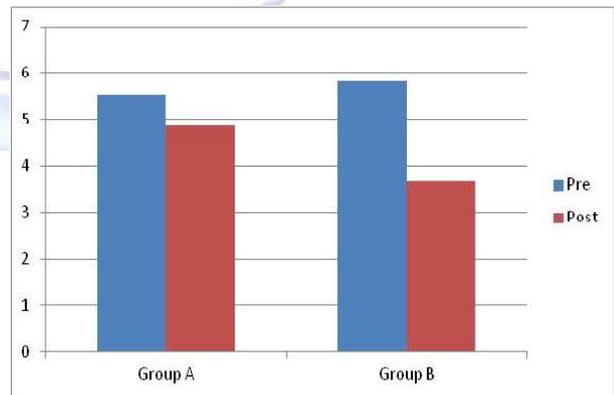
Table 3: Comparison of Pre test and Post test differences in VAS scores in Group A and Group B.

Mean of differences in VAS scores Pre test and Post test	Mean	SD	T value	p value
Group A	0.6667	0.8165	5.476	p<0.05
Group B	2.1333	0.63994		

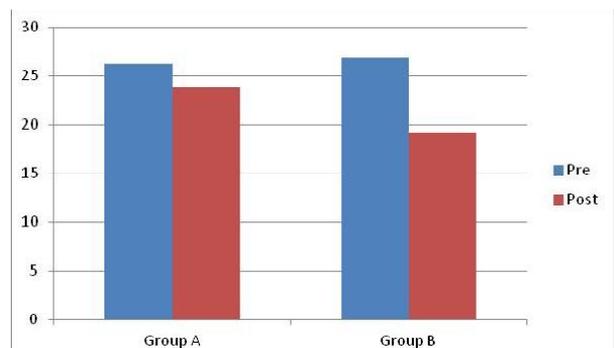
Table 4: Comparison of Pre test and Post test differences in Oswestry low back pain disability scores in Group A and Group B.

Mean of differences in Oswestry low back pain disability scores Pre test and Post test	Mean	SD	T value	p value
Group A	2.3333	0.0587	5.022	p<0.05
Group B	7.6	3.501		

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



DISCUSSION

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 farmers.

The results of the study are in favor of 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. This is 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.

Chronic low back pain is heterogeneous and subjects vary across studies in their chronicity, pain intensity, functional level and pain impact. This means that the validity of a comparison between the current work and other studies is limited.

This result of study coincide with the study of Moseley L (2002): Combined physiotherapy and education is efficacious for chronic low back pain.²⁸

Group A which had undergone only ergonomic intervention also showed significant effectiveness in pain relief coinciding to various research works showing similar results^{30,34}.

Nevertheless even when both groups (A & B) were effective in chronic low back pain, group B had greater effectiveness in pain relief and improved functional performance in farmers. Researches proved that physiotherapy plus ergonomic intervention more effective.^{29,31,32}

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 farmers.

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.
- Only males were included as subjects in the study.

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