A Comparative Study on the Effects of Aerobic Exercises and Extension Exercises in Teachers with Low Back Pain

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Abstract

Background: Low back pain is a musculoskeletal problem for which teachers are more prone due to their working conditions. Conservative treatments have been proposed for teachers with low back pain such as aerobic exercises and extension exercises. However, there was a lack of studies showing the comparison of effectiveness between aerobic exercises and extension exercises in treating low back pain in teachers.

Purpose: To compare the effectiveness of aerobic exercises and extension exercises in reducing pain among teachers with low back pain.

Materials and Methods: Based on the inclusion and exclusion criteria, 30 participants who are teachers with Low back pain were recruited, and informed consent was acquired from the subjects. The volunteers were informed about the study’s safety and simplicity. The individuals were randomly assigned to one of two groups: the control group (n=15) which received Aerobic exercises and the Experimental group (n=15) which received Extension exercises. All individuals were assessed for pain using Numerical Pain Rating Scale as a pre-test prior to the intervention and again after 4 weeks of intervention. This entire process was performed between November 2022 to April 2023.

Result: Statistical analysis was done for all the collected data using paired t-tests and unpaired t-tests. The test shows significant effects (p<0.0001) in both groups. The test shows that the subjects who received Extension exercise have had pain relief.

Conclusion: The results and the data obtained from this research were statistically classified and can be concluded that Extension exercises had a definite and proven effect on Low back pain.

Keywords: Teachers, low back pain, Numerical Pain Rating Scale, Extension exercises.

Introduction

Different demands placed on school instructors, such as teaching, grading homework, revising exams, and using computers, may be viewed as a risk factor for low back pain. These circumstances and demands include those that involve extended sitting or standing.¹ Low back discomfort not only denotes a poor quality of life but also lower labor productivity as a result of absences, early retirement, and time off from

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work. The other factor that had a positive impact on low back pain was regular physical activity. Teachers who regularly exercised were 0.52 times less likely to develop LBP than those who did not.  

Exercise has a proven track record of reducing chronic low back pain and enhancing function and productivity. Exercise may lessen the severity of back pain, which is an important benefit when treating chronic back pain.  

The therapeutic approach of low back pain involves a number of different strategies. More and more people are supporting active therapy approaches, which motivate patients to engage in the healing process. According to current claims, these methods of treatment are successful in reducing discomfort and disability as well as boosting spinal flexibility and endurance.  

Aerobic exercise may be essential in the rehabilitation of Low back pain and keeping your low back healthy. Enhanced skeletal muscle oxidative capacity and enhanced neuromotor coordination and control may be a few advantages of Aerobic exercise for those with Low back pain.  

Some forms of exercise tend to be beneficial once the pain has become chronic, despite the fact that exercise therapy seems to be ineffective when the pain is acute. Traditional physiotherapy, medical resistance training, stretches, and freely selected exercise are a few examples of these. Particularly, lumbar extension has proven to be successful.  

Aim  
To compare the effectiveness of aerobic exercises and extension exercises in reducing pain among teachers with low back pain.  

Materials and Methods  
30 participants who are teachers in nearby schools with Low back pain were recruited, and informed consent was acquired from the subjects. The volunteers were informed about the study’s safety and simplicity. The individuals were randomly assigned to one of two groups: the control group (n=15) who received Aerobic exercises and the Experimental group (n=15) which received Extension exercises. All individuals were assessed for pain using Numerical Pain Rating Scale as a pre-test prior to the intervention and again after 4 weeks of intervention from November 2023 to April 2023.  

Inclusion criteria:  
- Teachers with Low back pain.  
- Age 41-60.  

Exclusion criteria:  
- Back pain due to lumbosacral strain.  
- Previous lumbar surgery.  
- Pregnancy.  
- Spinal pathologies.  

Outcome measures:  
Subjects were assessed for their level of pain prior to the beginning of treatment as pre-test and again after the intervention as post-test using Numerical Pain Rating Scale (NPRS).  

Procedure  
Based on the inclusion and exclusion criteria, thirty teachers who were experiencing low back pain were selected from the school. The teachers who had Low Back Pain with consent were randomly split into two groups (Group A-15, Group B-15). The pre-test i.e the pain intensity before intervention was administered to all subjects using the Numerical Pain Rating Scale, and the post-test is administered four weeks after the intervention.  

Control group: (group-A) aerobic exercise:  
Walking:  
- Walk steadily, swing your arms around freely, and try to stand as straight as you can.  
- From heel to toe, take a step with your feet in a rolling motion. Wear thick, comfy cotton socks and shoes. Best are sensible, lightweight, comfy shoes with support.  

Jogging:  
- Keep a straight back, tighten your core, and look forward while jogging.  
- Keep your shoulders upright and avoid sagging your head.  
- While drawing your shoulders back and down, enlarge your chest and maintain it raised.
Use a calm arm swing while keeping your hands free. The front crossing of your arms is not recommended.

Cycling:
- For 5 to 10 minutes, pedal slowly and easily.
- Then increase your speed until you begin to perspire.
- Take an additional five minutes to cool down by pedalling more slowly when you’re prepared to finish.

Protocol:
- Frequency: The subjects were asked to practice every exercise 3-4 times a week.
- Intensity: exercise enough to reach your target heart rate.
- Time: Each exercise is to be done for at least 20 minutes.

Experimental group: (Group-B) extension exercises:

Pelvic tilt:
- On the ground, with your knees bent, lie on your back.
- By contracting your abs and raising your pelvis a little, you can flatten your back against the floor. Maintain for up to 10 seconds.

Cat and camel:
- Make a camel hump posture by tucking your head and tailbone in and arching your spine simultaneously, take a deep breath in.

Cobra stretch:
- In a prone position, lay down.
- Lay down your entire body on your mat face down.
- Bring your hands up close to your shoulder blades.
- Start raising your upper body.
- To lift heavier objects, flex your lower back muscles.
- Look up and slightly in front of you.

Standing back extension:
- Put both hands just above your hips and behind your back.

Bend backwards gradually.
- If you need more stability, you can lean back against a kitchen counter.
- For up to 60 seconds, maintain the bent back position while keeping an eye on your symptoms.

Protocol:
The subjects were asked to practice every exercise twice in total of ten repetitions, 3-4 times a week.

Data analysis

Using Numerical Pain Rating Scale (NPRS), (Aerobic exercise) Group A’s post-test mean was 5.13, whereas (Extension exercise) group B’s was 3.20. This demonstrates that Group B (extension exercise) received a higher NPRS score than Group A (aerobic exercise).
Fig-1: Comparison of pre-test and post-test of NPRS in both the groups, Group A (aerobic exercise) and Group B (extension exercise) using unpaired t-test shows that, mean for group a pre-test was 6.87 post-test was 5.13 and group b pre-test was 7.00 post-test was 2.40.

Fig-2: Comparison of post-test of NPRS in both the groups, Aerobic exercise (Group A) and Extension exercise (Group B) Using unpaired t-test shows that, mean for post-test Group A was 5.13 Group B was 2.40. This suggests that group B (extension exercises) performed considerably better than group A (aerobic exercises). This strongly suggests that Extension exercises have a positive effect on reducing the Low Back Pain among the Teachers.

Discussion

Low back pain is a common issue experienced by many teachers. The nature of their profession often involves prolonged periods of standing, sitting, bending, and lifting, which can put strain on the lower back. It is quite concerning how common low back pain is in teachers. Numerous studies have indicated that teachers are particularly prone to experiencing low back pain. In this project comparing the effectiveness of extension exercises and aerobic exercises for teachers with low back pain, the findings highlighted that extension exercises were more effective in managing their condition.

The purpose of the study is to find the effect of Extension exercises in patients with Low Back pain. Research studies also stated that Extension exercises have significant improvement in patients with Low Back Pain.

Sculco, 2001 with a 2.5-year follow-up to an initial 10-week exercise program evaluated the effects of low to moderate aerobic exercises as an adjuvant therapy for LBPP in a neurosurgical practice. This study’s objective was to evaluate the influence of both short- and long-term AE on LBPP. In the first 10-week period, mental states, pain/symptoms, and AE were compared to non-exercising controls.

Rainville J, 2004 examined a number of important elements relating to the security and effectiveness of exercises that may aid medical professionals in comprehending the value of it in the treatment of chronic back pain.

Choi SY, 2001 studied whether exercise programs are effective in reducing pain, decreasing depression, improving strength and endurance in the female teachers who have low back pain.

Rittweger J, 2002 investigated if lumbar muscle force could be a reason for the low back pain and found that the lumbar muscle force is not responsible for the low back pain.

Meng XG, 2005 evaluated if aerobic exercise is effective in reducing low back pain and concluded that aerobic exercise is effective in reducing low back pain.

Smith D, 2011 studied if extension exercise is effective in treating low back pain and it came out to be effective in reducing the low back pain.


Bandpei MA, 2014 investigated teachers’ risk factors and prevalence of low back pain (LBP), as well as the relationship between personal and professional traits and LBP occurrence.

Matsudaira K, 2015 tested if a McKenzie method-based standing back extension exercise called “One Stretch” may reduce or eliminate low back pain (LBP) in care workers. On the basis of the study’s findings, suggestions can be made for the clinical care of low back pain. Clinicians should think about including extension exercises in the treatment plan for patients with low back pain if it is discovered that they are more helpful at lowering pain than aerobic exercises. In order to ascertain these interventions’ long-term effects on pain management and functional improvement in people with low back pain, future research should examine the long-term effects of these interventions beyond the 3-month follow-up period.

Conclusion

Throughout the research period comparisons of effectiveness between Aerobic exercises and Extension exercises were investigated. Findings of this project indicated that the effectiveness of Extension exercises in reducing the low back pain...
pain among teachers varied greatly to the overall effectiveness of Aerobic exercises in reducing the low pain among teachers. This finding led me to the conclusion that Extension exercise was found to be more successful than Aerobic exercise in reducing pain among Teachers with Low Back Pain.

**Ethical Clearance:** This research was approved by the ISRB committee. ISRB number-03/ 001/2022/ ISRB/ SR/ SCPT.

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**References**


