



A Study to Compare the Efficacy of Back Strengthening Therapy in Patients with Lower Back Pain on Analgesics to that of those on Placebo in a Tertiary Care Hospital in Chennai

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Authors' contributions

We declare that all of the authors mentioned in the article have contributed equal efforts in this research and also for the submission of the article.

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ABSTRACT

Aim: Isometric and Core strengthening exercises for lower back pain provides relief to patients, whereas combing it with analgesics also provides relief of pain, thereby in this study the efficacy of isometric and core strengthening exercises alone is evaluated.

Method: A cross-sectional study involving 200 subjects was conducted in the OPD of department of Orthopaedics, Saveetha Medical college and hospital. Assessment of lower back pain was done using ODI (Oswestry Disability Index) among patients receiving Isometric and Core strengthening exercises with and without analgesics for a period of 3 months.

Results: There is no significance difference in the reduction of pain among group A who received analgesics along with isometric and core strengthening exercises and group B who received only isometric and core strengthening exercises.

Conclusion: Isometric and core strengthening exercises alone is as effective as its combination with analgesics.

Keywords: Lower back pain; strengthening exercise; analgesics.

1. INTRODUCTION

Low back pain (LBP) is a common disorder involving the nerves muscles, and bones of the back [1-7]. Pain usually varies from a constant or intermittent, dull aching pain or sharp pricking type of pain. Low back pain can be classified based on duration as acute which last for less than 6 weeks, for 6 to 12 weeks as sub-chronic, or chronic which last for more than 12 weeks. Its further classified depending on the underlying cause as either mechanical, non-mechanical, or referred pain [8]. Low back pain is a common health problems in India with a prevalence of 60%, which results in functional loss that in turn reduces the productivity of individual and in turn country [9]. In 85% of patients with low back pain, the signs and symptoms are non-specific to any etiology and cannot be arrived at a clear diagnosis, treatment protocol or prognosis. A variety of conservative treatment modalities, such as medication, exercise and physical therapy are used in the treatment of low back pain. These techniques are employed to reduce pain, increase mobilization and improve functional and psychological status of the patient which in turn increases the quality of life of the patient. Exercising is one of the mainstray treatments used for low back pain and has proven by various studies that it reduce the duration and frequency of lower back pain [10]. In this study we aim at evaluating the effectiveness of physical treatment modalities for pain relief and functional status of the patient with low back pain. Increasing strength of lumbar muscle is the most important therapeutic modality for the patient with LBP. Isotonic, isokinetic, and isometric exercise has been used to improve muscle strength and endurance of muscles in lumbosacral area. Isometric exercise is safe from injury and has potent efficacy for increasing muscle strength, and it can apply to the patients with motion limitation. Mat exercise is the most used type of isometric exercise, however this exercise has difficult in controlling muscle power [6].

ODI Questionnaire

2. METHODS

Study design and Duration – This was a cross-sectional study conducted between January and March 2021 at Saveetha Medical College in Chennai, Tamil Nadu across 200 subjects with consent using a well instructed questionnaire which was validates by experts.

Inclusion – The subjects participated in the study are healthy individuals with lower back pain above 18 years of age with no other spinal disease.

Exclusion – The subjects not included for the study are patients with congenital disorder of spine, malignancy, previous surgery, compression fractures/ spinal cord compression, inflammatory arthritic conditions, acute infection, pregnancy, serious instability, osteoporosis, severe cardiovascular disorder and any other metabolic disease.

Study Procedure - After obtaining permission from IEC, patients with lower back pain who were willing to take part in our study after being read and explained the information sheet and signing the informed consent was interviewed with ODI questionnaire. The subjects were divided into two groups randomly each consisting of 100 subjects, one group (A) receiving analgesics that is NSAIDS (Non-steroidal anti-inflammatory drugs) along with Isometric and Core strengthening exercises where as group two (B) consist of subjects receiving only Isometric and Core strengthening exercises for a period of three months. The Isometric and core strengthening exercises given to patients include slide plank, Half-Kneeling Pall of Press, superman, Stretching, low impact aerobics, etc. Demographic details was noted. Procedure consist of answering a set of questions regarding lower back pain by themselves which was put forth by the investigator and patients answers for the same were noted and ODI were evaluated before and after treatment.

SECTION 1 - PAIN INTENSITY

- I can tolerate the pain I have without having to use painkillers.
- The pain is bad but I manage without taking painkillers.
- Painkillers give complete relief from pain.
- Painkillers give moderate relief from pain.
- Painkillers give very little relief from pain.
- Painkillers have no effect on the pain and I do not use them.

SECTION 2 - PERSONAL CARE (washing, dressing etc.)

- I can look after myself normally, without causing extra pain.
- I can look after myself normally, but it causes extra pain.
- It is painful to look after myself and I am slow and careful.
- I need some help, but manage most of my personal care.
- I need help every day in most aspects of self-care.
- I do not get dressed, wash with difficulty and stay in bed.

SECTION 3 - LIFTING

- I can lift heavy weights without extra pain.
- I can lift heavy weights, but it gives extra pain.
- Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned (e.g., on a table).
- Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.
- I can lift only very light weights.
- I cannot lift or carry anything at all.

SECTION 4 - WALKING

- Pain does not prevent my walking any distance.
- Pain prevents me walking more than 1 mile.
- Pain prevents me walking more than ½ of mile.
- Pain prevents me walking more than ¼ mile.
- I can only walk using a stick or crutches.
- I am in bed most of the time and have to crawl to the toilet.

SECTION 5 - SITTING

- I can sit in any chair as long as I like.
- I can sit in my favourite chair as long as I like.
- Pain prevents me sitting more than 1 hour.
- Pain prevents me from sitting more than ½ an hour.
- Pain prevents me from sitting more than 10 minutes.
- Pain prevents me from sitting at all.

SECTION 6 - STANDING

- I can stand as long as I want without extra pain.
- I can stand as long as I want but it gives me extra pain.
- Pain prevents me from standing for more than 1 hour.
- Pain prevents me from standing for more than 30 minutes.
- Pain prevents me from standing for more than 10 minutes.
- Pain prevents me from standing at all.

SECTION 7 - SLEEPING

- Pain does not prevent me from sleeping well.
- I can sleep well only by using tablets.
- Even when I take tablets, I have less than 6 hours sleep.
- Even when I take tablets, I have less than 4 hours sleep.
- Even when I take tablets, I have less than 2 hours sleep.
- Pain prevents me from sleeping at all.

SECTION 8 - SEX LIFE (if applicable)

- My sex life is normal and causes no extra pain.
- My sex life is normal but causes some extra pain.
- My sex life is nearly normal but is very painful.
- My sex life is severely restricted by pain.
- My sex life is nearly absent because of pain.
- Pain prevents any sex life at all.

SECTION 9 - SOCIAL LIFE

- My social life is normal and gives me no extra pain.
- My social life is normal, but increases the degree of pain.
- Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., dancing, etc.
- Pain has restricted my social life and I do not go out as often.
- Pain has restricted my social life to my home.
- I have no social life because of pain.

SECTION 10 - TRAVELLING

- I can travel anywhere without extra pain.
- I can travel anywhere but it gives extra pain.
- Pain is bad but I manage journeys over 2 hours.
- Pain restricts me to journeys of less than 1 hour.
- Pain restricts me to short necessary journeys under 30 minutes.
- Pain prevents travel except to the doctor or hospital.

Chart 1.

Interpretation of scores

0% to 20%: minimal disability:	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21%-40%: moderate disability:	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%: severe disability:	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled:	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
81%-100%:	These patients are either bed-bound or exaggerating their symptoms.

3. RESULTS

This study comprised of 200 subjects, which included 96 males and 104 females whose ODI

score was measured before and after treatment. The comparison between group A (patients receiving analgesics along with isometric and core strengthening exercises) and group B (

patients receiving only isometric and core strengthening exercises) was made with respect to their ODI score before and after treatment , to calculate the sample chi square was done.

Table 1. Age distribution

Years	Group A	Group B
18 – 27	36	20
28 – 37	14	28
38 – 47	23	17
48 – 57	14	27
58 – 67	7	7
>68	6	1

Table 2. Gender distribution

	Group A	Group B
Male	44	52
Female	56	48

Table 3. Duration distribution

Months	Group A	Group B
1 -12	65	80
13 - 24	22	11
25 - 36	5	7
37 - 48	3	1
49 - 60	5	1

Table 4. Radiation distribution

	Group A	Group B
Yes	9	7
No	91	93

Table 5. Odi interpretation distribution before treatment

	Group A	Group B
Minimal disability	1	1
Moderate disability	2	1
Severe disability	32	28
Crippled	15	23
Bed ridden	50	46

Table 6. Odi interpretation distribution after treatment

	Group A	Group B
Minimal disability	12	11
Moderate disability	30	31
Severe disability	34	38
Crippled	23	19
Bed ridden	1	1

Values of p<.05 was considered to be significant. Assuming the Null hypothesis is true, that is there are no significant of difference between the ODI score measured from group A and group B. The chi square was calculated as below –

CHI SQUARE CALCULATION

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

GROUP A - The chi-square statistic is 82.6309 (P<.05).

GROUP B - The chi-square statistic is 79.337 (P<.05).

Since the χ^2 (group A) = 82.63 at $p < .05$ and χ^2 (group B) = 79.33 at $p < .05$, there is no significant difference exist between the ODI score measured from group A and group B at 5% level, the null hypothesis is accepted.

4. DISCUSSION

In this randomized controlled trial, it had been found that Isometric and core strengthening therapy for 3 months alone provided similar improvement in pain and functional status of patients thereto of Isometric and core strengthening therapy alongside analgesics like NSAIDs for 3 months. The aim of the treatment is to scale back pain, to enhance flexibility, to extend strength and endurance of the trunk stabilizers, to scale back tension, and to enhance mobility and posture, thereby, resulting in improved functional status, better ability to perform activities of lifestyle, and prevention of labor loss. Many methods like resting, medical treatment, exercise programs, physiotherapy modalities, and manipulation are utilized in the treatment of lower back pain [2]. During this study ODI (Oswestry Disability Index) score is employed within the assessment of pain and functional status of patient. In this study out of 200 subjects 23 subjects have undergone surgical intervention during the study and it had been found that similar improvement within the ODI score was obtained from both the groups (A – isometric and core strengthening therapy alongside analgesics, B – isometric and core strengthening therapy alone). Thereby it's proven that Isometric and core strengthening exercises alone is as effective as Isometric and core strengthening exercises alongside analgesics (NSAIDs). Whereas during a similar study conducted in Turkey to assess the effect of physiotherapy modalities on pain and functional status in patients with non specific low back pain, it had been found that there was significant improvement among patients after combined treatment with exercise, medical therapy, and physiotherapy was found to be simpler for non-specific Chronic lower Back pain than exercise and medical therapy alone. During a article by Ali Hasanpour-Dehkordi compares pilates and McKenzie (MK) methods, within the MK group, participants performed 1-hour of workouts for 20

days while the pilates group practiced sessions 3 times every week for six weeks and both were compared with Control Groups. After therapeutic exercises, no big difference in pain relief was found between the pilates group and therefore the MK group (P=0.327) but an improvement in pain score was seen in both techniques in comparison to the Control Groups. In the study done by Jamil Natour, considered an impact groups with patients taking non steroidal anti-inflammatory drug drugs (NSAIDs) and therefore the intervention group (IG) where pilates was used twice every week for 3 months additionally to NSAIDs. Pain improved within the IG also less NSAIDs than the Control groups [4]. In our study, we found that isometric and core strengthening exercises alone provide similar improvement in pain and functional status of patient as that of isometric and core strengthening exercises alongside analgesics, thus we will limit the utilization of analgesics for long duration, thereby avoiding its adverse effects. Even though analgesics have found to play an important role in alleviating acute pain, it can avoided for mild to moderate cases of lower back pain. In case of severe and chronic back pain, analgesics can be used to relief pain. Some studies have shown meditation can be an effective treatment for lower back pain. Developing the focus and ability to move your mind off the pain and onto something more soothing can decrease your discomfort. Plus, you may reduce the incidence of accompanying conditions such as anxiety and stress [4].

5. CONCLUSION

In accordance with many studies of chronic lower back pain, patients perceived significantly less pain after intervention, regardless of group allocation. Subjects randomly allocated group A who received analgesics along with isometric and core strengthening exercises had similar outcomes as subjects who were allotted to group B who received only isometric and core strengthening exercises. According to the results obtained in this study, both groups responded in terms of pain and that there was no difference between groups was found. Thus in conclusion, isometric and core strengthening exercises alone is as effective as its combination with analgesics. Thereby we can avoid the use of analgesics for long duration and prevents its adverse effects.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our

area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Our study was duly approved by scientific review board and Institutional Ethics committee of our institute.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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