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Efficacy of Integrated Treatment of Yoga and McKenzie exercise program among patients with non-specific Low Back Pain

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Abstract

Low back pain is a common and disabling condition affecting people of all ages. Yoga, a holistic approach to health, has gained popularity as a complementary treatment. However, there's limited research comparing the effectiveness of yoga to traditional physical therapy for chronic back pain. This study aims to evaluate the combined benefits of yoga and McKenzie exercises for people with common lower back pain. Forty participants will be divided into two equal groups: one group will receive both yoga and McKenzie exercises, while the other group will receive standard care. The control group will undergo standard physical therapy treatment. The experimental group would receive the referred Physiotherapy treatment and McKenzie exercise program along with Yoga therapy. The present study reveals that integrating the Yoga program along with the conventional physiotherapy treatment method has proven to significantly change how well patients with lower back pain can perform daily activities.

1. Introduction

Low back pain is a widespread problem with many potential causes, including job-related factors, mood, weight, height, and age. However, the exact reasons for most cases remain unclear, making it difficult to pinpoint a specific diagnosis. Back pain itself isn't a disease but a collection of symptoms (Yan W et al., 2021). The causes of most cases are unclear. Low back pain affects people of all ages, from children to the elderly, and is a very frequent reason for medical consultations (Pal S et.al., 2020). Low back pain is one of the top ten most disabling health conditions worldwide. (Cahya S A et.al.,2021). It is difficult to estimate the incidence of

low back pain as the incidence of first-ever episodes of low back pain is already high by early adulthood and symptoms tend to recur over time (Anggiat L., 2020).

Low back pain is influenced by various factors. These include job demands, overall physical health, age, and gender, with women being more affected. Additionally, socioeconomic status, education level, and a history of back pain contribute to the risk. Physical factors like heavy lifting, repetitive tasks, poor posture, and muscle tension can increase the likelihood of experiencing back pain. Psychological factors such as anxiety, depression, job dissatisfaction, and stress also play a role. Other contributing factors include long working hours, obesity, and job-related pressures. (Ansari A et.al.,2020). “Low back pain is a major cause of disability worldwide, affecting people of all backgrounds. It significantly impacts daily life and work and is a common reason for doctor visits. While there are specific causes in some cases, most back pain has no clear origin”. (Cahya S A et.al.,2021).

The conventional treatment involves Interferential therapy to the lower back spine and McKenzie exercise program curated for the patient’s needs McKenzie back exercises were developed by physiotherapist Robin McKenzie in the 1950s and became widely known in the mid-1980s. The McKenzie method, also known as Mechanical Diagnosis and Therapy (MDT), is widely used as a classification system for the diagnosis and treatment of a variety of musculoskeletal conditions, including lower back, neck, and extremity pain (Liddle SD et.al.,2007; Shipton EA., 2018; Alshehri MA et.al.,2020). It stresses self-treatment through posture correction and repeated exercise movements at the end range performed with high frequency (Anggiat L., 2020).

The McKenzie method categorizes lower back pain into distinct groups based on how patients respond to specific movements. This approach involves identifying patterns in how pain changes when patients bend, extend, or move their spines. The McKenzie method emphasizes the centralization phenomenon in the assessment and treatment of spinal pain, in which pain originating from the spine refers distally, and through targeted repetitive movements the pain migrates back toward the spine (Lam OT et.al.,2018; Bid D et.al.,2018). Several randomized control trials have proven Yoga to be an effective treatment. However, the comparative effectiveness of Yoga and physical therapy, a common mainstream treatment for chronic low back pain, is not much explored (Singh R., 2016).

Modern Hatha yoga combines physical postures, breathing techniques, focus, and meditation. A typical class lasts about 30 to 60 minutes and involves a group following an instructor's

guidance on body positioning, breath control, and mental concentration. Iyengar style of yoga has a focus on holding postures, and the use of modifications (such as blocks, belts, chairs, and blankets) to accommodate individual physical abilities (Chauhan et al., 2022).

This study compared the combined effects of yoga and McKenzie exercises on people with common lower back pain. We measured pain levels using a visual analog scale, lower back flexibility, and overall function using the Oswestry Disability Index. This study aimed to evaluate the combined effectiveness of yoga and McKenzie exercises for people with common lower back pain.

2. Study Design

The study was approved by the relevant ethics committees at Sri Ramachandra Institute of Higher Education and Research. Participants were recruited from the physiotherapy outpatient clinic at the same institution in Chennai. The Study Design is a comparative prospective study

The sample size was derived from Master 2.0 - Sample size software by using the standard deviation in two groups from a similar research article titled “Yoga compared to non-exercise or physical therapy exercise on pain, disability and quality of life with chronic back pain” found in Research gate. The mean difference, effect size, and power percentage were estimated, and the sample size was found to be 20 per group. The Sampling design is the Convenience Sampling method. Participants Inclusion criteria are age group 20 - 45 years and had a general diagnosis of lower back pain without a specific cause by a Physician. Participants were excluded when they had poor comprehension ability, past spinal surgeries, spinal instability, and active infections (Saper RB et.al., 2017; Zhu F et.al., 2020)

Group A (Experimental Group) received referred Physiotherapy and McKenzie Exercise program and Yoga therapy. Group B (Control Group) - Referred Physiotherapy and McKenzie Exercise program. Forty people took part in the study. Twenty patients were assigned to the control group, and twenty patients were assigned to the experimental group. Patients belonging to both groups underwent an intake evaluation to obtain baseline measures. McKenzie Exercise Program – Lying prone, extension in lying, extension in standing. Yoga Program – Bhujangasana, Marjari asana, Trikonasana, Ardha Chandrasana.

2.1 Outcome measures

2.1.1 Pain-severity measurement

Participants rated their pain on a scale of 0 to 10, where 0 meant no pain and 10 was the worst imaginable pain.

2.1.2 Range of Motion-related measure

To measure the range of motion of the lower back, a modified Schober test was used. Two marks were placed 15 centimeters (about 5.91 in) apart on the lower back. The patient was asked to bend backwards as far as possible. The distance between the marks was measured again. The difference between the original and final measurements is the range of motion. (Verma Y et.al., 2013; Bilgilişoy Filiz M et.al., 2019; Alhakami AM et.al.,2020).

2.1.3 Functional performance measure:

The Oswestry Disability Index (ODI) score ranges from 0 (no disability at all) to 100 (completely disabled). The creators of the ODI classified scores as follows: 0-20 as mild disability, 20-40 as moderate disability, 40-60 as severe disability, 60-80 as unable to leave home, and 80-100 as bedridden. The ODI questionnaire is easy to understand and can be filled out by the person being surveyed in just 5 minutes. Scoring the answers takes only 1 minute. The ODI questionnaire was first created in English but has been modified to suit different cultures and is offered in multiple languages. For the patient population, ODI translated into Tamil has been used (Kothari P et.al., 2019).

2.2 Intervention

The participants were divided into two groups: a control group and an experimental group.

2.2.1 Control group

Control group, subjects received conventional therapy which included Interferential therapy (IFT) with the McKenzie exercise program.

2.2.1.1 Interferential therapy

Each patient was treated by the same physical therapist. After a standard evaluation, patients were positioned comfortably either on their stomach or side. Electrodes were placed on the painful area of the lower back. For patients with pain on one side, one electrode was placed at the top of the painful area and the other at the bottom. For patients with pain on both sides, electrodes were placed on both sides of the spine, parallel to it. (Hurley DA et.al., 2001).

The physical therapist explained the treatment to the patient and then turned on the machine. The intensity was slowly increased until the patient felt a strong but comfortable tingling sensation. The therapist adjusted the intensity throughout the 20-minute treatment to maintain a constant level of comfort. (Bason., 2012).

2.2.1.2 McKenzie Exercise programs

- **Lying on Stomach:** The patient lies flat on their belly.
- **Elbow Support:** Lying on their stomach, the patient supports themselves on their elbows with their back arched.
- **Hand Support:** Lying on their stomach, the patient supports themselves on their hands with their arms straight and back arched.
- **Standing Back Extension:** Standing with feet shoulder-width apart, the patient places hands on their lower back and arches their back.

Dosage: 3 sets 1 repetition (10 times) hold for 6 seconds rest for 1-3 minutes between them.

2.2.2 Experimental group

The experimental group received Yoga Therapy in addition to the standard treatment and McKenzie exercises, while the control group only received the standard treatment and McKenzie exercises.

2.2.2.1 Balasana

"Child's pose takes the pressure off the lower back by elongating and aligning the spine, which decompresses it and gives a nice stretch".

Procedure

- **Instruction:** Kneel on the floor with knees hip-width apart and feet together behind you. Inhale deeply, then exhale as you fold forward, resting your torso on your thighs. Stretch your neck and spine by lengthening your body from tailbone to crown. Place your forehead on the ground and extend your arms forward. Hold for 1-2 minutes.

2.2.2.2 Cat and Camel Pose

Moving between cat and cow poses gently flexes and stretches the spine, improving flexibility. This movement can also help release lower back tension. By practicing these poses, you'll develop a better sense of your spine's neutral position, which is essential for good posture.

Procedure

- Instruction: Start on your hands and knees. Gently round your back like a cat as you exhale, then arch your back like a cow as you inhale. Repeat this flowing movement for 2-3 minutes.

2.2.2.3 Adho Mukha Svanasana

Tight hamstrings can often lead to lower back pain. Stretching these muscles, along with the calves, through a downward-facing dog pose can help alleviate discomfort.

Procedure

- Starting in a child's pose, the patient sits up on their knees, keeping hands on the ground. They then lift their body into a downward-facing dog position.
- Instruction: Focus on straightening legs and reaching heels towards the floor. Relax the head between the arms and look towards the legs or belly button. Hold this pose for 30-60 seconds.

2.2.2.4 Knee to Chest

Procedure

- Lying on their back, the patient is asked to draw both knees towards their chest and hold them there. While maintaining this position, they gently sway their upper body back and forth. This movement is repeated for one to two minutes.

2.2.2.5 Upward facing Dog

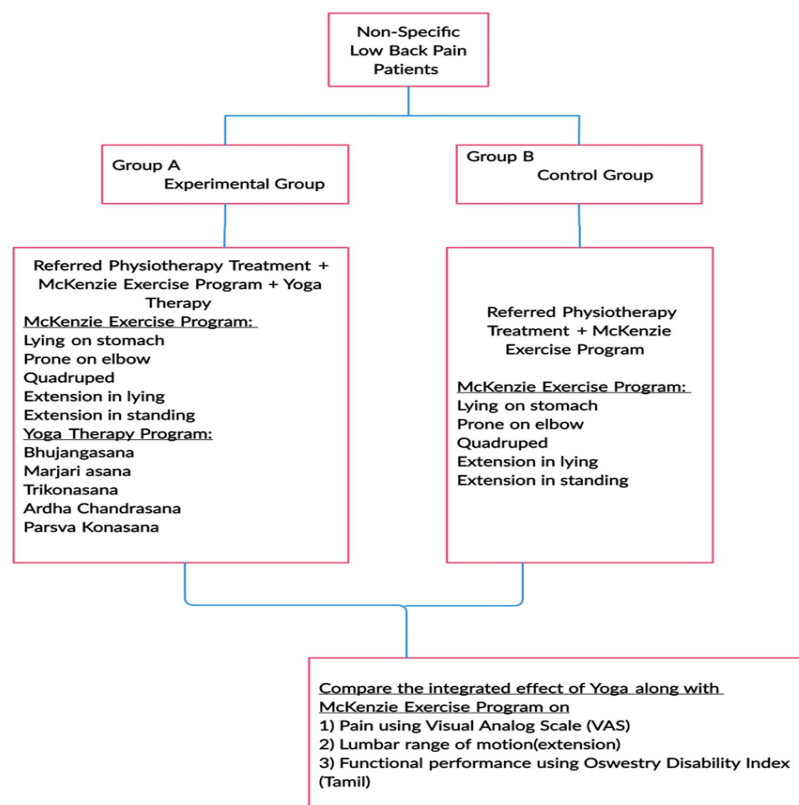
This exercise strengthens the muscles surrounding the spine, providing improved support for sore areas.

Procedure

- Begin in a push-up position with arms bent.
- Instruction: Lower your body halfway to the ground, keeping elbows close to your

sides. From there, gently drop your hips to the floor and position your feet so the tops are flat. Engage your abdominal muscles, straighten your arms, and lift your chest while pulling your shoulders back. Hold your head up to open your chest. Maintain this position for 30 to 60 seconds.

Figure 1: Flowchart of the study Process



2.2.2.6 Setubandhasana/Setu Bandha Sarvangasana or the Bridge pose

This pose, also known as Bridge Pose, offers many benefits. It stretches and relieves tension in the chest, neck, and spine, while building strength in the back and legs. Additionally, it improves blood flow, reduces stress, and promotes relaxation.

Procedure

- Starting flat on their back with hands by their sides, the patient is asked to bend both knees while keeping their knees apart and moving their heels closer to their body.
- Instructions: Lie on your back with your legs straight and toes pointing forward. Place your hands under your lower back for support. Breathe deeply and use your core muscles to lift your stomach and chest off the floor, taking your hips with you. Hold this position for 10-15 seconds before lowering back down.

3. Results

IBM SPSS Statistics software version 24.0 was used to analyze data obtained from a sample size of 20. Categorical variables were summarized using percentages, and continuous variables were described using averages and standard deviations. The data was found to be normally distributed based on the normality test. Parametric statistical tests were used to compare the groups. Results were considered statistically significant if the probability of obtaining them by chance was less than 5%.

Table 1: Demographic Data Analysis

TOTAL (N)	40
Male	17
Female	23

Table 2: Within Group Analysis of Control Group

VARIABLES	PRE – TEST Mean ± standard deviation	POST – TEST Mean ± standard deviation	Significance level
VISUAL ANALOG SCALE	7.98 ± (1.098)	2.30 ± (1.302)	<0.001
RANGE OF MOTION	12.20 ± (0.951)	20.20 ± (0.768)	<0.001

OSWESTRY DISABILITY INDEX	49.10 ± (12.937)	26.15 ± (4.738)	<0.001
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With p value <0.05 as significance, the unpaired t test shows that within group analysis of control group are <0.05 and >0.001, has significant results.

Table 3: Changes Within the Treatment Group

VARIABLES	PRE – TEST Mean ± standard deviation	POST – TEST Mean ± standard deviation	Significance level
VISUAL ANALOG SCALE	7.98 ± (1.009)	0.25 ± (1.118)	<0.001
RANGE OF MOTION	12.70 ± (1.031)	25.65 ± (0.933)	<0.001
OSWESTRY DISABILITY INDEX	46.65 ± (14.946)	10.65 ± (8.499)	<0.001

With p value <0.05 as significance, the unpaired t test shows that within group analysis of experimental group are <0.05 and >0.001, has significant results.

Table 4: Comparison of Outcomes Between Treatment and Control Groups

VARIABLES	CONTROL GROUP Mean and standard deviation	EXPERIMENTAL GROUP Mean and standard deviation	Significance level
VISUAL ANALOG SCALE	5.30 ± (1.302)	7.25 ± (1.118)	<0.001

RANGE OF MOTION	8.20 ± (0.768)	13.65 ± (0.933)	<0.001
OSWESTRY DISABILITY INDEX	23.15 ± (4.738)	35.65 ± (8.499)	<0.001

Statistical analysis using the unpaired t-test revealed significant differences between the intervention and comparison groups for pain (VAS), flexibility (ROM), and disability (ODI). These differences were considered statistically significant as the p-value was less than 0.05 for all comparisons.

4. Discussion

We investigated the benefits of a combined Yoga and McKenzie exercise program for patients with common low back pain. Pain, lower back flexibility, muscle strength, and functional ability were assessed using specific measurement tools.

The primary goal was to evaluate the combined effectiveness of Yoga and McKenzie exercises for treating individuals with common low back pain. The primary objective was to compare how well Yoga combined with McKenzie exercises worked for people with common low back pain. We measured the impact on pain levels (using the Visual Analog Scale), back flexibility (lumbar range of motion), and overall function (using the Oswestry Disability Index). The participants had undergone the Mckenzie exercise program and Yoga program as per said parameters in methodology.

Data analysis revealed positive changes in clinical outcomes for the intervention and comparison groups. However, upon analysis statistically, the data revealed that those who belonged to the experimental group had better improvement of functional status 10.65 (8.499) than the control group 26.15(4.738) at the end of 10 session treatment, as depicted in Table 4. Variables within the group were compared for the experimental and control group, carried out separately for VAS, ROM, and ODI. The control group of 20 participants did not show any meaningful improvement following the standard exercise regimen. All the participants in the experimental group (n=20) underwent a well-structured Yoga program along with the conventional treatment and showed no significant improvement in ROM during post-intervention.

A past study was attempted to analyze the effect of integrating Yoga into a Physiotherapy intervention. The main finding of the study suggests that Yoga can decrease pain and increase functional ability in patients with lower back pain (Chauhan A. et.al., 2022). According to Pence PG (2011), Yoga is an intervention that appears to be well-balanced and should be included in physiotherapy treatment. Upon analysis of past studies, it is found that yoga might decrease pain from short term to intermediate term and improve functional disability status from short term to long term compared with non-exercise (e.g., usual care, education) (M Sawyer A., 2012). The limitations of this study that need to be considered: A long-term follow-up was not performed; Small sample size and potential methodological bias of this study.

5. Conclusion

The present study reveals that integrating the Yoga program along with the conventional physiotherapy treatment method has proven to significantly change the functional status with the improvement of all clinical outcomes among patients with non-specific low back pain. Hence, this proves the need to integrate a basic Yoga program into conventional treatment techniques and may be recommended for clinical practice.

Conflict of Interest: None

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