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Effect of pilates on nonspecific low back pain in middleaged housewives

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Abstract
Background: Nonspecific low back pain is one of the commonest emerging health problems among the middle-aged housewives which may be due to a combination of risk factors that typically appears in the middle age. One of the most common treatments for this is exercises and in recent years Pilates has been a common option for treating low back pain.
Objective: To assess the level of low back pain and to determine the effectiveness of Pilates on low back pain among middle aged housewives.
Methodology: Quasi experimental research design is adopted. The data will be collected using demographics NPRS and ODS. 20 subjects with low back pain will be taken for the study. 10 subjects will be assigned to the experimental group (group A) and the other 10 to the control group (group B). 7 Pilates exercises along with conventional exercises will be taught and practiced by them for 5 days in a week for 4 weeks duration and control group will be taught conventional exercises only.
Result: The analysis showed statistically significant improvement from pre to post in group A and group B in NPRS with $p<0.001$. The analysis showed statistically significant improvement from pre to post in group A in ODI score with $p<0.001$ but there was no statistically significant improvement in group B in ODI score as the p value was > 0.05. When both the groups were compared, the analysis showed better improvement in group A as compared group B.
Conclusion: The findings of the present study concluded that Pilates along with conventional exercises was more effective in treating participants with nonspecific low back pain.

Keywords: low back pain, middle aged housewives, pilates

Introduction

The prevalence of low back pain (LBP), which is a growing global health concern, is higher in middle-aged women (ages 35 to 58) [1]. Due to its rising prevalence, low back pain creates a burden to the healthcare system and is a serious social issue. It has been estimated that up to 84 percent of people may experience low back pain in their lifetime, and that 23 percent of people may experience chronic non-specific low back pain (CNLBP) [2]. Low back pain is described as "pain, stiffness The, and/or increased muscle tension, located between the costal margin and the inferior gluteal folds, with or without referred discomfort to the lower limbs" in the definition [3]. The most common form of LBP is non-specific [4]. The prevalence of pain was higher in women than in males, according to previous studies, which was a frequent finding (prevalence of back pain of 24.3 percent in women and 20.9 percent in men) [5]. A typical housewife engages in 45 different forms of work and dedicates 16 to 20 hours each day to household chores, with no breaks and even no free time [6]. According to a study conducted in Qatar, LBP can have a significant negative impact on one's quality of life. The study also discovered that LBP risk factors are multifaceted and include physical variables, social demographic features, habits, and psychological aspects [7].

Women traditionally perform housework as unpaid work. It entails regular and necessary household maintenance chores like cleaning, cooking, washing, living, purchasing, etc. as well as family care responsibilities like child rearing and other care-giving jobs that demand significant physical, emotional, and intellectual labour [8]. Women often work long hours performing highly repetitive tasks or standing or sitting for extended periods of time, perhaps thousands of times every day. Each of these movements can place a heavy burden on the body. Due to the disruption of circulation, it can cause musculoskeletal and cardiovascular issues [9].

Since it can be utilised as a crucial tool for the rehabilitation of many musculoskeletal illnesses, including non-specific persistent low back pain, the Pilates approach has gained relevance in recent years [10]. One biological explanation for why Pilates might be effective is based on the notion that persons with LBP have impaired spinal muscle stability and control. Two motor control deficiencies are thought to be present in LBP patients suffering: first, when the stability of the spine is stressed during dynamic tasks, deep muscles like the multifidus and transverse abdominis take longer to begin to contract. Second, people with LBP frequently increase the activity of superficial muscles to make up for this lack of stability, which makes the spine more rigid. By enhancing the deep muscles' motor control and lowering their level of activity, the workouts recommended by the Pilates technique work to improve these two factors. of superficial muscles), as well as to enhance alignment and awareness of one's body. These elements may help LBP patients with their pain, disability, and quality of life [3]. Therefore, the goal of this study is to determine if Pilates exercises may effectively cure middle-aged housewives' non-specific low back pain.

Methodology

1. **Study design:** Quasi- Experimental Study

2. **Study setting:** The study was conducted in the locality

3. **Criteria for sample selection**

Inclusion criteria

- Housewives aged between 32-42 years
- Women with persistent non-specific low back pain for greater than 6 weeks or recurrent Low back pain.
- Women with moderate to severe pain on NPRS

Exclusion criteria

- Patients with any contraindication to exercise therapy
- Pregnancy
- Patients with serious spinal pathology (i.e., cancer, fractures, cauda equina syndrome and inflammation disease)
- Any surgeries

4. **Study sample:** Middle aged housewives

5. **Samples size:** 20

6. **Sampling design:** Non probability snowball sampling

7. **Procedure**

The subjects with Non-specific low back pain were identified from the locality. Middle aged housewives with age between 32-42 years having symptoms of Nonspecific low back pain from 6 weeks with an NPRS rating of 5 or more than 5 and those who were willing to be a part of the study were included in the study. An informed and written consent was obtained from participants who agreed to be a part of the study. Subjects with low back pain attributed to any specific pathology like radiculopathy, disc prolapse, osteoporosis, cauda equina, fracture were excluded from the study. A total of 20 participants became part of the study. The participants underwent a detailed pre – evalution. The pain was assessed by Numerical Pain Rating Scale and functional disability was scored by Oswestry Disability Index. Out of 20, 10 subjects were assigned to Experimental group (Group A) And the other 10 to control group (Group B) group A subjects were treated with pilates along with the conventional physiotherapy for 5 days a week. while Group B subjects were treated with conventional physiotherapy only for 5 days a week for 4 weeks. After 4 weeks of treatment subjects of both groups underwent post– evaluation. The pre and post – treatment data were noted and then evaluated further. The week wise protocol for pilates is mentioned below.

Treatment protocol: Pilates exercise protocol for Group A [13].

Week – 1	Week – 2	Week – 3	Week – 4
Supine beathing (5 min)	Supine breathing (5 min)	Supine breathing (5 min)	Supine breathing (5 min)
Hip twist (5 reps)	Hip twist (5 reps)	Hip twist (5 reps)	Hip twist (5 reps)
Supine twist (5 reps)	Supine twist (5 reps)	Supine twist (5 reps)	Supine twist (5 reps)
	Single leg stretch (5 reps)	Single leg stretch (5 reps)	Single leg stretch (5 reps)
		Clams (5 reps)	Clams (5 reps)
		Chest lift (5 reps)	Chest lift (5 reps)
			Swan (5 reps)

Data analysis

Statistical analysis of the data was done using SPSS 23.0. Descriptive statistics were calculated and summarized which includes frequency, percentage, mean and standard deviation. Inferential statistics had been carried out in the study. Pre and post comparison was done using paired t test. Between group comparison was performed by unpaired t test Level of significance was set at 5%. The present study included 10 patients in group A with average age 37.8±2.973 years and group B included 10 patients with average age 36±2.666 years. Average BMI of group A was 23.48±0.936 and average BMI of group B was 23.14±1.225. The average pre NPRS in group A was 6.5±0.849 and post was 3.7±0.823 with an average improvement of 2.8 with $p<0.001$. The average pre NPRS in group B was 6.6±1.074 and post was 5.1±1.197 with an average improvement of 1.5 with $p<0.001$. The analysis showed statistically significant improvement from pre to post in group A and group B. The average pre ODI in group A was 20.9±2.33 and post was 17±1.885 with an average improvement of 3.9 with $p<0.001$. The average pre ODI in group B was 19.6±2.366 and post was 18.8±2.394 with an average improvement of 0.8 with $p>0.05$. The analysis showed statistically significant improvement from pre to post in group A and but there was no statistically significant improvement in group B as the p value is > 0.05. The average NPRS improvement in group A was 2.8 and that of group B was 1.5 with $p<0.001$. The analysis showed better improvement in group A as compared group B. The average ODI improvement in group A was 3.9 and that of group B was 0.8 with $p<0.001$. The analysis showed better improvement in group A as compared group B.

Table 1: Mean and standard deviation of age and BMI

	Group	N	Mean	Std. Deviation
Age	Group A	10	37.8000	2.97396
	Group B	10	36.0000	2.66667
BMI	Group A	10	23.4800	.93666
	Group B	10	23.1400	1.22583

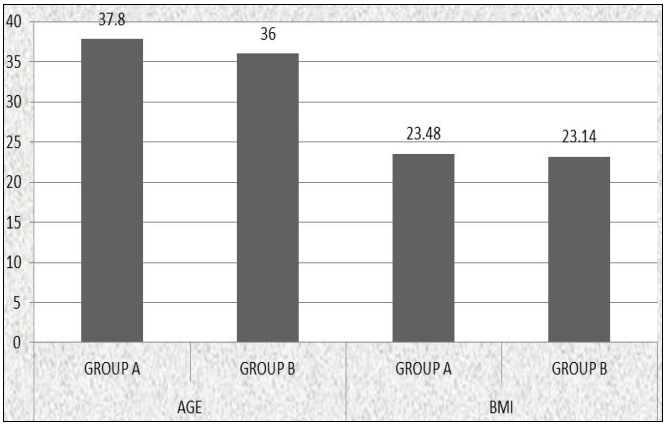

Fig 1: Mean age and BMI

Table 2: Mean ODI score of Group A (EXPERIMENTAL GROUP) and Group B (COMVENTIONAL GROUP).

		Mean	N	Std. Deviation	t value	p value
Group A	Pre	6.5000	10	.84984	14.0	P<0.001
	Post	3.7000	10	.82327		
Group B	Pre	6.6000	10	1.07497	9.0	P<0.001
	Post	5.1000	10	1.19722		

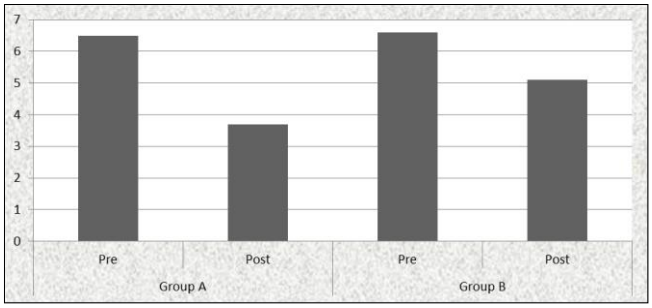

Fig 2: Showing mean NPRS in group A and group B.

Table 3: Comparison between group A and group B in NPRS and ODI

		Mean	N	Std. Deviation	t value	p value
Group A	Pre	20.90	10	2.33095	16.714	P<0.001
	Post	17.00	10	1.88562		
Group B	Pre	19.60	10	2.36643	1.562	P>0.05
	Post	18.80	10	2.39444		

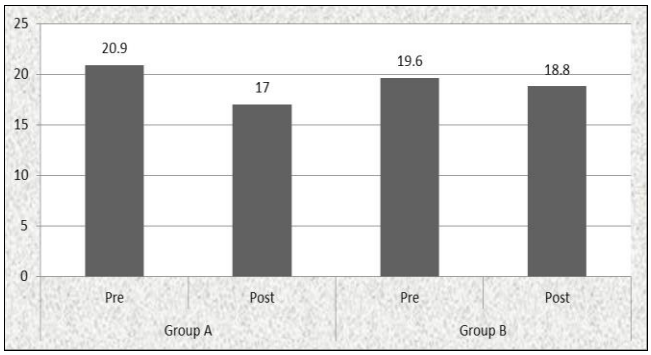

Fig 3: average improvement in NPRS and ODI in group A and group B

Table 4: Comparison between group A and group B in NPRS and ODI

Group		Mean	Std. Deviation	t value	p value
NPRS	Group A	2.80	.63246	4.993	P<0.001
	Group B	1.50	.52705		
ODI	Group A	3.90	.73786	5.509	P<0.001
	Group B	.80	1.61933		

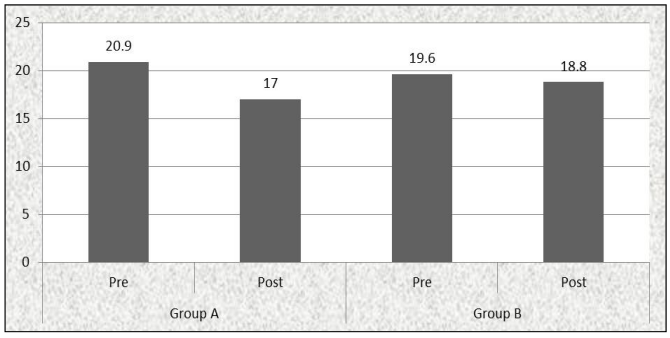

Fig 4: average improvement in NPRS and ODI in group A and group B

Discussion

It has been estimated that up to 84 percent of people may experience LBP in their lifetime, and that 23 percent of people may experience chronic nonspecific low back pain (CNLBP). Pilates is described by practitioners as "A unique method of physical fitness" that uses a combination of muscle strengthening, lengthening and breathing to develop trunk muscles and restore muscle balance [11].

In group A, the average pre NPRS was 6.5 ± 0.849 and post was 3.5 ± 0.823 with average improvement of 2.8 with $p < 0.001$. The average pre ODI in group A was 20.9 ± 2.33 and post was 17 ± 1.885 with an average improvement of 3.9 with $p< 0. 001$.Thus, it indicated that there was a significant improvement in the level of pain and disability in NSLBP among middle aged housewives with the combination of pilates and conventional exercises. In group B, the average pre NPRS was 6.6 ± 1.074 and post was 5.1 ± 1.197 with an average improvement of 1.5 with $p < 0.001$. The average pre ODI in group B was 19.6 ± 2.366 and post was 18.8 ± 2.394 with an average improvement of 0.8 with $p> 0.05$. The analysis showed that there is a statistically significant improvement in the pain level whereas there is no statistically significant improvement in group B in the disability level as the p value was > 0.05. On comparing group, A and group B, the t value of NPRS was 4.993 and t value of ODI score was 5.509. The average NPRS improvement in group A was 2.8 and That of group B was 1.5 with $p < 0.001$. The average ODI improvement in group A was 3.7 and that of group B was 0.8 with $p < 0.01$. Thus, the statistical analysis showed that there is better improvement in group A as compared to group B.

Miyamoto *et al* found a significant short - term reduction in pain and disability in the group that received a minimal intervention using mat Pilates; however., no difference was found in the medium term [12]. The results of these studies [12, 13] are like those of the present study about disability. The difference in the results for results for pain may have occurred because the above - mentioned studies compared the Pilates method with minimal intervention or a control intervention and not with another form of exercise. The results another showed that pilates was effective for the reduction of pain and disability in individuals with non - specific LBP corroborating with similar results found in the literature [14, 16]. Studies that evaluated the effectiveness of a pilates protocol compared to general exercises or self - management for eight weeks concluded that the method was more effective in reducing pain, disability, flexibility, and balance in individuals with chronic LBP [17, 18]. In a study conducted in Melbourne, Australia, they compared an exercise program based on the pilates method with a general exercise program in patients with chronic low back pain, the between 18 and 70 years of age, for six weeks. They assessed the intensity of pain by the numeric scale and the functional impairment using the Quebec questionnaire. Eighty-three participants were randomized into two groups: The Pilates group with 41, and the exercise group with 42. The results showed a reduction in low back pain and improvements in the functional impairment in both groups, but with no statistics difference between them [19].As this study has shown significant improvement in participants who received pilates along with conventional exercises in group A in term of pain and disability, it can be used in the treatment protocol of nonspecific low back pain as with its

immediate effectiveness, and it may also increase patient therapist adherence and treatment adherence.

Conclusion

The conclusion of this study is based on the comparison of pre post mean measures of NPRS and ODI score within and Between group A and group B which concluded that there is significant improvement in group A then group B. There was a significant difference seen in within the group comparison and there was significant difference seen on comparison of both groups. The analysis showed better improvement in group A as compared group B. As per data Analysis and Interpretation and clinical improvement, null hypothesis is rejected and research hypothesis accepted which states there is a significant effect of reduction of pain and disability among middle aged housewives who receives the Pilates along with conventional exercises is group A in comparison with the group B that has received only conventional exercises. Future studies should include a larger sample size and should be performed to find out the effect of longer duration of the treatment.

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