

A Study To Assess The Effectiveness of Stationary Cycle Exercise on Knee Joint Pain Among Elderly People in Selected Old Age Homes of Sangli, Miraj, Kupwad Corporation Area

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ABSTRACT

Background of the Study:

Pain in the knee joint is a frequent problem among older adults, often resulting from age-related changes such as osteoarthritis. This condition can limit movement, reduce independence, and negatively affect the quality of life. Elderly individuals living in old age homes may experience more discomfort due to reduced physical activity and lack of regular exercise. Engaging in appropriate physical exercises can help in managing pain and improving joint function. Stationary cycling is a low-impact and easy-to-perform exercise that can strengthen muscles around the knee and enhance mobility. Hence, this study focuses on evaluating how effective stationary cycle exercise is in reducing knee joint pain among elderly people residing in selected old age homes in the Sangli, Miraj, and Kupwad corporation area.

Objectives:

To determine whether stationary cycle exercise helps in decreasing knee joint pain among elderly individuals living in selected old age homes of the Sangli, Miraj, and Kupwad corporation area.

Material and Methods:

A quasi-experimental research design was used for this study, conducted in selected old age homes under the Sangli, Miraj, and Kupwad Corporation. Reliability was established using the intra-rater method, yielding a coefficient of $r = 1$, indicating a highly reliable tool. Content validity was confirmed by 28 subject experts from relevant fields. The study sample included 84 participants (42 in the experimental group and 42 in the control group), selected through purposive sampling. Data were collected using the Numerical pain scale (NPS) to assess pain severity and analysed using descriptive and inferential statistics.

Results:

The analysis shows that in the experimental group, the mean pre-test pain score was 7.69 ± 1.00 , which reduced to 4.78 ± 0.87 after intervention, with a mean reduction of 2.91. This difference was statistically significant ($t = 28.72$, $p = 0.000$). In the control group, the mean pain score decreased from 6.47 ± 1.06 to 5.57 ± 0.99 , with a smaller mean reduction of 0.90, which was also statistically significant ($t = 11.01$, $p = 0.000$). Comparison between groups in the post-test showed that the experimental group (4.78 ± 0.87) had lower pain scores than the control group (5.57 ± 0.99), with a significant difference ($t = 3.86$, $p = 0.000$). Association analysis revealed that in the experimental group, gender ($p = 0.023$) and duration of knee pain ($p = 0.034$) were significantly associated with pain reduction, while in the control group, diagnosed medical condition ($p = 0.044$) showed significant association. Overall, the values indicate that stationary cycle exercise was more effective in reducing knee joint pain among elderly people.

Conclusion: The study concludes that the stationary cycle exercise is a highly effective intervention for reducing knee joint pain in elderly people.

Introduction

BACKGROUND OF THE STUDY

Aging is a natural and permanent process in which the body gradually loses strength, flexibility, and normal musculoskeletal function. Thanks to advancements in healthcare and better living conditions, India is witnessing an increase in life expectancy, leading to a rapidly expanding senior population. As people age, degenerative joint disorders become increasingly prevalent, with knee joint pain being one of the most commonly reported health issues among older adults. Chronic knee pain greatly limits mobility, diminishes independence, and adversely impacts the general well-being and daily living standards, especially among older adults living in assisted care facilities.¹

Knee pain in older adults mainly occurs due to degenerative conditions such as osteoarthritis, the deterioration of cartilage, decreased synovial fluid, and weakened muscles surrounding the joint. Persistent discomfort hampers daily activities such as walking, standing, and ascending stairs, potentially leading to increased reliance on others and

emotional challenges. Research conducted in India has shown that elderly individuals living in care facilities often report more severe knee pain due to inactive lifestyles, extended periods of sitting, and a lack of structured exercise programs²

Stationary cycling is a type of low-impact aerobic exercise that facilitates smooth movement of the knee joints without putting excessive strain on them. Engaging in regular cycling builds muscle strength, enhances blood circulation, and aids in lubricating the joints, which helps to reduce stiffness and discomfort. This form of exercise is particularly suitable for older adults as it requires minimal balance, can be easily monitored, and presents a low risk of falls. Research conducted in India supports the effectiveness of cycling exercises in alleviating knee pain and enhancing the functional capabilities of elderly individuals⁴ Several studies in nursing and physiotherapy carried out in India have demonstrated that structured exercise programs greatly reduce pain levels among elderly individuals living in old age homes, as assessed using standardized tools like the Numerical Rating Scale.⁵ Postgraduate nursing studies have also highlighted exercise therapy as an effective non-pharmacological method for managing chronic knee pain among elderly individuals living in institutions.⁶

Results:

The analysis shows that in the experimental group, the mean pre-test pain score was 7.69 ± 1.00 , which reduced to 4.78 ± 0.87 after intervention, with a mean reduction of 2.91. This difference was statistically significant ($t = 28.72$, $p = 0.000$). In the control group, the mean pain score decreased from 6.47 ± 1.06 to 5.57 ± 0.99 , with a smaller mean reduction of 0.90, which was also statistically significant ($t = 11.01$, $p = 0.000$). Comparison between groups in the post-test showed that the experimental group (4.78 ± 0.87) had lower pain scores than the control group (5.57 ± 0.99), with a significant difference ($t = 3.86$, $p = 0.000$). Association analysis revealed that in the experimental group, gender ($p = 0.023$) and duration of knee pain ($p = 0.034$) were significantly associated with pain reduction, while in the control group, diagnosed medical condition ($p = 0.044$) showed significant association. Overall, the values indicate that stationary cycle exercise was more effective in reducing knee joint pain among elderly people.

Conclusion:

The study concludes that the stationary cycle exercise is a highly effective intervention for reducing knee joint pain in elderly people.

SECTION II

Deals with the analysis of data related to the assessment of knee joint pain among elderly people in selected old age homes in the experimental group. The findings are presented in terms of frequency and percentage to describe the distribution of participants based on the severity and characteristics of knee joint pain.

Pre-test:

At the time of pre-test, the findings show that none of the participants reported no pain or mild pain. A small proportion, 9.52%, experienced moderate pain, whereas the majority, 90.48%, reported severe knee joint pain. The mean pre-test score was 7.69 with a standard deviation of 1.00. The minimum score recorded was 5 and the maximum score was 9, indicating a higher level of pain among most of the elderly before intervention. Post-test: In the post-test assessment, there was a noticeable reduction in pain levels. None of the participants reported no pain or severe pain. Mild pain was reported by 7.14% of the elderly, while the majority, 92.86%, experienced moderate pain. The mean post-test score reduced to 4.78 with a standard deviation of 0.87. The scores ranged from a minimum of 3 to a maximum of 6. Overall, the findings indicate a reduction in the severity of knee joint pain among the experimental group following the intervention, as evidenced by the decrease in mean pain scores and the shift from severe pain in the pre-test to predominantly moderate pain in the post-test.

SECTION III

Deals with the analysis related to the effectiveness of stationary cycle exercise on knee joint pain among elderly people in selected old age homes of Sangli, Miraj, Kupwad Corporation area in the experimental group. The analysis focuses on comparing pre-test and post-test findings to determine the effect of the intervention on knee joint pain levels.

Table 1: Effectiveness of stationary cycle exercise on knee joint pain among elderly people in selected old age homes – Experimental Group N=42

Experimental	N	Mean	S.D.	t value	P value
Pre Test	42	7.69	1.00	28.72	0.000
Post Test	42	4.78	0.87		

The comparison of knee joint pain scores between pre-test and post-test in the experimental group was analyzed using a paired t-test. The mean pre-test score was 7.69 with a standard deviation of 1.00, while the mean post-test score was 4.78 with a standard deviation of 0.87.

The calculated paired t-test value was 28.72, and the corresponding p-value was 0.000, which is less than 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. This indicates that there is a statistically significant difference between pre-test and post-test knee joint pain scores in the experimental group. Hence, it can be concluded that stationary cycle exercise was effective in reducing knee joint pain among elderly people in selected old age homes in the experimental group.

Table 2: Comparisons of knee joint pain among elderly people in selected old age homes - control group N=42

Control	N	Mean	S.D.	t value	P value
Pre Test	42	6.47	1.06	11.01	0.000
Post Test	42	5.57	0.99		

The comparison of knee joint pain scores between pre-test and post-test in the control group was analyzed using a paired t-test. The mean pre-test score was 6.47 with a standard deviation of 1.06, while the mean post-test score was 5.57 with a standard deviation of 0.99.

The calculated paired t-test value was 11.01, with a p-value of 0.000, which is less than 0.05. Hence, the null hypothesis is rejected and the alternative hypothesis is accepted. This indicates that there is a statistically significant difference between the pre-test and post-test knee joint pain scores in the control group.

Therefore, it can be concluded that there was a significant difference in pre-test and post-test knee joint pain among elderly people in selected old age homes, even in the control group.

Table 3: Effectiveness of stationary cycle exercise on knee joint pain among elderly people in selected old age homes – Experimental vs Control Group N=42+42

Post test	N	Mean	S.D.	t value	P value
Experimental	42	4.78	0.87	3.86	0.000
Control	42	5.57	0.99		

The comparison of post-test knee joint pain between the experimental and control groups was analyzed using an unpaired t-test. The mean post-test score in the experimental group was 4.78 with a standard deviation of 0.87, whereas the control group had a mean score of 5.57 with a standard deviation of 0.99.

The calculated unpaired t-test value was 3.86, and the p-value was 0.000, which is less than 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. This indicates that there is a statistically significant difference in post-test knee joint pain between the experimental and control groups.

Hence, it can be concluded that stationary cycle exercise was effective in reducing knee joint pain among elderly people in selected old age homes in the experimental group compared to the control group.

DISCUSSION

The findings of the present study reveal that stationary cycle exercise was effective in reducing knee joint pain among elderly people living in selected old age homes. The demographic profile indicated that most of the participants were above 60 years of age, predominantly females, and had a history of knee joint pain for 1–3 years. A majority of the participants reported no other joint problems and did not use any assistive devices. In the experimental group, the pre-test assessment showed that most of the elderly experienced severe knee joint pain, with a high mean score of 7.69 ± 1.00 . After the intervention, a clear reduction in pain levels was observed, where most participants shifted from severe to moderate pain. The mean post-test score decreased to 4.78 ± 0.87 , indicating a noticeable improvement in knee joint condition. These results suggest that stationary cycle exercise is an effective non-pharmacological approach for managing knee joint pain among elderly individuals. It may also contribute to improved physical comfort, enhanced mobility, and better quality of life in this population.

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