International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
ISSN Online: 2349-4182
Received: 04-01-2026, Accepted: 03-02-2026, Published: 19-02-2026
Volume 13, Issue 1, 2026, Page No. 413-418

Effect of knee pain on functional activity and quality of life in people of rural areas

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Abstract
Background: Knee pain is one of the most common musculoskeletal complaints among adults, particularly in rural populations where physically demanding work, limited access to healthcare, and delayed treatment often worsen symptoms. Persistent knee pain can restrict mobility, reduce independence in daily activities, and negatively impact overall quality of life. Understanding its effect on functional activity and well-being is essential for developing community-based preventive and rehabilitative strategies.
Methodology: A cross-sectional study was conducted among adults living in rural areas. Participants with self-reported knee pain for more than three months were included. Data were collected using a structured questionnaire, including the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) to assess pain, stiffness, and physical function, and the SF-36 to evaluate quality of life.
Result: The findings showed that individuals with higher levels of knee pain had significantly reduced functional activity, particularly in walking, stair climbing, squatting, and performing household tasks. WOMAC scores demonstrated a strong association between pain intensity and functional impairment. Quality-of-life scores were markedly lower in the physical, psychological, and social domains among participants with moderate to severe knee pain. Limited access to healthcare services and reliance on physical labor further contributed to decreased quality of life.
Conclusion: Knee pain substantially affects functional activity and reduces quality of life in rural populations. Early identification, improved access to healthcare, community-based Physiotherapy programs, and awareness about joint-care practices are essential to minimize disability and improve overall well-being in these communities.

Keywords: Knee pain, functional activity, Quality of life, rural population, WOMAC, SF-36

Introduction

Knee pain can make daily life difficult by limiting movement and making everyday tasks harder. One of the main reasons for knee pain, especially in older adults, is osteoarthritis. Additional factors like a history of injury, being overweight, and engaging in intense physical activity can also develops knee pain. The most common reason for chronic knee pain is osteoarthritis, which is a degenerative joint condition. Other possible causes include inflammatory diseases like rheumatoid arthritis, crystal-related joint problems, pain after an injury, and pain that remains even after knee surgery (T Vanneste *et al*; 2025) [1].

Nearly half of the population experiences knee pain, making it a major cause of disability, reduced work efficiency, and increased healthcare costs. Because knee pain is so common, many treatment approaches are available. These include physiotherapy, interventional pain management techniques (C.W Hunter *et al*; 2022) [4].

Knee pain affects about one in four adults, and its occurrence has increased by nearly 65% over the last two decades. It is responsible for almost four million visits to primary care clinics each year. The first step in evaluating knee pain is to rule out serious or emergency conditions and decide whether referral is needed. A detailed patient history is essential and should include the patient's age, the site, onset, duration, and nature of the pain, presence of mechanical or systemic symptoms, history of swelling, any recent injury, and relevant medical or surgical history. Urgent referral is usually required for patients with intense pain, marked swelling, joint instability, or inability to bear weight after acute trauma, as well as for those showing signs of joint infection such as fever, redness, swelling, and restricted joint movement (C.W Bunt *et al*; 2018) [7].

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is a commonly used self-reported questionnaire that evaluates pain, stiffness, and physical function in older adults with knee osteoarthritis. It measures pain experienced during movement or rest, stiffness felt in the morning, and difficulties in performing everyday activities. Higher WOMAC scores in elderly patients reflect greater levels of disability and are often associated with long-standing knee pain (YY Leung *et al*; 2022) [5].

The SF-36 health survey is a well-validated self-administered questionnaire consisting of 36 items that assesses health-related quality of life and is commonly used in older adults with knee osteoarthritis. It evaluates eight health domains, including physical function and pain, which are combined to generate physical and mental health summary scores. In individuals with knee osteoarthritis, the physical health component is often markedly reduced due to knee-related pain and functional limitations (G.S Goh *et al*; 2023) [2].

Review of Literature

1. T Vanneste *et al*; 2025 [1] This article explains about the chronic knee pain as a long-lasting condition that continues for months and affects daily activities and

quality of life. It describes that chronic knee pain is usually not caused by a single problem but by a combination of joint damage, nerve sensitivity, muscle weakness, and ongoing inflammation. This article discuss different causes such as osteoarthritis, previous injuries, postsurgical pain, and nerve-related pain. The article highlights that management should be step-by-step, starting with education, exercise, weight control, and medications, and moving to interventional treatments like injections or nerve-based procedures when needed. Overall, it emphasizes a multidisciplinary and individualized approach to control pain, improve function, and help patients live better with chronic knee pain.

2. G.S Goh *et al*; 2023 [2] This study investigated the patient acceptable symptom state (PASS) for commonly used outcome measures—the Knee Society Score (KSS), Oxford Knee Score (OKS), and Short Form-36 (SF-36)—in patients who underwent unicompartmental knee arthroplasty. The aim was to identify score thresholds that represent a satisfactory symptom level from the patient's perspective. The results showed specific PASS cut-off values for each questionnaire, helping clinicians interpret postoperative scores more meaningfully. These findings support the use of KSS, OKS, and SF-36 as effective tools for evaluating patient-reported outcomes and determining treatment success after unicompartmental knee replacement.
3. J.P Berteau *et al*; 2022 [3]. This article explains knee pain in osteoarthritis in a clear and practical way. It describes how osteoarthritis develops due to gradual cartilage damage, changes in bone, and inflammation inside the joint, which together cause pain, stiffness, and reduced movement. The article also discusses common risk factors such as aging, obesity, previous knee injury, weak muscles, and abnormal joint loading. Recent evidence highlighted in the article shows that physiotherapy plays a key role in managing knee osteoarthritis, especially through exercises that improve strength, flexibility, balance, and movement patterns. Overall, the article emphasizes that well-planned, regular physiotherapy can reduce pain, improve function, and slow disability, often reducing the need for medications or surgery.
4. C.W Hunter *et al*; 2022 [4]. This article explains about the treatments to manage knee pain, especially when regular treatments like medicines, or lifestyle changes do not give enough relief. It discusses different procedures such as knee injections, nerve blocks, radiofrequency ablation, and other pain-relieving interventions, and explains when and for whom these treatments should be used. The guidelines stress that treatment should be individualized, based on the cause of knee pain, severity of symptoms, and patient response to previous treatments. It also highlights the importance of proper diagnosis, imaging when needed, and using interventions as part of a multidisciplinary approach, not as a standalone solution. Overall, the article provides clear guidance to help clinicians choose safe and effective interventional options for knee pain management.
5. YY Leung *et al*; 2022 [5]. This study aimed to evaluate and improve the measurement properties of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) in patients undergoing knee arthroplasty. The authors examined whether the WOMAC accurately measures pain, stiffness, and physical function in this patient group and whether its scores can be transformed into an interval-level scale for better interpretation. Using advanced psychometric methods, the study found that certain WOMAC subscales required modification to meet measurement standards. After validation and scale transformation, the refined WOMAC demonstrated improved reliability, validity, and responsiveness. The findings support the use of an interval-scaled WOMAC for more accurate assessment of outcomes in patients undergoing knee replacement surgery, particularly in clinical research and outcome evaluation.
6. S.M Mcclinton *et al*; 2020 [5]. This article explains how physiotherapists assess and treat anterior knee pain, which is common in active people and often caused by a mix of muscle weakness, poor movement patterns, and overuse rather than a single structure. The article emphasize a thorough examination that looks beyond the knee, especially at hip strength, lower-limb alignment, flexibility, and how the patient moves during activities like walking, running, or squatting. Management focuses on patient education, reducing pain and load, and correcting movement faults through individualized exercise programs, particularly strengthening the hip and thigh muscles. The article highlights that successful treatment depends on addressing the underlying causes, gradually progressing activity, and using a patient-specific, evidence-based rehabilitation approach rather than relying only on rest or passive treatments.
7. C.W Bunt *et al*; 2018 [7]. This article describes a clearance of evaluating knee pain in adults and adolescents, focusing on identifying serious conditions early while avoiding unnecessary tests. It explains how a detailed patient history (onset of pain, injury, swelling, mechanical symptoms, and activity level) combined with a focused physical examination helps narrow down the possible causes of knee pain. The article focuses the importance of recognizing red-flag signs such as severe trauma, infection, fracture, or inflammatory disease that require urgent referral. The article also guides clinicians on when imaging like X-rays or MRI is truly needed and when conservative management is appropriate. Overall, it emphasizes that careful clinical assessment is the key to accurate diagnosis and effective initial management of knee pain.

Objectives

1. To determine the effect of knee pain on the functional disability in people of rural areas.
2. To determine the effect of knee pain on the quality life in people of rural areas.
3. To identify the need of Physiotherapy and awareness regarding knee pain in rural population.

Methodology

The study was conducted on Nawada village Greater Noida, Uttar Pradesh. On people of age between 45 to 70 years, who were engaged in occupations such as domestic work,

agriculture, or manual labour and reported experiencing with the knee pain.

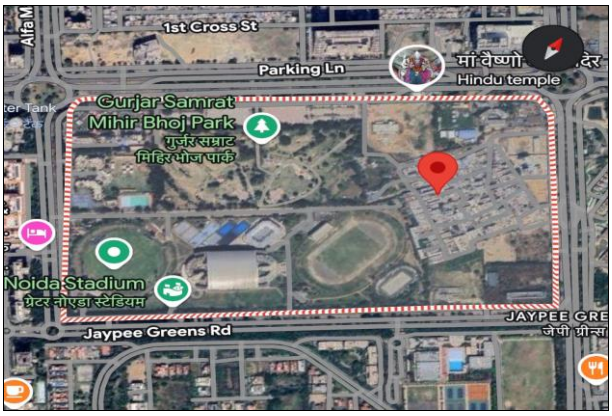
Individuals who were willing to take part in the study were included after obtaining verbal consent. A detailed assessment was conducted to gather information about their symptoms, and the WOMAC and SF36 was used to measure the level of functional disability and quality of life caused by knee pain, expressed as a percentage

Participants were then educated about the objectives of the study and informed regarding the causes, preventive measures, and management of knee pain.

A detailed history about the symptom was recorded in a face-to-face sitting to know about the severity of the knee pain. After recording the history and score, awareness was given about the causes, dos, don'ts, management and prevention of the condition.

Management included ergonomic modifications weight management, and Physiotherapy based exercises that can be followed regularly. After 1weeks WOMAC and SF-36 scores were again taken to know about the effectiveness of the intervention and feedback were taken from the participants.

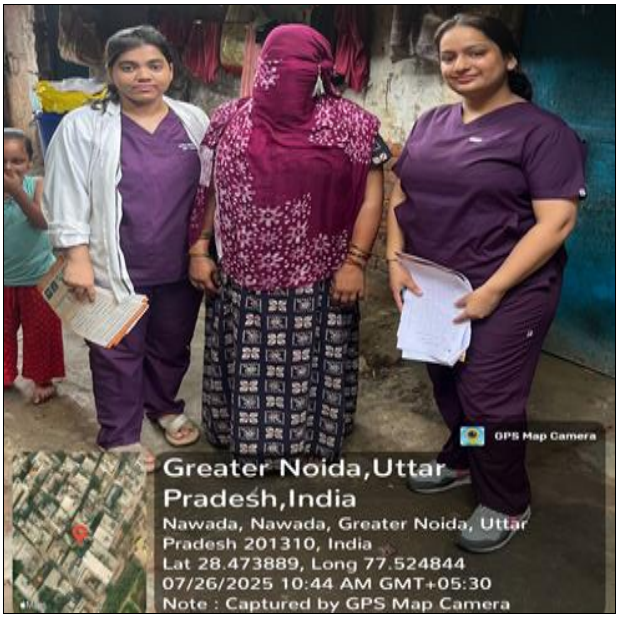
MAP and VISIT

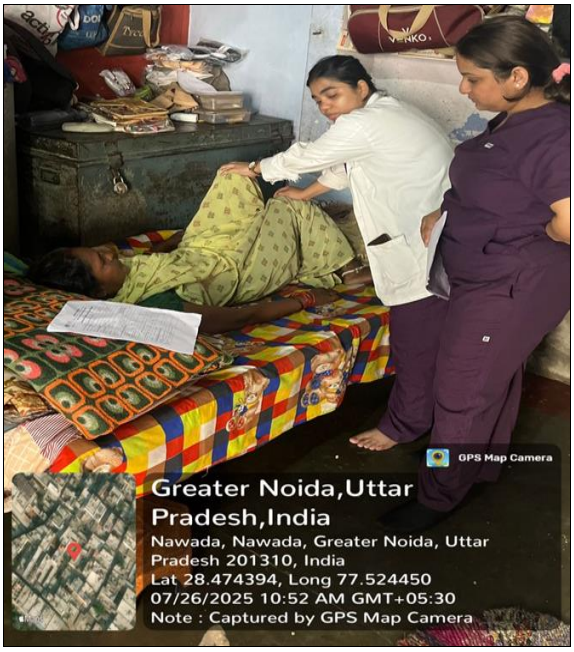


Venue- Village Nawada, Greater Noida, Uttar Pradesh

Proof of Visit

First visit on 26/7/25





Second visit on 2/8/25

Data Description

A Total of sixteen subjects were included in this study.

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is a widely used, disease-specific questionnaire designed to assess pain, stiffness, and physical function in individuals with knee and hip osteoarthritis. It helps measure the severity of symptoms and the impact of joint problems on daily activities, making it useful for both clinical evaluation and research. The Short Form-36 (SF-36) is a generic health-related quality-of-life questionnaire that evaluates overall well-being across eight domains, including physical functioning, pain, vitality, mental health, and social functioning. It provides a comprehensive measure of an individual's physical and mental health status, applicable to both healthy individuals and those with various medical conditions.

Table 1: Patient Information showing pre- and post-intervention scores of WOMAC and SF-36

Serial No.	Age	Gender (M/F)	WOMAC and SF-36 Total Score (in %)			
			Pre-intervention (WOMAC)	Post-intervention (WOMAC)	Pre-intervention SF-36	Post-intervention SF-36
1	38	F	52	38	48	36
2	46	M	32	28	52	48
3	49	M	30	24	36	31
4	38	F	34	28	34	29
5	30	F	42	36	48	42
6	27	F	28	24	52	48
7	48	F	46	38.	56	51
8	37	F	48	42	57	54
9	39	F	36	30	48	42
10	37	M	42	38	32	29
11	39	M	38	32	58	55
12	48	F	52	34	49	43
13	41	F	34	22	34	30
14	39	F	46	38	49	45
15	42	F	40	38	54	50
16	29	F	61	64	64	58

Result

Given Data

WOMAC and SF36 Total Scores for 16 participants - recorded Pre-intervention and

Post-intervention

Inference-

SF-36

The Exact test‘t’ static value 2.0 is significant. P = 0.000; ‘p’ < 0.01

This shows that the median SF-36 values differ significantly.

Descriptive Statistics

	Pre- SF-36	Post- SF-36
Median	49.0	44.0

Inference-

WOMAC

The Exact test‘t’ static value 2.0 is significant. P = 0.000; ‘p’ < 0.01

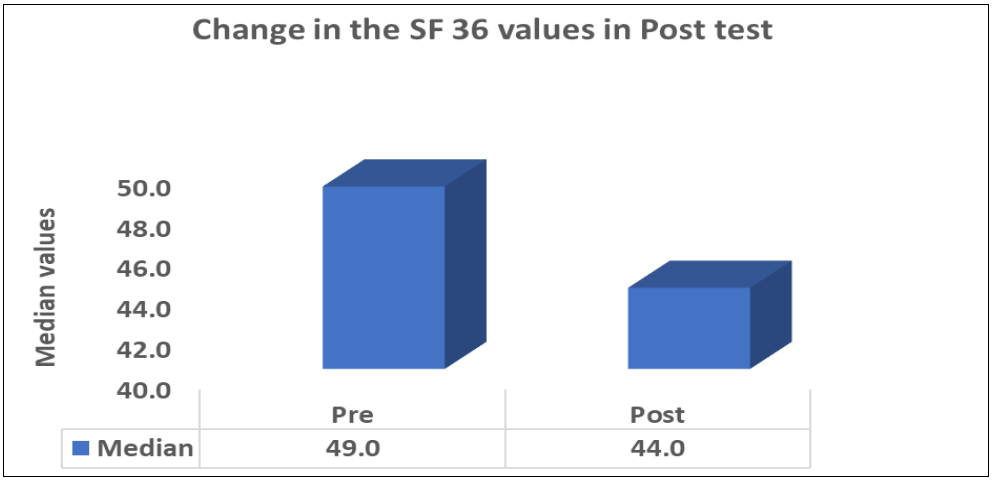
This shows that the median WOMAC values differ significantly.

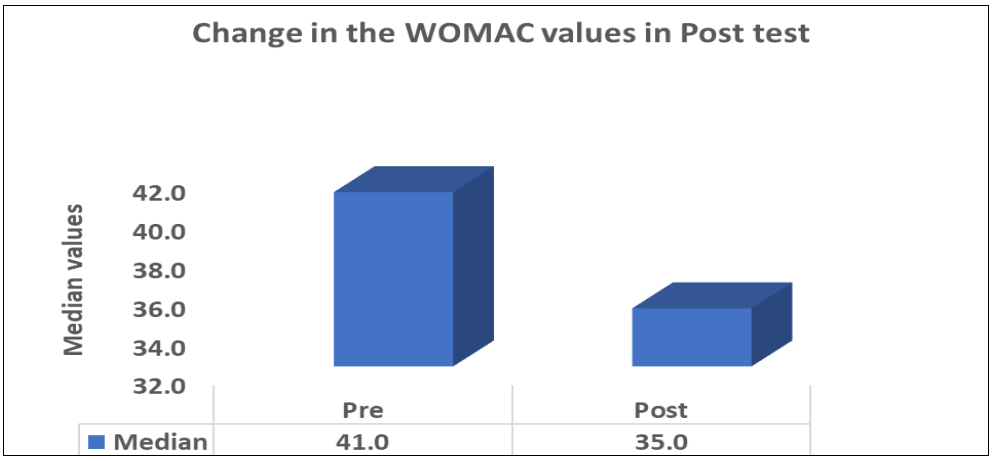
Descriptive Statistics

	Pre- WOMAC	Post- WOMAC
Median	41.0	35.0

Median values 41.0 in the pre-test is reduced to 35.0 in the post test.

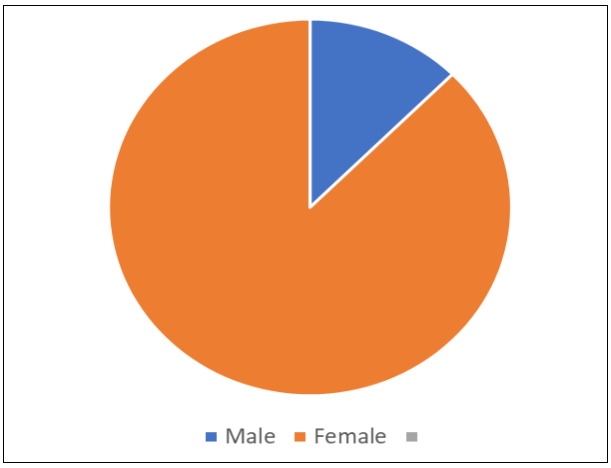
Median values 49.0 in the pre test is reduced to 44.0 in the post test.





Interpretation

The median pre-intervention WOMAC 41.0 and SF-36 score was 49.0, while the mean post-intervention score of WOMAC 35.0 and SF-36 44.0



This Pie chart shows that in total 16 participants of the study, 2 were Males and 14 were Females having Knee Pain.

Discussion

The present community-based project was undertaken to evaluate the effectiveness of an educational and physiotherapy-oriented intervention in reducing knee pain related to functional disability and quality of life among adults in a rural setting. The WOMAC and SF-36 was used as the primary assessment tool to asses' functional disability and quality of life experienced by participants before and after the intervention.

After the implementation of ergonomic education and physiotherapy guidance, the post-intervention WOMAC score decreased to 35.0 and SF-36 was 44.0.This reduction in functional disability percentage and improvement in quality of life indicates a positive response to the intervention and demonstrates that even in short-term, community-based physiotherapy awareness programs can yield measurable functional benefits.

By promoting weight management and ergonomics modification individuals can effectively manage discomfort and maintain functional independence. Moreover, the present results underscore the significance of extending physiotherapy knowledge beyond clinical settings into community environments, particularly among populations with limited access to healthcare facilities.

The results demonstrate that community-based interventions focused on ergonomic education, exercise awareness, and lifestyle modification can meaningfully reduce knee pain. Such initiatives not only enhance physical well-being but also empower individuals to take an active role in maintaining their musculoskeletal health.

Conclusion

The present study concluded that community-based ergonomic education and physiotherapy awareness

programs can significantly reduce knee related functional disability and quality of life among individuals engaged in daily physical or household work. The decrease in the mean WOMAC score from 41.0 pre-intervention to 35.0 post-intervention and SF-36 score from 49.0 pre-intervention to 44.0 post-intervention reflects a clear improvement of 11.0, indicating that participants experienced less discomfort and better functional ability following the intervention.

These findings emphasize the importance of preventive education and simple therapeutic exercises in minimizing the effects of knee pain, which are common in both domestic and occupational settings. By promoting weight management, ergonomics modification, adequate rest breaks, and regular strengthening exercises of knee, such community initiatives can help reduce pain, improve quality of life and reducing functional disability, and lower the risk of chronic musculoskeletal problems.

Integrating physiotherapy-based guidance at the community level is both feasible and beneficial. Continued efforts in health education, awareness, and follow-up training can further strengthen musculoskeletal health and encourage self-care practices among rural populations.

Summary

This study was conducted in Village Nawada, Greater Noida, Uttar Pradesh, where residents were surveyed to identify common musculoskeletal problems affecting their daily activities. Based on the survey findings, 16 community individuals experiencing knee Pain were selected to participate in the program. A detailed history regarding the onset, nature, and aggravating factors of their knee pain was obtained, and participants were evaluated using the WOMAC and SF-36 to assess the severity of pain and the level of functional limitation and Quality of life. A total of two visits were carried out over a period of two weeks. During these sessions, participants were educated about the causes and prevention of knee pain, with a focus on weight management, ergonomics modification practices into their routine. The management component included ergonomic modifications, weight management, and physiotherapy-based exercises for strengthening and range of motion exercises, which were demonstrated and reinforced throughout the visits.

On the final visit, participants feedback was recorded, and the WOMAC and SF-36 scores were reassessed. The community members also reported better awareness of weight management, strengthening exercises, range of motion exercises and motivation to continue exercises. Overall, the study demonstrated that community-based physiotherapy education and ergonomic awareness can play a vital role in reducing knee pain and improving quality of life and decreasing functional disability.

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