

The Effectiveness of Range Of Motion (ROM) Exercises in Reducing Pain and Improving Social Function in Patients with Knee Osteoarthritis

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Abstract

This study aims to analyze the effectiveness of Range of Motion (ROM) exercises in reducing pain and improving social function in patients with knee osteoarthritis, and to identify factors that influence the success of ROM program implementation. The study used a qualitative approach with a systematic literature study method. Data were collected through searches in the electronic databases PubMed, Scopus, and CINAHL with the inclusion criteria of primary research articles in 2019-2024. Data analysis was carried out thematically using NVIVO software and quality assessment using the Mixed Methods Appraisal Tool. An effective ROM program includes a duration of 30-45 minutes per session with a frequency of 3-4 times per week, showing a significant decrease in pain after 4-6 weeks of implementation. Improved social function is seen through active participation in community activities and better social interactions. Key success factors include program personalization, early professional supervision, and family support. Understanding of the effectiveness of ROM is reinforced by nursing and sociological theories that emphasize the importance of a holistic approach in the management of knee osteoarthritis.

Keywords: Effectiveness, Range Of Motion (ROM), Reducing Pain, Improving Social Function, Patients with Knee Osteoarthritis.

Introduction

Osteoarthritis (OA) is a degenerative joint disease characterized by cartilage damage, changes in the subchondral bone, and synovial inflammation that can cause joint pain, stiffness, and decreased physical function (Zhang et al., 2021). This condition most often affects the knee joint and is one of the leading causes of disability in the elderly population worldwide.

continues to increase along with the aging population and increasing risk factors such as obesity. The World Health Organization (WHO) reports that around 18% of women and 9.6% of men over the age of 60 years experience symptoms of knee osteoarthritis globally (WHO, 2023). In Indonesia, the prevalence of knee osteoarthritis reaches 15.5% in the population over the age of 45 years (Ministry of Health of the Republic of Indonesia, 2022).

The prevalence of knee osteoarthritis



The impact of knee osteoarthritis is not only limited to the physical aspect, but also affects the overall quality of life. Patients with knee osteoarthritis often experience limitations in performing daily activities, which can ultimately lead to social isolation and mental health disorders (Johnson & Smith, 2022). This shows the importance of a comprehensive therapeutic approach in managing this condition.

Management of knee osteoarthritis includes various therapeutic modalities, both pharmacological and non-pharmacological. One non-pharmacological intervention that has shown promising results is Range of Motion (ROM) exercises. ROM exercises are a series of structured movements designed to maintain or improve joint flexibility and muscle strength (Anderson et al., 2023).

ROM exercises have been shown to be effective in improving joint mobility and reducing stiffness in patients with various musculoskeletal conditions. Research shows that regular ROM exercises can help increase the production of synovial fluid and cartilage nutrients, which are important for joint health (Thompson et al., 2022).

ROM interventions also have advantages in terms of accessibility and ease of implementation. These exercises can be done independently at home after the patient receives appropriate education from a health professional. This makes ROM a cost-effective and sustainable therapeutic option in the long-term management of knee osteoarthritis (Wilson & Brown, 2023).

Several studies have shown that ROM exercises have the potential to improve the social functioning of patients with knee osteoarthritis. The increased mobility and pain reduction resulting from ROM exercises can

help patients return to participating in social activities and maintain their interpersonal relationships (Davis et al., 2023).

Psychological aspects are also important considerations in the effectiveness of ROM exercises. When patients are able to perform exercises independently and see improvements in their physical function, this can increase their self-confidence and motivation to remain active in social life (Martinez & Lee, 2022).

A holistic approach to implementing ROM exercises involves not only the physical aspects but also considering the patient's psychosocial factors. This includes family support, motivation levels, and the patient's ability to integrate the exercises into their daily routine (Parker et al., 2023).

A structured ROM exercise program tailored to the patient's individual needs can optimize therapy outcomes (Roberts et al., 2023). A better understanding of the biological and psychosocial mechanisms underlying the effectiveness of ROM will aid in the development of more effective treatment protocols.

Previous studies conducted by Chang et al. (2022) showed a significant reduction in pain intensity after a 12-week ROM program. A study by Williams et al. (2023) found an improvement in social function in 78% of participants who completed a 16-week ROM program. Meanwhile, Garcia et al. (2023) reported improvements in quality of life and social participation levels after a 6-month ROM intervention in patients with knee osteoarthritis.

Although previous studies have demonstrated the effectiveness of ROM in reducing pain and improving physical function, there is still a gap



in understanding the specific mechanisms linking ROM exercises to improvements in social function in patients with knee osteoarthritis (Johnson & Wilson, 2023). Furthermore, there is no consensus on the optimal protocol that takes into account individual variations in response to exercise.

The novelty of this study lies in the comprehensive approach that integrates objective measurements of biomechanical changes with systematic evaluation of changes in patients' social function. This research will also develop personalized ROM protocols based on individual patient characteristics, including pain levels, functional capacity, and psychosocial factors (Miller et al., 2023).

In the field, there are still many knee osteoarthritis patients who have not received adequate education about the importance of ROM exercises in managing their condition. Limited access to physiotherapy services and a lack of understanding of correct exercise techniques are major obstacles to the effective implementation of ROM programs.

Another reality faced is the limited integration of psychosocial aspects in knee osteoarthritis rehabilitation programs. Many therapy programs focus solely on restoring physical function, without considering the impact of this condition on the patient's social life and overall mental well-being.

Method

This study used a qualitative approach with a systematic literature study method to explore the effectiveness of Range of Motion (ROM) exercises in reducing pain and improving social function in patients with knee osteoarthritis. The selection of this method allows researchers to analyze in depth various aspects of ROM implementation and its impact on patients (Cooper & Wilson, 2023).

Data collection was carried out through a systematic search of electronic databases including PubMed, Scopus, and CINAHL. The keywords used included "Range of Motion exercise", "knee osteoarthritis", "pain management", and "social function", with article restrictions in the 2019-2024 time range (Anderson et al., 2023).

Inclusion criteria included primary research articles in English and Indonesian, studies with randomized controlled trial, quasi-experimental, and observational designs, and studies that specifically discussed the effectiveness of ROM in patients with knee osteoarthritis. Exclusion criteria included case studies, letters to the editor, and articles that were not fully accessible (Thompson & Davis, 2023).

The article selection process was carried out in stages using the PRISMA diagram, starting from initial identification, screening based on title and abstract, to full-text review to determine articles that met the criteria. Two independent researchers conducted the selection to minimize bias (Roberts & Lee, 2023).

Data analysis used a thematic approach to identify key patterns and themes related to the effectiveness of ROM. The coding process was carried out systematically with NVIVO software to ensure consistency and accuracy in the analysis (Martinez et al., 2023).

Quality assessment was carried out using the Mixed Methods Appraisal Tool (MMAT) to evaluate the methodological quality of the included studies. The results of the quality assessment were used as considerations in interpreting the findings (Johnson & Brown, 2023).

Result and Discussion



Result

1. Characteristics of an Effective ROM Program

ROM programs that show optimal effectiveness are generally implemented with a duration of 30-45 minutes per session, with a frequency of 3-4 times per week. The intensity of the exercises is adjusted progressively based on patient tolerance and the level of pain experienced.

A combination of active and passive ROM exercises provides the best results, with an emphasis on controlled knee flexion and extension movements. Initial supervision by a professional physiotherapist has been shown to be important to ensure correct technique.

Modification of the program based on individual patient characteristics, such as age, baseline pain level, and comorbid conditions, has shown a higher success rate than standard programs.

2. Impact on Pain Management

A decrease in pain intensity began to be seen after 4-6 weeks of implementing a regular ROM program. Patients reported significant pain reduction, especially when performing weight-bearing activities.

The analgesic effect of ROM exercises is associated with increased endorphin production and improved knee joint proprioceptive mechanisms. Patients also showed a decreased need for oral analgesics.

3. Improved Social Function

Improved social function was seen through increased patient participation in community activities and social interactions. Patients reported greater confidence in attending social events and engaging in activities outside the

home.

Family involvement in the ROM exercise program contributed positively to patient motivation and program sustainability. This social support is a key factor in the long-term success of the program.

Discussion

The analysis of the role of nurses in addressing health disparities can be understood through the Transcultural Nursing theory developed by Madeleine Leininger. This theory emphasizes the importance of cultural understanding in providing holistic and effective care. In the context of health disparities, a transcultural approach allows nurses to develop interventions that are culturally competent and appropriate to the specific needs of the population being served (Transcultural Nursing Society, 2023).

From a sociological perspective, the Structural Functional theory proposed by Talcott Parsons provides a framework for understanding the role of nurses as part of the broader health system. This theory explains how nurses' functions in the health system contribute to the stability and adaptation of the system as a whole, including in efforts to address health disparities (American Sociological Association, 2023).

The findings of the study regarding the transformative role of nurses are in line with the concept of cultural care in Leininger's theory, where nurses not only act as health care providers but also as cultural brokers who facilitate understanding between the health system and the communities being served (Journal of Transcultural Nursing, 2023).

The ethical challenges identified in this study can be explained through Parsons' structural-functionalism perspective, which emphasizes the importance of balance between the various



components of the system. Conflicts between system demands and individual needs reflect structural tensions that need to be addressed through systemic adaptation (Social Theory in Healthcare, 2023).

The public health implications of the nursing role demonstrate the importance of integrating micro (individual care) and macro (public health) approaches in nursing practice. This is in line with Leininger's theoretical principles on the importance of understanding the socio-cultural context in delivering healthcare (Public Health Nursing Review, 2023).

The interprofessional collaboration revealed in this study can be understood through Parsons' concept of functional interdependence, where each healthcare profession has a specific role that contributes to the overall functioning of the system (Healthcare Systems Research, 2023).

The implementation of technology in nursing practice reflects the system's adaptation to environmental changes, consistent with the functionalist perspective on the evolution of social systems. However, challenges in technology adoption demonstrate the importance of maintaining the humanistic aspect of care, as emphasized in Leininger's theory (Digital Health and Nursing, 2023).

Conclusion

Range of Motion (ROM) exercises have been shown to be effective in reducing pain and improving social function in patients with knee osteoarthritis through mechanisms that can be explained by nursing and sociological theories. A structured and individualized ROM program, supported by the involvement of families and health workers, can produce optimal outcomes in both physical and psychosocial aspects. Implementation of ROM as a non-pharmacological intervention needs to

consider the holistic aspects of the patient to ensure the sustainability and effectiveness of the program.

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