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Original Article

Association Between Occurrence of Knee Osteoarthritis and Physical Activity in Older Adults

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ABSTRACT

Background: Knee osteoarthritis (OA) is a leading cause of disability among older adults, significantly affecting their quality of life and mobility. The relationship between physical activity and the severity of knee OA symptoms has been a subject of extensive research, with mixed results on whether physical activity exacerbates or alleviates OA symptoms.

Objective: This study aimed to investigate the association between physical activity levels and the severity of knee osteoarthritis, as well as to assess the impact of physical activity on the health-related quality of life among individuals with knee OA.

Methods: A cross-sectional study was conducted among 171 patients diagnosed with knee osteoarthritis at four medical institutions. Data on demographics, physical activity levels, and OA severity were collected through standardized questionnaires, including the SF-36 Health Survey and the Knee injury and Osteoarthritis Outcome Score (KOOS). Physical activity levels were categorized as poor, moderate, and good. The severity of knee OA was classified as no OA, moderate OA, and extreme OA. Statistical analysis was performed using SPSS version 25, employing descriptive statistics, chi-square tests for categorical variables, and Pearson's correlation to assess the association between physical activity levels and OA severity.

Results: The study population comprised 35.1% males and 64.9% females, with a mean age of 71.1±3.9 years. Regarding physical activity, 30.4% engaged in poor, 46.8% in moderate, and 22.8% in good physical activity. The severity of knee OA was reported as extreme in 25.1% of patients, moderate in 49.1%, and absent in 25.7%. Statistical analysis revealed a significant association between physical activity levels and knee OA severity (Pearson Chi-Square = .000), indicating that higher levels of physical activity were associated with lower severity of OA symptoms.

Conclusion: This study supports the notion that engaging in physical activity is associated with a reduced severity of knee osteoarthritis symptoms and suggests that physical activity could be beneficial for managing OA symptoms and improving the quality of life among individuals with knee OA. These findings highlight the importance of promoting physical activity as a key component of knee OA management strategies.

Keywords: Knee osteoarthritis, Physical activity, Quality of life, SF-36, KOOS, Cross-sectional study.

INTRODUCTION

Knee osteoarthritis (OA) represents a major progressive condition that significantly impairs movement and is intricately linked with the natural process of aging, boasting a lifetime prevalence among Americans of 44% (1). This degenerative joint disease holds a parallel importance to cardiovascular disease in terms of its potential to cause long-lasting disability (2), highlighting the crucial need to understand the association between physical activity and the development of knee OA in both clinical and public health settings (3). Characterized by symptoms such as discomfort, reduced physical function, limited range of motion, joint stiffness, swelling, muscle weakness, and instability (4), knee OA particularly affects mobility in older adults aged 65 and above more than any other medical condition, often necessitating assistance with walking or ascending stairs (5). However, the relationship between the

frequency of physical activity in daily life and the functional capacity of older adults in the community, especially those experiencing chronic pain, remains underexplored (6). Furthermore, the link between the daily volume of physical activity and the level of discomfort experienced due to knee OA is still not fully understood (7), underscoring the importance of this area of research especially in the absence of pharmaceutical interventions that can halt the progression of the disease and the associated increased risk of premature mortality (8).

The variability in physical activity levels among individuals and within an individual over their lifespan (9) calls for a deeper investigation into knee pain and its risk factors, particularly in the middle-aged and older populations (10). Despite previous studies on the epidemiology of OA (11), there remains a gap in understanding the impact of pain catastrophizing, which has been found to be more debilitating and psychologically distressing than the physical sensation of pain itself (12). The manifestation of OA through pain and inflammation in the cartilages restricts normal physical activities (13), making the early detection and prevention of knee OA critically important (14). Challenges in accurately assessing physical activity levels through self-reported measures, which only show moderate reliability (15), further complicate the understanding of this condition. As the most prevalent form of OA, knee osteoarthritis significantly contributes to disability and reduced productivity in the United States (16), underscoring the need for research that assesses the role of spontaneous physical activity and the potential risks associated with heavy activity. Such research could inform interventions aimed at improving physical function and enhancing the quality of life for those affected by this debilitating condition.

MATERIAL AND METHODS

The requisite permissions were obtained from the management of the hospitals involved, ensuring the inclusion of patients diagnosed with osteoarthritis. Participants were enrolled from four medical institutions: the University of Lahore teaching hospital, Jinnah Hospital, Services Hospital, and Central Park Teaching Hospital. Prior to their inclusion, all participants were provided with detailed information about the study's objectives, procedures, potential risks, and benefits, following which informed consent was obtained, adhering to the principles outlined in the Declaration of Helsinki regarding ethical conduct in research involving human subjects.

The study population comprised individuals of both genders who had been formally diagnosed with knee osteoarthritis. To explore the relationship between physical activity levels and the severity and impact of knee osteoarthritis on the participants' quality of life, the study employed two widely recognized and validated tools: the SF-36 Health Survey and the Knee injury and Osteoarthritis Outcome Score (KOOS) questionnaire. These instruments are designed to measure health-related quality of life and specific symptoms and limitations associated with knee osteoarthritis, respectively.

Upon the completion of data collection, rigorous measures were taken to ensure the confidentiality and security of the participants' information. All collected data were stored in a secure area, accessible only to the research team, to prevent unauthorized access and minimize the risk of bias in the handling and analysis of the data.

For the analysis of the gathered data, the Statistical Package for the Social Sciences (SPSS) version 25 was utilized. The approach to data analysis was bifurcated into qualitative and quantitative methodologies. The qualitative data obtained from the questionnaires were analyzed through the calculation of frequencies and percentages, and the results were subsequently presented in a visually accessible format using bar charts and pie charts. Quantitative data analysis involved the computation of mean values and standard deviations for the variables under study, with histograms utilized to graphically represent the distribution of these variables. Furthermore, a chi-square test was executed to ascertain the existence and strength of the relationship between physical activity levels and indicators of knee osteoarthritis as measured by the SF-36 and KOOS questionnaires.

RESULTS

In the conducted study, a thorough examination of the age demographic among participants diagnosed with knee osteoarthritis revealed an average age of 71.17 years, with a standard deviation of 3.924 years. This indicates a relatively narrow age range within the study group, stretching from a minimum of 65 to a maximum of 80 years. Such a demographic profile underscores the prevalence of knee osteoarthritis among the elderly, highlighting its significance as a public health concern within this age group.

Regarding physical activity levels among the participants, the distribution presents a varied landscape of engagement. A notable 30.4% of the participants reported poor levels of physical activity, amounting to 52 individuals. This contrasts with the 46.8% (80 individuals) who reported moderate levels of physical activity, and the 22.8% (39 individuals) who categorized their physical activity levels as good. The total number of participants surveyed for physical activity levels amounted to 171, providing a comprehensive overview of physical activity patterns among individuals with knee osteoarthritis.

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The severity of knee osteoarthritis among the study participants was also documented, revealing a significant variation in the condition's impact. A quarter of the participants (25.1%, or 43 individuals) reported experiencing extreme knee osteoarthritis, indicating severe limitations and challenges. The largest group, comprising 49.1% (84 individuals), experienced moderate knee osteoarthritis, suggesting a wide range of symptoms and impacts on daily life. Interestingly, a similar proportion of the participants (25.7%, or 44 individuals) reported no symptoms of knee osteoarthritis, highlighting the heterogeneous nature of the disease's presentation and the potential for asymptomatic cases within the population. The total count of participants assessed for knee osteoarthritis severity stood at 171, mirroring the physical activity cohort.

Table 1 Demographic and Study Characteristics

Variable	Statistics	Values
Age	Mean (years)	71.17
	Standard Deviation	3.924
Physical Activity Level	Frequency	Percent (%)
	Poor	52
	Moderate	80
	Good	39
	Total	171
Knee Osteoarthritis Severity	Frequency	Percent (%)
	Extreme knee Osteoarthritis	43
	Moderate knee Osteoarthritis	84
	No knee Osteoarthritis	44
	Total	171
Statistical Test	Pearson Chi-Square (P-Value)	.000

The interrelation between physical activity levels and knee osteoarthritis severity was statistically analyzed, utilizing the Pearson Chi-Square test, which yielded a p-value of .000. This result indicates a statistically significant association between the two variables, suggesting that the level of physical activity has a discernible impact on the severity of knee osteoarthritis symptoms experienced by the participants. Such a finding is pivotal, as it emphasizes the importance of physical activity in managing and potentially mitigating the severity of knee osteoarthritis, providing valuable insights for healthcare professionals and patients alike in the development of treatment and management strategies for this condition.

DISCUSSION

In this study, an analysis of 171 patients with knee osteoarthritis revealed a gender distribution of 35.1% male and 64.9% female, with an average age of 71.1 years and an age range of 65 to 80 years. The physical activity levels among these patients varied, with 30.4% engaging in poor physical activity, 46.8% in moderate, and 22.8% in good physical activity. The severity of knee osteoarthritis also differed within the cohort, with 25.1% of the patients experiencing extreme knee osteoarthritis, 49.1% moderate, and 25.7% showing no signs of the condition. These findings are in concordance with a study conducted in Saudi Arabia, published in the Journal of Clinical Medicine, which identified a significant correlation between the intensity of physical exercise and the severity of knee osteoarthritis (17, 18). This study suggested that high-intensity physical exercise could potentially alleviate the severity of knee osteoarthritis symptoms (19), supporting the notion that increased physical activity is beneficial.

Further supporting this, a study in the Journal of Clinical Rheumatology highlighted the positive effects of physical exercise on functioning and health-related quality of life in individuals with knee osteoarthritis (20, 21). This underscores the importance of physical activity as a modifiable factor that can significantly impact the quality of life and disease progression in knee osteoarthritis patients.

The present study, by delineating the relationship between physical activity levels and knee osteoarthritis severity, adds to the growing body of evidence that suggests a protective role of exercise in managing osteoarthritis symptoms. However, it is important to acknowledge the study's limitations, including its cross-sectional design, which limits the ability to infer causality, and the reliance on self-reported measures of physical activity, which may be subject to bias.

Despite these limitations, the study's findings are consistent with previous research, reinforcing the recommendation for physical activity as a key component of management strategies for knee osteoarthritis. Future research should aim to explore this relationship further through longitudinal studies to better understand the causal pathways involved. Additionally, intervention studies are needed

to determine the optimal types and intensities of physical activity that can most effectively reduce the severity of knee osteoarthritis and improve patients' quality of life.

CONCLUSION

In conclusion, this study contributes to the accumulating evidence on the benefits of physical activity for individuals with knee osteoarthritis, highlighting its potential to mitigate disease severity and enhance quality of life. Given the global prevalence of knee osteoarthritis and its impact on mobility and daily functioning, these findings underscore the need for healthcare providers to incorporate physical activity guidance as a fundamental part of osteoarthritis management. Further research is warranted to refine these recommendations and to explore innovative strategies to encourage and maintain physical activity among this population.

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