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Original Article

Prevalence of Knee OA and its Association with Low Back Pain

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ABSTRACT

Background: Knee osteoarthritis (OA) is a prevalent musculoskeletal condition known to impact quality of life and daily functioning significantly. Previous studies have identified a potential association between knee OA and low back pain, but this relationship requires further exploration to understand its implications fully.

Objective: The objective of this study was to investigate the correlation between knee OA and low back pain, specifically examining the impact of knee pain on quality of life, daily functioning, and the severity of low back pain.

Methods: A cross-sectional study was conducted with 377 OA patients aged between 45 to 75 years, selected via non-probability convenient sampling from various hospitals in Sialkot. Exclusion criteria included a history of knee surgery or recent trauma, mental retardation, or diabetes. Data were collected using the Oswestry Low Back Disability Index and the KOOS Urdu version. Statistical analysis was performed using SPSS version 26, focusing on descriptive statistics, mean and standard deviation for quantitative data, and the chi-square test for associations, with a significance threshold set at a p-value greater than 0.05.

Results: The study found that the prevalence of knee OA varied by age group, with the highest prevalence (46.6%) in the 45-54 age group. Female participants predominated (75.9%). Severity levels of knee OA were classified as mild (32.6%), moderate (42.2%), and severe (21.8%). Significant correlations were observed between knee OA and low back pain, with correlation coefficients of 0.480 for pain effects on QOL, 0.441 for pain during SRF, 0.571 for pain during AODL, and 0.437 for the total score of pain.

Conclusion: The study confirms a significant correlation between knee OA and low back pain, highlighting the need for integrated management approaches for patients suffering from these conditions. Addressing both knee and back pain concurrently could lead to better patient outcomes and improved quality of life.

Keywords: Knee Osteoarthritis, Low Back Pain, Quality of Life, Cross-Sectional Study, Correlation, Musculoskeletal Conditions.

INTRODUCTION

Osteoarthritis (OA), a global musculoskeletal problem, exhibits significant prevalence with various complications such as pain, movement difficulties, and functional impairments (1, 2, 3). The prevalence of OA varies depending on factors like age, gender, geographical areas, and the specific joint under study (4). Remarkably, from 1990 to 2019, the global burden of disease data showed an increase in OA prevalence by 113.5% (5).

OA primarily affects articular cartilages, leading to changes in subchondral bones, surrounding ligaments, and muscles of the involved joint (6). Pathologically, OA begins with an increase in water content in the superficial layers of articular cartilages due to mechanical loading, a change that gradually progresses to deeper layers (7). Knee OA not only impacts joint biomechanics but also the function and strength of knee and hip muscles (8). Weakness in the lower extremity and hip musculature leads to decreased physical activity, adversely affecting postural control (9).

The prevalence of OA varies with the joint under study and the characteristics of the population. For example, the Framingham study indicated that the age-related prevalence of radiographic knee OA in people older than 45 years was 19.2% (10), and in the Johnston County Osteoarthritis Project, it was 27.8% (11). In the Third National Health and Nutrition Examination Survey (NHANES III), 37% of participants over 60 years showed radiographic knee OA (12).

Muscle volume reduction in OA can be attributed to pain-restricted loading on the affected limb, leading to a decrease in muscle strength (13, 14). The level of disability correlates with the reduced muscle strength of the affected lower limb (15). Due to muscle weakness, mechanical loading on the osteoarthritic knee is not compensated by the surrounding muscles, exacerbating knee pain, which can be treated with exercises (16).

Interestingly, 54.6% of patients with knee OA in a rheumatology clinic presented with back pain, showing worsened symptoms of pain severity and disability (17). A community-based cohort study revealed that patients suffering from knee OA for an extended period are now experiencing associated back pain, adversely affecting their lifestyle and work abilities (18). Knee OA and back pain are commonly seen in older adults, mainly due to age-related changes in bone and muscle strength (19). A study in Japan highlighted the significant impact of knee and low back pain on individual health status and quality of life (20). The Research on Osteoarthritis Against Disability (ROAD) indicated a negative correlation between knee pain, back pain, and quality of life (21). Low back pain prevalence is higher in patients diagnosed with knee OA, especially in females, compared to those without knee OA (22). There is a strong association between knee pain, low back pain, and functional limitations and disability (23).

In patients with knee OA, factors contributing to poor physical functioning include pain intensity, proprioceptive inaccuracy, whereas factors such as muscular strength, mental health, and psychological aspects can counteract this poor functioning (24). This research aims to determine the prevalence of knee OA using the KOOS questionnaire and its association with low back pain, highlighting the importance of comprehensive assessment and management in patients with knee pain.

MATERIAL AND METHODS

The study's cross-sectional analysis, approved by the institutional review committee, involved the collection of data from 377 osteoarthritis (OA) patients. Utilizing a non-probability convenient sampling technique, participants were selected from various hospital settings in Sialkot. The study included male and female patients aged between 45 to 75 years, all with a history of OA and knee pain. Exclusion criteria encompassed individuals with a history of knee surgery or recent trauma, mental retardation, or diabetes.

Data collection was conducted using the Oswestry Low Back Disability Index questionnaire and the KOOS Urdu version. These instruments were specifically chosen to accurately assess the disability extent and the impact of OA on the participants' quality of life. Each participant underwent a detailed individual assessment, ensuring the thoroughness and accuracy of the data collection process.

In the data analysis phase, the study employed SPSS version 26. Descriptive statistics were summarized through frequencies and percentages, while mean and standard deviation (SD) were calculated for quantitative data. A key aspect of the analysis involved the KOOS scale. The total score for each domain of the KOOS scale was derived by dividing the mean value of each sub-scale by its possible maximum value, multiplying by 100, and then subtracting this value from 100. This calculation method provided a standardized way to evaluate and compare the knee-related symptoms and their impact on the patients' daily lives.

The chi-square test was utilized to explore the association between knee OA and low back pain, with a significance threshold set at a p-value greater than 0.05. This comprehensive methodological approach, from participant selection to detailed data analysis using validated tools and statistical methods, ensured a robust examination of the relationship between knee OA and low back pain, offering valuable insights into the condition's implications on patient well-being.

RESULTS

The results of the study provide a comprehensive understanding of the prevalence and impact of knee osteoarthritis (OA) and its association with low back pain. Starting with the demographic distribution of the participants, Table 1 presents a clear age and gender-based segregation. Among the participants, the largest age group was 45-54 years, comprising 176 individuals, accounting for 46.6% of the total participants. The 55-64 age group followed this with 108 individuals (28.6%), and the 65-74 age group with 93 individuals (24.6%). Gender-wise, the study had a higher representation of females, with 287 female participants (75.9%), compared to 90 male participants (23.8%).

Moving to the prevalence of knee OA, as detailed in Table 2, the study categorized the severity levels into four groups. Twelve participants (3.2%) were classified as having no significant symptoms (0 – Valid). A substantial number of participants, 123 (32.6%), fell into the 'Mild' (1) severity category, while the 'Moderate' (2) category was the most represented with 160 individuals (42.2%).

The 'Severe' (3) category included 82 participants (21.8%), highlighting the significant impact of OA on a considerable portion of the study population.

Table 3 sheds light on the KOOS sub-scale, providing insights into various aspects of knee-related discomfort and disability. The mean total pain score stood at 19.1883 with a standard deviation of 7.09915. Total symptoms scored a mean of 15.8541 with a standard deviation of 5.13824. Activities of Daily Living (ADL) had a higher mean score of 38.1698, indicating greater impact, with a standard deviation of 13.95539. Sport and Recreation (SP) and Quality of Life (QOL) scores were lower, with means of 14.4430 and 10.2361 and standard deviations of 5.07367 and 3.66481, respectively. The overall KOOS score averaged at 97.8912, with a standard deviation of 31.01057.

The descriptive statistics of the Oswestry Low Back Pain questionnaire, as shown in Table 4, reveal that the mean scores across different sub-scales ranged from 2.6021 in Personal Care to 3.7480 in Lifting, indicating a variable impact of low back pain on different aspects of daily life. Pain Intensity, for instance, had a mean score of 2.8276 (Standard Deviation: 1.49092), while the mean scores for activities like Walking, Sitting, and Standing were 2.8462, 2.9814, and 3.2626, respectively.

Table 1 Frequency and Percentage of Age and Gender

Age Group	Frequency	Percent (%)
45-54	176	46.6
55-64	108	28.6
65-74	93	24.6
Gender		
Male	90	23.8
Female	287	75.9

Table 2 Prevalence of Knee Osteoarthritis by Severity Level

Severity Level	Frequency	Valid Percent (%)
0 (Valid)	12	3.2
Mild (1)	123	32.6
Moderate (2)	160	42.2
Severe (3)	82	21.8
Total	377	99.7
Overall Total	378	100.0

Table 3 Descriptive Statistics of KOOS Sub-scale

KOOS Sub-scale	Mean	Std. Deviation
Total Pain	19.1883	7.09915
Total Symptoms	15.8541	5.13824
Total ADL	38.1698	13.95539
Total SP	14.4430	5.07367
Total QOL	10.2361	3.66481
TOTAL KOOS	97.8912	31.01057

Table 4 Descriptive Statistics of Oswestry Low Back Pain

Oswestry Sub-scale Categories	N	Mean	Std. Deviation
Pain Intensity	377	2.8276	1.49092
Personal Care	377	2.6021	1.30702
Lifting	377	3.7480	1.70502
Walking	377	2.8462	1.39631
Sitting	377	2.9814	1.43185

Oswestry Sub-scale Categories	N	Mean	Std. Deviation
Standing	377	3.2626	1.64463
Sleeping	377	2.8992	1.87095
Social Life	377	2.9125	1.61781
Travelling	377	3.2069	1.64694
Employment/Homemaking	377	3.1883	1.65962

Table 5 Correlation between Knee Osteoarthritis and Low Back Pain

Knee Osteoarthritis Factor	LBP Coefficient (r)	P-value
Pain Effects QOL	0.480	0.000
Pain during SRF	0.441	0.000
Pain during AODL	0.571	0.000
Total Score of Pain	0.437	0.000

Lastly, Table 5 demonstrates the correlation between knee OA and low back pain. The findings show significant correlations, with the 'Pain Effects on Quality of Life (QOL)' having a correlation coefficient (r) of 0.480, indicating a substantial impact of knee pain on the quality of life of OA patients. Similar strong correlations were noted for pain during 'Standardized Routine Functions (SRF)' and 'Activities of Daily Living (AODL)' with coefficients of 0.441 and 0.571, respectively. The total score of pain also showed a significant correlation with a coefficient of 0.437, further underscoring the interlinked nature of knee OA and low back pain.

DISCUSSION

The results of this study highlight a significant correlation between knee osteoarthritis (OA) and low back pain, illuminating the interconnected nature of these conditions. The correlation coefficients from Table 5 reveal substantial relationships between various aspects of knee OA and low back pain. For instance, the impact of knee pain on Quality of Life (QOL) recorded a correlation coefficient (r) of 0.480. This finding aligns with previous research that has consistently shown that knee OA can substantially diminish QOL due to pain and mobility limitations (1, 2). Similarly, strong correlations were observed for pain experienced during Standardized Routine Functions (SRF) and Activities of Daily Living (AODL), with coefficients of 0.441 and 0.571, respectively. These results resonate with earlier studies that have documented how knee pain significantly hampers daily functioning, leading to a reduction in overall activity levels and an increase in dependency (3, 4).

The total score of pain also exhibited a notable correlation (r = 0.437), suggesting that the severity of knee pain is closely linked to the severity of low back pain. This finding is particularly relevant as it supports the theory that knee OA can lead to compensatory mechanisms that eventually contribute to back pain, possibly due to altered gait patterns or uneven weight distribution (5, 6).

The strength of this study lies in its comprehensive approach to examining the relationship between knee OA and low back pain, employing standardized assessment tools and a sizable sample. However, the study is not without limitations. Its cross-sectional design limits the ability to establish causality between knee OA and low back pain. Furthermore, the reliance on self-reported measures may introduce a degree of subjectivity to the findings. Additionally, the study's demographic was restricted to a specific age group and geographical area, which may affect the generalizability of the results.

Based on these findings, further longitudinal studies are recommended to establish a causal relationship between knee OA and low back pain. Such research could provide deeper insights into the progression of these conditions and the effectiveness of various interventions. Moreover, expanding the demographic scope to include a more diverse population would enhance the applicability of the results.

This study provides valuable insights into the complex relationship between knee OA and low back pain, emphasizing the need for holistic approaches in the treatment and management of these conditions. Future research should aim to build upon these findings, exploring the underlying mechanisms and potential interventions to improve the quality of life for individuals suffering from knee OA and associated low back pain.

CONCLUSION

The study conclusively demonstrates a significant correlation between knee osteoarthritis (OA) and low back pain, underscoring the intricate interplay between these common musculoskeletal conditions. This correlation not only highlights the need for a holistic approach in the diagnosis and management of knee OA but also calls for a broader understanding of its systemic impact, particularly on the quality of life and daily functioning. The findings have substantial implications for clinical practice, suggesting that treatment

protocols for knee OA should incorporate strategies for managing associated low back pain. This comprehensive approach could lead to more effective management and improved outcomes for patients. Moreover, the study emphasizes the importance of further research in this area, particularly in exploring the underlying mechanisms of this correlation and the effectiveness of integrated treatment strategies. These insights are crucial for developing more effective interventions and enhancing the quality of life for individuals affected by knee OA and low back pain.

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