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Kinesiophobia and Artificial Joint Awareness After Total Knee Arthroplasty

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ABSTRACT

Background: Total Knee Arthroplasty (TKA) is a commonly performed surgical procedure designed to alleviate pain and disability from knee arthritis. This study aims to explore the psychological aftermath of TKA, focusing on Kinesiophobia (fear of movement) and joint awareness.

Objective: To investigate the relationship between Kinesiophobia and the awareness of an artificial joint in patients post-TKA.

Methods: This cross-sectional study involved 64 patients aged 45-64 who underwent TKA 6-12 months prior. Exclusion criteria included other lower extremity surgeries, infection, or history of TKR revision or dislocation. The Forgotten Joint Score (FJS) and the Tampa Scale for Kinesiophobia (TSK) were used for evaluation. Data analysis was performed using SPSS.

Results: The study revealed a significant negative correlation between FJS and TSK scores ($r = -0.375$; $p = 0.002$), indicating that higher Kinesiophobia levels correlate with increased artificial joint awareness. Additionally, 20.31% of participants had Kinesiophobia and 79.69% had severe Kinesiophobia, with a notable female predominance (84.4%). The mean FJS score was 28.63 (±22.469), and the mean TSK score was 41.10 (±18.68), suggesting a moderate level of Kinesiophobia with wide variability among participants.

Conclusion: The study concludes a significant negative relationship between Kinesiophobia and artificial joint awareness post-TKA, highlighting the psychological impact of TKA on patients. These findings emphasize the need for considering psychological factors in post-operative care and rehabilitation.

Keywords: Total Knee Arthroplasty, Kinesiophobia, Joint Awareness, Artificial Joint, Psychological Impact Post-Surgery.

INTRODUCTION

Total Knee Arthroplasty (TKA) is a widely implemented surgical procedure primarily used in the advanced treatment of knee osteoarthritis (OA). Joint function loss is a common outcome of OA, which manifests as symptoms like joint pain, tenderness, and stiffness (1). The increasing prevalence of OA, particularly in older adults and more commonly in women, can be attributed to various risk factors, including obesity, prior knee injuries, earlier knee surgeries, and occupations that involve significant bending and lifting (2, 3).

TKA, including its variants such as uni-condylar knee replacement (UKR) and patello-femoral replacement (PFR), involves the replacement of the articular surfaces of the tibio-femoral joint, sometimes including the articulating surface of the patella (4). The primary goals of TKA are to alleviate pain and improve physical functionality, thereby enabling patients to return to an active lifestyle and perform daily activities with ease (5). Given the critical role of rehabilitation in post-arthroplasty recovery, assessing patient outcomes is vital to identifying the most effective rehabilitation strategies. In this context, patient-reported outcome measures are used to evaluate the success of arthroplasty rehabilitation in restoring patients' ability to engage in daily activities (3, 6).

A notable psychological factor impacting rehabilitation outcomes is kinesiophobia, an excessive, irrational fear of movement due to perceived vulnerability to pain or re-injury (7). Particularly prevalent in orthopaedic trauma patients, with incidences reported as high as 52.8%, kinesiophobia can emerge as a maladaptive response, causing

patients to avoid physical activity due to fears related to pain. This condition is not only a natural physiological reaction in the early stages post-surgery but is also associated with the transition from acute to chronic pain and a reduction in health-related quality of life measures. The Tampa Scale for Kinesiophobia (TSK) is a specialized tool developed for assessing kinesiophobia, focusing on the patient's comfort, security, and readiness for movement (8-10).

Another critical aspect of TKA outcomes is joint awareness. The goal in joint arthroplasty is for patients to 'forget' the artificial joint, which is indicative of optimal patient satisfaction. Studies have demonstrated improvements in joint awareness and function six months post-TKA (11). However, the relationship between kinesiophobia and joint awareness post-TKA remains underexplored (12).

The TSK, a 17-item questionnaire using a four-point Likert scale, assesses subjective perceptions of security and confidence in movement, with higher scores indicating greater fear levels. Similarly, the Forgotten Joint Score-12 (FJS-12) evaluates the patient's ability to 'forget' the artificial joint during daily activities. A higher score on the FJS-12, determined via a 5-point Likert system, signifies a greater ability to forget the artificial joint or a lower degree of joint awareness. Both TSK and FJS-12 have demonstrated reliability and validity in assessing kinesiophobia and joint awareness, respectively (9, 13).

Given this background, the specific objective of this study is to investigate the relationship between kinesiophobia and changes in joint awareness in the artificial joint following TKA. This involves assessing whether higher levels of kinesiophobia correlate with increased joint awareness, thereby potentially impacting the overall success of TKA in terms of patient satisfaction and rehabilitation outcomes (14). The study aims to provide insights that could guide future rehabilitation protocols and patient counselling strategies, ultimately enhancing the effectiveness of TKA procedures.

MATERIAL AND METHODS

The study utilized a descriptive cross-sectional design to explore the relationship between kinesiophobia and joint awareness in patients post-total knee arthroplasty (TKA). This design was selected for its effectiveness in assessing the prevalence and characteristics of these variables at a specific point in time.

Conducted at the Ghurki Trust Teaching Hospital, renowned for its orthopaedic expertise, the study capitalized on the hospital's high volume of TKA procedures and its diverse patient demographics. This setting was strategically chosen to ensure a representative sample and to understand the variables in a context where TKA is a prevalent treatment option.

Participants comprised 64 middle-aged adults, both males and females, aged 45 to 64 years. These individuals were specifically chosen based on their recent experience of undergoing TKA within the previous six months (15). Exclusion criteria were set to exclude individuals who had other lower extremity surgeries, signs of infection, or a history of TKA revision or dislocation, aiming for a homogenous and relevant study group (16).

The Tampa Scale for Kinesiophobia (TSK-17), a 17-item self-report tool using a 4-point Likert scale, was employed to assess the degree of movement-related fear (10). Additionally, the Forgotten Joint Score-12 (FJS-12) was used to evaluate the awareness of the artificial joint post-TKA (17).

Data was collected and analyzed using the Statistical Package for Social Sciences (SPSS) version 26. The study utilized descriptive statistics, including tables and histograms, to present the data. Ethical considerations were meticulously addressed, with approval secured from the Ethics Committee of the LCPT and informed consent obtained from all participants, ensuring confidentiality of their responses. The study's demographic composition was carefully balanced in terms of gender, with a representative age distribution within the middle adult range, crucial for ensuring variability and generalizability in the findings. To address potential biases, particularly the selection bias inherent in non-probability convenience sampling, the research design included strategies to ensure a representative sample of TKA patients. The use of validated instruments like TSK-17 and FJS-12 aimed to reduce measurement bias (9).

Statistical analysis was conducted with an eye towards controlling for confounding variables, such as the time elapsed since surgery and the severity of preoperative conditions. The application of advanced statistical techniques in SPSS facilitated a thorough examination of the relationship between kinesiophobia and joint

awareness in post-TKA patients, aiming to generate results that could significantly inform clinical practice and future research in orthopaedic rehabilitation. Ethical permission was taken from the committee of Lahore College of Physical Therapy and permission for data collection was also taken from study setting. Confidentiality of participants was maintained. Informed consent in written form was taken from the participants. Data was protected under laptop and password.

RESULTS

Table 1, titled "Gender and Kinesiophobia Categories," provides a breakdown of Kinesiophobia levels and gender distribution among 64 participants. In the Kinesiophobia category, 13 participants (20.31%) are categorized with Kinesiophobia, while a larger portion, 51 participants (79.69%), are classified with severe Kinesiophobia. Regarding gender distribution, the table shows that 10 participants (15.6%) are male, and a majority of 54 participants (84.4%) are female. This table effectively illustrates the prevalence of severe Kinesiophobia in the group and highlights a significant female predominance.

Table 1 Gender and Kinesiophobia Categories

Variable	Response	Frequency (n=64)	Percentage (100%)
Kinesiophobia	Kinesiophobia	13.0	20.31
	Severe Kinesiophobia	51.0	79.69
Gender	Male	10.0	15.6
	Female	54.0	84.4

Table 2 Scores of Forgetfulness, Kinesiophobia and Age

Variable	Mean	Standard Deviation
Patients' Tendency to Forget Artificial Joints	28.63	22.469
Age	56.11	5.668
Kinesiophobia	41.10	18.68

Table 2, titled "Scores of Forgetfulness, Kinesiophobia, and Age," presents the mean and standard deviation for three variables among the participants. The mean score for patients' tendency to forget artificial joints is 28.63 with a standard deviation of 22.469, indicating a wide variability in this tendency among participants. The average age of the participants is 56.11 years, with a relatively low standard deviation of 5.668, suggesting a more homogenous age group. Lastly, the mean Kinesiophobia score is 41.10, with a standard deviation of 18.68, indicating a moderate level of Kinesiophobia with considerable variation among the participants. This table provides valuable insights into the average tendencies and characteristics of the group in relation to forgetfulness, age, and Kinesiophobia.

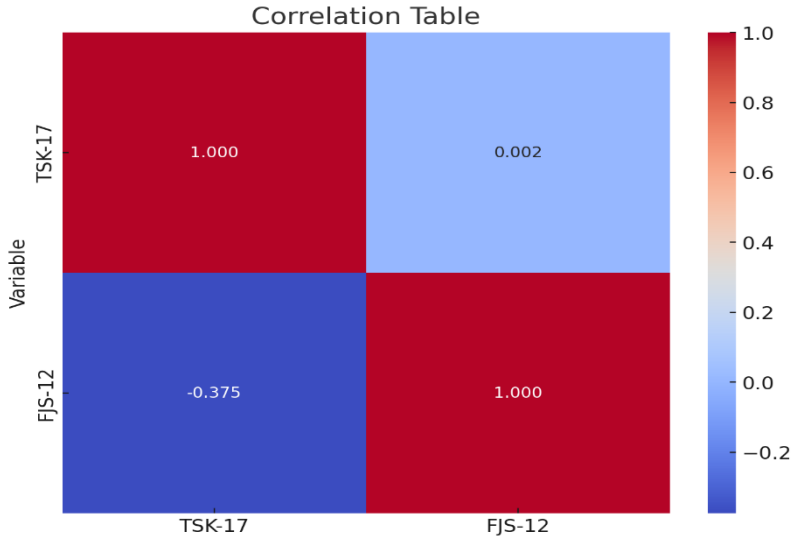

Figure 1 Correlation between TSK-17 and FJS-12

The correlation table presents the Pearson correlation coefficients between two variables, "TSK-17" and "FJS-12". On the diagonal, both variables show a correlation of 1 with themselves, which is standard in correlation matrices. The correlation coefficient between "TSK-17" and "FJS-12" is listed as -0.375, indicating a moderate negative correlation, suggesting that increases in "TSK-17" are associated with decreases in "FJS-12", and vice versa. The significance level for this correlation is very low at 0.002, implying a statistically significant relationship between these variables. The symmetric nature of the matrix is reflected in the identical correlation value between "FJS-12" and "TSK-17". The

heatmap's color scheme visually represents the strength and direction of these correlations, with warmer colors indicating stronger positive correlations and cooler colors for negative ones. This table is an essential tool in statistical analysis for understanding and interpreting the linear relationships between these variables.

DISCUSSION

The study conducted on the relationship between kinesiophobia and joint awareness in patients post-total knee arthroplasty (TKA) revealed significant insights. It demonstrated a moderate negative correlation between kinesiophobia and the ability to forget the artificial joint, indicating that patients with higher kinesiophobia scores tend to be more aware of their artificial joint. This finding contrasts with a 2018 study that reported only a 24.4% prevalence of kinesiophobia post-TKA, suggesting that regional and cultural differences may influence the incidence rate of kinesiophobia (18). Additionally, the study's observation that almost all patients exhibited kinesiophobia 6 to 12 months after surgery, with a minimal improvement in joint forgetfulness, echoes the results from other research indicating a persistent awareness of the artificial joint in the given timeframe (19).

Furthermore, according to the FJS-12 score, the study's findings are consistent with earlier studies on the relationship between pain, quadriceps strength, and joint awareness. Comparable studies have shown that FJS scores tend to improve significantly in the first six months post-TKA but plateau, thereafter, highlighting a continued awareness of the artificial joint. This consistency in findings across different studies reinforces the understanding that improvements in joint awareness post-TKA may have a limited timeframe (20).

The relationship between kinesiophobia and various physical factors was also highlighted. For instance, older patients post-TKA showed correlations between fear of movement and muscle strength, pain level, and physical performance in activities like the 30-second sit-to-stand test. However, no significant correlations were found with age or walking tests. These insights emphasize the need to consider kinesiophobia in the assessment and rehabilitation stages post-TKA.A retrospective study in 2020 delved into patient-reported outcomes using the FJS system, revealing that the greatest improvements in functional status are generally observed between 6 and 12 months post-surgery (21). This finding, although contrasting with the current study's observation of persistent joint awareness in the same timeframe, highlights the variability in patient experiences post-TKA (9). The difference could be attributed to variations in sample size and population demographics. It is crucial to consider the limitations of the current study. The small sample size and specific patient demographics limit the generalizability of the findings. These limitations raise questions about the study's external validity and whether the results can be applied to different populations or settings. Furthermore, potential biases in the study design or methodology could have influenced the outcomes, necessitating a cautious interpretation of the results within the broader context of existing research (22, 23).

CONCLUSION

This study sheds light on the moderately negative relationship between kinesiophobia and artificial joint awareness in patients post-TKA. It underscores the persistence of kinesiophobia and joint awareness in the months following surgery, aligning with and contrasting various aspects of existing research in this field. The study's findings, while informative, should be interpreted within the context of its limitations and the broader spectrum of research on post-TKA patient experiences.

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