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Prevalence and Characteristics of Kinesiophobia Among Postoperative Extremity Fracture Patients: A Descriptive Study at a Referral Hospital

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ABSTRACT

Introduction: Patient complaints after extremity fracture surgical procedures can lead to pain and an irrational fear of movement (Kinesiophobia) is a highly prevalent yet frequently unrecognized psychological complication in orthopedic nursing practice

Aim: This study aimed to describe the profile of kinesiophobia in postoperative extremity fracture patients according to demographic and clinical characteristics

Method: A quantitative descriptive design with a cross-sectional approach was applied to 51 respondents recruited via total sampling in the surgical inpatient ward hospital in Jember. Kinesiophobia was measured using the Tampa Scale of Kinesiophobia (TSK-17), with a score ≥ 37 classified as high kinesiophobia. Data were analyzed using univariate analysis and presented through descriptive cross-tabulation.

Result: Results demonstrated that 72.5% of respondents experienced high kinesiophobia. The highest proportions were observed in female respondents (100%), oldest-old patients (100%), homemakers (100%), primary school graduates (100%), radius fractures (100%), and femur fractures (84.6%). Groups with dominant low kinesiophobia included males (43.7%), unemployed respondents (58.3%), and ulna fractures (80.0%).

Conclusion: These findings underscore the necessity of routine TSK-17 screening and prioritized non-pharmacological interventions targeting female, elderly, and lower extremity fracture patients in postoperative orthopedic nursing care.

Keywords: extremity fracture; kinesiophobia; orthopedic nursing; postoperative; Tampa Scale of Kinesiophobia

Introduction

Extremity fractures constitute the most frequently operatively managed musculoskeletal condition globally, with the World Health Organization (WHO, 2023) estimating over 178 million new fracture cases annually, the majority involving the lower extremities. Within the Indonesian context, Basic Health Research data (Riskesdas, 2018) documented that 67.9% of all fracture cases affect the lower extremities and 32.1% the upper extremities, with road traffic accidents representing the predominant traumatic mechanism at 70.1% of cases, followed by fall-related injuries at 17.6% (Riskesdas, 2023). Although Open Reduction Internal Fixation (ORIF) remains the standard operative approach for achieving anatomical reduction and skeletal stabilization, the procedure is invariably accompanied by complex postoperative sequelae — including acute pain, mobility impairment, and a psychological response manifesting as fear of movement, clinically termed kinesiophobia (Wane et al., 2020).

First conceptualized by Kori et al. (1990), kinesiophobia is defined as an irrational and debilitating fear of physical movement arising from a perceived vulnerability to pain or re-injury. In postoperative fracture patients, the condition emerges from a complex interplay

of intense pain experience, erroneous beliefs regarding movement safety, and anxiety over implant failure or wound dehiscence (Febriani & Wijaya, 2024), collectively establishing a self-reinforcing fear-avoidance cycle wherein movement avoidance precipitates muscular deconditioning and heightened pain perception, further entrenching fear. Critically, kinesiophobia has been shown to exert a greater adverse effect on functional disability than pain intensity per se (Lee et al., 2025).

Prevalence data across independent studies underscore the magnitude of this problem: 72.10% among 340 hip fracture patients (Zha et al., 2025, Frontiers in Psychiatry, Scopus Q2), 59.7% in pediatric postoperative fracture cohorts (Xiao et al., 2025, Frontiers in Pediatrics, Scopus Q1). Failure to identify kinesiophobia early carries serious clinical consequences: a retrospective study of 150 elderly limb fracture postoperative patients identyified two distinct kinesiophobia trajectories across 12 weeks of postoperative follow up -79.3% demonstrated a slow yet continuous decline, while 20.7% exhibited a decline-rebound pattern wherein kinesiophobia that had initially subsequently worsened, with advanced age and high pain intensity as dominant predictors of the unstable trejectoty (Jiang et al., 2024) immobility-related complications encompassing deep vein thrombosis, hypostatic pneumonia, muscular atrophy, joint contracture, and urinary retention collectively extend hospitalization and impose substantial economic burdens on patients and health systems (Tarmisih & Hartini, 2024).

Despite this, comprehensive descriptive data characterizing the profile of kinesiophobia according to demographic and clinical characteristics in Indonesian hospital populations remain markedly scarce — existing literature has predominantly concentrated on intervention efficacy rather than systematic descriptive profiling of kinesiophobia distribution by age, sex, fracture type, and surgical procedure. Such descriptive understanding constitutes an indispensable scientific foundation for identifying the most at-risk patient subgroups and designing targeted nursing interventions; it is precisely this evidence gap that the present study seeks to address.

Method

Design

This study employed a quantitative descriptive design using a cross-sectional approach. The design was selected to describe the distribution of kinesiophobia among patients who had undergone surgery for extremity fractures at a single point in time. The unit of analysis was individual postoperative fracture patients. As the primary objective was to describe the prevalence and characteristics of kinesiophobia rather than to examine causal relationships, a descriptive analytical strategy was adopted.

Setting and Time

The study was conducted in the surgical inpatient ward of a hospital in Jember, East Java, Indonesia. The setting was chosen because it provides postoperative care for patients with upper and lower extremity fractures, making it relevant to the investigation of

kinesiophobia during the early recovery period. Data collection was carried out between September and November 2024.

Population, Sample, and Sampling

The target population consisted of adult patients who underwent surgery for extremity fractures. The accessible population included all postoperative extremity fracture patients admitted to the surgical ward during the study period.

A total of 51 respondents participated in the study. The sample was obtained using a total sampling technique, in which all eligible patients meeting the study criteria during the data collection period were invited to participate. Inclusion criteria were: (1) age ≥18 years; (2) inpatient status in the surgical ward following surgery for upper and/or lower extremity fractures; and (3) a minimum postoperative period of 24 hours. Patients who were unable to communicate effectively or declined participation were excluded from the study.

The use of total sampling minimized selection bias by including all accessible eligible participants and ensured adequate representation of the study population within the specified period.

Instrument and Measurement Properties

Data were collected using two instruments. The first instrument was a respondent characteristics questionnaire developed by the researchers to obtain demographic and clinical information, including age, sex, educational level, occupation, fracture extremity location, fracture type, and surgical procedure performed.

The second instrument was the Tampa Scale of Kinesiophobia (TSK-17), originally developed by Miller, Kori, and Todd (1991) to assess fear of movement and fear of re-injury. The TSK-17 consists of 17 self-report items rated on a 4-point Likert scale ranging from strongly disagree to strongly agree. Total scores range from 17 to 68, with higher scores indicating greater levels of kinesiophobia.

The TSK-17 has demonstrated satisfactory psychometric properties in previous studies, including acceptable validity and reliability across various musculoskeletal and orthopedic populations. Based on the cut-off score proposed by Vlaeyen et al. (1995) and confirmed by Dupuis et al. (2023), a total score of ≥37 was classified as high kinesiophobia, whereas scores <37 were categorized as low kinesiophobia.

Data Collection Procedure

Prior to data collection, ethical approval and institutional permission were obtained. Eligible participants were identified through hospital records and screened according to the inclusion criteria. The objectives, procedures, benefits, and voluntary nature of participation were explained to all prospective participants. Written informed consent was obtained before enrollment.

Data were collected through self-administered questionnaires. Respondents completed the questionnaires independently, while trained enumerators provided assistance when clarification or reading support was required. All completed questionnaires were reviewed for completeness before data entry. Participant anonymity was maintained by assigning unique identification codes and excluding personally identifiable information from the dataset.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize respondent characteristics and kinesiophobia levels. Categorical variables were presented as frequencies and percentages, whereas numerical variables were reported as means, standard deviations, minimum values, and maximum values.

The distribution of kinesiophobia according to respondent characteristics was examined using descriptive cross-tabulation (crosstab) analysis. No inferential statistical testing was performed because the objective of the study was descriptive rather than analytical.

Ethical Declaration

This study received ethical approval from the Health Research Ethics Committee of the Faculty of Nursing, University of Jember, Indonesia, under approval number 299/UN25.1.14/KEPK/2024. The study was conducted in accordance with the principles of the Declaration of Helsinki. Participation was voluntary, and all participants provided informed consent before enrollment. Participants were informed of their right to decline participation or withdraw from the study at any time without consequences. Confidentiality and privacy were protected by anonymizing all collected data and restricting access to research personnel only.

Result

Measuring the incidence of kinesiophobia in post-op patients with upper and/lower extremity fractures used the Tampa Scale of Kinesiophobia (TSK-17) questionnaire which was developed by Miller, Kori & Todd in 1991.

Table 1. Characteristics of in Post-Op Extremity Fracture Patients (n=51)

Characteristics of Respondents		Frequency (n)	Percentage (%)
Age			
a.	Late adolescent (17-25)	19	37,3
b.	Early adult (26-35)	8	15,7
c.	Late adult (36-45)	8	15,7
d.	Early elderly (46-55)	7	13,7
e.	Late elderly (56-65)	5	9,8
f.	Oldest old (>65)	4	7,8
Total		**51**	**100**
Gender			
a.	Male	32	62,7
b.	Female	19	37,3
Total		**51**	**100**
Education			
a.	No Education	0	0
b.	Primery school	10	19,6

c.	Junior high school	9	17,6
d.	Senior high school	17	33,3
e.	Diploma	3	5,9
f.	Bachelor's degree	12	23,5
Total		**51**	**100**
Occupation			
a.	Unemployed	12	23,5
b.	Housewife	7	13,7
c.	Farmer	5	9,8
d.	Entrepreneurs	18	35,3
e.	Civel Servent	6	11,8
f.	Other (Security)	3	5,9
Total		**51**	**100**
Location of fracture extremity			
a.	Upper	20	39,2
b.	Lower	31	60,8
Total		**51**	**100**
Fracture location			
a.	Clavicula	2	3,9
b.	Humerus	9	17,6
c.	Radius	4	7,8
d.	Ulna	5	9,8
e.	Femur	13	25,5
f.	Fibula	7	13,7
g.	Patella	3	5,9
h.	Pelvis	1	2,0
i.	Tibia	7	13,7
Total		**51**	**100**
Type of operation			
a.	ORIF	50	98,0
b.	OREF	1	2,0
Total		**51**	**100**

As shown in Table 1, the largest age group was late adolescents (17–25 years), comprising 19 respondents (37.7%), followed by early and late adults (15.7% each). The majority were male (62.7%). Senior high school was the most prevalent educational level (33.3%), followed by bachelor's degree (23.5%) and primary school (19.6%). Self-employed was the most common occupation (35.3%), followed by unemployed (23.5%) and homemakers (13.7%). Lower extremity fractures predominated (60.8%), with the femur most frequently affected (25.5%), followed by humerus (17.6%), and fibula and tibia (13.5% and 13.7%, respectively). Nearly all respondents underwent ORIF (98.0%).

Table 2. Distribution of Kinesiophobia in Post-Op Extremity Fracture Patients (n=51)

Variable		Frequency (n)	Percentage(%)
Kinesiophobia			
a.	Low kinesiophobia	14	27,5
b.	High kinesiophobia	37	72,5
Total		**51**	**100**

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Based on Table 2, the majority of respondents 37 (72.5%) experienced high kinesiophobia, while 14 respondents (27.5%) were classified as low kinesiophobia. These figures indicate that over three-quarters of postoperative extremity fracture patients in this study exhibited high-level kinesiophobia.

Table 3. Cross-Tabulation of Respondent Characteristics by Kinesiophobia Level (n=51)

Characteristic	Low Kinesio (n, %)	High Kinesio (n, %)	Total (n)
Age			
Late adolescent (17–25)	7 (36.8%)	12 (63.2%)	19
Early adult (26–35)	2 (25.0%)	6 (75.0%)	8
Late adult (36–45)	3 (37.5%)	5 (62.5%)	8
Early elderly (46–55)	1 (14.3%)	6 (85.7%)	7
Late elderly (56–65)	1 (20.0%)	4 (80.0%)	5
Oldest old (>65)	0 (0.0%)	4 (100.0%)	4
Sex			
Male	14 (43.7%)	18 (56.3%)	32
Female	0 (0.0%)	19 (100.0%)	19
Education			
Primary School	0 (0.0%)	10 (100.0%)	10
Junior High School	1 (11.1%)	8 (88.9%)	9
Senior High School	7 (41.2%)	10 (58.8%)	17
Diploma	1 (33.3%)	2 (66.7%)	3
Bachelor's degree	5 (41.7%)	7 (58.3%)	12
Occupation			
Unemployed	7 (58.3%)	5 (41.7%)	12
Housewife	0 (0.0%)	7 (100.0%)	7
Farmer	1 (20.0%)	4 (80.0%)	5
Self-employed	4 (22.2%)	14 (77.8%)	18
Civil servant	1 (16.7%)	5 (83.3%)	6
Other (Security)	1 (33.3%)	2 (66.7%)	3
Fracture Location			20
Upper extremity	7 (35.0%)	13 (65.0%)	31
Lower extremity	7 (22.6%)	24 (77.4%)	
Bone Site			
Clavicula	0 (0.0%)	2 (100.0%)	2
Femur	2 (15.4%)	11 (84.6%)	13
Fibula	2 (28.6%)	5 (71.4%)	7
Humerus	3 (33.3%)	6 (66.7%)	9
Patella	1 (33.3%)	2 (66.7%)	3
Pelvis	0 (0.0%)	1 (100.0%)	1
Radius	0 (0.0%)	4 (100.0%)	4
Tibia	2 (28.6%)	5 (71.4%)	7
Ulna	4 (80.0%)	1 (20.0%)	5
Surgery Type			
ORIF	14 (28.0%)	36 (72.0%)	50
OREF	0 (0.0%)	1 (100.0%)	1

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Table 3 shows that high kinesiophobia predominates across nearly all respondent characteristics (n=51). The proportion of high kinesiophobia increases with age, reaching 100% in the oldest-old group. All female respondents also reported high kinesiophobia, while males showed a lower proportion (56.3%). A similar pattern is observed across education and occupation, with consistently higher proportions of kinesiophobia among lower education groups and among housewives, farmers, and civil servants, although high kinesiophobia remains present in all categories.

Clinically, patients with lower extremity fractures demonstrated a higher proportion of kinesiophobia (77.4%) compared to upper extremity fractures (65.0%). The femur and several other weight-bearing bones showed notably high proportions of kinesiophobia, while ulna fractures showed the lowest. Most patients undergoing ORIF also experienced high kinesiophobia (72.0%). Overall, kinesiophobia is highly prevalent across all subgroups, particularly among older patients, females, and those with lower extremity fractures.

Discussion

This study found that more than two-thirds of postoperative extremity fracture patients experienced high levels of kinesiophobia, indicating that fear of movement constitutes a substantial psychological burden during the early recovery period. The prevalence observed in this study is consistent with previous findings among orthopedic populations and approximates the prevalence reported by Zha et al. (2025) among patients with hip fractures. This consistency across studies suggests that kinesiophobia is a common phenomenon following fracture-related surgery and should be recognized as an important component of postoperative recovery.

The demographic and clinical profile of respondents reflects the epidemiological characteristics of fracture patients in Indonesia. Most participants were young adults, male, and economically productive individuals, findings that correspond with national reports indicating that traffic-related injuries disproportionately affect young productive-age populations (Riskesdas, 2023; Batara et al., 2026). Lower extremity fractures were the predominant injury type, with femoral fractures representing the most frequently affected anatomical site. This distribution is comparable to national data showing that lower extremity fractures account for the majority of fracture cases in Indonesia (Riskesdas, 2018). The overwhelming use of open reduction and internal fixation (ORIF) further reflects contemporary orthopedic management practices for displaced fractures in referral hospitals.

The high prevalence of kinesiophobia identified in this study may be explained by the convergence of several clinical factors. Most participants sustained lower extremity fractures, injuries that directly compromise weight-bearing function and independent mobility. Unlike upper extremity injuries, lower extremity fractures affect fundamental activities such as standing, walking, and transferring, thereby increasing perceived vulnerability during movement (Pradana et al., 2024). Furthermore, the predominance of femoral fractures may have amplified movement-related fear because the femur serves as

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the principal weight-bearing bone of the body. Patients recovering from these injuries may perceive movement as a threat to fracture healing, particularly during the immediate postoperative period when pain, physical limitations, and uncertainty regarding recovery outcomes remain highly salient.

These findings can be interpreted within the framework of the Fear-Avoidance Model proposed by Vlaeyen et al. (1995). According to this model, individuals who perceive pain or physical activity as threatening are more likely to develop maladaptive beliefs that movement will cause reinjury or worsen their condition. Such beliefs subsequently lead to avoidance behaviors, reduced physical activity, and delayed functional recovery. In the present study, the near-universal use of ORIF procedures may have reinforced these concerns. Patients frequently associate implanted fixation devices, such as plates, screws, or intramedullary nails, with fears of implant displacement, fixation failure, or disruption of the healing process during movement (Febriani & Wijaya, 2024). Without adequate reassurance and education, these perceptions may strengthen fear-avoidance beliefs and contribute to persistent kinesiophobia.

Although the study was descriptive in nature, several noteworthy patterns emerged across respondent characteristics. High kinesiophobia appeared more common among older adults, women, individuals with lower educational attainment, homemakers, and patients with lower extremity or femoral fractures. These observations are consistent with existing literature suggesting that age-related functional decline, chronic disease burden, and accumulated pain experiences may increase fear of movement among older adults (Zha et al., 2025). Similarly, women have been reported to demonstrate greater pain sensitivity and a higher tendency toward pain catastrophizing, factors that may contribute to elevated kinesiophobia levels (Higuchi et al., 2022; Silva et al., 2016). Educational attainment may also influence patients' ability to understand the healing process and evaluate movement-related risks accurately. Individuals with limited health literacy may be more vulnerable to misconceptions regarding postoperative mobilization, resulting in excessive fear and avoidance behaviors.

Occupational demands may represent another contextual factor influencing kinesiophobia. Participants whose daily roles depended heavily on physical mobility, including homemakers, farmers, self-employed workers, and civil servants, tended to exhibit higher proportions of kinesiophobia. Functional limitations following fracture surgery may be perceived as a threat not only to physical independence but also to social roles, productivity, and economic stability. Such concerns may intensify anxiety regarding movement and reinforce avoidance behaviors. Conversely, individuals with lower immediate functional demands may perceive fewer consequences associated with temporary mobility restrictions, potentially reducing movement-related fear.

The findings of this study have important implications for nursing practice. Routine assessment of kinesiophobia should be considered an integral component of postoperative orthopedic nursing care, particularly during the early recovery phase. The use of standardized instruments such as the TSK-17 may facilitate early identification of patients at risk of excessive fear of movement. Moreover, postoperative education should extend

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beyond information regarding wound care and pain management to include clear explanations of fracture healing, the safety and benefits of early mobilization, and realistic expectations regarding recovery. Tailoring educational interventions to patients' literacy levels and addressing specific misconceptions related to movement and fixation devices may help reduce maladaptive fear-avoidance beliefs and promote functional recovery.

Several limitations should be acknowledged. First, the descriptive cross-sectional design precludes determination of causal relationships between respondent characteristics and kinesiophobia. Second, the study was conducted in a single institution with a relatively small sample size, which may limit the generalizability of the findings. Third, potentially influential variables such as pain intensity, social support, psychological distress, previous fracture experience, and rehabilitation participation were not assessed. Future studies employing larger multicenter samples and analytical designs are warranted to identify independent predictors of kinesiophobia and to evaluate interventions aimed at reducing fear of movement among postoperative fracture patients.

Overall, the findings demonstrate that kinesiophobia is highly prevalent among patients following extremity fracture surgery. The predominance of lower extremity injuries, femoral fractures, and ORIF procedures may contribute to heightened fear of movement during recovery. Given the potential impact of kinesiophobia on mobilization and functional outcomes, early screening and targeted nursing interventions should be incorporated into routine postoperative orthopedic care.

Conclusion

This study found that 72.5% of postoperative extremity fracture patients experienced high kinesiophobia. Cross-tabulation revealed the highest proportions of high kinesiophobia in: female respondents (100%), oldest-old patients (100%), homemakers (100%), primary school graduates (100%), radius fractures (100%), and femur fractures (84.6%). Groups demonstrating dominant low kinesiophobia were males (43.7% low), unemployed respondents (58.3% low), and ulna fractures (80.0% low). These findings support the integration of routine TSK-17 screening and prioritization of non-pharmacological kinesiophobia interventions for female patients, elderly patients, and those with lower extremity fractures in postoperative orthopedic nursing practice.

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Conflict of Interest

None

Author Contributions

MH contributed to the study conception and design, supervision of the research process, interpretation of data, and critical revision of the manuscript. CDP was responsible for data collection, data entry, preliminary data analysis, and drafting the initial manuscript. Both authors approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Data Availability Statement

The datasets generated and/or analyzed during the current study are not publicly available due to institutional ethical restrictions, but may be obtained from the corresponding author upon reasonable request.

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