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Original Article

Incidence of Fear of Fall and Stairs Climbing Status in Older Adults After Total Knee Arthroplasty

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ABSTRACT

Background: This research aimed to assess factors influencing the frequency and fear of falls, and the anxiety related to climbing stairs in patients undergoing total knee arthroplasty (TKA). Fall-related injuries are common complications after TKA, affecting daily activities and overall quality of life.

Objective: To evaluate the incidence of falls, fear of falling, and stair climbing abilities in patients post-TKA.

Methods: The study included 183 patients who had undergone unilateral or bilateral TKA between 6 months to 1 year prior, encompassing both genders. Data were collected using the Fall Efficacy Scale (FES) and the Timed Up and Go (TUG) scale through structured questionnaires.

Results: The mean age of participants was 68.78 years (SD=6.828, range 60-89). The mean total FES score was 64.11 (SD=10.712, range 37-91). Approximately 65% of patients had a high fear of falling and poor stair climbing status.

Conclusion: The study found that 65% of patients experienced fear of falling and difficulties in stair climbing post-TKA. Continued risk of falls necessitates providing physical therapy and comprehensive discharge training to mitigate fall risk and improve functional outcomes.

Keywords: Falls, Fear of falling, Osteoarthritis, Stair climbing status, Total knee arthroplasty

INTRODUCTION

Total joint arthroplasty is a highly effective intervention for individuals with moderate to severe arthritis, significantly improving their quality of life. Total joint arthroplasty encompasses two primary types: total hip arthroplasty (THA) and total knee arthroplasty (TKA), both of which enhance joint mobility and reduce pain. Knee osteoarthritis, a degenerative joint disease, is particularly prevalent and more common in women than men due to biomechanical factors, as the knee is a load-bearing joint subject to high compressive stress on the articular cartilage and subchondral bone (1, 2). This condition often arises in the medial compartments of the knee, exacerbated by activities that involve significant weight-bearing and joint stress. Risk factors include joint injuries, repetitive stress, aging, obesity, metabolic diseases, and bone deformities, leading to symptoms such as pain, stiffness, swelling, bone spurs, and loss of flexibility, which collectively contribute to physical impairment and disability among the elderly (3).

Knee osteoarthritis is categorized into five stages, ranging from normal (stage 0) to severe (stage 4), with the latter being particularly debilitating and linked to an increased risk of falls (4). TKA is a common procedure for end-stage knee osteoarthritis, offering substantial relief from pain and improving functional capabilities (5). However, patients are often advised to delay surgery until pain becomes intolerable to minimize the need for future revisions due to the limited lifespan of prosthetic components (6). This delay can lead to muscle atrophy, reduced strength, and diminished functional ability due to the degenerative nature of knee osteoarthritis. Early mobilization post-TKR has been shown to reduce complications and expedite recovery (7).

Globally, osteoarthritis affects approximately 250 million people, with increasing prevalence due to factors such as obesity, aging, and joint injuries. Symptoms in the affected joints include severe pain, stiffness, and instability, which worsen over time due to the absence of a cure (8, 9). TKA, which involves the resection of the abnormal articular surface and resurfacing with metal and

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polyethylene components, is an effective solution for severe arthritis. There are three basic types of TKA: totally constrained, semi-constrained, and unconstrained. Despite the benefits, functional decline post-surgery, such as reduced walking speed and difficulty climbing stairs, is common (10). Postoperative improvements in pain and dependency levels are expected, enhancing daily activities and quality of life (11).

Balance is crucial for maintaining postural stability, which is necessary for functional activities and fall prevention. Falls and the fear of falling are prevalent concerns among the elderly, affecting one-third of this population. This fear can limit daily activities, negatively impacting overall health and functional autonomy (12, 13). Decreased muscle strength, particularly in the quadriceps, can increase fall risk during walking and stair climbing, leading to potentially life-threatening injuries such as fractures and head trauma, which further reduce quality of life and increase disability (14, 15).

Intrinsic factors, such as muscle weakness and balance issues, and extrinsic factors, like environmental hazards, contribute to the risk of falls. High body mass index (BMI) is associated with complications post-TKA. Polypharmacy and environmental hazards, such as poor lighting and lack of bathroom safety equipment, also elevate fall risk (16, 17, 18). In older adults with knee osteoarthritis, pain is linked to muscle weakness, mobility limitations, and impaired balance, which collectively increase fall risk. Advanced age, continuous functional deficits, and high BMI are significant risk factors for falls (19).

Functional activities, particularly stair climbing, pose challenges post-TKA due to structural changes and loss of quadriceps function. Patients often adopt compensatory movements to manage these deficits, which can further affect their ability to climb stairs safely (20). After TKA, a significant proportion of patients report limitations in functional activities, including stair climbing, despite pain relief and improved mobility (21). The risk of falling on stairs is significant, with accidents during descent leading to severe injuries. Postoperative assessments often reveal reduced knee internal rotation, flexion, and extension during stair climbing (22, 23).

The Fall Efficacy Scale (FES) and Timed Up and Go (TUG) scoring scale are commonly used to evaluate fall risk and stair climbing ability, respectively (24, 25). This study aims to assess the incidence of falls and fear of falling, functional status, and stair climbing ability in older adults after TKA, ultimately evaluating patient satisfaction with the procedure.

Objective: This study aimed to assess the incidence of falls and fear of falling, functional status, and stair climbing ability in older adults post-TKA, ultimately evaluating patient satisfaction with the procedure.

METHODS

The study employed a cross-sectional design to investigate the fear of falling and stair climbing status in older adults following total knee arthroplasty (TKA). Data were collected from three hospitals: Wapda Hospital, Jinnah Hospital, and Naseer Hospital. The study was conducted over six months, commencing after the approval of the synopsis. A convenient sampling technique was utilized to select participants. The research encompassed a sample size of 183 patients, all of whom were aged 60 years or older and had undergone either unilateral or bilateral TKA. Both male and female patients were included in the study.

Participants who had chronic knee joint infections, rheumatoid arthritis, avascular necrosis, gout, osteochondromatosis, neurological disorders resulting in impaired balance, or visual impairments were excluded from the study. The primary variables of interest were the fear of falling and the ability to climb stairs, assessed six months to one year post-TKA.

Data were collected using structured questionnaires administered to the participants. The questionnaires were designed to gather detailed information on the patients' demographic characteristics, medical history, and postoperative outcomes, specifically focusing on their fear of falling and stair climbing capabilities. The collected data were then analyzed to identify patterns and correlations between the variables.

The inclusion criteria ensured that the study focused on older adults who had sufficient recovery time post-TKA to evaluate their functional status and fear of falling accurately. Exclusion criteria were rigorously applied to maintain the study's internal validity and to ensure that the observed outcomes were directly attributable to TKA rather than other confounding conditions.

Overall, this methodical approach enabled a comprehensive assessment of the incidence of fear of falling and stair climbing difficulties in older adults post-TKA, contributing valuable insights into the postoperative challenges faced by this population. The findings aimed to inform clinical practices and improve postoperative care strategies to enhance the quality of life for patients undergoing TKA.

RESULTS

The study concluded that 65% of patients experienced fear of falling and poor stair climbing status following total knee arthroplasty (TKA). The mean age of the participants was 68.78 years, with a standard deviation of 6.828 years, and the age range was from 60 to 89 years. The mean weight of the patients was 81.32 kg, with a standard deviation of 14.005 kg, ranging from 52.00 kg to 110.00

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kg. The mean body mass index (BMI) was calculated to be 29.0874, with a standard deviation of 4.35423, and the BMI range was 16 to 39.

The mean total score for fear of falling, measured using the Falls Efficacy Scale (FES-1), was 64.11, with a standard deviation of 10.712 and a score range from 37 to 91. The mean score for the risk of falls, assessed by the Timed Up and Go (TUG) scale, was 1.34 with a standard deviation of 0.476. The study sample consisted of 65% women (n=119) and 35% men (n=64). Unilateral TKA was performed on 68% of the patients (n=125), while 32% (n=58) had bilateral TKA.

Regarding the use of assistive devices, 35% of the patients (n=65) used a cane, and 23% (n=42) used a walker. Additionally, 140 patients reported needing to stop and rest during activities, and 43 patients exhibited impaired cognition. The study included 183 participants to evaluate the incidence of fear of falling and stair climbing status in older adults post-TKA. The findings highlighted significant concerns regarding postoperative mobility and the psychological impact of fear of falling, underscoring the need for targeted interventions to improve functional outcomes and quality of life in this population.

Table 1: Descriptive Statistics of Study Variables

	N (VALID)	MISSING	MEAN	STANDERED DAVIATION	MAXIMUM	MINIMUM
Age	183	0	68.7760	6.82828	89	60
Weight	183	0	81.3169	14.00463	110	52
Height	183	0	165.9454	7.51608	182	152
BMI	183	0	29.0874	4.35423	39	16
Duration	183	0	2.0874	.85357	3	1
Gender	183	0	1.6503	.47819	2	1
Surgery	183	0	1.3279	.49352	2	1
Take a bath or shower	183	0	3.9508	4.23652	10	1
Reach into	183	0	9.0164	2.81572	10	1

DISCUSSION

The study examined the postoperative outcomes of patients who had undergone total knee arthroplasty (TKA) and found that approximately 65% of them had a high risk of falling, with the remainder experiencing moderate or low risk. Previous studies have shown that over half of TKA patients fell before their operations, with about one-fifth falling again postoperatively. This aligns with findings by Laura Frattura and colleagues, who reported a postoperative fall prevalence ranging from 12% to 38% (45). The association between TKA and increased fall risk has been well documented (46-48). Notably, a history of preoperative falls and poor functional status were significant risk factors for postoperative falls. One study indicated that approximately one-third of TKA patients fell postoperatively, with a higher likelihood among those with a preoperative fall history. Additionally, patients who had fallen before surgery were three times more likely to fall again postoperatively (49).

In this study, patients exhibited a significantly higher-than-average fear of falling (1.3 ± 0.47), which may correlate with the increased postoperative fall rate. Falls pose a significant health risk, causing anxiety and leading to a sedentary lifestyle among the elderly. This sedentary behavior results in muscle atrophy and weakness, particularly in the lower extremities, further increasing fall risk. Advanced age has also been associated with a higher fall risk, though this study found no significant correlation between age and the number of falls or fear of falling. However, women reported a greater fear of falling and lower overall functional levels compared to men, despite no significant difference in fall rates between genders. The cultural expectation that first-degree relatives will care for postoperative patients contributes to the observed outcomes. Studies by Lo et al. indicated that patients living alone were less active post-TKA, increasing their fall risk (49). Jorgensen and Kehlet found that female patients and those living alone were more likely to be rehospitalized due to falls, regardless of familial support (12). Other studies have shown no significant connection between gender and fall risk, although Riddle and Gollady noted a higher fall risk in women, suggesting further research is needed (50).

Knee pain increases fall risk by disrupting joint sensory and mechanical function, leading to balance abnormalities. Chronic pain fosters sedentary behavior, resulting in muscle weakness and further balance issues. This leads to increased "kinesiophobic behavior," where fear of movement exacerbates pain. Contrary to this, Riddle, Gollady, and Tsonga et al. found no correlation

between pain and falls. Turhan Damar and colleagues, however, identified a link between fear of falling and postoperative pain levels (7).

Patients with preoperative falls reported higher pain levels, which persisted postoperatively. Those who fell postoperatively also reported higher pain and fear of falling compared to those who did not fall. This suggests that pain-avoidance behavior contributes to increased fall rates due to higher fall fear. No correlation was found between body mass index (BMI) and fall incidence, fear of falling, or functional status in TKA patients, aligning with other studies. Functionality levels varied with the type of walking aids used; patients without support reported lower functionality but a higher incidence of falls and greater fear of falling, though the difference was not statistically significant.

Discharge criteria emphasize the need for patients to be able to perform self-care and mobility tasks independently before being released from the hospital. Effective discharge training, including fall prevention measures such as additional lighting, toilet risers, and handles, has shown positive outcomes in patients' ability to perform daily activities. Ergonomic factors like stair use, bathroom safety, and toilet type are critical in preventing falls post-TKA (49).

Organizing living spaces according to elderly patients' needs and supporting their independent activities with appropriate equipment is crucial. In this study, the most significant postoperative challenges were encountered in the bathroom, followed by reaching into cabinets, moving around the house, preparing meals, personal grooming, and answering the door or telephone. Consistent with other research, this study highlights the high prevalence of fear of falling and postoperative falls among TKA patients. It underscores the importance of addressing patients' fears and providing adequate social support to improve their functional status and reduce fall risk.

CONCLUSION

The study assessed fear of falling, falls, and stair climbing abilities in patients post-total knee arthroplasty (TKA), revealing that 65% experienced difficulties. The findings indicated a persistent risk of falls and impaired stair navigation post-TKA. To mitigate these risks, it is essential to provide physical therapy support and comprehensive discharge training to at-risk patients. Physical therapy plays a vital role in reducing fall fear and improving functional outcomes, thereby enhancing patients' quality of life. Implementing these measures can help prevent falls and promote safer, more confident mobility in individuals undergoing TKA. The results underscore the importance of ongoing rehabilitation and patient education in post-TKA care.

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