Trends in Psychological Well-being and Resilience Following Knee Replacement Surgery in Older Adults: A Longitudinal Study

Farideh Bastani (iD) [1], Sahba Mousavi (iD) [2], Zahra Gharagozloo (iD) [3], Fatemeh Ghanbari (iD) [4], Seyedeh Esmat Hosseini (iD) [5, *]

[1] Geriatric Mental Health Research Center, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

[2] Department of Community Health Nursing and Geriatric Nursing, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

[3] Student Research Committee, Community Health Nursing Department, Geriatric Mental Health Research Center, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

[4] Department of Nursing, Faculty of Nursing and Midwifery, Shahed University, Tehran, Iran

[5] Nursing and Midwifery Care Research Center, Iran University of Medical Sciences, Tehran, Iran

Corresponding Author: Nursing and Midwifery Care Research Center, Iran University of Medical Sciences, Tehran, Iran. Email: esmat.hosseini_110@yahoo.com

Abstract

Background: Knee osteoarthritis is a prevalent condition among the elderly, often necessitating total knee replacement surgery, which can impact psychological well-being and resilience during recovery. Understanding the trajectory of these psychological factors is essential for optimizing postoperative care and promoting successful aging.

Objectives: This longitudinal study aimed to evaluate trends in self-assessed psychological well-being and resilience among elderly patients following knee replacement surgery.

Methods: This research is a longitudinal study. A total of 432 elderly adults (aged 60 - 74 years) undergoing unilateral or bilateral knee replacement surgery at Shafa Yahyaian Hospital, Iran, were assessed at discharge, one month, and three months post-surgery. Psychological well-being was measured using the Reef Psychological Well-being Questionnaire, and resilience was assessed by the Brief Resilience Scale. Data were analyzed using repeated measures ANOVA and other appropriate statistical tests.

Results: Psychological well-being significantly improved from discharge to one month and three months post-surgery (P < 0.001), with no significant difference between the one- and three-month assessments. All six dimensions of psychological well-being (autonomy, environmental mastery, personal growth, positive relationships, purpose in life, and self-acceptance) demonstrated significant positive changes over time, except for purpose in life, which showed a different pattern. Resilience scores also increased significantly over time, peaking at three months post-surgery (P < 0.001). No significant associations were found between psychological measures and demographic characteristics such as age, gender, or education.

Conclusions: Psychological well-being and resilience improve significantly during the first three months following knee replacement surgery in elderly patients. These findings underscore the importance of integrating psychological assessments and resilience-building strategies into postoperative nursing care and discharge planning to support holistic recovery and healthy aging.

Keywords: Psychological Well-being, Resilience, Elderly, Knee, Surgery, Longitudinal Study

1. Background

Aging is an inevitable process during which the functions of various body systems gradually decline, exposing elderly persons to multiple injuries (1). One of the most common problems faced by the elderly, and the leading cause of mobility disability among them, is knee osteoarthritis, affecting 80% of the population over 65 years and incurring annual costs exceeding $185.5 billion (2). Elderly people experience a lot of anxiety

about knee replacement surgery due to concerns about post-operative complications such as pain and discomfort, changes in body image or function, increased dependencies, and potential changes in their lifestyle (3, 4). The rehabilitation and reintegration of patients increasingly depend on their participation and psychological factors in achieving optimal functioning and managing pain and daily activities in older adults (5), which can include self-assessment of psychological well-being and resilience.

In line with the concept of "healthy and successful aging", three components are proposed: The maintenance of reduced risk of diseases and disabilities, preservation of physical and psychological function, and engagement in life. Such a paradigm directs aging as a natural process towards focusing on well-being (6). Indeed, one of the variables affected by aging is psychological well-being (7). High psychological well-being is a crucial factor for growth, maintaining health, and preventing many psychological disorders. It seems that human potential capacities are expanding throughout the lifespan, and psychological well-being plays a significant role in the completion and enhancement of these capabilities (8). Psychological well-being is widely recognized as a key aspect of health, and evidence indicates that it influences quality of life, self-efficacy, coping with disease burden, improved work productivity, and reduced mortality in individuals with diabetes (9, 10). Seemingly, there is a positive significant relationship between psychological well-being and resilience in older adults (11, 12).

In this context, resilience is introduced as an intrinsic characteristic that allows individuals to return to their normal lives, stronger and more capable than before, after experiencing adversities and crises such as illness. In other words, the importance of resilience in life lies in the flexibility required to return to a state of equilibrium. Using appropriate coping strategies and resilience can improve self-efficacy and psychological health, as well as create positive outcomes in the field of health, including chronic diseases (13). Nurses, adopting a holistic approach, play a key role in planning and implementing all aspects of health due to their closer connection with individuals in the community (6). In this regard, nurses can provide better healthcare services and support for the vulnerable elderly population by assessing and monitoring related psychological disorders to realize the ideal of "healthy, active, and successful aging", which encompasses all physical, psychological, and social dimensions of elderly health.

Given the high incidence and prevalence of osteoarthritis in the elderly and the associated surgical interventions, a deeper understanding of its consequences seems beneficial.

2. Objectives

The aim of this study is to determine the trend of self-assessment of psychological well-being and resilience in this vulnerable population group following knee joint replacement surgery through a longitudinal study. This research can expand the existing body of knowledge in this area and provide a foundation for future health interventions and planning aimed at promoting health and healthy, active aging.

3. Methods

3.1. Study Design

The present study is a longitudinal study that included older adults admitted to Shafa Yahyaian Hospital, affiliated with Iran University of Medical Sciences, between May 2024 and October 2024. Patients who had total knee replacement surgery were assessed for self-rated psychological well-being and resilience, by gender, at discharge, one month, and three months after surgery.

Eligibility criteria were as follows: Elderly Iranian men and women undergoing knee joint surgery (unilateral or bilateral), aged between 60 to 74 years (living at home and not in a nursing facility); no cognitive impairment (achieving a score of 7 out of 10 on the AMT test to assess cognitive status); no psychiatric disorders and no use of psychoactive medications (according to medical records); ability to communicate and capacity to respond to the questionnaire in Persian. Patients who were unwilling to complete the questionnaires were excluded.

Given the conditions of the elderly (post-surgery and weakened immune systems), except for the initial phase of data collection, which was conducted in person at the time of discharge, the questionnaires were completed via telephone one month and three months after discharge, at times that were convenient for the participants, to reduce the need for the elderly to travel. The data collection instruments included a demographic information form, psychological well-being assessments, and resilience measures. It took about 30 minutes to complete the questionnaires in each of the three time stages.

3.2. Research Tools

The demographic variables in this study included age, education level, marital status, employment status, feeling lonely in life, underlying illness, and benefit from a family caregiver.

3.3. Reef Psychological Well-being Questionnaire

This questionnaire has 18 questions and aims to assess psychological well-being from different dimensions: (1) Autonomy, (2) environmental mastery, (3) personal growth, (4) positive relationships with others, (5) purpose in life, and (6) self-acceptance. Its scoring range is based on a six-point Likert scale (1-6), and the range of scores is 0 - 108, with higher scores indicating better psychological well-being. The validity of this questionnaire has been confirmed in terms of face and content validity, and its reliability has been determined through internal consistency with a Cronbach's alpha of 0.960 (8). The questionnaire is valid and reliable and is suitable for use in assessing the psychological well-being of Iranian individuals (14). In this study, the reliability of the instrument was re-evaluated in 30 elderly men and women, resulting in a reliability score of 0.72.

3.4. The Brief Resilience Scale (BRS)

This scale measures a person's ability to recover from stress (resilience) in 6 items (15). In this questionnaire, a 5-point Likert scale from 1 to 5 is considered for each question. Responses to the items are based on the Likert scale from completely disagree to completely agree. Internal consistency was good, with Cronbach's Alpha ranging from 0.80 to 0.91. The validity and reliability of the Persian version of the Brief Resilience Scale are acceptable in the Iranian population (16). The reliability of the instrument was re-evaluated in 30 elderly men and women in this study, resulting in a reliability score of 0.79.

3.5. Sample Size

The sample size was calculated to estimate self-assessment of psychological well-being with a 95% confidence level and a precision of 1 point, resulting in an estimated 216 participants per gender group (male and female). Sample size calculations were also performed for other study variables, but this estimate was the largest and thus determined the overall required sample size.

3.6. Data Analysis

Data analysis included descriptive statistics — frequencies and percentages for qualitative variables,

and minimum, maximum, mean, and standard deviation for quantitative variables. Inferential statistics involved independent *t*-tests, chi-square tests, ANOVA, and logistic regression. Analyses were performed using SPSS version 22. Statistical significance was set at P < 0.05 with a 95% confidence interval.

3.7. Ethical Considerations

This study was approved by the Iran University of Medical Sciences' Ethics Committee (approval No. IR.IUMS.REC.1403.190) and conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the research.

4. Results

A total of 432 older adults were recruited for this study, with a mean age of 64.53 ± 4.34 years. The mean ages of women and men were 64.18 ± 4.06 and 64.88 ± 4.58 years, respectively. Among the participants, 75.2% had an education level below diploma, 78.9% were married, 47.9% were retired, and 77.1% reported their income as relatively sufficient. Regarding psychosocial factors, 6.8% of the elderly reported no feelings of loneliness, 56.7% had no underlying chronic conditions, and 77.1% had a family caregiver. No statistically significant associations were found between psychological well-being or resilience and individual demographic characteristics (Table 1).

Repeated measures analysis of variance showed statistically significant differences in psychological well-being between elderly men and women at one or more time points assessed (P < 0.001). Pairwise comparisons revealed that psychological well-being scores at one month and three months post-surgery were significantly higher than those recorded at discharge (P < 0.001). However, no statistically significant difference was observed between psychological well-being at one month and three months post-surgery (P = 0.696, Table 2).

Psychological well-being among the elderly participants showed statistically significant differences across all dimensions: Autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, and self-acceptance (P < 0.001). Except for the purpose in life dimension, psychological well-being scores were significantly lower at discharge compared to one month and three months post-surgery (P < 0.001). At discharge, the highest average score was observed in the autonomy dimension (8.98 ± 2.71), while

Table 1. Demographic Details of the Study Population [a]

Parameters	Total	Women	Men	P-Value [b]
Age (y)				0.092
60 - 64	247 (57.2)	130 (60.2)	117 (54.2)	
65 - 69	111 (25.7)	57 (26.4)	54 (25)	
> 70	74 (17.1)	29 (13.4)	45 (20.8)	
Level of education				0.001
Primary school and less	35 (8.1)	24 (11.1)	11 (5.1)	
Middle school	325 (75.2)	144 (66.7)	181 (83.8)	
Diploma	53 (12.3)	36 (16.7)	17 (7.9)	
Academic degree	19 (4.4)	12 (5.6)	7 (3.2)	
Marital status				0.047
Single	19 (4.4)	14 (6.5)	5 (6.5)	
Have a spouse	341 (78.9)	161 (74.5)	180 (83.3)	
Divorced	31 (7.2)	20 (9.3)	11 (5.1)	
Deceased spouse	41 (9.5)	21 (9.7)	20 (9.3)	
Employment status				< 0.001
Employed	45 (10.4)	12 (5.6)	33 (15.3)	
Unemployed	11 (2.5)	4 (1.9)	7 (3.2)	
Retired	207 (47.9)	31 (14.4)	176 (81.5)	
Housewife	169 (39.1)	169 (78.2)	0	
Income				0.055
Low	15 (3.5)	12 (5.6)	3 (1.4)	
Middle	333 (77.1)	161 (74.5)	172 (79.6)	
High	84 (19.4)	43 (19.9)	41 (19)	
Feeling lonely in life				0.094
Yes	88 (20.4)	51 (23.6)	37 (17.1)	
No	344 (79.6)	165 (76.4)	179 (82.9)	
Chronic diseases				0.145
Yes	187 (43.3)	101 (46.8)	86 (39.8)	
No	245 (56.7)	115 (53.2)	130 (60.2)	
Family support				0.001
Yes	333 (77.1)	152 (70.4)	181 (83.8)	
No	99 (22.9)	64 (29.6)	35 (16.2)	

[a] Values are expressed as No. (%).

[b] P-value was computed by natural logarithm of size.

Table 2. Psychological Well-being at Discharge, One Month, and Three Months Post-surgery [a]

Psychological Well-being	Total	Women	Men
At discharge	50.34 ± 11.04	51.35 ± 9.52	49.33 ± 12.31
One month after surgery	60.73 ± 9.66	61.85 ± 9.47	59.61 ± 9.75
Three months after surgery	61.33 ± 3.86	61.91 ± 3.93	60.75 ± 3.71
ANOVA with repeated measures	F = 206/438, P < 0010	F = 114/985, P < 0010	F = 94/345, P < 0.001

[a] Values are expressed as mean ± SD.

the lowest average was in environmental mastery (7.54 ± 2.86), (Table 3).

Resilience in elderly men and women was statistically significantly different at least at one of the time points studied (P < 0.001). Pairwise comparisons

Table 3. Dimensions of Psychological Well-being at Discharge, One Month, and Three Months After Surgery [a]

Dimensions; Time Point	Total	Women	Men
Autonomy			
At discharge	8.98 ± 2.71	3.97 ± 2.64	8.59 ± 2.71
One month	13.6 ± 2.78	13.31 ± 2.61	13.01 ± 2.94
Three months	8.06 ± 2.95	8.41 ± 2.88	7.64 ± 2.98
ANOVA with repeated measures [b]	F = 377/832, P < 0.001	F = 183/02, P < 0.001	F = 194/898, P < 0.001
Environmental mastery			
At discharge	7.54 ± 2.86	7.52 ± 2.76	7.56 ± 2.97
One month	8.74 ± 3.61	9.54 ± 3.59	7.9 ± 3.45
Three months	9.78 ± 2.23	9.59 ± 2.28	9.97 ± 2.17
ANOVA with repeated measures [b]	F = 67/256, P < 0.001	F = 38/768, P < 0.001	F = 45/817, P < 0.001
Personal growth			
At discharge	8.6 ± 2.66	8.86 ± 2.45	8.35 ± 2.84
One month	12.17 ± 2.97	11.98 ± 2.91	12.36 ± 3.03
Three months	11.51 ± 2.06	11.61 ± 2.21	11.39 ± 1.95
ANOVA with repeated measures [b]	F = 204/469, P < 0.001	F = 204/469, P < 0.001	F = 118/367, P < 0.001
Positive relationships with others			
At discharge	8.72 ± 2.96	8.43 ± 3.01	9.01 ± 2.9
One month	10.24 ± 2.46	9.97 ± 2.48	10.51 ± 2.41
Three months	8.95 ± 2.47	9.27 ± 2.21	8.64 ± 2.69
ANOVA with repeated measures [b]	F = 45/397, P < 0.001	F = 20/709, P < 0.001	F = 33/473, P < 0.001
Purpose in life			
At discharge	8.62 ± 2.91	9.19 ± 2.76	8.06 ± 2.95
One month	8.45 ± 3.02	8.84 ± 3.01	8.08 ± 3.01
Three months	13.52 ± 3.08	13.39 ± 3.08	13.64 ± 3.09
ANOVA with repeated measures [b]	F = 322/071, P < 0.001	F = 128/571, P < 0.001	F = 200/312, P < 0.001
Self-acceptance			
At discharge	7.85 ± 3.12	7.95 ± 2.92	7.74 ± 3.31
One month	7.93 ± 2.52	8.19 ± 2.47	7.67 ± 2.56
Three months	9.53 ± 1.5	9.62 ± 1.49	9.45 ± 1.51
ANOVA with repeated measures [b]	F = 88/222, P < 0.001	F = 40/152, P < 0.001	F = 48/83, P < 0.001

[a] Values are expressed as mean ± SD.

[b] ANOVA with repeated measures was used for statistical testing.

Table 4. Resilience Scores at Discharge, One Month, and Three Months Post-surgery [a]

Resilience	Total	Women	Men
At discharge	17.78 ± 2.11	17.82 ± 2.11	17.47 ± 2.28
One month after surgery	18 ± 2.19	18 ± 2.19	17.89 ± 2.35
Three months after surgery	18.49 ± 2.37	18.49 ± 2.37	18.17 ± 2.4
ANOVA with repeated measures	F = 56/586, P < 001/0	F = 29/132, P < 001/0	F = 28/739, P < 001/0

[a] Values are expressed as mean ± SD.

showed that resilience was significantly higher three months after surgery compared to both discharge and one month post-surgery (P < 0.001). Additionally, resilience at one month after surgery was significantly greater than at discharge (P < 0.001, Table 4).

5. Discussion

The findings of the present study indicated that the average age of the elderly participants was 64.53 years, suggesting that the elderly included in the study can be categorized as "young elderly". Approximately 20% of the elderly participants self-reported feelings of loneliness in their lives. Loneliness can occur across all age groups; however, its prevalence appears to be higher among the elderly. A systematic review revealed that the average loneliness score among older adults is high, and feelings of loneliness are significantly greater in those living in nursing homes and away from family compared to those residing in family environments, due to a lack of social relationships [17]. In the current study, all elderly men and women were residents of family settings. Subjective loneliness was not measured using a specific standardized tool but was instead assessed through a single self-reported question. There was a significant negative correlation between feelings of loneliness and psychological well-being, psychological capital, and spiritual intelligence among the elderly. These findings may have important therapeutic and caregiving implications, considering the significance of these variables in reducing feelings of loneliness among older adults [18].

The results of the present study indicate that psychological well-being is significantly lower in elderly patients at the time of discharge compared to one month and three months post-surgery. This difference is statistically significant across all dimensions of psychological well-being. Qualitative findings suggest that while psychological well-being is initially low following surgery, it tends to improve over time. Given that mental health following surgery impacts recovery, psychological assessment and informational support for patients recovering from surgery can facilitate their healing experience. Therefore, the development of a comprehensive care follow-up system to ensure continuity of care and provide professional support should be considered [19].

Furthermore, as life expectancy increases, the factors associated with healthy aging become more significant. One of these factors that contributes to successful aging is psychological well-being [20]. Psychological well-being plays a major role in the decision-making processes of older adults, as it appears that with increasing age, their ability to make daily life decisions and maintain autonomy becomes more restricted. Understanding factors such as the decision-making capabilities of older adults is crucial for the formulation of health and successful aging policies [21].

In the present study, all dimensions of psychological well-being, including autonomy, self-acceptance,

purpose in life, environmental mastery, positive relationships, and personal growth, were evaluated. These dimensions are recognized within the mental health system and are considered a priority in health policy [22]. If we consider psychological well-being as related to mental health, contemporary research indicates that higher mental health in late adulthood is associated with increased longevity and quality of life. The results of a prospective cohort longitudinal study involving 1,000 American seniors aged 90 years showed that modifiable biological and behavioral factors (such as smoking, high blood pressure, diabetes, and regular exercise) could predict longevity and psychological well-being [23].

Resilience in the elderly, as assessed three months post-surgery, was significantly higher than at the time of discharge and one month after discharge. The findings of the current study indicated that resilience in elderly individuals undergoing knee joint surgery did not have any statistically significant correlation with their personal characteristics. Furthermore, resilience did not show a statistically significant difference based on gender between women and men. Resilience is defined as the ability to maintain or rapidly recover mental health during and after periods of hardship. This concept emerges as a result of a dynamic process that leads to successful adaptation to stressors; however, the underlying mechanisms of resilience in the face of adversities over time within specific demographic groups remain poorly identified and understood [24].

Hooper and Casco argue that large-scale longitudinal studies focus on the process of resilience across various developmental stages, from infancy to adulthood, and identify and discuss individual characteristics associated with successful coping. Additionally, they recommend that future research should concentrate on gene-environment interactions and individuals' responses to life stressors, identifying and moderating these factors [25].

The concept of resilience has garnered increasing attention in recent decades as a key factor influencing physical and psychological well-being in the context of stressors associated with aging. Psychological resilience is strongly and consistently linked to health outcomes, as well as to intrapersonal and interpersonal resources that promote and protect health and functioning in the face of challenges and adversities [26]. In fact, resilience acts as a protective factor against psychological and physical adversities and emphasizes the importance of resilience-enhancing strategies in interventions aimed at promoting successful aging [27]. This aspect should be taken seriously into account in the care plans of

nurses during the discharge of elderly patients undergoing knee joint replacement surgery.

5.1. Conclusions

The results of this study significantly enhance the understanding of the psychological status of elderly patients following knee replacement surgery and provide valuable insights for the development of tailored discharge care plans by professional nurses. By identifying the trends in psychological well-being and resilience during the recovery phase, nurses can better anticipate patients' emotional and mental health needs and implement timely, personalized interventions. Integrating these findings into nursing practice supports holistic patient care, promotes psychological recovery, and ultimately contributes to more effective rehabilitation and healthier, more successful aging. Furthermore, this evidence lays important groundwork for advancing epidemiological and clinical research focused on psychological outcomes in elderly surgical patients.

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Footnotes

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