

Investigating the impact of hip and knee replacement surgery on the quality of life of nursing home residents: a preliminary study

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Abstract

Introduction: The world's population is rapidly aging, leading to a surge in the prevalence of chronic joint diseases. Hip and knee replacement surgeries have become a common treatment for these conditions, offering significant improvements in the quality of life for older adults by restoring mobility and reducing pain.

Aim of the research: The aim of this study was to analyse the effects of hip and knee replacement surgeries on the quality of life of nursing home residents, considering variations among patient groups and emphasising the importance of personalised rehabilitation care.

Material and methods: The study included 117 residents of a nursing home in the Mazovian voivodeship (Poland), during the first half of 2024. The study was conducted by means of a diagnostic survey; the tool was a self-administered survey questionnaire and the WHOQOL-BREF questionnaire, which contains 26 questions analysing 4 domains of life and, separately, perception of quality of life and self-assessment of health status.

Results: The findings revealed that residents who underwent hip replacements reported higher levels of life satisfaction across physical, psychological, social, and environmental domains compared to those with knee replacements. Age and gender were identified as significant factors impacting life satisfaction in various domains.

Conclusions: The study demonstrated distinct impacts of lower limb orthopaedic surgeries on the quality of life among nursing home residents, emphasising the necessity for personalised rehabilitation strategies tailored to different patient groups.

Introduction

An ageing population is a global demographic trend that is contributing to an increase in the prevalence of chronic joint conditions, such as osteoarthritis, which affects an estimated 240 million people worldwide. As a result, hip and knee endoprosthesis procedures are becoming increasingly common, representing a crucial treatment option for osteoarthritis in older individuals. The use of joint endoprostheses is often an effective solution that significantly enhances the quality of life for patients. An important aspect of this treatment is proper rehabilitation following surgery, which can have a decisive impact on the final therapeutic outcomes [1, 2].

Published research indicates that hip and knee endoprosthesis surgery in nursing home residents presents unique challenges due to factors such as age, overall health status, and potential complications arising from coexisting chronic conditions. A study by Kappenschneider *et al.* [3] reported that older patients are at increased risk of infections, thrombosis, or respiratory disorders after endoprosthetic surgery compared to younger populations. Consequently, a case-by-case approach, a thorough risk analysis, and

a careful assessment of the patient's health status prior to surgery are essential [4].

Moreover, comprehensive rehabilitation following endoprosthesis surgery plays a critical role in the therapeutic process for nursing home residents. Research by Bade *et al.* demonstrates that intensive physiotherapy rehabilitation facilitates a faster return to full mobility and reduces the risk of complications following surgery [5]. Cooperation between medical and rehabilitation staff, along with the active involvement of the patient and nursing home care staff, is vital for achieving optimal treatment outcomes [6].

Studies on quality of life after hip and knee replacement surgery in elderly patients have shown significant improvements in function and daily activities. A study by Canovas *et al.* found that after endoprosthesis surgery, patients reported substantial improvements in quality of life, including pain reduction, increased mobility, and enhanced joint function, among other benefits [7]. Additionally, following surgery, patients experienced a noticeable return of independence in performing daily activities, which contributed to greater autonomy and life satisfaction.

Furthermore, research by Lee *et al.* indicates that patients who undergo hip and knee replacement also

report improvements in mental and emotional health, which significantly impact their overall quality of life. Reduced pain, enhanced mobility, and increased self-confidence lead to greater social engagement, which fosters a higher level of community integration [8].

In conclusion, hip and knee replacement surgery in elderly patients has a profound positive effect on their quality of life. By alleviating pain, improving mobility, and enhancing joint function, patients regain not only physical mobility but also independence in daily activities, along with a greater sense of life satisfaction. Comprehensive rehabilitation and support from an interdisciplinary team are crucial elements in the recovery process following surgery [9, 10].

Aim of the research

Analysis of the impact of hip and knee replacement surgery on the quality of life of nursing home residents, taking into account differences between patient groups and the need for an individualised approach to rehabilitation care.

Material and methods

Design and data collection

The survey was conducted in the first half of 2024 (May/June) among residents of a social welfare home in the Mazowieckie voivodeship (Poland). It was carried out anonymously, respecting the dignity and privacy of the respondents. Before participating, each participant was fully informed about the purpose and methodology of the survey and was guaranteed the right to withdraw at any time without giving any reason. Respondents were assured that their data would be kept confidential and used solely for research purposes. A total of 130 survey questionnaires were distributed to nursing home residents. Ultimately, 117 questionnaires were included in the study, all of which were correctly completed according to the established quality standards.

Inclusion criteria for the study:

- Nursing home resident status.
- Status following hip or knee replacement surgery, confirmed by imaging findings.
- Absence of post-operative complications that could interfere with recovery.

Exclusion criteria for the study:

- Status following endoprosthetic surgery for more than 5 years.
- Excessive obesity or significant malnutrition that could adversely affect the recovery process.
- Presence of a serious neurological disorder (e.g. stroke, post-traumatic brain injury) that significantly impairs motor function.
- Serious psychiatric disorders or communication difficulties that prevent proper cooperation during the examination.

Research tool

The study was conducted using a diagnostic survey method. The research tool employed was a self-administered survey questionnaire, which included questions about the demographic characteristics of the respondents, such as age, gender, education, place of residence prior to their stay in the nursing home (DPS), and their current status of residence in the DPS. Additionally, respondents were asked for information regarding the type of surgery performed and the time elapsed since the surgery.

The study also utilised the WHOQOL-BREF, a standardised tool for assessing quality of life in both healthy and ill individuals in clinical practice. It covers the domains of physical, psychological, social, and environmental functioning. The tool is licensed under CC BY-NC-SA 3.0 IGO.

The individual patient assessment encompasses various aspects: in the physical domain (activities of daily living, dependence on medication and treatment, energy, mobility, pain, sleep, ability to work), in the psychological domain (appearance, feelings, self-esteem, spirituality, thinking, memory, concentration), in the social domain (personal relationships, social support, sexual activity), and in the environmental domain (financial resources, safety, health, home environment, developmental opportunities, physical environment).

In addition, the WHOQOL-BREF includes questions on overall perceptions of quality of life (WHO1) and health (WHO2), which are scored on a 5-point scale. Higher scores in each domain indicate a better quality of life in that area.

Statistical analysis

The study was conducted with statistical analyses performed using the advanced statistical software Statistica 13.3. The arithmetic mean and standard deviation were used to describe quantitative variables, while qualitative variables were presented as frequencies and percentages. The relationship between two qualitative variables was assessed using the χ^2 test to determine the significance of the association. A statistical significance level of $\alpha < 0.05$ was adopted, meaning that the results were considered statistically significant if the probability of the observed outcomes occurring by chance was less than 5%. The analyses were designed to thoroughly explore the collected data and address the specific research questions posed by the study.

Results

The study population was characterised by a diversity of ages, with the largest groups being 61 to 70 years old (31.62%) and 50 to 60 years old (25.64%). Furthermore, the majority of respondents were men

Table 1. Demographic characteristics of the study group

Characteristic	Value	Percentage
Age groups		
50–60 years	30	25.64%
61–70 years	37	31.62%
71–80 years	26	22.22%
81–90 years	14	11.97%
91+ years	10	8.55%
Gender		
Female	55	47.01%
Male	62	52.99%
Education level		
Primary	6	5.13%
Vocational	12	10.26%
Secondary	65	55.56%
Higher	34	29.06%
Place of residence before DPS		
Urban	70	59.83%
Rural	47	40.17%
Current residence in DPS		
Permanent	61	52.14%
Temporary	56	47.86%

(52.99%), while women made up 47.01% of the group. In terms of education, most people had secondary education (55.56%), while correspondingly smaller percentages had tertiary education (29.06%), vocational education (10.26%), and primary education (5.13%). These data may be relevant for planning preventive and therapeutic measures, taking into account the specificities of the age and education group. Before moving into the social care facility, 59.83% of participants were from urban areas, while 40.17% came from rural areas. Additionally, 52.14% of respondents lived permanently in the facility, whereas 47.86% were temporary residents. These demographic characteristics are presented in Table 1.

The study found that most participants (61.54%) had undergone hip replacement surgery, while 38.46% had knee replacement surgery. A deeper analysis of the data revealed that 49.57% of participants had surgery within the past 1–3 months, 26.5% within the last month, 13.38% between 3 and 6 months ago, and 10.26% between 6 and 12 months ago. The findings indicate that hip replacement surgery is more common than knee replacement surgery among the respondents. Additionally, the fact that most participants had their surgery within the last 3 months

suggests that joint replacement is a prevalent and effective treatment for joint-related issues.

Next, data analysis was conducted using the standardised WHOQOL-BREF questionnaire, which evaluates the quality of life in physical, psychological, environmental, and social domains. The analysis demonstrated the impact of these domains on the participants' overall well-being and highlighted areas for potential improvement. For instance, physical pain was identified as a significant limitation for 62% of respondents, with 36.75% experiencing substantial discomfort. In terms of daily functioning, 37.61% of participants reported only moderate improvements, while 42.74% reported a lack of sufficient energy to engage in normal activities. Regarding the ability to lead a normal life, 34.19% expressed average satisfaction, and 47.86% felt moderately satisfied with their work capacity. These findings underline the importance of addressing both health and social factors in enhancing the quality of life of the respondents. The study indicates that physical pain remains a key barrier to daily functioning, calling for further advancements in treatment options.

Regarding the psychological domain, 52.99% of participants expressed average satisfaction with life, while 31.61% reported low satisfaction. The sense of life's meaning was rated as average by 68.38% of respondents, with only 14.53% experiencing a low sense of meaning. Acceptance of personal appearance was also rated as average by 71.79% of participants, and self-satisfaction was reported as average by 67.52%. When assessing unpleasant moods, 83.76% of participants experienced them to some degree. These results highlight the need for targeted interventions to improve respondents' mental well-being, particularly in areas such as life satisfaction, self-acceptance, and emotional regulation.

The self-assessment of life satisfaction in the psychological domain yielded a mean score of 37.22 points, indicating a generally high level of satisfaction. The scores varied minimally, with the lowest score being 27 points and the highest reaching 42 points, suggesting that most participants were content with their lives. Statistical analysis confirmed a significant relationship between convalescence in the nursing home and improvements in the mental state of patients, as indicated by the chi-square coefficient with a significance level of 0.000872. These findings are presented in Table 2.

Further analysis focused on the social domain, where respondents rated their satisfaction highly, with an average score of 27.21 points. The lowest recorded score was 15 points, and the highest was 29 points, with a small standard deviation, indicating little variability in responses. The calculated χ^2 coefficient was 22.33, with a significance value of 0.0008. These results suggest that the stay in the nursing home had a positive impact on the social functioning of the respondents after their surgeries.

Table 2. Post-Operative Recovery and Quality of Life (WHOQOL-BREF Results)

WHOQOL domain	Subdomain/question	Result summary
Physical domain	Pain and mobility restrictions	62% report mild pain limitation, 36.75% major limitation
	Daily life dependent on treatment	37.61% moderate impact, 29% large impact
	Energy levels to perform normal activities	42.74% moderate energy, 37.61% low energy
	Mobility	65% report moderate mobility, 29.9% good mobility
	Sleep satisfaction	46.15% moderate satisfaction, 33.33% high satisfaction
Psychological domain	Enjoyment of life	52.99% moderate enjoyment, 31.61% low
	Sense of life meaning	68.38% moderate meaning, 14.53% low
	Focus ability	66.67% moderate, 17.09% low focus
	Self-acceptance	71.79% moderate acceptance, 10.26% low
	Self-satisfaction	67.52% moderate satisfaction, 17.09% high
	Negative moods (e.g. sadness, depression)	83.76% moderate, 4.27% high mood disturbance

A separate analysis examined the effect of gender on life satisfaction across various domains. The results revealed a statistically significant relationship between gender and life satisfaction in the physical, psychological, social, and environmental domains ($p = 0.038$, $p = 0.027$, $p = 0.036$, $p = 0.021$), with women reporting higher levels of satisfaction. Similarly, the analysis showed a significant relationship between age and life satisfaction in the physical ($p = 0.028$), psychological ($p = 0.032$), and social ($p = 0.031$) domains, with younger individuals expressing greater satisfaction. In contrast, life satisfaction varied significantly based on the type of hip endoprosthesis ($p = 0.033$, $p = 0.025$, and $p = 0.003$ in the physical, psychological, and social domains, respectively), with patients who received hip replacements reporting higher satisfaction. These findings suggest that gender, age, and the type of surgery all influence life satisfaction in different aspects. Women and younger individuals may experience higher satisfaction due to greater emotional expression and better social relationships. Patients with hip replacements are likely to report better quality of life due to improved mobility and pain relief. The observed differences in life satisfaction can be attributed to psychological, social, and physical factors.

Discussion

Investigating the effects of hip and knee replacement surgery on the quality of life of nursing home residents is a topic that is gaining increasing interest in research in health sciences. Learning about the impact of these treatments on wellbeing and overall satisfaction is crucial to improving their quality of life and optimising treatment outcomes. A review of the results

and the individual experiences of patients can provide valuable information to help improve medical care.

The analysis conducted in the context of examining the relationship between age, gender, education level, and quality of life of patients after hip and knee replacement surgery presents important information regarding the impact of the aforementioned factors on the experience of people undergoing hip and knee replacement surgery. The results indicate that the age of the patients is a significant factor, especially for the age group 50–70 years, which accounted for the largest proportion of the sample. In addition, the significant number of men in the study population suggests the possibility of gender differences in patient experience. Similar results were presented in a study by Miettinen *et al.* [11].

In the context of the education of the survey, it was apparent that most respondents had secondary education, suggesting a potential relationship between education level and the effectiveness of coping and the rehabilitation process after hip and knee replacement surgery. In addition, it is important to note that most respondents had undergone this particular surgical procedure, which may be due to more common joint conditions and an increased need for improved quality of life among older people. The results also show that advances in the medical field and developments in medical technology are contributing to the effectiveness and availability of this type of surgery, which in turn encourages older people to benefit from this type of treatment. A study by Lewis *et al.* confirms similar findings regarding the frequency of hip replacement surgery among older people [12].

By analysing patients' quality of life in various aspects using the WHOQOL-BREF questionnaire, it is

possible to better understand the impact of these areas on patients' wellbeing and develop appropriate strategies to improve their quality of life. The study showed that physical pain was a significant life-limiting factor for most respondents, indicating the need for continued research into new therapeutic approaches to improve patients' wellbeing. An important finding of the study is also the need to take greater account of psychological, environmental, and social aspects when planning patients' care, in order to provide comprehensive support. Similar results were presented in a study by Moarrefzadeh *et al.* [13].

Ultimately, a comprehensive analysis of the results of the study shows that age, gender, education, and treatment modality are important for the quality of life of patients after hip and knee replacement surgery. Further research and the development of therapies focused on different aspects of patients' lives may help to improve treatment outcomes and quality of life for patients with joint problems.

The survey was only conducted in one nursing home in one province, which limits its overall representativeness. In future, it would be worth extending the survey to a larger number of facilities in different regions to obtain a more comprehensive picture of the situation of patients after joint replacement surgery. In addition, although the survey was conducted anonymously and with respect for the dignity of the respondents, it would be worthwhile to also include the opinions of medical staff and carers to get a more comprehensive perspective on the quality of life of patients after surgery. In addition, increasing the number of respondents and using additional survey tools could provide more detailed and reliable data for analysis. Future studies would also need to take into account the length and regularity of follow-up to more accurately track changes in patients' quality of life over time.

Conclusions

The study demonstrated that hip and knee replacement surgeries significantly improve the quality of life for nursing home residents. Post-operative patients reported a reduction in pain, increased mobility, and better joint function, leading to greater independence in daily activities. These improvements highlight the critical role of surgical intervention in enhancing the overall well-being of elderly individuals in care facilities.

The analysis revealed that intensive physiotherapy is a crucial component of the post-surgery recovery process for residents. Physiotherapeutic rehabilitation not only facilitates a quicker return to full mobility but also plays a key role in minimising the risk of post-surgical complications. The collaborative approach within the interdisciplinary team, combined with active patient participation, is vital for achieving

optimal recovery outcomes and improving quality of life.

Investigating the influence of age, gender, education, and type of surgery on the quality-of-life outcomes for patients who underwent hip and knee replacements provided valuable insights into the factors that affect their well-being. The findings underscore the need for tailored therapeutic strategies that address specific patient characteristics. Further research should focus on developing targeted interventions that consider these factors to enhance treatment outcomes and the overall quality of life for this demographic.

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Ethical approval

Data collection was conducted in accordance with the Declaration of Helsinki (The World Medical Association, 2018). In line with Polish law, no explicit ethical approval was required for this study, and therefore, an ethics committee was not approached.

Conflict of interest

The authors declare no conflict of interest.

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