Original Scientific Paper

QUALITY OF LIFE ASSESSMENT IN PATIENTS WITH LOWER LIMB AMPUTATION: A CROSS-SECTIONAL STUDY

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DOI: https://doi.org/10.65241/wh.8.2.7

For citation: Kosic M, Kriksic V, Ilic B, Ledinski S, Ozimec Vulinec S, Kovacevi I. Quality of life assessment in patients with lower limb amputation: A cross-sectional study. World of Health. 2025;2(8):53-58. DOI: https://doi.org/10.65241/wh.8.2.7

Received: 18 September 2025 | Revised: 6 November 2025 | Accepted: 2 December 2025

ABSTRACT

Background: Lower limb amputation is a major medical and public health concern, with consequences extending beyond the physical loss of a limb. Patients face substantial physical, emotional, and social challenges that significantly impact their quality of life. This study aimed to assess the impact of amputation on quality of life and to compare outcomes between younger and older patients.

Methods: A cross-sectional study was conducted at Dubrava University Hospital, including 30 patients (15 men, 15 women) who underwent lower limb amputation. The most common comorbidities were peripheral vascular disease and diabetes mellitus. Participants were divided into two age groups (18–65 years; ≥66 years). Data were collected using the WHOQOL-BREF questionnaire and the Social Support Scale. Descriptive statistics and the Mann–Whitney U test were applied.

Results: Older patients reported significantly poorer quality of life ($U = 21.00$, $p < 0.001$), reduced physical functioning ($U = 14.50$, $p < 0.001$), more pronounced negative emotional symptoms ($U = 47.50$, $p = 0.007$), and lower perceived social support ($U = 22.50$, $p < 0.001$). Pain levels declined over time, and satisfaction with rehabilitation programs was positive, with no significant differences between age groups.

Conclusions: Age is a key determinant of quality of life after amputation. Older patients face multiple challenges, underscoring the need for an individualized, multidisciplinary, and holistic rehabilitation approach that integrates medical, psychological, and social support.

Keywords: *Amputation; quality of life; older adults; rehabilitation; social support.*

INTRODUCTION

Lower limb amputation represents a serious public health issue associated with the increasing prevalence of chronic non-communicable diseases, particularly diabetes and peripheral arterial disease. Global incidence varies depending on the availability of healthcare and preventive measures. It is estimated that in developed countries, 1–3 amputations occur annually per 1000 patients with diabetes, whereas in developing countries, the rate is considerably higher (1). In Croatia, the data are equally concerning—during 2022, a total of 2249 diabetes-related amputations were recorded, representing a significant increase compared to the previous year (2). Particularly alarming is the amputation rate in eastern Croatia, which is nearly 2.2 times higher than in England, highlighting regional inequalities in prevention and rehabilitation (3). The most affected patients are older men with comorbid cardiovascular diseases, hyperlipidaemia, and smoking habits (4).

The most common causes of lower limb amputation include diabetes mellitus, peripheral arterial disease, trauma, infections, and malignant tumours, with most patients

presenting additional comorbidities that further complicate recovery (2,5–7). The consequences of amputation extend beyond the physical loss of a limb and include phantom pain, reduced functionality, psychological difficulties, and social isolation (8–10). In addition to physical limitations, amputation has a profound impact on emotional well-being, often leading to anxiety and depression, while stigmatization and reduced social participation further impair quality of life (11).

In contemporary medicine, quality of life is defined more than mere survival, encompassing the subjective perception of health, emotional well-being, social relationships, and functional capacity (12,13). According to the World Health Organization, quality of life refers to an individual's perception of their position in life in the context of their goals, expectations, and cultural background (14). Instruments such as SF-36 and WHOQOL-BREF allow for standardized measurement of these aspects and are frequently used in studies on amputation and rehabilitation (14,15). Given the increasing prevalence of amputations and their complex impact on patients' lives, there is a need for systematic research focusing on the physical, emotional, and social dimensions of adaptation. This study aimed to examine differences in quality of life between younger and older individuals following lower limb amputation, with particular emphasis on the role of nurses in monitoring functionality, addressing emotional difficulties, and providing support throughout the rehabilitation process.

METHODS

The study was conducted at the Department of Vascular and General Surgery, Dubrava University Hospital. A total of 30 participants were included, evenly distributed by sex (15 men and 15 women), all of whom had undergone lower limb amputation within the previous year or earlier. Participants were recruited during routine outpatient follow-up visits and rehabilitation procedures. Participation was voluntary, anonymous, and based on informed consent, and the study was approved by the institutional Ethics Committee.

Inclusion criteria were age ≥18 years, history of lower limb amputation, and ability to understand and independently complete the questionnaire. Exclusion criteria included: severe cognitive impairment or dementia, acute psychiatric conditions that prevented cooperation, inability to communicate verbally or in writing in the Croatian language, and refusal to participate.

Participants were divided into two groups: younger (18–65 years) and older (≥66 years) to compare quality of life, physical functionality, emotional state, and perceived social support.

ETHICAL ASPECTS

The study was approved by the Ethics Committee of Dubrava University Hospital. All participants were informed in advance about the objectives of the study and signed informed consent. Participation was voluntary, anonymous, and had no impact on subsequent healthcare. The study was conducted in accordance with the Declaration of Helsinki and its later amendments.

INSTRUMENTS AND STATISTICAL ANALYSIS

The research instruments included:

- WHOQOL-BREF (The WHOQOL Group, 1998), validated Croatian version, used to assess quality of life across four domains (physical health, psychological state, social relationships, and environment). Higher scores indicated better quality of life, and results were transformed to a 0–100 scale (16, 17).
- Social Support Scale by Šverko et al. (2007), adapted from Abbey, Abramis, and Caplan (1985), containing eight items on the availability of emotional and instrumental support. The total score ranged from 8 to 32, with higher scores reflecting greater perceived support (18, 19).
- Additional questions included pain intensity (numeric scale 0–10), presence of comorbidities, and experiences related to rehabilitation and changes in emotional state.

Statistical analysis was performed using SPSS software. To compare the two age groups, the Mann–Whitney U test was applied as a nonparametric method suitable for distributions deviating from normality. Statistical significance was set at $p < 0.05$.

The sample included all eligible participants (n = 30) who met the inclusion criteria during the study period; therefore, a formal power analysis was not conducted. The internal consistency of the instruments was satisfactory (WHOQOL-BREF domains $\alpha = 0.83–0.89$; Social Support Scale $\alpha = 0.91$). Missing responses (<5%) were handled using the pairwise deletion method. Normality was verified by the Shapiro–Wilk test, which indicated non-normal data distribution ($p < 0.05$). Accordingly, the Mann–Whitney U test was applied as an appropriate nonparametric alternative for group comparisons.

RESULTS

A total of 30 participants (15 men, 15 women) who had undergone lower limb amputation within the previous year or earlier were included. Participants were stratified into two age groups: younger (18 - 65 years) and older (≥66 years). The analysis aimed to examine differences in post-amputation adaptation between these groups.

Table 1. Sociodemographic characteristics of participants

Sociodemographic characteristics		n	%
Sex	Male	15	50%
	Female	15	50%
Age	18-65	16	53.3%
	≥66	14	46.7%
Education	Primary school	3	10.00%
	Secondary school	13	43.30%
	Higher education/ University	14	46.70%
Place of residence	Village	3	10%
	Small town (<5,000 inhabitants)	4	13.3%
	Medium town (5,000–50,000 inhabitants)	8	26.7%
	City (>50,000 inhabitants)	15	50%
Employment status	Homemaker	2	6.7%
	Employed	12	40%
	Unemployed	2	6.7%
	Retired	14	46.7%
Marital status	Single	4	13.3%
	Married	16	53.3%
	Cohabiting/Partnered	2	6.7%
	Widowed	8	26.7%
Financial status	Below average	11	36.7%
	Average	14	46.7%
	Above average	5	16.7%

Description: Participants were evenly distributed by sex and age. The largest proportion had higher education, and half lived in urban areas. Most were either retired or employed, while their financial status was predominantly self-assessed as average.

Table 2. Time since amputation

Time since amputation	Frequency	%	Cumulative %
1-11 months	15	50.0	50.0
≥1 year	15	50.0	100.0
Total	30	100.0	

Description: Half of the participants had undergone amputation within one year before the study, while the other half had a longer post-amputation period.

Table 3. Quality of life of participants (World Health Organization Quality of Life Questionnaire – Short Form, WHOQOL-BREF)

	n	Min.	Max.	Percentiles		
				25th	50th (Median)	75th
WHOQOL-BREF PHYS	30	35.71	85.71	50.00	62.50	71.43
WHOQOL-BREF PSYCH	30	37.50	87.50	58.33	68.75	79.17
WHOQOL-BREF SOCIAL	30	16.67	100.00	50.00	62.50	83.33
WHOQOL-BREF ENVIR	30	31.25	96.88	53.12	68.75	81.25

Note: A Higher score indicates better quality of life.
Note: WHOQOL-BREF domains: PHYS – Physical health; PSYCH – Psychological health; SOCIAL – Social relationships; ENVIR – Environment.

Description: The highest values were observed in the psychological domain, while physical health was rated somewhat lower. All quality-of-life domains showed significantly above-average scores.

Table 4. Differences in quality of life between the two groups of participants: Mann-Whitney U test.

Age group	n	Median	P25	P75	Mann-Whitney U	p
18–65 years	16	75.00	68.75	81.25	21.00	<0.001
≥66 years	14	56.25	50.00	62.50		

Note: Mann–Whitney U = 21.00, Z = –3.785, p < 0.001.

Description: According to the Mann–Whitney U test (U = 21.00, Z = –3.785, p < 0.001), younger participants (18–65 years) reported significantly higher quality-of-life scores compared to older participants (≥66 years).

Table 5. Most common comorbidities

Comorbidity	n	%
Peripheral vascular disease	20	66.7
Diabetes mellitus	17	56.7
Visual impairment	12	40.0
Hypertension	9	30.0
Reduced mobility	9	30.0
Other	6	20.0

Description: The most frequently reported comorbidities were peripheral vascular disease and diabetes mellitus, followed by visual impairment, hypertension, and reduced mobility.

Table 6. Differences in emotional state and social support by age group

Variable	Age group	Median	Mann–Whitney U	p
Emotional state	18–65 years	4.0	47.50	0.007
	≥66 years	3.0		
Social support (0–32)	18–65 years	29.0	22.50	<0.001
	≥66 years	24.0		

Note: Emotional state: Mann–Whitney U = 47.50, Z = –2.694, p = 0.007. Social support: Mann–Whitney U = 22.50, Z = –3.740, p < 0.001.

Description: Younger participants reported significantly better emotional state and higher perceived social support compared to older participants.

DISCUSSION

Previous studies have shown that age and general health status are important predictors of quality of life among individuals with amputation (20). The findings of this study confirm that older participants experience a lower quality of life compared to younger ones, highlighting the need for rehabilitation to address not only the physical component (e.g., walking with a prosthesis) but also psychological and social support, particularly for older patients. This result is consistent with earlier research emphasizing the vulnerability of the elderly population and the necessity of an individualized rehabilitation approach (21).

Our study also demonstrated that amputation has a significant impact on functional independence. Almost 37% of participants reported substantial limitations in performing daily activities, while younger participants achieved significantly better physical functioning outcomes compared to older participants (U = 14.50; p < 0.001). These findings align with previous studies that have identified age, the presence of comorbidities, and cognitive abilities as key predictors of functional outcomes (22).

Pain intensity showed a clear pattern of decline over time, which corresponds to literature describing the natural course of postoperative pain (23, 24). However, some participants continued to report significant pain even one year after amputation, indicating the need for an additional multidisciplinary approach, including psychological intervention.

Negative emotional states were present in a portion of participants, with older individuals showing more pronounced symptoms compared to younger ones (U = 47.50; p = 0.007). These results confirm that amputation entails not only physical but also significant psychological consequences, consistent with previous studies reporting high rates of depression and anxiety in this population (25). Psychological support and participation in rehabilitation programs are, therefore, key elements of successful adjustment.

Social relationships and support networks emerged as important protective factors. Most participants did not experience changes in family relationships, while some even reported improvements. These findings align with literature emphasizing the role of family and close social ties in the adaptation process (26, 27). Satisfaction with healthcare professionals' support was also rated highly, which is highlighted as another important factor for successful rehabilitation (28). Most participants used prostheses or other assistive devices, and previous studies have shown that assistive technology contributes to improved functionality and quality of life (29).

In this study, 70% of participants took part in rehabilitation programs, with overall high satisfaction and no significant differences between age groups. This suggests that rehabilitation has a positive effect on all patients, consistent with literature confirming its importance for improving functional abilities and psychosocial adjustment (30-34).

A particularly important finding relates to the perception of social support. Younger participants reported significantly higher levels of support compared to older ones ($p < 0.001$), consistent with the assumption that older individuals are more likely to experience social isolation. This underscores the need to develop programs that encourage social inclusion and intergenerational support.

Based on the results of this study, it can be concluded that the quality of life of individuals with lower limb amputation is determined by a complex combination of physical, emotional, and social factors. Future research should further explore differences in quality of life with respect to the cause of amputation (diabetes, trauma, vascular disease), as well as identify specific forms of social and psychological support that have the greatest impact on adaptation and subjective well-being.

LIMITATIONS OF THE STUDY

This study has several limitations that should be considered when interpreting the results. First, it was conducted on a relatively small sample of 30 participants from a single healthcare institution, which limits the generalizability of the findings to the wider population. Second, as a cross-sectional study, it does not allow for monitoring changes over time or establishing causal relationships. Third, self-report questionnaires were used, which may be subject to response bias and the influence of participants' current emotional state. In addition, this study did not analyse the differences in quality of life in detail based on the cause of amputation (e.g., diabetes, trauma, vascular disease), which could provide further insights into the specific needs of different patient groups. Despite these limitations, the findings provide valuable insights into the factors shaping the quality of life of individuals with lower limb amputation and highlight areas where targeted health and social interventions are needed.

CONCLUSION

The results of this study demonstrate that lower limb amputation significantly affects patients' quality of life, with older participants representing a particularly vulnerable group. They were more likely to report lower levels of physical functioning, more pronounced negative emotional states, and weaker perceived social support compared to younger participants. Although pain decreased over time in most cases, its persistence and psychological burden in some patients highlight the need for long-term multidisciplinary management.

The findings emphasize the importance of comprehensive rehabilitation programs that address not only the physical but also the psychological and social dimensions of care. Special attention should be directed toward older patients, who face greater challenges in adaptation. The integration of medical and psychological support, promotion of social inclusion, and provision of accessible rehabilitation services can substantially improve the quality of life for individuals after amputation. Future research should focus on the differences in quality of life related to the cause of amputation and on identifying interventions best suited to the needs of different age groups.

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