

Research article

Quality of Life in Patients Diagnosed with Avascular Osteonecrosis

Lucian Ion Stanciu^{1,4}, Corneliu Dan Blendea^{2,5*}, Adrian Cursaru^{1,3}, Bogdan Crețu^{1,3}, Doroteea Teoibaș-Șerban⁵, Cătălin Cîrstoiu^{1,3}

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- 1 University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania;
- 2 Titu Maiorescu University, Faculty of Medicine, Bucharest Romania; danblendea@gmail.com
- 3 Orthopedics and Traumatology, University Emergency Hospital, Bucharest, Romania;
- 4 Orthopedics and Traumatology, Ilfov County Clinical Emergency Hospital, Bucharest, Romania;
- 5 Medical Rehabilitation, Ilfov County Clinical Emergency Hospital, Bucharest, Romania;

* Correspondence: danblendea@gmail.co;

Abstract: Aseptic osteonecrosis has a significant and multidimensional impact on patients' quality of life, affecting physical function, psycho-emotional balance, and social integration. Its insidious progression can lead to a gradual deterioration in the perception of health status and overall quality of life. The present study evaluated a cohort of 60 patients diagnosed with aseptic osteonecrosis, in order to assess the disease's impact on quality of life, regard-less of the treatment approach (conservative or surgical). Patients completed a standard-ized questionnaire assessing their perception of quality of life. The results highlighted the need for a patient-centered therapeutic approach, in which quality of life evaluation is integrated as a key parameter in medical decision-making, as a purely technical approach is insufficient. Restoration of motor function, psycho-social re-integrations, and enhancement of self-esteem are essential components of successful treatment.

Keywords: osteonecrosis, quality of life, questionnaire

1. Introduction

Aseptic bone osteonecrosis has a major impact on quality of life, affecting its social, emo-tional, and professional dimensions. Between 10000 and 20000 new cases are reported annually in the United States alone[1]. This debilitating condition typically affects individ-uals in their 40s and 50s and, if left untreated, can lead to complete bone destruction. It most commonly occurs in the femoral head, knee, talus and humeral head [2]. The medi-cal literature includes limited studies focusing on quality of life assessment in patients with osteonecrosis. A study conducted in Brasil[3] on a cohort of 40 patients aged between 32 and 45 years old, who underwent hip surgery, reported a significant improvement in the Harris Hip Score (HHS), from a preoperative average of 20.36 to 96.15 postoperatively. Surgical treatment resulted in improved mobility, increased self-confidence and inde-pendence, and an overall enhancement of bone function in the immediate postoperative period.

Avascular necrosis occurring in the context of another debilitating chronic condition has a significant impact on quality of life, both through the impact of the primary disease and its treatment, and through the disabling nature of bone involvement. A study conducted in Nigeria [4] highlighted that quality of life encompasses the ability to perform daily activi-ties such as attending school or work, and caring for family- all significantly affected by the disease. The study, which included 80 patients with Sickel Cell Disease (SCD), found that their quality of life was markedly

lower compared to the general population. Pain was identified as a key factor contributing to physical deterioration and impaired social interactions.

Sociodemographic variables such as gender, marital status and level of education were also shown to be important determinants of quality of life in patients with chronic illnesses, including SCD. These findings are emphasizing that if there is a better understanding of the disease, the adoption of a healthy lifestyle, and emotional support from a partner can foster a more positive perception of the illness.

This article includes a specific direction aimed at the multidimensional assessment of quality of life in patients with avascular necrosis, using an integrative approach that considers functional, social, and emotional dimensions. The underlying premise is that the effectiveness of a treatment cannot be fully measured through objective parameters alone (such as radiological or biomechanical data), but must also incorporate the patient's subjective perception of their functional capacity and adaptability.

This approach allows for the evaluation not only of the patient's current status, but also for the identification of predictive clinical-psycho-social patterns, which are valuable for establishing therapeutic interventions and anticipating multidisciplinary support needs.

The specific objectives of this research direction are:

- To assess the overall quality of life score in patients with aseptic osteonecrosis.
- To determine the degree of impairment in the psycho-emotional, social, and functional domains.
- To identify correlations between age, gender, and individual domain scores.

2. Methodology

This research was conducted as a descriptive, cross-sectional, observational study aimed to evaluate the quality of life in patients diagnosed with aseptic osteonecrosis. The study was conducted for 12 months (2023-2024) and included patients with various stages of aseptic bone necrosis, evaluated during routine follow up visits. Participants had undergone either surgical treatment or conservative management.

A total of 60 patients were enrolled based on implicit informed consent, expressed by completing the quality of life questionnaire. They were invited to participate by filling out a questionnaire developed in our hospital, aligned with internationally validated instruments (WHOQOL-BREF [5], Oxford Hip Score [6,7], SF-36[8], EQ-5D[9, 10]).

The inclusion criteria for the study were:

- Confirmed diagnosis of aseptic osteonecrosis based on imaging (MRI,X-ray) and clinical criteria;
- Age $\geq$ 20 years
- At least 3 months of initiated treatment to ensure relevant post-therapy quality of life assessment
- Independent and complete questionnaire completion.

The exclusion criteria were:

- Cognitive impairment or major neurological disorders affecting response accuracy (e.g., stroke, dementia);
- Untreated major psychiatric disorders (e.g., active schizophrenia, severe depression);
- Disabling comorbidities (e.g., severe rheumatologic conditions);
- Non-compliance or refusal to participate.

The questionnaire consisted of seven items, each clearly and coherently formulated to address one of the core dimensions of quality of life: Emotional state – psychological impact of the disease, including negative emotions, anxiety, and adaptability, Family support – assessment of the support network, encompassing affection, assistance, and communication, Social integration – the extent of participation in social activities, quality of interpersonal interactions, and ability to maintain social relationships, Daily mobility – physical ability to move independently, Level of independence – capacity for self-care and performance of routine daily activities without assistance, Sleep quality – indirectly reflecting both emotional and physiological well-being, Overall life perception – overall satisfaction and ability to maintain an active lifestyle.

Responses were rated on a five-point scale (table 1), where 1 – indicates the patient is unaffected and perceives their condition as very good and 5 – indicates severe impairment.

The total score ranged from 7 to 35 points, with higher scores reflecting greater impairment.

Score	Interpretation	Main Recommendations
7 – 14	Very good quality of life	Maintain current recommendations, lifestyle, and level of social and physical activity.
15 – 24	Moderately impaired quality of life	Requires evaluation and psychological counseling, medical rehabilitation methods including physiotherapy, and regular clinical reassessments.
25 – 35	Severely impaired quality of life	Requires complex intervention, multiple sessions of evaluation and psychological counseling, social integration, and family support.

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Table 1 - Quality of Life Score Interpretation

In developing our own instrument for assessing quality of life in patients with aseptic osteonecrosis, we aimed to integrate both the conceptual and methodological dimensions used in the most widely applied and validated international questionnaires in this field (figure 1).

Questionnaire for Assessing Quality of Life in Patients with Aseptic Osteonecrosis

The questionnaire is anonymous, complies with current ethical standards, and completion represents your consent for the scientific and statistical processing of the provided data.

Sex: F ☐ M ☐
 Age group: 20–40 years ☐ 41–60 years ☐ >60 years ☐
 Treatment: Surgical ☐ Conservative ☐

Evaluation scale (applies to the following questions):
 Please select for each question a score between 1 and 5, where:
 1 – Not at all / not affected
 2 – Slightly
 3 – Moderately
 4 – Highly
 5 – Very much / extremely affected

1. To what extent has your health condition affected your emotional state in the last month?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
2. How supported have you felt by your family or close ones during the post-treatment period?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
3. To what extent are you able to participate in social activities (e.g., meetings, hobbies, events)?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4. How easy is it for you to move around in daily activities (e.g., walking, climbing stairs, going outside)?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
5. How dependent are you on assistance from others for daily activities?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
6. How satisfied are you with your sleep quality in the last month?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
7. To what extent do you consider yourself able to lead an active and pleasant life despite your condition?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Figure 1 - Quality of Life Questionnaire

The structure and content of the questionnaire were developed with reference to established tools such as the WHOQOL-BREF, Oxford Hip Score (OHS), SF-36 (Short Form-36 Health Survey), and EQ-5D, each addressing quality of life components from different perspectives. The WHOQOL-BREF (developed by the World Health Organization) served as a reference model for formulating the psycho-emotional and social items in the questionnaire administered to patients [11,12].

Its dimensions – psychological health, social relationships, and environment – were adapted in the questionnaire items to reflect family support, social integration, and the patient's overall emotional state.

For functional assessment, we incorporated principles from the Oxford Hip Score (OHS), recognized for its ability to measure pain and physical limitations in performing daily activities [13, 14]. The questionnaire items addressing mobility (e.g., climbing stairs, walking short distances) and the degree of dependence in everyday life reflect this focus, highlighting the impact of joint dysfunction on the patient's quality of life.

The SF-36 questionnaire also formed the basis for defining the general evaluation framework. The overall score in the present questionnaire, obtained by summing the responses to each item, is an adaptation of the SF-36 methodology [15, 16]. In particular, the SF-36 dimensions “physical functioning,” “emotional role,” and “mental health” were incorporated here as questions on sleep, emotional balance, and perception of living an active life.

In addition, the questionnaire reflects principles of the EQ-5D [17], which provides a rapid but effective evaluation of five essential domains in quality of life assessment: mobility, self-care, performance of usual daily activities, pain/discomfort, and anxiety/depression. Patient questions on the degree of independence, difficulties in daily activities, and level of emotional impact were adapted to the realities and needs of patients with aseptic osteonecrosis, whether in recovery or adapting after treatment.

Therefore, the questionnaire developed here is not a simplified version of existing instruments, but a selective integration of them into the specific context of bone disease, aiming to capture the complexity of the patient's experiences and limitations.

For organizing and centralizing the data collected with the questionnaire, a statistical database was created in Microsoft Excel, structured to include both demographic data (age, sex, type of treatment) and individual responses to each of the seven questions, along with the automatically calculated total score for each patient.

This database allowed for efficient systematization of the information obtained from the 60 participants in the study, enabling subsequent statistical processing and comparative analysis of the results.

For the descriptive and inferential statistical analysis, we used specialized software such as IBM SPSS Statistics to perform: calculation of means, frequencies, and standard deviations, group comparison tests, Spearman correlations.

3. Results:

The data were statistically analyzed to outline the demographic profile of the subjects and their distribution by key study variables.

The sample showed a relatively balanced distribution between males and females, with a slight male predominance. This finding is consistent with the literature, which reports a higher incidence of osteonecrosis in men, particularly in cases associated with chronic alcohol use or corticosteroid therapy.

Most patients were aged 41–60 years, the peak of professional activity, where the disease has major functional and social impact. Cases over 61 years remained significant, suggesting the cumulative effect of metabolic and degenerative risk factors.

About 20% of patients reported very good quality of life, reflecting good post-treatment adaptation. Half of the patients had moderately impaired quality of life, suggesting partial functional or emotional limitations. The remaining 30% reported severely impaired quality of life, highlighting the need for complex interventions and multidisciplinary support. This distribution is consistent with international data, where osteonecrosis often has a major impact on functionality and social integration, particularly in surgically treated or advanced cases.

The distribution of patients by treatment was balanced, with a slight predominance of surgical cases, reflecting current clinical practice in advanced stages of disease.

The overall mean quality of life score was 22.77 (median 22.0; SD 7.84), indicating a moderate impact. Women reported higher mean scores (23.58 vs. 21.78 in men), suggesting greater perceived impairment. By age, patients ≥ 61 years showed the highest mean scores (25.11), consistent with a more pronounced decline due to cumulative functional limitations, comorbidities, and social factors.

In summary, quality of life was moderately affected in the study group, with more severe impairment observed in women and older patients.

Patients who underwent surgical treatment had lower mean quality of life scores, indicating a very good outcome. In contrast, those managed conservatively (anti-inflammatory medication, local infiltrations, or rehabilitation procedures) showed higher mean scores, reflecting greater physical and social impairment.

These results align with existing literature, showing that surgical interventions, when properly indicated and performed at the right disease stage, lead to faster recovery of joint function, mobility, pain reduction, and socio-professional reintegration. This supports the study hypothesis that treatment type is a relevant predictor of quality of life in aseptic osteonecrosis.

Among the 36 surgically treated patients, quality of life outcomes varied:

- 16.7% reported very good quality of life, suggesting full functional recovery and good psychosocial adaptation.
- 47.2% had moderately impaired quality of life.
- 36.1% reported severely impaired quality of life, despite surgery.

Surgical treatment in aseptic osteonecrosis, although effective in restoring joint biomechanics, does not uniformly ensure improved quality of life. Nearly half of operated patients continue to experience moderate dysfunction, while over one-third report severe impairment. These outcomes highlight the strong influence of individual factors—disease stage, comorbidities, psychosocial support, and access to rehabilitation—on postoperative recovery. The findings emphasize the need for a multidisciplinary approach, integrating surgery with psychological support, structured physical rehabilitation, and lifestyle management, to optimize quality of life outcomes.

In conservatively treated patients, only 6.7% reported very good quality of life, confirming that this approach rarely leads to complete recovery. More than half (53.3%) experienced moderate impairment, while 40% reported severe deterioration, highlighting persistent functional and psychosocial limitations. These findings support the hypothesis that surgical treatment generally provides superior quality of life outcomes compared to conservative management, particularly in functional recovery and pain reduction. However, the significant proportion of moderate or severe scores in both groups underlines the multifactorial nature of quality of life perception.

Thus, aseptic osteonecrosis treatment should not be viewed solely as a surgical act, but rather as part of a multidisciplinary, patient-centered approach including psychological support, structured physical rehabilitation, patient education, and active family involvement.

Men more often reported a “very good” quality of life, suggesting a more optimistic perception of health and recovery. In contrast, women tended to report severe impairment, reflecting greater sensitivity to mobility limitations, pain, and psychosocial impact. Moderate impairment was distributed relatively equally between sexes. These findings are consistent with the literature, which documents sex-related differences in musculoskeletal and osteoarticular diseases, with women more frequently reporting higher pain and discomfort scores and greater emotional burden.

The results emphasize the need for a sex-sensitive approach in managing aseptic osteonecrosis, including tailored psychological support, early therapeutic education, and individualized rehabilitation programs.

Spearman’s test was applied to assess the association between age and total quality of life scores. Although a slight trend toward higher scores with increasing age was observed (Spearman = 0.148; $p = 0.260$), no statistically significant correlation was found.

The Kruskal-Wallis test was used to evaluate patient responses regarding perceived family support after treatment. Results showed a statistically significant difference between groups ($H = 45.44$; $p < 0.0001$). Patients with severely impaired quality of life reported higher (negative) scores, indicating reduced perceived family support compared to those with better outcomes.

Patients with good quality of life reported lower scores, reflecting adequate perceived family support. This highlights a direct link between poor quality of life and insufficient physical or emotional support, underlining the crucial role of family involvement in recovery.

The Kruskal-Wallis test applied to mobility-related responses showed significant differences among the three quality of life groups (very good, moderately impaired, severely impaired). This indicates that limitations in daily mobility strongly influence perceived quality of life in patients with aseptic osteonecrosis.

The results (figure 2) showed a statistically significant difference ($H = 41.51$, $p < 0.0001$), confirming that mobility perception is closely linked to overall quality of life. This finding is consistent with the literature, which reports that patients with major difficulties in daily activities (e.g., climbing stairs, walking) tend to have a negative perception of their health and social integration. It highlights the need for both objective and subjective functional assessment and supports targeted therapeutic interventions, such as personalized physio-therapy programs, to improve autonomy.

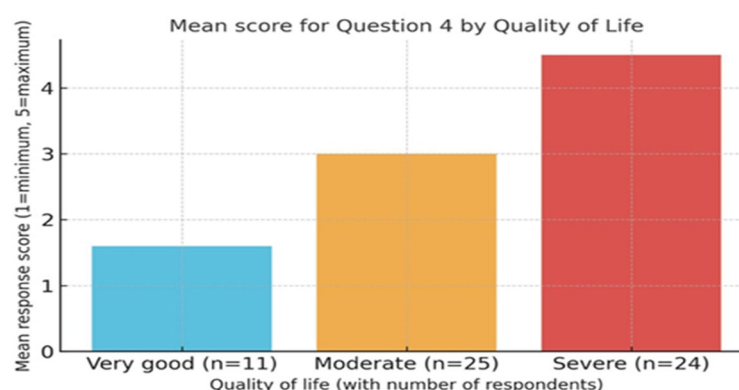


Figure 2 - Mean score for Question 4

Regarding dependence on others for daily activities, the Kruskal-Wallis test revealed highly significant differences ($H = 45.20$, $p < 0.0000000002$), indicating a strong association between dependence and reduced quality of life.

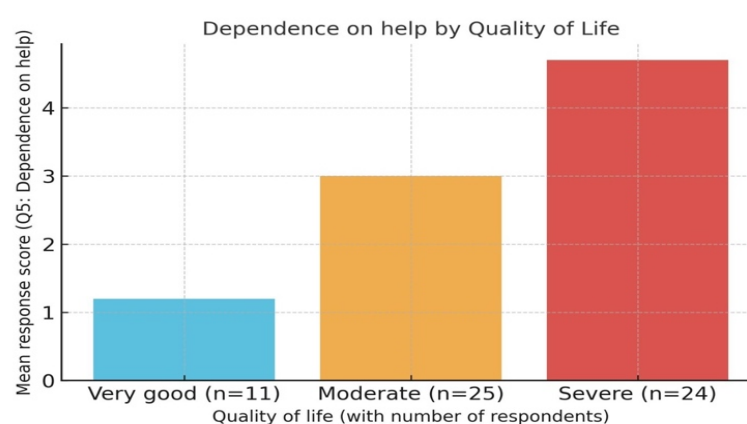
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Figure 3 - Positive correlation between the dependence score (Question 5) and the overall quality of life score.

Additionally, Spearman's test applied to Question 6 ("How satisfied are you with your sleep quality in the last month?") revealed a significant positive correlation ($\rho = 0.922$, $p < 0.05$), confirming the association between sleep quality and global quality of life perception (figure 4).

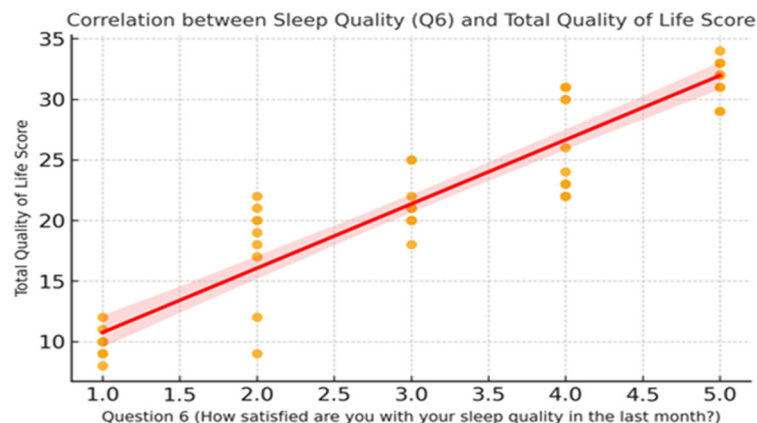


Figure 4 - Correlation between sleep quality and overall quality of life score

This causal relationship between mean scores of sleep quality and overall score highlights the critical role of sleep quality in shaping the perception of overall quality of life. It is evident that sleep disturbances may adversely affect psycho-emotional status, physical rehabilitation capacity, social integration, and daily autonomy.

The final questionnaire item assessed the patient's perception of their ability to maintain an active and enjoyable life despite their bone condition: "To what extent do you consider yourself able to lead an active and pleasant life despite your condition?". Results demonstrated a very strong and statistically significant correlation (Spearman's $\rho = 0.827$, $p < 0.000000000000000037$) - as seen in figure 5.

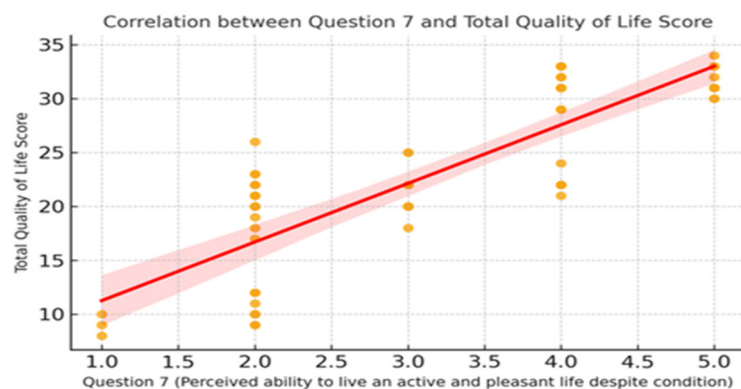


Figure 5 - Correlation between Q7 quality and overall quality of life score

4. Conclusion

This study emphasizes the necessity of a patient-centered approach in aseptic osteonecrosis, moving beyond a purely structural or medical perspective. The specifically designed quality-of-life questionnaire highlighted key negative determinants: functional dependence, sleep disturbances, mobility limitations, and the perceived ability to maintain an active lifestyle. Family support showed a strong association with emotional stability and disease adaptation. Notably, surgical treatment, while improving functionality, did not necessarily enhance patients' perception of quality of life, underlining the importance of subjective dimensions. The findings suggest future validation of the questionnaire on larger, multicenter cohorts, as well as its integration into digital platforms for longitudinal monitoring. The central conclusion is that subjective quality-of-life assessment should be considered an essential parameter in the comprehensive management of aseptic osteonecrosis.

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