

QUALITY OF LIFE AMONG GERIATRIC PATIENTS BEFORE AND AFTER TOTAL KNEE ARTHROPLASTY

Oana HĂRȘAN¹, Patricia-Maria CRIȘAN-MĂLĂNCRĂVEAN², Tiberiu-Andrei CONSTANTIN¹, Alexandra-Camelia BAHAR^{1, 3*}

¹ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, Romania

² Municipal Hospital of Sighisoara, Romania

³ County Clinical Emergency Hospital of Targu Mures, Romania

*Corresponding author: alexandra.bahar@umfst.ro

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Abstract. Total knee arthroplasty is an essential orthopaedic procedure and understanding its impact on the quality of life of geriatric patients is important for improving clinical practice and rehabilitation outcomes. The main hypothesis from which we started this research was that the quality of life of geriatric patients diagnosed with gonarthrosis is strongly affected, and performing total knee arthroplasty surgery leads to a significant increase in it. Twenty gonarthrosis-diagnosed patients, aged 65-75 years old, admitted to the Orthopaedics and Traumatology Clinical Department of the County Clinical Emergency Hospital of Targu Mures, were subject to our research. All participants completed a twenty-eight-item questionnaire regarding their general health, physical activities, pain level, vitality, social functioning and mental health, before and after a total knee arthroplasty surgery. The initial assessment proved that gonarthrosis has a major negative impact on quality of life. A comparison of the initial and final assessments showed statistically significant improvements in physical activity ($p < 0.001$), pain level ($p < 0.0001$), and general health and mental status ($p < 0.001$). The main hypothesis was confirmed, as follows: total knee arthroplasty has a strong influence on the quality of life and the mental state of geriatric patients, reducing knee pain, improving physical activity and decreasing movement restriction.

Keywords: total knee arthroplasty; quality of life; geriatrics.

Introduction

The knee is the most common site of arthritis, a common joint pathology, especially with the increasing prevalence of obesity and increasing life expectancy of the population. Increasing age is an important risk factor; 13% of women and 10% of men aged 60 years or older develop symptomatic gonarthrosis of the knee. These data highlight the major impact of ageing and other risk factors developing gonarthrosis (Kawano et al., 2015; Jang et al., 2021). There is a discrepancy in the number of cases regarding gender distribution, as gonarthrosis tends to occur more frequently in women (Allen & Golightly, 2015). Disregarding age and gender criteria, the incidence of symptomatic gonarthrosis of the knee is 240 cases per 100,000 people, each year (Hsu & Siwiec, 2023; Arden et al., 2018).

Total knee arthroplasty is a procedure that can benefit pain relief and improved joint function, targeting certain principles, such as restoring limb alignment, achieving proper soft tissue balance, correct implant alignment, and improving range of motion (Wainwright & Kehlet, 2022). Understanding its impact on the quality of life of geriatric patients is important for improving clinical practice and rehabilitation outcomes.

Quality of life is influenced by an individual's state of health, both mental and physical, while at the same time, contributing factors such as family and socio-professional factors intervene. The literature reports that up to 30% of patients have dissatisfaction that is directly related to their quality of life, which they consider to be insufficient. Their quality of life depends on many physical, behavioural, social, and psychological factors, which are not

accounted for by functional outcome scores. In the 1990s, different scales and scores were introduced to assess quality of life and joint function, in addition to objective data collected by surgeons (pain, mobility, stability, etc.), complication rate, and implant survival rate (Canovas & Dagneaux, 2018).

Pain assessment scores reflect patients' perspectives and experiences in evaluating surgical outcomes. Over the past 20 years, these scores have played a decisive role in public health. The meta-analysis by Shan et al. (2015) indicated that postoperative mid- and long-term quality of life scores were significantly improved compared with preoperative scores, with a satisfaction rate of 75% at five years postoperatively.

Thus, the starting point for conducting the study was the existence of a genuine clinical resonance specific to gonarthrosis, in relation to the existence of functional limitation given by painful symptomatology. In this way, the quality of life of the patients concerned is significantly affected (Arden et al., 2018). In a similar vein, we aimed to perform a comparative symptomatologic and functional evaluation, pre- and postoperatively, in order to emphasize the postsurgical results in the patients included in the study.

The main hypothesis from which we started this research was that the quality of life of geriatric patients diagnosed with gonarthrosis is strongly affected, and performing total knee arthroplasty surgery leads to a significant increase in it.

Materials and methods

Our prospective observational research was done through the following methods: the bibliographic study method, the observation method, the measurement and recording method, the questionnaire and survey method, the comparison method, the statistical-mathematical processing method, and the graphic method.

Twenty gonarthrosis-diagnosed patients, aged 65-75 years-old, admitted to the Orthopaedics and Traumatology Clinical Department of the County Clinical Emergency Hospital of Targu Mures, were subject to our research. From this, eight were males and twelve were women. Follow-up and evaluation of patients in the current prospective study was conducted from January 2024 through May 2024.

All subjects included in the present research gave informed consent and signed the consent statement. The entire study complied with the recommendations of the Declaration of Helsinki and the study protocols were approved by the Scientific Research Ethics Committee of the George Emil Palade University of Medicine, Pharmacy, Sciences and Technology, by Decision no. 2636 from 8 December 2023 and by the Medical Ethics Commission for the Clinical Study of Medicinal Products of the County Clinical Emergency Hospital of Targu Mures, by Decision no. 29002 from 27 October 2023.

Our research included geriatric patients aged 65-75 years, hospitalized with the diagnosis of gonarthrosis and undergoing total knee arthroplasty. From this study were excluded subjects who refused participation in the study, subjects who had undergone other surgery within the last six months, and subjects with other associated pathologies (e.g., cardiologic, respiratory, etc).

All participants completed a twenty-eight-item questionnaire regarding their general health, physical activities, pain level, vitality, social functioning, and mental health, before and after a

total knee arthroplasty surgery. The application of the patient quality of life questionnaires was performed as part of an initial in-hospital, preoperative assessment, followed by a secondary assessment of patients in the postoperative period, after exactly ninety days, by telephone call.

In our study, we applied a questionnaire similar in model to the SF 36, which included 28 questions related to general health status, limitations in daily physical activities, pain, social function, vitality, affective function, mental health, for the purpose of a comparative pre- and postoperative evaluation of the patients.

Results

The study followed the health status in the pre- and postoperative period; the distribution of the responses of the patients in the group is represented in Table 1.

Table 1. *Pre- and postoperative health distribution*

Health status	Preoperative	Postoperative
Excellent	0 (0%)	4 (20%)
Very good	0 (0%)	6 (30%)
Good	4 (20%)	10 (50%)
Mediocre	12 (60%)	0 (0%)
Poor	4 (20%)	0 (0%)

We followed the health status of the twenty patients after surgery. The results (Figure 1) showed the following: twelve patients (60%) reported better than usual health, eight patients (40%) reported slightly better than usual health compared to before surgery, and no patient reported the same as usual status or worse than usual health at present.

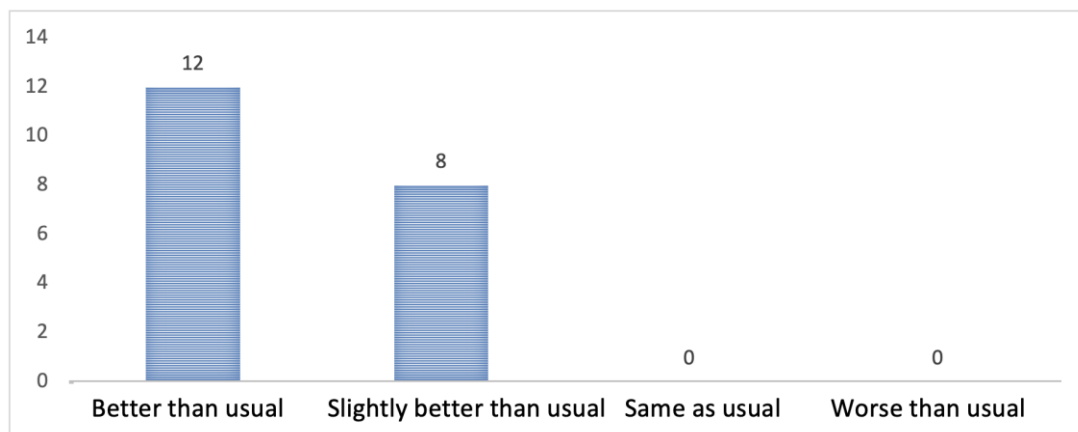


Figure 1. Health improvement after surgery

Figure 2 shows the distribution of pain intensity, on a scale from 0 to 10, before and after surgery. The limitation of daily activities was also followed, obtaining the following data preoperatively (Figure 3) and postoperatively (Figure 4): no patient reported zero lack of limitation preoperatively; one patient (5%) reported small daily activities limitation preoperatively; nineteen patients (95%) reported significant limitation preoperatively; seven patients (35%) reported a zero lack of limitation postoperatively; thirteen patients (65%)

reported small limitation postoperatively; no patient reported significant postoperative limitation.

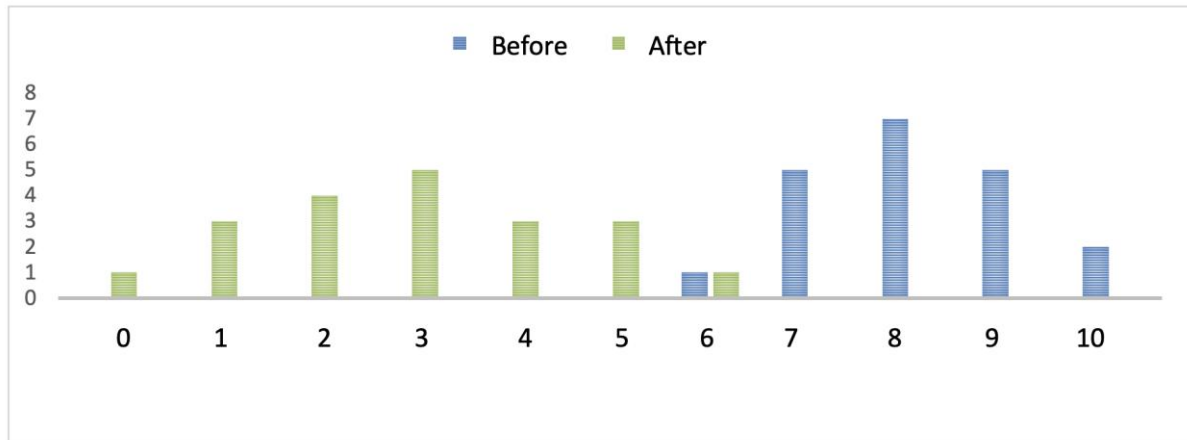


Figure 2. Pain intensity before and after surgery

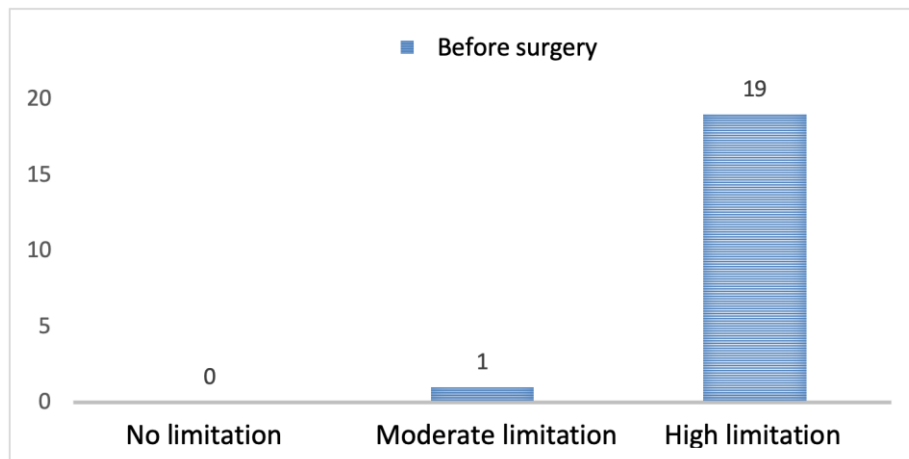


Figure 3. Preoperatively limitations of daily activity

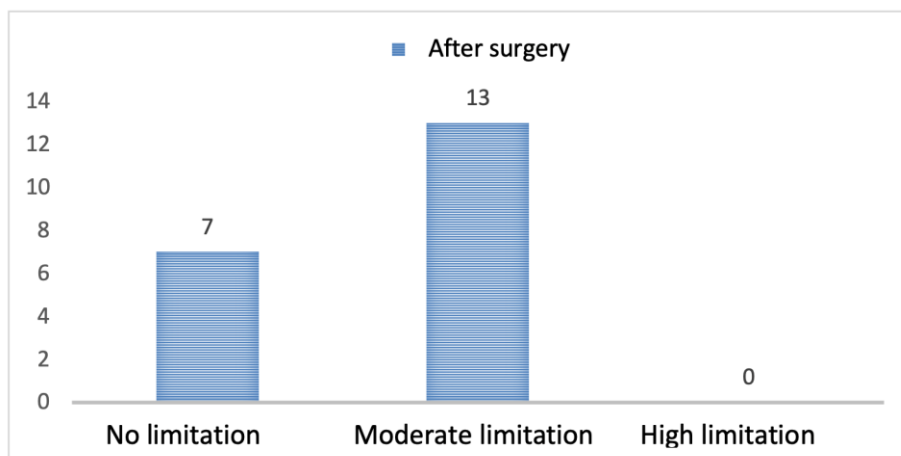


Figure 4. Postoperatively limitations of daily activity

When analysing the impact of knee pain on daily activities preoperatively and postoperatively the data indicate a significant change in the perception of knee pain and its impact on daily activities (figure 5).

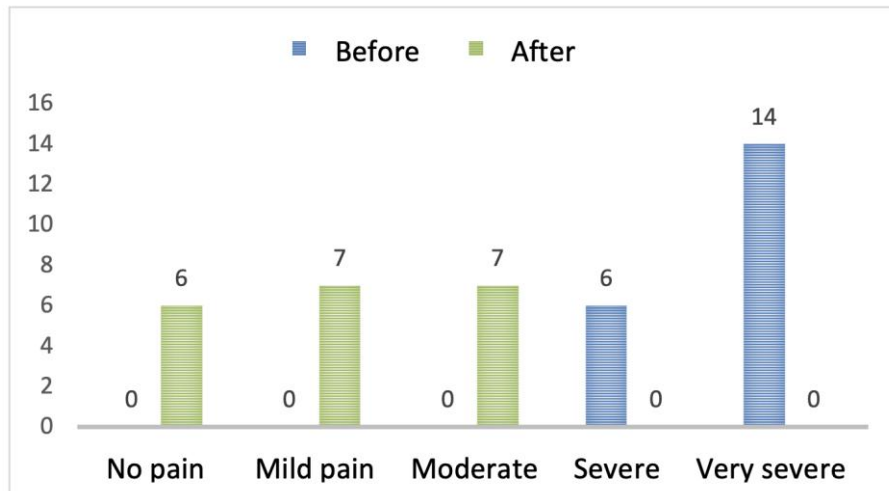


Figure 5. Pain's influence on daily life activities, before and after surgery

Following knee surgery, the data shown in Figure 6 indicate a significant change in patients' perception and impact of pain. Out of the twenty participants, eighteen (90%) observed a significant decrease in pain after surgery, while two (10%) did not report the same improvement.

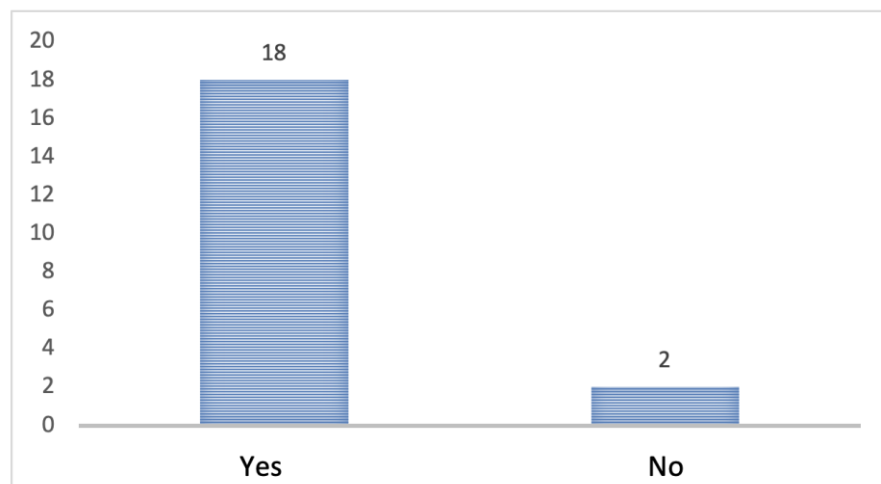


Figure 6. Pain presence after surgery

Following the analysis of the data collected, highlighted in Figure 7, the following results were observed: preoperatively, eighteen patients (90%) reported limitations in work or other activities, while two patients (10%) did not report such limitations. Postoperatively, the number of patients who reported limitations decreased to six (30%), while fourteen patients (70%) reported no limitations in work or other activities.

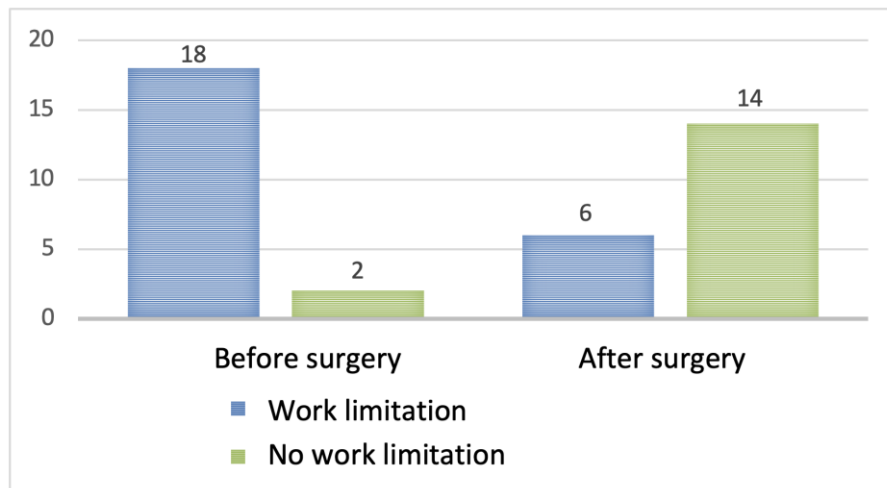


Figure 7. Work ability before and after surgery

Preoperatively, nineteen subjects experienced difficulties in everyday life, while only one did not. In contrast, in the postoperative phase, the number of those reporting difficulties was significantly reduced to six, while fourteen indicated that they had no such problems (Figure 8).

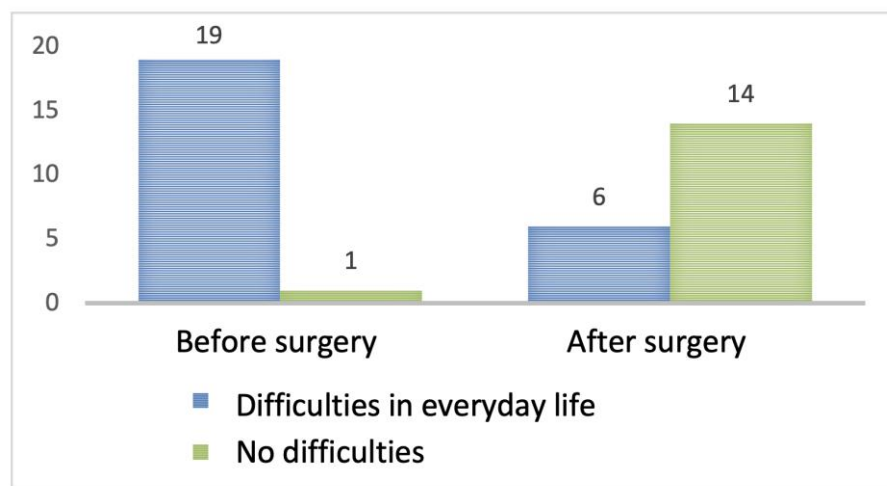


Figure 8. Difficulties in everyday life

In terms of dealing with difficulties in social activities and roles in society before and after arthroplasty, we found that in the preoperative phase, thirteen subjects (65%) had difficulties in their social life, and seven (35%) did not report such difficulties. In the postoperative phase, two subjects (10%) indicated that they continued to have difficulties in their social life, while eighteen (90%) reported that they had no such difficulties (figure 9).

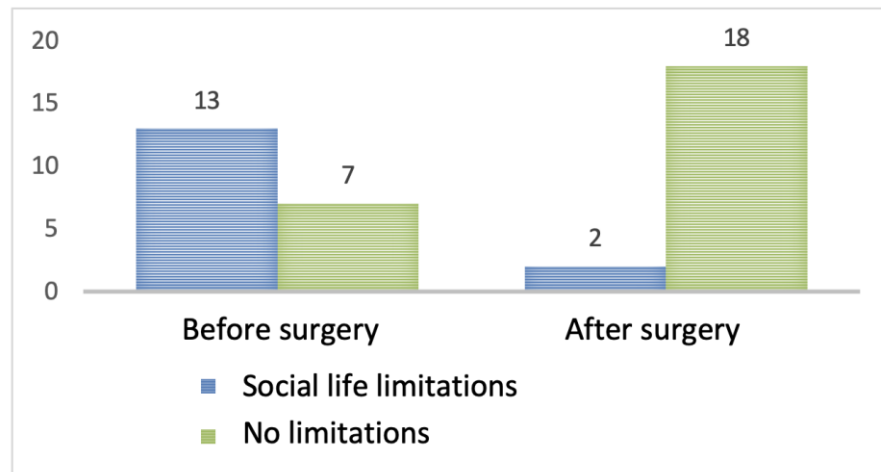


Figure 9. Social life limitations

In the preoperative period 70% of the subjects reported an increased level of social stress due to changes related to their health, while 30% indicated a low level. In the postoperative phase, only 15% experienced an increased level of social stress, while 85% indicated a low level of social stress (Figure 10).

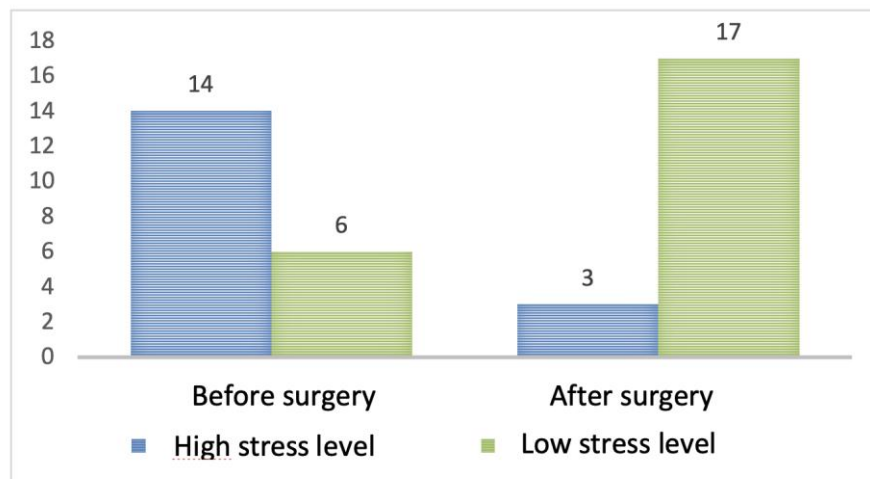


Figure 10. Stress level

Figure 11 provides information about patients' energy levels after surgery. Of all the patients analysed, sixteen reported a higher energy level, while four indicated a lower energy level.

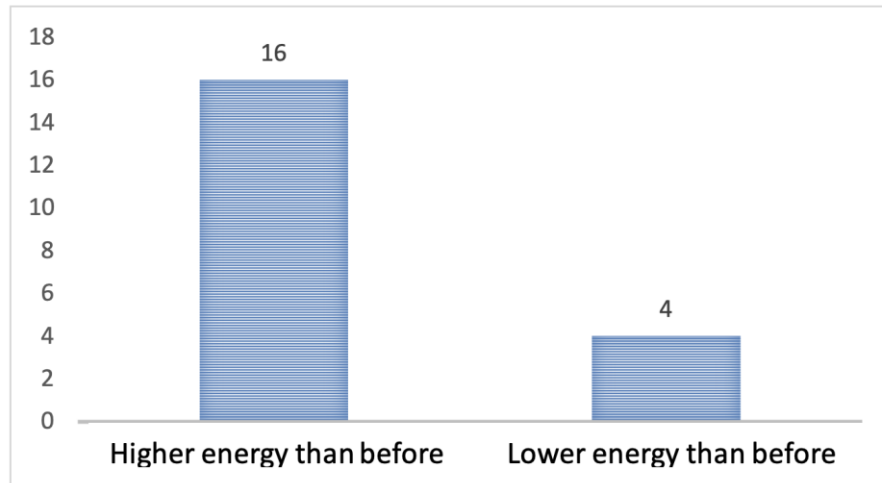


Figure 11. Postoperatively energy level

In the preoperative period, most of the patients (85%) reported difficulties in managing routine tasks due to their emotional state, while only 15% had no such problems. After the surgery, the results showed that only 15% continued to have difficulties, while 85% reported no problems (Figure 12).

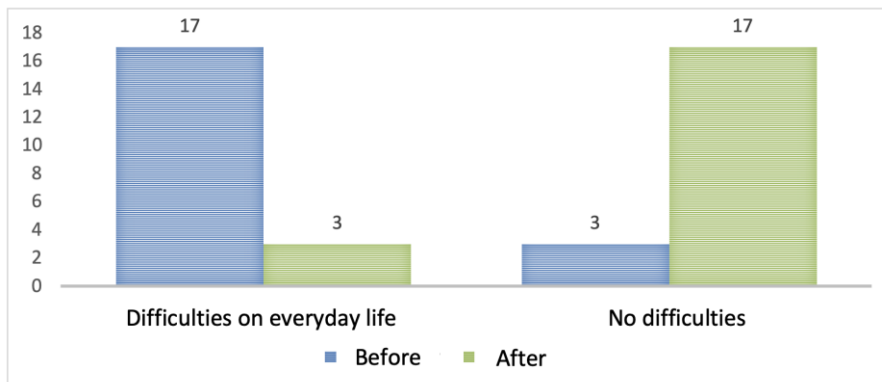


Figure 12. Emotional status impact on everyday life

Preoperatively, 85% of subjects reported nervousness, while only 15% did not. After surgery, the percentage of those who experienced nervousness was 30%, while 70% of subjects reported that they did not experience nervousness (Figure 13).

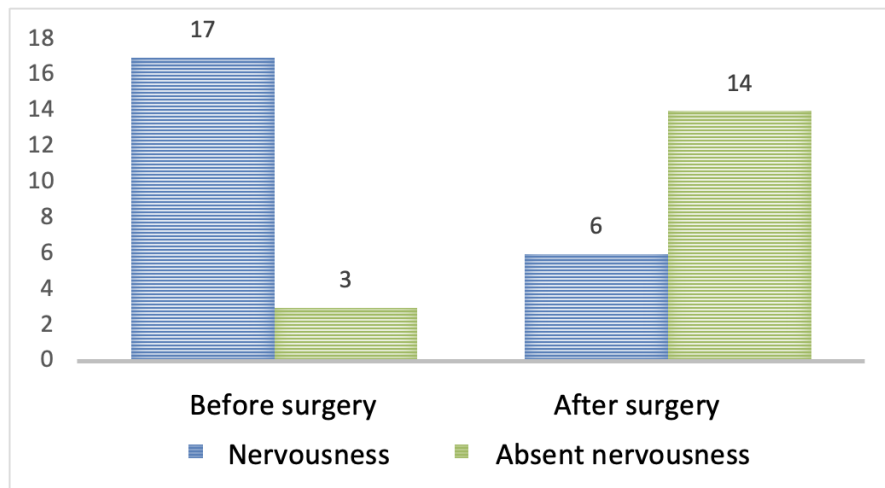


Figure 13. Anger times before and after surgery

In the preoperative period, 80% of the subjects reported feeling depressed, while 20% did not. After surgery, the percentage of those who felt depressed was 15%, while 85% of the subjects reported that they no longer experienced depression (Figure 14).

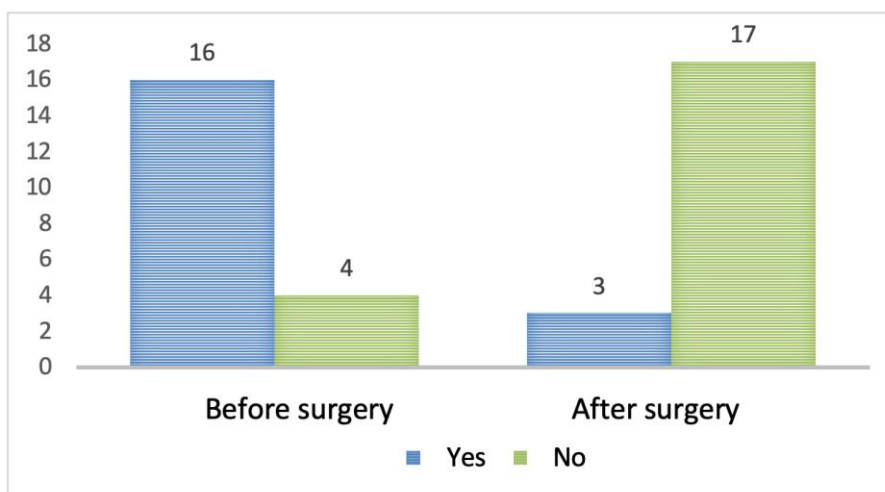


Figure 14. Depression before and after surgery

Following the statistically processed analysis based on the GraphPad Prism program, at a threshold $p = 0.05$, a significant association between pre- and postoperative health status was found, $p < 0.0001$. Also, the analysis of the influence of the current state of health on daily activities showed a statistically significant association with $p < 0.001$. A significant association was obtained between the impairment of daily activities due to knee pain between the preoperative and postoperative period, resulting in a $p < 0.0001$. Following the correlation between feeling overwhelmed or unable to perform daily activities before and after knee arthroplasty, we obtained a statistically significant difference with $p < 0.001$.

Discussion and Conclusions

Gonarthrosis is a painful and disabling rheumatic disease that is very common in the geriatric population (Restuccia et al., 2022; Clark, 2023). The goal of our study was to

determine the impact of gonarthrosis and total knee arthroplasty on multiple aspects related to the quality of life.

Following the investigation, interpretation and statistical analysis of the recorded results, we can state that the main hypothesis is confirmed, as follows: total knee arthroplasty has a strong influence on the quality of life and the mental state of geriatric patients, reducing knee pain, improving physical activity and decreasing movement restriction. The initial assessment proved that gonarthrosis has a major negative impact on quality of life. A comparison of the initial and final assessments showed statistically significant improvements in physical activity ($p < 0.001$), pain level ($p < 0.0001$), and general health and mental status ($p < 0.001$).

Previous studies indicate a relationship between gonarthrosis and a decreased quality of life in all its domains: physical, psychological, and environmental (Wojcieszek et al., 2022). In the study of Vitaloni et al. (2019), conducted on 264 patients, it was also demonstrated a strong connection between gonarthrosis and quality of life, mainly in the physical, and psychological domains.

Regarding the benefits of total knee arthroplasty, Alomran (2022) showed that the surgery has a positive effect on quality of life, pain, joint mobility, and overall satisfaction. The same results were presented in the systematic review conducted by Song et al., 2024.

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