

## QUALITY OF LIFE AND COPING WITH DISEASE-RELATED STRESS IN PATIENTS AFTER AMPUTATION OF A LOWER LIMB

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### Abstract

In theoretical terms, the concept of health-related quality of life (HRQoL, QoL) and the concept of adaptation are based on the biopsychosocial paradigm. In this regard, there is a need for a combined study of the patients' QoL indicators in the situation of illness and the psychological mechanisms of adaptation to it. A specific cohort is represented by patients who underwent amputation due to tumor lesions of the bones and soft tissues of the lower extremity. They have not been sufficiently studied in terms of psychology. The foregoing determined the purpose of this research: to study the clinical and psychological status, strategies and personal resources for coping with stress, and QoL of patients who underwent lower limb amputation due to cancer in comparison with patients who underwent amputation due to non-cancer diseases. An empirical study is carried out using clinical and psychodiagnostic methods, including the QLQ-C30, WCQ, Big V questionnaires. Two groups of patients were studied: those who underwent amputation due to an oncological disease (group 1, n=24), and those who underwent amputation due to other –non-oncological– diseases (group 2, n=15).

The results obtained indicate patients' rather high adherence to postoperative treatment and rehabilitation in a hospital setting, and a pronounced decrease in the QoL of patients. Patients of both groups rated their physical and role activity as low, as well as their financial situation. Among the symptoms limiting vital functioning, all emphasize fatigue; the differences between the groups were determined according to three symptomatic scales: fatigue ( $p=0,071$ ) and pain ( $p=0,093$ ) are more troubling for patients with oncological pathology, shortness of breath ( $p=0,047$ ) for patients with other chronic somatic diseases. When studying the mechanisms of psychological adaptation to the disease, it was found that among patients of group 1, the coping strategies "Distancing" ( $p=0,056$ ) and "Escape-avoidance" ( $p=0,098$ ) prevail, as well as the strategy "Positive reappraisal" ( $p=0,025$ ), the indicators of which, however, are lower than the average normative values.

The studied cohort of patients are in a situation of chronic stress associated with the loss of a limb and with cancer; they require psychological support at all stages of treatments taking into account the specifics of their reactions to the disease stress and the potential coping resources that are available to them.

**Keywords:** *Lower limb amputation, cancer of bones and soft tissues, health-related quality of life, adherence to treatment, coping.*

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### 1. Introduction

In theoretical terms, both the concept of health-related quality of life (HRQoL, QoL) and the concept of adaptation in medicine and clinical psychology are based on the biopsychosocial paradigm. In practical terms, the study of QoL essentially means the study of those objective restrictions that the disease imposes on the patient's functioning, and those subjective reactions, emotional states, motivational and behavioral characteristics that are formed in the conditions of the disease and provide psychological adaptation to the disease.

In this regard, there is a need for a combined study of the patients' QoL indicators in the situation of illness and the psychological mechanisms of adaptation to it (Shchelkova et al., 2018). This largely applies to oncological diseases due to their chronic and life-threatening nature, complex treatment and the associated stress.

A specific cohort is represented by patients who underwent amputation due to tumor lesions of the bones and soft tissues of the lower limb. They have not been sufficiently studied in terms of

psychology, although it is evident that they are in a situation of chronic intense stress associated with cancer and the loss of a limb. A few studies have shown a decrease not only in the patients' activity level and working ability after amputation, but also in psychological and social adaptation, as well as in QoL in general (Balk et al., 2019; Davie-Smith et al., 2019; Young et al., 2019; Shchelkova et al., 2021). The psychological aspects of patients undergoing amputation require further study. A comparison of psychological adaptation and QoL of patients who underwent amputation due to cancer and other somatic diseases, which, however, are not accompanied by an actual vital threat related to cancer, may be one of the emerging areas of research. The present study is aimed at obtaining preliminary (due to the limited sample) data in this direction.

Thus, the foregoing determined the purpose of this research: to study the clinical and psychological status, strategies and personal resources for coping with stress, as well as the main parameters of QoL of patients who underwent lower limb amputation due to cancer in comparison with patients who underwent amputation due to non-cancer diseases.

## 2. Methods

In accordance with the objectives of the study, a set of methods for clinical and psychological diagnostics was used.

Clinical diagnostics, along with other methods used in onco-orthopedics, included the use of a 10-degree visual analogue scale of pain intensity (VAS Pain), a five-point scale for an objective medical assessment of the severity of the pain syndrome (Watkins' scale), the Karnofsky scale, the "Musculoskeletal Tumor Society" (MSTS) scale.

The psychological diagnostic included a preliminary interview, during which informed consent was obtained from each patient; a structured interview was also used to study the socio-demographic characteristics of patients, their attitudes towards the disease and adherence to treatment after surgery.

The following questionnaires were used: the "Ways of Coping Questionnaire" (WCQ), the "Big Five Inventory" (BIG V), the "EORTC Core Quality of Life Questionnaire" (QLQ-C30).

The differences in psychodiagnostic parameters between two groups were determined using a one-way analysis of variance ANOVA; a frequency analysis was carried out using Pearson's  $\chi^2$ .

39 inpatients of the Department of General Oncology at the National Medical Research Center of Oncology named after N.N. Blokhin were included in the study. In accordance with the objectives of the study, patients were divided into two groups: group 1 – patients who underwent amputation due to cancer; group 2 – patients who underwent amputation due to a non-cancer disease. The groups were studied during the period of rehabilitation treatment and inpatient rehabilitation after amputation.

Table 1 shows the main demographic characteristics of the patients who made up the comparison groups.

*Table 1. Demographic characteristics of the studied patients.*

Demographic characteristics	Group 1 (n=24)		Group 2 (n=15)	
	N	%	N	%
Male	15	62.50	14	93.30
Female	9	37.50	1	6.70
Mean age	47.25±3.17		59.67±2.27	

## 3. Results

### 3.1. Social and clinical characteristics

At the time of hospitalization, a small number of patients in groups 1 and 2 retained their previous professional status (12.5% and 13.3%, respectively); in both studied groups, most patients lost their ability to work due to the underlying disease. More than half of the patients are married, more than 60% of patients in each group have children. Differences between groups in these parameters are not significant.

The cause of amputation in group 1 was oncological lesions of long bones and soft tissues of the extremities: osteosarcoma of the femur and lower leg bones, chondrosarcoma, liposarcoma of the soft tissues of the lower leg, sarcoma of the soft tissues of the thigh, etc. The cause of amputation in group 2 was a variety of diseases and pathological conditions: atherosclerosis of the arteries of the lower extremities, chronic osteomyelitis, diabetes mellitus, varicose veins of the lower extremities and venous thrombosis.

The average values of the subjective assessment of pain severity according to the VAS Pain scale and the average values of the expert assessment of the severity of the pain syndrome (by the attending physician) according to the Watkins scale, as well as the differences between groups 1 and 2 are shown in Table 2.

Table 2. Mean values of the severity of pain syndrome.

Scales	Group 1		Group 2		p-value
	M	SD	M	SD	
VAS Pain scale	5.37	1.60	2.57	2.14	p=0.000
Watkins scale	1.79	0.79	0.64	0.84	p=0.000

There were no significant differences between the patients in terms of their general condition according to the Karnofski scale (76.00, 3.06 vs 82.50, 6.48).

According to the MSTS scale, patients differ in five out of six aspects characterizing the functional result of treatment and rehabilitation after amputation: pain (p=0.006), function (p=0.000), supports (p=0.001), walking (p=0.003), gait (p=0.000). In all cases, the functional result was worse in the group of patients with oncological pathology (group 1). However, patients did not differ in the aspect of emotional reaction to the amputation.

Thus, the analysis of indicators of the general condition of patients, the severity of pain syndrome and the quality of the functional result of treatment and rehabilitation of patients who underwent amputation showed a significant decrease in several of the studied parameters in the group of patients with oncological lesions compared with the group of patients with other chronic diseases.

### 3.2. Psychological characteristics

The majority of patients in both groups undergo all the necessary examinations, they follow the physician's prescriptions regarding drug treatment; show interest in information about the disease, prognosis, treatment options. At the same time, with a generally compliant attitude of patients to inpatient treatment and rehabilitation after amputation, a slightly higher level of adherence to the recommendations on regimen and limiting physical activity was revealed in group 1, as well as a more trustful relationship with the attending physician ( $\chi^2=3.378$ ; p=0.066).

Patients' coping strategies were studied using the WCQ. Its mean values are presented in Table 3.

Table 3. WCQ mean values in patients of two clinical groups.

WCQ scales	Group 1		Group 2		p-value
	M	SD	M	SD	
Confrontive	47.41	6.23	43.38	18.61	–
Distancing	45.41	9.70	36.25	12.44	p=0.056
Self-controlling	47.59	13.71	42.38	13.21	–
Seeking social support	49.94	10.45	40.88	8.74	–
Accepting responsibility	47.77	9.97	48.87	18.47	–
Escape – avoidance	44.82	9.06	37.87	10.11	p=0.098
Planful problem-solving	47.41	10.21	43.13	11.83	–
Positive reappraisal	40.18	16.09	26.25	2.66	p=0.025

Few differences were observed between two groups of patients in terms of their coping strategies. Thus, patients who underwent amputation due to an oncological lesion tend to use cognitive and behavioral strategies (giving a positive meaning to an objectively unfavorable situation associated with gaining new experience or post-traumatic personal growth, devaluing the situation, mentally switching to pleasant or neutral topics, avoiding the reality) aimed at relieving disease-related emotional stress to a greater extent.

The study of patients' personality traits was carried out using the BIG V inventory. Statistical analysis showed significant differences between groups on one scale – “conscientiousness” (p=0.010), with higher values in group 1 (34.33, 4.90 vs 27.88, 6.51).

The main parameters of patients' QoL were studied using the QLQ-C30, and although patients in group 2 suffer from other (non-oncological) diseases, the estimated QoL parameters are relevant to their condition, since they reflect the objective limitations and subjective attitude associated with a severe somatic disease. The mean values of the QLQ-C30 are presented in Table 4.

Table 4. The QLQ C-30 mean values in patients of two clinical groups.

QLQ-C30 scales		Group 1		Group 2		p-value
		M	SD	M	SD	
QL-2	General health	47.37	17.18	51.28	26.53	–
Functional scales						
PF-2	Physical functioning	54.73	30.27	55.39	22.01	–
RF-2	Role functioning	39.47	37.77	57.69	33.36	–
EF	Emotional functioning	74.12	20.01	67.30	25.56	–
CF	Cognitive functioning	78.07	19.29	74.35	25.11	–
SF	Social functioning	51.75	29.34	64.10	28.74	–
Symptomatic scales						
FA	Fatigue	52.04	24.58	36.75	19.45	p=0.071
NV	Nausea and vomiting	8.77	14.02	8.97	18.77	–
PA	Pain	50.88	31.66	32.05	27.60	p=0.093
DY	Dyspnea	15.79	23.22	35.90	31.80	p=0.047
SL	Insomnia	43.86	24.98	30.77	31.81	–
AP	Appetite loss	33.33	27.21	33.33	30.43	–
CO	Constipation	22.81	33.43	28.21	35.61	–
DI	Diarrhea	8.77	18.73	15.38	25.87	–
FI	Financial difficulties	43.86	31.53	46.15	28.99	–

Note. In functional scales of the QLQ-C30 a higher score corresponds to a higher QoL level; in symptomatic scales a higher QoL level corresponds to lower scale indexes.

The overall QoL in both groups corresponds to an average level. There were no significant differences in functional scales between the groups. In each group, patients most highly rate cognitive and emotional activity, the lowest – physical and role activity; the only significant difference was established in the symptomatic scale “shortness of breath” (dyspnea) ( $p=0.047$ ), which disturbs patients from group 2 to a greater extent.

#### 4. Discussion

Given the favorable prognosis in many of the cases, patients with tumors of the musculoskeletal system have to be included in specific programs for functional, social and psychological rehabilitation to improve their quality of life and to help them adapting to their new condition. At the same time, in recent studies of QoL, not only the clinical and social aspects of the patient’s functioning in a situation of oncological disease are discussed; the emphasis is placed on the subjective, personal experience related to the disease and the psychological coping with it (Sirota et al., 2016).

The present study revealed several patterns in the coping behaviour of patients with oncological lesions. Data on the mutual influence of the level of QoL and the characteristics of coping can also be found in other studies of oncological patients after amputation (Silva et al., 2019). The discrepancy between a relatively high level of QoL (assessed subjectively by patients) and an objective assessment of their state of health and vitality is indirectly confirmed by their greater adherence to treatment and emotional attachment to the attending physician compared to the control group, since existing studies have shown that deterioration in QoL significantly affects adherence to restorative treatment after amputation (Padovani et al., 2015). Amputated patients are subjected to an enormous stress, pain and grief, but they have hope of regaining independence after amputation (Norlyk et al., 2013).

The results of the present study confirmed the need for a combined research of the mechanisms of psychological adaptation and QoL of onco-orthopedic patients, since their indicators potentiate and concretize each other, allowing to see a holistic picture of the patient’s personality in conditions of a life-threatening disease and amputation.

#### 5. Conclusion

In conclusion, despite the preliminary nature of the presented study results, the obtained psychological data can now be integrated into the general scheme of treatment and rehabilitation of onco-orthopedic patients. Research in this direction will be continued on a larger sample to accumulate existing data.

### *Acknowledgements*

This research was supported by the Russian Foundation for Basic Research (RFBR) (Grant No 20-013-00573).

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