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Quality of life of lung cancer patients

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ABSTRACT

Lung cancer is one of the most prevalent forms of cancer in patients in Ukraine. The objective of the study was to identify the main problems in the quality of life of patients with lung cancer in order to optimize medical care for this patient group. A survey of 411 patients of oncology institutions in nine regions of Ukraine was conducted in the period from November 2021 to February 2022. The sociological survey was performed using the EORTC QLQ-C30 and QLQ-LC29 questionnaires. As of the pre-war period, the quality of life of lung cancer patients in Ukraine amounted to 49.12 points on a 100-point scale. According to the QLQ-C30 symptom scale, the highest score among the complaints of Ukrainian patients is that of financial difficulties, the second place is occupied by fatigue. According to the QLQ-LC29 symptom scale, patients with lung cancer were most concerned with "Fear of progression". Ukrainian patients were least concerned about diarrhea and hemoptysis. When providing medical care to cancer patients, components to ensure the proper quality of their lives and psychosocial care, including the standardization of psychological care and its introduction in all institutions that provide medical care to cancer patients; organization of social and psychological support for cancer patients and their families; as well as educational work with relatives, colleagues, medical professionals on awareness of the need for social and psychological support for patients must be taken into account.

INTRODUCTION

In Ukraine, cancers are among the top 5 causes of death and take second place after cardiovascular diseases [1]. Lung cancer (LC) is one of the most common forms of cancer among such patients in Ukraine. According to the Center for Medical Statistics of the Ministry of Health, the incidence of malignant neoplasms of the respiratory and thoracic organs in 2020 amounted to 9,956 cases among men, and 2,347 cases among women. The number of cases of LC, tracheal and bronchial cancer amounted to 8,136 among men and 2,049 among women [2]. Cancer of the trachea, bronchi and lungs ranks first among other cancer types among men.

Cancer is the leading cause of death worldwide, accounting for nearly 10 million deaths in 2020. In terms of new cancer cases, LC was the second most common cancer after breast cancer in 2020, which occurred in 2.21 million cases. LC took the first place as the reason for cancer deaths in 2020, as 1.80 million deaths were recorded [3].

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Between 30 and 50% of all cancer cases can now be prevented by avoiding risk factors and implementing evidence-based prevention strategies. The burden of LC can also be reduced by early detection and appropriate treatment, as well as by caring for patients who develop LC. The impact of early detection of LC on the quality of life of the patient is felt in reducing disease-related and treatment complications, decreasing anxiety and psychological stress [4].

In general, quality of life is a broad concept defined by the World Health Organization as people's perception of their position in life in the cultural context and value system in which they live, as well as in relation to their goals, expectations, standards and concerns. It covers an individual's physical and psychological health, the level of their independence, social aspects and their relationship with their environments [5,6]. The objective of the study was to identify the main problems in the quality of life of LC patients (C33-C34) in order to optimize the health care system for them.

MATERIALS AND METHODS

The sociological study was performed by surveying 411 patients according to a unified study protocol, which included the use of a comprehensive questionnaire consisting of a questionnaire to determine the quality of life in oncology, EORTC QLQ-C30, and a questionnaire to determine the quality of life of patients with LC, QLQ-LC29. Permission to use the data from "EORTC Quality of Life Group" questionnaires was obtained in November 2021.

The study was conducted in the oncological institutions of nine regions of Ukraine: Chernihiv, Zaporizhia, Dnipropetrovsk, Kyiv, Poltava, Khmelnytsk, Ivano-Frankivsk, Zakarpattia and Lviv. Primary data were collected from November 2021 to February 2022. All participants gave written consent to participate in the study.

The required number of participants was calculated according to Glen's method, and was 398 people. Taking into account the possibility of elimination (10%), we sent 440 questionnaires proportionally to different regions of Ukraine (North, South, West, East, Central), from which we received 411 questionnaires.

The inclusion criteria were patients who were hospitalized with a histologically confirmed diagnosis "lung cancer" and received inpatient treatment. Exclusion criteria were lack of written consent to participate in the study.

We found that the average age of patients was 64.99±9.87 years, while 79.3% of all patients were men and 20.7% – women. Moreover, 84.9% of all patients were smokers. Non-small cell lung cancer was the predominant type (NSCLC 87.6% vs SCLC 12.4%).

The more frequent concomitant pathologies in patients with LC were chronic obstructive pulmonary disease which accounted for 46.7% of all patients, arterial hypertension – 37.2% of all patients, coronary heart disease – 27.5% of all patients, type II diabetes – 15.8% of all patients and adiposity – 5.6% of all patients.

49.6% of all patients received chemotherapy, combined treatment – 21.9% of all patients, surgical treatment – 15.8% and radiation therapy – 12.7% of all patients.

The distribution of lung cancer patients is presented in Table 1. The distribution data are identical to the average data in Ukraine.

Calculations were performed according to the methodology of EORTC QLQ-C30 Scoring Manual [7] and QLQ-LC29 [8]. An analysis of three main indicators, functional scale (FS), symptom scale (SS) and quality of life (QoL) was performed. Primarily, the average score (Raw Score – RS) was estimated for each indicator, which is presented in the form of M±SD, where M is the mean, SD is the standard deviation.

EORTC QLQ-C30 is a questionnaire of the European Organization for Research and Treatment of Cancer. It was developed by the EORTC Quality of Life Study Group, and is currently one of the most widely used tools for determining the quality of life in oncology [7,9,10]. The current version consists of 30 questions and includes 5 functional scales: physical functioning (PF2), cognitive functioning (CF), role functioning (RF2), social functioning (SF), emotional functioning (EF); and 9 parameters of the QLQ-C30 symptom scale: fatigue (FA), sleep disturbances (SL), diarrhea (DI), nausea (NV), appetite loss (AP), dyspnea (DY), pain (PA), constipation (CO), financial difficulties (FI).

Table 1. The distribution of lung cancer patients

Classification item		Number of patients	Percentage
Gender	men	326	79.3%
	women	85	20.7%
Average age	64.99±9.87 years		
Smoking status	smoker	349	84.9%
	non-smoker	62	15.1%
Disease	NCSLC	360	87.6%
	SCLC	51	12.4%
Therapeutic approach	curative	178	43.3%
	palliative	233	56.7%
Treatment	chemotherapy	204	49.6%
	combined treatment	90	21.9%
	surgical treatment	65	15.8%
	radiation therapy	52	12.7%
Comorbidity	chronic obstructive pulmonary disease	192	46.7%
	arterial hypertension	153	37.2%
	coronary heart disease	113	27.5%
	type 2 diabetes	65	15.8%
	adiposity	23	5.6%

Since the structure of the questionnaire enables the questions to have a 4 or 7-point scale, the developers proposed a unified approach by using a 100-point scale for each of the parameters. Thus, the value of the functional scale (FS) per 100 points was calculated by the following formula:

$$FS = \frac{1 - (RS-1)}{range} \cdot 100$$

Where RS is the average score of the scale, range is the range of the scale, which is determined by the difference between the possible maximum and minimum values of the scale.

The symptom scale (SS) and quality of life (QoL) per 100 points were calculated according to the following formula:

$$SS = \frac{RS-1}{range} \cdot 100$$

Where RS is the average score of the scale, range is the scale range determined by the difference between the possible maximum and minimum scale values.

Interpretation of the obtained results was performed according to the traditional approach: a high level of functional scale (FS) indicated a high (healthy) level of functioning regarding this indicator. Similarly, a high quality of life scale (QoL) indicated a high quality of life, but a high level of symptom scale (SS) indicated a high level of existence of this problem or symptom.

For scales consisting of 2 or more questions, & Cronbach's alpha was calculated as an indicator of scale consistency.

Statistical calculations were performed by the means of RStudio v. 1.1.442 and R Commander v.2.4-4 software.

RESULTS

According to the obtained results, the quality of life of GLOBAL HEALTH STATUS/QoL in patients with LC amounted to 49.12 points on a 100-point scale. It should be noted that the answers of the respondents were of the same type, as indicated by sufficient consistency determined by the method of Cronbach and it equals 0.93.

According to the questionnaire, within the QLQ-C30 functional scale, among other subscales, the worst indicators belong to the subscale of "Role functioning", which amounted to 63.82 points on a 100-point scale (Table 2), and the average score is 2.09±0.91. This item consisted of questions indicating that there were some difficulties for the patient in performing their work and daily activities. Moreover, there were restrictions on hobbies or leisure activities.

Table 2. The results of the QLQ-C30 functional scale survey in lung cancer patients

Scale items	Directory code	Score on a 100-point scale	& Cronbach
Role functioning	RF2	63.82	0.85
Physical functioning	PF2	66.67	0.83
Emotional functioning	EF	67.47	0.89
Social functioning	SF	76.83	0.84
Cognitive functioning	CF	78.80	0.68

The score of the "Physical Functioning" subscale was slightly better, amounting to 66.67 on a 100-point scale, and according to the questionnaire, patients found it harder to do strenuous physical work, walk for a long/short period of time and carry heavy baggage. In addition, some patients had to stay in bed or chair during the day and/or they needed help with eating, dressing and hygienic procedures – which in turn affected the patient's self-esteem.

The item "Emotional functioning" amounted to 67.47 points on a 100-point scale. This subscale includes questions about stress, anxiety, irritation and depression.

Compared to the previous items, the score of the "Social functioning" subscale was slightly higher and amounted to 76.83 out of 100 possible. This subscale covers the issues of limitation and discomfort in family life and communication with people related to the patient's physical condition or treatment.

The best indicators in the QLQ-C30 functional scale belonged to "Cognitive functioning". Its score on a 100-point scale equaled 78.80. This indicates that most patients did not have difficulty concentrating and remembering, for example, when reading newspapers or watching television.

In general, Cronbach's alpha for the QLQ-C30 functional scale in LC patients ranged from 0.83 to 0.89, indicating a high consistency of patient responses. It amounted to 0.68 only for the "Cognitive functioning" subscale, which corresponded to the questionable consistency of patient responses.

The QLQ-C30 symptom scale survey of LC patients evaluated the following symptoms: fatigue (FA), nausea and vomiting (NV), pain (PA), sleep disturbances (SL), dyspnea (DY), appetite loss (AP), constipation (CO), diarrhea (DI), financial difficulties (FI).

The worst results were in the symptom scale QLQ-C30 belonged to the "Financial difficulties" item (with its average score being 2.50±1.01), which is often among the leading subscales that worry the cancer patients in Ukraine the most. The score on a 100-point scale amounted to 50.16 for this item (Figure 1).

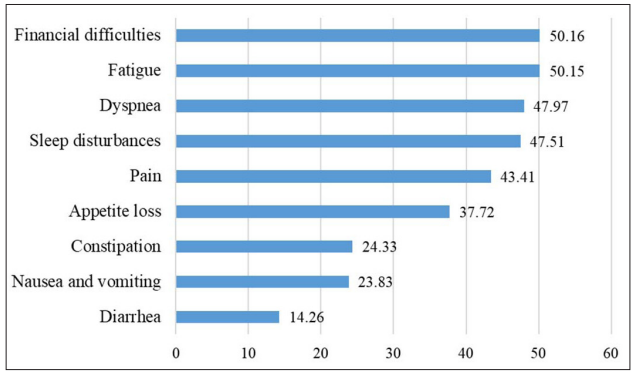

Figure 1. Results of the QLQ-C30 symptom scale questionnaire in lung cancer patients (score on a 100-point scale)

According to the results of the survey, patients are concerned about fatigue to a lesser extent than financial difficulties, which amounted to 50.15 points on a 100-point scale. In general, various genetic and behavioral risk factors may contribute to patient fatigue. The presence of fatigue significantly affects the quality of life, this symptom often worries patients with malignant tumors and is reflected in the physical and psychological state of the patient.

The third place in the results of the survey on the QLQ-C30 symptom scale in LC patients belongs to the item "Dyspnea". It amounted to 47.97 points on a 100-point scale. This symptom is characteristic of LC patients, because dyspnea is a direct consequence of a decrease in airway clearance that is observed in 30-40% of all patients with LC. It can also be caused by compression of large blood vessels in the lungs. Its severity depends on many factors (the size of the tumor, the degree of pressure on the neighboring structures, veins, bronchi). Approximately half of all patients complain of this symptom, and in 10% it is manifested in the early stages of the disease [11].

The score of the "Sleep Disturbances" subscale is almost commensurate with the "Dyspnea" subscale. It amounted to 47.51 on a 100-point scale. Sleep disturbances together with weakness and decreased concentration are considered as manifestations of fatigue that negatively affect work, mood and social relations, and reduce the quality of life of a patient with LC. Moreover, sleep disturbances contribute to an even greater increase in fatigue.

According to our findings, the item "Pain" amounted to 43.41 points on a 100-point scale. Chest pain, which is often aggravated by deep breathing, coughing and laughing, is one of the common symptoms that develops in the later stages of LC and significantly affects the quality of life of a cancer patient.

Another one of the most common symptoms of LC is appetite loss and unexplained weight loss [12]. In the body of a cancer patient with LC there is a restructuring for maximum nutrition of the tumor from all available sources: there is a breakdown of adipose and muscle tissue

and inadequate use of energy. Cancer patients may develop anorexia (aversion to food), as well as taste inversion. As a result, eating disorders significantly increase the risk of complications of chemotherapy and radiation therapy, as well as postoperative complications. On examining the item "Appetite loss" in the QLQ-C30 symptom scale questionnaire, we found that it amounted to 37.72 points.

The symptoms that bothered patients with LC the least, according to the results of the QLQ-C30 questionnaire, were: constipation, nausea and vomiting, diarrhea. The lowest score in the QLQ-C30 symptom scale questionnaire is set for the item "Diarrhea", which amounted to 14.26 points out of 100 possible. Therefore, this symptom worried LC patients the least.

The QLQ-LC29 symptom scale questionnaire, is an updated EORTC module for assessing the quality of life of LC patients, which takes into account the following indicators related to LC: fear of progression (FP), dyspnea (DY), side effects (SE), cough (COU), chest pain (PC), hemoptysis (HA), pain in the arms/shoulders (PA), weight loss (WL), pain in other parts of the body (PO), consequences of surgery (SU).

Current oncological medical methods of treatment, age and comorbidities can have a profound and negative impact on patient responses. The indicator for "fear of progression" was the highest in the QLQ-LC29 symptom scale, it amounted to 66.18 points on a 100-point scale (Figure 2), the average score was 2.99±0.91. This subscale includes questions regarding worries about future health, as well as concern about possible tumor growth.

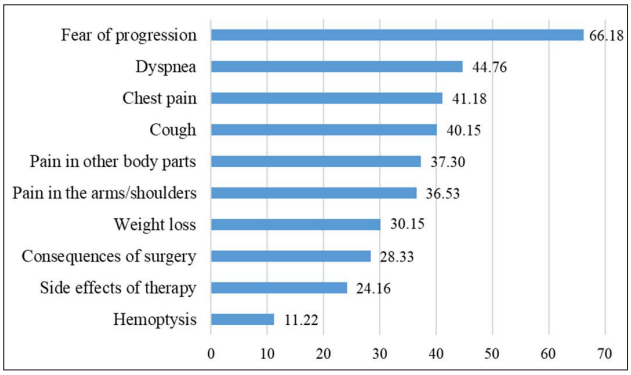

Figure 2. Results of the QLQ-LC29 symptom scale questionnaire in lung cancer patients (score on a 100-point scale)

Patients were also concerned about dyspnea, as this item of the QLQ-LC29 symptom scale in LC patients amounted to 44.76 points on a 100-point scale. This subscale included questions about shortness of breath at rest, while walking, or when climbing stairs. To a lesser extent, patients suffer from chest pain, according to the results, the score of this subscale amounted to 41.18 points on a 100-point scale.

Naturally, the "cough" item is one of the four "leading" symptoms that worry patients the most among the indicators on the QLQ-LC29 symptom scale in LC patients. After all, cough is one of the first and most important symptoms of LC. In general, at the stage of diagnosis, patients are concerned about the cough, which does not pass after 2-3 weeks and worsens over time. Also, cough in lung cancer is often accompanied by wheezing and hoarseness. According to the results of the survey, this item's score amounted to 40.15 points on a 100-point scale. Questionnaire questions took into account whether the patients coughed frequently and whether they had a dry cough.

According to the results of the survey on the QLQ-LC29 symptom scale LC patients worried about pain in other parts of the body to a lesser extent, this item's score amounted to 37.30 on a 100-point scale. The indicator for "pain in the arms/shoulders" was slightly better, its score on the same scale equaled 36.53.

During the survey, a certain cohort of respondents noted that losing weight was a problem for them. The QLQ-LC29 symptom subscale of "weight Loss" amounted to 30.15 points on a 100-point scale.

The score of the "consequences of surgery" item amounted to 28.33 points on a 100-point scale. According to the QLQ-LC29 questionnaire, some patients complained of pain at the site of the operation, the wound site was overly sensitive, patients had difficulty using the arm or shoulder on the side of the chest surgery, and scarring interfered with their daily activities.

The QLQ-LC29 symptom scale's item "side effects" amounted to 24.16 points on a 100-point scale. This section included questions about whether patients had pain in their mouth or tongue, whether they had difficulty swallowing, whether they felt tingling in their hands or feet, whether they lost hair, whether they had thin or weakened hair due to illness or treatment, whether they had allergic reactions, whether they had heartburn or pain in their eyes, whether they had skin problems (such as itching, dryness), whether they experienced a decrease in their physical capabilities, whether they had speech problems, or whether they had dizziness.

One of the important symptoms of LC at the stage of diagnosis, which is indicated to patients as requiring a mandatory and urgent response, is a cough accompanied by blood-streaked sputum. On the QLQ-LC29 symptom scale, the item "hemoptysis" amounted to 11.22 on a 100-point scale. These are the lowest indicators of this scale, and therefore the best result among the surveyed respondents.

Cronbach's alpha was in the range from 0.75 to 0.85, indicating sufficient and high consistency of patient responses, except for the "cough" scale indicator, where Cronbach's alpha was 0.69, which corresponds to questionable consistency.

DISCUSSION

While overall survival is obviously the ultimate criterion for the treatment of LC, psychosocial care is needed for the patient to cope with their cancer and is becoming an increasingly important issue in the treatment of this life-threatening disease [13-17].

According to the obtained results, the quality of life (GLOBAL HEALTH STATUS/QoL) in Ukrainian LC patients is higher than in European countries [16]. In their study on gender differences in quality of life and symptomatic burden of LC patients, Our European colleagues describe GLOBAL HEALTH STATUS/QoL for women,

which is higher than the data obtained by us, and for men, which is lower than the score indicated by us [9].

According to our findings, the worst indicators within the QLQ-C30 functional scale belonged to the "role functioning" subscale (among all other subscales). The research of Koch et al. indicated a lower score, and generally the item "role functioning" is also the lowest indicator of the QLQ-C30 functional scale established in their study [16]. In the European study on the impact of gender on the quality of life of LC patients, the item "role functioning" of the QLQ-C30 functional scale is below the scores obtained by us [9]. In the above mentioned work, the obtained data are described as the worst for the "role functioning" subscale.

The results of the survey obtained by us on the QLQ-C30 symptom scale reflect the highest score in the complaints of financial difficulties, which is much higher than the figure in European countries [9,16]. The second place among the complaints in QLQ-C30 symptom scale is fatigue, which is lower than the studies of European authors, where the subscale "fatigue" is assigned first place [9,16].

Approximately 25% of all cancer patients suffer from psychosocial disorders [10,16]. Distress is defined as "a multifactorial unpleasant experience of a psychological, social, spiritual and/or physical nature that may interfere with the ability to cope with cancer, its physical symptoms and its treatment effectively" according to the NCCN Guidelines for Distress Management [7,16]. Lung cancer patients are more likely to report depression and anxiety than patients suffering from other cancers [18].

During cancer, many aggravating events can occur, such as the initial diagnosis or detection of tumor progression [10,16,19]. Psychosocial intervention, if done early enough, can help reduce this distress [10,15,16]. Therefore, early detection is very important [10,20]. Due to the high workload of doctors who treat patients in critical condition, the issues of psychosocial distress are often insufficiently addressed [10,14,20], which can negatively affect their quality of life.

It should be noted that according to our findings the item "fear of progression" leads the list of symptoms of the QLQ-LC29 symptom scale, which is consistent with the data obtained by our German colleagues [16], but this indicator is higher than in European studies on the impact of gender on the quality of life of LC patients. Among all the symptoms that bother LC patients in the mentioned study, the highest score belongs exactly to "fear of progression".

According to the results of our studies, patients were concerned the least with diarrhea on the QLQ-C30 symptom scale and hemoptysis on the QLQ-LC29 symptom scale. These symptoms were also marked by the lowest scores in the works of our German colleagues [16]. The "hemoptysis" subscale and the "diarrhea" item are lower than the figures obtained by us.

CONCLUSIONS

1. In Ukraine, as of the pre-war period (November 2021 – February 2022), the quality of life of LC patients was higher than in European countries. According to our findings, the worst indicators within the QLQ-C30 functional scale belonged to the "role functioning" subscale (among all other subscales).
2. According to the QLQ-C30 symptom scale, the highest score among the complaints of Ukrainian patients is that of financial difficulties. The second place on the complaints of the QLQ-C30 symptom scale belong to fatigue. According to the results of our study on the QLQ-LC29 symptom scale, LC patients were most concerned about "fear of progression" and were least concerned about diarrhea on the QLQ-C30 symptom scale, and hemoptysis on the QLQ-LC29 symptom scale.
3. When developing comprehensive medical and social models or strategies for the provision of medical care to cancer patients, the components for ensuring the proper quality of their lives and psychosocial care must be taken into account. The key ways to ensure this include the following: the organization of socio-psychological support of cancer patients and their families; standardization of psychological care and its introduction in all institutions that provide medical care to cancer patients; as well as educational work with relatives, colleagues and medical professionals to understand the need for socio-psychological support for patients with cancer

AUTHORS' STATEMENT

The authors declare no conflict of interest regarding this article.

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