Mental Health Assessment of Cancer Patients: Prevalence and Predictive Factors of Depression and Anxiety

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Abstract

Background: Patients with oncological diseases often have mental disorders in the form of comorbidity. The aim of this study was to research the association of cancer with the presence of symptoms of depression and anxiety in primary health care patients.

Methods: This prospective observational study done in 2020 included adult users of health care at the Health Center Trstenik, Central Serbia, aged 19 and over, both sexes, with a diagnosis of oncological disease. A research instrument to assess depressive symptoms is used PHQ-9 (The Patient Health Questionnaire) questionnaire, derived from PRIME MD- and (The Primary Care Evaluation of Mental Disorders), and the Beck Anxiety Scale (BAI) to register the presence of certain anxiety symptoms.

Results: The largest percentage of patients had symptoms of mild (27.2%) or moderate depression (22%), while 18% reported symptoms of major depression. The level of depression was higher in older subjects, in the presence of chronic diseases with greater limitations of activity and the presence of difficulties in performing daily activities, with a more pronounced effect of pain on activity, the presence of stress. All subjects were characterized as persons with severe anxiety (score 26-63). The level of anxiety was higher in older respondents, in the presence of long-term illness, with greater limitations of activities and difficulties in performing daily activities, with a more pronounced influence of pain on performing activities and the influence of the media.

Conclusion: Caring for the mental health of cancer patients must occupy a significant part of each country's national health policy.

Keywords: Mental health; Cancer patients; Depression; Anxiety

Introduction

Diagnosis of malignant disease and the process of modern and very complex treatment, can cause not only somatic problems among patients but very intense emotional reactions, with significant psychological consequences. The results of modern scientific research indicate that patients with oncological diseases often have mental disorders (in the form of comorbidity), with depressive and anxiety symptoms being the most common (1- 8). Mental health disorders are directly related to the level of disability, disease progression, the presence of pain and accompanying side effects of certain chemotherapeutic drugs, sadness due to current and expected losses, fear of diagnostic and therapeutic procedures, and fear of death (9). Although the relationships between oncological diseases and mental disorders can vary (depending on the course, stage, and prognosis of the disease itself), the fact is that oncological diseases are more strongly associated with depression and anxiety than any other disease.

Besides, mental disorders can be developed from almost all types of oncological diseases and their existence can affect and cause the poorer adherence to prescribed therapeutic treatments, worsening the quality of life and increased mortality (10). Data from the literature shows the fact that patients with malignant diseases with mental disorders usually do not receive adequate treatment, despite the existence of effective psycho-oncological interventions, especially for common problems such as depression and anxiety (11). Mental disorders among these patients are often unrecognized by healthcare professionals. These disorders are usually masked by the clinical picture of underlying disease symptoms or treatment effects such as fatigue, loss of appetite, sleep problems, nausea, vomiting, and may negatively affect the cooperation and treatment acceptance, functional and cognitive patient ability, quality of life, recovery, and survival (11).

The aim of this study was to research the association of cancer with the presence of symptoms of depression and anxiety in primary health care pa-tients. The relationship between depression and anxiety among cancer patients has not been fully investigated in The Republic of Serbia, which contributes to the relevance of this research.

Materials and Methods

Study Design and Sample
The research was conducted in the form of a prospective observational study was done in 2020 which included users of health care at the Health Center Trstenik, Central Serbia, aged 19 and over, both sexes, with a diagnosis of oncological disease (inspection of medical documentation - health card).

Before the start of the study, patients were introduced to the purpose and procedure of the study and gave informed consent to participate in this study. The protocols of this research were approved by the Ethics Committee of the Health Center Trstenik, Central Serbia.

Inclusion criteria for participation in the study were patients with diagnosed oncological diseases who signed informed consent for participation in the study, while exclusion criteria were patients under 19 years of age, the presence of psychiatric illness, the presence of acute infectious (infectious) disease, the presence of chronic infectious diseases, pregnant women and patients who did not give a written consent to participate in the study.

Assessment Instruments
Besides the general questionnaire on demographic and socio-economic characteristics (European Health Survey Questionnaire - Second Wave) (12), as a research instrument to assess depressive symptoms is used PHQ-9 (The Patient Health Q*uestionnaire*) questionnaire, derived from PRIME MD- and (The Primary Care Evaluation of Mental Disorders).

PHQ-9 is a shorter form questionnaire related to the following mental problems: decreased interest or satisfaction in performing activities; discour-

agement, depression, hopelessness; sleep problems (problem falling asleep, sleeping continuously, or sleeping too much); feeling tired or lacking in energy; decreased or increased appetite; bad opinion of oneself, feeling of failure, disappointment in oneself or one's family (feeling of worthlessness or excessive or inadequate feeling of guilt); difficulty concentrating on activities such as reading newspapers or watching television (reduced ability to think, concentrate or indecision - assessed subjectively or by others); slow movement or speech or vice versa, psychomotor restlessness and polykinesia (noticed by others, not just as a subjective feeling); suicidal thoughts. The scale consists of 9 questions with possible answers "no problem" (which is scored with zero points) or "a few days, sometimes" (which is scored with 1 point), or "more than 7 days" (which is scored with 2 points) points), or "almost every day" (which is scored with 3 points). Adding points for each answer gives a total score ranging from 0 to 27. Score values from 0 to 4 indicate the absence of depressive symptoms, a score from 5 to 9 indicates mild depressive symptoms (subsyndromal depression), and a score of 10 or more indicates a high probability of the existence of a depressive episode, which is further qualified as moderate (score from 10 to 14), moderately severe (score from 15 to 19) and severe depression (score 20 and more). Based on the PHQ-9 score, subjects were classified into one of the following categories: no depressive symptoms, mild depressive symptoms (subsyndromal depression), and depressive episode (moderate, moderate, and severe depression) (13).

The Beck Anxiety Scale (BAI) which can be used for both clinical and research purposes, in this study was not used to diagnose anxiety disorders but to register the presence of certain anxiety symptoms. Questions referred to the presence of certain symptoms of anxiety (e.g. fear of the worst, nervousness, inability to relax, fear or dread, shivering, feeling out of control, etc.). Each question has a range of four possible answers among which respondents choose one (0- no at all, 1- mild "didn't bother me much", 2-

moderate "it was occasionally very uncomfortable" and 3-serious "it was almost unbearable"). The scale is graded that the first answer carries 0 and the fourth 3 points. The range of possible points on the scale ranges from 0 to 63. Based on the scores obtained on the scale, respondents were classified into one of four categories: 0-7 those with a minimum level of anxiety, 8-15 those with mild anxiety, 16-25 those with moderate anxiety, and 26-63 those with severe anxiety (14).

Social support score (Oslo-3 Social Support Scale) was formed on the basis of three questions from the question-naire: "How many people are so close to you that you can count on them when you have serious personal problems?" , "How many people are really interested in you, in what you are doing, or in what is going on in your life?" , "How easy is for you to get practical help from neighbors if you have a need for it?" The number of points ranges from 1 to 5. After collecting points, the scores of social support were formed: a strong social support (12-14 points), moderate (9-11 points) and bad (3-8 points), (15).

Insight into the medical documentation (health card) collected data on the presence/absence of oncological diseases as well as the presence of comorbidities. The dependent variable in the study was the presence of symptoms of depression and anxiety in primary care cancer patients. Independent variables in the research were: demographic characteristics: gender, age, marital status, family structure, type of settlement; socio-economic characteristics (occupation, education, material status); health self-assessment; health condition (presence of another chronic non-communicable disease); ability to perform daily activities; use of primary and hospital health care, unmet health care needs; determinants of health (smoking, alcohol use, physical activity, hygiene habits, eating habits, stress); social support.

Statistical Analysis

Descriptive statistics methods were used to present the data: tabulation and graphical representa-

tion. The chi-square (χ2) test is used to compare differences in the frequency of categorical variables. The relationships between the dependent variable (presence/absence of depression and anxiety) and the set of independent variables were examined by univariate and multivariate logistic regression. The risk was assessed using the size of the OR (odds ratio), with a 95% confidence interval. All results where the probability is less than 5% ($P < 0.05$) were considered statistically significant. All statistical calculations were done using the commercial, standard software package SPSS, version 20.0 (Chicago, IL, USA).

Results

Sociodemographic Characteristics
The study included 250 patients aged 19 years and older, with a diagnosis of cancer: 174 females (69.6%) and 76 males (30.4%). Slightly more patients were from rural areas 52.4%, in the marital community 68.4%, with secondary education are 40.8% (Table 1). The most common cancers were breast cancer (28.3%), bronchial and lung cancer (7.2%), and prostate cancer (5.6%), (Table 2). When it comes to the stage of the disease, (65.7%) they were in the first stage of the disease, (33.1%) in the second, and (1.2%) in the third.

Table 1: Sociodemographic characteristics of cancer patients

Variables		N° (%)
Gender	Male	76 (30.4)
	Female	174 (69.6)
Environment	Rural	131 (52.4)
	Urban	119 (47.6)
Marital status	Unmarried	5 (2)
	Marriage	171 (68.4)
	Widow(er)	50 (19.9)
	Divorced	24 (9.7)
Education	Without school	8 (3.2)
	Primary school	91 (36.4)
	Secondary school	102 (42.4)
	Higher scool	17 (6.8)
	College/undergraduate studies	28 (11.2)
Employment	Employed	115 (45.8)
	Self-employed	3 (1.2)
Self-assessment of health as a whole	Very good	7 (2.8)
	Good	1 (0.4)
	Average	77 (30.8)
	Bad	161 (64.4)
	Very bad	4 (1.6)
The presence of physical pain in the previous 4 weeks	Without pain	-
	Very weak	31 (12.4)
	Weak	33 (13.2)
	Moderate	124 (49.6)
	Strong	61 (24.4)
	Very strong	1 (0.4)
	Not at all	6 (2.4)
Influence of pain on activities	Little	48 (19.2)
	Moderate	118 (47.2)
	Much	63 (25.2)
	Very much	15 (6)
Social support	Strong	-
	Moderate	26 (10.4)
	Bad	224 (89.6)

Table 2: The incidence of individual types of cancer in the study population

Cancer identification the chart	ICD mark	Localization	Percentage share in the study population
1	C00	Lips	0.8
2	C10	Oropharynx	2.0
3	C17	Small intestine	1.6
4	C18	Colon	4.4
5	C19	Sigma and rectum	3.6
6	C20	Rectum	3.6
7	C21	Anus	5.2
8	C23	Gallbladder	1.2
9	C25.9	Pancreas	1.6
10	C30	Nasal cavity	0.4
11	C32	Larynx	2.4
12	C33	Trachea	0.8
13	C34	Bronchus and lungs	7.2
14	C43	Melanoma	3.2
15	C44	Skin	1.6
16	C45	Pleural mesothelioma	0.8
17	C50	Breast	28.3
18	C51	Vulva	0.8
19	C52	Vagina	1.2
20	C53.1	Exocervix	5.2
21	C54.3	Uterus	1.2
22	C56	Ovary	2.4
23	C61	Prostate	5.6
24	C62	Testicle	0.4
25	C64	Kidney	3.6
26	C67	Bladder	3.2
27	C70	Meninges	0.4
28	C73	Thyroid gland	2.0
29	C77	Lymph nodes	4.0
30	C81.9	Hodgkin	1.2
31	C90	Multiple myeloma	3.6

Prevalence and Factors Associated with Depression

The mean value of the depression score at the level of the entire study population was 11.6 ± 6.9 (range 0-25). The largest percentage of patients included in the study had symptoms of mild depression (27.2%) or moderate depression (22%), while 18% of the study population reported symptoms of major depression. There was a significant difference in PHQ-9 values among patients with different types of cancer (One-Way ANOVA, df (30) = 3,317, P <0.001). The highest mean PHQ-9 scores were found in patients with lymphoma (23.0), meningioma (22.0), and pancreatic cancer (20.8) (Table 3). The highest average values depression were recorded in patients in the third stage of the disease (21.5 ± 4.9), while the values were lower in those in the second (12.7 ± 6.7) and the first stage of the disease (10.9 ± 6.9).

Table 3: Display of PHQ-9 score values in patients with different cancers

ICD mark	N°	PHQ-9 (Ῡ)	SD	Min-Max
C00	2	8.5	0.71	8.0–9.0
C10	5	12.0	4.12	7.0–15.0
C17	4	13.0	5.03	8.0–20.0
C18	11	14.7	6.26	3.0–22.0
C19	9	9.4	8.25	0.0–19.0
C20	9	9.3	3.32	4.0–15.0
C21	13	12.2	9.32	5.0–25.0
C23	3	16.3	1.53	15.0–18.0
C25.9	4	20.8	6.5	11.0–24.0
C30	1	4.0	–	–
C32	6	10.8	6.85	2.0–16.0
C33	2	0	0	0.0
C34	18	17.0	5.07	9.0–25.0
C43	8	3.8	3.28	0.0–8.0
C44	4	8.2	4.5	6.0–15.0
C45	2	13.0	2.83	11.0–15.0
C50	71	9.5	5.93	0.0–25.0
C51	2	2.5	0.71	2.0–3.0
C52	3	5.0	5.57	0.0–11.0
C53.1	13	12.4	7.14	5.0–23.0
C54.3	3	8.7	2.89	7.0–12.0
C56	6	18.0	3.29	13.0–21.0
C61	14	12.6	6.55	2.0–22.0
C62	1	12.0	–	–
C64	9	11.6	8.37	2.0–23.0
C67	8	17.6	4.95	13.0–23.0
C70	1	22.0	–	–
C73	5	7.0	6.71	0.0–15.0
C77	1	23.0	–	–
C81.9	3	16.0	8.66	6.0–21.0
C90	9	15.6	6.15	8.0–22.0

Regression analysis showed a statistically significant impact of the following variables on the level of depression: lower level of education, higher absence from work, use of antihypertensives, less need for help with activities, less use of ambulances, less social support, and rural environment. The level of depression was higher in older subjects, in the presence of chronic diseases/conditions (comorbidities), with greater limitations of activity, and the presence of difficulties in performing daily activities, with a more pronounced effect of pain on activity, the presence of vision difficulties, poor oral hygiene and tension/stress (Table 4).

Prevalence and Factors Associated with Anxiety

The mean value of the anxiety score in the study population was 45.4 ± 9.5 (range 27-63). All subjects in the study were characterized as persons with severe anxiety (score 26-63).

Statistical analysis revealed a significant difference in the severity of anxiety among patients with different types of cancer (One-Way ANOVA, df (30) = 3,197, *P* <0,001). The highest mean Beck scores were found in patients with meningioma (63.0), pancreatic cancer (58.2), and lymphoma (56.0), (Table 5).

The highest average values anxiety were recorded in patients in the third stage of the disease (53.0 ± 14.1), while the values were lower in those in the second (48.1 ± 8.9) and the first stage of the disease (44.01 ± 9.4).

Regression analysis showed a statistically significant impact of the following variables on the degree of anxiety: lower level of education, less need for help with activities, less use of home care, less activity, and social support. The level of anxiety is higher in older respondents, in the presence of long-term illness, with greater limitations of activities and difficulties in performing daily activities, with a more pronounced influence of pain on performing activities and the influence of the media (Table 6).

Discussion

Depressive and anxiety symptoms often appear in the form of comorbidity among patients with oncological diseases. Most cancer survivors adjust well to life after being diagnosed with cancer, but some experience permanent negative moods ranging from common feelings of vulnerability, sadness, and fear to a disability, depression, anxiety, trauma, panic, and existential crisis that disrupt normal functioning in daily activities and quality of life (16, 17).

Table 4: Association between characteristics and depression in cancer patients

| *Variables* | **PHQ-9 скор** | | |
	95% CI for Exp (B) (lower–upper)	Odds ratio	p
Age	1.9–25.8	10.6	0.045
Gender	0.3-0.4	0.35	0.961
Education	0.5–1.3	0.92	<0.001
Environment	0.3–9.2	4.72	0.038
Business hours	0.9–7.6	4.27	0.012
Absence from the job	2.6–8.7	5.68	<0.001
Activity restriction	2.9–6.2	4.62	<0.001
Health in general	0.7–4.2	2.43	0.006
Chronic diseases	0.4–1.8	1.14	0.002
Hypertension	1.1–2.7	1.91	<0.001
Use of antihypertensives	0.4–2.1	1.27	0.002
Vision difficulties	0.3–2.4	1.37	0.013
Teeth condition	0.3–2.3	1.03	0.043
Difficulties in performing daily activities	0.2–2.2	1.03	0.042
Influence of the pain on activities performance	1.6–3.1	2.30	<0.001
The need for additional help with activities	0.9–4.2	2.56	0.002
Presence of tension/stress	0.6–3.7	1.57	0.008
Unmet health care needs	1.1–3.7	2.14	0.001
Using emergency help	5.3–10.4	7.89	<0.001
Social support	0.2–2.4	1.42	0.036

Table 5: Beck score values in patients with different cancers

ICD mark	N°	Beck score (Ȳ)	SD	Min-Max
C00	2	40.0	5.65	36.0–44.0
C10	5	42.4	0.89	41.0–43.0
C17	4	48.0	8.98	37.0–59.0
C18	11	54.0	8.79	34.0–62.0
C19	9	46.2	10.34	33.0–56.0
C20	9	44.6	7.60	32.0–52.0
C21	13	45.8	13.77	32.0–63.0
C23	3	49.5	2.12	48.0–51.0
C25.9	4	58.2	9.50	44.0–63.0
C30	1	38.0	–	–
C32	6	39.8	7.86	30.0–46.0
C33	2	34.0	0.0	–
C34	18	50.8	7.67	40.0–63.0
C43	8	32.2	4.03	28.0–39.0
C44	4	40.2	7.41	34.0–51.0
C45	2	51.5	7.78	46.0–57.0
C50	71	42.5	7.69	32.0–63.0
C51	2	32.0	7.07	27.0–37.0
C52	3	44.3	7.51	40.0–53.0
C53.1	13	47.7	9.01	37.0–62.0
C54.3	3	41.7	2.52	39.0–44.0
C56	6	54.8	5.42	44.0–58.0
C61	14	46.1	8.92	28.0–62.0
C62	1	44.0	–	–
C64	9	44.3	8.19	36.0–63.0
C67	8	52.4	8.81	38.0–63.0
C70	1	63.0	–	–
C73	5	43.6	9.50	37.0–60.0
C77	1	56.0	–	–
C81.9	3	51.3	15.01	34.0–60.0
C90	9	47.1	8.36	37.0–56.0

Some studies indicate an increased level of anxiety and depression even years after diagnosis, which is most often caused by fear of recurrence and disease progression (18, 19).

A study examining anxiety and depression in adult cancer survivors and related factors found that 40% of cancer survivors reported moderate to high anxiety, and approximately 20% reported moderate to high depression. Higher anxiety was significantly associated with female gender, younger age, lower social support, lower physical health, and poorer family functioning (20). Being unemployed, receiving less social support, not being treated, a shorter time than diagnosis, poorer physical health, and poorer family functioning were significantly associated with higher levels of depression. Better social support, family functioning, and physical health were associated with lower anxiety and depression (20).

Table 6: Association between characteristics and anxiety in cancer patients

Variables	Beck score		
	95% CI for Exp (B) (lower–upper)	Odds ratio	p
Age	0.07–0.27	0.18	0.001
Gender	1.6–2.2	1.9	0.349
Education	0.3–1.6	0.93	0.004
Employment	0.7–15.1	7.90	0.032
Health in general	4.9–10.2	7.60	<0.001
Long-term illness	7.5–24.5	16.1	<0.001
Activity restriction	3.8–8.9	6.40	<0.001
Hypertension	0.5–2.0	1.28	0.001
Difficulties in performing daily activities	1.8–4.5	3.17	<0.001
Influence of the pain on activities performance	0.7–2.5	1.59	<0.001
The need for additional help with activities	2.3–6.3	4.32	<0.001
The need for help at home	1.8–5.3	3.56	<0.001
Presence of tension/stress	3.7–5.9	4.80	<0.001
Using daily hospital	0.05–7.6	3.76	0.043
Using home care	1.5–9.4	5.46	0.008
Using emergency help	5.6–12.8	9.29	<0.001
Unmet health care needs	0.5–7.5	3.53	0.032
Activity	0.6–5.4	3.02	0.016
Media	0.9–6.7	3.84	0.011
Social support	0.4–3.6	2.03	0.015

The studies examining levels of anxiety and depression depending on the type of cancer, according to the type of cancer revealed significant differences, so that patients with lung cancer, gynecological or hematological cancer reported the highest level of changes in mental health at the time of diagnosis (21, 22). Symptoms of depression and anxiety were more common in older patients than in younger ones, then in patients with lower education and rural areas, as well as in patients with a higher burden of symptoms and poorer physical functioning, while patients who were married were less likely to report anxiety symptoms and depression. It follows from all this that education can be a protective factor in the occurrence of depression and anxiety due to better access to information about one's health condition, understanding of treatment protocols. Al-

so, marital union, religiosity, and spirituality are recognized as a source of support that helps the oncology patient to overcome life difficulties and stressful events such as cancer diagnosis. The higher incidence of symptoms of depression and anxiety in patients in rural areas can be explained by the poor availability of health services faced by the rural population (23, 24). The data also show that in patients with a poorer prognosis, psychological distress increases significantly in the last two to three months before death, and especially in the last month of life (25, 26). In our research the level of depression and anxiety is higher in older subjects, in the presence of comorbidities, with greater limitations of activity, and the presence of difficulties in performing daily activities, with a more pronounced effect of pain on activity.

High levels of patient suffering and quality of life for cancer patients, especially those under stress and depression, should be an important public health issue. In that sense, it is necessary to enable adequate screening for depression and anxiety among patients with oncological diseases in order to prevent mental health disorders in this population category. In addition, the gradual introduction of psycho-oncological interventions, such as counseling and psychotherapy, is a prerequisite for improving the quality of life of patients and a better prognosis of the disease (27, 28).

Conclusion

Identification of patients' psychosocial needs by health professionals, understanding of the process of coping with the disease, and timely detection of mental health disorders are important steps in the reduction of mental disorders in patients with malignant diseases. Caring for the mental health of cancer patients must occupy a significant part of each country's national health policy.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgments

Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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