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Assessment of anxiety and depression and selected psychosocial variables in cancer patients

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Summary

Aim. Assessment of anxiety-depressive disorders in an oncologically ill patient may help in the treatment process and planning psycho-oncological care. The aim of the study was to assess the level of anxiety and depression in cancer patients and their relationship with psychosocial variables.

Methods. The study group consisted of adult cancer patients, eligible for causal treatment for at least 6 weeks. The HADS questionnaire was used to examine 537 patients aged 19 to 91 (average age: 53.5).

Results. Both during the first oncological treatment and in the relapse of the disease, patients more often show symptoms of anxiety than depression. These conditions occur with greater intensity in women than in men ($p = 0.000$), moreover, the risk of depressive disorders increases with the patient's age ($p = 0.015$). The highest intensity of symptoms of depression was observed in patients living in the countryside and in people on disability or retirement pension, and the lowest in small and medium-sized towns and in people who were economically active or on short sick leave. On the other hand, the simultaneous occurrence of anxiety and depression was distinctive for the patients with breast and reproductive organs cancers, which were least frequently reported by patients with urinary tract cancers.

Conclusions. Tools for screening the risk of depression and anxiety disorders should be used routinely during regular medical consultations in a patient with cancer. This will allow for early detection of symptoms and initiation of therapeutic measures.

Key words: anxiety, depression, cancer, HADS

Introduction

Neoplastic diseases are the second leading cause of death worldwide [1]. Cancer and the necessity to undergo treatment are significant sources of stress for the patients and their families. Despite the growing effectiveness of cancer therapy, the disease is still viewed as severe and life-threatening [2, 3]. The crisis associated with cancer and its treatment is a serious emotional and behavioral burden for the patient, which may contribute to the development of anxiety-depressive disorders and trigger destructive coping strategies [4].

In holistic treatment of a human being, including the approach to health and disease problems, the mutual relations between the psyche and the body are emphasized. It is known that this relationship is two-way: the psyche can affect the somatic state and vice versa – the somatic state (disease) can cause mental disorders and/or aggravate their symptoms [5]. The coexistence of chronic diseases and depression is often recognized. Particularly high severity of depressive symptoms is observed in the course of chronic diseases with a neurological background (e.g., stroke, Parkinson's disease, Alzheimer's disease) [6–8].

In relation to oncological diseases, the two-way relationship between the psyche and the body is also emphasized. The literature shows that the percentage of patients with depression in the group of cancer patients is three times higher than in the general population [9]. Diagnosis of depression in cancer patients is often very difficult, because many of the symptoms of depression are blurred and non-characteristic, or overlap with symptoms associated with neoplastic disease and/or its treatment [10, 11]. Massie [12] emphasizes a similar problem, pointing out that no aspect of the mental state of an oncological patient is as difficult to assess as depression, which negatively affects the psychophysical functioning of the patient. Therefore, every cancer patient should be tested for depressive symptoms. Holland and Lesko [13] see the following reasons for the low recognition of depression in cancer patients: considering depression as a normal reaction to the disease, masking depression with somatic symptoms, confusing it with states of sadness, fear of talking about depression with the patient and the expectation that the patient will raise this topic himself [11].

The most common psychological causes of depressive disorders in cancer patients are: a sense of threat to life, uncertainty about the present and the future, loss of control over one's own life, insufficient information about the disease and treatment options, and a change in appearance due to illness and treatment. Depression is also aggravated by the feeling of helplessness and powerlessness towards the disease and inability to influence it. Feeling out of control and being influenced deepens depression and contributes to activating and consolidating destructive coping strategies [14, 15]. Factors from the somatic sphere that may affect the development of depressive disorders include: risk factors from the period before the disease, type of cancer, impaired organ function, metabolic disorders, long-term suffering associated with cancer pain

and cachexia, various physical ailments leading to the weakening of the body, and pharmacotherapy [15, 16].

Neurobiological changes occurring in the course of oncological diseases, causing a sense of psychological anxiety may also cause depression [17]. Cancer is often accompanied by anxiety, dominated by a feeling of a strong unformed threat or a frightening change [18]. It is accompanied by symptoms such as: mental agitation, insomnia, increased alertness, irritability; motor agitation (such as increased muscle tension, restlessness, stupor, trembling hands), and imaginations related to the experienced threat (such as: a sense of closeness to death, the threat of mental breakdown, loss of control over consciousness or behavior) or change – unclear and surprising [4, 19, 20].

The search for factors related to depression and anxiety among oncological patients is not easy but is a priority for clinicians implementing the model of a holistic approach to the patient.

Research aim, research questions and hypotheses

The aim of the study was to assess the level of anxiety and depression in the population of cancer patients and to examine intergroup differences as well as the relationship between anxiety and depression and the type and stage of the neoplastic disease and psychosocial variables such as: gender, age, education, place of residence, and life situation of the patient.

Research questions:

1. What is the level of anxiety and depression in the study group?
2. Are there relationships between anxiety and depression and the patient's individual situation, including: gender, age, education, place of residence, being or not in a relationship, professional situation, type of cancer, stage of treatment of oncological disease.

Research hypotheses:

1. There are differences in the mean values of the studied variables (anxiety, depression) in relation to sex, age, education, place of residence, life situation (in a relationship/single), work situation, type of cancer, stage of treatment of oncological disease;
    a. There are relationships between anxiety and depression and the patient's individual situation, including: gender, age, education, place of residence, being/not in a relationship, professional situation, type of cancer, stage of treatment of oncological disease.

Material and methods

Study group

The study group consisted of 537 adult patients (314 women, 223 men) aged 19 to 91. The mean age of the participants was 53.5 (mean age of women: 54.6, *SD* = 12.11, mean age of men: 52.0, *SD* = 16.17). The participants were patients of the Pain Treatment Clinic of the Maria Skłodowska-Curie National Research Institute of Oncology in Warsaw. The inclusion criterion for the study was the diagnosis of neoplastic disease for at least 6 weeks eligible for causal treatment.

The study was voluntary and based on a single measurement during a visit to the Pain Clinic. Patients who had a result in the questionnaire indicating anxiety or depressive disorders received psychological support provided by a psychologist employed in a pain clinic. The study was part of the research plan for 2016–2018 and was conducted in the period from 01.2017 to 12.2018.

Method

The diagnosis of sociodemographic factors: age, sex, place of residence, work and life situation as well as the type of cancer, stage of treatment of the oncological disease was carried out with the use of the author's questionnaire, which included questions verifying the examined variables.

Depression and anxiety were measured using the Polish (by Majkowicz, de Walden-Gałuszko, and Chojnacka-Szawłowska, 1997) of the *Hospital Anxiety and Depression Scale* (HADS) by Zigmond and Snaith (1983). The HADS scale is a screening tool for the diagnosis of anxiety and depressive disorders in people with physical illnesses. The scale consists of 7 items diagnosing anxiety severity and 7 items diagnosing depression severity. The intensity of these variables is assessed on a 4-point Likert scale. In the anxiety or depression scale, the maximum score is 21 points. In the anxiety or depression scales, a final score of 0–7 points indicates no disorder or low severity, a score of 8–10 points indicates borderline states (medium severity of the disorder) and a score of 11–21 points indicates high severity od the disorder.

Statistical analysis

The normality of the distributions of the study variables was checked using the Kolmogorov-Smirnov test. Homogeneity of variance was tested using Levene's test. Significance of observed differences when comparing 2 subgroups was tested using Student's *t*-test with optional Cochran-Cox correction in case the Levene's test result indicated lack of homogeneity of variance in compared groups. The significance of observed differences when more than 2 groups were compared was tested using one-way analysis of variance; when statistically significant differences were found, they were analyzed using NIR post-hoc tests. The occurrence of relationships was tested using

Kendall's tau-b correlation coefficient. The significance level of 0.05 was assumed in all tests. Statistical analyses were performed using SPSS version 26.

Results

537 patients (314 women and 223 men) aged 19 to 91 were examined, the mean age of the respondents was 53.5 (mean age of women: 54.61, *SD* 12.11, mean age of men: 52.04 *SD* 16.17).

The most common diagnosis was breast cancer (139 patients, 25.9% of cases). The second most frequent neoplasm among the respondents was the neoplasm of the reproductive organs, which accounted for 13.2% of cases (71 patients). Data on tumor location is presented in Table 1.

Table 1. **Tumor location**

Tumor location	Frequency	Percent (%)
Tissues and the nervous system	40	7.4
Reproductive organs	71	13.2
Urology	56	10.4
Lungs	40	7.4
Breast	139	25.9
Lymphomas	38	7.1
Digestive system	69	12.8
Head, neck	71	13.2
Other	13	2.4
Total	537	100.0

The demographics of the study group are presented in Table 2.

Table 2. **Sociodemographic data of the study group**

Place of residence	Frequency	Percent (%)
Country	132	24.6
Small town	154	28.7
Big city	251	46.7
Education		
	Frequency	Percent
Primary	37	6.9

table continued on the next page

Vocational	113	21.0
Secondary	207	38.5
Higher	180	33.5
Employment status		
	Frequency	Percent
Active	164	30.5
Sick leave	114	21.2
Sickness pension	83	15.5
Pension	176	32.8
Family status		
	Frequency	Percent
In relationship	409	76.2
Single	128	23.8
Illness stage		
	Frequency	Percent
First treatment	325	60.5
Relapse	212	39.5

Mean HADS scores in the study group indicated a low level of depressive symptoms (mean 5.35; *SD* 3.8) and a moderate severity of anxiety symptoms (mean 7.48; *SD* 4.23).

Table 3. **Mean HADS scores (anxiety and depression subscales) in men and women**

	Sex	N	Mean	Std. Deviation	Std. Error	Two-tailed significance
Anxiety (HADS)	F	314	8.57	4.457	0.252	0.000
	M	223	5.95	3.363	0.225	
Depression (HADS)	F	314	5.96	3.913	0.221	0.000
	M	223	4.49	3.485	0.233	

* Method used: Student's t-test.

Differences in the severity of anxiety and depression between men and women were verified using Student's *t*-test. The study showed statistically significant differences in the severity of anxiety and depressive symptoms between the group of women and men ($p = 0.000$). In women, the average severity of anxiety symptoms in the HADS

scale (mean 8.57; *SD* 4.45) indicates an increased risk of anxiety disorders during oncological treatment. Detailed results are shown in Table 3.

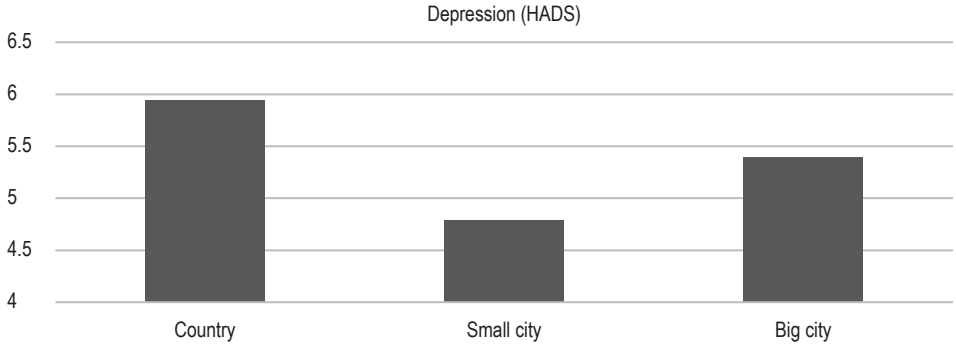
Correlation analyzes by Kendall's tau-b method for the studied variables and age showed a positive correlation between depression and the patient's age ($p = 0.001$). No similar relationships were found with regard to anxiety.

The analysis of differences in the severity of depressive symptoms in subgroups differing in the place of residence was performed using one-way ANOVA with post-hoc analysis using the NIR method. The differences were statistically significant ($p = 0.039$) (Table 4, Figure 1). Patients from small towns showed the lowest severity of depressive symptoms. Patients living in the countryside had the highest level of depressive symptoms (mean 5.94, *SD* 4.07). There were no statistically significant differences in the severity of anxiety symptoms depending on the place of residence.

Table 4. **Place of residence and depression**

		N	Mean	Std. Deviation	Std. Error
Depression (HADS)	Country	132	5.94	4.075	0.355
	Small town	154	4.79	3.729	0.300
	Big city	251	5.39	3.675	0.232
	Total	537	5.35	3.808	0.164

* Methods used: one-way ANOVA, NIR post-hoc tests.



* Methods used: one-way ANOVA, NIR post-hoc tests.

Figure 1. **Place of residence and depression**

The analysis of differences in the severity of symptoms of depression and anxiety in subgroups differing in the status of professional activity was performed using one-way ANOVA with post-hoc analysis using the NIR method. The differences in terms of depression were statistically significant ($p = 0.000$) (Table 5, Figure 2). People on a disability pension or retirement pension were characterized by a higher severity of symptoms of depression than those professionally active or on a short sick leave. There were no significant differences in the severity of anxiety symptoms in the subgroups

differing in the level of professional activity. Detailed results of the post-hoc analysis are presented in Table 6.

Table 5. **Employment status and depression**

		N	Mean	Std. Deviation	Std. Error
Depression (HADS)	Active	164	4.54	3.368	.263
	Sick leave	114	4.88	3.763	.352
	Sickness pension	83	6.27	3.908	.429
	Pension	176	5.98	3.999	.301
	Total	537	5.35	3.808	.164

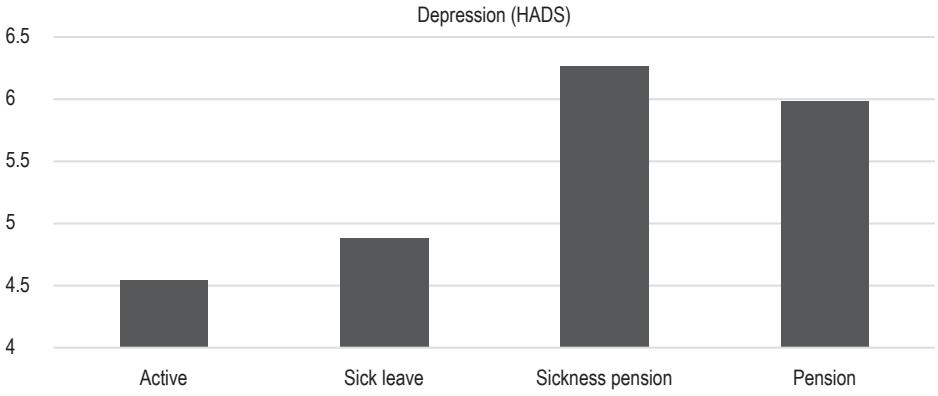
* Methods used: one-way ANOVA, NIR post-hoc tests.

Table 6. **Post-hoc analysis: differences in depression in subgroups differing by employment status**

Employment status (I)	Employment status (J)	Mean difference (I-J)	Std. error	Significance
Disability pension	Active	1.722	0.505	0.001
	Sick leave	1.388	0.541	0.011
Pension	Active	1.440	0.407	0.000
	Sick leave	1.106	0.451	0.015

* Methods used: one-way ANOVA, NIR post-hoc tests.

The notation I-J should be interpreted as the difference in the value of the mean severity of depression in the subgroup defined by the column labeled I and in the subgroup defined by the column labeled J.

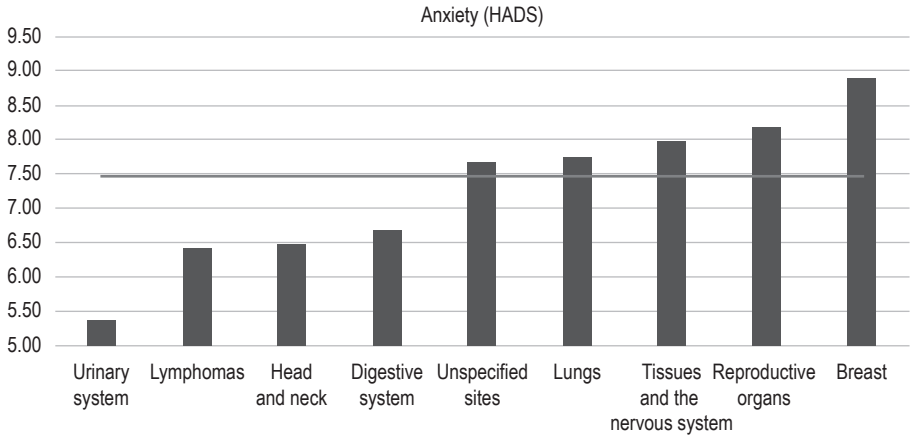


* Methods used: one-way ANOVA, NIR post-hoc tests.

Figure 2. **Severity of depression in groups with different professional status**

There were no statistically significant differences in the severity of anxiety and depressive symptoms in the subgroups differing in the level of education, as well as between patients remaining in a relationship and single patients, and between patients during the first oncological treatment and patients treated during the subsequent relapse of the disease.

The one-way ANOVA was used to analyze the differences in the severity of anxiety and depressive symptoms in relation to the type of cancer. Statistically significant differences were found in the level of anxiety ($p = 0.000$) and depression ($p = 0.003$). The highest levels of anxiety occurred in patients with breast and reproductive organs cancers, followed by cancers of the nervous system, soft tissues and nervous system. On the other hand, the lowest level of anxiety was found in patients with cancer of the urinary system. The highest level of depression was reported in patients with breast and reproductive organs cancers, while the lowest was in patients with cancers of the urinary system. It should also be emphasized that the level of anxiety in relation to diagnosis was significantly higher than that of depression.

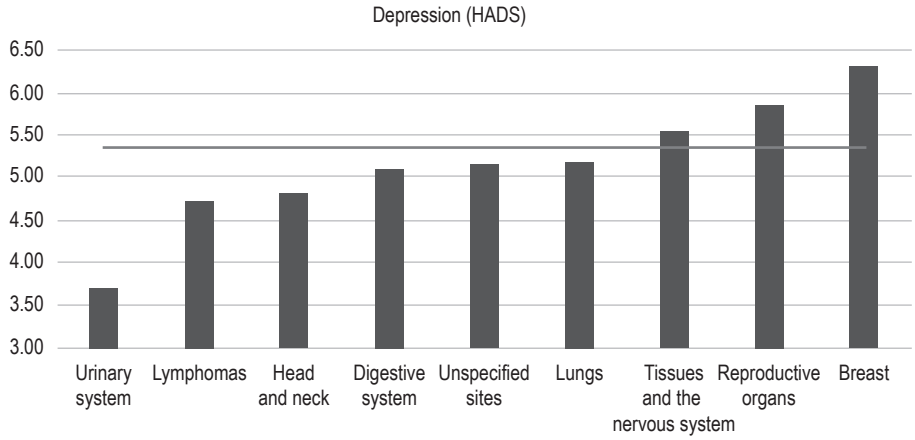


* Method used: one-way ANOVA.

Figure 3. **Tumor location and anxiety**

Discussion

Anxiety and depressive disorders significantly reduce the patient's quality of life during and after completion of oncological treatment. Therefore, it is worth considering preventive diagnosis of anxiety and depressive disorders in all patients undergoing oncological treatment. As a screening tool, the HADS scale has good parameters; it is short and patient-friendly (important in the case of seriously ill patients) and can be used by doctors, psychologists and nurses. The routine use of the HADS scale in the early screening of anxiety and depressive disorders in patients may accelerate the implementation of psychological and psychiatric help [12, 22].



* Method used: one-way ANOVA.

Figure 4. **Tumor location and depression**

Our study found that the problem of anxiety and depressive disorders is important and should be taken into account in the diagnosis of cancer patients. Similar observations are made by Pasquini and Biondi [21], who emphasize the importance and significance of screening procedures for the diagnosis of depression in cancer patients. The authors emphasize that an emotional state, including depression, may influence the course of the disease and interest in treatment. Moreover, inadequate diagnosis of anxiety and depressive disorders reduces the quality of life and extends hospitalization among cancer patients [21]. Dauchy et al. [23] also point out the prevalence of depression and its impact on the functioning of this group. The authors emphasize the impact of emotional state on quality of life, treatment outcomes, and patient attitudes, such as attitudes toward physician compliance. Due to the prevalence of depressive disorders among cancer patients, the importance of an interdisciplinary team that is able to correctly recognize the first symptoms of the disease and then include its treatment in a comprehensive cancer care plan is emphasized [23].

The results of the research indicate that the highest levels of anxiety and depression were found in patients with breast and reproductive organs cancers, while the level of anxiety in relation to the diagnosis was significantly higher than that of depression. These studies thus reveal a second aggravating factor for the female sex, namely breast and genital cancer. In the studies by Jadoon et al. [24], it was found that patients with neoplastic disease exhibit greater anxiety than patients with disease other than cancer (66.0% vs. 40.7%). It has been found that greater anxiety occurs in gastrointestinal and breast cancer compared to other types of cancer. [24].

In own study, a positive correlation between depression and age of patients was found (the percentage of patients with depression caused by a cancer diagnosis increases with age). The obtained results correspond with the reports of Smith [25] who presents

that a cancer diagnosis in children and adolescents does not result in greater depression than among healthy peers. In adults, statistically significant differences are observed in relation to anxiety and depressive disorders and the gender of the studied patients. In some types of cancer, women are up to two to three times more likely than men to experience depressive states. It is important to note that emotional state changes over the course of the disease, and the most severe anxiety and depressive symptoms accompany patients at the time of diagnosis. Anxiety is a natural response to danger, including cancer diagnosis and treatment. The authors expected that the severity of anxiety would increase with the age of patients, which was described by Trevino et al. [26]. Our study did not show such a relationship. Instead, we found that high anxiety severity was present regardless of the age of the patients.

In the presented study, it was also observed that the lowest level of depressive symptoms was experienced by patients from small towns, and the highest by patients living in the countryside. Living in a small rural community may contribute to having fewer skills in seeking social, informational and emotional support in adapting to illness. This may contribute to an increased risk of developing anxiety and depressive disorders. The research by Friber et al. [27] carried out on patients diagnosed with prostate cancer shows that the risk of having a first episode of depression is higher for those with primary education than with secondary and higher education. However, the authors emphasize the multidimensional foundations of depression, including the influence of comorbid factors (including other diseases) and lifestyle. Patients with lower education and a lower socioeconomic position are more likely to be overweight and obese, which may suggest lower health awareness and, at the same time, lower remedial capacity [28].

Cancer patients on a disability pension or retirement pension showed a higher level of depression than those who were professionally active or on a short-term sick leave. This is an important result showing that despite the disease, it is worth encouraging the patient to remain in professional activity, as it is a protective factor for depression. Professional activity is also combined with social activity, which additionally supports the quality of life and better functioning of the patient.

The highest levels of anxiety and depression occurred in patients with breast and reproductive organs cancers, and then in cancers of the nervous system and lungs. In contrast, the lowest levels of anxiety and depression were found in patients with cancer of the urinary system. A study by Naser et al. [29] in hospital settings showed more frequent depression among patients with bladder cancer and severe anxiety states in patients with lung cancer. On the other hand, in the outpatient care, symptoms of depression and anxiety were most common in patients with breast and prostate cancer. The results of the research indicate the necessity of periodic examination of cancer patients for anxiety and depressive disorders [29].

Conclusions

1. Assessment of psychosocial factors in an oncological patient can help in planning psycho-oncological care and should be used in all cancer patients.
2. Women have significantly higher levels of both anxiety and depression compared to men
3. It was found that the higher the patient's age, the higher the level of depressive disorders.
4. The highest level of depression was found in patients living in rural communities, and the lowest level of depression was found in patients living in small towns.
5. Patients professionally inactive due to illness showed a significantly higher level of depression than those professionally active or on short sick leave.
6. The highest level of anxiety and depression was observed in patients with breast and reproductive organs cancers, followed by cancers of the nervous system and lungs. The lowest level of anxiety was found in patients with urinary tract cancers.

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