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Assessment of Anxiety, Depression, Stress and Holistic Needs of Lung Cancer Patients That Undergo Oncology Treatments during the COVID-19 Pandemic

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Abstract

Introduction: Lung cancer is associated with high morbidity and mortality with symptoms deriving from both the disease and its treatment, resulting in mental disorders such as anxiety, stress and depression which have been aggravated amidst the COVID-19 pandemic. **Aim:** This paper aims to investigate the prevalence of anxiety, stress and depression among lung cancer patients undergoing chemotherapy/immunotherapy during the COVID-19 pandemic as well as investigate the association of these mental disorders with the psychological distress experienced by lung cancer patients. **Material and Method:** DASS-21 was used to assess the prevalence of anxiety, depression and stress experienced by lung cancer patients, and the Distress Thermometer was used to assess the level of their distress. **Results:** 160 lung cancer patients under treatment participated in the present study at the Oncology Outpatients' Clinic, "Sotiria" Athens' Chest Diseases Hospital in Athens, Greece. The prevalence of depression was 22%, of anxiety 35% and of stress 17.6%, with the majority experiencing moderate levels (45.7%, 35.7% and 53.6% respectively). The total mean score of DASS-21 was 21.0 ± 18.1 and its subscales mean scores were 9.7 ± 6.7 for stress, 5.9 ± 6.6 for anxiety and 5.3 ± 6.4 for depression, with women having significantly higher scores in all subscales compared to men (p = .018, .010 & .44 respectively). The mean score of DT was 3.8 ±

2.5 and 62.5% of the patients had Practical problems, 24.4% Family problems, 70.6% Emotional problems, 9.4% Spiritual problems and 95% Physical Problems. The subscales of DASS-21 and DT were positively correlated ($p < .001$) indicating that the more distress the patients experience the more psychological symptoms they exhibit and vice versa. Emotional problems are a predictive factor for Stress ($p = .001$) and physical and emotional problems for Anxiety ($p = .009$ & .020 respectively). **Conclusions:** Lung cancer patients under treatment during the COVID-19 pandemic are in need of a holistic approach so as to prevent or alleviate psychological and distress symptoms, thus enhancing their quality of life.

Keywords

Lung Cancer, Treatment, Distress, Stress, Anxiety, Depression

1. Introduction

Since the World Health Organization (WHO) declared SARS-CoV-2 as a public health emergency and later on as a pandemic, named after the disease it causes, COVID-19, there have been severe changes in the provision of health services worldwide (Clouston et al., 2021; Mauri et al., 2020; Sohrabi et al., 2020; Symvoulakis et al., 2020). The focus was placed on patients with COVID-19 infection due to their massive numbers, a situation which affected the treatment of vulnerable patient groups, such as lung cancer patients (Eckford et al., 2022; Bartmann et al., 2021; Bao et al., 2020).

Lung cancer patients undergo treatment such as chemotherapy alone or in combination with immunotherapy and radiotherapy, which are associated with severe side effects but at the same time they should not be stopped because they are vital in managing the disease. However, during COVID-19 there is evidence that lung cancer patients faced delays in their treatments (Eckford et al., 2022; Sharafeldin et al., 2021; Wang et al., 2021; Parohan et al., 2020; Lunski et al., 2021). Such conditions have the potential of increasing the risk of depression, anxiety and stress as well as psychological distress, disorders which are common among cancer patients due to their disease. Except that, lung cancer patients are at higher risk of morbidity and mortality due to COVID-19, since their immune and respiratory systems are already compromised by both cancer and its treatment (Bartmann et al., 2021; Wang et al., 2020a).

During the COVID-19 pandemic, depression, anxiety and stress were found at higher levels among cancer patients as opposed to healthy controls (Ng et al., 2020), with an estimation that they affect more than half of cancer patients (Koca et al., 2022). Regarding the psychological distress of cancer patients due to COVID-19, it has been supported that it is to be expected because of the fear of its impact on the therapy, especially among newly diagnosed patients (Momenimovahed et al., 2021; Wang et al., 2020b), and it is estimated that it was present

for more than 60% of cancer patients during COVID-19 (Ayubi et al., 2021).

All the above are factors that increase the risk of mental disorders which threaten lung cancer patients' mental health and well-being (Rodrigues-Oliveira et al., 2022; Wang et al., 2020b). Therefore, the aim of the present study was to estimate the prevalence of depression, anxiety and stress among lung cancer patients under treatment during COVID-19 pandemic and also investigate their association with psychological distress. It is hoped that this study will provide evidence that should be taken into consideration while treating lung cancer patients during uncertain conditions, which are in need of a holistic approach.

2. Materials and Methods

2.1. Sample

160 lung cancer patients were prospectively reviewed at the Oncology Outpatients' Clinic, "Sotiria" Athens' Chest Diseases Hospital, Greece, after the approval of the study by the Hospital's Science and Medical Ethics Board (registration number 7488/12-3-2021). All requirements of the General Data Protection Regulation (GDPR) were met. All patients gave their informed consent prior their enrollment in the study.

2.2. Data Collection

Data collection took place during 2021-2022 using one general form and two specific ones, which are the following:

1) General form: it included the demographic characteristics of the sample, such as gender, age and educational and marital status. Financial situation and occupation were also included (Ginieri-Coccossis et al., 2008).

2) Focused forms:

a) Depression, Anxiety and Stress Scale-21 Items (DASS-21): it is the shorter version of DASS-42 (Lovibond & Lovibond, 1995) which has been translated and validated for its use in the Greek population (Pezirkianidis et al., 2018). It consists of 3 subscales with 7 items each, measuring the levels of depression, anxiety and stress. Each item is scored between 0 - 3 with 0 indicating that an item does not apply while 3 indicates that an item applies very much or most of the times. The total score is based on summing the scores of all the items, with a total score of 63 and the total score of each subscale is based on summing the scores of the relevant items, with the maximum scoring being 20. However, the scores of DASS-21 need to be multiplied by 2 to calculate the final score for the total scale and each subscale. The cut-off scores for each subscale are as follows:

Depression: 0 - 9 normal, 10 - 13 mild, 14 - 20 moderate, 21 - 27 severe, 28+ extremely severe.

Anxiety: 0 - 7 normal, 8 - 9 mild, 10 - 14 moderate, 15 - 19 severe, 20+ extremely severe.

Stress: 0 - 14 normal, 15 - 18 mild, 19 - 25 moderate, 26 - 33 severe, 34+ extremely severe. The internal consistency of DASS-21 was $\alpha = .92$.

b) Distress Thermometer (DT): the National Comprehensive Cancer Network (NCCN) has developed DT to screen the presence of psychological distress among cancer patients (Tang et al. 2011). The 40 items included, with "yes" or "no" answers, are grouped into five categories which are: practical problems, family problems, emotional problems, spiritual problems and physical problems. Besides these, it includes one question with possible scoring between 0 - 10, with ten indicating severe distress, with cut-off points being < 4 mild or no distress and >4 moderate to extremely severe distress. The internal consistency of DT was α = .85.

3. Results

160 patients were prospectively reviewed. 70% (n = 112) were men, 68.8% were married (n = 110), 38.1% (n = 61) had basic education and the mean age was 66.2 ± 8.2 years. Half of the patents were still working (n = 80, 50%) and 26.9% (n = 43) considered their financial situation to be good (Table 1).

Regarding the medical characteristics of the sample during COVID-19 pandemic, 45% (N = 72) was diagnosed in 2020, with 41.3% (N = 66) visiting their doctor one month after the onset of their symptoms. 57 patients (35.6%) received chemotherapy and more than half (N = 87, 54.4%) had no comorbidity. The majority (N = 149, 93.1%) were not infected by COVID-19 (Table 2).

Table 1. Lung cancer patients' demographic characteristics (n = 160).

Characteristics	N	%
Gender		
Male	112	70
Female	48	30
Marital status		
Single	9	5.6
Married	110	68.8
Divorced	21	13.1
Widowed	20	12.5
Educational level		
Basic	61	38.1
Secondary	56	35
Tertiary	43	26.9
Occupation		
Retired	80	50
Working	80	50
Financial situation		
Good	43	26.9
Sufficient	86	53.8
Poor	31	19.4

Table 2. Lung cancer patients' medical characteristics during COVID-19 pandemic.

	N	%
Year of diagnosis		
2019	42	26.3
2020	72	45
2021	46	28.7
Time of symptom onset and first visit to the doctor		
One month	66	41.3
3 months	14	8.8
>3 months	17	10.6
Randomly	28	17.5
Not given	35	21.9
Treatment		
Chemotherapy	57	35.6
Immunotherapy	40	25
Chemotherapy/Immunotherapy	26	16.3
Chemotherapy/Radiotherapy	18	11.3
Chemotherapy/Radiotherapy/Immunotherapy	11	6.9
Radiotherapy/Immunotherapy	8	5
Comorbidity		
Yes	73	45.6
No	87	54.4
COVID-19 infection		
Yes	11	6.9
No	149	93.1

The mean score of DASS-21 was 21.0 ± 18.1. Regarding its subscales, the mean score of depression was 5.3 ± 6.4, of anxiety 5.9 ± 6.6 and of stress 9.7 ± 6.6. The prevalence of depression was 22.0%, of anxiety 35.0% and of stress 17.6%, with the majority experiencing moderate levels (45.7%, 35.7% and 53.6% respectively). There was significant difference between men and women both in the total mean score of DASS-21 [t (72.6) = −2.6, p = .012] and its subscales. More specifically, women had higher scores in depression [t (69.7) = −2.1, p = .044], in anxiety [t (74.8) = −2.6, p = .010] and stress [t (77.1) = −2.4, p = .018] than men. No other differences were found regarding the rest of the demographic and medical characteristics of the participants (See Table 3).

The mean score of DT was 3.8 ± 2.5. Regarding its subscales DT, as shown in Table 4, the majority of the majority of the patients faced physical (N = 152, 95%), emotional (N = 113, 70.6%) and practical (n = 100, 70.6%) problems.

As shown in Table 5, the subscales of DASS-21 were positively correlated with each other (p < .001). Strong positive correlations were also found between

Table 3. Prevalence of depression, anxiety and stress

	Yes N (%)	Mild N (%)	Moderate N (%)	Severe N (%)	Extremely severe N (%)
Depression	35 (22)	14 (40)	16 (45.7)	2 (5.7)	3 (8.6)
Anxiety	56 (35)	19 (33.9)	20 (35.7)	5 (8.9)	12 (21.4)
Stress	28 (17.6)	10 (35.7)	15 (53.6)	3 (10.7)	-

Table 4. Distress thermometer.

Problems	Yes		No	
	N	%	N	%
Practical	100	62.5	60	37.5
Family	39	24.4	121	75.6
Spiritual	15	9.4	145	90.6
Emotional	113	70.6	47	29.4
Physical	152	95	8	5

Table 5. Correlations between DASS-21 and DT.

		DASS-21	Depression	Anxiety	Stress	DT	Practical	Emotional	Spiritual	Family	Physical
DASS-21	P.C		.924**	.917**	.889**	.436**	.420**	.572**	.350**	.359**	.369**
	p		.000	.000	.000	.000	.000	.000	.000	.000	.000
Depression	P.C	.858**		.753**	.724**	.473**	.382**	.471**	.321**	.289**	.295**
	p	.000		.000	.000	.000	.000	.000	.000	.000	.000
Anxiety	P.C	.699**	.806**		.699**	.416**	.338**	.522*	.299**	.330**	.404**
	p	.000	.000		.000	.000	.000	.000	.000	.000	.000
Stress	P.C	.889**	.724**	.699**		.395**	.427**	.562**	.319**	.359**	.281**
	p	.000	.000	.000		.000	.000	.000	.000	.000	.000

P.C = Pearson Correlation; ** Correlation is significant at the .01 level (2-tailed).

DASS-21 and DT as well as its subscales ($p < .001$). The more the depression, anxiety and stress, the more distress lung cancer patients experience and vice versa ($p < .001$). Furthermore, the more problems lung cancer patients face, the more depressed, anxious and stressed they felt ($p < .001$).

As per multiple linear regression analyses, physical problems positively influence both Stress ($p = .009$) and Anxiety ($p = .020$) while emotional problems positively influence Stress ($p = .001$) (Table 6).

4. Discussion

The present study aimed at investigating the prevalence of anxiety, depression

Table 6. Influence of DT subscales on patients' mental disorders.

	B	Std.Error	Beta	T	*p*
Emotional problems	.986	.284	.249	3.474	.001
Physical problems	−.288	.108	−.173	−2.663	.009
Dependent variable Stress R^2 = .79					
Physical problems	.218	.092	.132	2.357	.020
Dependent variable Anxiety R^2 = .83					

and stress among lung cancer patients undergoing therapy during the COVID-19 pandemic as well as investigating the association between these mental disorders with the distress experienced by lung cancer patients.

The prevalence of anxiety was 35% of depression 22%, and of stress 17.6%, with the majority experiencing moderate levels (45.7%, 35.7% and 53.6% respectively). It was also found that these mental disorders are highly dependent on each other, and more specifically the more depressed the patients felt, the more stressed and anxious they were and vice versa. Also, women exhibited higher levels of depression, anxiety and stress, despite the fact that the ratio between women and men in the present study is disproportionate, with a possible explanation that in Greece, as shown in the present study, the majority of smokers, a high-risk habit of lung cancer, is men, placing Greece in the third place of lung cancer incidence (Mountzios et al., 2020).

In accordance with the above, Koca et al. (2022) also found high prevalence of anxiety (25.2%), depression (14.6%) and stress (7.5%) in their study, highlighting that COVID-19 pandemic has proved to be a highly traumatic event for cancer patients. In the study of Romito et al. (2020), high prevalence of these disorders was also found especially among women, in accordance with the present study. Moreover, in a study among 6.213 cancer patients in China, 23.4% was found to experience depressive symptoms, 17.7% anxiety symptoms and 9.3% PTSD symptoms, which is a direct effect of COVID-19 and associated with high morbidity (Wang et al., 2020b).

However, in the present study, in disagreement with the previous study, the percentages of the participants who contracted COVID-19 was very small with zero mortality could be attributed to the fact the in Greece especially during the two first waves of the pandemic, the measures for the protection of public health and especially in hospitals were taken sooner in comparison with the other countries, which acted as a shield for the vulnerable populations including lung cancer patients, which is reflected by the fact that there were no interruptions in their treatments. Another reason could be that perhaps the patients contracted a less virulent strain of the virus, not the Delta strain, which resulted in a better response in combination with the timely appropriate treatment (Gountas et al., 2020; Li et al., 2021).

Zheng et al. (2020) also found high prevalence of this disorders as well as high psychological distress, as did Sun & Li (2021). More specifically, they associated

these disorders with the psychological distress felt by lung cancer patients. In the present study, psychological distress was strongly correlated with the increase of depression, anxiety and stress and the same was found regarding its subscales. More specifically, practical, emotional, family, spiritual and physical problems were positively associated with all three mental disorders, finding which are supported by several studies which have shown that such problems lead to poor mental health, high prevalence of mental disorders, resulting in poor quality of life (Occhipinti et al., 2019; Liu et al., 2018). These findings are also supported by the study of Anagnosti et al. (2023) who found that emotional problems such as nervousness, anxiety, fears and grief are frequent among lung cancer patients.

The problems which predict the presence of Anxiety and Stress were found to be the physical and emotional problems faced by lung cancer patients during the pandemic. This finding can be explained by the fact that the pandemic exacerbated the emotional and physical problems already felt by this population mainly because of the restrictive measures and their fear of the pandemic itself amidst their treatment for their cancer (Bartmann et al., 2021; Bao et al., 2020; Eckford et al., 2022; Momenimovahed et al., 2021; Wang et al., 2020b).

This study has proven the association between depression, anxiety and stress with psychological distress among lung cancer patients during the COVID-19 pandemic. This finding is significant and needs to be taken into consideration while treating lung cancer patients under unprecedented conditions, and it also highlights the importance of a holistic approach, which should focus not only on cancer treatment but also on preventing mental disorders, which highly deteriorate lung cancer patients' mental and physical health. However, the present study is limited by the fact that it is a single centre study and the stage of the lung cancer and mortality due to cancer was not recorded. However, it was proven that lung cancer patients' mental health is affected by psychological distress, which should be recognized and treated holistically by physicians so as to promote both the mental health and the quality of life of lung cancer patients.

5. Conclusion

Anxiety, depression and stress are prevalent among lung cancer patients and strongly associated with psychological distress leading to a deterioration in their mental health and quality of life. These patients should be screened for the presence of mental disorders and psychological distress and mental health specialists should actively participate in their management so as to prevent their negative effects on their well-being and the outcome of their cancer, especially amidst the difficulties posed by unexpected health emergencies, such as the pandemic COVID-19.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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