ORIGINAL ARTICLE

Depression in Patients with Lung Cancer during the COVID-19 Pandemic

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ABSTRACT

Introduction: The coronavirus disease (COVID-19) pandemic has caused significant disruptions in various aspects of life, leading to psychological distress and an increase in mental health disorders, particularly in vulnerable populations such as lung cancer patients. This study investigated the depression levels among lung cancer patients during the COVID-19 pandemic.
Methods: A cross-sectional study was conducted at the Thoracic Oncology Outpatient Clinic of Persahabatan National Respiratory Referral Hospital, Jakarta. Depression levels were evaluated using the Patient Health Questionnaire-9 (PHQ-9) in Indonesian. Sociodemographic and clinical characteristics and COVID-19-related stress factors (such as concerns about treatment delays, access to healthcare, psychological pressure, and interpersonal relationships) were also assessed.
Results: Out of 42 patients, 42.9% were found to have depression during the pandemic. Factors significantly associated with depression included being female, having a lower economic status, poor performance status, undergoing chemotherapy, and experiencing higher levels of psychological pressure related to COVID-19.
Conclusion: This study highlighted a high prevalence of depression among lung cancer patients during the COVID-19 pandemic. Psychological assessment and interventions are crucial to prevent further deterioration in mental health and quality of life, which could negatively affect patients' prognoses.

INTRODUCTION

The coronavirus disease (COVID-19) pandemic, which began at the end of 2019, has brought massive changes in many areas of society, including the health, social, political, economic, and educational sectors. These disruptions have contributed to psychological strain, resulting in a rise in mental health disorders during the pandemic.[1] An online mental health survey of 4,010 respondents in 34 provinces in Indonesia showed that 64.8% of respondents experienced psychological problems, and 61.5% of them experienced depression.[2]

The impact is particularly severe for patients who need frequent hospital visits, such as those with lung cancer. The therapeutic management of lung cancer patients underwent various adjustments due to the pandemic. Reports indicated that 30-57% of lung cancer patients had alterations in their treatment plans, such as delays and discontinuation of palliative and adjuvant therapy, as well as changes in consultation schedules and methods.[3,4] Some strategies implemented include reducing the number of hospital visits and inpatients, changing the consultation method through telemedicine, accelerating the fractionation of radiotherapy, and stopping or reducing the frequency of maintenance therapy. However, these changes were linked to increased levels of anxiety and depression.[5]

Lung cancer patients also faced challenges due to overlapping radiological signs of COVID-19-related pneumonia and those of lung cancer progression, opportunistic infections, or lung cancer-associated pneumonitis. They are more prone to attribute physical discomfort to COVID-19 and are highly sensitive to physiological changes, particularly concerning symptoms such as coughing, shortness of breath, fatigue, and others. This was compounded by fears of

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being infected with COVID-19, especially due to more severe complications in cancer patients, economic instability, lack of social support due to limited social activities, and reduced communication between patients and medical personnel due to the pandemic. Psychological distress arising from these factors causes an increase in symptoms of mental illness in patients.[6]

Depression is one of the most prevalent mental health conditions among cancer patients. A study by Wang, *et al*. (2020) in China which involved 6,213 cancer patients, showed that, during the COVID-19 pandemic, 23.4% suffered from depression, with mental health worsening compared to pre-pandemic levels.[7] Factors associated with depression include having a history of mental illness, excessive alcohol consumption, worry about delaying therapy during the pandemic, and symptom severity.[7] Depression in lung cancer patients can affect cancer progression, decrease quality of life, decrease medication adherence, and immune system dysregulation, which leads to worsening of symptoms, prognosis, and patient survival rates. Given the profound implications of these issues, further research is critical to assess the prevalence of depression among lung cancer patients during the COVID-19 pandemic and identify contributing factors. Findings from such studies could help improve the quality of treatment services by adopting a more holistic approach that addresses patients' bio-psycho-social needs.

METHODS

This observational study used a cross-sectional design. The subject recruitment took place from March to September 2021. Patients who met the research criteria were recruited using the consecutive sampling technique at Persahabatan National Respiratory Referral Hospital, Jakarta, in which all eligible patients who visited the Thoracic Oncology Outpatient Clinic during the study period were invited to participate. The inclusion criteria were as follows: patients diagnosed with primary lung cancer, aged 18 years or older, capable of understanding Indonesian, and willing to participate in the study and provide informed consent. Exclusion criteria included patients with metastatic lung cancer originating from other organs, patients with a history of psychological disorders, and patients with a performance status greater than 2, as assessed by the Eastern Cooperative Oncology Group (ECOG) Performance Status scale. Participants were thoroughly informed about the objectives of the study before providing consent. Once they agreed, they filled out a questionnaire with the assistance of their family or guardian under the guidance of the researcher.

Measures

COVID-19 pandemic-related factors questionnaire. The COVID-19-related psychological stress factor questionnaire was developed by Wang, *et al*. (2020) to identify factors contributing to psychological distress in patients with cancer as a result of the COVID-19 pandemic.[7] This questionnaire is a Likert scale consisting of five items to measure barriers to treatment and access to health facilities, exposure to information related to COVID-19, concerns about delays in treatment, psychological stress, and the quality of interpersonal relationships during the pandemic.[7]

The Indonesian version of the Patient Health Questionnaire-9 (PHQ-9) is a 9-item questionnaire using a 4-point Likert scale developed to screen for major depressive disorder based on the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria. Patients are asked to reflect on their feelings over the past two weeks, with responses ranging from 0 (not at all) to 3 (almost every day). The total score ranges from 0 to 27, with a score of 10 or higher indicating depression.[8]

Data Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Subgroup analyses utilized the Chi-square test or Fisher's exact test.

Ethics Approval

This study was approved by the Ethics Committee of Persahabatan National Respiratory Referral Hospital, Jakarta (No. 92/KEPK-RSUPP/09/2021). Participants were provided with complete and detailed information about the objective of the study before consenting to participate. They were also informed of their right to withdraw from the study at any time. Personal information collected during the study is kept confidential and is accessible only to the research team.

RESULTS

Sociodemographic Characteristics

Table 1 shows the sociodemographic characteristics of patients, including gender, age, education level, economic level, residency, occupation, staging, performance status, histological type, type of therapy, smoking status, and time since diagnosis.

Table 1. Sociodemographic characteristics

Characteristics (N=42)		N (%)
Gender	Male	26 (61.9)
	Female	16 (38.1)
Age	<60 years old	17 (40.5)
	≥60 years old	25 (59.5)
Education level	Low	7 (16.7)
	High (high school or higher)	35 (83.3)
Marriage status	Married	40 (95.2)
	Single	2 (4.8)
Economic level	Low-middle	27 (64.3)
	High	15 (35.7)
Residency	Urban	33 (78.6)
	Rural	9 (21.4)
Occupational status	Employed	10 (23.3)
	Unemployed	18 (42.9)
	Retired	14 (33.3)
Staging	I	0 (0.0)
	II	2 (4.8)
	III	8 (19.0)
	IV	32 (76.2)
Performance status (PS)	PS 0	11 (26.2)
	PS 1	22 (52.4)
	PS 2	9 (21.4)
Histologic type	Adenocarcinoma	23 (54.8)
	Squamous cell carcinoma	6 (14.3)
	Small cell lung cancer	2 (4.8)
	N/A	11 (26.1)
Therapy	Chemotherapy	21 (50.0)
	Targeted therapy	18 (42.9)
	Radiotherapy	5 (11.9)
	Surgery	1 (2.4)
	Immunotherapy	3 (7.1)
	Palliative	2 (4.8)
	Control	1 (2.4)
History of smoking	Yes	17 (40.5)
	No	25 (59.5)
Time since diagnosis	<2 years	27 (64.3)
	≥2 years	15 (35.7)

Depression in Lung Cancer Patients during the Pandemic

In this study, nearly half (42.9%) of lung cancer patients reported experiencing depression during the COVID-19 pandemic. Table 2 outlines the factors associated with depression in lung cancer patients during the pandemic, including gender, economic status, performance status, and chemotherapy.

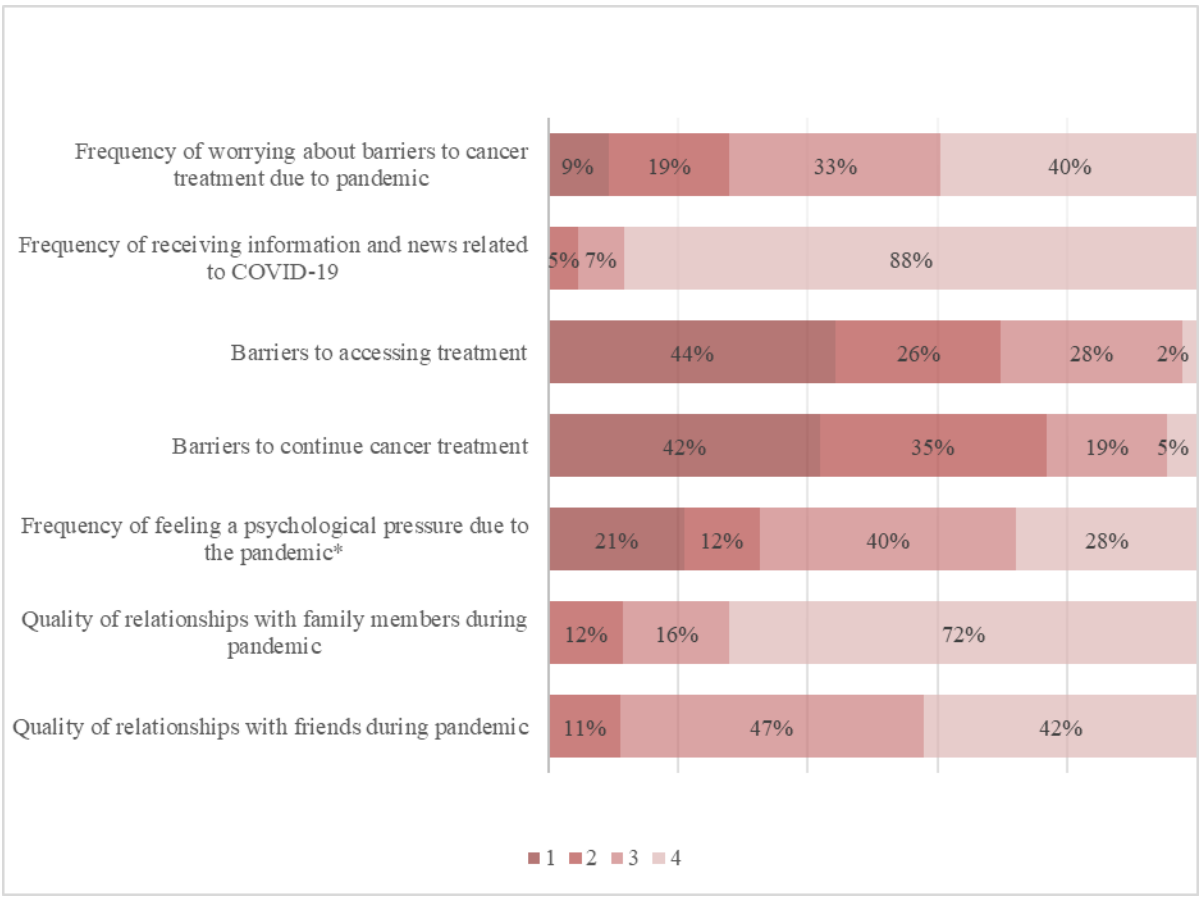
Table 2. Factors associated with depression in lung cancer patients

Characteristics		Depression Status		p
		Depression (N = 18)	Non-Depression (N = 24)	
Gender	Male	8 (30.8)	18 (69.2)	0.044*
	Female	10 (62.5)	6 (37.5)	
Age	<60 years old	7 (41.2)	10 (58.8)	0.856
	≥60 years old	11 (44.0)	14 (56.0)	
Education level	Low	3 (42.9)	4 (57.1)	1.000
	High (high school or higher)	15 (42.9)	20 (57.1)	
Marriage status	Married	17 (42.5)	23 (57.5)	1.000
	Single	1 (50.0)	1 (50.0)	
Economic level	Low-middle	15 (55.6)	12 (44.4)	0.026*
	High	3 (20.0)	12 (80.0)	
Residency	Urban	14 (42.4)	19 (57.6)	1.000
	Rural	4 (44.4)	5 (55.6)	
Occupational status	Employed	3 (30.0)	7 (70.0)	0.473
	Unemployed	15 (46.9)	17 (53.1)	
Staging	I-II	1 (50.0)	1 (50.0)	1.000
	III-IV	17 (42.5)	23 (57.5)	
Performance status (PS)	PS 0-1	11 (33.3)	22 (66.7)	0.025*
	PS 2	7 (77.8)	2 (22.2)	
Histologic type	Non-small cell lung cancer	12 (40.0)	18 (60.0)	1.000

	Small cell lung cancer	1 (25.0)	3 (75.0)	
Therapy	Chemotherapy	13 (61.9)	8 (38.1)	0.013*
	Targeted therapy	5 (27.8)	13 (72.2)	0.087
	Radiotherapy	4 (80.0)	1 (20.0)	0.146
	Surgery	1 (100.0)	0 (0.0)	0.429
	Immunotherapy	0 (0.0)	3 (100.0)	0.247
	Palliative	1 (50.0)	1 (50.0)	1.000
	Control	0 (0.0)	1 (100.0)	1.000
History of smoking	Yes	9 (52.9)	8 (47.1)	0.276
	No	9 (36.0)	16 (64.0)	
Time since diagnosis	<2 years	12 (44.4)	15 (55.6)	0.780
	≥2 years	6 (40.0)	9 (60.0)	

COVID-19-Related Factors

Figure 1 shows COVID-19-related factors in lung cancer patients, which include concerns about exposure to information related to COVID-19, barriers to treatment and access to health facilities, psychological pressure, and the quality of relationships with family and friends during the pandemic. Most patients often felt worried about the barriers in the cancer therapy process due to the pandemic and were often exposed to information related to COVID-19 from many sources. Most patients felt that there were no barriers to accessing treatment or barriers to continuing cancer treatment during the pandemic. Forty percent of patients sometimes felt psychologically pressured due to the pandemic. The patients generally had good-quality relationships with family during the pandemic.



*Significant relationships with depression level

Figure 1. Coronavirus disease (COVID-19)-related factors

DISCUSSION

The COVID-19 pandemic has significantly affected many areas, including psychological well-being. It was reported that, during the pandemic, there was an increase in the prevalence of various mental disorders in various countries, including depression.[9–11] In Indonesia, a survey conducted by the Indonesian Psychiatric Association (PDSKJI) on 4,010 respondents showed that 64.8% experienced psychological problems and 61.5% experienced depression.[2] Identified stressors included restrictions on social activities, financial insecurity due to rising unemployment and declining

income levels, and fear of pandemic-related uncertainties.[1]

In this study, most patients were males, which is consistent with findings by Haris, *et al.* (2015) in Jakarta, where most lung cancer patients were males.[12] Similar trends were observed in China and Japan, with 58.4% and 71.4% male patients, respectively.[13,14] According to the Global Cancer Observatory (GLOBOCAN) 2020, lung cancer is the most prevalent cancer among males globally and in Indonesia. In Southeast Asia, the incidence of lung cancer is 26.4 per 100,000 males and 9.6 per 100,000 females.[12] This discrepancy is linked to higher risk behaviors in males than females, particularly in Asia.[15] The age distribution in this study aligns with previous studies, where lung cancer prevalence was highest among patients aged 60 years old and older, likely due to aging-related biological factors such as deoxyribonucleic acid (DNA) damage and telomere shortening.[16–18] Most patients in this study were from low-to-middle-income levels, similar to a study by Torre, *et al.* in the United States (US), which stated that groups from low economic levels had a higher risk of lung cancer due to higher smoking behavior in low economic groups.[17]

The high percentage of patients at stage IV in this study was due to patients being generally diagnosed when they reached an advanced stage. The delay in diagnosis in lung cancer patients can be caused by generally asymptomatic features of early-stage lung cancer. Moreover, the initial symptoms that arise are similar to various respiratory diseases in general, such as coughing, shortness of breath, chest pain, and hemoptysis, thus allowing for misinterpretation.[19] Chemotherapy was the most common treatment in this study, utilized at various stages of lung cancer for neoadjuvant, adjuvant, or palliative purposes.[20]

The pandemic has exacerbated psychological distress among lung cancer patients, with depression being particularly prevalent.[7,21] In this study, 42.9% of patients experienced depression. Other studies reported varying prevalence rates during the pandemic, such as 34% in England and 51.61% in China, likely due to differences in assessment tools and population characteristics.[22,23]

In this study, several factors were related to depression, including gender, economic level, performance status, and chemotherapy. Female patients reported higher depression rates (62.5%) compared to males (30.8%), consistent with other studies.[13,24,25] This may stem from emotion-focused coping mechanisms and potential over-reporting by female patients, though findings on gender differences remain inconclusive.[24–27]

Patients from lower economic levels were more likely to experience depression. This is consistent with findings from studies by Gu, *et al.* (2017) and Sullivan, *et al.* (2016).[28,29] A higher rate of depression in this group was possibly due to unmet basic needs and economic instability, especially during the pandemic.[21] Patients with poorer performance status were also more vulnerable to depression, consistent with previous studies.[28,30,31] Decreased functional status, which causes limitations in performing daily activities, and increased dependence leads to feelings of hopelessness.[28,30]

Chemotherapy was another factor associated with depression. Various side effects caused by chemotherapy drugs, such as nausea and fatigue, can interfere with daily activities. Hence, it affects the psychological condition of patients, which makes them more susceptible to depression.[32] A study showed that some chemotherapy drugs can impair cognitive function, patient concentration, and memory.[33] Additionally, frequent chemotherapy sessions result in higher costs for treatment, transportation, and nutritional support, which intensify economic burdens and make lung cancer patients more vulnerable to depression.[34]

In this study, it was found that COVID-19 pandemic factors related to depression were the frequency with which patients felt psychologically pressured during the pandemic. Key stressors include significant changes in daily routine activities, concerns about treatment delays, fears of COVID-19 infection (particularly given the higher risk of severe complications in cancer patients), concerns regarding the instability of economic conditions, lack of family and community support due to limited social activities, misunderstanding of information related to COVID-19, and reduced communication between patients and medical personnel due to the pandemic.[14,21] In patients with terminal illnesses such as lung cancer, these challenges are compounded by the disease. A series of symptoms and physiological changes caused by the disease, side effects due to treatment that cause limitations in performing daily activities, and fears of worsening disease progression add to the psychological burden of the patients. Lee, *et al.* (2019) showed that patients' health problems, death of family or close people, and financial crises were the most common sources of stressors found in cancer patients.[32] Additionally, lung cancer patients often link their physical discomforts to COVID-19 symptoms, such as coughing, shortness of breath, and fatigue, exacerbating their concerns and negatively impacting their psychological well-being.[14]

Clinical Implications

This study emphasizes the need for routine psychological screenings in oncology care, especially during public health crises. Depression and other mental

health disorders are often underdiagnosed, as the focus tends to be on managing the physical aspects of cancer. However, failure to address the psychological well-being of cancer patients can result in worsened outcomes, impacting treatment adherence and quality of life. Clinicians should integrate standardized mental health screenings and offer early interventions for patients at risk. Oncology teams should include mental health professionals and train staff to recognize and address signs of depression.

Additionally, telehealth platforms should be utilized for psychological consultations, support groups, and mental health screenings during such public health crises. This ensures that patients continue to have access to mental health resources even when in-person visits are not possible. Healthcare systems should also include mental health support in emergency preparedness plans, ensuring that cancer patients receive adequate emotional care during crises.

LIMITATIONS OF THE STUDY

This study has several limitations to consider. It did not assess depression levels before the pandemic due to its cross-sectional design, preventing the establishment of a causal relationship between the pandemic and depression. This limitation reduces the ability to make inferences about the long-term psychological effects of COVID-19 on lung cancer patients. Second, depression status was based on self-reported questionnaires, which may be influenced by subjectivity and response bias. Clinical assessments could provide a more accurate measurement of depression. Future research should use longitudinal designs to explore causality and incorporate clinical assessments alongside self-reports for more reliable results. Future research should also explore interventions and coping strategies for lung cancer patients to mitigate the psychological impact of the pandemic, particularly in high-risk groups such as those with cancer.

CONCLUSION

This study revealed that a significant proportion of lung cancer patients experienced depression during the COVID-19 pandemic. Key factors contributing to this depression included gender, economic status, performance status, chemotherapy, and the level of psychological distress associated with the pandemic. The high rate of depression observed suggests that psychological interventions should be prioritized, particularly in the context of the ongoing pandemic. Multidisciplinary team mobilization is needed to achieve more holistic and comprehensive care, including the patient's bio-psycho-social aspects.

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Conflict of Interest

The authors declared there is no conflict of interest.

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Authors' Contributions

Preparation, data gathering and analysis, and drafting of the manuscript: HL. Preparation and approval of the manuscript for publication: SA. All authors reviewed and approved the final version of the manuscript.

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