Coping with COVID-19 in Patients with Lung Cancer

BY ELIZABETH S. VER HOEVE, MA; SARAH N. PRICE, PHD; TARA K. TORRES, MA; HEIDI A. HAMANN, PHD; AND LINDA L. GARLAND, MD

In Brief

Patients with lung cancer commonly experience high symptom burden and unmet supportive care needs, placing them at increased risk for psychosocial morbidities. This study assesses coping strategies and psychosocial well-being in patients with lung cancer, who are facing multiple stressors, specifically their cancer diagnosis and the COVID-19 pandemic. To do so, researchers assessed COVID-19-related burden, coping, and psychosocial well-being in 65 patients with lung cancer who were receiving treatment at a National Cancer Institute (NCI)-designated comprehensive cancer center between August 2020 and June 2021. Most patients worried that their cancer status increased their risk for COVID-19 illness. Cross-sectional patient-reported outcomes data indicated that prior experience with a chronic stressor (i.e., diagnosis and treatment for lung cancer) may have enhanced patients' resilience toward the management of stressors, including the COVID-19 pandemic.

The COVID-19 pandemic has yielded devastating effects worldwide,[1] with risks for contraction, hospitalization, and death disproportionately felt by certain subpopulations.[2,3] From the outset, lung cancer patients were warned about their heightened likelihood of severe illness and death if exposed to the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)[4] due to comorbidities, such as chronic obstructive pulmonary disease and cancer treatment history, including thoracic surgery.[5-10] Indeed, research conducted during the first year of the COVID-19 pandemic confirmed that patients with lung cancer, particularly those undergoing active treatment, experienced significantly higher rates of hospitalization relative to healthy adults and more fatalities than patients with other types of solid tumor cancers.[8,9] Prior to the pandemic, numerous studies also identified associations between lung cancer and psychological distress, including stigmatization, symptom burden, and unmet medical and psychological needs.[11-16] Specifically, relative to patients with other cancer types, patients with lung cancer often reported higher levels of distress at cancer diagnosis[15] and experienced a higher risk of suicide,[16] suggesting that these individuals may be at greater risk for psychosocial morbidities during an acutely stressful event like a global pandemic. This confluence of physical and psychosocial vulnerabilities suggests the need for investigation into how patients with lung cancer have coped—mentally and physically—during the COVID-19 pandemic.

Lazarus and Folkman's transactional model of stress and coping was designed to assess the impact of psychological stressors by balancing an individual's appraisal of a stressful event with the actions they take to cope with the event.[17] This model identifies coping as a dynamic process influenced by an individual's cognitive appraisal of a stressful event and explores the various outcomes mediated by the use of different coping strategies.[17] Specifically, this model examines how individuals interpret their perceived susceptibility, given the severity and relevance of a particular stressor, how they interpret their perceived control and self-efficacy over that stressor's outcome can influence their psychological outcomes (e.g., anxiety, depression), and the coping strategies they choose to employ to meet the demands of a particular situation.[18,19]

Emerging data suggest that individuals with heightened COVID-19 health risks are more likely to experience increased psychological distress.[20] For example, healthcare workers in Italy

Utilization of effective coping strategies has been linked to better health and psychosocial outcomes in patients with a variety of cancer diagnoses.[23-25]

with higher COVID-19 risk perception had greater levels of psychological worry compared to the general public.[21] Likewise, a recent qualitative study of individuals living with long-term physical health conditions (e.g., cancer, cardiovascular disease) identified overarching COVID-19-related themes, including high levels of fear and anxiety associated with heightened perceptions about the consequences of being infected with COVID-19.[22]

The coping strategies that patients with cancer employ, based on their threat appraisal, can influence their psychosocial outcomes. Utilization of effective coping strategies has been linked to better health and psychosocial outcomes in patients with a variety of cancer diagnoses.[23-25] Conversely, a recent meta-analysis found that patients with cancer who characterized their cancer diagnoses as a harm or loss often relied on ineffective coping techniques, such as avoidance coping (e.g., behavior designed to avoid thinking or feeling about a stressor).[24,26] For example, patients with breast cancer who engaged in avoidant-style coping behaviors reported greater physical symptom burden.[25] Similarly, newly diagnosed patients with lung cancer who endorsed avoidant coping styles reported higher levels of anxiety and depression.[23] Understanding how patients with lung cancer cope within the context of dual stressors (having a history of lung cancer and living during the COVID-19 pandemic) may:

- Reveal which strategies are most effective for coping with challenging circumstances
- Elucidate associations between psychological coping and mental health outcomes
- Help guide improved patient-centered cancer care.

This study assesses appraisal of risk, psychological distress, and coping behaviors during the COVID-19 pandemic among patients with lung cancer.[27]

Method

Patients and Recruitment

Between August 2020 and June 2021, the principal investigator (Garland) at an NCI-designated comprehensive cancer center (Banner University Medical Center, University of Arizona Cancer Center) invited English-speaking patients with lung cancer in active treatment or follow-up care to participate in this study. Patients completed electronic surveys and consent forms through a secure link via REDCap. This study was approved by the University of Arizona's institutional review board, and analyses were performed using SPSS version 27.

Measures

Demographics and Disease History

Demographic characteristics included gender, race/ethnicity, age, marital status, employment, highest level of education, housing status, and insurance status. Cancer history characteristics included stage at diagnosis, type of lung cancer, and treatment history.

COVID-19 Experiences and Burden

The *COVID-19: Impact of the Pandemic and HRQOL in Cancer Patients and Survivors*[27] questionnaire has been recommended for use by the National Institutes of Health Office of Behavioral and Social Sciences Research.[28] This instrument includes 19 descriptive questions and 36 five-point Likert scale items to assess patients' perceived COVID-19 burden. Perceived COVID-19 Burden includes seven subscales that measure:

- Financial hardship (4 items; e.g., "I have experienced financial difficulties.")
- Healthcare disruption (2 items; e.g., "My general medical care has been disrupted or delayed.")
- Disruption to daily activities (3 items; e.g., "I have been unable to perform my typical daily routines like work, physical or leisure activities.")
- Perceived benefits (4 items; e.g., "I have deeper appreciation for life.")
- Functional social support (4 items; e.g., "I have received emotional support from family or friends when needed.")
- Perceived stress management (5 items; e.g., "I am able to recognize thoughts and situations that make me feel stressed or upset about COVID-19.")
- Satisfaction with providers (2 items; e.g., "My healthcare providers have taken the necessary measures to address COVID-19.")
- COVID-19 anxiety (6 items; e.g., "I worry about the possibility of dying from COVID-19.")
- COVID-19 depression (6 items; e.g., "I have experienced feelings of social isolation or loneliness.").

A Total COVID-19 Burden score reflected the average of all 36 items (items 15 to 16 and 24 to 36 were reverse coded); higher scores (range: 0 to 4) indicated greater burden. Psychometric properties of this questionnaire are preliminary.[28]

The Brief COPE

The *Brief COPE*[29] contains 14 subscales: acceptance, emotional support, humor, positive reframing, religion, active coping, planning, instrumental support, venting, denial, substance use, behavioral disengagement, self-distraction, and self-blame. Higher scores (range 2 to 8) indicated greater utilization of a strategy.

Open-Ended Responses

First, participants who responded "yes" to "I have used my experience in coping with cancer to deal with COVID-19" were asked to explain (via free-text response) how their cancer experience helped them cope during the pandemic. Second, participants who reported a change in the type or frequency of their coping strategies (using the *Brief COPE*) since the onset of COVID-19

were asked to indicate which strategies they now used more/less frequently.

PROMIS® Anxiety-4a and Depression-4a

PROMIS Anxiety-4a and PROMIS Depression-4a are standardized, validated measures[30,31] normalized to the U.S. adult population. Each scale includes four items measured via five-point Likert scales; scores are summed and normed to obtain a standardized *T*-score for general anxiety and general depression. Higher scores signify a greater extent of a symptom.

Results

Descriptive Analyses

Patient Characteristics

Of 130 patients approached, 65 (50 percent) consented and provided survey data (see Figure 1, below). The average age of participants was 69 years; the majority identified as female (66.2 percent), non-Hispanic White (81.5 percent), and married or partnered (58.5 percent), with 49.2 percent reporting educational attainment of at least a bachelor's degree. Most patients had Stage III or Stage IV disease (53.8 percent), and 69.2 percent were diagnosed with non-small cell lung cancer (see Table 1, page 56).

COVID-19 Experiences

Most patients (89.2 percent) had at least one general risk factor for severe COVID-19 illness, and 15.4 percent had specific risk factors, such as exposure to COVID-19+ individuals (6.2 percent) or recent travel to COVID-19 hotspots (7.7 percent). Approximately one-third of patients (33.8 percent) were formally tested for COVID-19. Only five patients (7.7 percent) reported exposure to someone who tested positive, and only one patient (1.5 percent) tested positive with a mild case that did not require hospitalization. Patients generally reported spending less time outside compared with their normal routine (79.4 percent) and experienced a reduction in the amount of work they were able to accomplish (69.2 percent). Some patients (38.5 percent) canceled general medical appointments, and a minority (6.2 percent) avoided a visit to the emergency room or urgent care even when medical attention was warranted. Most patients attended all cancer appointments (in-person or telehealth) during the pandemic (72.3 percent).

Perceived COVID-19 Burden

Most patients (86.1 percent) reported experiencing disruptions to their daily social interactions, with some unable to perform typical daily routines (40.6 percent) and some unable to adequately take care of family members or friends (15.6 percent; see Table 2, page 57). However, few reported financial hardships (23.1 percent), most indicated minimal healthcare disruptions due to COVID-19 (76.6 percent), and most felt as though their healthcare team had taken the necessary measures to address COVID-19 (67.2 percent). Most participants reported feeling anxious (58.5 percent) and concerned that their cancer status put them at greater risk of dying from COVID-19 (72.3 percent), yet most believed that the pandemic would not impact their personal cancer care (64.6 percent), and a minority felt they had no control over how COVID-19 impacted their lives (43.1 percent). Approximately one-third reported changes in sleep patterns (n = 23; 35.4 percent), eating behavior (n = 24; 36.9 percent), and difficulty concentrating (n = 19; 29.2 percent). At the same time, most participants reported feeling a deeper appreciation for life (67.7 percent) and a greater

Figure 1. Study Recruitment Process

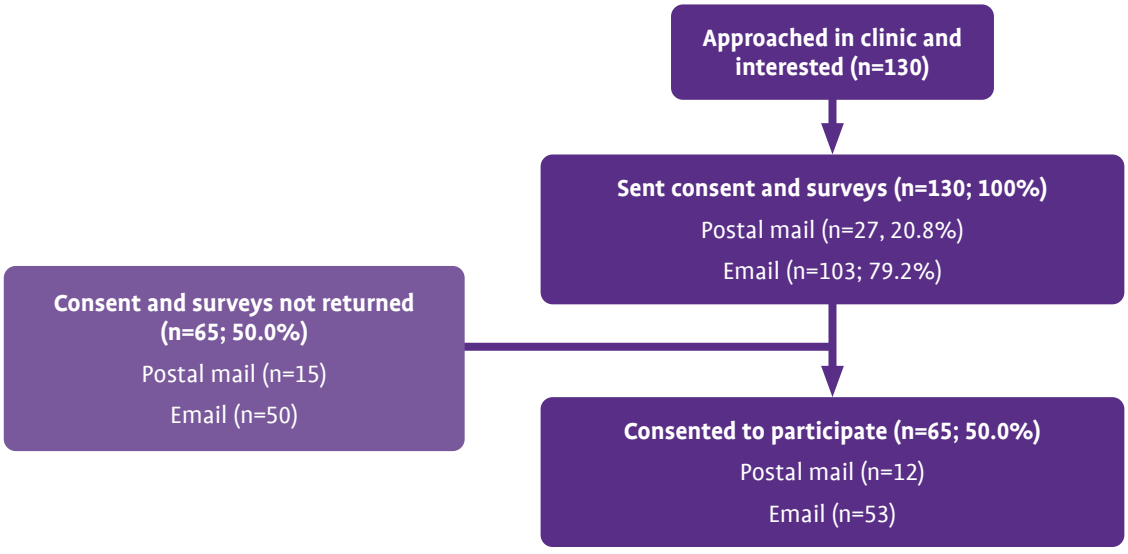

Table 1. Demographic and Disease Characteristics (*N* = 65)

	Mean, SD or *n* (%)
Age	69.03, 7.80
Gender	
Female	43 (66.2)
Male	22 (33.8)
Race/Ethnicity	
Non-Hispanic White	53 (81.5)
Hispanic (any race)	4 (6.2)
Non-Hispanic Black/African American	5 (7.7)
Asian	1 (1.5)
Bi-racial/multi-racial	2 (3.1)
Marital Status	
Single	6 (9.2)
Married/cohabitating	38 (58.5)
Divorced/separated	17 (26.1)
Widowed	4 (6.2)
Education	
High school degree/GED	17 (26.2)
Some college	6 (9.2)
Associate's degree/2-year degree	10 (15.4)
Bachelor's/4-year degree	22 (33.8)
Graduate degree	10 (15.4)
Cancer Stage	
Stage I	8 (12.3)
Stage II	12 (18.5)
Stage III	14 (21.8)
Stage IV	21 (32.3)
Unknown	10 (15.1)
Lung Cancer Type*	
NSCLC	45 (69.2)
SCLC	11 (16.9)
Neuroendocrine/other/more than one type	6 (9.2)
Cancer Treatment*	
Radiation	
Never	20 (30.8)
Current	7 (10.8)
Completed	37 (56.9)
Chemotherapy	
Never	8 (12.3)
Current	17 (26.2)
Completed	39 (60)
Surgery	
Never	34 (52.3)
Current	30 (46.2)

NSCLC = non-small cell lung cancer; SD = standard deviation; SCLC = small cell lung cancer.
*Not all percentages equal 100 percent due to missing data

level of acceptance (69.2 percent), with most participants receiving emotional support from friends and family (69.2 percent), engaging in relaxation practices (80 percent), relying on information-seeking (81.5 percent), re-examining negative thoughts (84.6 percent), and using self-care practices (84.6 percent). Total COVID-19 burden was not associated with any demographic or disease characteristics. Given the rapidly evolving situation with the pandemic, a one-way analysis of variance on total COVID-19 burden was conducted to confirm that participants who completed the survey in 2020 did not differ significantly from those who completed the survey in 2021, F (1, 63) = 0.164, p = 0.687.

Coping Strategies During COVID-19

Among the 14 coping strategies available to individuals facing challenges in their lives, acceptance, active coping, and emotional support were most endorsed. The least endorsed coping strategies were substance use, denial, and self-blame (Table 3, page 58). Most patients reported using the same coping strategies before and during the pandemic, although 22 patients (33.8 percent) reported changing their coping strategies since the start of the pandemic, relying more frequently on religion (24.6 percent), self-distraction (25.6 percent), acceptance (20 percent), and positive reframing (18.5 percent) and less frequently on venting (16.9 percent), self-blame (15.4 percent), distraction/avoidance (12.3 percent), and denial (12.3 percent). The majority of participants (84.6 percent) reported that previous experiences with cancer helped them cope with the COVID-19 pandemic. Qualitative free-text responses from 28 patients (Table 4, page 59) convey how patients' experiences with cancer helped them cope with COVID-19, as indicated by recurring themes of appreciation, patience, and acceptance. Three exemplary quotes are included below:

> *"I have been more focused on the present moment and accepting life as is since I've had cancer, and that helps with COVID-19, too."*

> *"Follow directions for COVID (mask, stay home, etc.) and stick to FDA [U.S. Food and Drug Administration] directions like my oncologist's directions."*

> *"I cannot control the cancer's final outcome, but I can do my part and let God do the rest. Same will be true for COVID-19."*

COVID-19 Total Burden, Coping Strategies, and Psychosocial Outcomes

Average PROMIS *T*-scores for general anxiety (M = 53.59, SD = 9.05, range, 40.3 to 77.9) and depression (M = 51.19, *SD* = 8.3, range, 41 to 69.4) for this sample of patients with lung cancer were within one standard deviation of national averages for normed populations of healthy individuals. Among the demographic and disease characteristics, only female gender was associated with greater anxiety (r[63]=0.377, p=0.002) and depression (r[64]=0.334, p=0.007). Patients with higher total COVID-19 burden experienced greater general anxiety (r = 0.489,

Table 2. COVID-19 Subscales and Total Burden Associated with PROMIS Anxiety and Depression

Impact of COVID-19	Number of Patients (n)	Mean (SD)	Skew Statistic (SE)	PROMIS Anxiety	PROMIS Depression
COVID-19 Total Burden	**65**	**1.65 (0.34)**	**0.792 (0.297)**	**0.489****	**0.414****
Financial hardship	61	1.15 (0.11)	0.868 (0.306)	0.306*	0.285*
Healthcare disruptions and concerns	63	1.13 (0.09)	−0.091 (0.302)	−0.059	0.001
Disruptions to daily activities and social interactions	63	2.23 (0.08)	0.093 (0.302)	0.297*	0.294*
Perceived benefits	63	2.66 (0.71)	−1.139 (0.299)	−0.155	−0.038
Functional social support	62	2.82 (0.08)	−0.946 (0.304)	0.049	0.081
Perceived stress management	63	2.94 (0.06)	−2.327 (0.302)	0.198	0.295*
Provider communication	64	2.47 (0.90)	−0.783 (0.299)	−0.129	−0.127
COVID-19-specific anxiety	63	2.51 (0.86)	−0.05 (0.302)	0.493**	0.359**
COVID-19-specific depression	59	1.87 (0.93)	−0.08 (0.311)	0.663**	0.694**

Missing values from the COVID-19 Total Burden Score were replaced with the series mean.
*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).
SD = standard deviation; SE = standard error

$p < 0.001$) and general depression ($r = 0.414$, $p < 0.001$; see Table 2). Total COVID-19 burden was also correlated with greater use of planning, instrumental support, venting, behavioral disengagement, and self-blame (Table 3). Greater general anxiety was associated with greater use of religion, planning, instrumental support, venting, denial, substance use, behavioral disengagement, and self-blame (Table 3). Greater general depression was associated with greater reliance on planning, instrumental support, venting, denial, substance use, and self-blame (see Table 3). Patients with lung cancer who reported higher levels of general anxiety tended to experience greater financial hardship, disruption to daily activities, COVID-19-specific anxiety, and COVID-19-specific depression. Patients who reported higher levels of general depression tended to experience greater financial hardship, disruption to daily activities, perceived ability to manage stress, COVID-19-specific anxiety, and COVID-19-specific depression (Table 2).

Discussion

The majority of patients with lung cancer in this sample recognized their heightened health risks due to COVID-19 and utilized adaptive coping strategies to mitigate those risks, thus demonstrating effective management of COVID-19-related distress. Strong resilience factors seemed to underlie these patients' appraisals of COVID-19, with most participants capitalizing on social support and engaging in gratefulness, perspective-taking, and self-care behaviors. Patients strongly endorsed the behavioral coping strategies of acceptance, active coping, and emotional support, and the majority identified having used these strategies to cope with cancer and continuing to apply these same strategies to the novel COVID-19 stressor. Although perceived COVID-19 burden was generally low in this sample, patients with higher perceived COVID-19 burden relied on less effective coping strategies, including more venting and behavioral disengagement, and reported higher generalized anxiety and depression, suggesting that these patients' selection of particular coping strategies may impact their psychosocial well-being in response to challenging situations.

According to Lazarus and Folkman, individuals' interpretations of the severity and relevance of stressors and of their control over those stressors' outcomes can influence the coping strategies they choose to employ, which in turn can shape the stressor's actual impact on their lives.[17] In this sample, levels of general anxiety and depression were not found to be significantly higher than those levels found in normed populations of healthy controls, suggesting that these participants' high utilization of appropriate coping behaviors and their realistic perceptions of the pandemic's impact on their daily lives may have guided improved management of psychosocial distress.

Table 3. Correlations Between Coping Strategies and COVID-19 Total Burden, Anxiety, and Depression

Coping Strategies	Mean (SD)	COVID-19 Total Burden	PROMIS Anxiety	PROMIS Depression
Acceptance	6.44 (1.63)	−0.019	0.022	−0.056
Emotional support	5.38 (1.36)	0.063	0.171	0.146
Humor	3.59 (1.58)	0.157	0.057	0.214
Positive reframing	4.87 (1.61)	0.156	0.227	0.055
Religion	5.18 (2.26)	0.116	0.306*	0.148
Active	5.79 (1.45)	0.206	0.191	0.053
Planning	5.05 (1.81)	0.291*	0.332*	0.316*
Instrumental support	4.33 (1.54)	0.323**	0.428**	0.333**
Venting	3.61 (1.32)	0.334**	0.479**	0.41**
Denial	2.5 (1.2)	0.16	0.467**	0.326*
Substance use	2.37 (0.97)	0.232	0.391**	0.353**
Behavioral disengagement	4.40 (1.17)	0.265*	0.308*	0.176
Self-distraction	5.19 (1.53)	0.048	0.216	0.098
Self-blame	3.16 (1.59)	0.403**	0.505**	0.534**

*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).
SD = standard deviation

This study is not without its limitations. Due to recruitment challenges during the pandemic, our sample size was relatively small and, therefore, results may not be generalizable to all patients with lung cancer. Most of the participants reported a relatively high educational status, partnered relationship status, and financial security (suggesting higher socio-economic status), factors that may have partially protected these patients from increased COVID-19 risk impact.[32] Our cross-sectional design also limits generalizability and our ability to make strong statistical inferences. Finally, this study utilized a relatively new measure (the *Impact of the COVID-19 Pandemic and HRQOL in Cancer Patients and Survivors*[27] questionnaire) that was developed quickly to measure real-time patient experiences within the context of the unfolding pandemic. Although the measure has understandably undergone limited psychometric testing given the need for rapid implementation, the use of this measure represents a significant strength because it has been vetted and endorsed by the NIH as a patient-reported outcomes measure of COVID-19 burden[27,28] and because it was designed specifically for use with patients with cancer.

Despite the known stressors associated with COVID-19, patients with lung cancer in this study maintained protective appraisals and coping strategies that may have buffered them against the negative psychosocial consequences (i.e., anxiety and depression) commonly reported by a variety of individuals and groups throughout the COVID-19 pandemic.[33,34] Importantly, our cross-sectional patient-reported outcomes data indicate that prior experience with a chronic stressor (i.e., diagnosis and treatment of lung cancer) may have enhanced resilience toward management of future stressors like the COVID-19 pandemic. As future studies reference our results and the field continues to generate data on the psychosocial well-being of patients with cancer during the pandemic, the generalizability of our findings will be strengthened. Ultimately, identifying and understanding the coping strategies utilized by patients with lung cancer during a global pandemic may guide clinicians and researchers as they attempt to conceptualize resiliency within the context of stress and psychosocial well-being. OI

Elizabeth S. Ver Hoeve, MA, and Tara K. Torres, MA, are clinical psychology doctoral students, and Heidi A. Hamann, PhD, is an associate professor in the Department of Psychology at the University of Arizona, Tucson, Ariz. Sarah N. Price, PhD, is a postdoctoral fellow at Wake Forrest, Winston-Salem, N.C. Linda L. Garland, MD, is a thoracic medical oncologist and professor of medicine at the University of Arizona Cancer Center, Tucson, Ariz.

Table 4. Summary of Free Choice Responses Related to Patients' Coping Strategies

Strategy Theme	Number of Times Endorsed	Exemplary Quotes
Acceptance	20	*"Do not worry until there is something to worry about. Patience—the world does not run on your schedule."* *"I accept others' opinions and responses much more now...I feel I have become much less judgmental and opinionated."* *"Having a cancer diagnosis, I realized I can only take care of myself and 'let it be.' Same for COVID- I can take the precautions and then 'let it be.'"*
Drawing on inner strength and skills learned from their cancer experience	11	*"I have learned to relieve stress through new activities adopted after the cancer diagnosis (baths, yoga, breathing exercises, increased reading)."* *"If I can survive cancer, I can survive anything."*
Appreciation for life	5	*"I suspect I appreciate the true meaning of my mortality a lot more than...a normal human who behaves and plans as though they will live forever."* *"Every day is a gift and should be enjoyed no matter what. There is always something good in a day!"* *"I thank God every day that I am still alive."*
Connection with others and the present moment	5	*"Using technology to communicate with friends/family."* *"Making sure that I connect with friends and family more. Trying to be more supportive of friends and family. Trying to make more time to just sit and think."*

Funding

This study received a basic/clinical partnership grant (Garland/Hamann) from the University of Arizona Cancer Center (P30CA023074).

Conflicts of Interest

The authors have no conflicts of interest to disclose.

Ethics Approval

This study was approved by the University of Arizona's Institutional Review Board (IRB No. 2004563860).

References

1. Jensen N, Kelly AH, Avendano M. The COVID-19 pandemic underscores the need for an equity-focused global health agenda. *Humanit Soc Sci Commun.* 2021;8(1):1-6. doi:10.1057/s41599-020-00700-x

2. Stokes EK. Coronavirus disease 2019 case surveillance—United States, January 22-May 30, 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69(24):759-765. doi:10.15585/MMWR.MM6924E2

3. Killerby ME. Characteristics associated with hospitalization among patients with COVID-19—metropolitan Atlanta, Georgia, March-April 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69(25):790-794. doi:10.15585/MMWR.MM6925E1

4. Horn L, Garassino M. COVID-19 in patients with cancer: managing a pandemic within a pandemic. *Nat Rev Clin Oncol.* 2020;18(1):1-2. doi:10.1038/s41571-020-00441-5

5. Luo J, Rizvi H, Preeshagul IR, et al. COVID-19 in patients with lung cancer. *Ann Oncol.* 2020;31(10):1386-1396. doi:10.1016/J.ANNONC.2020.06.007

6. Dai M, Liu D, Liu M, et al. Patients with cancer appear more vulnerable to SARS-CoV-2: a multicenter study during the COVID-19 outbreak. *Cancer Discov.* 2020;10(6):783-791. doi:10.1158/2159-8290.CD-20-0422

7. National Cancer Institute. Coronavirus: what people with cancer should know. Published 2021. Accessed August 1, 2021. https://www.cancer.gov/about-cancer/coronavirus/coronavirus-cancer-patient-information

8. Fernandes GA, Feriani D, França e Silva ILA, et al. Differences in mortality of cancer patients with COVID-19 in a Brazilian cancer center. *Semin Oncol.* 2021;48(2):171-180. doi:10.1053/j.seminoncol.2021.01.003

9. Tagliamento M, Agostinetto E, Bruzzone M, et al. Mortality in adult patients with solid or hematological malignancies and SARS-CoV-2 infection with a specific focus on lung and breast cancers: a systematic review and meta-analysis. *Crit Rev Oncol Hematol.* 2021;163:103365. doi:10.1016/j.critrevonc.2021:103365

10. Passaro A, Bestvina C, Velez MV, Garassino MC, Garon E, Peters S. Severity of COVID-19 in patients with lung cancer: evidence and challenges. *J Immunother Cancer.* 2021;9(3):e002266. doi:10.1136/JITC-2020-002266

11. Sanders SL, Bantum EO, Owen JE, Thornton AA, Stanton AL. Supportive care needs in patients with lung cancer. *Psychooncology*. 2010;19(5):480-489. doi:10.1002/pon.1577

12. Vodermaier A, Lucas S, Linden W, Olson R. Anxiety after diagnosis predicts lung cancer-specific and overall survival in patients with stage III non-small cell lung cancer: a population-based cohort study. *J Pain Symptom Manage*. 2017;53(6):1057-1065. doi:10.1016/J.JPAINSYMMAN.2016.12.338

13. Lehto RH. Symptom burden in lung cancer: management updates. *Lung Cancer Manag*. 2016;5(2):61-78. doi:10.2217/lmt-2016-0001

14. Hamann HA, Ostroff JS, Marks EG, Gerber DE, Schiller JH, Lee SJC. Stigma among patients with lung cancer: a patient-reported measurement model. *Psychooncology*. 2014;23(1):81-92. doi:10.1002/pon.3371

15. Linden W, Vodermaier A, MacKenzie R, Greig D. Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. *J Affect Disord*. 2012;141(2-3):343-351. doi:10.1016/j.jad.2012.03.025

16. Rahouma M, Kamel M, Abouarab A, et al. Lung cancer patients have the highest malignancy-associated suicide rate in USA: a population-based analysis. *Ecancermedicalscience*. 2018;12:1-11. doi:10.3332/ecancer.2018.859

17. Lazarus RS, Folkman S. *Stress, Appraisal, and Coping*. New York: Springer; 1984.

18. Emotion-focused coping. APA Dictionary of Psychology. Accessed July 28, 2021. https://dictionary.apa.org/emotion-focused-coping

19. Problem-focused coping. APA Dictionary of Psychology. Accessed July 28, 2021. https://dictionary.apa.org/problem-focused-coping

20. Pfefferbaum B, North CS. Mental health and the COVID-19 pandemic. *N Engl J Med*. 2020;383(6):510-512. doi:10.1056/NEJMP2008017/SUPPL_FILE/NEJMP2008017_DISCLOSURES.PDF

21. Simione L, Gnagnarella C. Differences between health workers and general population in risk perception, behaviors, and psychological distress related to COVID-19 spread in Italy. *Front Psychol*. 2020;11:2166. doi:10.3389/FPSYG.2020.02166/BIBTEX

22. Fisher A, Roberts A, McKinlay AR, Fancourt D, Burton A. The impact of the COVID-19 pandemic on mental health and well-being of people living with a long-term physical health condition: a qualitative study. *BMC Public Health*. 2021;21(1):1801. doi:10.1186/S12889-021-11751-3

23. Oancea C, Suciu C, Timar B, Papava I, Raica M, Burlacu O. The reciprocal relationship between coping mechanisms and lung cancer diagnosis: findings of a prospective study. *Cancer Manag Res*. 2018;10:33-40. doi:10.2147/CMAR.S148341

24. Franks HM, Roesch SC. Appraisals and coping in people living with cancer: a meta-analysis. *Psychooncology*. 2006;15(12):1027-1037. doi:10.1002/pon.1043

25. Bauer MR, Harris LN, Wiley JF, et al. Dispositional and situational avoidance and approach as predictors of physical symptom bother following breast cancer diagnosis. *Ann Behav Med*. 2016;50(3):370-384. doi:10.1007/s12160-015-9763-7

26. American Psychological Association. Avoidance coping. APA Dictionary of Psychology. Accessed December 1, 2021. https://dictionary.apa.org/avoidance-coping

27. Penedo FJ, Cohen L, Bower J, et al. COVID-19: Impact of the pandemic and HRQOL in cancer patients and survivors. Unpublished questionnaire. Published 2020. Accessed August 18, 2022. nlm.nih.gov/dr2/COVID-19_IMPACT_HRQOL_QUESTIONNAIRE_FINAL.pdf

28. National Institute of Environmental Health Sciences, U.S. National Library of Medicine. COVID-19 OBSSR research tools. Published May 14, 2020. Accessed December 1, 2021. nlm.nih.gov/dr2/COVID-19_BSSR_Research_Tools.pdf

29. Carver CS. You want to measure coping but your protocol's too long: consider the Brief COPE. *Int J Behav Med*. 1997;4(1):92-100. doi:10.1207/s15327558ijbm0401_6

30. Cella D, Yount S, Rothrock N, et al. The Patient-Reported Outcomes Measurement Information System (PROMIS): progress of an NIH roadmap cooperative group during its first two years. *Med Care*. 2007;45(5 Suppl 1):S3-S11. doi:10.1097/01.mlr.0000258615.42478.55

31. Gershon RC, Rothrock N, Hanrahan R, Bass M, Cella D. The use of PROMIS and assessment center to deliver patient-reported outcome measures in clinical research. *J Appl Meas*. 2010;11(3):304-314.

32. Liao TF, De Maio F. Association of social and economic inequality with coronavirus disease 2019 incidence and mortality across U.S. counties. *JAMA Netw Open*. 2021;4(1). doi:10.1001/jamanetworkopen.2020.34578

33. Rudenstine S, McNeal K, Schulder T, et al. Depression and anxiety during the COVID-19 pandemic in an urban, low-income public university sample. *J Trauma Stress*. 2021;34(1):12-22. doi:10.1002/jts.22600

34. Bäuerle A, Teufel M, Musche V, et al. Increased generalized anxiety, depression and distress during the COVID-19 pandemic: a cross-sectional study in Germany. *J Public Health (Oxford)*. 2020;42(4):672-678. doi:10.1093/pubmed/fdaa106