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Research Article

Stress Levels of the Cancer Patients During the COVID-19 Pandemic: The Roles of Self-Efficacy and Spiritual Exercises

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Abstract

During the COVID-19 pandemic, cancer patients, a vulnerable group, faced heightened stress along with the stress they experienced due to their ongoing condition. Previous research emphasized the importance of engaging in spiritual exercises in stress management. Furthermore, self-efficacy is recognized as a crucial variable in coping with stress. The current study aims to examine whether self-efficacy predicted trauma-related stress in cancer patients during the COVID-19 pandemic and explored whether performing spiritual exercises moderated this relation. Ninety-one cancer patients were recruited through the oncology departments of hospitals and social media channels of cancer-related solidarity associations. The results of the hierarchical regression analysis indicated that higher self-efficacy was associated with lower trauma-related stress levels. However, engaging in spiritual exercises neither directly affected stress levels of the cancer patients nor moderated the relation between self-efficacy and trauma-related stress. The association between trauma-related stress levels and self-efficacy during periods of heightened health threats, such as the COVID-19 pandemic, holds significant implications for health psychologists and clinical psychologists who work with cancer patients. Understanding this relation can inform targeted interventions and therapeutic strategies aimed at enhancing self-efficacy, which may, in turn, mitigate stress and improve overall psychological well-being in this vulnerable population. Future research is recommended to consider the significance attributed to spiritual practices and the duration of individuals' engagement with these practices to yield more precise findings.

Keywords:
COVID-19 pandemic • Trauma-related stress • Cancer • Self-efficacy • Spiritual exercises

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Introduction

COVID-19 infection, the complicated respiratory syndrome caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has grown into a rapidly global pandemic (Sohrabi, 2020). During this global pandemic, not everyone was affected to the same degree by this virus. Compared to healthy people, cancer patients were found as more vulnerable to infection since their immune system is suppressed due to the deleterious tissues and treatments like radiotherapy, immunotherapy, and chemical-based therapies (Sinha & Kundu, 2021). Thereby, cancer patients infected with SARS-CoV-2 showed severe indications of the virus, such that they had higher rates of need for invasive mechanical ventilation (Dai et al., 2020). In addition to the physiological vulnerability of the cancer patients, Cui and colleagues (2020) reported that breast cancer patients were psychologically at higher risk than the nurses working in the first row to combat COVID-19 infections in Wuhan, China. Hence, cancer patients were one of the most vulnerable groups during the COVID-19 pandemic due to their both physiological and psychological susceptibilities.

Parallel to the view of biopsychosocial model, which suggested a holistic approach to health and illness (Engel, 1980), besides the biological factors, psychological and social ones have also been considered while studying COVID-19 infection. Self-efficacy is an example of the psychological dimension of the biopsychosocial model. Self-efficacy was defined by Bandura (1995) as the people's beliefs about their ability to produce certain levels of performance, emphasizing that it determines people's emotions, thoughts, motivations, and behaviors. Research showed that self-efficacy is positively associated with mental health (Abdel-Khalek & Lester, 2017) and psychological well-being (Fu et al., 2018). It is such a powerful factor that it has a stronger effect than other psychological factors, such as attitudes and norms, on intentions and behaviors (Sheeran et al., 2016). It was associated with reduced pain severity (Lenoci et al., 2002) and decreased physical symptoms in patients with sickle cell disease (Edwards et al., 2000). Since some of the physical symptoms of sickle cell disease (e.g., nausea, vomiting, pain, and fatigue) are similar to those of cancer, we can expect similar findings in cancer patients. As expected, self-efficacy was negatively correlated with fatigue and pain, and positively associated with well-being in cancer patients (Porter et al., 2008). Moreover, self-efficacy reduced the influence of fatigue on physical activities of cancer patients (Haas, 2011). Thus, Bozo and colleagues (2019) suggested that cancer patients with high self-efficacy can overcome the difficulties of the disease and the requirements of the treatment in an easy and effective way. One of the limited studies examining the effects of self-efficacy on quality of life in cancer patients reported that those with higher self-efficacy had a better quality of life than those with low self-efficacy (Merluzzi et al., 2001). Thus, self-efficacy could be an important factor in both the physical and

psychological well-being of cancer patients, and it should be further examined with respect to other psychological variables, such as stress.

Stress refers to the neuroendocrine response of the body (Chrousos, 1998), the body's reaction to environmental challenges (Simandan, 2010), or an adaptive response that aids an organism to fight and modify themselves (Bisaz et al., 2009). In the case of cancer, a bidirectional relation between stress and cancer was suggested. While stress may be associated with microorganisms that cause cancer (Moreno-Smith et al., 2010), cancer and its damages on physiological (e.g., hair loss, functional loss) and social life (e.g., effects on social roles and occupation) may also cause stress (Pitman et al., 2018). Previous research has revealed that cancer patients have greater stress than the healthy population (Pitman et al., 2018; Slimano et al., 2020; Tsaras et al., 2018). To elaborate, cancer is usually seen as a miserable disease due to its high mortality rate and adverse effects on patients' self-image. These negative perceptions about the disease may lead to elevated levels of stress, such that breast cancer patients have a stress prevalence rate of about 78 per cent (Alagizy et al., 2020). Given these findings, it is inevitable that the stress levels of cancer patients, who are already battling with this challenging disease, will increase in the face of a new and unpredictable disease like COVID-19. During the pandemic, the vast majority of cancer patients reported that they feared their disease would worsen, and almost all of them reported high levels of anxiety, depression, and stress (Chen et al., 2020).

After biopsychosocial model was accepted as the dominant model in the field of health, spirituality was also suggested as one of the dimensions of health (Miller & Thoresen, 1999; Dhar et al., 2013). Spirituality is an abstract term used in many contexts with different definitions such as the sense of purpose (Hassed, 2000), the search for hope/harmony (McSherry, 2000), sense of being (Stoll, 1989) or giving meaning to life (Swinton & Pattison, 2001). Research has shown the therapeutic impact of spirituality on the well-being of cancer patients. The diagnosis of cancer leads to feelings such as anxiety or hopelessness (Vachon, 2008). Spirituality, on the other hand, has a strong effect on reducing hopelessness (Gülerce & Maraj, 2021) and anxiety (Rias et al., 2020). Therefore, spirituality can be a useful tool for coping with stress in cancer patients (Fehring et al., 1997; Weaver & Flannelly, 2004; Turke et al., 2020).

Besides spirituality, the cognitive model of stress has addressed self-efficacy as an important factor for evaluating external demands as a threat or challenge (Lazarus & Folkman, 1984). In fact, high self-efficacy is associated with perceiving demands as a challenge rather than a threat (Chemers et al., 2001). Cancer patients with higher self-efficacy showed much better coping with their symptoms, more harmony in their lives, lower stress level, greater cancer compliance, and higher behavioral functionality

(Beckham et al., 1997; Martos-Méndez, 2015; Merluzzi et al., 2019; Rottmann et al., 2010). Similarly, Akıncı, Akyüz-Yılmaz and Bozo (2021) emphasized the critical role of breast cancer patients' beliefs in their ability to sustain their daily activities for having better physical and psychological well-being during treatment process.

In addition to the individual effects of spirituality and self-efficacy on stress levels, research has highlighted that spirituality and self-efficacy may also be related, which may in turn further influence psychological outcomes (Lopez et al., 2012). In sickle cell patients, higher spirituality was associated with higher self-efficacy, and their interaction was associated with higher quality of life (Adegbola, 2011). Moreover, higher spirituality and self-efficacy were associated with decreased hopelessness, and the relation between spirituality and hopelessness was mediated by self-efficacy (Kasapoğlu, 2022). Given these findings in different populations, the interrelation between spirituality and self-efficacy is worth exploring in cancer patients, as well.

All in all, the individual and interaction effects of spirituality and self-efficacy on stress are of great importance. However, to our knowledge, no studies have investigated these associations, particularly in cancer patients within the context of a pandemic. Therefore, the present study aimed to examine whether self-efficacy and spiritual exercises are related to trauma-related stress levels in cancer patients, as well as whether these factors interact in predicting trauma-related stress. Accordingly, we proposed the following hypotheses:

H1. Cancer patients with higher self-efficacy would report lower trauma-related stress.

H2. Cancer patients engaging more frequently in spiritual exercises would report lower trauma-related stress.

H3. Spiritual exercises would moderate the relation between self-efficacy and trauma-related stress, such that cancer patients with higher self-efficacy would report significantly lower stress levels if they engaged in more spiritual exercises.

Method

Participants

Ninety-one cancer patients (M_{age} = 50.57, *SD* = 10.40), were recruited from Ankara Oncology Education and Research Hospital and various cancer associations via convenience sampling. Inclusion criteria were having an official cancer diagnosis of any type, being between 30-70 years old, being able to read and understand Turkish and providing informed consent. See Table 1 for detailed information on the demographic characteristics of the participants.

Table 1
Demographic Characteristics of Participants

Variables	*N*	*%*	*M*	*SD*	*Min-Max*
Age	91		50.57	10.40	30−70
Gender					
Female	67	73.6			
Male	24	26.4			
Education level					
Primary school	13	14.3			
Secondary school	5	5.5			
High school	21	23.1			
University student	3	3.3			
Bachelor's degree	42	46.1			
Master's degree	7	7.7			
Employment status					
Yes	27	29.7			
No	64	70.3			
Financial status					
Low	17	18.7			
Average	68	74.7			
High	6	6.6			
COVID-19 infection					
Yes	43	47.3			
No	48	52.7			
Hospitalization due to COVID-19					
Yes	18	19.8			
No	73	80.2			
Physiological disorder (comorbidity)					
Yes	21	23.1			
Having treatment					
Yes	16	76.2			
No	5	23.8			
No	70	76.9			
Psychological disorder					
Yes	12	13.2			
Having treatment					
Yes	8	66.6			
No	4	33.3			
No	79	86.8			

Measures

Demographic Information Form. Information regarding the participants' age, gender, education level, employment status, financial status, duration of the cancer since the diagnosis, treatment duration, the city of participation was collected via this form. Participants also provided information on psychological and physical disorders other than cancer, their COVID-19 history, hospitalization status during the pandemic, and perceptions of COVID-19 severity and controllability.

Cancer Behavior Inventory (CBI). CBI was developed by Merluzzi et al. (2001) to measure the self-efficacy of cancer patients about performing their tasks. It is composed of 33 items measured on a 9-point Likert-type scale, ranging from 1 (not at

all confident) to 9 (totally confident). Higher scores obtained from the scale indicate higher self-efficacy (e.g., Accepting that I have cancer, trying to be calm throughout treatments and not allowing scary thoughts to upset me). The original scale was found reliable (α = .94) and valid. Bozo et al. (2019) adapted this scale into Turkish with a high internal consistency reliability (α = .91). The validity analyses of the Turkish CBI yielded satisfactory results. It was highly correlated with the Life Orientation Test-Revised (r = .50, p < .01) and the Beck Depression Inventory (r = -.50, p < .01). The internal consistency reliability of CBI for the present sample was .93.

Impact of Event Scale-Revised (IES-R). The IES-R (Weiss & Marmar, 1997) is a revised version of the IES developed to measure stress in patients exposed to traumatic events. The instrument is composed of three subscales (i.e., intrusion, avoidance, and hyperarousal) and 22 items rated on a 5-point Likert-type scale ranging from 0 (not at all) to 4 (extremely). Internal consistency reliabilities of the subscales range from .83 to .89, and the test-retest reliabilities range from .52 to .76. Although primarily used for PTSD-related stress, IES-R has also been applied to assess COVID-19 related stress (Miaskowski et al., 2020; Wang et al., 2020). The Turkish adaptation, conducted by Çorapçıoğlu et al. (2006), demonstrated high internal consistency reliability (α = .93) and validity, including a strong correlation with Clinician Administered Post Traumatic Stress Disorder Scale (CAPS) (r = .705, p < .001). In the present sample, Cronbach's α was .91.

Spiritual Exercises. Participants' frequency of engaging in spiritual exercises during the COVID-19 epidemic (according to their religious beliefs) was measured with a single 5-point Likert-type question, ranging from 1 (never) to 5 (always). While answering, they were asked to consider the past three months (When you think about your last three months, how often did you do spiritual exercises (e.g., praying, visiting a prayer hall, doing meditation and/or yoga during the COVID-19 pandemic period?).

Procedure

Ethical approval was obtained from the Institutional Review Board of the Middle East Technical University and Ankara Provincial Health Directorate. Participants were contacted through the Ankara Oncology Education and Research Hospital and cancer-related associations. Researchers informed hospital staff about the study and obtained verbal permission to meet patients attending treatment. Research announcements were also shared via associations' social media accounts. Data collection occurred between April 2022 and January 2023, during the post-lockdown period. Participants completed the survey online via Qualtrics XM, a secure platform that allows anonymous data collection and randomization of survey items. The study link was sent to patients who agreed to participate. After providing informed consent, participants first completed the demographic information form, and then the

assessment tools presented in a randomized order. Participation took approximately 15 minutes. At the end, participants received a debriefing form with researchers' contact information and study details.

Data Analysis

Data were analyzed using IBM SPSS. To test our hypotheses, we conducted a hierarchical multiple regression analysis to examine whether spiritual exercises (i.e., moderating variable) moderated the relation between self-efficacy (predictor variable) and trauma-related stress (outcome variable) in cancer patients. Comorbidity was included to the model as a covariate, as it was significantly associated with trauma-related stress in preliminary analyses. Continuous predictors were mean centered prior to the analysis (Aiken & West, 1991), and an interaction term was computed as the product of self-efficacy and spiritual exercises. Model assumptions (e.g., normality, multicollinearity, linearity and homoscedasticity) were evaluated, and outliers and influential cases were screened prior to hypothesis testing.

Results

Before conducting the primary analyses, the data were screened for missing values and outliers. Since one participant was outside the age range specified for this study, their data were excluded from further analyses. Outlier analysis performed through Mahalanobis distance revealed no outliers in the dataset.

As a first step in the assumption checks, multicollinearity was examined. Results showed that multicollinearity was not a concern in the data, as all tolerance values were greater than .90 and all VIF values were around 1 (range = 1.059–1.104). The normality of standardized residuals was examined through visual inspection of the histogram and the Normal P–P plot, both of which supported the assumption of normality. The assumptions of linearity, homoscedasticity, and residual distribution were checked using a scatterplot of standardized residuals against standardized predicted values. The residuals were randomly scattered across predicted values with no systematic pattern, showing that these assumptions were satisfied. Lastly, influential cases were observed using Cook's distance. All values were below 1 (range = 0-0.172), indicating no observation had a disproportionate impact on the regression results.

Initial analyses were performed to examine the descriptive characteristics of the measures. Overall, participants perceived the COVID-19 infection as highly serious (M = 5.74, SD = 1.52, min-max = 1−7) and relatively uncontrollable (M = 4.79, SD = 1.86, min-max = 1−7) problem. Pearson zero order correlations were then calculated among the study measures. As presented in Table 2, trauma-related stress had a

significant negative correlation with self-efficacy (r = -.40, p < .01), and a significant positive correlation with comorbidity (r = .309, p < .01). There was also a significant positive correlation between self-efficacy and perceived COVID-19 controllability (r = .29, p < .01).

Table 2
Descriptive Characteristics of and Bivariate Correlations among the Study Measures

Variable	1	2	3	4	5	6	*M*	*SD*	*Min-Max*
1. Trauma-related stress	(.908)						2.53	0.71	1−5
2. Self-efficacy	-.400*	(.926)					6.94	1.22	1−9
3. Spiritual exercises	.097	.161	(–)				3.29	1.52	1−5
4. Perceived COVID-19 seriousness	.105	.027	.009	(–)			5.74	1.52	1−7
5. Perceived COVID-19 controllability	.030	.286*	.045	-.110	(–)		4.79	1.86	1−7
6. Comorbidity	.309*	-.197	.145	.058	-.012	(–)	0.22	0.42	0−1

Note 1. *Correlation is significant at the 0.01 level (2-tailed).
Note 2. Scores within the parentheses indicate Cronbach's alpha coefficients of the respective measures.

Moderation Analysis

The moderating role of spiritual exercises in the association between self-efficacy and trauma-related stress level was tested through a hierarchical multiple regression analysis following the approach of Baron and Kenny (1986). Based on the preliminary analyses, of the clinical and demographic variables, only comorbidity was significantly related to trauma-related stress; other measured variables (time since diagnosis, perceived controllability, perceived severity) were not significantly associated with trauma-related stress and did not change the pattern of the results. Therefore, comorbidity (coded 0 = no, 1 = yes) was included into the analysis as the sole covariate.

Before running regression analysis, all variables were centered by subtracting the respective sample mean of each variable (Aiken & West, 1991). The interaction term was obtained from the multiplication of the centered independent variable, self-efficacy, and the moderating variable, spiritual exercises. For the hierarchical regression model, comorbidity, the covariate variable, was entered in Step 1, self-efficacy in Step 2, spiritual exercises in Step 3, and the interaction term in Step 4 (see Table 3). The full model including comorbidity, self-efficacy, spiritual exercises and the interaction term explained 23.5% variance in trauma-related stress (R2 = .235), with an adjusted R2 of 0.199. In the first step, comorbidity was significantly associated with trauma-related stress (β = .309, p = .003, 95% CI [.186, .867], R2 = .096), indicating that 9.6% of variance in trauma-related stress could be explained by having comorbid disease. In the step 2 of the analysis, higher self-efficacy was significantly associated with lower trauma-related stress (β = -.353, p < .001, 95% CI [-.315, -.094], R2partial = .132, ΔR2 = .12). Therefore, our first hypothesis, an increase in self-efficacy would be related to a decrease in trauma-related stress level, was supported. However, the step 3 showed that spiritual exercises were not related

to trauma-related stress in cancer patients (β = .126, p = .196, 95% CI [-.031, .148], R2partial = .019, ΔR2 = .015). Thus, our second hypothesis was not supported by the findings. In the last step of the analysis, the results did not provide evidence for the significance of the interaction term (β = .068, p = .483, 95% CI [-.052, .110], R2partial = .006, ΔR2 = .004). In other words, there was no moderating role of spiritual exercises in the association between self-efficacy and trauma-related stress level. Thus, our last hypothesis was not supported.

To further examine the interaction between self-efficacy and spiritual exercises on trauma-related stress, simple slopes were analyzed at low (-1 SD), mean, and high (+1 SD) levels of spiritual exercises (Aiken & West, 1991). Across all levels of spiritual exercises, higher self-efficacy was related to lower trauma-related stress: at low level, B = –0.233, SE = 0.069, t = –3.36, p < .01, at medium level, B = –0.204, SE = 0.056, t = –3.64, p < .001, at high level, B = –0.175, SE = 0.069, t = –2.52, p = .013. Although the interaction term was not significant, Figure 1 illustrates how trauma-related stress varied across levels of self-efficacy and spiritual exercises.

Overall, the findings indicated that comorbidity and self-efficacy were significantly associated with trauma-related stress; however, neither spiritual exercises nor the interaction between self-efficacy and spiritual exercises significantly related to trauma-related stress in the cancer patients.

Figure 1

Interaction Plot Showing Trauma-Related Stress Across Levels of Self-Efficacy and Spiritual Exercises

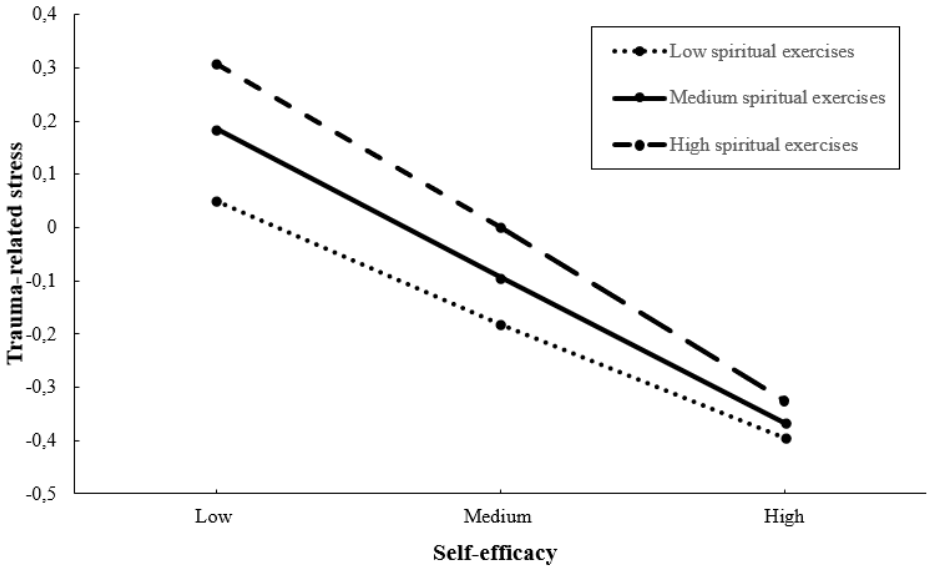

Table 3.
Hierarchical Regression Model of Self-Efficacy and Spiritual Exercises Predicting Trauma-Related Stress, with Comorbidity as a Covariate

Variable	*B*	*SE*	*β*	ΔR^2	ΔF	*d.f.*
Step 1 Comorbidity	0.526	.171	.309	.096	9.425	1,89
Step 2 Self-efficacy	-0.204	.056	-.353	.120	13.434	1,88
Step 3 Spiritual exercises	0.059	.045	.126	.015	1.700	1,87
Step 4 Self-efficacy X Spiritual exercises	0.029	.041	.068	.004	0.496	1,86

Discussion

The current study aimed to investigate the relation between self-efficacy and trauma-related stress levels of cancer patients, as well as the potential moderating effect of spiritual exercises on this relation. With this purpose, we conducted a hierarchical multiple regression analysis.

Our first hypothesis —that self-efficacy and trauma-related stress level would be negatively related— was supported by the analysis. Our finding was in line with previous studies showing that self-efficacy predicts lower psychological stress and higher cancer adjustment (Beckham et al., 1997), and also how important the self-relevant beliefs are for well-being (Akıncı et al., 2021) of cancer patients. However, no studies to date have examined the relation between self-efficacy and trauma-related stress levels during the COVID-19 pandemic, which can be considered as an additional life crisis for cancer patients. Therefore, our study made an important contribution to literature examining the trauma-related stress of cancer patients.

Our second hypothesis, that engaging in spiritual exercises would be negatively related to trauma-related stress level, was not supported by our findings. In the literature, there are some studies investigating the role of spirituality in individuals suffering from various physical disorders. For instance, in a sample of sickle cell disease patients, those with high spirituality had higher quality of life (Adegbola, 2011). Additionally, studies conducted with cancer patients showed that there is a significant negative association of spirituality with anxiety and depression (McCoubrie & Davies, 2006). Spirituality, particularly in the form of existential communion, was negatively correlated with stress, indicating that, regardless of life threat, spirituality was a significant predictor of better quality of life (Loubmeier et al., 2004). Hence, previous studies introduced spirituality as a significant predictor of quality of life and psychological health, while our study was the first to explore how engaging in spiritual practices is related to trauma-related stress levels of cancer patients during the COVID-19 pandemic.

The null effect may be due to measurement limitations, insufficient statistical power, or timing of engagement in spiritual exercises. While measurement tools like the Spirituality Scale (Delaney, 2005; Şirin, 2018) are available to measure general spiritual tendencies, there is currently no instrument specifically designed to

assess the underlying purpose of engaging in spiritual exercises, such as if they are performed for coping with stress or as a part of daily routine. In addition, considering our participants' health condition, we assessed spirituality with a single question, because administering a long survey would lead to exhaustion and higher drop-out rates. Nevertheless, relying on a single question for measurement may invite criticism regarding the assessment of individuals' spiritual exercises. For example, additional questions could be included to evaluate such aspects as satisfaction with spiritual exercises and the personal meaning attributed to these practices. To an extent, these spiritual exercises may have solely traditional meanings and become part of daily life for patients rather than consciously combating cancer or COVID-19 induced stress. Beginning spiritual exercises after a cancer diagnosis or treatment might produce meaningfully different consequences than regularly engaging in them. Therefore, it might also be significant to note the time period when individuals start doing spiritual exercises. Thus, the limited measurement may have reduced the ability to capture true effects of spiritual exercises.

Our third hypothesis regarding the moderating role of spiritual exercises in the relation between self-efficacy and trauma-related stress levels was not supported as the interaction between spirituality and self-efficacy did not have a significant impact on the trauma-related stress levels of cancer patients. Several factors might have contributed to this unexpected result. Considering the limitations of our study, the most important drawback was our limited sample size due to the difficulty of reaching cancer patients during the pandemic. Complex models requiring moderation analysis demand larger sample sizes (Memon et al., 2020), so our study might be underpowered to reliably detect moderation effects. A post-hoc power analysis (f^2 = .0052, α = .05, N = 91) revealed an achieved power of .105, indicating only a 10.5% probability of correctly detecting the moderation effect. Accordingly, the probability of a Type II error was as high as 89.5%; thus, the null finding might be attributable to a Type II error, suggesting that the true effect was not captured due to the limited sample size. Therefore, the absence of the interaction effect should be interpreted cautiously, and future research with substantially larger samples, and therefore higher statistical power, is needed to more precisely determine the moderating role of spiritual exercises.

Furthermore, as mentioned before, the single-item frequency measure for evaluating spiritual exercises might not have provided detailed information. Several studies in the literature measured spirituality using a single-item question (e.g., "Do you consider yourself as a spiritual person?") specifically among cancer patients and other health-risk populations (Doster et al., 2002; Johnson et al., 2007; Monod et al., 2011; Park et al., 2021). While this approach prompts participants to reflect on spirituality in a more abstract and global manner, it may lack reliability and content

validity compared to multi-item questionnaires (Fisher, 2015). Future studies are recommended to use tools such as FACIT-SP, DUREL, BRIEF RCOPE or DSES that can measure spirituality more comprehensively. Using such comprehensive tools may allow future studies to reveal the effects that were not observed with a single-item frequency measure. In particular, future research may benefit from systematically examining the timing of spiritual exercises (pre-diagnosis vs post-diagnosis), as well as patient motivation to engage in such exercises (daily routine vs coping strategy) to further clarify the effect of spiritual exercises on trauma-related stress. Future studies could better understand the temporal effects on psychological outcomes by comparing patients with long-standing spiritual habits with those who adopt spiritual exercises after diagnosis. Another limitation might be that the data collection period did not overlap with the COVID-19 quarantine period, during which spiritual exercises might have played a stronger role in terms of COVID-19 trauma-related stress and cancer-related self-efficacy. Additionally, some important clinical covariates such as cancer type and stage, were not addressed in this study. Future research should account for such factors when explaining cancer-related psychological outcomes. Overall, these points should be approached with caution in future studies, as they would provide guidance for obtaining more powerful results.

Despite its limitations, our study is of great importance in terms of shedding some light on the conditions of cancer patients during the COVID-19 pandemic. Due to the scarcity of studies on spirituality, self-efficacy, and trauma-related stress level in cancer patients, especially during the COVID-19 period, our study is valuable in filling a gap in literature. Additionally, our result regarding the negative association between self-efficacy and trauma-related stress level emphasized the importance of intervening in the self-efficacy of the cancer patients to reduce their trauma-related stress levels. As previously noted, consistent with the existing literature, in our study, self-efficacy emerged as a significant predictor of trauma-related stress levels of cancer patients. Thus, enhancing self-efficacy might be crucial in helping cancer patients to manage their trauma-related stress levels, particularly during highly stressful times such as global pandemics. Alongside medical treatments, incorporating psychological interventions aimed at boosting self-efficacy could be an effective strategy to mitigate their increased trauma-related stress levels. Accordingly, empirically supported techniques such as performance accomplishment, verbal persuasion or vicarious experience (Gong et al., 2021) might be applied. Interventions could also target health-care providers and caregivers to enhance their understanding of self-efficacy's role in managing cancer patients' trauma-related stress. To achieve this, health psychologists could organize psychoeducation seminars. These seminars would educate both health-care staff and caregivers about the protective benefits of self-efficacy.

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Authors' contribution. The first and second authors contributed equally to the preparation of the manuscript. The study conception and design were carried out by the first two and the last author. Material preparation and data collection were conducted by the first and second authors. The third author conducted the statistical analyses, revised the entire manuscript, prepared the figures and tables, and finalized the results section. The last author supervised the study design and the overall preparation of the manuscript. The first draft was written by the first and second authors, and subsequently reviewed and refined by the third and last author. All authors provided feedback on previous drafts and approved the final version of the manuscript.

Peer-review. This research was rigorously evaluated by two or more experts in the field, and the and the manuscript was revised in accordance with their constructive comments and recommendations.

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Data Availability. Data supporting the findings are available upon request from the authors.

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