Correlation between spiritual health, anxiety, and sleep quality among cancer patients

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ABSTRACT

Background: Receiving a cancer diagnosis constitutes a profoundly distressing and disconcerting experience for patients, often resulting in a loss of existential meaning. Consequently, individuals grappling with such diagnoses frequently manifest symptoms of anxiety and sleep disorders, impeding their adaptation to the challenges posed by the illness. In light of this, this research paper explores the correlation between spiritual health, anxiety, and sleep quality among cancer patients.

Methods: The study was conducted in Hamadan, Iran's Shahid Beheshti Hospital's oncology department, over a one-year period. A total of 222 cancer patients were selected through convenience sampling. Data were collected using questionnaires on demographic information, Islamic spiritual health, Beck anxiety, and Pittsburgh sleep quality.

Results: The results showed a negative correlation between spiritual health and anxiety (r = -0.232, p < 0.05), indicating that patients with lower spiritual health had higher anxiety levels. Similarly, there was a negative correlation between anxiety and sleep quality (r = -0.146, p < 0.05), suggesting that higher anxiety was associated with poorer sleep quality. However, there was no significant correlation between spiritual health and sleep quality (r = 0.032, p > 0.05).

Limitations: The limitations of the study include the use of self-report questionnaires and the potential impact of COVID-induced anxiety.

Conclusion: The study concludes that healthcare providers should assess and address the needs of cancer patients, including providing spiritual care, to reduce anxiety and improve sleep quality. Overall, the findings highlight the importance of incorporating spiritual care into cancer patients' treatment plans to enhance their well-being.

1. Introduction

Cancer constitutes a significant global health challenge, impacting millions of individuals, and its prevalence has shown an upward trajectory in recent decades (Sung et al., 2021). A substantial proportion of cancer patients undergo extended therapeutic regimens involving chemotherapy and radiotherapy, interventions integral to cancer management. However, these treatments are accompanied by transient side effects, encompassing phenomena like temporary alopecia, fluctuations in weight, fatigue, as well as nausea and vomiting (Brook, 2021).

A cancer diagnosis is a profound and distressing experience, often giving rise to anxiety, depression, and a profound sense of existential loss. These psychological challenges can significantly impact the quality of sleep among cancer patients and may impede their capacity to

navigate the complexities of the disease (Niedzwiedz et al., 2019). Anxiety, a prevalent and understandable response to a cancer diagnosis, is intricately linked to perceived threats to various aspects of an individual's life, including functionality, body image, familial relationships, and overall existence. The manifestation or exacerbation of anxiety is not confined to a specific stage in the disease continuum but can emerge at any point, spanning from diagnosis through treatment, remission, recurrence, survival, to the terminal phase. Furthermore, anxiety's influence extends to health-related behaviors, potentially resulting in procrastination or neglect of crucial aspects of cancer prevention, treatment adherence, and follow-up care (Torabi et al., 2023).

Meanwhile, cancer patients exhibit a significantly higher prevalence of sleep disorders compared to the general population, ranging from 30 % to 93.1 % (Grandner, 2020). Various factors contribute to these sleep disturbances, including the psychological ramifications of cancer, physical discomfort, prolonged hospitalizations, and medical interventions. The adverse consequences of poor sleep extend beyond the realm of sleep itself, exerting a detrimental impact on the mental health and day-to-day functionality of cancer patients. Furthermore, compromised sleep may manifest as delusions or delirium, emerging as prominent symptoms in this population (Susana Villa García & Luis Enrique Miranda, 2022).

On the other hand, the onset of cancer often instigates a profound shift in patients' existential perspectives. Frequently, cancer acts as a disruptive force, undermining patients' aspirations, dreams, and overall spiritual well-being. Consequently, individuals grappling with cancer may experience spiritual distress (Laursen et al., 2019). The state of their spiritual health assumes critical significance, intricately linked with their overall quality of life. Spiritual health, a multidimensional construct encompassing facets such as faith, the meaning of life, and peace of mind, holds substantial relevance across diverse cultural and belief systems. Within the context of human experience, spirituality emerges as a pivotal resource aiding patients in formulating strategies to navigate challenges and crises (Majda et al., 2022; Yousofvand et al., 2023). Moreover, it serves as a reservoir of meaning and emotional support, furnishing individuals with the resilience needed to confront confusion and adversities. Notably, spirituality provides an avenue for individuals to exert indirect control over life events, mitigating feelings of loneliness and isolation (Leão et al., 2021; Torabi et al., 2023).

Cancer patients necessitate spiritual resources to navigate the challenges of the ailment, seeking meaning and purpose in the course of their treatment. Spiritual health, an indicator of human well-being, hinges upon establishing equilibrium between one's internal faculties and the external milieu. This equilibrium is characterized by stability, tranquility, and harmony with God, self, society, and nature (Lee, 2019; Torabi et al., 2023). In this context, nurses assume a pivotal role in aiding cancer patients in managing the psychological repercussions of the disease and facilitating their adaptation to these challenges. Furthermore, nurses can employ strategies to enhance spiritual health, contributing to the amelioration of anxiety levels and the enhancement of sleep quality, complementing medical interventions (Tuominen et al., 2019).

The interplay between spiritual health, anxiety, and sleep constitutes crucial dimensions of the quality of life for cancer patients. However, these dimensions are subject to cultural influences, necessitating comprehensive research to discern the nuanced ways in which spiritual health impacts anxiety and sleep in diverse cultural settings. This study delves into this intricate relationship within the specific cultural context of Iranian cancer patients, characterized by unique cultural and religious backgrounds.

2. Methods

2.1. Study design and setting

This cross-sectional correlational descriptive study was conducted at the oncology department of Shahid Beheshti Hospital in Hamadan, Iran. The investigation spanned a duration of one year, commencing in July 2022 and concluding in July 2023.

2.2. Sample and sampling

The convenience sampling method was employed to enroll a cohort of 222 cancer patients for the study. The sampling and data collection procedures were executed by two nursing students. Inclusion criteria stipulated participants must have received a cancer diagnosis from an oncologist at least three months prior, possess a baseline level of literacy in reading and writing, exhibit no indications of mental or anxiety disorders, and provide informed consent for study participation. The sole exclusion criterion was the presence of incomplete questionnaires.

2.3. Data collection and instruments

Initially, a sampling frame was constructed using data from the hospital's information technology unit. Patients meeting the predefined inclusion criteria were then identified. Subsequently, these patients were contacted via telephone, wherein comprehensive details pertaining to the study's objectives, methodology, and potential benefits were provided. Those patients who expressed their willingness to partake in the study were extended an invitation to participate. Given that these individuals were routinely admitted to the hospital twice weekly for essential treatments such as chemotherapy or radiotherapy, the researchers conducted on-site sampling at the patients' bedsides in collaboration with the patients and the oncology departments.

Prior to any data collection, informed written consent was diligently obtained from all participating patients. The questionnaires, administered through a self-reporting approach, were elucidated to the patients, and the entire process unfolded in the patients' rooms, specifically on their beds. Each patient was allocated an average timeframe of 30 to 45 min to meticulously complete the questionnaire under the direct supervision of the researchers. Additionally, patients were apprised of the option to seek clarification on any questionnaire item, emphasizing the researchers' readiness to address queries as they arose.

Data collection entailed the utilization of four distinct instruments: the demographic information form, the Islamic spiritual health questionnaire, the Beck anxiety questionnaire, and the Pittsburgh Index. These instruments were employed to gauge participants' personal characteristics, assess their spiritual health, quantify anxiety levels, and evaluate sleep quality, respectively.

2.3.1. Demographic information form

Demographic information encompassed details such as the patient's age, gender, marital status, residence, education, occupation, and pertinent information about the disease and clinical conditions. This information underwent scrutiny and received approval from ten faculty members affiliated with the Faculty of Nursing and Midwifery at Hamadan, Iran.

2.3.2. Islamic spiritual health questionnaire

The Islamic spiritual health questionnaire, as developed by Khorashadizadeh et al. (2017), comprises 32 items structured on a Likert scale of four options: strongly disagree (0), disagree (1), agree (2), and strongly agree (3). The questionnaire is organized into three sub-scales, namely holy love (items 1–17), holy act (items 18–27), and holy knowledge (items 28–32). The total score ranges from 0 to 96, with scores falling within the intervals of 0–30, 33–64, and 65–96 indicative of low, moderate, and high levels of spiritual health, respectively. The instrument demonstrates desirable validity and reliability. Specifically, the reported internal consistency (Cronbach's alpha) in the original study by Khorashadizadeh et al. (2017) was 0.91 (Khorashadizadeh et al., 2017), and in the present study, it was found to be 0.90.

2.3.3. Pittsburgh sleep quality Index (PSQI)

The PSQI assesses sleep quality over the preceding month, comprising nine general questions organized into seven subscales. These subscales encompass subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, sleeping medication usage, and daytime dysfunction. Each sub-scale of the questionnaire employs a scoring system ranging from 0 to 3, with values of 0, 1, 2, and 3 denoting a normal state, low problem, moderate problem, and high problem in sleep, respectively. Total scores, derived from the seven subscales, range from 0 to 21, and higher scores indicate poorer sleep quality, with scores exceeding 5 indicative of compromised sleep quality. Buysse et al. (1989) reported that the PSQI demonstrated a sensitivity of 6.89 and specificity of 5.86. The internal consistency, measured by Cronbach's alpha, was 0.83, and the test–retest validity was determined to be r = 0.85 (Buysse et al., 1989). Moreover, Chehri et al. (2020) found the internal consistency of the PSQI to be 0.81, and the correlation score among scales ranged from 0.48 to 0.71 (Chehri et al., 2020). In the present study, the internal consistency (Cronbach's alpha) of the PSQI was established to be 0.89.

2.3.4. Beck anxiety inventory (BAI)

The BAI questionnaire, formulated by Beck et al. in 1988, comprises 21 questions designed to assess various facets of anxious mood conditions. These include four categories of anxious moods, three types of specific fears, and fourteen instances of autonomic hyperactivity and motor tension associated with generalized anxiety disorder and panic attacks. The instrument demonstrates favorable internal consistency, as indicated by a Cronbach's alpha of 0.92, and a test–retest reliability of r = 0.75. Each question utilizes a Likert scale, encompassing responses ranging from 'not at all' (score 0), 'mild' (score 1), 'moderate' (score 2), to 'severe' (score 3). Participants articulate their anxiety symptoms, and scores are assigned accordingly. The total score, spanning from 0 to 63, categorizes anxiety levels into four ranges: 0–7, 8–15, 16–25, and 26–63, signifying no or low, mild, moderate, and severe anxiety, respectively. Beck et al. (1988) reported that the BAI exhibits high internal consistency (α = 0.92) and test–retest reliability over one week, with r (81) = 0.75. Additionally, it exhibits a moderate correlation with the revised Hamilton Anxiety Rating Scale (r(150) = 0.51) and a mild correlation with the revised Hamilton Depression Rating Scale (r(153) = 0.25) (Beck et al., 1988). In Iran, Kaviani and Mousavi (2008) found the Persian version of BAI to possess good reliability (r = 0.72, p < 0.001), very good validity (r = 0.83, p < 0.001), and excellent internal consistency (Alpha = 0.92) (Kaviani & Mousavi, 2008). Furthermore, Salari-Moghaddam et al. (2018) reported a Cronbach's alpha of 0.89 for the questionnaire (Salari-Moghaddam et al., 2018). In the current study, the internal consistency (Cronbach's alpha) for the BAI questionnaire was determined to be 0.91.

2.4. Data analysis

The normality assumption of the data was initially assessed through the application of the Kolmogorov-Smirnov test. Subsequently, the data underwent analysis employing descriptive statistics, encompassing frequencies, percentages, means, and standard deviations. Furthermore, Pearson's correlation test was employed to scrutinize relationships among variables, utilizing SPSS version 22, with a predetermined significance level of 0.05.

2.5. Ethical considerations

This study received approval from the Ethics Committee of Hamadan University of Medical Sciences under the reference number IR.UMSHA. REC.1401.260. Prior to commencement, the researchers elucidated the study's objectives to the participants. Subsequently, written informed consent was sought from each participant, encompassing both study participation and the potential publication of results. Participants were assured that all information acquired during the study would be treated with confidentiality, and they were informed of their right to withdraw from the study at any point.

3. Results

The participants in the current study primarily consisted of individuals aged 40 years and above (161 participants, 72.5 %), predominantly comprising females (123 participants, 55.4 %). Additionally, a substantial majority of the participants were married (185 participants, 83.3 %), and the majority did not hold a university degree (164 participants, 73.9 %) (**refer to** Table 1).

Based on the findings of this study, the durations of hospitalization and diagnosis were predominantly within the range of 1 to 10 days (172 participants, 77.5 %) and 3 to 12 months (126 participants, 56.2 %),

Table 1

Participants' socio-demographic characteristics (N = 222).

Socio-demographic characteristics	N	Percent
Age (year)		
Less than 40 y	61	27.5%
More than 40 y	161	72.5%
Gender		
Female	123	55.4%
Male	99	44.6%
Marital status		
Married	185	83.3%
Single	37	16.7%
Residence		
Urban	139	62.6%
Rural	83	37.4%
Education		
Non-academic	164	73.9%
Academic	58	26.1%
Occupation		
Housewife	103	46.4%
Employee	29	13.1%
Freelance	76	34.2%
Unemployed	14	6.3%
Underlying disease		
Hypertension	40	18.0%
Cardiovascular	18	8.1%
Diabetes	25	11.3%
Gastrointestinal	23	10.4%
Stroke	4	1.8%
Other	15	6.8%
No	97	43.7%
Family support		
Low	9	4.1%
Moderate	29	13.1%
Good	49	22.1%
Excellent	135	60.8%
Economic conditions		
Less than enough	111	50.0%
Enough	109	49.1%
More than enough	2	0.9%
Religious activities		
High	184	82.9%
Moderate	24	10.8%
Low	14	6.3%

respectively. The most frequently diagnosed type of cancer was leukemia (79 participants, 35.6 %) (refer to Table 2).

The results of the study indicated a negative correlation between spiritual health and anxiety (r = -0.232, p < 0.05), suggesting that patients with lower spiritual health experienced higher levels of anxiety. Similarly, there was a negative correlation between anxiety and sleep quality (r = -0.146, p < 0.05), indicating that higher anxiety levels were associated with poorer sleep quality. However, no significant correlation was found between spiritual health and sleep quality (r = 0.032, p > 0.05) (refer to Table 3).

4. Discussion

The primary objective of this study was to investigate the relationship between spiritual health, anxiety, and sleep quality among Iranian cancer patients. The data analysis unveiled a statistically significant negative correlation between spiritual health and anxiety levels in cancer patients. This suggests that elevated spiritual health corresponds to reduced anxiety among the patients. Furthermore, the findings demonstrated a significant negative association specifically between the existential and religious dimensions of spiritual health and anxiety. This indicates that heightened experiences of meaning and purpose in life, coupled with a strong faith in God, were associated with lower levels of

Table 2
Participants' clinical characteristics (N = 222).

Clinical characteristics	N	Percent
Hospitalization duration (day)		
1 - 10	172	77.5%
11 - 20	45	20.2%
21 - 30	5	2.3%
Diagnosis duration (month)		
3 - 12	126	56.8%
13 - 24	14	6.3%
More than 24	82	36.9%
Cancer type		
Gastric	24	10.8%
Colon	12	5.4%
Liver	15	6.8%
Lung	17	7.7%
Bone	11	5.0%
Leukemia	79	35.6%
Bladder	4	1.8%
Kidney	15	6.8%
Brain	7	3.2%
Esophageal	2	0.9%
Uterus	6	2.7%
Ovarian	4	1.8%
Other	26	11.7%
Stage		
I	118	53.2%
II	71	32.0%
III	20	9.0%
IV	13	5.9%
Metastasis		
Yes	92	41.4%
No	130	58.6%
Radiotherapy		
Yes	94	42.3%
No	128	57.7%
Chemotherapy		
Yes	153	68.9%
No	69	31.1%

anxiety. Consequently, we posit that augmenting spiritual health can effectively mitigate anxiety among cancer patients (Abardeh and Niknam, 2021). Religion and spirituality emerge as valuable resources for patients grappling with illness, fostering a sense of commitment, engendering positive emotions, promoting increased social engagement, motivating adaptive responses, and enhancing communication. Accordingly, they function as beneficial coping mechanisms for effectively managing the challenges and distress associated with life (Gergianaki et al., 2019; M. Torabi et al., 2023).

Recent empirical investigations underscore the psychological and social benefits associated with religious engagement as an adaptive strategy in coping with stress. Within this framework, religious beliefs and practices assume the role of providing solace, imbuing life with meaning, and instilling hope for individuals confronted with challenges (Oshvandi et al., 2022). The present study accentuates the prevalence of religious adherence among the Iranian populace, indicating a propensity to turn to religious frameworks, particularly in navigating crisis situations within their cultural milieu. It underscores the indispensability of spiritual health for the harmonious functioning of biological, psychological, and social dimensions, positing that the attainment of the highest quality of life is contingent upon its presence.

In the context of anxiety management, the study posits that individuals facing anxiety tend to resort to spiritual practices for alleviation (Jadidi et al., 2022; Oshvandi et al., 2022). A pivotal facet of this phenomenon lies in the coping mechanisms individuals employ in grappling with existential concerns, notably the anxiety surrounding mortality and the concept of nothingness. These resources are perceived as instrumental in aiding individuals in adapting to the multifaceted impacts of a cancer diagnosis and subsequent treatments, with a specific emphasis on chemotherapy (Rahmat et al., 2022).

Spiritual health serves as a facilitator for the augmentation of self-awareness, effective communication, social support, self-confidence, and the cultivation of meaning and purpose in the lives of cancer patients. Additionally, it plays a pivotal role in equipping individuals to cope adeptly with mental disorders, specifically anxiety, thereby contributing to the enhancement of mental health and adaptation to novel circumstances (Karimi et al., 2022). Through fostering a sense of spiritual well-being and placing trust in a higher power, individuals can derive profound meaning in their existence, leading to a reduction in anxiety levels (Harorani et al., 2022). Recognizing the paramount significance of spirituality in mitigating mental health challenges, it becomes imperative to accord special attention to the promotion of spiritual health as a strategy for alleviating anxiety among cancer patients (Jadidi et al., 2022).

The findings of this investigation reveal a lack of statistically significant correlation between the spiritual health and sleep quality among cancer patients. This aligns with a prior study that similarly identified an absence of a statistically significant relationship between sleep quality and the spiritual health scores in Muslim women diagnosed with breast cancer (Khoramirad et al., 2014). In concurrence with the outcomes of Jadidi's study, it was observed that patients experiencing heightened anxiety and perceiving themselves to be in the terminal phases of life tended to feel a closer proximity to death (Jadidi et al., 2022). Consequently, it is plausible that the religious beliefs of cancer patients may not comprehensively address the elevated levels of anxiety associated with sleep disturbances. This potential inadequacy in addressing anxiety through spiritual means could elucidate the observed lack of improvement in sleep quality among these patients.

The absence of a significant association between spiritual health and sleep quality in cancer patients may be attributed, in part, to the pronounced physical complications and heightened anxiety levels induced by the cancer itself. Additionally, variations in the impact of religious and spiritual beliefs on patients could contribute to this observed disconnect (Koenig et al., 2021). It is noteworthy that certain religious beliefs may exert detrimental effects on the health and sleep quality of cancer patients. For example, discouragement from seeking or

Table 3

Pearson Correlations coefficients among the factors and sub-factors of spiritual health, sleep quality, and anxiety questionnaires.

Factors & sub-factors	Mean ± SD	Spiritual health	Sacred love	Sacred act	Sacred science	Anxiety	Sleep quality	Subjective sleep quality	Sleep latency	Sleep latency	Habitual sleep efficiency	Sleep disturbances	Sleeping medication usage	Daytime dysfunction
Spiritual health	43.21 ± 15.14	1												
Sacred love[a]	22.64 ± 9.63	0.885[d]	1											
Sacred act[a]	13.45 ± 5.06	0.807[d]	0.482[d]	1										
Sacred science[a]	7.11 ± 3.21	0.651[d]	0.331[d]	0.615[d]	1									
Anxiety	32.65 ± 11.52	-0.232[d]	-0.195[d]	-0.169[c]	-0.213[d]	1								
Sleep quality	12.75 ± 5.05	0.032	0.060	-0.043	0.046	-0.146[c]	1							
Subjective sleep quality[b]	2.08 ± 1.04	0.118	0.142[c]	0.033	0.073	-0.139[c]	0.882[d]	1						
Sleep latency[b]	1.94 ± 0.957	0.076	0.118	-0.027	0.048	-0.165[c]	0.764[d]	0.690[d]	1					
Sleep duration[b]	2.52 ± 0.79	0.002	0.012	-0.078	0.107	-0.151[c]	0.825[d]	0.717[d]	0.646[d]	1				
Habitual sleep efficiency[b]	0.75 ± 1.08	0.004	0.021	-0.031	0.012	-0.014	0.565[d]	0.394[d]	0.261[d]	0.416[d]	1			
Sleep disturbances[b]	2.16 ± 0.79	0.043	0.067	-0.019	0.038	-0.153[c]	0.820[d]	0.718[d]	0.630[d]	0.632[d]	0.220[d]	1		
Sleeping medication usage[b]	1.73 ± 1.02	-0.051	-0.051	-0.046	-0.007	-0.080	0.784[d]	0.651[d]	0.518[d]	0.538[d]	0.238[d]	0.700[d]	1	
Daytime dysfunction[b]	1.57 ± 0.91	-0.025	0.008	-0.077	-0.008	-0.107	0.770[d]	0.590[d]	0.408[d]	0.573[d]	0.411[d]	0.613[d]	589[d]	1

[a] Sub-factor of spiritual health.

[b] Sub-factor of sleep quality.

[c] Correlation is significant at the 0.05 level (2-tailed).

[d] Correlation is significant at the 0.001 level (2-tailed).

continuing medical treatments, delays in accessing medical care, refusal of preventive interventions, or involvement in religious misconduct may be potential mechanisms through which specific religious beliefs adversely affect health outcomes in this population (Salawati Ghasemi et al., 2022).

Furthermore, certain religious groups may foster unrealistic expectations, potentially leading to heightened stress, anxiety, and social isolation. Moreover, the adherence to flawed belief systems, particularly those pertaining to sleep, has the potential to adversely impact overall health outcomes (Liang et al., 2022). These complexities highlight the need for a nuanced understanding of the interplay between spirituality, religion, and health outcomes, particularly within the context of cancer patients.

This investigation established a significant negative correlation between anxiety and sleep quality among cancer patients, indicating that heightened anxiety levels were associated with poorer sleep quality. This finding aligns with prior research that similarly observed a negative impact of anxiety on the sleep quality of individuals diagnosed with lung cancer (He et al., 2022). Additionally, another study revealed a parallel association, noting that chronic pain patients exhibited elevated anxiety levels alongside compromised sleep quality (Alhalal et al., 2021). Serdari et al. further corroborated these observations, reporting that anxiety was linked to increased daytime sleepiness, insomnia, poor sleep quality, and the occurrence of obstructive sleep apnea (OSA) in patients. Consequently, individuals diagnosed with anxiety disorders were found to be more predisposed to experiencing sleep disorders (Serdari et al., 2020).

A potential implication arising from this study suggests that the implementation of spiritual care programs and sessions, coupled with a consideration for and respect of the spiritual and religious beliefs of cancer patients, may contribute to anxiety reduction and the enhancement of sleep quality. This approach holds promise as a therapeutic strategy aimed at fostering the overall well-being of these individuals. In light of these findings, it is recommended that researchers devise targeted spiritual interventions that accommodate the cultural and religious diversity inherent in-patient populations. Moreover, healthcare providers, including nurses, doctors, psychologists, and social workers involved in the care of cancer patients, stand to benefit from the insights yielded by the study across diverse professional domains.

For educational purposes, the findings serve as instructive material for healthcare providers, offering insights into the concepts and metrics of spiritual health, anxiety, and sleep quality within the context of cancer. Furthermore, the study's outcomes provide a basis for educating healthcare providers on the intricacies of conducting correlational studies, including aspects such as sampling methodologies, data collection, analysis procedures, and result interpretation. The results can also facilitate discussions and reflections, encouraging healthcare providers to contemplate the study's implications, recognize its limitations, and suggest avenues for future research.

In the realm of research, the study findings offer valuable information and inspiration for healthcare researchers exploring the intersection of spiritual health, anxiety, and sleep quality in cancer patients. The findings serve as a foundational resource, providing a rationale for further investigations into this topic and guiding researchers in the design and analysis of their studies. It also aids in comparative analyses with similar studies, identifying gaps and challenges in the existing literature.

The study's outcomes have direct implications for enhancing the clinical practice of healthcare providers involved in the care of cancer patients. Healthcare practitioners can utilize the findings to assess and comprehend their patients' spiritual health, anxiety, and sleep quality. This understanding, in turn, enables the provision of tailored interventions and support to enhance overall well-being. Moreover, the findings assist healthcare providers in evaluating and adjusting their interventions based on patient needs, ensuring a patient-centered approach. Collaborative efforts with other healthcare professionals,

family members, and religious leaders are also facilitated, promoting a holistic approach to patient care in the context of cancer.

5. Limitations

It is important to note that the study has certain limitations, such as the use of self-report questionnaires and the potential impact of COVID-induced anxiety. Future research should explore other chronic diseases and employ different methods to enhance the generalizability of the findings.

6. Conclusion

The study concludes that healthcare providers should consider assessing and addressing the spiritual needs of cancer patients to reduce anxiety and improve sleep quality. It emphasizes the importance of incorporating spiritual care into the treatment plans of cancer patients to enhance their overall well-being.

CRediT authorship contribution statement

Zahra Khalili: Conceptualization, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing, Data curation, Investigation. **Edris Habibi:** Conceptualization, Data curation, Writing – original draft, Writing – review & editing. **Naser Kamyari:** Conceptualization, Data curation, Formal analysis, Methodology, Validation, Writing – original draft, Writing – review & editing. **Shahin Tohidi:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Vahid Yousofvand:** Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Alhalal, E. A., Alhalal, I. A., Alaida, A. M., Alhweity, S. M., Alshojaa, A. Y., & Alfaori, A. T. (2021). Effects of chronic pain on sleep quality and depression: a cross-sectional study. *Saudi Medical Journal, 42*(3), 315–323. https://doi.org/10.15537/smj.42.3.20200768

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: psychometric properties. *Journal of Consulting and Clinical Psychology, 56*(6), 893. https://doi.org/10.1037/0022-006X.56.6.893

Brook, I. (2021). Early side effects of radiation treatment for head and neck cancer. *Cancer/radiothérapie, 25*(5), 507–513. https://doi.org/10.1016/j.canrad.2021.02.001

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Research, 28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Chehri, A., Nourozi, M., Eskandari, S., Khazaie, H., Hemati, N., & Jalali, A. (2020). Validation of the Persian version of the Pittsburgh Sleep Quality Index in elderly population. *Sleep Science (sao Paulo, Brazil), 13*(2), 119–124. https://doi.org/10.5935/1984-0063.20190134

Gergianaki, I., Kampouraki, M., Williams, S., & Tsiligianni, I. (2019). Assessing spirituality: is there a beneficial role in the management of COPD? *NPJ Primary Care Respiratory Medicine, 29*(1), 1–5. https://doi.org/10.1038/s41533-019-0134-x

Grandner, M. A. (2020). Sleep, health, and society. *Sleep Medicine Clinics, 15*(2), 319–340. https://doi.org/10.1016/j.jsmc.2020.02.017

Harorani, M., Jadidi, A., Zand, S., Khoshkhoutabar, T., Rafiei, F., & Beheshti, S. Z. (2022). Spiritual care in hospitalized patients in Iran: an action research study. *Journal of Religion and Health, 61*(5), 3822–3839. https://doi.org/10.1007/s10943-021-01302-w

He, Y., Sun, L.-Y., Peng, K.-W., Luo, M.-J., Deng, L., Tang, T., & You, C.-X. (2022). Sleep quality, anxiety and depression in advanced lung cancer: patients and caregivers. *BMJ Supportive & Palliative Care, 12*(e2), e194–e200. https://doi.org/10.1136/bmjspcare-2018-001684

Abardeh, F. S. H. P., & Niknam, M. (2021). The relationship between spiritual health with existential anxiety and morbid anxiety in female patients with breast cancer. *Journal of Arak University of Medical Sciences, 24*(3), 360–371. https://doi.org/10.32598/jams.24.3.5952.2

Jadidi, A., Sadeghian, E., Khodaveisi, M., & Fallahi-Khoshknab, M. (2022). Spiritual needs of the muslim elderly living in nursing homes: a qualitative study. *Journal of Religion and Health, 61*(2), 1514–1528. https://doi.org/10.1007/s10943-021-01263-0

Karimi, R., Mousavizadeh, R., Mohammadirizi, S., & Bahrami, M. (2022). The effect of a spiritual care program on the self-esteem of patients with cancer: a quasi-experimental study. *Iranian Journal of Nursing and Midwifery Research, 27*(1), 71–74. https://doi.org/10.4103/ijnmr.ijnmr_118_21

Kaviani, H., & Mousavi, A. (2008). Psychometric properties of the Persian version of Beck Anxiety Inventory (BAI). *Tehran University Medical Journal*.

Khoramirad, A., Mousavi, M., Dadkhahtehrani, T., & Pourmarzi, D. (2014). Relationship between sleep quality and spiritual well-being/religious activities in muslim women with breast cancer. *Journal of Religion and Health, 54*. https://doi.org/10.1007/s10943-014-9978-0

Khorashadizadeh, F., Heydari, A., Nabavi, F. H., Mazlom, S. R., Ebrahimi, M., & Esmaili, H. (2017). Development of islamic spiritual health scale (ISHS). *Journal of Pakistan Medical Association, 67*(3), 386–394.

Koenig, H. G., Hill, T. D., Pirutinsky, S., & Rosmarin, D. H. (2021). Commentary on "does spirituality or religion positively affect mental health?". *The International Journal for the Psychology of Religion, 31*(1), 27–44. https://doi.org/10.1080/10508619.2020.1766868

Laursen, L., Schønau, M. N., Bergenholtz, H. M., Siemsen, M., Christensen, M., & Missel, M. (2019). Table in the corner: a qualitative study of life situation and perspectives of the everyday lives of oesophageal cancer patients in palliative care. *BMC Palliative Care, 18*(1), 60. https://doi.org/10.1186/s12904-019-0445-2

Leão, D. C. M. R., Pereira, E. R., Pérez-Marfil, M. N., Silva, R. M. C. R. A., Mendonça, A. B., Rocha, R. C. N. P., & García-Caro, M. P. (2021). The importance of spirituality for women facing breast cancer diagnosis: a qualitative study. *International Journal of Environmental Research and Public Health, 18*(12), 6415. https://doi.org/10.3390/ijerph18126415

Lee, Y. H. (2019). Spiritual care for cancer patients. *Asia-Pacific Journal of Oncology Nursing, 6*(2), 101–103. https://doi.org/10.4103/apjon.apjon_65_18

Liang, Y., Hao, G., Wu, M., & Hou, L. (2022). Social isolation in adults with cancer: an evolutionary concept analysis. *Frontiers in Psychology, 13*, Article 973640. https://doi.org/10.3389/fpsyg.2022.973640

Majda, A., Szul, N., Kołodziej, K., Wojcieszek, A., Pucko, Z., & Bakun, K. (2022). Influence of spirituality and religiosity of cancer patients on their quality of life. *International Journal of Environmental Research and Public Health, 19*(9). https://doi.org/10.3390/ijerph19094952

Niedzwiedz, C. L., Knifton, L., Robb, K. A., Katikireddi, S. V., & Smith, D. J. (2019). Depression and anxiety among people living with and beyond cancer: a growing clinical and research priority. *BMC Cancer, 19*(1), 1–8. https://doi.org/10.1186/s12885-019-6181-4

Oshvandi, K., Torabi, M., Khazaei, M., Khazaei, S., & Yousofvand, V. (2022). Impact of hope on stroke patients receiving a spiritual care program in Iran: a randomized controlled trial. *Journal of Religion and Health,* 1–14. https://doi.org/10.1007/s10943-022-01696-1

Rahmat, H. K., Basri, A. S. H., Putra, R. M., Mulkiyan, M., Wahyuni, S. W., & Casmini, C. (2022). The influenced factors of spiritual well-being: a systematic review. *Sociocouns: Journal of Islamic Guidance and Counseling, 2*(1), 43–58. https://doi.org/10.35719/sjigc.v2i1.23

Salari-Moghaddam, S., Ranjbar, A., & Fathi-Ashtiani, A. (2018). Validity and reliability measurement of the Persian version of anxiety control questionnaire. *Journal of Clinical Psychology, 9*(4), 33–43. https://doi.org/10.22075/JCP.2018.11010.1073

Salawati Ghasemi, S., Bagheri-Saveh, M. I., Shali, M., Zakariaee, S., & Sheikh Zakaryaee, N. (2022). Explaining the process of spiritual adjustment in parents of a child with cancer: a qualitative study. *Journal of Caring Sciences, 11*(4), 232–238. https://doi.org/10.34172/jcs.2022.27

Serdari, A., Manolis, A., Tsiptsios, D., Vorvolakos, T., Terzoudi, A., Nena, E., & Tsamakis, K. (2020). Insight into the relationship between sleep characteristics and anxiety: a cross-sectional study in indigenous and minority populations in northeastern Greece. *Psychiatry Research, 292*, Article 113361. https://doi.org/10.1016/j.psychres.2020.113361

Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians, 71*(3), 209–249. https://doi.org/10.3322/caac.21660

Susana Villa García, U., & Luis Enrique Miranda, C. (2022). Anxiety, Depression, and Delirium in Terminally Ill Cancer Patient. In H. Dr. Bassam Abdul Rasool (Ed.), *Supportive and Palliative Care and Quality of Life in Oncology* (pp. Ch. 3). IntechOpen. 10.5772/intechopen.107325.

Torabi, M., Yousofvand, V., Azizi, A., Kamyari, N., & Khazaei, M. (2023). Impact of spiritual care programs on stroke patients' death anxiety: a randomized controlled trial. *Journal of Affective Disorders Reports, 14*, Article 100650. https://doi.org/10.1016/j.jadr.2023.100650

Torabi, M., Yousofvand, V., Mohammadi, R., Karbin, F., & Ranjbaran, H. (2023). Effectiveness of group spiritual care on leukemia patients' hope and anxiety in Iran: a randomized controlled trial. *Journal of Religion and Health*. https://doi.org/10.1007/s10943-023-01866-9

Tuominen, L., Stolt, M., Meretoja, R., & Leino-Kilpi, H. (2019). Effectiveness of nursing interventions among patients with cancer: An overview of systematic reviews. *Journal of Clinical Nursing, 28*(13–14), 2401–2419. https://doi.org/10.1111/jocn.14762

Yousofvand, V., Torabi, M., Oshvandi, K., Kazemi, S., Khazaei, S., Khazaei, M., & Azizi, A. (2023). Impact of a spiritual care program on the sleep quality and spiritual health of Muslim stroke patients: a randomized controlled trial. *Complementary Therapies in Medicine, 77*, Article 102981. https://doi.org/10.1016/j.ctim.2023.102981