This article has been accepted for publication in BMJSPCARE following peer review.
The definitive copyedited, typeset version is available online at
10.1136/spcare-2025-005715

Title:

Spirituality and Cancer: Quality of Life, Anxiety/Depression, and Symptom Severity

Authors:

Rawan Koleilat[1]; Nathalie Akiki[2]; Nicole Charbel[3]; Walaa El Sheikh[4]; Sati Dib[5]; Ali Taher[3]; Maya Bizri[1*];*

[1] Department of Psychiatry, American University of Beirut Medical Center, Beirut, Lebanon
[2] Department of Internal Medicine, University of Oxford, Oxford, England
[3] Department of Internal Medicine, American University of Beirut Medical Center, Beirut, Lebanon
[4] Department of Medicine and Health Sciences, American University of Beirut, Beirut, Lebanon
[5] Faculty of Medicine, American University of Beirut, Beirut, Lebanon
*Corresponding author: mb112@aub.edu.lb

ORCIDs:
Rawan Koleilat: 0009-0002-6711-681X
Walaa El Sheikh: 0000-0002-4890-0222
Ali Taher: 0000-0001-8515-2238
Maya Bizri: 0000-0003-0350-6157

Abstract:

Objectives:
As a leading cause of morbidity and mortality worldwide, cancer imposes psychological, physical and functional burdens. Recent paradigms focus on integrative treatment approaches in cancer patients which include psychological and spiritual care. While spirituality has been shown to have a potential role in alleviating disease burdens, both psychological and physical, this effect has not yet been fully elucidated in the Middle East. Our study examines the impact of spirituality on the quality of life (QoL), depression, anxiety and cancer symptom severity in patients with cancer within the Lebanese population.

Methods:
Our cross-sectional study followed 200 adults with solid tumors in a tertiary care center in Beirut, Lebanon. Data was mainly collected through questionnaires: HADS, FACIT-SP-12, MDASI, and SF-36. Multivariable logistic regression analyses were conducted to predict anxiety and depression. Interaction terms between spirituality and each of symptom severity levels, physical QoL, and mental QoL were assessed.

Results:
Higher spirituality significantly reduced the odds of anxiety (aOR=0.89, 95%CI=[0.84, 0.94], *p<0.001*) and depression (aOR=0.9, 95%CI=[0.85, 0.95], *p<0.001*) in cancer patients, independent of symptom severity or QoL measures.

Conclusions:
Our findings shed the light on the role that spiritual care plays in alleviating cancer burden despite physical symptoms severity – and pave the way to potentially modify cancer treatment protocols in the Middle East.

MeSH Keywords: Anxiety, cancer, depression, Lebanon, middle east, oncology, prevalence, quality of life, severity, spirituality

Key Messages

What is already known on this topic
Spirituality can improve mental well-being in cancer patients, but Middle Eastern data and analyses across cancer types and stages are limited.

What this study adds
This study found that higher spirituality was independently linked to lower odds of anxiety and depression in adults with cancer, regardless of symptom severity, quality of life, or cancer stage.

How this study might affect research, practice or policy
Integrating culturally relevant spiritual care into oncology may help reduce psychological distress, and routine psychiatric screening should be prioritized in cancer care settings.

Introduction:

Cancer is one of the main challenges facing healthcare systems, and a common cause of morbidity and mortality worldwide [1]. According to Global Cancer Incidence, Mortality and Prevalence (GLOBOCAN) estimates for the year 2022: there were approximately 20 million new cancer cases and 9.7 million cancer-related deaths globally [2]. The World Health Organization (WHO) predicts a 77% increase in new cancer cases by 2050 relative to 2022 [3].

In the Middle East and Africa, findings also highlight a rapidly growing rate, with cancer rising from the third to the second leading cause of death between 2000 and 2019 [4]. In Lebanon, there were around 13 thousand new cancer cases and 7 thousand cancer-related deaths in 2022 [2].

While cancer-related morbidity and mortality have repeatedly been established, they do not fully capture health burdens. Over the past decades, patient-reported outcomes (PROs), have been the focus of evidence-based research [5]. PROs are multidimensional and subjective measures, reflective of patients' functioning, health status, and satisfaction [6]. Health-related quality of life (HRQoL) is an example of PRO and is often a primary outcome in cancer trials, representing the "patient's general perception of the effect of illness and treatment on physical, psychological, and social aspects of life"[5]. Multiple studies have established a poor HRQoL in patients with cancer across all domains (physical, functional, psychosocial, and financial) [7].

Psychosocial issues in cancer had not been researched up until a couple of decades ago, when the field of psycho-oncology developed in the 1970s [8]. Since then, treatment has evolved beyond survival to include psychological and emotional goals [9]. Several psychotherapeutic interventions have been validated in patients with cancer, including supportive-expressive group therapy, cognitive behavioral therapy, and meaning-centered psychotherapy (MCP) [10].

A cornerstone of MCP is spirituality, i.e. "a subjective connection to something greater than oneself: a pursuit of meaning, purpose and inner peace" [11]. While illness precipitates existential dilemmas and suffering, spirituality provides meaning to such experiences [11]. By the 20th century, spirituality had been incorporated into the curricula of 75% of US medical

schools [12]. In the Middle East and precisely in Lebanon, it is rooted within the sociocultural fabric of the population, playing a key role in individuals' lives [13]. Religion is often viewed as a sub-form of spirituality, allotting it to the practices of an organized institution [14]. However, research examining the effectiveness of religiosity in improving the quality of life and decreasing psychological distress has been mixed. A Lebanese study by Naja et al. (2018) with 102 breast cancer patients found no correlation between religiosity and current depression. If anything, there was a near-significant negative association ($p=0.055$) suggesting a potentially detrimental impact of religiosity on the odds of depression following a cancer diagnosis [14].

In our current study, we evaluate primarily the association between spirituality and HRQoL, depression, anxiety, and cancer symptom severity in patients with cancer within the Lebanese population. Secondarily, our study aims to highlight the gap in psycho-therapeutic approaches in the region, paving the way for future research.

Methods:

1- Study Design:

This cross-sectional study was approved by the Institutional Board Review (IRB) at the American University of Beirut Medical Center (AUBMC), under approval number SBS-2022-0061. Written informed consent was obtained from all participants prior to data collection. Participant confidentiality and anonymity were strictly maintained throughout the study. All procedures followed were in accordance with the ethical standards of the responsible committee and with the 1964 Helsinki Declaration and its later amendments.
We first collected patients' sociodemographic information, quality of life (QoL), symptom severity, depression and anxiety, and spiritual well-being scores using self-reported questionnaires. We then collected from our electronic medical records EPIC (Epic Systems Corporation) data about patients' cancer type, severity, mode of treatment, type of pain control as well as their medical and psychiatric history [15].
Data collection took place in a tertiary referral center in Lebanon: Naef K. Basile Cancer Institute (NKBCI) at AUBMC which provides treatment for 2500 new patients yearly in the clinics and chemotherapy infusion unit [16]. Participants were receiving chemotherapy in the day unit, in a private room, when approached for recruitment.

2- Participants:

Participants were 200 adults, diagnosed with solid tumors undergoing current treatment at NKBCI. Excluded were patients younger than 18 years old, those diagnosed with liquid or soft tissue tumors, patients in remission, and patients with current cognitive impairment or conditions that may hinder assessment. The latter included illiteracy, dementia, substance use disorder (alcohol, drugs), and organic cognitive impairment including ongoing brain metastasis. Patient recruitment occurred between March 2022 and March 2023.

Five questionnaires were distributed to patients as hard copies in either English and corresponding validated Arabic scales, depending on patient language preference: a sociodemographic questionnaire, the 36-item Short Form Survey Instrument (SF-36) [17-20], the MD Anderson Symptom Inventory (MDASI) [21-23], the Hospital Anxiety and Depression

Scale (HADS) [24-26] and the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being 12 Item Scale (FACIT-Sp-12) [27, 28] .

The **SF-36** is a multi-purpose survey examining adult patients' QoL. The 36 items are grouped into 8 dimensions: physical functioning, physical and emotional limitations, social functioning, bodily pain, and general and mental health. Items are scored on Likert scales with higher scores correlating with better outcomes [17-20, 29].

The **MDASI** assesses the severity of symptoms related to the patient's malignancy and/or treatment. The core MDASI's 13 symptom items include pain, fatigue, nausea, disturbed sleep, distress/feeling upset, shortness of breath, difficulty remembering, lack of appetite, drowsiness, dry mouth, sadness, vomiting, and numbness/tingling. It also includes 6 items that evaluate symptom interference with everyday life activities such as walking, activity, working (including housework), relations with other people, enjoyment of life, and mood. Items are scored from 0-10 the higher the score, the worse the symptoms related to cancer and treatment [21-23].

The **HADS** has been used for anxiety and depression evaluation in those with chronic and somatic symptoms. It includes 14 items (7 for Anxiety and 7 for Depression) with scores ranging from 0 to 3, resulting in a maximum score of 21 for each subscale (Anxiety and Depression). A higher score points to a higher risk of anxiety and depression. Sub-scores of eight of above indicate notable clinical symptoms [24].

The **FACIT-Sp-12** is a 12-item questionnaire that assesses spirituality in people with cancer or other health challenges, providing insight into the roles of meaning, peace, and faith in general well-being [27]. The first component - Meaning/Peace (eight items) assesses a person's life purpose and peace, whereas Faith (four items) assesses the efficacy of spiritual beliefs in serious illness. The phrasing of the items on this scale is distinctive in that it doesn't presume a belief in God. As a result, an atheist or agnostic way may easily complete it while touching on both conventional religious aspects ("Faith") and spiritual dimensions ("Meaning/Peace component). This instrument which measures opinions, attitudes, or behaviors has a five-point Likert-type scale ranging from zero (not at all) to four (very much). The overall score runs from 0 to 48, with higher values indicating higher degrees of spirituality [28].

Our sociodemographic variables were age, gender, religion, education level, marital status, nationality, employment status, support system (family/friends), and insurance and financial coverage. Subjects were allowed to opt out of answering certain demographic questions, such as religious beliefs.

Clinical variables included cancer type, type of treatment received (chemotherapy, radiotherapy, immunotherapy, surgery), comorbidities (including psychiatric disorders if any mentioned in each patient's record), pain management (use of opioids or not), cancer recurrence, time of diagnosis, cancer prognosis (localized/metastatic) and cancer staging (advanced/not advanced). Psychiatric history was positive if any of the following were positive: previous psychiatric history (by chart or patient recall), history of mental health providers (including counselors and psychotherapists), and history of use of psychotropic medications.

3- Procedures:

Primary oncology provider consent was also a prerequisite. Data collectors were CITI-certified research fellows. The oncologist discussed the study with patients a priori, and if they were interested, they were approached by the research team for informed consent. Patients filled in questionnaires in a quiet private room. Assistance in filling questionnaires was provided to participants whenever needed.
The questionnaires were deidentified and further sealed only to be reopened at the time of data analysis.

4- **Statistical Analysis:**
Data management and analysis were conducted using IBM SPSS version 28 (IBM, New York, NY, USA). Categorical variables were presented using count (%), while continuous variables were presented using mean ± standard deviation (SD). Associations between categorical exposures and categorical outcomes (physical QoL, mental QoL, anxiety, and depression) were assessed using the chi-square test or Fisher's exact test, as appropriate, while associations between continuous exposures and the outcomes were assessed using independent-sample t-tests. Multivariable logistic regression models were conducted to predict physical QoL, mental QoL, anxiety, and depression, while a multiple linear regression model was conducted to predict symptom severity. The results of this analysis were presented as an adjusted odds ratio (aOR) with 95% confidence interval (CI). Significance was set at a *p-value <0.05*. All percentages were rounded to the nearest whole number throughout the manuscript

Results:

This study included 200 patients, 137 were females, and 63 were males. Most patients were Lebanese (87%), married (79%) and older than 40 (87%) (***Table 1***). Among those who disclosed their religious affiliations, two-thirds identified as Muslims, a quarter as Christians, and the rest as Druze or others (9%). The average spirituality score (FACIT-Sp-12), which included both meaning/peace and faith, was 35.4 ± 9, over a maximum score of 48, and higher scores implying greater levels of spirituality. The most identified support systems were family (84%) followed by partners (40%) and friends (34%). Only 3% of our patients reported not having any support system. Very few participants (4%) had a psychiatric history. In terms of education and employment, 54% of our patients had college degrees or higher, and yet most (58%) were unemployed. Breast tumors were the most prevalent type of cancer (41%), followed by gastrointestinal tumors (21%), and lung tumors (15%). Most of our patients were undergoing chemotherapy (96%), 41% underwent radiotherapy and 55% surgery. Among our sample, 72% of patients had metastasis and 27% had cancer recurrence. Throughout the study, six patients unfortunately passed away. (***Table 1***)

Table 1. Sociodemographic and clinical characteristics of the sample (N = 200).

Variables		**N (%)**
Age categories	**18-40 years old**	26 (13%)
	>40 years old	174 (87%)
Gender	**Male**	63 (31%)
	Female	137 (69%)
Religion	**Muslim**	132 (66%)
	Christian	50 (25%)

	Atheist/Druze and other religions/Doesn't want to specify	18 (9%)
Marital status	**Married**	158 (79%)
	Single/Divorced/Widowed	42 (21%)
Educational level	**No college degree**	90 (46%)
	College degree/Higher degrees (MS, PHD)	107 (54%)
Employment status	**Currently employed**	81 (42%)
	Currently unemployed	111 (58%)
Nationality	**Lebanese**	173 (87%)
	Other nationality/Lebanese with another nationality	26 (13%)
Support system	**Partner**	80 (40%)
	Family	167 (84%)
	Friends	67 (34%)
	No one	5 (3%)
Insurance coverage	**Private insurance**	76 (39%)
	Self-payer	51 (26%)
	NSSF/Covered by Ministry of Public Health/Others	70 (36%)
Cancer type	**Breast**	81 (41%)
	Lung	30 (15%)
	GI	41 (21%)
	Genitourinary + OBGYN	30 (15%)
	Heart + Skin + Others	18 (9%)
No comorbidities		72 (36%)
Hypertension		53 (27%)
Diabetes mellitus		39 (20%)
Others		89 (45%)
Autoimmune disease		29 (15%)
Cardiovascular diseases		31 (16%)
Psychiatric diseases		7 (4%)
Time of diagnosis	**0-6 months**	29 (15%)
	7-12 months	53 (26%)
	13-24 months	33 (17%)
	25-50 months	31 (16%)
	51-80 months	29 (15%)
	81-100 months	11 (5%)
	100-200 months	11 (5%)
	200 months and above	3 (1%)
Metastasis		144 (72%)
Recurrence		53 (27%)
Death		6 (3%)
Chemotherapy		192 (96%)
Radiotherapy		81 (41%)
Surgery		110 (55%)
Hormonal or immunotherapy treatment		108 (54%)
Pain control		99 (50%)
Paracetamol		94 (47%)
Non-steroidal anti-inflammatory drugs		15 (8%)
Opioids		69 (35%)
Other analgesics		18 (9%)
FACIT-Sp-12 Meaning/Peace + Faith (Mean ± SD)		35.4 ± 7.9
MDASI Mean Core Symptom Severity (Mean ± SD)		3 ± 2.1
HADS Anxiety	**Normal**	133 (67%)
	Borderline abnormal (borderline case) AND Abnormal (case)	67 (33%)
HADS Depression	**Normal**	121 (61%)
	Borderline abnormal (borderline case) AND Abnormal (case)	79 (39%)
Physical QoL	**Better (>=50)**	129 (66%)
	Worse (<50)	67 (34%)
Mental QoL	**Better (>=50)**	123 (64%)
	Worse (<50)	69 (36%)

NSSF: *National Social Security Fund;* ***MD****: Doctor of Medicine;* ***MS****: Master of Science;* ***GI****: Gastrointestinal;* ***OBGYN****: Obstetric & Gynecologic;* ***QoL****: Quality of Life;* ***MDASI****: Anderson Symptom Inventory;* ***HADS****: Hospital Anxiety and Depression Scale;* ***FACIT-Sp-12****: Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being 12 Item Scale.*

Our study's first aim was to assess spirituality's impact on cancer patients' QoL.

Table 2 discusses bivariate associations, revealing that individuals with a college degree or higher have better physical quality of life (QoL) (61% vs. 39%, *p=0.02*), while unemployed patients have worse physical QoL (67% vs. employed 33%, *p=0.047*). Patients using pain control, particularly Paracetamol, show lower physical and mental QoL (58%, *p=0.023*; 59%, *p=0.0009*, respectively).
Multivariate logistic regression models highlight spirituality as a protective factor, lowering the odds of anxiety by 11% (OR=0.89, *p<0.001*) and depression by 10% (OR=0.9, *p<0.001*). In contrast, higher symptom severity (MDASI) increases the odds of anxiety by 38% (OR=1.38, *p=0.024*) and depression by 42% (OR=1.42, *p=0.008*). Worse physical QoL nearly triples the odds of anxiety (OR=2.91, *p=0.03*), while worse mental QoL more than triples the odds of anxiety (OR=3.44, *p=0.01*) and increases the odds of depression by 166% (OR=2.66, *p=0.029*). Females have 213% higher odds of anxiety compared to males (OR=3.13, *p=0.025*), while single, divorced, or widowed patients have 81% lower odds of anxiety than those who are married (OR=0.19, *p=0.007*). Unemployment is linked to 142% higher odds of depression (OR=2.42, *p=0.033*), while cancer recurrence reduces the odds of depression by 72% (OR=0.28, *p=0.01*).

Table 2. Bivariate associations with physical QoL and mental QoL.

Variables		**Physical QoL**		**P-value**	**Mental QoL**		**P-value**
		Better (>=50)	**Worse (<50)**		**Better (>=50)**	**Worse (<50)**	
Age categories	**18-40 years old**	20 (16%)	6 (9%)	*0.2*	17 (14%)	9 (13%)	*0.88*
	>40 years old	109 (84%)	61 (91%)		106 (86%)	60 (87%)	
Gender	**Male**	42 (33%)	20 (30%)	*0.699*	33 (27%)	25 (36%)	*0.173*
	Female	87 (67%)	47 (70%)		90 (73%)	44 (64%)	
Religion	**Muslim**	86 (67%)	42 (63%)	*0.804*	82 (67%)	44 (64%)	*0.786*
	Christian	31 (24%)	19 (28%)		32 (26%)	18 (26%)	
	Atheist/Druze and other religions/Doesn't want to specify	12 (9%)	6 (9%)		9 (7%)	7 (10%)	
Marital status	**Married**	101 (78%)	54 (81%)	*0.707*	96 (78%)	55 (80%)	*0.788*
	Single/Divorced/Widowed	28 (22%)	13 (19%)		27 (22%)	14 (20%)	
Educational level	**No college degree**	49 (39%)	37 (56%)	*0.02*	53 (43%)	32 (48%)	*0.568*
	College degree/Higher degrees (MS, PHD)	78 (61%)	29 (44%)		69 (57%)	35 (52%)	
Employment status	**Currently employed**	59 (48%)	22 (33%)	*0.047*	52 (43%)	27 (42%)	*0.881*
	Currently unemployed	63 (52%)	44 (67%)		68 (57%)	37 (58%)	
Nationality	**Lebanese**	110 (86%)	59 (88%)	*0.679*	102 (83%)	63 (93%)	*0.061*
	Other nationality/Lebanese with another nationality	18 (14%)	8 (12%)		21 (17%)	5 (7%)	
Support system	**Partner**	52 (40%)	27 (40%)	*0.999*	51 (42%)	26 (38%)	*0.608*
	Family	107 (83%)	58 (87%)	*0.51*	103 (84%)	58 (84%)	*0.954*
	Friends	41 (32%)	25 (37%)	*0.437*	44 (36%)	21 (30%)	*0.453*
	No one	4 (3%)	1 (1%)	*0.663*	4 (3%)	1 (1%)	*0.656*
Insurance coverage	**Private insurance**	47 (37%)	27 (40%)	*0.154*	45 (37%)	27 (40%)	*0.927*
	Self-payer	29 (23%)	22 (33%)		32 (26%)	18 (26%)	

	NSSF/Covered by Ministry of Public Health/Others	50 (40%)	18 (27%)		44 (36%)	23 (34%)	
Cancer type	**Breast** **Lung** **GI** **Genitourinary + OBGYN** **Heart + Skin + Others**	52 (40%) 18 (14%) 26 (20%) 23 (18%) 10 (8%)	27 (40%) 12 (18%) 15 (22%) 5 (8%) 8 (12%)	*0.318*	54 (44%) 15 (12%) 28 (23%) 19 (15%) 7 (6%)	25 (36%) 13 (19%) 13 (19%) 8 (12%) 10 (14%)	*0.157*
No comorbidities		50 (39%)	21 (31%)	*0.27*	47 (39%)	24 (35%)	*0.578*
Hypertension		34 (27%)	17 (25%)	*0.858*	31 (25%)	19 (28%)	*0.748*
Diabetes mellitus		26 (20%)	13 (20%)	*0.919*	26 (21%)	12 (18%)	*0.545*
Others		53 (41%)	33 (49%)	*0.274*	53 (43%)	30 (44%)	*0.958*
Autoimmune disease		17 (13%)	11 (16%)	*0.553*	16 (13%)	12 (17%)	*0.422*
Cardiovascular diseases		21 (16%)	10 (15%)	*0.788*	20 (16%)	10 (15%)	*0.729*
Psychiatric diseases		5 (4%)	2 (3%)	*1*	4 (3%)	3 (4%)	*0.705*
Time of diagnosis	**0-6 months** **7-12 months** **13-24 months** **25-50 months** **51-80 months** **81-100 months** **100-200 months** **200 months and above**	18 (14%) 33 (26%) 24 (19%) 19 (15%) 18 (14%) 7 (5%) 7 (5%) 3 (2%)	11 (16%) 19 (28%) 9 (13%) 12 (18%) 10 (15%) 2 (3%) 4 (6%) 0 (0%)	*0.902*	16 (13%) 30 (24%) 20 (16%) 21 (17%) 20 (16%) 6 (5%) 7 (6%) 3 (2%)	13 (19%) 20 (29%) 12 (17%) 9 (13%) 8 (12%) 3 (4%) 4 (6%) 0 (0%)	*0.819*
Metastasis		88 (68%)	53 (79%)	*0.108*	88 (72%)	49 (71%)	*0.938*
Recurrence		34 (26%)	16 (24%)	*0.749*	36 (29%)	15 (22%)	*0.281*
Death		4 (3%)	2 (3%)	*1*	3 (2%)	2 (3%)	*1*
Chemotherapy		122 (95%)	66 (99%)	*0.268*	117 (95%)	67 (97%)	*0.713*
Radiotherapy		52 (40%)	27 (40%)	*0.999*	48 (39%)	29 (42%)	*0.684*
Surgery		70 (54%)	36 (54%)	*0.943*	67 (55%)	39 (57%)	*0.784*
Hormonal or immunotherapy treatment		70 (54%)	34 (51%)	*0.64*	66 (54%)	34 (49%)	*0.56*
Pain control		57 (44%)	40 (60%)	*0.039*	54 (44%)	40 (58%)	*0.061*
Paracetamol		53 (41%)	39 (58%)	*0.023*	49 (40%)	41 (59%)	***0.009***
Non-steroidal anti-inflammatory drugs		10 (8%)	5 (8%)	*0.942*	7 (6%)	8 (12%)	*0.144*
Opioids		38 (30%)	30 (45%)	*0.033*	38 (31%)	27 (39%)	*0.247*
Other analgesics		10 (8%)	8 (12%)	*0.336*	9 (7%)	8 (12%)	*0.317*
SP-12 Meaning/Peace + Faith (Mean ± SD)		37.1 ± 8	32.6 ± 6.9	*<0.001*	37.7 ± 7.4	31.8 ± 7.2	***<0.001***
MDASI Mean Core Symptom Severity (Mean ± SD)		2.2 ± 1.7	4.7 ± 1.8	*<0.001*	2.2 ± 1.7	4.5 ± 2	***<0.001***
HADS Anxiety	**Normal** **Borderline abnormal (borderline case) AND Abnormal (case)**	106 (82%) 23 (18%)	24 (36%) 43 (64%)	*<0.001*	101 (82%) 22 (18%)	27 (39%) 42 (61%)	***<0.001***
HADS Depression	**Normal** **Borderline abnormal (borderline case) AND Abnormal (case)**	89 (69%) 40 (31%)	29 (43%) 38 (57%)	*<0.001*	92 (75%) 31 (25%)	24 (35%) 45 (65%)	***<0.001***

NSSF: *National Social Security Fund;* ***MD****: Doctor of Medicine;* ***MS****: Master of Science;* ***GI****: Gastrointestinal;* ***OBGYN****: Obstetric & Gynecologic;* ***QoL****: Quality of Life;* ***MDASI****: Anderson Symptom Inventory;* ***HADS****: Hospital Anxiety and Depression Scale;* ***FACIT-Sp-12****: Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being 12 Item Scale.*

Secondarily, we looked at determining the relationship between spirituality and symptom severity of cancer patients.

Table 3 presents the bivariate associations between all variables and symptom severity level, to eliminate any confounders. Patients without a college degree had higher symptom severity (3.36 ± 2.25) than college graduates (2.68 ± 1.88, *p=0.023*). Those on pain control exhibited worse

symptom severity (3.38 ± 2.2) than those without (2.64 ± 1.9, *p=0.012*). Notably, those on Paracetamol and opioids experienced more severe symptoms (*p=0.007* and *p=0.029*, respectively). Higher HADS anxiety and depression scores correlated with increased symptom severity (4.44 ± 2.03 vs. 2.29 ± 1.71, *p<0.001*; 4.07 ± 1.98 vs. 2.32 ± 1.85, *p<0.001*). Worse physical and mental QoL were associated with higher symptom severity (4.66 ± 1.82 vs. 2.16 ± 1.69, *p<0.001*; 2.21 ± 1.68 vs. 2.21 ± 1.68, *p<0.001*). Additionally, spirituality was negatively correlated with symptom severity (correlation coefficient: -0.327, *p<0.001*).

Table 3. Bivariate associations with symptom severity.

Variables		**Mean ± SD**	**P-value**
Age categories	**18-40 years old**	3.16 ± 2.72	*0.754*
	>40 years old	2.99 ± 1.98	
Gender	**Male**	2.88 ± 2.22	*0.537*
	Female	3.07 ± 2.02	
Religion	**Muslim**	2.94 ± 2.1	*0.785*
	Christian	3.18 ± 1.99	
	Atheist/Druze and other religions/Doesn't want to specify	3.07 ± 2.3	
Marital status	**Married**	3.11 ± 2.11	*0.197*
	Single/Divorced/Widowed	2.64 ± 1.95	
Educational level	**No college degree**	3.36 ± 2.25	*0.023*
	College degree/Higher degrees (MS, PHD)	2.68 ± 1.88	
Employment status	**Currently employed**	2.81 ± 2.02	*0.298*
	Currently unemployed	3.13 ± 2.14	
Nationality	**Lebanese**	3.03 ± 2.07	*0.835*
	Other nationality/Lebanese with another nationality	2.94 ± 2.26	
Support system partner	**No**	2.95 ± 2.03	*0.599*
	Yes	3.11 ± 2.17	
Support system family	**No**	3.14 ± 2.24	*0.698*
	Yes	2.99 ± 2.06	
Support system friends	**No**	3 ± 2.08	*0.889*
	Yes	3.04 ± 2.11	
Support system no one	**No**	3.02 ± 2.11	*0.362*
	Yes	2.6 ± 0.88	
Insurance coverage	**Private insurance**	2.95 ± 1.73	*0.072*
	Self-payer	3.55 ± 2.5	
	NSSF/Covered by Ministry of Public Health/Others	2.68 ± 2.04	
Cancer type	**Breast**	3.24 ± 2.02	*0.085*
	Lung	3.26 ± 2.4	
	GI	2.92 ± 2.24	
	Genitourinary + OBGYN	2.06 ± 1.68	
	Heart + Skin + Others	3.35 ± 1.8	
No comorbidities	**No**	2.99 ± 2.12	*0.833*
	Yes	3.05 ± 2.07	
Hypertension	**No**	3.02 ± 2.17	*0.914*
	Yes	2.99 ± 1.87	
Diabetes mellitus	**No**	2.97 ± 2.11	*0.545*
	Yes	3.2 ± 2.05	
Others	**No**	2.95 ± 2.05	*0.644*
	Yes	3.09 ± 2.13	
Autoimmune disease	**No**	2.99 ± 2.09	*0.752*
	Yes	3.13 ± 2.1	
Cardiovascular diseases	**No**	3.05 ± 2.05	*0.507*
	Yes	2.78 ± 2.3	
Psychiatric diseases	**No**	3 ± 2.06	*0.698*
	Yes	3.31 ± 2.88	

Time of diagnosis	**0-6 months** **7-12 months** **13-24 months** **25-50 months** **51-80 months** **81-100 months** **100-200 months** **200 months and above**	2.82 ± 2.01 3.42 ± 2.27 2.51 ± 2.03 3.01 ± 2.25 2.67 ± 1.63 3.66 ± 2.3 3.57 ± 1.79 1.95 ± 1.98	*0.37*
Metastasis/Local	**Local** **Metastasis**	2.74 ± 1.98 3.11 ± 2.12	*0.259*
Recurrence	**No** **Yes**	2.93 ± 2.01 3.13 ± 2.16	*0.547*
Death	**No** **Yes**	3.00 ± 2.07 3.29 ± 2.58	*0.736*
Chemotherapy	**No** **Yes**	3.07 ± 1.42 3.01 ± 2.11	*0.931*
Radiotherapy	**No** **Yes**	2.81 ± 2.15 3.3 ± 1.97	*0.102*
Surgery	**No** **Yes**	2.93 ± 2.1 3.08 ± 2.08	*0.601*
Hormonal or immunotherapy treatment	**No** **Yes**	3.24 ± 2.12 2.81 ± 2.04	*0.146*
Pain control	**No** **Yes**	2.64 ± 1.9 3.38 ± 2.2	***0.012***
Paracetamol	**No** **Yes**	2.63 ± 1.85 3.44 ± 2.25	***0.007***
Non-steroidal anti-inflammatory drugs	**No** **Yes**	3.02 ± 2.1 2.9 ± 1.91	*0.828*
Opioids	**No** **Yes**	2.78 ± 2.02 3.45 ± 2.15	***0.029***
Other analgesics	**No** **Yes**	2.95 ± 2.02 3.67 ± 2.64	*0.269*
HADS Anxiety	**Normal** **Borderline abnormal (borderline case) AND Abnormal (case)**	2.29 ± 1.71 4.44 ± 2.03	***<0.001***
HADS Depression	**Normal** **Borderline abnormal (borderline case) AND Abnormal (case)**	2.32 ± 1.85 4.07 ± 1.98	***<0.001***
Physical QoL	**Better (>=50)** **Worse (<50)**	2.16 ± 1.69 4.66 ± 1.82	***<0.001***
Mental QoL	**Better (>=50)** **Worse (<50)**	2.21 ± 1.68 4.49 ± 2	***<0.001***
SP-12 Meaning/Peace + Faith (correlation coefficient)		-0.327	***<0.001***

NSSF: *National Social Security Fund;* ***MD****: Doctor of Medicine;* ***MS****: Master of Science;* ***GI****: Gastrointestinal;* ***OBGYN****: Obstetric & Gynecologic;* ***QoL****: Quality of Life;* ***MDASI****: Anderson Symptom Inventory;* ***HADS****: Hospital Anxiety and Depression Scale;* ***FACIT-Sp-12****: Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being 12 Item Scale.*

Table 4 explores separately the bivariate associations between all variables and each of anxiety and depression. Married patients had worse anxiety scores than single/divorced/widowed patients (88% as compared to 12%, *p=0.026*).

Our study also aimed to compare spirituality across different types and stages of cancers. There were no significant differences in mean spirituality across any type: breast (35.5 ± 7.7), lung (33.6 ± 8.1), GI (35.8 ± 8.3), genitourinary + OBGYN (35.6 ± 8.6), and heart/skin/others (37 ± 6.7), *p = 0.649* (see ***Figure 1***).

Similarly, there were no significant differences in mean spirituality across the different stages of cancers: metastasis (35 ± 8.3) and local (36.6 ± 6.8), $p = 0.204$.

Table 4. Bivariate associations with anxiety and depression.

Variables		Anxiety		P-value	Depression		P-value
		Normal	Borderline abnormal/ Abnormal		Normal	Borderline abnormal/ Abnormal	
Age categories	**18-40 years old**	19 (14%)	7 (10%)	*0.446*	19 (16%)	7 (9%)	*0.16*
	>40 years old	114 (86%)	60 (90%)		102 (84%)	72 (91%)	
Gender	**Male**	45 (34%)	18 (27%)	*0.317*	39 (32%)	24 (30%)	*0.783*
	Female	88 (66%)	49 (73%)		82 (68%)	55 (70%)	
Religion	**Muslim**	87 (65%)	45 (67%)	*0.965*	81 (67%)	51 (65%)	*0.891*
	Christian	34 (26%)	16 (24%)		30 (25%)	20 (25%)	
	Atheist/Druze and other religions/Doesn't want to specify	12 (9%)	6 (9%)		10 (8%)	8 (10%)	
Marital status	**Married**	99 (74%)	59 (88%)	***0.026***	92 (76%)	66 (84%)	*0.202*
	Single/Divorced/Widowed	34 (26%)	8 (12%)		29 (24%)	13 (16%)	
Educational level	**No college degree**	54 (42%)	36 (54%)	*0.104*	51 (43%)	39 (51%)	*0.263*
	College degree/Higher degrees (MS, PHD)	76 (58%)	31 (46%)		69 (57%)	38 (49%)	
Employment status	**Currently employed**	51 (41%)	30 (45%)	*0.595*	53 (45%)	28 (38%)	*0.334*
	Currently unemployed	74 (59%)	37 (55%)		65 (55%)	46 (62%)	
Nationality	**Lebanese**	117 (87%)	56 (84%)	*0.317*	104 (86%)	69 (88%)	*0.608*
	Other nationality/Lebanese with another nationality	15 (11%)	11 (16%)		17 (14%)	9 (12%)	
Support system	**Partner**	52 (39%)	28 (42%)	*0.714*	51 (42%)	29 (37%)	*0.443*
	Family	111 (84%)	56 (84%)	*0.982*	99 (8%)	68 (86%)	*0.428*
	Friends	43 (32%)	24 (36%)	*0.622*	43 (36%)	24 (30%)	*0.45*
	No one	3 (2%)	2 (3%)	*1*	4 (3%)	1 (1%)	*0.65*
Insurance coverage	**Private insurance**	54 (42%)	22 (33%)	*0.144*	44 (37%)	32 (42%)	*0.731*
	Self-payer	28 (22%)	23 (34%)		31 (26%)	20 (26%)	
	NSSF/Covered by Ministry of Public Health/Others	48 (37%)	22 (33%)		45 (38%)	25 (32%)	
Cancer type	**Breast**	48 (36%)	33 (49%)	*0.12*	49 (40%)	32 (41%)	*0.624*
	Lung	17 (13%)	13 (19%)		16 (13%)	14 (18%)	
	GI	32 (24%)	9 (13%)		28 (23%)	13 (16%)	
	Genitourinary + OBGYN	23 (17%)	7 (10%)		16 (13%)	14 (18%)	
	Heart + Skin + Others	13 (10%)	5 (8%)		12 (11%)	6 (8%)	
No comorbidities		47 (36%)	25 (37%)	*0.843*	48 (40%)	24 (31%)	*0.187*
Hypertension		32 (24%)	21 (31%)	*0.284*	29 (24%)	24 (31%)	*0.289*
Diabetes mellitus		27 (21%)	12 (18%)	*0.705*	24 (20%)	15 (20%)	*0.951*
Others		61 (46%)	28 (42%)	*0.584*	49 (41%)	40 (51%)	*0.158*
Autoimmune disease		16 (12%)	13 (19%)	*0.169*	19 (16%)	10 (13%)	*0.574*
Cardiovascular diseases		24 (18%)	7 (10%)	*0.155*	21 (17%)	10 (13%)	*0.389*
Psychiatric diseases		4 (3%)	3 (5%)	*0.69*	2 (2%)	5 (6%)	*0.113*
Time of diagnosis	**0-6 months**	22 (17%)	7 (10%)	*0.674*	18 (15%)	11 (14%)	*0.849*
	7-12 months	34 (26%)	19 (28%)		29 (24%)	24 (30%)	
	13-24 months	24 (18%)	9 (13%)		20 (17%)	13 (17%)	
	25-50 months	17 (13%)	14 (21%)		18 (15%)	13 (17%)	
	51-80 months	19 (14%)	10 (15%)		20 (17%)	9 (11%)	
	81-100 months	7 (5%)	4 (6%)		6 (5%)	5 (6%)	
	100-200 months	7 (5%)	4 (6%)		7 (6%)	4 (5%)	
	200 months and above	3 (2%)	0 (0%)		3 (2%)	0 (0%)	
Metastasis		94 (71%)	50 (75%)	*0.557*	89 (74%)	55 (70%)	*0.545*
Recurrence		40 (3%)	13 (20%)	*0.119*	38 (31%)	15 (19%)	*0.058*
Death		4 (3%)	2 (3%)	*1*	4 (3%)	2 (3%)	*1*
Chemotherapy		127 (96%)	65 (97%)	*0.721*	117 (97%)	75 (95%)	*0.715*
Radiotherapy		51 (38%)	30 (45%)	*0.382*	46 (38%)	35 (44%)	*0.376*
Surgery		74 (56%)	36 (54%)	*0.798*	64 (53%)	46 (58%)	*0.458*
Hormonal or immunotherapy treatment		74 (56%)	34 (51%)	*0.512*	68 (56%)	40 (51%)	*0.44*

Pain control		59 (44%)	40 (60%)	***0.041***	51 (42%)	48 (61%)	***0.01***
Paracetamol		55 (41%)	39 (58%)	***0.024***	49 (41%)	45 (57%)	***0.023***
Non-steroidal anti-inflammatory drugs		12 (9%)	3 (5%)	*0.249*	11 (9%)	4 (5%)	*0.29*
Opioids		42 (32%)	27 (40%)	*0.221*	35 (29%)	34 (43%)	***0.04***
Other analgesics		14 (11%)	4 (6%)	*0.288*	9 (7%)	9 (11%)	*0.339*
SP-12 Meaning/Peace + Faith (Mean ± SD)		37.6 ± 7.3	31.2 ± 7.3	***<0.001***	38.1 ± 7.1	31.3 ± 7.4	***<0.001***
MDASI Mean Core Symptom Severity (Mean ± SD)		2.3 ± 1.7	4.4 ± 2	***<0.001***	2.3 ± 1.9	4.1 ± 2	***<0.001***
Physical QoL	**Better (>=50)**	106 (82%)	23 (35%)	***<0.001***	89 (75%)	40 (51%)	***<0.001***
	Worse (<50)	24 (18%)	43 (65%)		29 (25%)	38 (49%)	
Mental QoL	**Better (>=50)**	101 (79%)	22 (34%)	***<0.001***	92 (79%)	31 (41%)	***<0.001***
	Worse (<50)	27 (21%)	42 (66%)		24 (21%)	45 (59%)	

NSSF: *National Social Security Fund;* ***MD****: Doctor of Medicine;* ***MS****: Master of Science;* ***GI****: Gastrointestinal;* ***OBGYN****: Obstetric & Gynecologic;* ***QoL****: Quality of Life;* ***MDASI****: Anderson Symptom Inventory;* ***HADS****: Hospital Anxiety and Depression Scale;* ***FACIT-Sp-12****: Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being 12 Item Scale.*

Discussion:

To our knowledge, this is the first study both in the Middle East and worldwide to examine the role of spirituality in relation to anxiety, depression, symptom severity, and quality of life among adult patients with cancer – across different types and stages. Prior literature had either partly evaluated these outcomes or had focused on specific patient populations (e.g. adolescents and young adults) or types and stages of cancer [30-33].

Our main finding was that higher spirituality levels were protective against anxiety and depression in patients with cancer. This protective effect persisted irrespective of physical symptom severity, physical QoL, and mental QoL. This is in line with previous research. A 2015 meta-analysis by Salsman et. al demonstrated a positive correlation between spirituality and mental wellbeing [34]. Studies from England, Mexico and China had also found spirituality to be significantly negatively correlated with anxiety and depression in patients with cancer [32, 35, 36]. While data from the Middle East has been limited, one cross-sectional study from Iran showed similar results. Among 305 breast cancer survivors, spirituality was also negatively correlated with depression and anxiety. However, participants in the study were only women, and spirituality was assessed using the System of Belief Inventory Questionnaire which measures religious beliefs along with spiritual beliefs [37]. Nationally, data from Lebanon has been minimal. In a 2018 observational single-center study by Chaar et al, authors similarly observed that higher spirituality was associated with lower anxiety and depression in 97 Lebanese patients with cancer [1]. Similar to our study, anxiety, depression, and spirituality were assessed by the HADS and FACIT-Sp-12 respectively.

Although our findings do not infer a causal association, they were consistent irrespective of physical symptom severity, physical QoL, and mental QoL. This perhaps suggests that spirituality remains strongly protective against mental health disorders whether physical symptoms are mild or severe. This further translates into the “mind-over-matter” benefit, whereby spiritual interventions could prove beneficial to mental health despite physical pain and advanced illness.
In our study, spirituality was indeed significantly negatively correlated with cancer symptom severity. However, this association was not reproduced after adjusting for confounding variables. Similarly, spirituality was not shown to improve physical QoL in patients with cancer. This finding remains an area of research, given the literature linking spiritual well-being, reduced

physical symptoms, and improved quality of life [38, 39]. For example, Bai et. al reviewed 36 global studies to establish the association between spiritual well-being and quality of life among patients with cancer. They revealed a positive association between overall spiritual well-being and quality of life, which remained significant even after controlling for different demographic and clinical variables [38]. Nationally, Chaar et. al also found a significant positive correlation between spirituality and QoL [1]. Another small Lebanese pilot study by Rached et al. also found an inverse correlation between spirituality and QoL among patients with cancer, but were only able to achieve these finding after controlling for depression as a confounder [40]. These global and national findings were not replicated in our study, likely due to the various factors in play within the assessment of QoL at the time of our study. We collected the data a couple of years into the "quadruple crisis" in Lebanon, a time of political conflicts and socioeconomic collapse, COVID-19 pandemic, Beirut blast, and a humanitarian refugee crisis, and a time of limited resources including health coverage [41].

Symptom severity proved to be associated with worsened mental and physical QoL, anxiety, and depression, as is supported by ample evidence [42, 43]. Numerous studies report the negative impact of cancer pain on an individual's QoL and the benefit of pain control [44, 45]. Our study further evaluated the role of pain control. In our sample, those receiving pain medications had reported worse physical symptom severity, unlike previous literature [44]. This is possibly because the degree to which pain was adequately managed was not assessed, nor is it clear whether worse physical QoL had preceded pain medication administration. Similarly, those receiving non-opiate pain control such as paracetamol and NSAIDs were at least four times more likely to report a worse mental QoL, which may be due to an emerging opiate aversion among physicians and refractory pain [46].

More than 30% of our study's population had significant anxiety or depression, with 33% of participants having borderline-abnormal anxiety scores on HADS-A, and 39% having borderline-abnormal depression scores on HADS-D. Globally, these rates are considerably higher than the literature. In 2011, a multinational meta-analysis of diagnostic interviews of more than 10,000 patients revealed a 16% prevalence of depression and 10% prevalence of anxiety [47]. More recently, another larger meta-analysis covering more than 180,000 patients with cancer reported a 27% prevalence of depression [48]. Our higher estimates may be explained by the different assessment tools utilized. In fact, the HADS, which we used in our study, has been shown to be better suited for assessment of patients with cancer, as its exclusion of physical symptoms of distress makes it more sensitive in medical illnesses [49]. Moreover, global data may not resemble those of our region.

When looking at country-specific data within the Middle East, our rates of depression and anxiety are higher than reports from Jordan. In a Jordanian study of 1011 patients with cancer, 23% exhibited symptoms of depression and 20% exhibited symptoms of anxiety [50]. Within Lebanon, reported rates vary based on tools used. For example, our rates are somewhat similar reports among 150 breast cancer patients in Lebanon where 41% had anxiety and 25% had depression, also assessed using HADS [51]. However, more recently, only 23% of 194 Lebanese patients surveyed had moderate to severe depression and 15% had moderate to severe anxiety – both lower than our findings. This difference may be attributed to the utilization of different scales (Generalized Anxiety Disorder-7 (GAD-7) for anxiety, Patient Health Questionnaire-9 (PHQ-9) for depression) compared to HADS used in our study [52]. Additionally, higher

national rates may also be due to the timing of our study and the aforementioned “quadruple crisis”, which may compound the cancer diagnosis burden and contribute to the emergence of mental health disorders [53, 54].

Despite our high prevalence rates, only 4% of our participants had a disclosed or documented prior psychiatric history. Prior psychiatric history is clinically relevant, as individuals with pre-existing psychiatric history are less likely to receive adequate guideline-based interventions and are at higher risk of worsened cancer staging and survival [55, 56]. In our study, the prevalence of prior psychiatric history was low, even compared to the general Lebanese population. In Lebanon, one out of every four adults are estimated to suffer from a mental health diagnosis in their lifetime, and 17% of adults have been shown to meet criteria for at least one mental diagnosis within the prior 12 months [57, 58]. Among patients with cancer, an estimated 30-35% are diagnosed with a psychiatric disorder across different phases of the disease [59]. Therefore, our premorbid numbers are lower than those expected in both the general population and patients with cancer. This could be partly attributed to lower rates of detection, whether due to internalized cultural stigma or to recall bias. In Middle Eastern societies, people may hesitate to disclose their health issues, seek professional care, or acknowledge their problems for fear of being judged, shamed, or having their reputation damaged [60]. This further highlights a need to raise awareness and implement routine psychiatric screening in patients with cancer.

In our patients, cancer recurrence was protective against depression. This is counterintuitive with the increased focus in psycho-oncology circles on fear of cancer recurrence (FCR) that cancer survivors often report [61]. Although FCR is associated with anxiety-like symptoms of worry and fear, Yang et. al present it as a relatively independent and unique experience, with only a few weak links to anxiety and depression [61]. Our findings likely correlate with patients’ adaptation to illness, with the development of resources, resilience, hope, and a support system. In fact, a Swiss study exploring factors that promote resilience among survivors of childhood cancer focused on post-traumatic growth (PTG), or positive life changes following a major crisis. PTG is pivotal in illustrating the adaptive processes in cancer patients, and could play a role in our findings [62]. Furthermore, the Lebanese population, in specific, has often times been acknowledged for its resilience in the face of adversity, theoretically linking adaptation to a ‘resilience reserve’ [63].

Lebanon’s social structure revolves around families and tightly-knit communities. This is reflected in our study, with only 3% of patients reporting not having any social support system. Our finding is notable when compared to data from more individualistic societies. In the UK, out of around 1800 patients surveyed, one in four newly diagnosed patients with cancer lacked support, with 12% mentioning no family or friends had visited them during their cancer treatment in more than 6 months [64]. Social support in patients with cancer is adaptive and has been correlated with an improved quality of life [65]. Our findings reflect the nature of Middle Eastern society, which encourages family bonds and strong inter-social connections.

Our study has several limitations. Firstly, data collection coincided with a state of widespread political unrest and financial instability In Lebanon. This may limit the generalizability of our rates of anxiety and depression, and possibly suggest a falsely inflated number given these circumstances. Secondly, given the cross-sectional retrospective design, involving chart reviews and surveys, our findings may be limited by recall bias. This may also partly explain the lower

rate of patients with a past psychiatric history. Moreover, such cross-sectional design precludes causal inference. Thirdly, most recruited participants were in the chemotherapy day unit rather than in clinics, suggesting a selection bias, and possibly limiting the generalizability of our results. Finally, a culture-specific element may be at play in spirituality, so re-creating this study in various populations may offer an understanding of cultural spirituality .

Conclusion:

In this first-of-its-kind study from the Middle East, higher spirituality was independently associated with lower odds of anxiety and depression among adults with cancer, regardless of symptom severity or quality of life measures. Despite the high prevalence of psychological distress observed, only a small fraction of participants reported a prior psychiatric history, underscoring the need for routine mental health screening in oncology care. Our findings support integrating spiritual care and meaning-centered interventions alongside conventional treatment to address the psychosocial burden of cancer, particularly in culturally relevant contexts. Future longitudinal and interventional studies are warranted to clarify causality and optimize the incorporation of spirituality into comprehensive cancer care.

Conflict of Interest:
There is no conflict of interest to disclose.

Funding
No funding was received for this study.

Acknowledgements:

The authors thank all participants and staff at the Naef K. Basile Cancer Institute (NKBCI) at AUBMC for their support during data collection.

Ethics Statement:

This study was approved by the IRB at American University of Beirut Medical Center, under approval number SBS-2022-0061. Written informed consent was obtained from all participants prior to data collection. Participant confidentiality and anonymity were strictly maintained throughout the study. All procedures followed were in accordance with the ethical standards of the responsible committee and with the 1964 Helsinki Declaration and its later amendments.

References

1. Chaar, E.A., et al., *Evaluating the impact of spirituality on the quality of life, anxiety, and depression among patients with cancer: an observational transversal study.* Support Care Cancer, 2018. **26**(8): p. 2581-2590.
2. Bray, F., et al., *Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries.* CA: A Cancer Journal for Clinicians, 2024. **74**(3): p. 229-263.
3. World Health, O., *Global Cancer Burden growing, Amidst Mounting Need for Services.* www.who.int, 2024.
4. Hofmarcher, T., et al., *The Disease Burden and Economic Burden of Cancer in 9 Countries in the Middle East and Africa.* Value Health Reg Issues, 2023. **37**: p. 81-87.
5. Lipscomb, J., C.C. Gotay, and C.F. Snyder, *Patient-reported outcomes in cancer: a review of recent research and policy initiatives.* CA Cancer J Clin, 2007. **57**(5): p. 278-300.
6. Silveira, A., et al., *Patient reported outcomes in oncology: changing perspectives-a systematic review.* Health Qual Life Outcomes, 2022. **20**(1): p. 82.
7. Sitlinger, A. and S.Y. Zafar, *Health-Related Quality of Life: The Impact on Morbidity and Mortality.* Surg Oncol Clin N Am, 2018. **27**(4): p. 675-684.
8. Holland, J.C., *Psycho-oncology: Overview, obstacles and opportunities.* Psycho-Oncology, 2018. **27**(5): p. 1364-1376.
9. Lang-Rollin, I. and G. Berberich, *Psycho-oncology.* Dialogues Clin Neurosci, 2018. **20**(1): p. 13-22.
10. Anghel, T., et al., *Review of Psychological Interventions in Oncology: Current Trends and Future Directions.* Medicina, 2025. **61**(2): p. 279.
11. Puchalski, C.M., *Spirituality in the cancer trajectory.* Ann Oncol, 2012. **23 Suppl 3**: p. 49-55.
12. Puchalski, C.M., et al., *Spirituality and health: the development of a field.* Acad Med, 2014. **89**(1): p. 10-6.
13. Chaar, E.A., et al., *Evaluating the impact of spirituality on the quality of life, anxiety, and depression among patients with cancer: an observational transversal study.* Supportive Care in Cancer, 2018. **26**(8): p. 2581-2590.
14. Abou Kassm, S., et al., *Depression and religiosity and their correlates in Lebanese breast cancer patients.* Psychooncology, 2018. **27**(1): p. 99-105.
15. *Epic | ...With the patient at the heart.*
16. El Cheikh, J., et al., *Implemented Interventions at the Naef K. Basile Cancer Institute to Protect Patients and Medical Personnel From COVID Infections: Effectiveness and Patient Satisfaction.* Frontiers in oncology, 2021. **11**: p. 685107-685107.
17. Brazier, J.E., et al., *Validating the SF-36 health survey questionnaire: new outcome measure for primary care.* Bmj, 1992. **305**(6846): p. 160-4.
18. Treanor, C. and M. Donnelly, *A methodological review of the Short Form Health Survey 36 (SF-36) and its derivatives among breast cancer survivors.* Qual Life Res, 2015. **24**(2): p. 339-62.

19. Bunevicius, A., *Reliability and validity of the SF-36 Health Survey Questionnaire in patients with brain tumors: a cross-sectional study.* Health Qual Life Outcomes, 2017. **15**(1): p. 92.
20. El Osta, N., et al., *Validation of the Arabic version of the SF-36, generic questionnaire of quality of life related to health among the elderly in Lebanon.* East Mediterr Health J, 2019. **25**(10): p. 706-714.
21. Sailors, M.H., et al., *Validating the M. D. Anderson Symptom Inventory (MDASI) for use in patients with ovarian cancer.* Gynecologic oncology, 2013. **130**(2): p. 323-328.
22. Mendoza, T.R., et al., *The Validity and Utility of the M. D. Anderson Symptom Inventory in Patients With Breast Cancer: Evidence From the Symptom Outcomes and Practice Patterns Data From the Eastern Cooperative Oncology Group.* Clinical breast cancer, 2013. **13**(5): p. 325-334.
23. Nejmi, M.M.D.P., et al., *Validation and Application of the Arabic Version of the M. D. Anderson Symptom Inventory in Moroccan Patients With Cancer.* Journal of pain and symptom management, 2010. **40**(1): p. 75-86.
24. *Accuracy of the Hospital Anxiety and Depression Scale Depression subscale (HADS-D) to screen for major depression: systematic review and individual participant data meta-analysis.* BMJ (Online), 2021. **373**: p. n1231-n1231.
25. Bjelland, I., et al., *The validity of the Hospital Anxiety and Depression Scale: An updated literature review*. 2002, Elsevier Inc: England. p. 69-77.
26. Terkawi, A.S., et al., *Development and validation of Arabic version of the Hospital Anxiety and Depression Scale.* Saudi journal of anaesthesia, 2017. **11**(Suppl 1): p. S11-S18.
27. Weng, N., et al., *Evaluation of the reliability and validity of Functional Assessment Of Chronic Illness Therapy-Spiritual Well-Being-Expanded in elderly patients with chronic orthopaedic diseases.* Psychogeriatrics, 2021. **21**(1): p. 32-41.
28. Lazenby, M., et al., *Psychometric properties of the Functional Assessment of Chronic Illness Therapy-Spiritual Well-being (FACIT-Sp) in an Arabic-speaking, predominantly Muslim population.* Psycho-oncology (Chichester, England), 2013. **22**(1): p. 220-227.
29. LoMartire, R., et al., *Psychometric properties of Short Form-36 Health Survey, EuroQol 5-dimensions, and Hospital Anxiety and Depression Scale in patients with chronic pain.* PAIN, 2020. **161**(1): p. 83-95.
30. Bovero, A., et al., *The Spirituality in End-of-Life Cancer Patients, in Relation to Anxiety, Depression, Coping Strategies and the Daily Spiritual Experiences: A Cross-Sectional Study.* Journal of Religion and Health, 2019. **58**(6): p. 2144-2160.
31. Kandasamy, A., S. Chaturvedi, and G. Desai, *Spirituality, distress, depression, anxiety, and quality of life in patients with advanced cancer.* Indian Journal of Cancer, 2011. **48**(1): p. 55-59.
32. McCoubrie, R.C. and A.N. Davies, *Is there a correlation between spirituality and anxiety and depression in patients with advanced cancer?* Support Care Cancer, 2006. **14**(4): p. 379-85.
33. Grossoehme, D.H., et al., *Association of Religious and Spiritual Factors With Patient-Reported Outcomes of Anxiety, Depressive Symptoms, Fatigue, and Pain Interference Among Adolescents and Young Adults With Cancer.* JAMA Network Open, 2020. **3**(6): p. e206696-e206696.

34. Salsman, J.M., et al., *A meta-analytic approach to examining the correlation between religion/spirituality and mental health in cancer.* Cancer, 2015. **121**(21): p. 3769-78.
35. Chen, J., et al., *Association between spiritual well-being, quality of life, anxiety and depression in patients with gynaecological cancer in China.* Medicine, 2021. **100**(1): p. e24264.
36. Turke, K.C., et al., *Depression, anxiety and spirituality in oncology patients.* Rev Assoc Med Bras (1992), 2020. **66**(7): p. 960-965.
37. Firouzbakht, M., K. Hajian-Tilaki, and D. Moslemi, *Analysis of quality of life in breast cancer survivors using structural equation modelling: the role of spirituality, social support and psychological well-being.* Int Health, 2020. **12**(4): p. 354-363.
38. Bai, M. and M. Lazenby, *A systematic review of associations between spiritual well-being and quality of life at the scale and factor levels in studies among patients with cancer.* J Palliat Med, 2015. **18**(3): p. 286-98.
39. Jim, H.S., et al., *Religion, spirituality, and physical health in cancer patients: A meta-analysis.* Cancer, 2015. **121**(21): p. 3760-8.
40. Rached, G., et al., *Spirituality and the quality of life of cancer patients: An antidepressant effect.* L'Encéphale, 2022. **48**(4): p. 365-370.
41. Bizri, M., et al., *National trauma and substance use disorders: A slippery slope in Lebanon.* Subst Abus, 2021. **42**(3): p. 264-265.
42. Omran, S. and S. McMillan, *Symptom Severity, Anxiety, Depression, Self- Efficacy and Quality of Life in Patients with Cancer.* Asian Pac J Cancer Prev, 2018. **19**(2): p. 365-374.
43. Deshields, T.L., et al., *The persistence of symptom burden: symptom experience and quality of life of cancer patients across one year.* Support Care Cancer, 2014. **22**(4): p. 1089-96.
44. Yang, P., et al., *Quality of life in cancer patients with pain in beijing.* Chin J Cancer Res, 2012. **24**(1): p. 60-6.
45. Rodriguez, C., et al., *Cancer Pain and Quality of Life.* J Hosp Palliat Nurs, 2019. **21**(2): p. 116-123.
46. Dalal, S. and E. Bruera, *Pain Management for Patients With Advanced Cancer in the Opioid Epidemic Era.* Am Soc Clin Oncol Educ Book, 2019. **39**: p. 24-35.
47. Mitchell, A.J., et al., *Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: a meta-analysis of 94 interview-based studies.* Lancet Oncol, 2011. **12**(2): p. 160-74.
48. Mejareh, Z.N., et al., *Global, regional, and national prevalence of depression among cancer patients: A systematic review and meta-analysis.* Indian J Psychiatry, 2021. **63**(6): p. 527-535.
49. Ibrahim, N., et al., *The Arabic Hospital Anxiety and Depression Scale: validation in a sample of Lebanese patients with cancer.* Middle East Current Psychiatry, 2023. **30**(1): p. 85.
50. Naser, A.Y., et al., *Depression and Anxiety in Patients With Cancer: A Cross-Sectional Study.* Front Psychol, 2021. **12**: p. 585534.
51. Akel, R., et al., *Anxiety, Depression and Quality of Life in Breast Cancer Patients in the Levant.* Asian Pac J Cancer Prev, 2017. **18**(10): p. 2809-2816.

52. Hassan, M.A., et al., *Prevalence of depression and anxiety among newly diagnosed cancer patients: a single centre experience in the Middle East.* Ecancermedicalscience, 2024. **18**: p. 1690.
53. Islam, Z., et al., *Mental health impacts of Lebanon's economic crisis on healthcare workers amidst COVID-19.* Int J Health Plann Manage, 2022. **37**(2): p. 1160-1165.
54. Farran, N., *Mental health in Lebanon: Tomorrow's silent epidemic.* Ment Health Prev, 2021. **24**: p. 200218.
55. Davis, L.E., et al., *Stage at diagnosis and survival in patients with cancer and a pre-existing mental illness: a meta-analysis.* J Epidemiol Community Health, 2020. **74**(1): p. 84-94.
56. Wang, Y.-H., et al., *Impact of pre-existing mental health disorders on the receipt of guideline recommended cancer treatments: A systematic review.* Psycho-Oncology, 2023. **32**(3): p. 307-330.
57. Karam, E.G., et al., *Lifetime prevalence of mental disorders in Lebanon: first onset, treatment, and exposure to war.* PLoS Med, 2008. **5**(4): p. e61.
58. Karam, E.G., et al., *Prevalence and treatment of mental disorders in Lebanon: a national epidemiological survey.* The Lancet, 2006. **367**(9515): p. 1000-1006.
59. Caruso, R. and W. Breitbart, *Mental health care in oncology. Contemporary perspective on the psychosocial burden of cancer and evidence-based interventions.* Epidemiol Psychiatr Sci, 2020. **29**: p. e86.
60. Sobhani, M., et al., *Improving mental health infrastructure across the Middle East.* Asian J Psychiatr, 2024. **93**: p. 103908.
61. Yang, Y., et al., *Network connectivity between fear of cancer recurrence, anxiety, and depression in breast cancer patients.* Journal of Affective Disorders, 2022. **309**: p. 358-367.
62. Seiler A., J.J., *Resilience in Cancer Patients* Frontiers 2019.
63. El Hayek, S. and M. Bizri, *Beirut blast and mental health in Lebanon: Finding ways out.* Asian Journal of Psychiatry, 2020. **54**: p. 102458.
64. *Many cancer patients are struggling alone, charity says*. 2013 [cited 2024; Available from: https://www.bbc.com/news/health-21380607.
65. Ruiz-Rodríguez, I., et al., *The Association of Sources of Support, Types of Support and Satisfaction with Support Received on Perceived Stress and Quality of Life of Cancer Patients.* Integr Cancer Ther, 2021. **20**: p. 1534735421994905.

Figure Legend:
Figure 1. Line graph depicting mean spirituality scores for patients with different types of cancer. GI: Gastrointestinal; OBGYN: Obstetric & Gynecologic; FACIT-Sp-12: Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being 12 Item Scale.