The Role of Spirituality in Patients Undergoing Hematopoietic Stem Cell Transplantation: a Systematic Mixed Studies Review

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BACKGROUND: Hematopoietic stem cell transplantation (HSCT) has become the standard treatment for many diseases, but it is an intense and distinctive experience for patients. HSCT-related mortality is present throughout the whole process of transplantation, from pretransplantation to recovery. Long-term rehabilitation and the uncertain risk of death evoke feelings of vulnerability, helplessness, and intense fear. Zimmermann et al. proposed that spiritual well-being is an important dimension of quality of life and that patients at the end stage of life require spiritual support in addition to physical care, psychological care, and social support. Therefore, the purpose of this review is to examine the role of spirituality in the process of HSCT.

METHOD: A systematic mixed studies review (SMSR) was based on Pluye and Hong's framework to understand the role of spirituality in patients' experiences while undergoing HSCT. We use the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement to report the results of integration.

RESULTS: Fifteen original qualitative studies, 19 quantitative studies, and one mixed method study were included in the systematic mixed studies review. The evidence from the review revealed the following three themes: the spiritual experiences of HSCT patients, the spiritual coping styles of HSCT patients, and the spiritual need changes brought about by HSCT.

DISCUSSION: Few medical institutions currently offer spiritual healing, although HSCT patients with different cultural backgrounds may have different spiritual experiences and spiritual coping styles. Psychotherapists or nurses should be considered to provide spiritual care for patients undergoing HSCT, to help patients cope with disease pressures, promote HSCT patients' comfort, and improve their quality of life.

KEY WORDS: hematopoietic stem cell transplantation; spirituality; systematic mixed studies review; quality of life.

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INTRODUCTION

Hematopoietic stem cell transplantation (HSCT) has become the standard treatment for many diseases and offers the hope of a cure, but it is a distinctive experience for patients.[1,2] HSCT-related mortality is present throughout the whole process of transplantation, from pretransplantation to recovery, including the risks related to pretransplant infection, bleeding, graft-versus-host disease, infection, relapse, and gastrointestinal complications because of immune function complexity. Long-term rehabilitation and the uncertain risk of death evoke feelings of vulnerability, helplessness, and intense fear.[2,3] Prior literature has reported that patients have different coping styles when facing life-threatening diseases.[4,5] A negative coping style can deteriorate the quality of life and the prognosis of patients,[6] while a positive coping style can relieve the psychological pressure of patients.[1]

Spirituality originates from religion and can be defined as "experiencing a meaningful connection to our core selves, others, the world, and/or a greater power, as expressed through our reflections, narratives, and actions"; [7] thus, spirituality does not always contain notions of a formal religion.[8] Spirituality is a major component for patients with life-threatening diseases as it provides them with comfort, personal growth, and meaning in life.[9] Several studies have proven that spirituality and beliefs play significant roles in patients' positive coping styles in the face of cancer diagnosis and treatment [10,11] and indicate better health outcomes, such as allowing patients to better adjust to their illness and better experience the meaning of life.[12,13]

At present, qualitative studies of HSCT mainly focus on the survival experience before, during, and after HSCT. Studies on the spiritual experiences of patients with HSCT are rare. Spiritual experiences often promote positive health outcomes as a dimension of quality of life or as an aspect of supportive care, but it is not clear what role spiritual support plays in HSCT patients. There are some limitations in single qualitative research regarding the guidance of clinical practice. Therefore,

we aim to integrate qualitative and quantitative research evidence on the spiritual experiences of HSCT patients to understand the spiritual experiences and needs of HSCT patients more comprehensively and promote people-oriented nursing clinical practices.

METHODS

Based on Pluye and Hong's [14] framework, a systematic mixed studies review (SMSR) was conducted to evaluate and integrate evidence on the spirituality of patients undergoing HSCT and to describe the role of spirituality in the experience of HSCT patients. This review integrated qualitative, quantitative, and mixed research methods to ensure a comprehensive understanding of the phenomenon.[14] The application of the seven steps of the mixed studies review guidelines ensured the rigor of the review.[14] In addition, we used the preferred reporting items for systematic reviews and meta-analysis (PRISMA) statement [15] to report the results of integration.

1. Stage 1: Formulate a Review Question

What role does spirituality play in the experiences of patients undergoing HSCT?

2. Stage 2: Define the Eligibility Criteria

Published qualitative, quantitative, and mixed methods studies were included to gain a comprehensive understanding of HSCT patients' spirituality. The inclusion criteria were as follows:

(i) Research type: Qualitative research, quantitative research, and mixed methods studies.
(ii) Sample: Individuals who express spirituality before or after undergoing HSCT.
(iii) Research content: Articles were included if they mentioned or referred to any of the selected spiritual experiences, viewpoints, domains quality of life, or needs in the process of HSCT.

3. Stage 3: Apply an Extensive Search Strategy

The main search terms are as follows: spirituality, spiritualism, spiritual therapies, spiritual healing, exorcism, survivorship, hematopoietic stem cell transplantation, and bone marrow transplantation. See Table 1 for the specific search strategy.

4. Stages 4 and 5: Identify and Select Relevant Studies

Searches were conducted in the PubMed, Web of Science, Embase, CINAHL, and Cochrane Library databases (from date of record to 2019 February 23). Two reviewers (first author and last author) independently screened the abstracts of the articles identified by the search strategy. The two reviewers discussed and reached a consensus on the papers that should be included. The process of literature identification is shown in Figure 1.

5. Stage 6: Appraise the Quality of the Included Studies

Critical appraisal was conducted in collaboration between the first author (L.Y.Z.) and the last author (X.Y.Z.) by using the Mixed Methods Appraisal Tool (MMAT) (Version 2018). All of the articles were significant in relation to the spiritual domain, and none were excluded in the quality appraisal process. Please see Table 2 for MMAT scoring; a star represents an affirmative answer to a question.

6. Stage 7: Synthesize Included Studies

The thematic synthesis framework developed by Thomas and Harden [16] was conducted in three stages (re-reading and understanding the results or the findings section of each article, identifying similar concepts across studies, and identifying themes). Specifically, the main authors immersed themselves in the data by reading and re-reading the results or the findings section of each article, identifying simple concepts across the articles, and producing a synthesis that is close to the findings of the included articles. New themes emerged and changed through discussion by the authors. In our study, two main researchers (L.Y.Z. and X.Y.Z.) from our research group repeatedly read the backgrounds, methods, results, and discussions of the original research to understand the results of the original research as much as possible. To reduce the risk of data bias, the two authors summarized similar topics and identified a more appropriate topic through discussion when they had differences.

RESULTS

Included Studies

A total of 652 records were identified, and after deduplication, 35 articles were included in this review (please see the PRISMA flow diagram in Fig. 1). These 15 qualitative studies, 19 quantitative studies, and one mixed method study were published between 1997 and 2018. The quantitative studies include quantitative descriptive studies and nonrandomized psychoeducational support intervention studies. The qualitative studies include grounded theory studies, descriptive or hermeneutic phenomenological studies, qualitative descriptive studies, thematic or content analyses, and case analyses. The mixed research method consisted of a convergent design. Please see Table 2 for the characteristics of the studies and Table 3 for the characteristics of the participants.

Critical Appraisal

There are differences in the methodological quality of the studies. All of the articles were significant in relation to the spiritual domain, and none were excluded in the quality

Table 1 Search Strategy to Identify Articles About HSCT Spirituality (Search Date: from Record to 2019 February 23)

Literature database	Hematopoietic stem cell transplantation	Spiritual need related topics	Total articles identified
PubMed	#1 ("Bone Marrow Transplantation"[Mesh]) OR (((((Grafting, Bone Marrow[Title/Abstract]) OR Bone Marrow Grafting[Title/Abstract]) OR Transplantation, Bone Marrow[Title/Abstract]) OR Bone Marrow Cell Transplantation[Title/Abstract]) OR Transplantation, Bone Marrow Cell[Title/Abstract]) #2 (((Stem Cell Transplantation, Hematopoietic[Title/Abstract]) OR Transplantation, Hematopoietic Stem Cell[Title/Abstract])) OR "Hematopoietic Stem Cell Transplantation"[Mesh] #3 #1OR#2	#4 ("Spirituality"[Mesh]) OR spiritualities [Title/Abstract] #5 ((((((((Therapies, Spiritual[Title/Abstract]) OR Spiritual Healing[Title/Abstract]) OR Healing, Spiritual[Title/Abstract]) OR Healings, Spiritual[Title/Abstract]) OR Spiritual Healings[Title/Abstract]) OR Exorcism[Title/Abstract]) OR Exorcisms[Title/Abstract])) OR "Spiritual Therapies"[Mesh] #6 "Survivorship"[Mesh] #7 #4AND#5AND#6	#3 AND #7—74
CINAHL	S1=SU (hematopoietic stem cell transplantation or bone marrow transplant) OR TI (hematopoietic stem cell transplantation or bone marrow transplant)	S2 SU Survivorship OR TI Survivorship S3 SU Exorcism OR TI Exorcism S4 SU Spiritual Therapies OR TI Spiritual Therapies S5 SU Spiritual Healing OR TI Spiritual Healing S6 SU Spirituality OR TI Spirituality S7=S2 OR S3 OR S4 OR S5 OR S6	S1 AND S7—23
Web of Science	#1 TOPIC: ("bone marrow transplantation") OR TOPIC: ("Grafting, Bone Marrow") OR TOPIC: ("bone marrow grafting") OR TOPIC: ("transplantation, bone marrow") OR TOPIC: ("bone marrow cell transplantation") OR TOPIC: ("transplantation, bone marrow cell") #2 TOPIC: ("Hematopoietic Stem Cell Transplantation") OR TOPIC: ("Stem Cell Transplantation, Hematopoietic") OR TOPIC: ("Transplantation, Hematopoietic Stem Cell") #3 #1 OR #2	#4 TOPIC: (Spirituality) OR TOPIC: (Spiritualities) OR TOPIC: ("spiritual therapy") OR TOPIC: ("spiritual healing") OR TOPIC: (exorcism) OR TOPIC: (survivorship) OR TOPIC: (religion)	#3 AND #4—288
Embase	#1 'bone marrow transplantation'/exp. #2 'bone marrow transplantation':ab,ti OR 'grafting, bone marrow':ab,ti OR 'bone marrow grafting':ab,ti OR 'transplantation, bone marrow':ab,ti OR 'bone marrow cell transplantation':ab,ti OR 'transplantation, bone marrow cell':ab,ti #3 'hematopoietic stem cell transplantation'/exp. #4 'hematopoietic stem cell transplantation':ab, ti OR 'stem cell transplantation, hematopoietic':ab, ti OR 'transplantation, hematopoietic stem cell':ab, ti #5 #1 OR #2 #6 #3 OR #4 #7 #5 OR #6	#8 'religion':ab,ti OR 'spirituality':ab,ti OR 'spiritualities':ab,ti OR 'spiritual therapies':ab,ti OR 'spiritual healing':ab,ti OR 'exorcism':ab,ti OR 'survivorship':ab,ti	#7 AND #8—254
Cochrane	#1 ("bone marrow transplantation"):ti,ab,kw OR ("grafting, bone marrow"):ti,ab,kw OR ("bone marrow grafting"):ti,ab,kw OR ("transplantation, bone marrow"):ti,ab,kw OR ("bone marrow cell transplantation"):ti,ab,kw OR ("transplantation, bone marrow cell"):ti,ab,kw #2 ("hematopoietic stem cell transplantation"):ti,ab,kw OR ("stem cell transplantation, hematopoietic"):ti,ab,kw OR ("transplantation, hematopoietic stem cell"):ti,ab,kw #3 #1 AND #2	#4 ("religion"):ti,ab,kw OR ("spiritual therapy"):ti,ab,kw OR ("spiritual healing"):ti,ab,kw OR("exorcism"):ti,ab,kw OR ("survivorship"):ti,ab,kw #5 ("spirituality"):ti,ab,kw OR ("spiritualities"):ti,ab,kw OR ("spiritualism"):ti,ab,kw #6 #4 OR #5	#3 AND #6—13

appraisal process. Please see Table 2 for MMAT scoring; a star represents an affirmative answer to a question. The reasons for scoring 4 stars are as follows: a high rate of attrition that leads to a high risk of nonresponse bias,[17–19] small samples that may lack representativeness,[20–22] and unclear data analysis methods.[23]

Inductive Analysis

The inductive analysis of the 35 studies revealed the following three themes: the spiritual experiences of HSCT patients, the spiritual coping styles of HSCT patients, and the spiritual changes brought about by HSCT (Tables 4, 5, and 6).

Spiritual Experiences of HSCT Patients. The sample of this SMSR included respondents both with and without religious beliefs, but none of the original studies included in this SMSR separately described the spiritual experiences of patients without religious beliefs in detail. Feeling connected with God was the common spiritual experience of religious HSCT patients.[1,24–28] This feeling was usually manifested in the aspects of a "positive view of disease" and "belief in God and destiny." After knowing that they were ill, most religious participants viewed the illness positively; some were willing to think that their "sickness is not seen as a misfortune," [25] and even that HSCT is a "divine test," [27] thereby affirming that "their life has a purpose." [28] Most of the religious participants were willing to believe in God,[27, 28] although some patients thought that their illness was an atonement or a punishment for sins, which they accepted frankly.[27] Quantitative evidence indicated that spiritual experiences in all sample groups were

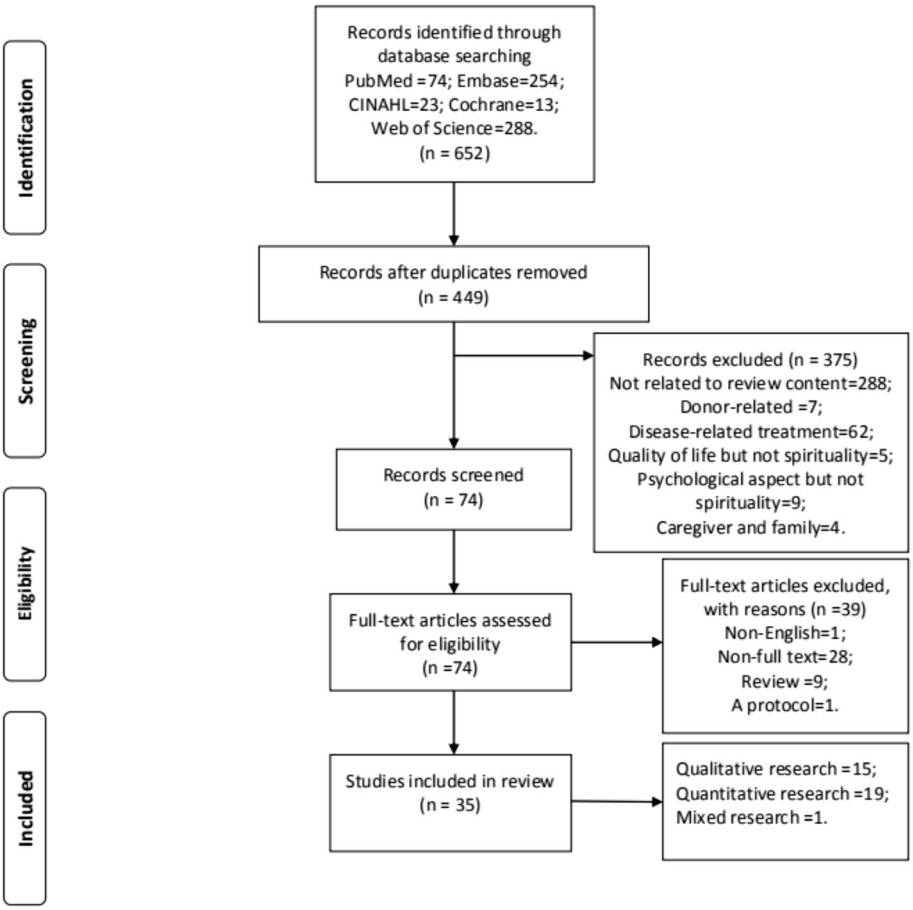

Figure 1 Flow diagram of individual studies screening.

affected by complications, ethnicity, education, culture, and income.[17,22,29–31] Harris et al.[21] and Prince et al.[29] indicated that the QOL of patients with the lowest spirituality level is significantly different from those with higher spirituality levels. Pereira et al.[32] proposed that patients with a spiritual absence and problematic compliance had greater hazards regarding 1-year all-cause mortality.

The participants included in this SMSR thought that the current system did not meet their spiritual needs. For example, the participants with religious beliefs thought that their spiritual experience during this difficult period needed the help of a psychotherapist.[33] In addition, when assessing QOL, both patients with religious beliefs and those with nonreligious beliefs tended to choose scales with spiritual items.[34] Some religious participants felt that spiritual/religious struggle was due to perceived risk and limited time,[23,26] which are significantly associated with gender, race, and time since diagnosis but not with QOL or medical variables.[18,35]

Spiritual Coping Styles of HSCT Patients. There are two forms of spiritual coping. External forms [3,25,28,36,37] of spiritual coping for religious participants include "supplication," "reading from the Holy Book and listening to its Recitation,"[25] and "receiving spiritual encouragement from family support or other survivors." [25,28] Internal forms [1,3,25,28,33,38] of spiritual coping for religious participants include patience,[25] "acceptance of fate,"[1] "reliance on faith,"[1] and a "genuine belief in God as the best cure for disease and sickness."[25]

In contrast, external forms of spiritual coping for nonreligious participants include "seeking spiritual support from family members or friends" [36] and "finding meaning of life."[3] Internal forms of spiritual coping for nonreligious participants include "appreciating life" [3] and "self-purification." [33]

Spiritual Need Changes Brought About by HSCT. Both participants with religious beliefs and those with nonreligious beliefs usually felt "spiritual dependence increases" after HSCT.[11,20,22,28,31,32,44,45] Religious participants had a greater reliance on religious and spiritual activities after HSCT,[42] such as "more committed to prayers than before; an increased faith in God helped me to feel stronger."[25] The studies included in this SMSR did not elaborate on these details for nonreligious participants. A quantitative study indicated that there was a significant negative association between spiritual growth and total perceived stress.[39] Older participants reported more spiritual growth than younger participants.[19] Religious faith and the meaning of peace dimension of spirituality improved after HSCT but not after allogeneic HSCT.[8,17,19,29,40,41] It is

Table 2 Description of Studies Included in the Mixed Methods Systematic Review

First author (year)	Country	Primary focus	Study design	Data collection method	Findings related spirituality	MMAT scoring
Wong (2010)	USA	After patients HSCT, predictors of QOL concerns	Prospective longitudinal study	COH-QOL-HCT	Sp-WB improved after HSCT. Sp-WB remained unchanged at other postallogeneic HCT time points. Chronic GVHD was the only factor significantly associated with concurrently worse spiritual well-being after allogeneic HCT. Spiritual QOL in patients who underwent allogeneic HCT without chronic GVHD was significantly better than among patients who underwent autologous HCT.	☆☆☆☆
Sherman (2004)	USA	How supportive care needs are addressed across different pediatric centers	Prospective longitudinal study	Item construction was informed in part by previous supportive care surveys	Spiritual concerns were screened less frequently.	☆☆☆☆☆
Byar (2005)	USA	Evaluate the QOL of individuals at least 5 years post-AHSCT and to determine instrument preference	Cross-sectional study	MOS-SF-36 COH-BMT FACT-BMT	MOS-SF-36 did not address spiritual life, changes in perspective. COH-BMT is easy to answer because it is very spiritual. Spiritual questions, very powerful healing tool.	☆☆☆☆☆
King (2013)	USA	Used of a screening protocol that identified patients who may have been experiencing R/S struggle and examined the prevalence and correlates of possible R/S struggle	Cross-sectional study	The ESRA-C; the Rush Protocol; RTCQOLQ-C30; PHQ-9; a standard pain intensity numerical scale of 0–10	Gender, race, and time since diagnosis were significantly associated with positive screening for R/S struggle. There were no associations between potential R/S struggle and QOL or pain.	☆☆☆☆
King (2017)	USA	Describes the prevalence of R/S struggle in long-term survivors after HSCT, demographic and medical correlates of R/S struggle, and its associations with depression and quality of life	Cross-sectional study	NRC; SFHS; McGill QOL; PHQ-8; current GVHD	Younger age and describing oneself as either spiritual but not religious or religious but not spiritual were associated with a higher risk of any R/S struggle. R/S struggle was not associated with gender, religious affiliation, diagnosis, years since diagnosis, or years since transplant. R/S struggle was not significantly associated with medical variables. Participants who described themselves as spiritual but not religious or religious but not spiritual were more likely to have R/S struggle than those who were both spiritual and religious.	☆☆☆☆☆
Harris (2010)	USA	The relationship between Sp-WB and QOL in patients with cGVHD	Cross-sectional study	FACIT-Sp; FACT-G	The level of current QOL is significantly associated in a positive manner to level of Sp-WB. Patients with a higher Sp-WB also experienced a better QOL overall.	☆☆☆☆
Prince (2015)	USA	Compares Sp-WB and QOL of Hispanic and non-Hispanic survivors	Cross-sectional study	FACIT-SpWB; FACT-G; SAS	Complication/ethnicity/education/culture affects Sp-WB. Sp-WB improved after HSCT.	☆☆☆☆☆
Sinclair (2016)	Canada	Examine the relationships between spiritual, religious, and sociodemographic factors and post-traumatic growth, QOL,	Cross-sectional study	FACT-BMT; PTGI; FACIT-Sp	Statistically significant differences were revealed in different incomes for the FACIT-Sp meaning subscale and the FACT-BMT spiritual well-being subscale.	☆☆☆☆☆

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Table 2. (continued)

First author (year)	Country	Primary focus	Study design	Data collection method	Findings related spirituality	MMAT scoring
		and Sp-WB in outpatients undergoing BMSCT			Significant differences not religious at all versus having at least some religiosity in spiritual change. Significant differences not spiritual at all versus having at least some spirituality on spiritual change. A religious affiliation was at least somewhat likely to recommend that a new patient seek the support of the clinic's spiritual care professional.	
Sirilla (2013)	USA	Evaluate the effect of QOL, Sp-WB, and supportive care resources post-HSCT	Prospective longitudinal study	FACT—BMT; FACIT—Sp; The Resource Questionnaire	Sp-WB mean baseline score (37.4) to day 180 (37.0) did not change. Faith, prayer, and spiritual healing were the most used resources at 63% of the participants. Moderate correlations between QOL and sp-WB were found in autologous patients. Spirituality scores increased as time increased from transplant.	☆☆☆☆☆
Wingard (2010)	Center for International Blood and Marrow Transplant Research (CIBMTR)	We evaluated demographic and clinical factors before and after HCT and selected psychosocial factors after HCT, exploring their association with self-reported physical and mental health	Cross-sectional study	PCS and MCS score of SF-36; QOL; Duke-UNC FSSQ; FACIT-Sp; LOT	Psychosocial factors associated with mental health included greater spiritual well-being.	☆☆☆☆☆
Cigrang (2003)	USA	Compare the frequency of spontaneous reports of religious coping across three groups of patients who were experiencing different types of chronic physical illness	Cross-sectional study	A written, open-ended question asking how they were coping with the challenges involved in their medical condition	Religious coping was highest in participants preparing for a BMT.	☆☆☆☆
Pereira (2010)	USA	The relationship between spiritual absence and 1-year all-cause mortality in AHSCT recipients	Cross-sectional study	MBMD; patient survival time and status were abstracted from medical records	Spiritual absence was not associated with 1-year mortality secondary to disease progression or new/secondary malignancy.	☆☆☆☆☆
Lounsberry (2010)	Canada	Feasibility and efficacy of a telehealth delivered psychoeducational support group for AHSCT survivors	Intervention study	FACT-BMT; FACIT–Sp-WB; PTGI	Spirituality was not significant change after mindfulness exercise with six weekly, 1.5 h.	☆☆☆☆
Lynchkelly (2016)	USA	Explore associations among lifestyle behaviors, perceived stress, and inflammation of individuals with cGVHD	Secondary analysis of prospective observational study	The data of individual factors and disease factors; HPLP-II; PSS; blood	There was a significant negative association between spiritual growth and total perceived stress.	☆☆☆☆☆
Andrykowski (2004)	40 transplantation centers worldwide	Examine HRQOL and growth, and Sp-WB in adult survivors of HSCT for a malignant disease	Quantitative descriptive	SF-36-GH; PHQ; STAI-Trait; SF-36-MH; CES-D; SF-36-PF; SF-36-Pain; FACT-PWB; FACIT-Fatigue; MOS-Sex and MOS-Sleep; SIP-AB; SF-36-SF; MOS-Family; Duke-UNC; UCLA; PTGI; FACIT-Sp	The survivor group reporting poorer sp-WB	☆☆☆☆☆
Fitchett (2017)	USA	Examining the validity of the Rush Protocol to screen for R/S struggle	Cross-sectional study	Neg RCOPE subscale of the Brief RCOPE; two versions of the Rush Protocol	Patients did not like about MOS-SF-36, because it did not address spiritual life, changes in perspective. The scale with	☆☆☆☆☆

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Table 2. (continued)

First author (year)	Country	Primary focus	Study design	Data collection method	Findings related spirituality	MMAT scoring
					spiritual evaluation is more popular with patients.	
Lesson (2015)	USA	Investigated changes in spirituality in hematologic cancer patients recovering from HSCT and relationships between spirituality and dimensions of quality of life following HSCT	Prospective longitudinal study	FACIT-Sp; IDAS; FSI; BPI; FACIT-PWB and FWB	The meaning/peace dimension changed significantly over time. Religious faith also changed significantly over time…	☆☆☆☆☆
Tallman (2010)	USA	Explore posttraumatic growth and psychological and physical well-being among 25 cancer survivors (12 men, 13 women) 9 years after receiving a HSCT from an unrelated donor	Prospective longitudinal study	LOT-Revised; MOS-SS; FACT-G; PTGI	Spiritual growth, with older participants reporting more spiritual growth than younger participants	☆☆☆☆
Saleh (2001)	USA	Understand the concept of hope in patients with cancer hospitalized for BMT	Hermeneutic phenomenology	One-time semistructured interview using open-ended questions	Feeling connected with god; affirming relationships; anticipating survival; fostering ongoing accomplishment	☆☆☆☆☆
Alaloul (2015)	USA	Understand the role of spirituality in the cancer experience among Arab Muslim HSCT survivors	Qualitative descriptive	Responded to 2 open-ended, self-report questions	Genuine belief in God is the best cure for disease and sickness; faith in destiny; sickness is not seen as misfortune; patience; supplication; reading from the Holy Book and listening to its recitation; strengthening of faith in God and greater reliance on R/S activities	☆☆☆☆☆
Berger (2001)	USA	Find common themes in the spiritual journeys of BMT/HSCT survivors	A story	Story and literature	Commonalities among the spiritual journeys of BMT/HSCT survivors; chaplain interventions are beneficial.	☆☆☆☆☆
Faris (2010)	Iran	Explored the coping strategies acute leukemia patients who were undergoing this form of treatment in transplantation units	Qualitative	Semistructured interviews	Connection with divine purpose (acceptance of fate; reliance on faith); patience and resignation	☆☆☆☆☆
Fairs (2012)	Iran	Elicit the coping process of adults experiencing acute leukemia who underwent HSCT therapy	Grounded theory	A series of pretransplant and posttransplant interviews	Perceived threat (disregarding disease signs and symptoms; limited time); suspension between fear and hope; finding meaning; coping strategies	☆☆☆☆☆
Fairs (2015)	Iran	Explain how the meaning of disease and spiritual responses to threatening stressors influence the final experiential outcomes of adults with leukemia undergoing HSCT	Grounded theory	A series of pretransplant and posttransplant interviews	Experiencing the meaning of cancer; divine test; god interest; atonement/ punishment for sins	☆☆☆☆☆
King (2012)	USA	A chaplain's faithful companioning a cancer patient	Case study	Telling stories	Courage; meaning; courage and growth in facing S/R struggle; rituals; R/S struggle; religious care; family emotional pain and struggles	☆☆☆☆
Lawson (2012)	USA	Explored BMT patients' perceptions of an art-making experience during BMT treatment	Qualitative	Patients receiving semistructured, in-depth interviews	Spirituality guided their individual treatment process.	☆☆☆☆☆
Ragsdale (2014)	USA	Explore the use of R/S in AYA HSCT recipients and to assess changes in belief during the transplantation experience	Grounded theory	Two semistructured interviews	Believing God has a reason; using faith practices; and benefitting from spiritual support people; believing God chose me; affirming that my life has a purpose;	☆☆☆☆☆

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Table 2. (continued)

First author (year)	Country	Primary focus	Study design	Data collection method	Findings related spirituality	MMAT scoring
					receiving spiritual encouragement; and experiencing strengthened faith.	
Alnasser (2018)	Saudi Arabia	To explore the lived experience of the patients post-HSCT and specifically after engraftment and before discharge	Descriptive phenomenology	In-depth semistructured interviews	Self-purification; spirituality and stress relief	☆☆☆☆☆
Cook (2012)	USA	Understand discharge needs of allogeneic transplantation recipients	Content analysis	Most of the patient-initiated topics, which were psychosocial in nature	Fear of future, uncertainty, life, death; more appreciate in life, " do not sweat the small stuff"	☆☆☆☆☆
Gabriel (2001)	USA	The benefit of art therapy	Art therapy intervention	Image-making with the art therapist	Existential/spiritual issues	☆☆☆☆☆
Lawson (2016)	USA	Understand patients' perceptions in relation to their experience with illness through the art-making process	Thematic analysis	Participants are encouraged to paint freely during their time in the BMT outpatient clinic	Faith; hope; positive attitude; social support	☆☆☆☆☆
Ragsdale (2018)	USA	Describe how Arabic-speaking Muslim families from the Middle East use Islam in the process of their child receiving BMT in the USA	Grounded theory	The open-ended interview	Muslim families used religious practices in the hospital; hospital supported Muslim practices.	☆☆☆☆☆
Rivera (1997)	USA	Share a story about being the wife of a cancer survivor who had a BMT	Case study	Personal experience and published articles related to the impact of cancer on the family	Find out what the family members' usual coping strategies are and encourage them to use those strategies; identify spiritual resources and encourage the patient and family to use these resources.	☆☆☆☆☆
Mattson (2013)	USA	Examine QOL among young adult survivors in relation to middle-aged and older adults, identify common areas of concern, and explore the association of individual characteristics with levels of QOL	Convergent design	A 1-time telephone interview utilizing the COH-QOL and 3 open-ended questions	The greatest difference was in the spiritual domain, with nonwhites reporting higher levels of spiritual well-being. There was a need for religious/spiritual services. Disease relapse was their biggest worry; returning to "normal life" was a worry; the long-term adverse effects secondary to their treatment are their difficulty. Well prepared for life after treatment; support or counseling groups; more treatment and information/education on adverse effect may be beneficial.	☆☆☆☆

HSCT, hematopoietic stem cell transplantation; HCT, hematopoietic cell transplantation; AHSCT, allogeneic hematopoietic stem cell transplant; BMT, blood and marrow transplantation; COH-BMT, City of Hope-Quality of Life-Bone Marrow Transplant; FACT-BMT, Functional Assessment of Cancer Therapy-Bone Marrow Transplant; FACIT-Sp, Functional Assessment of Chronic Illness Therapy–Spiritual well-being; Sp-WB, spiritual well-being; FACT-PWB, Physical Well-Being subscale of the Functional Assessment of Cancer Therapy scale; FACT-G, Functional Assessment of Cancer Therapy-General; QOL, quality of life; COH-QOL-HCT, The City of Hope Quality of Life; GVHD, graft-versus-host disease; R/S, religious/spiritual; ESRA-C, Electronic Self-Report Assessment—Cancer; RTCQOLQ-C30, Research and Treatment of Cancer Quality of Life Questionnaire-C30; PHQ, Perceived Health Questionnaire; NRC, Negative Religious Coping; SFHS, Short Form Health Survey; SBI, Spiritual Beliefs Inventory; SAS, The Short Acculturation Scale; PTGI, Post-Traumatic Growth Inventory; PCS, Physical Component Summary; MCS, Mental Component Summary; Duke-UNC, Duke-University of North Carolina Social Support Questionnaire; LOT, Life Orientation Test; MBMD, Stress Moderator Scale of the Millon Behavioral Medicine Diagnostic; HPLP-II, Health-Promoting Lifestyle Profile II; PSS, Perceived Stress Scale; MOS, Medical Outcomes Study; MOS-SS, The Medical Outcomes Study Social Support Survey; MOS-SF-36, Medical Outcomes Study-Short Form; SF-36-GH, general health perception subscale of the Medical Outcomes Study 36-Item Short Form Health Survey; SF-36-PF, Physical Functioning of the SF-36; SF-36-MH, Mental Health Subscale of the SF-36; SF-36-SF, Social Functioning subscale of the SF-36; STAI-Trait, Trait Anxiety subscale of the Spielberger State-Trait Anxiety Inventory; CES-D, Center for Epidemiologic Studies Depression Scale; SIP-AB, Alertness Behavior subscale of the Sickness Impact Profile; UCLA, University of California, Los Angeles Loneliness scale; Neg RCOPE subscale of the Brief RCOPE, 7-item negative religious coping subscale of the Brief RCOPE; IDAS, Inventory of Depression and Anxiety Symptoms; FSI, Fatigue Symptom Inventory; BPI, Brief Pain Inventory; FACIT-PWB and FWB, physical well-being and functioning well-being of FACIT

Table 3 Demographic Baseline of Participants

First author, year of publication, and country	*N* (sample size)	Sex	Mean age, years (range)	Ethnicity, *n* (%)	Marital status, *n* (%)	Education, *n* (%)	Primary diagnosis, *n* (%)	Stem cell source, *n* (%)	Religious affiliation, *n* (%)
Wong (2010) USA	312	M = 173 F = 139	48 (18–78)	White African American Asian Other	Married/partnered 203 (65) Single 64 (20) Divorced/-widowed/-separated 45 (14)	≤HS 71 (23) Some college 105 (34) Bachelor's degree 71 (23) Postgraduate degree 64 (21) Unknown 1 (0.3)	NHL 86 (28) AML 66 (21) MM 60 (19) Hodgkin lymphoma 25 (8) Acute lymphocytic leukemia 23 (7) Myeloproliferative disorder 18 (6) Other 34 (11)	Autologous only 170 (54) Allogeneic 142 (46)	NG
Sherman (2004) USA	64	NG	NG	NG	NG	NG	NG	NG	NG
Byar (2005) USA	92	47 (29–65)	Male = 48 Female = 44	White, non-Hispanic 88 (95) White, Hispanic 1 (1) Black, non-Hispanic 2 (2) Asian 1 (1)	NG	≤HS 13 (13) Trade 8 (8) College 19 (20) Associate 5 (5) Bachelor of Science 22 (23) Graduate hours 9 (9) Graduate degree 15 (16) No answer 1 (1)	AML 4 (4) Acute lymphocytic leukemia 1 (1) MM, cervical cancer 2 (2) NHL 47 (51) Hodgkin's disease 35 (38) BC 3 (3)	NG	NG
King (2013) USA	178	51.7 (20–72)	Male = 94 Female = 84	White 147 (83) Asian/Pacific Islander 14 (8) Other 8 (4) Unknown 9 (5)	NG	NG	NG	NG	Evangelical Protestant 36 (22) Mainline Protestant 29 (16) Catholic 29 (16) Other religion 11 (6) Spiritual not religious 20 (11) No affiliation 53 (30)
King (2017) USA	1449	55.5	Male = 744 Female = 705	White people 1316 (93.1) Others 133 (6.9)	NG	NG	Leukemia 678 (46.8) Lymphoma/-Hodgkin's disease 263 (18.2) MM 218 (15.0) AA 63 (4.3) MS (MDS) 157 (10.8) Other 44 (3.0) Solid tumors 26 (1.8)	NG	Christian 980 (68.3) Others 188 (13.1) No preference/none 129 (12.5) Agnostic/atheist 88 (6.1)
Harris(2010) USA	52	20–60	Male = 26 Female = 26	NG	Married (67)	NG	NG	NG	NG
Prince (2015) USA	171	43.7 (19–76)	Male = 107 Female = 64	Hispanic 69 (40.4) Non-Hispanic 102 (59.6)	Married 109 (63.7)	≤HS 48 (28) Some			College/Associate's degree 43 (25)

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Table 3. (continued)

First author, year of publication, and country	*N* (sample size)	Sex	Mean age, years (range)	Ethnicity, *n* (%)	Marital status, *n* (%)	Education, *n* (%)	Primary diagnosis, *n* (%)	Stem cell source, *n* (%)	Religious affiliation, *n* (%)
									Bachelor's degree 78 (45)
NG	NG	Christian 144 (84) Other 27 (15.2)							
Sinclair (2016) Canada	100	48.26 (19–68)	Male = 59 Female = 41	NG	Alone 11 (11) Not alone 89 (89)	≤HS 23 (23) More than HS 75 (75) Missing data 2 (2)	NG	NG	Roman Catholic 22 (22) Protestant 29 (29) Jewish 2 (2) Muslim 2 (2) Buddhist 3 (3) Other 16 (16) None 26 (26)
Sirilla (2013) USA	159	NG	Male = 94 Female = 61 Missing = 4	White 143 (90) African American 10 (7) Asian 5 (3)	Married 109 (68) Widowed 4 (3) Divorced 26 (16) Single 9 (6) Missing 11 (8)	NG	NG	Allogeneic 74 (46) Autologous 85 (54)	NG
Wingard (2010) Center for International Blood and Marrow Transplant Research (CIBMTR)	662	42.1 (18–71)	Male = 411 Female = 251	White 603 (92) Other 56 (8)	Married/living with partner/ committed 493 (75) Other 162 (25)	NG	ALL 243 (37) CL 131 (20) BC 156 (24) Lymphoma 132 (20)	NG	NG
Cigrang (2003) USA	111	NG	NG	White 74 (67), Hispanic 21 (19) Black 13 (12), American Indian 2 (2) Other ethnic group 1 (< 1)	Married 91 (82) Single 7 (6) Divorced 6 (5) Widowed 5 (5) Separated 3 (3)	NG	NG	NG	NG
Pereira (2010) USA	85	46.85	Male = 46 Female = 39	White, non-Hispanic 73 (86) Black/African--American 4 (5) Hispanic 6 (7) Asian 1 (1) Not reported 1 (1)	Single/never married, divorced, widowed 19 (22) Married 65 (76) Not reported 1 (2)	NG	NG	NG	NG
Lounsberry (2010) Canada	13	NG	NG	NG	NG	NG	NG	NG	NG
Lynch Kelly (2016) USA	24	53	Male = 10 Female = 14	White (87.5)	Married or in a relationship with a significant other (79.2)	Beyond HS (85.8)	AML (29.2) MS (16.7) Chronic myeloid leukemia or MM (12.5)	(79.2) received stem cells from a relative	NG
	662		Male = 252	White 21 (92)			AML 194 (29)		NG

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Table 3. (continued)

First author, year of publication, and country	*N* (sample size)	Sex	Mean age, years (range)	Ethnicity, *n* (%)	Marital status, *n* (%)	Education, *n* (%)	Primary diagnosis, *n* (%)	Stem cell source, *n* (%)	Religious affiliation, *n* (%)
Andrykowski (2004) 40 transplantation centers worldwide		49.1 (21–77)	Female = 410		Married or partnered 18 (73)	≤HS graduate 192 (29) Some college or technical education 212 (32) College degree 258 (39)	CML 128 (19) ALL 44 (7) BC 154 (23) Hodgkin's or NHL 131 (20) Other 2 (1) Missing data 9 (1)	HLA-identical sibling 187 (70) Alternative RD 11 (4) UD 33 (12) Other or missing 36 (13)	
Fitchett (2017) USA	1399	NG	Male = 725 Female = 674	White 1268 (93.0) Others 95 (7.0)	NG	NG	Leukemia 655 (46.8) Lymphoma/-Hodgkin's disease 255 (18.2) MM 207 (14.8) MS(s) 155 (11.1) AA61 (4.4) Other 41 (2.9) Solid tumors 25 (2.9)	NG	Christian 940 (67.9) Others 184 (13.3) No preference/none 175 (12.6) Agnostic/atheist 86 (6.2)
Lesson (2015) USA	220	NG	Male = 136 Female = 84	White 213 (96.8) Native American 2 (0.9) African American 2 (0.9) Latina/Latino 2 (0.9) Declined to respond 1 (0.5)	Married 182 (82.7) Single 19 (8.6) Divorced/-separated 15 (6.9) Widowed 4 (1.8)	≤HS 66 (30) Some college/trade school 59 (26.8) College graduate 59 (26.8) Postgraduate degree 36 (16.4)	Leukemias74 (33.6) CML 2 (0.9) CLL 4 (1.8) AML 35 (15.9) ALL 21 (9.6) MDS 13 (5.9) Lymphomas 69 (31.4) MM 69 (31.4)	Autologous 121 (55) Allogeneic 99 (45) Myeloblative 68 (30.9) Nonmyeloblative 31 (14.1)	Lutheran 56 (25.5) Catholic 51 (23.2) Methodist 21 (9.5) Other 54 (24.6) None 32 (14.5) Declined to respond 6 (2.7)
Tallman (2010) USA	25	37.21	Male = 12 Female = 13	Caucasians 23 (92) African American 2 (8)	Married 12 (50) Single 10 (37.5) Divorced 3 (12.5)	≤HS 7 (29.2) Attended graduate school or held a graduate degree 4 (16.7) 4-year college degree 10 (37.5) A 2-year college degree 4 (16.7)	NG	NG	NG
Saleh (2001) USA	9	47.3 (21–76)	Female = 2 Male = 7	White 7 (77.7) African-American 2 (22.2)	Single 1 (11.1) Married 7 (77.7) Widowed 1 (11.1)	≤HS 5 (55.5) Some college 3 (33.3) Completed college 1 (11.1)	BC 1 (11.1) CML1 (11.1) AML 3 (33.3) NHL 3 (33.3) MM 1 (11.1)	Autologous 4 (44.4) Allogeneic 5 (55.5)	NG
Alaloul (2015) USA	63	35.4 (19–63)	Male = 43 Female = 20	NG	Single 23 (36) Married 38 (60) Divorced 1 (2) Widowed 1 (2)	≤HS 33 (52) Diploma 10 (16) Undergraduate 14 (22) Graduate 6 (10)	Leukemia 31 (49) lymphoma 18 (29) MM 10 (16) Other cancer 4 (6.4)	Autologous 26 (41) Allogeneic 37 (59)	NG

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Table 3. (continued)

First author, year of publication, and country	*N* (sample size)	Sex	Mean age, years (range)	Ethnicity, *n* (%)	Marital status, *n* (%)	Education, *n* (%)	Primary diagnosis, *n* (%)	Stem cell source, *n* (%)	Religious affiliation, *n* (%)
Berger (2001) USA	1	NG	NG	NG	NG	NG	NG	NG	NG
Faris (2010) Iran	10	29.3	Male = 5 Female = 5	NG	Married 7 (70) Single 3 (30)	≤HS 5 (50) Bachelor degree 4 (40) Master of science degree 1 (10)	NG	NG	Muslim 10 (100)
Fairs (2012) Iran	10	29.3	Male = 5 Female = 5	NG	Married 7 (70) Single 3 (30)	≤HS 5 (50) Bachelor degree 4 (40) Master of science degree 1 (10)	NG	NG	Muslim 10 (100)
Fairs (2015) Iran	10	29.3	Male = 5 Female = 5	NG	Married 7 (70) Single 3 (30)	≤HS 5 (50) Bachelor degree 4 (40) Master of science degree 1 (10)	NG	NG	Muslim 10 (100)
King (2012) USA	1	NG	NG	NG	NG	NG	AML	NG	NG
Lawson (2012) USA	20	NG	Male = 10 Female = 10	White 14 (70) Black/African American 2 (10) Latino/Hispanic 2 (10) Biracial 2 (10)	Married 6 (30) Divorced 3 (15) Single 5 (25) Unknown 6 (30)	HS 8 (40) Some college/technical degree/AA 7 (35) College degree 5 (25)	AML 8 (40) ALL 5 (25) Lymphoma 2 (10) HL 1 (5) NHL 1 (5) TC 1 (5) MM 3 (15)	Autologous 3 (15) Allogeneic 12 (60)	NG
Ragsdale (2014) USA	12	19.25 (15–28)	Male = 5 Female = 7	Caucasian 9 (75) Afr-Am 1 (8) Hispanic 2 (17)	NG	NG	ALL 1 (8) AML 3 (25) AA 2 (17) SDA 1 (8) XLP-like ID 1 (8) NHL and XLP 1 (8) CGD 1 (8) HLH 1 (8) CML 1 (8)	RD 4 (33) UD 7 (59) Cord 1 (8)	Presbyterian 1 (8) Christian 4 (33) Baptist 3 (25) Roman Catholic 1 (8) Catholic 1 (8) None 1 (8) No response 1 (8)
Alnasser (2018) Saudi Arabia	15	NG	NG	NG	NG	NG	NG	NG	NG
Cook (2012) USA	141	48.76 (19–71)	Male = 73 Female = 68	Caucasian 116 (82) Asian or Pacific Islander 21 (15) African American 2 (1) Mixed or other 2 (1)	NG	NG	ALL 78 (51) MS 25 (16) NHL 19 (12) CL 15 (10) Myelofibrosis 5 (3) Myeloproliferation disorder 5 (3) HL 4 (3) Other 3 (2)	Matched, UD 74 (53) RD 67 (48)	NG

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Table 3. (continued)

First author, year of publication, and country	*N* (sample size)	Sex	Mean age, years (range)	Ethnicity, *n* (%)	Marital status, *n* (%)	Education, *n* (%)	Primary diagnosis, *n* (%)	Stem cell source, *n* (%)	Religious affiliation, *n* (%)
Gabriel (2001)	1	NG	NG	NG	NG	NG	NG	NG	NG
Lawson (2016) USA	171	NG	Male = 10 Female = 10	White 14 (70) Black/African American 2 (10) Latino/Hispanic 2 (10) Biracial 2 (10)	Married 6 (30) Divorced 3 (15) Single 5 (25) Unknown 6 (30)	HS 8 (40) Some college/technical degree/AA 7 (35) College degree 5 (25)	AML 8 (40) ALL 5 (25) Lymphoma 2 (10) HL 1 (5) NHL 1 (5) TC 1 (5) MM 3 (15)	Autologous 3 (15) Allogeneic 12 (60)	NG
Ragsdale (2018) USA	13	4.6 (0.8–9.8)	NG	NG	Children 13 (100)	NG	Hemophagocytic lymphohistiocytosis 3 (23) ALL 3 (23) AA 1 (7) Beta thalassemia 2 (15) CD40 ligand deficiency 1 (7) ID 1 (7) Hemoglobinopathy 1 (7) Bone marrow failure 1 (7)		
NG	NG								
Rivera (1997) USA	1	NG	Male	NG	Married	NG	NHL	NG	NG
Mattson (2013) USA	48	30.2 (20–38)	Male = 26 Female = 22	White 35 (73) African American 11 (23) Other 2 (4)	Single 21 (44) Married 19 (40) Separated 3 (6) Divorced 3 (6) Domestic partner 2 (4)	NG	Leukemia 19 (40) Lymphoma 29 (60)	NG	NG

AA, aplastic anemia; ALL, acute lymphoblastic leukemia; AML, acute myelogenous leukemia; BC, breast cancer; CGD, chronic granulomatous disease; CML, chronic myelocytic leukemia; CL: Chronic leukemia; HL, Hodgkin's lymphoma; HS, high school; ID, immune deficiency; MM, multiple myeloma; MS, myelodysplastic syndrome; NG, no given; NHL, non-Hodgkin's lymphoma; RD, related donor; SDA, Schwachman–Diamond anemia; TC, testicular cancer; UD, unrelated donor; XLP, X-linked lymphoproliferative disorder

Table 4 Summary Table of Spiritual Experience

Spiritual experience	Quantitative articles	Qualitative articles
Quantitative articles: 1. (Wong, 2010) 2. (Sherman, 2004) 3. (Byar, 2005) 4. (King, 2013) 5. (King, 2017) 6. (Harris, 2010) 7. (Prince, 2015) 8. (Sinclair, 2016) 9. (Sirilla, 2013) 10. (Wingard, 2010) 11. (Cigrang, 2003) 12. (Mattson, 2013) Qualitative articles: 13. (Saleh, 2001) 14. (Alaloul, 2015) 15. (Berger, 2001) 16. (Faris, 2010) 17. (Fairs, 2012) 18. (Fairs, 2015) 19. (King, 2012) 20. (Lawson, 2012) 21. (Ragsdale, 2014)	• Sp-WB is affected by ethnicity/education/culture/incomes, but not by stem cell source (1 + 7 + 8 + 11 + 12) • The scale with spiritual assessment is more popular than nonspiritual assessment with HSCT patients because of its powerful healing ability (2 + 3) • Sp-WB is an important part of psychosocial factors and the higher it is, the better overall QOL is (1 + 6 + 9 + 10) • Sp-WB in allogeneic HSCT patients without chronic GVHD was significantly better than autologous HSCT patients (1) • The level of spiritual well-being is worse after patients who underwent allogeneic HSCT with chronic GVHD (1) • R/S struggle was significantly associated with gender, race, and time since diagnosis, but not with QOL and medical variables (4 + 5)	• Feeling connected with God (13 + 14 + 15 + 16 + 17 + 18 + 19 + 20 + 21) • Spiritual/religious struggle (19)

possible that there are more complications and symptom burdens related to allogeneic HSCT than to autologous HSCT.

Table 6 Summary Table of Spiritual Changes

Spiritual changes	Quantitative articles	Qualitative articles
Quantitative articles: 1. (Wong, 2010) 7. (Prince, 2015) 9. (Sirilla, 2013) 29. (Lounsberry, 2010) 30. (Lynchkelly, 2016) 31. (Andrykowski, 2004) 32. (Fitchett, 2017) 33. (Lesson, 2015) 34. (Tallman, 2010) Qualitative articles: 14. (Alaloul, 2015) 21. (Ragsdale, 2014) 28. (Ragsdale, 2018) 35. (Rivera, 1997)	• There was a significant negative association between spiritual growth and total perceived stress (30) • Sp-WB mean baseline score did not change for the overall allogeneic and autologous group (31 + 9) • Religious faith, meaning/peace dimension of spiritual improved after autologous HSCT (1 + 7 + 9 + 32 + 33 + 34) • Older participants reporting more spiritual growth than younger participants (34) • Spiritual was not significantly changed after 1.5 h of mindfulness exercise for 6 weeks (29)	• Greater reliance on religious/spiritual activities (14 + 28) • Strengthening of faith in God (14 + 21 + 35)

DISCUSSION

Summary of Evidence

This SMSR has integrated qualitative and quantitative evidence on the spiritual experiences of patients who underwent HSCT. In this SMSR, most participants [1,25,27] were Muslims. Other participants [28,42] had diverse religious beliefs, including Presbyterian, Christian, Baptist, Catholic, Roman Catholic, Catholic, Protestant, Mormon, others, and none. The following three themes were revealed: the spiritual experiences of HSCT patients, the spiritual coping styles of HSCT patients, and the spiritual need changes brought about by HSCT. The lack of spiritual support is a key issue in the spiritual experiences of HSCT patients, although they have different spiritual coping styles. Both participants with religious beliefs and

Table 5 Summary Table of Spiritual Coping Style of HSCT Patients

Spiritual coping style	Quantitative articles	Qualitative articles
Quantitative articles: 9. (Sirilla, 2013) 22. (Hefner, 2017) 23. (Pereira, 2010) Qualitative articles: 14. (Alaloul, 2015) 17. (Faris, 2010) 21. (Ragsdale, 2014) 24. (Alnasser, 2018) 25. (Cook, 2012) 26.(Gabriel, 2001) 27. (Lawson, 2016) 28. (Ragsdale, 2018) 12.(Mattson, 2013)	• Religiousness and search for meaning showed to be the dominant coping style, but it has nothing to do with sociodemographic variables (22) • Spiritual absence has nothing to do with 1-year mortality secondary to disease progression (23) • Faith, prayer, and spiritual healing were the most used resources (9)	• External form of spiritual coping (12 + 14 + 21 + 26 + 27 + 28) • Internal form of spiritual coping (14 + 17 + 21 + 24 + 25 + 26)

those with nonreligious beliefs usually felt "spiritual dependence increases" after HSCT.

The integration results showed that HSCT patients need spiritual support regardless of whether the participants have various religious beliefs. The content and form of spirituality are different in participants with different religious beliefs. Religion has a great influence on Muslims' daily lives, especially during difficult times, which indicates the importance of incorporating religious needs into the nursing plans for Muslim patients and survivors.[25] Ragsdale et al.[28] have shown that faith participants can use their beliefs to "accept spiritual encouragement." Patients with higher levels of religious beliefs are more willing to accept medical intervention guidelines than are those with lower levels of religious beliefs.[43] Previous studies [7,12,13] have shown that religious and spiritual beliefs contribute to cancer adaptation. These findings are consistent with the integrated results of this study.

The spiritual support of patients without religious beliefs comes from the company of family, friends, or nurses. According to Liang et al.,[44] families can satisfy the spiritual needs of patients by accompanying the patients. These patients share an appreciation for the people who bolster their faith. Therefore, support from patients or nurses with the same beliefs should be involved in the healthcare systems. Consequently, meeting and understanding the spiritual needs of patients and families in the healthcare systems will provide better care and higher satisfaction levels for HSCT patients. Alnasser et al. indicated that patients seek help from family members to meet their spiritual needs because hospitals do not provide such services.[33] Therefore, professional spiritual services should be provided in the care plan of every HSCT patient. We suggest that priests with clinical education backgrounds as psychotherapists should be involved in the field of health care in the future. These priests can be instructed to provide suitable spiritual-based interventions for patients, which would contribute to improving the quality of life of HSCT patients.

Strengths and Limitations of the Review

To the best of our knowledge, this is the first systematic mixed studies review to integrate and assess evidence on the spiritual needs of patients undergoing HSCT. Although the search strategy was thorough, it may have missed sources in the gray literature. The included studies were conducted in countries with strong religious beliefs (Canada, Iran, Saudi Arabia, the USA), which means that the current study results may be quite different from the results of other countries. Thus, the current results are not enough to show the full picture of the role of spirituality in the experience of HSCT. Different researchers may have different integration themes due to the subjective determination of researchers. To reduce the risk of data bias in the current study, two main researchers (L.Y.Z. and X.Y.Z.) from our research group summarized similar topics and identified a more appropriate topic through discussion when they had differences.

CONCLUSION

It is certain that all patients need spiritual support during an illness. HSCT patients with different cultural backgrounds may have different spiritual experiences and spiritual coping styles. However, few medical institutions currently offer spiritual healing. Nurse psychotherapists or professional priests should be considered to provide spiritual care for patients undergoing HSCT, to help patients cope with disease pressures, promote their comfort, and improve their quality of life.

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Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

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