



The assessment of spirituality between cancer and chronic inpatients: a cross-sectional study

Yalan Liu¹ · Hao Xue² · Li Yan¹ · Yulin Xia¹ · Yilin Wang¹

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Abstract

Purpose Spiritual well-being had a protective effect on quality of life in cancer, due to the cultural, regional, and custom differences; it was rarely been discussed between cancer and chronic diseases in Chongqing, China. We aimed at comparing the level of spirituality in two groups and discussing its factors of subjects with cancer at county regions.

Methods A cross-sectional questionnaire survey was distributed to 630 inpatients who received treatment between January and December 2020 in Chongqing University Three Gorges Hospital. In addition to basic demographic data, spirituality was measured using the Chinese version of Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp-12). The mean, standard deviation, independent t-tests, ANOVA, and multiple regression were used for statistical description and analysis.

Results Significant differences were found between cancer and chronic diseases in total scores of FACIT-Sp-12 and each domain ($P < 0.05$). The meaning, peace, faith, and total scores in cancer were 11.21 ± 3.38 , 10.66 ± 4.46 , 11.43 ± 3.54 , and 33.3 ± 10.35 , respectively, which were lower than chronic diseases (13.00 ± 3.21 , 12.95 ± 4.76 , 12.66 ± 3.64 , 38.61 ± 10.88 , respectively). The spiritual well-being had significant differences in gender, character, and emotional with spouse for cancer ($P < 0.05$). The male and extravert character were significantly associated with a greater spiritual well-being.

Conclusion The study shows a medium level of spiritual well-being in cancer, which stands the population with lower economic and education in county regions. It suggests that under the current nursing mode, we should provide specifically spiritual care to the female, introvert, and those with poor relationship with spouses and create a harmonious doctor-patient environment to improve the spiritual well-being.

Keywords Spirituality · FACIT-Sp-12 · Cancer · Chronic diseases

Introduction

Globally, cancer has become the first cause of death and a major public health problem, with the changes of disease spectrum and human living environment. The GLOBOCAN released there were an estimated 18.1 million new cancer cases in 2018 and 19.29 million in 2020 [1]. While in China, an estimated 4.3 million new cases and 2.9

million new deaths occurred in 2018 [2], according to the 2020 China Health Statistical Yearbook[3], the mortality rate of cancer among urban and rural were 161.56/100,000 and 160.96/100,000 respectively, showing a high incidence and mortality rate of cancer and increasing year by year. Cancer has a long course; the patients mostly need radical surgery and combined with radiotherapy, chemotherapy, etc.; they endure physical pain, psychological pressure, and financial burden, require long-term care, and social support [4]. The aim of palliative care is to alleviate the symptoms of patients with cancer, reduce pain, and improve the quality of life. More than 90% of physical, psychological, and spiritual problems can be alleviated through it [5]. However, the core of palliative care is holistic care, and meeting the spiritual needs is the basic requirements. As the health essence of human, spiritual well-being in cancer patients is lower than others [6–8].

✉ Li Yan
yanli3073@sina.com

¹ Department of Quality Control, Chongqing University, Three Gorges Hospital/Chongqing Three Gorges Central Hospital, Chongqing, China

² Department of Liver and Gallbladder, Chongqing University, Three Gorges Hospital/Chongqing Three Gorges Central Hospital, Chongqing, China

Currently, scholars had different definitions of spirituality. For example, Hawks [9] proposed that spiritual health is a high-level belief, hope, and commitment related to the worldview and provides the life purpose, existence, and the direction for greater satisfaction of oneself. Other studies had also point out that spiritual health is a subjective feeling of happiness which affirms self-worth, managing interpersonal relationships with an open, acceptable attitude and possessing inner energy [10]. A scholar believed that in nursing, it is a dynamic process of approaching God and patients give diseases meaning through communication with the Creator, self, and others [11, 12]. In short, there are no clear and unified definition; what is more agreed is that spirituality is a subjective feeling and internal experience, and it is a spiritual force that intrinsically related to the meaning of life [13].

At present, researches mainly focus on concepts, assessment tools, influencing factors, and so on. Several studies have shown spiritual well-being interacts with quality of life, anxiety, and depression. For example, a cross-sectional study about 705 patients diagnosed with primary gynecological cancer was conducted through the European Organization for Research and Treatment of Cancer quality of life instruments (EORTC QLQ-SWB32 and EORTC QLQ-C30) and the Hospital Anxiety and Depression Scale and found that well spiritual well-being is associated with lower anxiety and depression, and better quality of life [14]. A research used EORTC QLQ-C30 and FACIT-Sp-12 for 97 cancer patients and concluded that spirituality can improve quality of life and decrease the incidence of anxiety and depression, which is consistent with other researches [8, 15–19]. Numbers of studies have shown that age, religious belief, and educational were the influence factors of spirituality. For example, a study of 202 advanced cancer found that patients with a religious affiliation showed higher score than those without a religious affiliation. Religious affiliation, individual spiritual activities, and quality of life were significantly related to a greater spiritual well-being [20]. A survey of 176 adult cancer patients who received chemotherapy at an outpatient clinic revealed that it was moderately to strongly associated with age, appetite, and quality of life and suggested that younger and stage I cancer patients need additional assistance to meet their spiritual needs, etc. [21–24]. In China, the earliest study originated in Taiwan, which found that the creation and the meaning of life were the most desired spiritual need for terminal cancer patients. Hong Kong scholars believed that spiritual care was an important aspect of cancer patient [25]. In short, it mainly focused on review of spiritual care and needs, reliability and validity test of assessment scale, etc. [26–31].

In general, due to the differences of culture, region and customs, the research cannot represent the level of spiritual well-being among cancer patients in the worldwide, and

there are few data describing levels and influence factors of spiritual well-being among such patients in Chongqing, which is a municipality directly under the Central Government of China. Cancer belongs to the category of chronic diseases, but the rate of progression, treatment methods, quality of life, etc. are different from those with chronic diseases, and the difference in spirituality is unknown. Therefore, the aim of this study were to explore the level of spirituality and analyze factors of cancer patients in the northeast of Chongqing and compare it with that of chronic disease, in order to provide reference for intervention on the spiritual well-being of cancer patients.

Materials and methods

Subjects

We randomly enrolled inpatients diagnosed with cancer and chronic diseases who had been treated in Chongqing University Three Gorges Hospital between January and December 2020. The inpatients of cancer were included if they were receiving the type of treatments, such as surgery, chemotherapy, or radiotherapy. The chronic inpatients were from the department of Endocrinology. Inclusion criteria were as follows: (1) clear expression and effective communication capacity and (2) patients who voluntarily agreed to participate in the study. Exclusion criteria were as follows: (1) mental or cognitive disorders; (2) inability to understand or express autonomously; and (3) unwillingness to participate.

Ethical considerations

The study protocol was approved by the ethics committee of Chongqing University Three Gorges Hospital and made in accordance with the ethical standards laid down in the declaration of Helsinki.

Data collection and study design

This study is a cross-sectional investigation; the content includes basic information and the state of spirituality.

The basic information was self-designed and variables included demographic, social, and biomedical factors as follows: age, gender, education, occupation, religion, character, blood type, marital status, emotional with spouse, course of disease, relationship with caregivers, monthly household income, and methods of payment.

We used the Chinese version of the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being and the 12-item Spiritual Well-Being Scale (FACIT-Sp-12) to measure the state of spirituality, which was translated by the Chinese scholar and developed to assess spiritual

well-being of patients with chronic or life-threatening diseases; the Cronbach's alpha is from 0.711 to 0.920 [31]. The scale includes 12 items and composes 3 dimensions to assess meaning (including items 2, 3, 5, 8), peace (including items 9, 10, 11, 12), and faith (including items 1, 4, 6, 7) domain. Each item is assessed according to a five-point liker response scale: 0 (not at all), 1 (a little), 2 (medium), 3 (many), and 4 (very good), but there are two items are reversed, for items 4 and 8. The score calculation is performed by the sum of responses to different items, for each dimension ranged between 0 and 16, whereas the total score ranged between 0 and 48. The highest scores reflect higher levels of spirituality; lower than 24 is classified as low level, 24 to 35 as medium level, and more than 36 as high level.

Investigators were the head nurse and received unified training. Before being asked to complete the questionnaire, the detailed description of the purpose, the data application, and the potential disclosure of the finding must provide to all participants and obtained the informed consent. Investigators provided the questionnaire to participants through mobile-internet platform, and it was completed by self administered. During the survey, investigators carefully explained each item and checked that no missing items were submitted on the spot after completed it.

Before collecting the survey data, we used G*power 3.1.9.2 to calculate the sample size by t-test of two independent groups, where alpha was set at 0.05, effect size at 0.5, tails at two, and power at 0.9.

A total of 465 cancer patients and 47 patients with chronic diseases would be sufficient enough to achieve the 90% power in data analysis.

Statistical analysis

A total of 630 subjects underwent statistical analysis. The frequency, composition ratio, mean, and standard deviation were used for statistical description. Independent t-tests were used to investigate the differences between the 2 groups (subjects with cancer and those with chronic diseases) according to the score of each item, each domain, and the total score of FACIT-Sp-12. ANOVA or t-tests were used as univariate analysis and performed to investigate the differences of spirituality according to the basic characteristics. Multiple regression analyses were performed to determine the factors associated with spirituality. The total score of FACIT-Sp-12 and each domain were considered dependent variables, respectively. The significant factors proven from univariate analysis were considered independent variables. All statistical analyses were performed using the

SPSS 21.0. The statistically significant level was set at $P < 0.05$.

Results

Table 1 shows the basic characteristics of subjects. From January to December 2020, a total of 588 questionnaires were collected for inpatients with cancer, with an effective rate of 97.1%. In the department of Endocrinology, 59 questionnaires were collected, with an effective rate of 100%. The patient participation rate for the cancer and chronic diseases were 0.52% and 3.29%, respectively.

Among the 59 inpatients with chronic diseases, 48 were diabetes, and 11 were hypertension, while for the 571 cancer patients, the three most common cancers were esophageal cancer (23.82%), cancer of the lungs (17.86%), and rectal cancer (12.43%). The treatments included combination therapy (64.62%), chemotherapy (25.92%), radiotherapy (5.78%), surgery (2.45%), targeted therapy (0.88%), and immunotherapy (0.35%). The performance status was assessed by Karnofsky, the average score of 297 samples reporting was 79.70 ± 5.48 ; above 80 points and 50 to 70 points accounted for 87.54% and 12.46% respectively. The majority were in stage III (31.13%) and stage IV (59.23%). The average ages were 59.66 ± 12.19 years and 59.97 ± 17.93 years, respectively, and the education below Junior high school accounted for 89.32% and 71.19% respectively. The majority of patients were married (88.89%), had no religious (97.46%), and had good relationship with spouses which were 80.39% and 64.41% respectively. The treatment costs were paid by medical insurance for 93.87% and 93.22% respectively.

Table 2 shows the differences of FACIT-Sp-12 scores between two groups. The total score, meaning, peace, and faith domain for cancer inpatients were 33.3 ± 10.35 , 11.21 ± 3.38 , 10.66 ± 4.46 , and 11.43 ± 3.54 , respectively, and for those inpatients with chronic diseases were 38.61 ± 10.88 , 13.00 ± 3.21 , 12.95 ± 4.76 , and 12.66 ± 3.64 respectively.

Significant differences were found between inpatients with cancer and those with chronic diseases in the total score of FACIT-Sp-12, as well as in the meaning, peace, and faith domains ($P < 0.05$). Except item 3 and item 1, the scores of each item in the two groups were statistically significant ($P < 0.05$).

Table 3 shows the relationships of FACIT-Sp-12 scores to the basic characteristics in subjects with cancer. The male showed a significantly higher score of FACIT-Sp-12, peace, meaning, and faith domain compared to female ($P < 0.05$). In terms of character, introvert showed a significantly lower score of FACIT-Sp-12 and each domain compared to extravert ($P < 0.05$) and hybrid

Table 1 Basic characteristics of the inpatients with cancer and chronic diseases

Variables		Cancer		Chronic diseases		Total	
		N	%	N	%	N	%
Gender	Male	342	59.89	24	40.68	366	58.10
	Female	229	40.11	35	59.32	264	41.90
Age	Less than 40	28	4.90	11	18.64	39	6.19
	41 to 65	343	60.07	26	44.07	369	58.57
	More than 65	200	35.03	22	37.29	222	35.24
Education	Junior high school ^a	510	89.32	42	71.19	552	87.62
	High school	39	6.83	15	25.42	54	8.57
	College	22	3.85	2	3.39	24	3.81
Occupation	Enterprise	26	4.55	6	10.17	32	5.08
	Civil servant	3	0.53	0	0.00	3	0.48
	Worker	51	8.93	5	8.47	56	8.89
	Self-employed	28	4.90	10	16.95	38	6.03
	Others	463	81.09	38	64.41	501	79.52
Religion	Yes	16	2.80	0	0.00	16	2.54
	No	555	97.20	59	100.00	614	97.46
<u>Character</u>	Extravert ^b	255	44.66	16	27.12	271	43.02
	Hybrid	187	32.75	34	57.63	221	35.08
	Introvert	129	22.59	9	15.25	138	21.90
Blood type	A	35	6.13	2	3.39	37	5.87
	B	23	4.03	1	1.69	24	3.81
	AB	16	2.80	0	0.00	16	2.54
	O	44	7.71	1	1.69	45	7.14
	Others	453	79.33	55	93.22	508	80.63
Marital status	Married	517	90.54	43	72.88	560	88.89
	Single	8	1.40	6	10.17	14	2.22
	Widowed	38	6.65	9	15.25	47	7.46
	Divorce	8	1.40	1	1.69	9	1.43
Emotional with spouse	Well ^c	459	80.39	38	64.41	497	78.89
	Ordinary ^d	109	19.09	21	35.59	130	20.63
	Bad ^e	3	0.53	0	0.00	3	0.48
Course of disease	Less than 12 months	408	71.45	25	42.37	433	68.73
	12 to 24 months	106	18.56	6	10.17	112	17.78
	More than 24 months	57	9.98	28	47.46	85	13.49
Relationship with caregivers	Spouse ^f	272	47.64	15	25.42	287	45.56
	Parents ^g	19	3.33	1	1.69	20	3.17
	Offspring ^h	196	34.33	17	28.81	213	33.81
	Brothers and sisters	9	1.58	1	1.69	10	1.59
	Nurse ⁱ	7	1.23	7	11.86	14	2.22
	Others	68	11.91	18	30.51	86	13.65
	Monthly household income	Less than 3000	411	71.98	5	8.47	416
	3000 to 5000	108	18.91	15	25.42	123	19.52
	5000 to 7000	33	5.78	11	18.64	44	6.98
	7000 to 10,000	13	2.28	5	8.47	18	2.86
	More than 10,000	6	1.05	23	38.98	29	4.60
Methods of payment	Own expense	17	2.98	1	1.69	18	2.86
	Workers medical insurance ^j	140	24.52	34	57.63	174	27.62
	Residents medical insurance ^k	396	69.35	21	35.59	417	66.19
	Commercial insurance	4	0.70	0	0.00	4	0.63
	Others	14	2.45	3	5.08	17	2.70

Table 1 (continued)

Variables	Cancer		Chronic diseases		Total	
	N	%	N	%	N	%

^awhich means the education are elementary school,junior high school or below.
^bwhich means the character is extrovert.
^cwhich means the best relationship between patients and spouses.
^dwhich means the patient has an average relationship with spouse.
^ewhich means the patient has a poor relationship with spouse.
^fwhich means the caregiver is the husband or wife during hospitalization.
^gwhich means the caregiver is the mother or father during hospitalization.
^hwhich means the caregiver is the son or daughter during hospitalization.
ⁱwhich means the caregiver is hired staff during hospitalization.
^jwhich means the basic medical insurance for urban workers.
^kwhich means the basic medical insurance for urban residents.

($P < 0.05$).The better relationship with spouse, the higher score of FACIT-Sp-12, peace, and meaning domain. However, there were no significant differences among age, education, occupation, religious, and so on.

The results of multivariate analysis are shown in Table 4. Gender ($\beta = -2.406$, $P < 0.05$), character ($\beta = -1.421$, $P < 0.05$)were significantly associated with the total score of FACIT-Sp-12, and the influence of gender ($\beta = -1.421$, $P < 0.05$) and character ($\beta = -0.695$, $P < 0.05$) on the peace domain was consistent with it. The score for the meaning domain was positively associated with the emotional with spouse ($\beta = -0.683$, $P < 0.05$), and it also related to gender ($\beta = -0.722$, $P < 0.05$) and character ($\beta = -0.382$, $P < 0.05$). The total score of peace and faith domain was not related to emotional with spouse ($P > 0.05$). In addition, the score for the faith domain was only correlated with gender ($\beta = -0.105$, $P < 0.05$).

Discussion

Human beings are the unity of biology, psychology, society, and spirituality; the quality of life cannot ignore spirituality, especially for cancer patients. Our study used the FACIT-sp-12 scale to access the spirituality, and its total score was 33.3 ± 10.35 , which was lower than the results of Munoz [15, 32–34], but higher than Lewis [20, 35]. The differences may be affected by the cultural background and religious beliefs of the subjects. The faith domain includes religious contents; thus, having religious affiliations may increase the total FACIT-Sp-12 scores [20], while 97.2% of the patients in our study had no religious beliefs. In this study, the level of spiritual well-being was moderate. It may be that 88.79% of the patients have spouses and 86.87% are taken care by relatives. Spouse and relatives are the core of family support for cancer patients, they

Table 2 The score of FACIT-Sp-12 for the inpatients with cancer and chronic diseases

FACIT-Sp-12	Cancer (mean \pm SD)	Chronic disease (mean \pm SD)	t value	P value
Total	33.30 \pm 10.35	38.61 \pm 10.88	-3.731	0.000
Faith	11.43 \pm 3.54	12.66 \pm 3.64	-2.535	0.012
Q1:I feel peaceful	2.82 \pm 1.19	2.92 \pm 1.26	-0.586	0.558
Q4: I have trouble feeling peace of mind	2.99 \pm 1.24	3.39 \pm 0.70	-3.874	0.000
Q6: I am able to reach down deep into myself for comfort	2.77 \pm 1.14	3.15 \pm 1.16	-2.435	0.015
Q7: I feel a sense of harmony within myself	2.85 \pm 1.09	3.2 \pm 1.16	-2.345	0.019
Meaning	11.21 \pm 3.38	13.00 \pm 3.21	-3.89	0.000
Q2: I have a reason for living	2.95 \pm 1.14	3.49 \pm 0.90	-4.31	0.000
Q3: My life has been productive	2.78 \pm 1.16	3.07 \pm 1.10	-1.832	0.067
Q5: I feel a sense of purpose in my life	2.74 \pm 1.13	3.19 \pm 1.09	-2.876	0.004
Q8: My life lacks meaning and purpose	2.74 \pm 1.39	3.25 \pm 1.12	-3.262	0.002
Peace	10.66 \pm 4.46	12.95 \pm 4.76	-3.725	0.000
Q9: I find comfort in my faith or spiritual beliefs	2.61 \pm 1.21	3.2 \pm 1.28	-3.552	0.000
Q10: I find strength in my faith or spiritual beliefs	2.64 \pm 1.22	3.27 \pm 1.14	-3.821	0.000
Q11: My illness has strengthened my faith or spiritual beliefs	2.69 \pm 1.24	3.24 \pm 1.14	-3.243	0.001
Q12: I know that whatever happens with my illness, things will be okay	2.72 \pm 1.23	3.24 \pm 1.26	-3.048	0.002

Table 3 Associations between Basic Characteristics and the Score of FACIT-Sp-12 in Cancer

Variables	Total			Peace			Meaning			Faith		
	Mean ± SD	P-Value		Mean ± SD	P-Value		Mean ± SD	P-Value		Mean ± SD	P-Value	
Gender	Male	34.30±10.25	0.005	11.05±4.46	0.011		11.51±3.23	0.01		11.74±3.42	0.011	
	Female	31.82±10.34		10.08±4.40			10.76±3.55			10.97±3.68		
Age	Less than 40	35.21±9.36	0.398	11.71±3.77	0.242		11.57±3.24	0.685		11.93±3.21	0.595	
	41 to 65	32.90±10.90		10.45±4.63			11.12±3.54			11.33±3.71		
Education	More than 65	33.74±9.47		10.89±4.23			11.32±3.13			11.54±3.28		
	Junior high school ^b	33.17±10.20	0.316	33.17±10.20	0.522		11.15±3.32	0.186		11.40±3.52	0.443	
Occupation	High school	33.18±12.57		33.18±12.57			11.26±4.13			11.28±4.11		
	College	36.59±9.26		36.59±9.26			12.50±3.14			12.36±3.02		
Occupation	Enterprise	34.88±10.76	0.845	11.04±4.64	0.782		12.19±3.70	0.566		11.65±3.56	0.927	
	Civil servant	34.67±9.29		11.00±4.36			12.00±2.00			11.67±3.06		
Religion	Worker	32.65±11.00		10.29±5.00			11.33±3.47			11.02±3.76		
	Self-employed	31.89±11.07		9.79±4.41			10.79±4.00			11.32±4.27		
Religion	Others	33.37±10.24		10.73±4.40			11.16±3.32			11.47±3.48		
	Yes	34.00±8.15	0.785	12.06±3.04	0.084		10.88±3.78	0.688		11.06±3.09	0.673	
Character	No	33.28±10.41		10.62±4.49			11.22±3.37			11.44±3.55		
	extravert ^b	33.98±10.40	0.003	11.05±4.44	0.003		11.42±3.36	0.017		11.51±3.46	0.006	
Blood type	hybrid	34.27±9.24		10.94±4.05			11.44±3.19			11.89±3.32		
	introvert	30.57±11.33		9.50±4.88			10.47±3.60			10.61±3.88		
Marital status	A	33.66±9.03	0.885	11.83±3.82	0.455		11.37±3.06	0.943		10.46±3.28	0.301	
	B	34.43±9.99		11.39±5.29			11.57±3.16			11.48±3.38		
Emotional with spouse	AB	31.69±6.68		10.00±3.41			11.06±2.52			10.63±3.12		
	O	32.27±9.04		10.39±4.00			10.89±3.22			11.00±2.96		
Course of disease	Others	33.38±10.70		10.59±4.53			11.22±3.47			11.57±3.63		
	Single	34.50±6.09	0.416	11.50±2.51	0.437		11.38±2.13	0.335		11.63±2.26	0.565	
Course of disease	Widowed	34.55±10.15		11.50±3.92			11.29±3.81			11.76±3.52		
	Divorce	38.50±9.13		12.13±3.94			13.38±3.02			13.00±3.42		
Course of disease	Well ^c	33.26±10.38	0.047	10.56±4.493	0.002		11.34±3.41	0.021		11.37±3.51	0.091	
	Ordinary ^d	33.89±10.03		11.284.184			10.80±3.15			11.81±3.62		
Course of disease	bad ^e	19.00±10.54		4.67±4.509			6.67±3.79			7.67±3.22		
	Less than 12 months	33.22±10.62	0.295	10.64±4.62	0.522		11.15±3.44	0.373		11.44±3.67	0.16	
Course of disease	12 to 24 months	32.60±9.82		10.44±3.89			11.13±3.32			11.03±3.31		
	More than 24 months	35.21±9.18		11.26±4.26			11.81±3.02			12.14±2.90		

Table 3 (continued)

Variables	Total		Peace		Meaning		Faith	
	Mean ± SD	P-Value	Mean ± SD	P-Value	Mean ± SD	P-Value	Mean ± SD	P-Value
Relationship with caregivers								
Spouse ^f	32.95±10.27	0.902	10.34±4.51	0.377	11.22±3.35	0.995	11.39±3.48	0.976
Parents ^g	34.11±8.08		11.84±3.67		11.11±2.54		11.16±3.18	
Offspring ^h	33.61±9.98		10.93±4.34		11.19±3.28		11.49±3.52	
Brothers & Sisters	32.22±10.16		10.11±4.68		11.33±3.04		10.78±3.49	
Nurse ⁱ	37.00±9.04		12.86±3.24		12.00±3.00		12.14±3.44	
Others	33.38±12.44		10.71±4.84		11.18±4.12		11.50±4.02	
Monthly household income								
Less than 3000	33.56±10.47	0.673	10.95±4.41	0.013	11.10±3.34	0.736	11.51±3.50	0.88
3000 to 5000	33.00±10.27		10.17±4.58		11.60±3.38		11.23±3.57	
5000 to 7000	30.79±8.95		8.36±4.27		11.15±3.73		11.27±4.00	
7000 to 10000	33.85±12.56		10.77±4.64		11.54±4.33		11.54±3.93	
More than 10000	33.67±3.39		12.33±2.34		11.00±2.37		10.33±3.20	
Method of payment								
Own expense	31.29±11.00	0.739	10.71±4.73	0.646	10.59±3.37	0.771	10.00±4.02	0.353
Workers medical insurance ^j	32.93±10.68		10.48±4.66		10.48±4.66		11.24±3.58	
Residents medical insurance ^k	33.42±10.26		10.69±4.39		10.69±4.39		11.53±3.52	
Commercial insurance	37.75±5.91		14.00±2.31		14.00±2.31		12.50±2.89	
Others	35.00±10.27		10.64±4.65		10.64±4.65		12.14±3.23	

^awhich means the education are elementary school, junior high school or below, ^bwhich means the character is extrovert, ^cwhich means the best relationship between patients and spouses, ^dwhich means the patient has an average relationship with spouse, ^ewhich means the patient has a poor relationship with spouse, ^fwhich means the caregiver is the husband or wife during hospitalization, ^gwhich means the caregiver is the mother or father during hospitalization, ^hwhich means the caregiver is the son or daughter during hospitalization, ⁱwhich means the caregiver is hired staff during hospitalization, ^jwhich means the basic medical insurance for urban workers, ^kwhich means the basic medical insurance for urban residents.

Table 4 Multivariate analysis of factors related to the score of FACIT-Sp-12 in cancer

Dependent variable	Factors	β	Standardized beta	<i>t</i> Value	<i>P</i> value
Total score	Gender	-2.406	-0.114	-2.75	0.006
	Character ^a	-1.421	-0.109	-2.613	0.009
	Emotional with spouse	-0.028	-0.001	-0.027	0.978
Peace	Gender	-0.937	-0.103	-2.488	0.013
	Character ^a	-0.695	-0.123	-2.97	0.003
	Emotional with spouse	0.415	0.039	0.931	0.352
Meaning	Gender	-0.722	-0.105	-2.526	0.012
	Character ^a	-0.382	-0.089	-2.151	0.032
	Emotional with spouse	-0.683	-0.084	-2.019	0.044
Faith	Gender	-0.105	-0.104	-2.487	0.013
	Character ^a	-0.089	-0.077	-1.842	0.066
	Emotional with spouse	-0.084	0.028	0.672	0.502

^awhich stands for personality traits.

can provide support and understanding to increase self-affirmation and confidence when cancers are helpless and negative [36]. At the same time, 77.41% of patients extroverted; they could adjust themselves to feel the meaning of life and have a peaceful heart.

Studies have shown that higher education is a protective factor for spiritual health. Our hospital is responsible for cancer prevention and treatment of 8,064,628 population in 11 districts and counties in northeast Chongqing, where the rural population is in the majority; the regional economic and the education are low. It is the only third-class hospital in this area with advanced cancer treatment equipment such as linear accelerators and PET-CT. In this study, 89.32% had a primary school education, and 71.98% had a family income below 3000. In the face of diseases with high recurrence and high cost, it is difficult to accept the guidance of positive energy to seek spiritual sustenance and the overall level of spirituality not high and lower than that of patients with chronic diseases. The patients with chronic diseases through healthy lifestyles and dietary interventions can control the progression, so they usually with a high quality of life. Cancer belongs to the category of chronic diseases, but because of its rapid progression, high recurrence, and death, once diagnosed and known to the patient, the spirit has become a serious burden, suggesting that the spirituality of cancer patients needs to be improved. Previous studies [37, 38] have shown that cancer patients have higher spiritual needs and meeting spiritual needs is the focus of nursing. Timely intervention should be conducted to make them face the disease with peaceful and strength.

From the perspective of dimensions and items, the lowest scores were the peace domain and item 9 “I find comfort in my faith or spiritual beliefs,” which was consistent with another study [39]. It may be that cancer patients have varying degrees of anorexia, pain and other symptoms, and combined with financial pressure, which leads them prone

to anxiety and depression and difficult to calm and find comfort. Related studies have shown that spiritual care affects the clinical outcomes, relieves pain, and contributes to health promotion so that patients can feel content and enjoy peace in mind [40, 41]. Therefore, under the condition of solving the economic pressure and using treatment methods to alleviate discomfort symptoms, it is necessary to meet their spiritual needs as the premise and provide appropriate measures of spiritual care.

Spiritual well-being was related to gender, character, and emotional with spouse from the ANOVA test or *t*-test, and the results of multiple regression analysis showed that gender and character jointly affected it. Male and extroverted cancer patients had a higher level of spirituality. The differences can be explained as follows. In terms of gender. The score of male was higher than that of female, which may be due to the fact that 78.07% of male patients are migrant workers and farmers, have rich experience, and profound inner experience. They are brave, strong, and unrestrained, and they are better able to see through the world and understand the essence of life. On the contrary, female patients are mainly emotional and focusing on family and rooted in traditional Chinese thoughts. Once they suffer from cancer, their physiological functions are impaired, and the ability to perform family duties is lacking; the physical and mental symptoms interact and shows more serious spiritual impairment. Chaar [15] also found that gender affects the spirituality of 97 Lebanese cancer patients in peace domain; there was a significantly higher score of in male compared to female (3.93 vs 3.46; $P=0.029$). Therefore, female patients need targeted supportive care, maximize the guidance to appreciate the meaning of life, and relax family responsibilities to reduce their ideological burden. In terms of character. The extrovert had a higher score than the introvert. It may be an optimistic and open-minded personality trait; is easier to form a harmonious, long-term, and stable

interpersonal relationship; and accepts the guidance of positive energy to seek spiritual sustenance and appreciate life. They show a scene of calm and serene, full of strength in the heart; it prompts that more spiritual care should be given to patients with introverted cancer. In terms of emotional with spouse. It was related to the score of the meaning dimension. It is possible that the support, understanding, and tolerance of the spouse can provide patients with rich emotional interaction and spiritual support, which can alleviate loneliness and helplessness, facilitate the integration with the outside, and deepen the understanding of the meaning of life. Therefore, medical staff should be good at communicating with patients to create a harmonious doctor-patient environment. For patients without a spouse or have a poor relationship with spouse, relatives and friends should be encouraged to actively participate in disease care and carry out family-centered health education to increase the social support for patients [42]. Because of the influence of religion and culture, western countries have matured spiritual care and with a higher level of spiritual well-being than that in China. In recent years, through the continuous exploration and efforts of scholars, tranquility treatment and end-of-life education are gradually developing. How to improve the spiritual well-being of cancer patients? The model should be suitable for the regional characteristics and rooted in Confucianism, Taoism, Legalism, and other historical culture, customs, and medical systems and pay attention to the subjects of focus.

Limitations

Our study did have some limitations. Due to the time and resources, we only recruited one medical institution and collected the basic demographic characteristics information. However, the information about cancer staging, psychological characteristics, quality of life, etc. were not included. Due to the geographic, economic, and sampling, the rate of others in cancer patients is too large. At the same time, the cross-sectional study was unable to find changes the trends. In the future, a multi-center longitudinal study can be carried out to comprehensively explore the influencing factors and dynamic changes of spirituality.

Conclusion

In our study, it found a medium level of spirituality of cancer patients in the northeast area of Chongqing, and gender, character, and emotional with spouse were the influencing factors. Therefore, under the current nursing model, the overall nursing should focus the patients on female, introverted, and those with poor relationship with spouses and

create a harmonious interpersonal environment and provide spiritual care to improve the spiritual well-being.

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Author contribution All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Yalan Liu, Xue Hao, and Yan Li. The first draft of the manuscript was written by Yalan Liu, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Code availability Not applicable.

Declarations

Ethics approval The study protocol was approved by the ethics committee of Chongqing University Three Gorges Hospital and made in accordance with the ethical standards laid down in the declaration of Helsinki.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication All individual participants provided informed consent for publication of the data.

Conflict of interest The authors declare no competing interests.

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