



Supportive care needs and associated factors among Chinese cancer survivors: a cross-sectional study

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Abstract

Purpose To investigate the unmet supportive care needs (SCNs) of Chinese cancer survivors and to identify factors associated with the unmet SCNs of cancer survivors.

Methods A cross-sectional survey of Chinese cancer survivors was conducted using validated scales of the Cancer Survivors Unmet Needs scale (CaSUN), physical symptom concerns (Cancer Survivors Survey of Needs—CSSN subscale), and a single-item measure of global quality of life (QoL) perception.

Results There were 330 participants, with a mean score of 7.1 (0–10) in overall QoL. The reported rate of the 19 symptom concerns ranged from 19.4 to 72.2%. The level of unmet SCNs (moderate and strong need) ranged from 12.1 to 59.1%. The top five unmet needs included concerns about the cancer re-occurring (59.1%), accessing the best medical care (52.7%), accessing complementary therapy services (51.5%), changes to beliefs (48.2%), and survivor expectations (47.6%). The strength of unmet SCNs was negatively correlated with participant age ($P < 0.05$), average time since diagnosis ($P < 0.05$), and overall QoL ($P < 0.01$) and positively correlated with all symptom concerns (all $P < 0.001$).

Conclusions Study findings call attention to cancer survivors' unmet SCNs and related factors. Underscored areas in developing survivorship care included paying special attention to existential survivorship, empowering survivor management of chronic symptoms, particularly for younger survivors, as well as for survivors with poor QoL, and those with a shorter time since diagnosis. This tailored survivorship care should be developed and delivered by a multidisciplinary team to support cancer services, with a greater capacity to deliver individualized, unmet SCN-driven care to survivors.

Keywords Cancer, oncology · Survivorship · Supportive care needs · Survivors · China

Introduction

Cancer is a leading cause of death worldwide. A total of 8.8 million cancer deaths were reported in 2015, accounting for one-sixth of all deaths. Of these, approximately 70% of all cancer deaths occurred in low- and middle-income countries

(LMICs) [1]. In China, evidence shows that cancer mortality rapidly and continuously increased in the 1970s, 1990s, and from 2004 to 2005, demonstrating that country's severe cancer burden [2]. Recently, evidence from mainland China has estimated that overall morbidity increased significantly from 2000 to 2011, while mortality rates have considerably decreased since 2006 [3]. These trends of increased cancer morbidity and decreased mortality may be due to the early detection and effective treatment of cancer, leading to a growing number of cancer survivors [4]. It is acknowledged that the act of redefining the term “cancer survivor” is part of a transformation in how cancer patients speak about their experiences, including both negative and positive consequences [5, 6]. In this study, a cancer survivor is described as an individual who has had a cancer diagnosis and has completed first-line cancer treatment.

The impact of cancer and treatment if given with curative intent can lead to survivors enduring ongoing, even permanent

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negative consequences, including physical [impaired quality of life (QoL), pain, fatigue, and sexual dysfunction], psychological (fear of relapse, depression, anxiety), financial (reduced income and increased expenditures for cancer survivorship care), and social (e.g., relationship problems, limited capacity to participate in social activities and household duties) health impairment [7, 8]. These lifelong increased risks of chronic health impairment in cancer survivors highlight the significance of addressing their health concerns across the entire cancer trajectory [9]. Unfortunately, this post-treatment phase has been comparatively ignored for many years, with the traditional approach focused on directing follow-up attention to surveillance for cancer recurrence, but more current approaches have attempted to include wider survivor psychosocial issues [10, 11]. Many survivors become lost in a transition once they complete treatment, moving from an orderly system of cure and care to a “non-system” in which there are few guidelines to support them during this phase of their survivorship [10]. The consequences of this non-system of survivorship is that some survivors are provided with excellent survivorship care, while others are left to seek services and manage the disease as best they can [12].

In the cancer context, recognition has been growing that providing survivorship care in cancer practice is very important, and it should follow cancer survivors across the entire cancer trajectory: “living with, through, and beyond a cancer diagnosis” [5]. The cancer burden of providing survivorship care, however, is anticipated to be more considerable in LMICs [13], such as in mainland China, where, while the number of cancer survivors continues to grow, there are limited resources and health budgets to provide survivorship care and manage patients effectively. Moreover, there is little exploration to advise health care professionals of any national or international approaches to deliver comprehensive and coordinated survivorship care. Considering the limitations on health care resources, provision of cancer survivorship care needs to be both sustainable and cost-effective [14]. This calls attention to the need to explore the unmet supportive care needs (SCNs) of cancer survivors, in order to develop effective and affordable survivorship care programs.

Indeed, evidence from survivors indicates that more tailored survivorship care—such as education on symptom management to meet the psychological and physical needs of cancer survivors—would be favorable [12, 15]. Other studies have also proposed that the development of an effective survivorship care program should systematically address the complex and multidimensional unmet SCNs of cancer survivors [16, 17]. With the increasing recognition of the significance of providing unmet SCN-driven survivorship care in cancer practice, literatures emerged to report the unmet SCNs of cancer survivors and its related factors [17–28]. These studies focused on the unmet SCNs of different types of cancer survivors, including mixed cancer types [18–21],

colorectal cancer [22], lung cancer [23], breast cancer [17, 24–26], gynecological cancer [27], and hematological malignancy [28]. Various factors have been reported as influencing the unmet SCNs of cancer survivors, including the cancer survivors’ sociodemographic characteristics, e.g., age, gender, working status, marital status, and level of education [17–19, 24, 27, 28], clinical characteristics, e.g., time since cancer diagnosis, location of cancer, stage of cancer, and cancer treatment [17–19, 21, 23, 24, 27], symptom burden and/or symptom distress [17, 21, 27], and overall QoL [19, 25].

However, no study was identified that specifically investigated the unmet SCNs of cancer survivors, and related factors, in Mainland China. Previous reports on exploring unmet SCNs in Asia, conducted in areas with high resources and well-funded health care systems, such as in Hong Kong, Taiwan, and Japan [20, 25, 26, 29], did not include information on unmet SCNs in Mainland China. Consequently, our study aims were to (i) investigate the unmet SCNs of cancer survivors in mainland China and (ii) identify factors associated with the unmet SCNs of cancer survivors. This study not only benefits the understanding of the unmet SCNs and associated factors of cancer survivors in mainland China, but also provides evidence for developing a survivorship care program to meet cancer survivors’ unmet SCNs, which may be beneficial in improving their QoL.

Methods

Study design and participants

This was a re-analysis of the data from survivorship care for patients with cancer after treatment completion in the Asia-Pacific region: an international service-mapping study (The STEP Study) [30]. This report particularly focused on data in mainland China. The inclusion period was January 2016 through June 2016 in a university-affiliated teaching hospital in Wuxi, China. Eligibility criteria included the following: at least 18 years in age, a confirmed cancer diagnosis, and having completed first-line cancer treatment. Participants were excluded if they were at the end of life, or had additional existing conditions, e.g., cognitive impairment, which limited their ability to participate in the survey, and an inability to understand Mandarin.

The sample size was determined according to (1) at least 150 participants at a participating site [30] and (2) the item numbers of the main scale being included in the survey. It was proposed that the sample size should range from 5 to 10 times the item numbers [31]. Given that the main instrument [the Cancer Survivors’ Unmet Needs measure (CaSUN)] applied in the survey contained 42 items, it was estimated that 210–420 participants were required.

Measures

A self-developed information sheet was designed to elicit information from participants on demographic and disease-related variables, such as age, gender, cancer type, and treatment (Table 1). In addition, the questionnaire battery was comprised of the following three measures.

The CaSUN [32] The CaSUN is comprised of 35 supportive care unmet need items, six positive change items and an open-ended question. Each item is scored using a five-point Likert-type scale (0 = No need, or is not applicable, 1 = Have need, but need is being met, 2 = Weak need, 3 = Moderate need, 4 = Strong need) [30]. Five factors were extracted from factor analysis on the 35 unmet need items, with seven excluded items. The five factors or domains were existential survivorship (14 items), comprehensive cancer care (6 items), information (3 items), quality of life (2 items), and relationships (3 items). The scale has good acceptability, internal consistency, and validity [32].

The translation of the CaSUN into Chinese was conducted according to a standardized protocol as proposed by the World Health Organization (WHO) [33]. Linguistic equivalence was established by forward and backward translation. Face validity was assessed by pre-testing in 10 participants. Minor amendments were made based on suggestions from the pre-testing participants, leading to the final version of the instrument applied in the survey. The good internal reliability of the Chinese version of CaSUN was established by Cronbach's α of 0.973 and 0.804–0.964 for the overall scale and five subscales.

The physical effects subscale of the cancer survivors survey of needs (CSSN) [34] The CSSN was designed to assess 19 symptoms in the previous week from the assessment day of completing the survey. Each symptom or item was scored using a numeric analog scale ranging from 0 (no concerns) to 5 (extreme concern). The translation of the CSSN into Chinese was conducted according to the same process as described earlier in translating the CaSUN. The good internal reliability of the Chinese version of CSSN was established by Cronbach's $\alpha = 0.948$ in the present sample.

Global QoL A single 11-point (0–10) numerical scoring scale was applied to evaluate global QoL over the past week. The higher the score, the better the global QoL. The global QoL was assessed as a part of the CSSN [30].

Procedures

Prior to the survey commencing, the STEP study was approved by the Royal Brisbane and Women's Hospital Human Research Ethics Committee (No. HREC/15/QRBW/

Table 1 Characteristics of participants ($n = 330$)

Characteristics	n (%) ^a
Age	
Years (mean \pm SD)	56.9 \pm 11.7 (range 24–89)
Gender	
Males	186 (56.4)
Females	144 (43.6)
Average time since diagnosis	
Months (mean \pm SD)	29.7 \pm 30.2 (range 9–216)
Diagnosis ^b	
Gastric and urological cancers	120 (36.4)
Colorectal cancer	63 (19.1)
Lung cancer	60 (18.2)
Breast cancer	37 (11.2)
Gynecological cancer	11 (3.3)
Hopkins lymphoma	11 (3.3)
Leukemia	5 (1.5)
Prostate cancer	1 (0.3)
Others	23 (7.0)
Treatment received	
Chemotherapy	263 (79.7)
Surgery	222 (67.3)
Radiation therapy	50 (15.2)
Hormone replacement therapy	7 (2.1)
Others	33 (10.0)
Quality of life	
1–3	15 (4.5)
4–6	132 (40.0)
7–10	177 (53.6)
Total mean score	7.1 \pm 2.1

SD standard deviation

^a The total n does not equal 330 because of missing values

^b All of the patients had advanced cancer were in stage III ($n = 134$, 40.6%) and stage IV ($n = 196$, 59.4%)

355) (Australia), and access approval was obtained from the Wuxi People's Hospital Research Ethics Committee (No. HREC201606002) (China). The hospital oncologists identified cancer survivors according to the eligibility criteria. Eligible participants were then approached by the research team and provided with written information. After the researchers obtained written informed consent from the participants, they invited the participants to complete the questionnaire in the hospital.

Data analysis

SPSS version 22.0 was applied to conduct all data analysis. $P < 0.05$ was set as the level of significance. Descriptive statistics were calculated to describe participant characteristics and to summarize the data. Pearson correlations were applied to identify correlations between participants' unmet SCNs and other variables. T tests (two groups) and one-way ANOVA

(above two groups) analyses were conducted to explore differences among variables in terms of unmet SCNs.

Results

Of the 390 eligible cancer survivors approached, 363 consented to participate in the survey and completed the questionnaire (response rate = 93.1%). Of those, 330 participants provided valid data for study variables (valid rate = 90.9%). All participants had advanced cancer, and nearly 60% of them had stage IV disease. Among the 330 participants, the majority were male (56.4%); had gastric and urological (36.4%), colorectal (19.1%), and lung (18.2%) cancers; and had received chemotherapy (79.7%). They were at a mean of 56.9 years old, 29.7 months since diagnosis, with a score of 7.1 in overall QoL (Table 1).

Physical symptoms

The reported rate of the 19 symptom concerns ranged from 19.4 to 72.2%. The top five symptoms were loss of strength (72.2%), fatigue (71.8%), sleep disturbance (64.8%), weight changes (64.5%), and poor appetite (64.0%), while the five least frequent symptoms included fertility issues (19.4%), sexual issues (33.1%), trouble swallowing (37.6%), dental and mouth problems (42.4%), and swelling in legs or arms (45.1%) (Table 2).

Unmet SCNs

The upper part of Table 3 (3a) represents the outcomes of CaSUN need items. The level of unmet SCNs (moderate and strong need) ranged from 12.1 to 59.1%. The top five unmet SCNs included concerns about the cancer re-occurring (59.1%), accessing the best medical care (52.7%), accessing complementary therapy services (51.5%), changes to beliefs (48.2%), and survivor expectations (47.6%).

The lower section of Table 3 (3b) describes the outcomes of CaSUN-positive change items. About half the respondents reported that they had benefitted from contact with others and made lots of positive changes. The remaining positive change items were endorsed by less than half the sample, but the majority did not want help to achieve these benefits.

Table 4 displays the strength of total unmet SCNs (shown as mean scores) on the CaSUN and their correlations with individual variables. Total unmet SCNs were negatively related to participant age ($P < 0.05$), average time since diagnosis ($P < 0.05$), and overall QoL ($P < 0.01$) and positively correlated with all symptom concerns (all $P < 0.001$).

In addition, no significant differences in total strength of unmet SCNs were identified by *T* tests between two groups of

different genders and different treatments received. The unmet SCNs were also not significantly different among groups with different cancer diagnoses (one-way ANOVA).

Discussion

Based on the study purpose and results, the following two aspects will be discussed: (i) the unmet SCNs of cancer survivors and (ii) factors associated with the unmet SCNs of cancer survivors.

The unmet SCNs of cancer survivors

Although this report mainly targets data from Mainland China, the inclusion of the STEP study across the Asia-Pacific region allows the comparison of related data between and among other countries in the region. In terms of frequency of reported unmet SCNs, cancer survivors in mainland China (an LMIC) had high levels for unmet SCNs (12.1%–59.1%), which was significantly higher than levels reported from the high-income countries and/or areas in Asia, including Australia (8.6–16%), Japan (18.4–25.3%), Hong Kong (11–19.7%), India (24.7–35.7%) [30], and Western countries [23, 35–38]. However, it is worth noting that the above comparison in range of percentages for unmet SCNs among different countries might not warrant the same difference existed for each need item. In comparison with India, for example, the China sample was actually lower in some areas of unmet SCNs, but higher in others. Nevertheless, the top unmet SCNs, related to concerns about cancer recurrence, were similar in most studies from around the world [23, 35–38]. In the present study, three of the top five unmet SCNs were related to existential survivorship, while the other two were related to receiving comprehensive cancer care and access to complementary therapy services. This was followed by unmet SCNs related to information, QoL, and relationships, respectively. In contrast, the positive changes (6.0) reported in China were lower than those reported in high-income countries, including Australia (12.2) and Korea (10.9) [30].

In summary, cancer survivors in Mainland China experienced a high level of unmet SCNs and a low level of positive changes. This suggests there may be a lack of well-developed cancer survivorship care in Mainland China, and these areas, such as existential survivorship, comprehensive cancer care, and complementary therapy services, may be of crucial consideration to policy makers in reforming cancer survivorship care to meet cancer survivors' unmet SCNs, particularly in Mainland China, which has limited resources and health budgets to provide survivorship care.

Table 2 Symptom concerns in the past week ($n = 330$)

Symptom ^a	Some concern ^b <i>n</i> (%)	Extreme concern ^b <i>n</i> (%)	Total concern ^c <i>n</i> (%)
Loss of strength	112 (33.9)	128 (38.3)	240 (72.2)
Fatigue	111 (33.6)	126 (38.2)	237 (71.8)
Sleep disturbance	99 (30.0)	115 (34.8)	214 (64.8)
Weight changes	99 (30.0)	114 (34.5)	213 (64.5)
Poor appetite	89 (27.0)	122 (37.0)	211 (64.0)
Pain	93 (28.2)	113 (34.2)	206 (62.4)
Memory and concentration	98 (29.7)	104 (31.5)	202 (61.2)
Osteoporosis/bone health	116 (35.2)	84 (25.5)	200 (60.7)
Tingling or numbness in hands/feet (neuropathy)	89 (27.0)	104 (31.5)	193 (58.5)
Hair or skin care issues	94 (28.5)	93 (28.2)	187 (56.7)
Nausea/vomiting	79 (23.9)	104 (31.5)	183 (55.4)
Body changes	93 (28.2)	87 (26.2)	180 (54.4)
Balance/walking/mobility	96 (29.1)	83 (25.2)	179 (54.3)
Hot flushes	93 (28.2)	64 (19.4)	157 (47.6)
Swelling in legs or arms (lymphedema)	77 (23.3)	72 (21.8)	149 (45.1)
Dental and mouth problems	81 (24.5)	59 (17.9)	140 (42.4)
Trouble swallowing	63 (19.1)	61 (18.5)	124 (37.6)
Sexual issues	52 (15.8)	57 (17.3)	109 (33.1)
Fertility issues	29 (8.8)	35 (10.6)	64 (19.4)

^a Symptoms were ranked in descending order according to the total concern

^b Some concern: scores 1–2; extreme concern: scores 3–5

^c Total concern = the sum of some concern and extreme concern

Factors associated with the unmet SCNs of cancer survivors

Study findings found that greater levels of unmet SCNs are related to younger patient age, shorter time since diagnosis, poor QoL, and greater symptom concerns. These findings are partly consistent with previous studies on the predictors of unmet SCNs in cancer survivors [16–18, 20, 23, 24, 26, 27, 34].

When it comes to participant age, consistent findings showed that younger age was related to more unmet SCNs across different types of cancer survivors, in studies of mixed cancer types [18, 19], breast cancer [17, 24], hematological malignancy [28], and gynecological cancer [27]. This may be due to the fact that younger cancer survivors have more needs in a number of areas, such as information, care, body image, sexuality, fertility, and relationships [17]. Indeed, further analysis of the present data also showed that younger participant age was also correlated with three domains of comprehensive care ($P < 0.05$), information ($P < 0.05$), and relationships ($P < 0.01$) in the scale of CaSUN and symptom concerns of sexual ($P < 0.01$) and fertility ($P < 0.001$) issues. In addition, a previous qualitative study on mutual support and challenges for Chinese couples living with colorectal cancer also showed that younger participants reported being more concerned than

older participants about the impact of the diagnosis and treatment of cancer on their work [39]. This suggests that health care professionals need to pay special attention to these areas when supporting younger cancer survivors.

In general, a shorter time since diagnosis was reported to be related to more unmet SCNs among cancer survivors [17, 24]. However, there were inconsistent findings reporting that a longer time since diagnosis was a predictor of greater unmet SCNs [21]. This inconsistent evidence on the relationship between the time since diagnosis and unmet SCNs in cancer survivors calls for further validation.

Previous studies have reported that the poorer overall QoL, the higher is unmet need of cancer survivors, across a range of studies which included mixed tumor sites [19], and single site studies, as well as a range of specific aspects of QoL [25, 35]. These findings are in line with the present study where our outcomes indicated that impaired QoL was significantly associated with more unmet needs. This is a reminder that interventions aimed at improving cancer survivors' QoL may benefit from decreasing their unmet SCNs, and vice versa.

Findings on the physical symptom concerns were similar in different countries included in the STEP study across the Asia-Pacific region. This is a reminder that more adequate care is required to help cancer survivors deal with chronic symptoms. Further analysis has indicated that the more

Table 3 Cancer survivors total needs and positive changes on the CaSUN ($n = 330$)

3a: CaSUN need items ^a	Meet need <i>n</i> (%)	Weak need <i>n</i> (%)	Unmet need ^b <i>n</i> (%)	Total need ^c <i>n</i> (%)
19. Concerns about the cancer coming back	57 (17.3)	29 (8.8)	195 (59.1)	281 (85.2)
4. Best medical care	74 (22.4)	29 (8.8)	174 (52.7)	277 (83.9)
9. Access to complementary therapy services	65 (19.7)	24 (7.3)	170 (51.5)	259 (78.5)
30. Changes to beliefs	62 (18.8)	29 (8.8)	159 (48.2)	250 (75.8)
32. Survivor expectations	56 (17.0)	33 (10.0)	157 (47.6)	246 (74.6)
6. Manage health with team	82 (24.8)	45 (13.6)	157 (47.6)	284 (86.0)
7. Doctors talk to each other	100 (30.3)	32 (9.7)	157 (47.6)	289 (87.6)
29. Move on with my life	68 (20.6)	27 (8.2)	157 (47.6)	252 (76.4)
5. local health care services	82 (24.8)	36 (10.9)	154 (46.7)	272 (82.4)
1. Up to date information	81 (24.5)	37 (11.2)	151 (45.8)	269 (81.5)
12. Changes to quality of life	78 (23.6)	35 (10.6)	143 (43.3)	256 (77.5)
35. Make my life count	63 (19.1)	33 (10.0)	143 (43.3)	239 (72.4)
8. Complaints addressed	68 (20.6)	37 (11.2)	140 (42.4)	245 (74.2)
15. Help to find out financial support and/or benefit I am entitled to	60 (18.2)	39 (11.8)	139 (42.1)	238 (72.1)
3. Understandable information	91 (27.6)	39 (11.8)	138 (41.8)	268 (81.2)
11. Manage side effects	81 (24.5)	40 (12.1)	134 (40.6)	255 (77.2)
24. Talk to others	78 (23.6)	41 (12.4)	134 (40.6)	253 (76.6)
33. Decisions about my life	48 (14.5)	47 (14.2)	134 (40.6)	229 (69.3)
31. Acknowledging the impact	44 (13.3)	47 (14.2)	133 (40.3)	224 (67.8)
21. Support partner/family	70 (21.2)	43 (13.0)	131 (39.7)	244 (73.9)
2. Information for others	81 (24.5)	40 (12.1)	129 (39.1)	250 (75.7)
22. Impact on my relationship	49 (14.8)	30 (9.1)	120 (36.4)	199 (60.3)
23. New relationships	54 (16.4)	38 (11.5)	116 (35.1)	208 (63.0)
10. Reduce stress in my life	62 (18.8)	36 (10.9)	115 (34.8)	213 (64.5)
20. Emotional support for me	78 (23.6)	32 (9.7)	115 (34.8)	225 (68.1)
28. Ongoing case manager	55 (16.7)	56 (17.0)	99 (30.0)	210 (63.7)
16. Life/travel insurance	50 (15.2)	43 (13.0)	98 (29.7)	191 (57.9)
25. Handle social/work situations	63 (19.1)	45 (13.6)	97 (29.4)	205 (62.1)
26. Changes to my body	66 (20.0)	51 (15.5)	92 (27.9)	209 (63.4)
34. Spiritual beliefs	50 (15.2)	51 (15.5)	85 (25.8)	186 (56.5)
18. Accessible hospital parking	59 (17.9)	40 (12.1)	65 (19.7)	164 (49.7)
27. Problems with sex life	48 (14.5)	35 (10.6)	58 (17.6)	141 (42.7)
13. Help with fertility problems	53 (16.1)	17 (5.2)	44 (13.3)	114 (34.6)
14. Assistance with getting & maintaining employment	49 (14.8)	24 (7.3)	42 (12.7)	115 (34.8)
17. Due to cancer, I need help to access legal services	38 (11.5)	40 (12.1)	40 (12.1)	118 (35.7)
3b: CaSUN positive change items	Yes, but I have always been like this <i>n</i> (%)	Yes, this has been a positive outcome <i>n</i> (%)	No, and I would like help to achieve this <i>n</i> (%)	No, and this is not important to me <i>n</i> (%)
i. Benefited from contact with others	82 (24.8)	171 (51.8)	51 (15.5)	26 (7.9)
ii. Focus more on important things	120 (36.4)	142 (43.0)	51 (15.5)	16 (4.8)
iii. Realize how precious life is	134 (40.6)	121 (36.7)	65 (19.7)	11 (3.3)
iv. Made lots of positive changes	84 (25.5)	172 (52.1)	65 (19.7)	9 (2.7)
v. Grown as a person	72 (21.8)	101 (30.6)	125 (37.9)	32 (9.7)
vi. Appreciate my relationships more	129 (39.1)	139 (42.1)	51 (15.5)	11 (3.3)

^a CaSUN need items (1–35) were ranked in descending order according to the unmet need

^b Unmet need = moderate to strong need

^c Total need = the sum of meet need, weak need, and unmet need

concerns in terms of the physical symptoms, either at the individual level or in total, is related to the higher strength of unmet SCNs (the mean scores) in the present study. This is in line with other studies [17, 27]. A systematic review of the predictors of unmet SCNs in breast cancer survivors indicated that heavier symptom burden is related to higher levels of unmet SCNs [17]. Another systematic review also showed that a heavier symptom burden is a risk factor of having higher levels of unmet SCNs among women with gynecological

cancer [27]. The authors assume that more symptom concerns among cancer survivors may indicate a greater risk of chronic health impairment, further increasing the level of unmet SCNs, and leading to impaired QoL. This remains to be validated in future research, e.g., how symptom concerns among cancer survivors increase their unmet SCNs and impact their QoL.

In addition, the present study's findings showed that factors such as participant gender, treatment type, and differing

Table 4 Strength of total unmet needs on the CaSUN and their correlations with individual variables

Variables	Mean (SD)	Age	Average time post-treatment	Quality of life	Symptom concerns	
					Total concern	19 symptoms
Existential survivorship	26.0 (18.0)	−0.102	−0.176**	−0.206**	0.498***	0.241–0.473***
Comprehensive cancer care	12.3 (7.5)	−0.118*	−0.094	−0.184**	0.505***	0.249–0.465***
Information	6.1 (4.1)	−0.125*	−0.106	−0.194**	0.479***	0.225–0.442***
Quality of Life	4.0 (2.9)	−0.028	−0.112*	−0.283**	0.557***	0.245–0.442***
Relationships	4.5 (3.8)	−0.183**	−0.117*	−0.183**	0.470***	0.253–0.450***
Total unmet need scale	62.2 (38.3)	−0.138*	−0.142*	−0.236**	0.580***	0.330–0.529***

*****Correlation is significant at the 0.05 level (two-tailed); correlation is significant at the 0.01 level (two-tailed); correlation is significant at the 0.001 level (two-tailed)

cancer diagnosis were not related to their unmet SCNs. This was partially backed by another study, as reported by Molassiotis et al., in that neither survivors' gender nor tumor thickness was associated with unmet SCNs [35]. In contrast, another study reported that female survivors with hematological malignancy had higher odds of reporting unmet SCNs [28]. However, Boyes et al. also revealed that it is survivors' sociodemographic characteristics, rather than disease characteristics, that influence their unmet SCNs [28]. This inconsistent evidence deserves further exploration in future research. In addition, we suggest that certain factors, such as education and employment, be further examined [17].

Study limitations

One limitation of this study was its cross-sectional design, as it analyzed unmet SCNs and related factors at only one point in the disease trajectory. Further studies examining prospective unmet SCNs and their related factor trajectory at different time points should be conducted, to explore how unmet SCNs progress across the cancer trajectory. In addition, the participants' Chinese cultural background may limit the generalizability of the results to other targeted populations in different cultures. Further, the fact that the sample has been collected in a university-affiliated teaching hospital, the frequency of cancer diagnosis, and all the survivors had advanced cancer may also limit the generalizability of the results to other areas in China, participants with different cancer diagnosis, and at different disease stages. Study findings need to be validated in cancer populations with different demographics. Moreover, due to the nature of secondary data analysis, certain potential variables, such as education, employment, and symptom distress, were missing in the current study when considering the related factors of unmet SCNs. Further study on the effects of diverse demographics, and systematically soliciting potentially related variables from cancer survivors, is required.

Implications for practice

Despite the limitations of this study, the findings indicate several potential implications for practice. Based on the study findings, the following aspects are highlighted for health care professionals when developing and providing cancer survivorship care to cancer survivors.

First, when developing survivorship care, a coordinated and well-integrated multidisciplinary health care professional team and environment are needed to benefit the management of various symptoms and address survivors' unmet SCNs. Next, in order to deal with cancer survivors' chronic impaired health status and lower QoL, cancer survivors could benefit from some preparation for follow-up care, e.g., teaching them self-management skills in managing their symptoms and care [11]. Further, in terms of survivorship care, special attention should be paid to survivors who are younger in age, with a shorter time since diagnosis, and with impaired QoL. In addition, findings of positive changes, e.g., around 50% of participants benefited from contact with others, and the 20% who asked for help to achieve this, are a reminder that they could benefit from interventions to promote peer-to-peer support.

Conclusion

Findings on high levels of unmet SCNs and a low level of positive changes suggest that survivorship care is needed, with the aim of addressing survivors' unmet SCNs, and benefiting from their experience. Findings further underscore the following areas in which cancer survivors could benefit from the establishment of survivorship care programs to meet their unmet SCNs: paying special attention to existential survivorship; empowering survivors' management of chronic symptoms or impaired health status by using self-management and peer-support approaches, particularly for those of younger age; a shorter time since diagnosis; and poor QoL. Future cancer survivorship care should have an increased number of referrals to

support services and a greater capacity to deliver unmet SCN-driven care, through a multidisciplinary team with the goal of increasing survivor satisfaction and reassurance.

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Yinghua XU: data collection/analysis; drafting of manuscript; critical revisions of the manuscript.

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Compliance with ethical standards

Conflict of interest The authors have no conflicts of interest to disclose.

We affirm that the content of our paper has not been published elsewhere and it does not overlap or duplicate any of our published work.

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