Supportive Care in Cancer (2019) 27:1287–1298
https://doi.org/10.1007/s00520-018-4615-1

ORIGINAL ARTICLE

Cancer survivorship care after curative treatment: Chinese oncology practitioners' practices

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Received: 9 September 2018 / Accepted: 11 December 2018 / Published online: 7 January 2019

Abstract

Purpose To establish oncology practitioners' perceptions of responsibility, confidence levels, and frequency of survivorship care practice in relation to the post-treatment phase of survivorship care in Mainland China; to identify factors associated with oncology practitioners' perceptions of responsibility, confidence levels, and frequency of survivorship care practice; and to examine factors that impede the provision of quality survivorship care.

Methods A cross-sectional survey of Chinese oncology practitioners was conducted using a test battery consisting of a self-developed information sheet, a 29-item survivorship care scale (29-SCS), and a 16-item impeding factors scale.

Results There were 331 participants. Mean values of the four subscales (8.87, 61.82, 18.62, and 40.49) on perceptions of responsibility were relatively higher than those of the mean values of confidence levels and frequency of survivorship care practice. Participant characteristics, including professional discipline, highest educational qualification achieved, work status, work role, and work setting, were identified as factors associated with oncology practitioners' responsibility perceptions, confidence levels, and survivorship care practice frequency. The top three barriers to quality survivorship care perceived by participants were lack of time, an appropriate physical location, and evidence-based practice guidelines to inform survivorship care.

Conclusions Findings of relatively high levels of perception of responsibility and low levels of confidence in survivorship care suggest that survivorship care is needed, with the aim of implementing oncology practitioners' responsibility and improving their confidence in providing survivorship care in cancer practice. Future multiple levels of cooperation for overcoming barriers and implementing quality survivorship care are highly recommended.

Keywords Cancer · Oncology · Survivorship care · Oncology practitioners · Practice patterns · Perspectives · Barriers · Mainland 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 overall cancer morbidity increased significantly from 2000 to 2011, while mortality rates have decreased considerably since 2006, leading to a growing number of cancer survivors [2]. This growing number of cancer survivors and the increased risk of chronic health problems in cancer survivors highlight the significance of addressing their health concerns across the entire cancer trajectory, that is survivorship care, from diagnosis to survivorship. Indeed, the impact of cancer and its treatment if given with curative intent can lead to ongoing, even permanent negative consequences for survivors, including physical, psychological, financial, and social health impairment [3, 4]. The Survivorship care for patients with cancer after TrEatment completion in the Asia-Pacific Region: An international

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service-mapping study (the STEP study) also showed that cancer survivors in this area had substantial symptom burden and unmet supportive care needs [5].

In the cancer context, the significance of providing survivorship care in cancer practice has increasingly been recognised [6]. The supportive care framework [7] proposed that the cancer care system include a spectrum of events and interactions, e.g. pre-diagnosis, diagnosis, treatment, and follow-up. The follow-up may consist of post-treatment, long-term survivorship care, palliative care, and terminal care. According to the seminal Institute of Medicine (IOM) report [8], special attention needs to be given to the post-treatment phase. This is the case in Mainland China, where cancer control planning mainly focuses on prevention, early diagnosis, and treatment [9].

The evidence from a Japanese study of oncology nurses' perceptions of long-term cancer survivorship care also supports this view. According to the findings from the Japanese study, oncology nurses reported that the quality of long-term survivorship care was poorer than nursing care at the time of cancer diagnosis, during treatment, and at the end of life [10]. In addition, participants in this study also acknowledged their awareness of the importance of dealing with issues faced by long-term survivors of cancer. However, due to the fact that there are few opportunities for oncology nurses to see survivors with cancer after they have been discharged from hospital, very few oncology nurses put long-term survivorship care into practice [10]. This is a reminder that high quality long-term survivorship care would require a coordinated approach by multidisciplinary practitioners, such as physicians, nurses, psychologists, and social workers, as recommended in the IOM report [8].

With the growing recognition of the importance of providing survivorship care, and the need for an organised approach by multidisciplinary practitioners in cancer practice, literature has emerged to investigate the perceptions of oncology practitioners regarding their survivorship care practice and perceived obstacles that hamper the execution of quality survivorship care [11–15]. Most studies in this area, however, have been conducted in Western countries, and various challenges and/or barriers in implementing survivorship care were reported from the perspectives of oncology practitioners [11–13]. For example, a study conducted in the USA reported that the potential determinants of implementing survivorship care included outcome expectancies (healthcare professionals' beliefs about the consequences of survivorship care use), intrinsic motivation (motivation and goals regarding survivorship care use), goal priority, and teamwork [11]. Another study found that the main challenge for oncology staff was the time required to obtain information for survivorship care planning [12]. An electronic survey of Canadian radiation oncologists reported that survivorship care plans are underutilised [13].

As for survivorship care in Asia, a study of 126 multidisciplinary oncology practitioners from various Southeast Asian countries revealed that survivorship care in Asia is relatively inadequate, and patient-specific barriers were reported as the main barriers to survivorship care provision [14]. Recently, the STEP study ($n = 1501$) reported that oncology practitioners working in LMICs (China, Thailand, India, Myanmar, and Philippines) had higher levels of responsibility, confidence, and frequency of delivering survivorship care than those working in high-income countries (HICs, including Australia, Hong Kong, Japan, South Korea, and Singapore) [15].

To our knowledge, no study has specifically investigated the perceptions of oncology practitioners of the implementation of cancer survivorship care in Mainland China. Consequently, our study aims were to (i) establish the perceptions of responsibility, confidence levels, and frequency of survivorship care practices among oncology practitioners in relation to the post-treatment phase of survivorship care in Mainland China, (ii) identify factors associated with the perceptions of responsibility, confidence levels, and frequency of survivorship care practices of oncology practitioners, and (iii) examine factors that impede the provision of quality survivorship care.

Methods

Study design and participants

This study analysed Chinese data from a large cross-sectional survey of oncology practitioners across the Asia-Pacific region [15]. The survey was conducted from June 2015 to July 2016 at a university-affiliated teaching hospital in Wuxi, China. Eligibility criteria included the following: (1) hospital-based clinical practitioners (i.e. physicians, nurses, allied health professionals) who worked in an oncology department; (2) at least 18 years in age; and (3) spending more than half of their time caring for cancer patients in their clinical practice.

The sample size was determined according to the item numbers of the main scale included in the survey. It was proposed that the sample size should range from five to 10 times the item numbers [16]. Given that the two instruments contained 45 items (a 29-item scale for perceptions of responsibility, confidence levels, and frequency of survivorship care practice, and a 16-item scale for the impeding factors), it was estimated that 225–450 participants were required.

Measures

We collected information from participants on demographic and work-related characteristics, including gender, age, years

Table 1 Demographics and professional characteristics of the participants ($n = 331$)

Characteristics		*N* (%)
Gender		
	Male	61 (18.4)
	Female	270 (81.6)
Age		
	18–29	139 (42.0)
	30–39	133 (40.2)
	40–49	42 (12.7)
	50–59	14 (4.2)
	60 and above	3 (0.9)
Years of experience in cancer care		
	< 1 year	27 (8.2)
	1–5 years	120 (36.3)
	6–10 years	90 (27.2)
	11–20 years	75 (22.7)
	> 20 years	19 (5.7)
Professional disciplines		
	Physicians	69 (20.8)
	Nurses	246 (74.3)
	Allied health	16 (4.8)
Work status		
	Full time	323 (97.6)
	Part time	8 (2.4)
Highest qualifications		
	Hospital certificate/diploma	34 (10.3)
	Bachelor degree	257 (77.6)
	Graduate or above	40 (12.1)
Work role		
	Direct clinical	308 (93.1)
	Managerial/administrative	9(2.7)
	Others	14(4.2)
Work settings		
	Outpatient	14(4.2)
	Inpatient	280(84.6)
	Mixed	37(11.2)
Patient setting		
	Adults	238 (71.9)
	Paediatrics	3 (0.9)
	Mixed	90 (27.2)

of experience in cancer care, and professional discipline (Table 1). The questionnaire battery consisted of a 29-item survivorship care scale (29-SCS) [15] and a 16-item impeding factor scale (16-IFS) [17].

The 29-SCS was developed specifically for the STEP study in assessing oncology practitioners' perceptions of responsibility (whether survivorship care should be their responsibility), confidence (how confident they are in delivering survivorship care), and frequency of care (how often they provide survivorship care to survivors at the completion of treatment) [15]. The 29 items were derived from the IOM seminal report *Lost in transition: From cancer patient to cancer survivor* [8], a literature review on survivorship care practices, with the original version piloted in two Australian studies of oncology nurses [18, 19]. These items were scored using a five-point Likert-type scale (*1 = totally disagree*, *2 = somewhat disagree*, *3 = do not know*, *4 = somewhat agree*, *5 =* to *totally agree*) for the subscale for perception of responsibility; a numeric analogue scale from 0 (*cannot do at all*) to 10 (*highly certain can do*) for the confidence subscale; and another five-point Likert-type scale (*1 = never*, *2 = occasionally*, *3 = often*, *4 = very often*, *5 = to all the time*) for the frequency subscale. Four domains or subscales of the 29-SCS were prevention (2 items), intervention (14 items), surveillance (4 items), and coordination (9 items). All subscales have good internal consistency, with Cronbach's α from 0.92 to 0.97 [15].

The translation of the 29-SCS into Chinese was conducted according to a standardised protocol as proposed by the World Health Organization (WHO) [20]. 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 29-SCS was established by Cronbach's α from 0.890 to 0.957 for all of the subscales of perception of responsibility, levels of confidence, and frequency of survivorship care practice (Table 2).

The 16-IFS was applied to assess factors, including individual, organisational, and professional levels, that hinder survivorship care implementation [17]. Each item was rated using a Likert scale based on levels of agreement (*1 = not at all*; *2 = somewhat*; *3 = quite a lot*; *4 = a great deal*). The translation of the 16-IFS into Chinese was conducted according to the same process described earlier in translating the 29-SCS. In the present sample, the good internal reliability of the Chinese version of 16-IFS was established by Cronbach's $\alpha = 0.922$.

Data collection

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/355) (Australia), and access approval was obtained from the Wuxi People's Hospital Research Ethics Committee (No. HREC201606002) (China). The hospital research team member (a head nurse) identified participants 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

Table 2 Descriptive statistics and Cronbach's alpha on perception of responsibility, levels of confidence, and frequency of survivorship care practice ($n = 331$)

	Number[a]	Possible range	Minimum	Maximum	Mean	standard deviation	Cronbach's alpha
Perception of responsibility							
Prevention	331	2–10	2.00	10.00	8.87	1.72	0.890
Intervention	330	14–70	22.00	70.00	61.82	7.77	0.899
Surveillance	331	4–20	5.00	20.00	18.62	2.17	0.893
Coordination	331	9–45	11.00	45.00	40.49	5.56	0.924
Levels of confidence							
Prevention	330	0–20	0.00	20.00	12.52	4.97	0.919
Intervention	327	0–140	24.00	140.00	93.36	26.77	0.948
Surveillance	329	0–40	0.00	40.00	29.33	8.24	0.931
Coordination	328	0–90	13.00	90.00	63.59	18.48	0.957
Frequency of survivorship care practice							
Prevention	329	2–10	2.00	10.00	6.05	2.14	0.912
Intervention	327	14–70	14.00	70.00	47.20	10.91	0.929
Surveillance	330	4–20	4.00	20.00	14.75	3.95	0.927
Coordination	330	9–45	12.00	45.00	30.43	8.64	0.949

[a] The total number does not equal 331 because of missing values

participants, they invited the participants to complete the questionnaire.

Data analysis

Statistical Package for the Social Sciences-version 22.0 (IBM®) was used 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 summarise the data. *t* tests (two groups) and one-way ANOVA (above two groups) analyses were further conducted to explore associations between the outcome measures (perception of responsibility, confidence, and frequency of survivorship care provision) and a range of demographic and work-related characteristics.

Results

Among the 331 participants, the majority were female (81.6%), under 40 years in age (82.2%), oncology nurses (74.3%), working full-time (97.6%), whose highest qualification was a bachelor's degree or above (89.6%), and working in inpatient (84.6%) and adult (71.9%) care settings (Table 1).

Outcome measures and their relationship with demographic and work-related characteristics

Table 2 shows the descriptive statistics on three outcome measures. Mean values of the four subscales on perception of responsibility were 8.87, 61.82, 18.62, and 40.49, respectively, with a percentage of possible maximum values ranging from 88.7% (8.87/10 in prevention) to 93.1% (18.62/20 in surveillance). In contrast to the outcomes of responsibility, mean values in levels of confidence and frequency of survivorship care practice were relatively lower, with a percentage of possible maximum values ranging from 60.5% (6.05/10 in prevention of frequency) to 73.8% (14.75/20 in surveillance of frequency).

Association between participant variables and the three outcome measures is displayed in Table 3. For the perception of responsibility (3a), significant differences were identified between physicians, nurses, and allied health professionals in intervention and surveillance. According to *post-hoc* tests, differences did not exist between physicians and nurses; however, both physicians and nurses had significantly higher responsibility perception scores for intervention and surveillance than allied health professionals. Those working full-time had higher scores for coordination than those working part-time. Significant differences were also identified in intervention, surveillance, and coordination in participants' work roles, e.g. direct clinical, administrative, and others. Further *post-hoc* tests found that those working directly in a clinical setting had higher scores for intervention and surveillance than those working in other occupations, while those working in administrative roles had higher scores for coordination than those working in other occupations.

In terms of levels of confidence (3b), male participants had higher scores in prevention, surveillance, and coordination than females. Significant differences were also identified between physicians, nurses, and allied health professionals in prevention, surveillance, and coordination. Physicians had significantly higher scores than nurses in prevention, surveillance, and coordination. There were significant differences between different groups with the highest qualifications, e.g. those with a hospital certificate or diploma, bachelor's degree, and graduate or above, in prevention, intervention, and coordination. Those who had a bachelor's degree reported lower levels of confidence in prevention than those with a graduate degree or above. No other differences between any other two groups existed, according to *post-hoc* tests. Significant differences were found for surveillance among participants working in outpatient, inpatient, and mixed settings, while participants working in an inpatient setting had lower levels of confidence in surveillance than those working in a mixed setting. In terms of patient setting, there were significant differences in prevention, and those working in an adult setting had lower scores than those working in a mixed setting.

In terms of frequency of survivorship care practice (3c), almost the same association profile was found between participant variables with frequency of survivorship care practice and with levels of confidence as described above (Table 3b and c). According to *post-hoc* tests, the following significant differences existed: (1) physicians had higher scores for prevention, surveillance, and coordination than nurses; (2) those who had a bachelor's degree reported lower frequency in prevention and coordination than those with a graduate degree or above; (3) those working in an inpatient setting reported lower frequency in surveillance and coordination than those working in a mixed setting.

Barriers that impede quality survivorship care

Table 4 shows the barriers that participants perceived to be impeding quality survivorship care. The top three barriers were lack of time, an appropriate physical location, and evidence-based practice guidelines informing survivorship care.

Discussion

To our knowledge, this is the first study that focuses on oncology practitioners' perspectives on cancer survivorship care in Mainland China. Unlike in the developed Western world, where there is a push for survivorship care to be delivered in community health centres, in Mainland China, it may be much more important for hospital-based oncology practitioners to deliver quality survivorship care. One reason for this may lie in the fact that it falls on relatively undeveloped community health centres to deal with survivorship issues in China. Another reason may be due to the fact that in Mainland China, patients, particularly those with cancer, usually seek care at clinics attached to the hospitals with the best reputation [21]. In addition, the fact that cancer control planning in China mainly focuses on prevention, early diagnosis, and treatment may contribute to that country's relatively undeveloped cancer survivorship care [9]. Based on the study aims and results, the following three aspects will be discussed:

Oncology practitioners' perceptions of responsibility, confidence levels, and frequency of survivorship care

In terms of perceptions of responsibility of survivorship care, oncology practitioners in Mainland China had the highest levels of perception of responsibility across the Asia-Pacific region [15]. However, their perception of confidence levels, e.g. subscales of intervention and coordination, were lower than those in Australia. This may partly due to the fact that survivorship care in LMIC is relatively undeveloped [22], and the preference of cancer survivors seeking care is at cancer clinics attached to hospitals [21]. This is a reminder that more effort is required to develop survivorship care in Mainland China. Nevertheless, the further Pearson correlation analysis between the perceptions of total levels of responsibility, confidence, and frequency of survivorship care all showed positive correlations ($r = 0.469$ between responsibility and confidence, $r = 0.428$ between reasonability and frequency, and $r = 0.770$ between confidence and frequency). This is consistent with the STEP study's findings, in that the higher the degree of responsibility that oncology practitioners perceived they had to provide in survivorship care, the more frequently they would deliver that care, and the more confident they would be [15].

Factors associated with oncology practitioners' perceptions of responsibility, confidence levels, and frequency of survivorship care practices

Although no gender difference was identified in terms of oncology practitioners' perceptions of responsibility in survivorship care practices, male practitioners were more confident and provided more frequent survivorship care than their female counterparts. Considering the fact that in China, most of the males would have been physicians, and most of the females would have been nurses, and this is the case in the present sample, in that only one (1/246) nurse was male, we would assume that findings regarding gender differences may be due to their different disciplines, e.g. physicians and nurses. However, no similar reports were identified. Future confirmation of the findings is required.

Indeed, similar to the differences in profile between male and female practitioners, no significant difference was identified between physicians and nurses regarding their perceptions of their responsibilities in survivorship care practices, although physicians were more confident and provided more frequent survivorship care than nurses. This may partly be due to the fact that physicians were more likely to communicate

Table 3 Association between the variables of the participants and perception of responsibility, levels of confidence, and frequency of survivorship care practice ($n = 331$)

Variables	Prevention				Intervention				Surveillance				Coordination			
	n[a]	Mean (SD)	t/F[b]	*P* value	n[a]	Mean (SD)	t/F[b]	*P* value	n[a]	Mean (SD)	t/F[b]	*P* value	n[a]	Mean (SD)	t/F[b]	*P* value
3a: Perception of responsibility																
Gender																
Male	61	8.84 (1.55)	− 0.171	0.864	61	60.88 (7.73)	− 0.109	0.328	61	18.59 (2.28)	− 0.501	0.917	61	40.16 (5.72)	− 0.501	0.617
Female	270	8.88 (1.78)			269	62.03 (7.77)			270	18.62 (2.15)			270	40.56 (5.53)		
Age																
18–29	139	8.78 (1.73)	0.227	0.923	138	61.57 (7.70)	0.646	0.630	139	18.37 (2.21)	0.848	0.495	139	39.81 (5.69)	1.013	0.401
30–39	133	8.97 (1.72)			133	61.65 (7.78)			133	18.75 (2.05)			133	40.84 (5.02)		
40–49	42	8.86 (1.77)			42	62.02 (7.85)			42	18.98 (2.17)			42	41.10 (6.34)		
50–59	14	8.93 (1.69)			14	64.93 (7.87)			14	18.64 (2.87)			14	41.86 (6.49)		
60 and above	3	8.67 (1.15)			3	63.33 (10.69)			3	18.67 (2.31)			3	41.33 (6.35)		
Years of experience in cancer care																
< 1 year	27	8.78 (2.01)	0.409	0.802	27	60.48 (11.06)	0.910	0.458	27	18.07 (3.16)	0.623	0.646	27	39.41 (6.97)	0.537	0.708
1–5 years	120	8.95 (1.59)			119	61.72 (6.49)			120	18.76 (1.81)			120	40.27 (5.31)		
6–10 years	90	8.71 (1.94)			90	62.53 (7.55)			90	18.52 (2.08)			90	40.79 (4.47)		
11–20 years	75	9.00 (1.51)			75	61.07 (8.43)			75	18.65 (2.31)			75	40.97 (5.78)		
> 20 years	19	8.74 (1.88)			19	63.89 (7.96)			19	18.79 (2.55)			19	40.05 (8.40)		
Professional disciplines																
Physicians	69	8.93 (1.69)	0.896	0.409	69	61.16 (7.45)	7.511	0.001	69	18.83 (2.17)	5.297	0.005	69	40.54 (5.64)	1.611	0.201
Nurses	246	8.89 (1.69)			245	62.45 (7.45)			246	18.67 (2.01)			246	40.63 (5.30)		
Allied health	16	8.31 (2.21)			16	55.00 (10.42)			16	16.94 (3.66)			16	38.06 (8.42)		
Work status																
Full time	323	8.88 (1.73)	0.408	0.684	322	61.89 (7.78)	1.132	0.259	323	18.64 (2.18)	1.142	0.254	323	40.58 (5.57)	1.998	0.047
Part time	8	8.63 (1.41)			8	58.75 (6.84)			8	17.75 (1.91)			8	36.63 (3.62)		
Highest qualifications																
Hospital certificate/diploma	34	8.76 (1.74)	0.079	0.924	33	62.55 (7.19)	0.795	0.452	34	18.53 (2.29)	0.402	0.669	34	40.12 (6.70)	0.176	0.839
Bachelor degree	257	8.89 (1.71)			257	61.94 (7.74)			257	18.67 (2.09)			257	40.58 (5.40)		
Graduate or above	40	8.85 (1.79)			40	60.45 (8.39)			40	18.35 (2.61)			40	40.18 (5.63)		
Work role																
Direct clinical	308	8.89 (1.70)	1.874	0.155	307	62.06 (7.49)	4.944	0.008	308	18.68 (2.05)	4.162	0.016	308	40.55 (5.40)	3.670	0.027
Administrative	9	9.33 (1.12)			9	63.22 (8.20)			9	18.89 (1.83)			9	43.44 (1.94)		
Others	14	8.07 (2.23)			14	55.57 (10.88)			14	17.00 (3.96)			14	37.29 (8.79)		
Work setting																
Outpatient	14	9.71 (0.61)	2.278	0.104	14	61.00 (4.26)	1.499	0.225	14	19.00 (1.52)	0.313	0.731	14	39.14 (7.21)	0.781	0.459
Inpatient	280	8.87 (1.71)			279	62.12 (7.65)			280	18.62 (2.10)			280	40.45 (5.38)		
Mixed	37	8.57 (1.98)			37	59.84 (9.39)			37	18.46 (2.86)			37	41.27 (6.21)		
Patient setting																
Adults	238	8.76 (1.78)	1.943	0.145	237	61.52 (7.91)	0.632	0.532	238	18.55 (2.16)	1.082	0.340	238	40.33 (5.45)	0.383	0.682

Table 3 (continued)

Variables	Prevention				Intervention				Surveillance				Coordination			
	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value
Paediatrics	3	8.33 (1.53)			3	62.00 (3.00)			3	17.33 (2.31)			3	40.00 (5.57)		
Mixed	90	9.17 (1.55)			90	62.60 (7.49)			90	18.83 (2.21)			90	40.92 (5.88)		
3b: Levels of confidence																
Gender																
Male	61	13.77 (4.88)	2.199	0.029	60	96.37 (25.29)	0.962	0.337	61	31.62 (6.70)	2.808	0.006	60	69.63 (14.42)	3.367	0.001
Female	269	12.23 (4.95)			267	92.69 (27.09)			268	28.81 (8.47)			268	62.24 (19.03)		
Age																
18–29	139	12.50 (4.82)	0.580	0.678	139	94.28 (26.20)	1.373	0.243	138	29.36 (7.73)	1.143	0.336	139	63.45 (17.74)	1.036	0.389
30–39	132	12.22 (5.06)			132	90.81 (27.26)			132	28.87 (8.78)			131	62.59 (18.72)		
40–49	42	13.14 (4.92)			41	94.29 (26.74)			42	30.31 (6.95)			42	63.86 (19.76)		
50–59	14	13.86 (4.94)			12	108.75 (24.02)			14	31.93 (9.152)			13	73.15 (19.67)		
60 and above	3	11.33 (9.87)			3	88.67 (36.86)			3	22.33 (17.21)			3	69.00 (16.52)		
Years of experience in cancer care																
< 1 year	27	14.37 (4.27)	2.246	0.064	27	98.15 (28.75)	0.833	0.505	27	30.52 (7.94)	1.605	0.173	27	66.70 (20.18)	1.073	0.370
1–5 years	120	12.00 (4.72)			120	91.38 (24.78)			120	28.71 (7.88)			119	62.29 (17.34)		
6–10 years	89	12.76 (5.15)			87	95.33 (27.52)			88	29.68 (8.34)			88	63.53 (17.54)		
11–20 years	75	11.92 (5.21)			74	91.09 (26.53)			75	28.51 (8.90)			75	62.81 (19.92)		
> 20 years	19	14.32 (4.90)			19	98.89 (33.50)			19	33.21 (7.07)			19	70.68 (21.00)		
Professional disciplines																
Physicians	68	14.19 (4.44)	5.666	0.004	67	97.87 (25.12)	1.416	0.244	68	32.56 (5.88)	6.866	0.001	67	69.67 (16.47)	5.617	0.004
Nurses	246	11.99 (5.10)			244	91.92 (27.72)			245	28.45 (8.77)			245	61.64 (19.06)		
Allied health	16	13.44 (3.29)			16	96.50 (14.76)			16	29.13 (4.41)			16	68.06 (9.35)		
Work status																
Full time	322	12.49 (5.00)	− 0.639	0.523	319	93.33 (26.91)	− 0.135	0.893	321	29.37 (8.23)	0.593	0.554	320	63.61 (18.56)	0.111	0.911
Part time	8	13.63 (3.50)			8	94.63 (22.25)			8	27.63 (8.98)			8	62.88 (15.45)		
Highest qualifications																
Hospital certificate/diploma	34	13.85 (4.61)	4.841	0.008	32	102.47 (25.18)	3.820	0.023	34	29.76 (8.19)	1.670	0.190	33	66.97 (19.66)	3.133	0.045
Bachelor degree	257	12.07 (5.02)			256	91.25 (27.30)			256	28.95 (8.48)			257	62.30 (18.71)		
Graduate or above	39	14.28 (4.37)			39	99.74 (22.10)			39	31.49 (6.21)			38	69.45 (14.25)		
Work role																
Direct clinical	307	12.48 (4.99)	0.132	0.877	304	93.29 (27.07)	0.038	0.963	306	29.28 (8.38)	0.129	0.879	305	63.60 (18.57)	0.000	1.000
Administrative	9	13.22 (3.96)			9	95.78 (20.18)			9	30.67 (7.83)			9	63.56 (20.78)		
Others	14	12.86 (5.30)			14	93.36 (25.43)			14	29.57 (5.21)			14	63.57 (15.87)		
Work setting																
Outpatient	14	13.21 (2.69)	1.409	0.246	14	95.86 (17.87)	0.741	0.478	14	30.71 (5.43)	3.024	0.050	14	64.86 (18.19)	2.656	0.072
Inpatient	279	12.32 (5.04)			277	92.61 (27.07)			278	28.87 (8.57)			278	62.68 (18.64)		
Mixed	37	13.70 (5.01)			36	98.14 (27.35)			37	32.27 (5.61)			36	70.14 (16.32)		

Table 3 (continued)

Variables	Prevention				Intervention				Surveillance				Coordination			
	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value
Patient setting																
Adults	237	12.02 (5.17)	4.293	0.014	236	91.55 (27.52)	1.956	0.143	236	28.89 (8.37)	1.339	0.264	235	62.91 (18.23)	0.571	0.566
Paediatrics	3	14.67 (4.16)			3	96.33 (23.25)			3	28.00 (6.00)			3	66.33 (14.50)		
Mixed	90	13.74 (4.19)			88	98.11 (24.40)			90	30.53 (7.90)			90	65.29 (19.28)		
3c: Frequency of survivorship care practice																
Gender																
Male	60	6.62 (1.78)	2.588	0.011	59	48.25 (10.49)	0.818	0.414	61	15.97 (3.08)	3.199	0.002	61	33.26 (7.08)	3.296	0.001
Female	269	5.93 (2.20)			268	46.97 (11.00)			269	14.48 (4.07)			269	29.78 (8.84)		
Age																
18–29	139	6.10 (2.21)	0.646	0.630	137	46.73 (11.72)	1.017	0.399	139	14.40 (4.00)	1.288	0.274	139	30.02 (8.79)	1.499	0.202
30–39	132	5.95 (2.17)			131	46.76 (9.94)			132	14.73 (3.93)			132	30.10 (8.37)		
40–49	42	6.10 (1.87)			42	48.71 (10.61)			42	15.60 (3.48)			42	31.05 (8.77)		
50–59	13	6.77 (1.74)			14	51.93 (11.12)			14	16.14 (4.33)			14	35.71 (8.90)		
60 and above	3	5.00 (2.65)			3	44.67 (16.86)			3	13.33 (6.11)			3	30.33 (5.77)		
Years of experience in cancer care																
< 1 year	27	6.52 (1.81)	0.974	0.422	26	48.81 (8.94)	0.974	0.422	27	15.07 (4.04)	2.032	0.090	27	30.89 (7.79)	1.423	0.226
1–5 years	120	6.02 (2.26)			120	45.74 (11.67)			120	14.23 (4.05)			120	29.66 (8.80)		
6–10 years	90	6.18 (2.09)			89	49.20 (10.35)			90	15.34 (3.38)			90	31.36 (7.57)		
11–20 years	74	5.72 (2.12)			73	45.19 (9.89)			74	14.35 (4.28)			74	29.53 (9.197)		
> 20 years	18	6.39 (2.06)			19	52.58 (11.96)			19	16.32 (3.89)			19	33.74 (10.71)		
Professional disciplines																
Physicians	67	6.90 (1.88)	6.728	0.001	66	49.20 (10.47)	2.596	0.076	68	16.31 (3.02)	7.008	0.001	68	33.46 (7.44)	6.047	0.003
Nurses	246	5.84 (2.17)			245	46.96 (10.83)			246	14.37 (4.06)			246	29.49 (8.80)		
Allied health	16	5.88 (1.89)			16	42.63 (12.75)			16	13.94 (4.22)			16	31.94 (8.05)		
Work status																
Full time	321	6.06 (2.15)	0.240	0.810	320	47.36 (10.93)	1.807	0.072	322	14.80 (3.93)	1.546	0.123	322	30.51 (8.65)	1.095	0.274
Part time	8	5.88 (1.46)			7	39.86 (6.74)			8	12.63 (4.10)			8	27.13 (7.97)		
Highest qualifications																
Hospital certificate/diploma	34	6.62 (2.28)	4.810	0.009	34	49.21 (12.46)	0.973	0.379	34	14.94 (4.19)	2.792	0.063	34	32.76 (8.19)	4.998	0.007
Bachelor degree	256	5.86 (2.10)			255	46.77 (10.85)			257	14.52 (3.98)			257	29.64 (8.74)		
Graduate or above	39	6.82 (2.05)			38	48.32 (9.80)			39	16.10 (3.23)			39	33.56 (7.31)		
Work role																
Direct clinical	306	6.08 (2.16)	0.379	0.685	304	47.39 (10.84)	2.135	0.120	307	14.84 (3.91)	1.981	0.140	307	30.46 (8.61)	0.764	0.467
Administrative	9	5.56 (1.67)			9	49.56 (8.08)			9	15.11 (3.82)			9	32.78 (8.60)		
Others	14	5.79 (2.08)			14	41.57 (12.82)			14	12.71 (4.50)			14	28.29 (9.47)		
Work setting																
Outpatient	14	6.07 (1.90)	2.232	0.109	14	42.57 (13.21)	2.463	0.087	14	14.64 (3.99)	3.178	0.043	14	31.21 (9.50)	4.254	0.015

Table 3 (continued)

Variables	Prevention				Intervention				Surveillance				Coordination			
	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value	n^a	Mean (SD)	t/F^b	*P* value
Inpatient	280	5.96 (2.18)			277	47.08 (10.69)			280	14.56 (4.01)			280	29.89 (8.63)		
Mixed	35	6.77 (1.80)			36	49.97 (11.17)			36	16.31 (3.11)			36	34.28 (7.52)		
Patient setting																
Adults	236	5.92 (2.18)	1.699	0.184	234	46.64 (10.58)	1.329	0.266	237	14.48 (3.96)	2.307	0.101	237	29.92 (8.71)	1.521	0.220
Paediatrics	3	7.00 (1.73)			3	44.33 (12.01)			3	13.67 (4.73)			3	30.33 (5.51)		
Mixed	90	6.37 (2.03)			90	48.76 (11.67)			90	15.50 (3.82)			90	31.78 (8.44)		

Note: SD = standard deviation

[a] The total *n* does not equal 331 because of missing values

[b] t/F: t = two groups using *t* test; F = above two groups using one-way ANOVA

with other healthcare professionals, e.g. nurses [14]. This is a reminder that more attention should be paid or more training programmes are needed for oncology nurses, to promote their knowledge and confidence in providing survivorship care in cancer practice. As suggested by Miura et al., incorporating quality survivorship care into undergraduate programmes in nursing education may be helpful in long-term cancer survivorship care [10]. Further study on nurses' knowledge of survivorship care, and nursing practices in the context of cancer, is required.

It was unexpected to find that oncology practitioners with a bachelor's degree reported lower levels in perceptions of confidence levels and frequency in providing survivorship care when compared to those with a graduate degree/above. No similar studies were identified. This is an area that deserves further investigation. Interestingly, further analysis found that the majority of nurses (212/246) had a bachelor's degree. These factors, together with the differing findings between physicians and nurses, may partially explain the above findings on differences between education levels. Future in-depth qualitative interviews of oncology practitioners with different educational qualifications, working in different disciplines, may be beneficial to better understand and improve survivorship care.

Among the three different work roles (direct clinical, administrative, and others), the others had the lowest levels of perception of their responsibility to provide survivorship care. However, no significant differences were identified in the perceptions of confidence levels and frequency among the three different work roles. Although no similar findings were found, this is considered reasonable, because providing survivorship care to cancer survivors is resource-intensive and requires multidisciplinary engagement [23].

In addition, the authors speculated that work status and different work settings may contribute to the related differences identified. For example, the higher levels of responsibility reported by full-time practitioners, compared to those working part-time, may be due to their different work status in a full-time or part-time job. Similarly, those working in a mixed work setting experienced higher levels of confidence and frequency in providing survivorship care, compared to those working in an inpatient department, since practitioners working in inpatient departments mainly focus on inpatient care. This may lead to relatively lower levels of confidence in providing survivorship care, particularly after-treatment care, compared to those working in a mixed work setting.

Factors that impede the provision of quality survivorship care

Similar to other countries in the Asia-Pacific region, lack of time was identified as the number one barrier impeding the provision of quality survivorship care in Mainland China

[15]. Other studies also reported that lack of time was the factor that prevented healthcare professionals from providing cancer survivorship care [12, 19]. This is a reminder that institutional support is imperative for the time needed to provide survivorship care [12]. In addition, other perceived factors, e.g. lack of an appropriate physical location and lack of evidence-based practice guidelines informing survivorship care, call attention to the need for multiple levels of cooperation in implementing survivorship care. These findings are consistent with the previous report, in that multiple factors were considered crucial in providing survivorship care, such as significant organisational support and clinical leadership, multidisciplinary engagement, resourcing, and timing of survivorship care delivery [23].

Study limitations

One limitation of this study was the participants' Chinese cultural background, which may limit the generalisability of the results to other targeted populations in different cultures. In addition, the fact that the sample was collected in a university-affiliated teaching hospital may also limit the generalisability of the results to other areas in China. Further, some significant demographic differences, e.g. the majority of participants were oncology nurses, working full-time, in an inpatient and adult care setting, might skew the conclusions of the study. Study findings need to be validated with oncology practitioners with different characteristics. However, 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. This may intensify its application and significance.

Implications for practice

On the basis of the findings of this analysis and guided by the supportive care framework [7], we highlight implications or recommendations for oncology practitioners seeking to provide quality survivorship care:

- Establishing a feasible survivorship care model: based on the current understanding, two models may be considered: a hospital-home-based model and a hospital-community-home-based model. The former may be applicable for the time being, while the latter would be the direction for future development.
- Creating applicable evidence-based practice guidelines for cancer survivorship care.
- Developing networks of multiple levels of cooperation for implementing survivorship care, e.g., support from administrative members for the workforce, and locations to provide survivorship care.

Table 4 Perceived factors that impedes quality survivorship care (*n* = 331)

Impede factors[a]	Not at all *n* (%)[c]	Somewhat *n* (%)[c]	Quite a lot *n* (%)[c]	A great deal *n* (%)[c]	Impede status[b] *n* (%)
2. Lack time	30 (9.1)	77 (23.1)	119 (36.0)	93 (28.1)	212 (64.1)
10. Lack an appropriate physical location (e.g. a quiet room)	44 (13.3)	87 (26.3)	106 (32.0)	82 (24.8)	188 (56.8)
12. Lack of evidence-based practice guidelines informing survivorship care	35 (10.6)	98 (29.6)	114 (34.4)	71 (21.5)	185 (55.9)
11. No end of treatment consultation dedicated to survivorship care in my organisation	51 (15.4)	85 (25.7)	98 (29.6)	85 (25.7)	183 (55.3)
9. Survivorship care is not a priority for my organisation	51 (15.4)	105 (31.7)	102 (30.8)	61 (18.4)	163 (49.2)
3. Lack knowledge and skills	35 (10.6)	128 (38.7)	105 (31.7)	51 (15.4)	156 (47.1)
13. Lack of dedicated educational resources for patients	45 (13.6)	119 (36.0)	103 (31.1)	52 (15.7)	155 (46.8)
14. Lack of dedicated educational resources for family members	45 (13.6)	121 (36.6)	109 (32.9)	44 (13.3)	153 (46.2)
4. Do not see the value of survivorship care	43 (13.0)	129 (39.0)	106 (32.0)	41 (12.4)	147 (44.4)
6. Do not know where the patient is at in their disease trajectory	67 (20.2)	126 (38.1)	89 (26.9)	37 (11.2)	126 (38.1)
5. Do not know when patients are completing their treatment	53 (16.0)	145 (43.8)	75 (22.7)	46 (13.9)	121 (36.6)
15. Patients' lack of interest	63 (19.0)	142 (42.9)	76 (23.0)	38 (11.5)	114 (34.5)
16. Family members lack of interest	69 (20.8)	137 (41.4)	71 (21.5)	39 (11.8)	110 (33.3)
7. Communication barriers between you and the patient	65 (19.6)	150 (45.3)	70 (21.1)	34 (10.3)	104 (31.4)
1. Do not know what survivorship care is	55 (16.6)	165 (49.8)	74 (22.4)	25 (7.6)	99 (30.0)
8. Communication barriers between you and the family members	61 (18.4)	164 (49.5)	67 (20.2)	27 (8.2)	94 (28.4)

[a] Impede factors (1–16) were ranked in descending order according to the impede status

[b] Impede status = the extent of factors' impeding from quite a lot to a great deal

[c] The total *n* does not equal 331 because of missing values

- Enhancing the education of oncology practitioners in survivorship care, e.g., improving assessments of the needs of cancer survivors, and developing related programmes to meet their needs.

Conclusion

Findings on relatively higher levels of perceptions of responsibility, and lower levels of confidence in survivorship care suggest that survivorship care is needed, with the aim of implementing oncology practitioners' responsibility and improving their confidence in providing survivorship care in cancer practice. The findings call further attention to oncology practitioners who are nurses and with a bachelor's degree. Future multiple levels of cooperation for overcoming barriers and implementing quality survivorship care are highly recommended.

Acknowledgments The first author (Qiuping LI) is especially grateful to Professor Raymond Javan CHAN (School of Nursing, Queensland University of Technology) for his valuable comments on the previous version of the manuscript. The authors gratefully acknowledge the support from the related hospital and all the participants for their sharing of their experience in this study.

Author contributions Qiuping Li: Study conception/design; data collection/analysis; drafting of manuscript.

Yi Lin and Yinghua Xu: Data collection/analysis; drafting of manuscript.

Alex Molassiotis: Critical revisions for important intellectual content.

Funding Financial support of this study was provided by the National Natural Science Foundation of China (No. 81773297). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Disclosures We (the authors) have full control of all primary data and agree to allow the journal to review the data if requested.

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