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# Oncology practitioners' perspectives and practice patterns of post-treatment cancer survivorship care in the Asia-Pacific region: results from the STEP study

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## Abstract

**Background:** Most efforts to advance cancer survivorship care have occurred in Western countries. There has been limited research towards gaining a comprehensive understanding of survivorship care provision in the Asia-Pacific region. This study aimed to establish the perceptions of responsibility, confidence, and frequency of survivorship care practices of oncology practitioners and examine their perspectives on factors that impede quality survivorship care.

**Methods:** A cross-sectional survey of hospital-based oncology practitioners in 10 Asia-Pacific countries was undertaken between May 2015–October 2016. The participating countries included Australia, Hong Kong, China, Japan, South Korea, Thailand, Singapore, India, Myanmar, and The Philippines. The survey was administered using paper-based or online questionnaires via specialist cancer care settings, educational meetings, and professional organisations.

**Results:** In total, 1501 oncology practitioners participated in the study. When comparing the subscales of responsibility perception, frequency and confidence, Australian practitioners had significantly higher ratings than practitioners in Hong Kong, Japan, Thailand, and Singapore (all  $p < 0.05$ ). Surprisingly, practitioners working in Low- and Mid- Income Countries (LMICs) had higher levels of responsibility perception, confidence and frequencies of delivering survivorship care than those working in High-Income Countries (HICs) ( $p < 0.001$ ), except for the responsibility perception of care coordination where no difference in scores was observed ( $p = 0.83$ ). Physicians were more confident in delivering most of the survivorship care interventions compared to nurses and allied-health professionals. Perceived barriers to survivorship care were similar across the HICs and LMICs, with the most highly rated items for all practitioners being lack of time, dedicated educational resources for patients and family members, and evidence-based practice guidelines informing survivorship care.

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**Conclusions:** Different survivorship practices have been observed between HICs and LMICs, Australia and other countries and between the professional disciplines. Future service planning and research efforts should take these findings into account and overcome barriers identified in this study.

**Keywords:** Cancer survivorship, Asia-Pacific region, Health professionals, Oncology practitioner, Practice patterns, Perspectives, Barriers

## Background

The incidence of cancer in the Asia-Pacific region is substantial, accounting for over 30% of all cases worldwide [17]. Projected to bear the largest absolute increase in new cancer cases over the next decade, the burden of cancer in the Asia-Pacific region is expected to grow by 41% or approximately 6.5 million new cases per year [17]. The proportion of people over 65 years of age in this region is likely to double from the current 7% by 2030 [13]. This growth has significant implications for cancer services in the region across all phases of the cancer trajectory. The survivorship phase in particular has received less attention to date in health service planning. In 2005, the American Institute of Medicine (IOM) released a seminal report entitled *Lost in transition: From cancer patient to cancer survivor* [3], which recommended four essential components of survivorship care: prevention and detection of new and recurrent cancers, surveillance for cancer spread or recurrence, interventions for the physical, psychosocial and economic consequences of cancer, and treatment and coordination of care between providers. The IOM report further stipulated that quality survivorship care requires a coordinated approach by multidisciplinary practitioners including but not limited to physicians, nurses, psychologists, and social workers [3]. The STEP study ( $n = 1873$ ) demonstrated that cancer survivors in the Asia Pacific region has significant symptom burden and unmet supportive care needs [10].

Several studies have investigated the perspectives of oncology practitioners concerning their survivorship care practice and perceived barriers that impede the implementation of quality survivorship care [1, 2, 5, 12, 14]. These studies report varying levels of standards in terms of care provision [1, 2, 5, 12, 14]. A Singaporean study of 126 multidisciplinary oncology practitioners reported there were varying levels of frequency in how often they delivered different components of survivorship care [12]. The participants in this study also reported that monitoring physical and treatment-related adverse effects is a much more prevalent practice compared monitoring psychosocial issues [12]. Such differences may be attributed to the different perceptions of the oncology practitioners regarding their responsibility, confidence levels and other barriers at the system-

practitioner- and patient- levels [12, 14]. Understanding these factors will help inform policies and targeted interventions [1, 12, 14].

Achieving high-quality cancer survivorship care requires a system level approach through implementing an effective cancer control policy as well as capacity building amongst health professionals [8]. These efforts must be evidence-based to optimise outcomes [8]. To date, most efforts to advance survivorship care have occurred in Western countries, while there has been limited research towards gaining a comprehensive understanding of survivorship care provision in the Asia-Pacific region. Therefore, the importance of cancer survivorship might not be fully appreciated in the non-Western countries in this region. With the increase in the number of cancer survivors across the Asia-Pacific region, there is a pressing need to gather evidence that can inform the design of interventions and service planning in this area.

## Methods

### Aims

This study aimed to establish the perceptions of responsibility, confidence, and frequency of survivorship care practices of oncology practitioners in relation to their provision of post-treatment survivorship care, and examine their perspectives of factors that impede quality survivorship care.

### Design

A cross-sectional survey of oncology practitioners in 10 Asia-Pacific countries was undertaken between May 2015–October 2016. The participating countries included Australia, Hong Kong, China, Japan, South Korea, Thailand, Singapore, India, Myanmar, and The Philippines. Relevant ethics and institutional research board approvals were obtained from all sites before commencement of data collection. The survey was administered via paper-based or online questionnaires. The sample size to be recruited from each participating country was based on feasibility in consultation with the respective international principal investigators. Each participating site was advised to aim for at least 100 completed questionnaires.

### Setting and sample

A principal investigator in each country was identified and asked to nominate the preferred method for recruitment. This included distribution via a national cancer care professional organisation (using email), via a specialist cancer care setting (using hard copies) that provides radiation or systemic antineoplastic therapy and/or cancer surgery, or via specialty training programs for oncology practitioners. Centres that provide cancer surgery alone were excluded. Eligible participants in this study were hospital-based oncology practitioners (i.e. physicians, nurses, allied-health professionals) who identified themselves as a care provider for patients with cancer. Inclusion criteria were: (1) aged >18 years (>21 years for Singapore); (2) spent >50% of work time on caring for patients with cancer; (3) working in a cancer care setting that provides systemic antineoplastic or radiation therapy.

### Materials

The questionnaire comprised measures of (i) demographic and work-related characteristics; (ii) three subscales that assessed oncology practitioners' perception of responsibility (whether survivorship care is part of their role); confidence (how confident they are in delivering survivorship care), and frequency of practices (how often they provide survivorship care to patients at the completion of treatment) relevant to 29 items of survivorship care interventions. These 29 items were developed from the IOM seminal report entitled *Lost in transition: From cancer patient to cancer survivor* [3] and a review of the literature on survivorship care practices. The original version (with 17 survivorship intervention items) was piloted with oncology nurses in two Australian studies [2, 14]. For the purpose of this study, the original questionnaire used in the pilot studies was amended to include an additional 12 items to reflect a wider range of responsibilities relevant to multidisciplinary teams (Additional file 1). These items were rated as *totally disagree* = 1, *somewhat disagree*, *do not know*, *somewhat agree*, to *totally agree* = 5 for the subscale for perception of responsibility; *cannot do at all* = 0, to *highly certain can do* = 10 for the confidence subscale; and *never* = 1, *occasionally*, *often*, *very often*, to *all the time* = 5 for the frequency subscale (Additional file 1). Additionally, (iii) individual, organisation and professional factors that impede quality survivorship care [9] were assessed using levels of agreement on a Likert scale (*not at all* = 1; *somewhat*; *quite a lot*, *a great deal* = 4) through a 16-item pre-determined list. Participants had an option to provide additional factors.

Principal investigators in each of the participating countries were responsible for translating the questionnaire to the language that the oncology practitioners were most proficient. A standardised translation

protocol was developed as informed by the World Health Organization (WHO) [16]. For each country requiring a non-English version of the questionnaire, a forward translation was undertaken by one bilingual health professional/researcher. Secondly, a bilingual expert panel ( $n \geq 4$ ) was invited to confirm the content validity of the surveys. Lastly, pre-testing was undertaken by 10 oncology practitioners (wherever possible including all three disciplines: medical, nursing and allied-health) to assess face validity. At this stage, the participants were asked if anything was unclear and to provide suggestions for further amendment, with these amendments leading to the final version of the instrument used in this study.

### Data collection

The local research team or nominated clinical staff invited the potential participants via email, by post, or face-to-face in clinical areas or educational meetings. A participant information sheet was provided to the participants regardless of means of communication (email/post/face-to-face). Completion and return of the survey implied consent. For surveys distributed via professional organisations, an initial invitation was sent to the members. A reminder was sent 2 weeks after the first invitation (or at another nominated time agreed on by the professional organisation).

### Analysis

All analyses were conducted using SPSS version 22. Descriptive statistics for all outcome measures (perception of responsibility, confidence, and frequency of survivorship care provision) were calculated including means, standard deviations, and frequency distributions. We also conducted bivariate analyses (e.g. t-test, ANOVA/Kruskal-Wallis or correlation coefficients) to explore relationships between the outcome measures and a range of participant characteristics (age; gender; professional disciplines; years of experience in cancer care; practice settings; highest qualification etc.). We calculated the missing data rates for each country and tested the assumption of missing-at-random. All results were compared across all participating countries; Australia vs other countries; Low- and middle- income countries (LMICs) [Myanmar, India, Thailand, The Philippines, and China] vs High-income countries (HICs) [Japan, South Korea, Hong Kong, Singapore, Australia], defined as such according to the World Bank classifications [15]. Australian data were used as a benchmark, as existing cancer control policies in Asia-Pacific countries suggest that survivorship care in the Australian healthcare system is expected to be more developed than those of other Asia-Pacific countries.

## Results

### Participant characteristics

In total, 1501 oncology practitioners participated in the study. The majority were below 40 years of age (66.9%,  $n = 1002$ ), female (85%,  $n = 1280$ ), with over 6 years of experience in cancer care (63.1%,  $n = 944$ ), oncology nurses (79.4%,  $n = 1191$ ), had a bachelor degree or above (80.3%,  $n = 1195$ ), working full-time (93.9%,  $n = 1410$ ), in a main role in direct clinical care (89.5%,  $n = 1344$ ), and working in adult care settings (81.3%,  $n = 1220$ ). Participants were recruited from a range of settings such as tertiary referral hospitals, regional hospitals, cancer clinics and professional organisations, with the majority working in a metropolitan area (84.4%,  $n = 1263$ ) (Table 1).

### Scale reliability and missing data

Cronbach's alpha for all subscales (perception of responsibility, frequency, confidence and impeding factors) ranged between 0.92 to 0.97. Using the spearman  $r$  correlation coefficients, there were statistically significant correlations between all subscales of perception of responsibility, confidence and frequency, further supporting the internal consistency of the scale. With regards to missing data, less than 2% of samples had missing data for all countries except for Australia (14.7%,  $n = 24$ ). The Australian participants who had a managerial or administrative role were more likely to have missing data ( $p < 0.05$ ).

### Outcome measures and demographic and work-related characteristics

There was a weak positive correlation between age and all four confidence subscales (all  $p < 0.001$ ). No statistically significant correlation was found between age and the responsibility perception and frequency subscales. Participants with a bachelor degree or above had higher confidence scores for all four subscales (all  $p < 0.001$ ), and higher frequency scores for the surveillance and coordination subscales (all  $p < 0.001$ ) than those with lower levels of education. Those working in the public settings had higher confidence scores for all subscales (all,  $p < 0.001$ ), higher responsibility perception scores for the prevention subscale ( $p < 0.05$ ) and higher frequency scores for the prevention ( $p < 0.05$ ) and coordination ( $p < 0.005$ ) subscales compared to those working in the private or mixed settings. Those working in non-metropolitan areas had significantly higher scores for all subscales (i.e. responsibility perception, confidence and frequency, all  $p < 0.001$ ), except for responsibility perception -surveillance subscale.

### Comparisons between Australia and other countries

When comparing all subscales including responsibility perception, frequency and confidence between Australia and other countries, Hong Kong, Japan, Thailand, and

**Table 1** Demographics and professional characteristics of the participants ( $N = 1501$ )

Characteristics	<i>N</i> (%)
<b>Country</b>	
Australia	163 (10.9)
Hong Kong	100 (6.7)
China	317 (21.1)
Japan	209 (13.9)
South Korea	100 (6.7)
Thailand	200 (13.3)
Singapore	147 (9.8)
India	103 (6.9)
Myanmar	110 (7.3)
Philippines	52 (3.5)
<b>Age</b>	
18–29	399 (26.6)
30–39	603 (40.3)
40–49	295 (19.7)
50–59	172 (11.5)
60 and above	29 (1.9)
<b>Years of experience in cancer care</b>	
<1 year	106 (7.1)
1–5 years	447 (29.8)
6–10 years	409 (27.2)
11–20 years	386 (25.7)
>20 years	149 (9.9)
<b>Professional disciplines</b>	
Physicians	250 (16.7)
Nurses	1192 (79.4)
Allied-health	59 (3.9)
<b>Work status</b>	
Full Time	1410 (93.9)
Part Time	90 (6.0)
<b>Highest qualifications</b>	
Hospital Certificate	37 (2.5)
Diploma	256 (17.2)
Bachelor Degree	666 (44.8)
Graduate Diploma/Certificate	194 (13.0)
Master	230 (15.5)
Doctorate/Doctor of Medicine	105 (7.1)
<b>Work settings</b>	
Public	958 (63.9)
Private	446 (29.8)
Mixed	95 (6.3)
<b>Patient setting</b>	
Adults	1220 (81.4)
Paediatrics	22 (1.5)
Mixed	256 (17.1)
<b>Geographical location of workplace</b>	
Metropolitan	1263 (84.4)
Regional	76 (5.1)
Rural	23 (2.3)
Mixed	124 (8.3)

Singapore had significantly lower scores across majority of the subscales (all  $p < 0.05$ ) than Australia (Table 2). China, India, Myanmar and The Philippines achieved either significantly higher scores (all  $p < 0.05$ ) or similar scores (i.e. not significant differences) compared to

**Table 2** Comparisons between Australia and all countries using independent-samples *t*-tests (*N* = 1501)

	Possible range	Australia <i>N</i> = 163 (Ref)	Hong Kong <i>N</i> = 100	China <i>N</i> = 317	Japan <i>N</i> = 209	South Korea <i>N</i> = 100	Thailand <i>N</i> = 200	Singapore <i>N</i> = 147	India <i>N</i> = 103	Myanmar <i>N</i> = 110	Philippines <i>n</i> = 52
Perception of responsibility											
Prevention	2–10	7.58 (2.14)	6.79 (1.95)**	8.88 (1.60)**	6.55 (1.84)**	NS	6.40 (1.9)**	6.64 (2.4)**	8.33 (2.05)**	NS	6.67 (2.87)*
Intervention	14–70	62.08 (7.19)	54.38 (10.35)**	NS	58.74 (6.88)**	57.65 (9.95)**	49.59 (13.39)**	55.82 (10.67)**	NS	51.37 (9.70)**	53.94 (11.73)**
Surveillance	4–20	14.83 (4.00)	NS	18.61 (2.19)**	16.16 (2.89)**	17.07 (3.30)**	NS	15.79 (3.76)*	17.78 (3.08)**	NS	NS
Coordination	9–45	39.14 (5.81)	36.07 (6.95)**	40.49 (5.62)*	35.39 (6.10)**	37.57 (6.57)*	31.45 (9.96)**	NS	NS	33.65 (6.30)**	NS
Confidence											
Prevention	0–20	10.21 (4.97)	7.86 (4.40)**	12.47 (5.03)**	3.88 (3.93)**	NS	12.89 (4.41)**	6.84 (5.02)**	12.47 (4.06)**	12.08 (5.22)**	NS
Intervention	0–140	85.28 (17.93)	64.64 (15.20)**	77.31 (19.82)**	51.22 (18.46)**	67.83 (16.39)**	67.59 (17.86)**	54.45 (23.73)**	77.46 (14.52)**	72.11 (24.56)**	70.80 (25.63)**
Surveillance	0–40	25.12 (8.98)	22.48 (7.67)*	29.25 (8.28)**	16.99 (9.13)**	NS	27.46 (7.62)*	18.68 (10.16)**	30.31 (5.88)**	28.82 (9.83)**	NS
Coordination	0–90	70.26 (16.29)	57.33 (13.72)**	63.69 (18.47)**	34.65 (20.50)**	58.08 (13.71)**	49.50 (17.85)**	50.81 (21.06)**	NS	63.61 (21.12)*	NS
Frequency											
Prevention	2–10	4.84 (2.21)	4.19 (1.61)*	6.08 (2.15)**	3.01 (1.21)**	NS	3.51 (1.81)**	3.52 (1.62)**	6.07 (1.92)**	5.94 (1.86)**	NS
Intervention	14–70	46.87 (11.61)	38.71 (8.77)**	NS	32.62 (9.81)**	37.78 (9.35)**	30.62 (9.82)**	34.21 (10.46)**	NS	41.31 (10.92)**	NS
Surveillance	4–20	10.80 (4.42)	10.18 (3.5)**	14.73 (3.96)**	8.78 (3.51)**	NS	10.75 (4.38)**	8.73 (3.70)**	15.02 (3.18)**	14.14 (3.53)**	13.9 (5.73)**
Coordination	9–45	29.55 (8.59)	26.38 (6.99)**	NS	18.22 (7.01)**	25.42 (8.29)**	NS	24.28 (8.19)**	33.15 (6.62)**	NS	36.73 (7.54)**

Note. All subscales: higher scores represent higher levels of responsibility perception, higher levels of confidence and higher frequency of care delivery; \**p* < 0.05; \*\**p* < 0.005

Australia for the majority of the subscales. South Korea had significantly lower ratings for six subscales (*p* < 0.05) and had either significantly higher (*p* < 0.005) or similar ratings for six subscales.

#### Comparisons between professional disciplines

For most of the responsibility perception, confidence and frequency subscales, there were significant differences amongst physicians, nurses and allied-health professionals (all *p* < 0.001) (Table 3). In terms of responsibility perception, the *post-hoc* tests indicate physicians and nurses had significantly higher ratings for the prevention and surveillance subscales than allied-health professionals (both *p* < 0.001). Nurses had significantly higher ratings for the intervention and coordination subscales than physicians (*p* < 0.001) and allied-health professionals (*p* < 0.05). Concerning confidence and frequency, compared to nurses and allied-health professionals, physicians also had significantly higher levels of confidence in delivering all survivorship care including prevention (*p* < 0.001), intervention (*p* < 0.001),

surveillance (*p* < 0.001) and coordination (*p* < 0.05) and had significantly higher frequency scores for prevention, surveillance and coordination (*p* < 0.001), but not statistically significant for intervention.

#### Comparisons between LMICs and HICs

There were significant differences in the ratings between those who worked in LMICs and HICs. Practitioners working in LMICs had higher levels of responsibility perception, confidence and frequencies of delivering survivorship care than those working in HICs (*p* < 0.001) (Table 4). These differences were consistently observed except for the responsibility perception of care coordination (*p* = 0.83).

#### Barriers that impede quality survivorship care

Participants identified a number of barriers that impede quality survivorship care (Table 5). These barriers were similar across the HICs and LMICs, with the most highly rated items for the total sample being lack of time, dedicated educational resources for patients and



**Table 3** Relationships between professional disciplines and perception of responsibility, levels of confidence, frequency of survivorship care practice using analysis of variance

		Number	M (SD)	Possible range	F(df)	P
Perception of responsibility						
Prevention	Physicians	245	7.48 (2.27)	2–10	19.09 (1497)	<0.001
	Nurses	1169	7.53 (2.08)			
	Allied-health	59	5.76 (2.78)			
Intervention	Physicians	245	52.21 (14.07)	14–70	65.48 (1470)	<0.001
	Nurses	1169	58.83 (8.83)			
	Allied-health	59	48.90 (12.37)			
Surveillance	Physicians	258	17.50 (3.10)	4–20	63.24 (1486)	<0.001
	Nurses	1180	16.47 (3.42)			
	Allied-health	59	11.85 (5.50)			
Coordination	Physicians	247	33.99 (10.24)	9–45	54.72 (1474)	<0.001
	Nurses	1171	38.09 (6.11)			
	Allied-health	59	31.42 (10.75)			
Confidence						
Prevention	Physicians	247	13.72 (4.70)	0–20	77.50 (1476)	<0.001
	Nurses	1173	9.31 (5.50)			
	Allied-health	59	6.98 (5.67)			
Intervention	Physicians	245	75.82 (17.59)	0–140	22.61 (1462)	<0.001
	Nurses	1162	67.97 (22.32)			
	Allied-health	58	54.50 (26.35)			
Surveillance	Physicians	248	31.72 (5.91)	0–40	100.31 (1468)	<0.001
	Nurses	1165	24.08 (9.74)			
	Allied-health	58	15.72 (10.73)			
Coordination	Physicians	243	60.40 (20.47)	0–90	12.12 (1461)	<0.001
	Nurses	1163	26.43 (20.94)			
	Allied-health	58	45.50 (24.22)			
Frequency						
Prevention	Physicians	244	5.44 (2.44)	2–10	23.95 (1468)	<0.001
	Nurses	1169	4.54 (2.14)			
	Allied-health	58	3.60 (2.01)			
Intervention	Physicians	243	41.10 (13.01)	14–70	9.18 (1452)	<0.001
	Nurses	1154	40.17 (12.05)			
	Allied-health	58	33.53 (12.30)			
Surveillance	Physicians	246	15.1 (2.93)	4–20	113.4 (1466)	<0.001
	Nurses	1166	11.19 (4.50)			
	Allied-health	57	8.70 (4.78)			
Coordination	Physicians	220	30.29 (8.26)	9–45	24.46 (1434)	<0.001
	Nurses	1161	26.48 (8.90)			
	Allied-health	56	22.29 (10.72)			

Note. All subscales: higher scores represent higher levels of responsibility perception, higher levels of confidence and higher frequency of care delivery

family members, and evidence-based practice guidelines informing survivorship care. Overall, lack of time and communication barriers between the practitioners and family members were rated to be the top barrier by the participating countries except for Australia and India which rated 'no end of treatment consultation' and 'don't know what survivorship care is' to be the top barrier, respectively.

## Discussion

To the best of our knowledge, this is the largest study that examined oncology practitioners' perspectives on survivorship practices in the Asia-Pacific region and is

the first international study that compared survivorship practices between LMICs and HICs. Although the intervention items examined in the questionnaire comprise the essential components of quality survivorship care, there were varying levels of agreement among oncology practitioners in terms of their responsibility for covering these components of care.

This study identified significant associations between perception of responsibility, confidence and frequency of care. The more the participants agreed the care should be part of their role, the more confident they were and the more frequently they delivered the care. These relationships were not confirmed by previous work with

**Table 4** Low- and middle- income countries vs. high income countries perceived responsibilities, levels of confidence, frequency of survivorship care practice

		Number	Total score M (SD)	Possible range	t (df)	P value
Perception of responsibility						
Prevention	HICs	719	7.85 (2.11)	2–10	−7.58 (1499)	<0.001
	LMICs	782	7.02 (2.14)			
Intervention	HICs	700	58.17 (9.14)	14–70	2.97 (1449)	.003
	LMICs	774	56.57 (11.49)			
Surveillance	HICs	707	15.74 (3.60)	4–20	−7.42 (1486)	<0.001
	LMICs	781	17.11 (3.50)			
Coordination	HICs	701	37.18 (6.49)	9–45	.21 (1452)	.830
	LMICs	777	37.09 (8.20)			
Confidence						
Prevention	HICs	701	7.27 (5.08)	0–20	−19.3 (1478)	<0.001
	LMICs	779	12.36 (5.05)			
Intervention	HICs	698	63.26 (22.81)	0–140	−9.24 (1401)	<0.001
	LMICs	768	73.72 (20.30)			
Surveillance	HICs	695	20.95 (9.51)	0–40	−16.25 (1411)	<0.001
	LMICs	777	28.69 (8.66)			
Coordination	HICs	695	51.89 (22.21)	0–90	−8.29 (1379)	<0.001
	LMICs	770	60.93 (19.19)			
Frequency						
Prevention	HICs	695	3.87 (1.82)	2–10	−13.61 (1444)	<0.001
	LMICs	777	5.34 (2.33)			
Intervention	HICs	684	37.48 (11.40)	14–70	−7.70 (1453)	<0.001
	LMICs	772	42.32 (12.62)			
Surveillance	HICs	692	9.76 (3.93)	4–20	−17.74 (1470)	<0.001
	LMICs	778	13.61 (4.40)			
Coordination	HICs	690	24.01 (8.81)	9–45	−12.11 (1436)	<0.001
	LMICs	748	29.55 (8.55)			

*Note.* All subscales: higher scores represent higher levels of responsibility perception, higher levels of confidence and higher frequency of care delivery; *HICs* high income countries; *LMICs* low- and middle-income countries

a smaller sample size [14]. The findings of the present study highlight the importance of having clearly defined roles and responsibilities within the multidisciplinary team in relation to survivorship care. Effective communication within the multidisciplinary team to ensure everyone is well aware of their roles is critical for ensuring patients' needs do not go undetected or unmanaged. These recommendations are consistent with previous qualitative findings with oncology nurses [7].

Using Australia as a benchmark, participants in Australia had higher ratings compared to Hong Kong, Japan, Thailand and Singapore; but not China, South Korea, Myanmar, India and The Philippines, with the latter countries demonstrating similar or higher ratings than Australia. Further qualitative research will be required to investigate the differences between these countries. Reasons for these discrepancies among the Asia-Pacific countries are likely multifactorial. The countries have different cancer control policies that may or may not have an emphasis on the post-treatment phase of care, and are at different stages of development

in terms of delivery of comprehensive cancer services. The differences are also likely to be due to differences in cancer workforce profiles. For example, although the Singaporean National Cancer Centre documented the importance of survivorship care as early as 2005 [11], the uptake of survivorship care provision among nurses has been slow due to workforce shortages. Such shortages lead to intense clinical workload and nurses' perception of not having sufficient time to deliver survivorship care even though they reported that they have the responsibility to do so.

Physicians, nurses and allied-health professionals differed in their perspectives of their role, confidence levels and frequency of survivorship care. This finding is consistent with other research reporting the differences in the patterns of follow-up practices between physicians and other practitioners such as nurses and allied-health professionals [12]. The physicians in our study consistently reported higher levels of confidence in the delivery of survivorship care than nurses and allied-health professionals.

**Table 5** Top five perceived factors that impedes quality survivorship care

	Australia	Hong Kong	China	Japan	South Korea	Thailand	Singapore	India	Myanmar	Philippines	HICs	LMICs
N=	138	100	317	208	100	200	147	103	110	52	693	782
Individual/Professional Level												
Don't know what survivorship care is				✓				✓				
Lack time	✓	✓	✓	✓	✓		✓	✓			1	1
Lack knowledge/ skills		✓		✓			✓				2	
Don't know where the patient is at in their disease trajectory				✓								
Communication barriers between you and the patient				✓		✓			✓	✓		
Communication barriers between you and the family members						✓			✓	✓		
Family members lack of interest	-	-	-	-	-	-	-	-	-	✓		-
Organisational Level												
Survivorship care is not a priority for my organisation			✓									
Lack an appropriate physical location (e.g. a quiet room)			✓		✓	✓		✓	✓			4
No end of treatment consultation dedicated to survivorship care in my organisation	✓		✓					✓	✓		5	2
Lack of evidence-based practice guidelines informing survivorship care	✓	✓	✓		✓		✓					3
Lack of dedicated educational resources for patients	✓	✓			✓	✓	✓	✓	✓	✓	4	5
Lack of dedicated educational resources for family members	✓	✓			✓	✓					3	

**Note.** ✓ - Top five factors that impedes quality survivorship care (only the items that received at least one top five rating were included); HICs high income countries; LMICs low- and middle- income countries

Professional development programs can be developed to enhance the knowledge and confidence of all oncology practitioners in their provision of survivorship care.

The differences between the ratings of those from LMICs and HICs, with the LMICs having higher ratings in perception of responsibility, confidence and frequencies of care were unexpected. No previous study has examined these outcomes. This finding may be explained by the specialization of oncology practitioners in HICs. That is, in many HICs, routine referral of patients to various specialists to care for specific issues faced by patients is common. For example, patients in HICs might be referred to a sexual health concern to a sex counsellor, whereas practitioners in the LMICs would normally assume the care responsibility without such resources available. A second possibility is that practitioners in the HICs could have higher care expectations for their healthcare systems and patients' standards of care, which could have contributed to a sense of diminished confidence. Further research will be required to gain an in-depth understanding of these differences.

In this study, we highlighted a number of barriers that prevent oncology practitioners from delivering quality survivorship care. It is important that future service planning addresses these barriers. Lack of time has been repeatedly reported in the literature as a barrier to implementation of quality survivorship care [4, 14]. Much advocacy work will be required to ensure health policies will be developed to not only raise the importance of cancer survivorship care, but also to ensure the cancer care workforce will be given adequate resources for providing quality survivorship care, especially in the ambulatory care setting. Given that the lack of educational patient resources available is a notable barrier, HICs have the responsibility to share resources with LMICs. Evidence-based, consumer informed resources for survivors who speak languages other than English, such as Mandarin, Cantonese, Vietnamese are already available in Australia [6]. These resources may be adapted to suit the cultural contexts for various countries in this region. A coordinated approach for building cancer survivorship capacity in this region should minimize duplicate efforts by involving oncology survivorship experts in the HICs. It would be opportunistic for



organisations such as the WHO to develop policies and strategic plans in collaboration with countries in this region.

### Limitations

This study has several limitations. First, this study used a convenience sampling method, which does not allow us to calculate response rates to support the representability of our findings. Therefore, we were unable to establish the characteristics of the oncology workforce in all participating sites and countries. Second, the majority of participants were nurses. Physicians and allied-health were under-represented in this sample. However, such proportions are commonly seen in other multidisciplinary surveys of the same nature [12]. Third, we were unable to compare data across care settings (i.e. tertiary referral hospitals, regional centres, university hospitals or professional organisations) where participants were recruited. The standards and criteria for each of these settings vary significantly across the participating countries. Despite these limitations, this study is the first to gain a comprehensive understanding of practice patterns and perspectives of oncology practitioners in this region. The findings from this study are critical for informing service planning and capacity building activities in the Asia-Pacific region.

### Conclusions

Different survivorship practices have been observed between HICs and LMICs, Australia and other countries and between the professional disciplines. Future service planning and research efforts should take these findings into account and overcome barriers identified in this study.

### Additional file

**Additional file 1:** Survivorship care items included in the questionnaire. (DOC 44 kb)

### Abbreviations

HICs: High-Income Countries; IOM: Institute of Medicine; LMIC: Low- and Mid- Income Countries; WHO: World Health Organization

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### Availability of data and materials

All data generated or analyzed during this study are included in this published article and its additional files. The data analyzed during the study are available from the corresponding author on reasonable request in a de-identified form.

### Authors' contributions

All authors assisted with the design of the questionnaires and were responsible for patient recruitment and data collection at participating sites. RC, PY and AM wrote the first draft; and the other authors made critical revisions to the manuscript. RC and AM conducted the statistical analysis. All members approved the final manuscript.

### Ethics approval and consent to participate

The STEP study was approved by Royal Brisbane and Women's Hospital Human Research Ethics Committee (No. HREC/15/QRBW/355) (Australia), Queensland University Technology Human Research Ethics Committee (No. 150000941) (Australia), Wuxi People's Hospital Research Ethics Committee (China) (No. N/A), Christian Medical College Institutional Review Board (No. 10142) (India), Research and University of Medicine 1 Yangon Research and Ethics Committee (No. 4251) (Myanmar), Mahidol University Institutional Review Board (No. NS2015/312.1510) (Thailand), Keio University Institutional Review Board (No. 20150219/239) (Japan), Siriraj Institutional Review Board (NO. Si671/2016) (Thailand), Seoul National University Institutional Review Board (No. 1507/001-016) (South Korea), National University of Singapore Institutional Review Board (Singapore), Bicol Medical Centre Ethics Committee (Philippines), Kowloon West Cluster Research Ethics Committee (No. KW/EX-15-147, 90-06) (Hong Kong), New Territory West Cluster Clinical and Research Ethics Committee (No. NTWC/CREC/15061) (Hong Kong), and National University of Singapore Institutional Review Board (No. B-15-215E) (Singapore). Approvals from local institutional ethics committees and other regional or national regulatory bodies were obtained prior to the initiation of the study in any site. Written informed consent, complying with local, regional and national requirements, was obtained from all participants prior to entry into the study.

### Consent for publication

Not applicable

### Competing interests

The authors declared that they have no competing interests.

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