

Original Article

Physical Symptoms, Unmet Needs, and Quality of Life in Thai Cancer Survivors after the Completion of Primary Treatment

Kanaungnit Pongthavornkamol¹, Pichitra Lekdamrongkul¹, Pimchan Pinsuntorn², Alex Molassiotis³

¹Department of Medical Nursing, Faculty of Nursing, Mahidol University, Bangkok, ²Nursing Department, Lopburi Cancer Hospital, Lopburi, Thailand, ³School of Nursing, The Hong Kong Polytechnic University, Kowloon, Hong Kong



Corresponding author: Kanaungnit Pongthavornkamol, PhD

Department of Medical Nursing, Faculty of Nursing, Mahidol University, Bangkok, Thailand

Tel: 662-419-7466-80 Ext 1955; Fax: 662-412-8415

E-mail: kanaungnit.pon@mahidol.ac.th

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ABSTRACT

Objectives: This study investigated physical symptoms, unmet supportive care needs, and quality of life (QoL) perception among different types of Thai cancer survivors who had completed first-line treatment. **Methods:** A cross-sectional study recruited breast, gynecological, colorectal, lung, and head and neck cancer survivors ($n = 236$) who were attending follow-up visits at a regional cancer hospital in central Thailand. Data were collected by the Physical Symptom Concerns Survey, the Cancer Survivors' Unmet Needs Scale, and a single item measuring global QoL. Descriptive statistics, one-way analysis of variance (ANOVA), and Welch's ANOVA were used for data analysis. **Results:** Cancer survivors generally perceived good QoL, with significantly low QoL for lung cancer survivors ($P < 0.001$). There were no differences in symptom experiences among the five cancer groups, except for pain, which was significantly higher in lung cancer survivors than in the other four groups.

The most frequently reported symptoms across all groups were numbness in the hands/feet, sleep disturbances, fatigue, and pain. The top unmet supportive care need among all participants was related to concerns of cancer recurrence (44.5%). Head and neck cancer survivors reported the highest number of unmet needs among the five cancer groups. **Conclusions:** This study mapped the unmet supportive care needs in Thai cancer patients and showed that patients with head and neck cancer and lung cancer were strongly affected. A survivorship care plan focusing on managing physical symptoms and providing supportive and psychosocial care should be developed to meet the needs of each cancer survivor group and to enhance QoL after the completion of treatment.

Key words: Cancer survivor, physical symptoms, quality of life, Thai, unmet needs

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Introduction

Ongoing advances in medical technology for cancer diagnosis and treatment have resulted in greater numbers of cancer survivors worldwide, including Thailand.^[1] A cancer survivor refers to a person who has survived after cancer diagnosis and who has been able to maintain life balance up to the present time regardless of the remaining length of his/her life.^[2] These cancer survivors are a group of patients who should receive greater attention from health-care systems and health-care teams, especially after the completion of primary cancer treatment from the hospital, when patients continue to suffer from pain/discomfort caused by long-term side effects/late effects of treatments such as chemotherapy, radiotherapy, surgery, or mixed treatment methods.

In addition to changes in their physical condition, cancer survivors often have psychological problems, loneliness, anxiety, and depression, all of which are emotional reactions after a cancer diagnosis and after experience with the side effects of treatment.^[3,4] Previous studies conducted among breast cancer survivors have found that patients may suffer from physical, psychological, emotional, and social discomforts, with impacts on their daily lives resulting in reduced quality of life (QoL).^[5,6] The aforementioned studies are consistent with studies conducted among breast cancer survivors in Thailand, which found that physical and psychological discomforts were negatively correlated and negatively impacted QoL.^[7] Such findings indicate that cancer survivors continue to suffer from discomfort caused by the disease and treatment, with potential effects on QoL, even though treatment itself is complete.

After the completion of hospital-based cancer treatment, when patients return home, many cancer survivors report a need for support related to their illness in various aspects, such as information/knowledge on cancer and health practice behaviors when leaving the hospital, strategies for managing an altered body image, and physical and psychological symptoms.^[8] Nevertheless, cancer survivors who completed treatment in previous studies reported unmet supportive care needs from health-care personnel.^[9] For example, patients receive little information to meet their needs,^[10] resulting in psychological and emotional stressors, such as anxiety and depression.^[11] Conversely, patients who receive sufficient information may promote self-care behaviors, leading to improved QoL.^[12]

While cancer survivorship care has received increasing attention internationally,^[13] in Thailand, less attention has been paid to supportive care needs, physical symptoms, and the QoL of cancer survivors. Thus, this paper considers survivors after the end of their first line of treatment. Due to differences in the nature of the disease and the complexity

of treatment of each cancer type, supportive care needs, physical symptoms, and QoL may differ among patients with different types of cancer after the end of the primary treatment. The aim of this study was to evaluate physical symptoms, unmet supportive care needs, and QoL among five groups of cancer survivors, including breast, colorectal, gynecological, head and neck, and lung cancer survivors, after the completion of treatment.

Methods

Study design and participants

A cross-sectional survey was conducted among five different types of cancer survivors after the completion of primary treatment as a secondary analysis of the Thai dataset, with new, additional data incorporated, which was part of a larger international collaborative study of cancer survivors in nine high- and low-income countries in Asia.^[14] The sample comprised adult cancer survivors who had completed treatment and who came for a follow-up visit at the outpatient department of a cancer hospital in the central region of Thailand between January and September 2016. Eligible participants met the following inclusion criteria: (1) those at least 18-year-old; (2) those aware of a cancer diagnosis; (3) those with cancer diagnosed previously and had already completed primary treatment with a current disease-free status; (4) those not in the terminal phase of cancer; and (5) those able to speak, read, and write in Thai. Patients were excluded if they had cognitive impairment or cancer recurrence. The sample size was calculated using the G*power version 3.1.9.4.^[15] One-way analysis of variance (ANOVA) was chosen for testing. The effect size was set at $f = 0.25$,^[16] with a test power of 0.85 and a significance level (α) of 0.05, and for the five groups in the study, a sample size of 220 subjects was required. This number was increased by 10% to prevent data attrition, thereby bringing the total number of 242 participants; 6 patients subsequently refused to participate or dropped out, leaving a total of 236 cancer survivors participating in this study.

Instruments

Participant characteristics

Participants' background and clinical characteristics (age, sex, number of years diagnosed with cancer, type of cancer, type of treatments received, and current treatment status) were collected using a demographic sheet.

Physical symptom concerns

The physical effect subscale of the Cancer Survivor Survey of Needs was used to assess the concerns regarding 19 physical symptoms experienced by cancer survivors on

the day of completing the questionnaire on a numerical rating scale (with six levels, ranging from 0 = no concern to 5 = extreme concern).^[17] The tool has demonstrated good validity and reliability, with a Cronbach's alpha coefficient of 0.96.^[17] In the current study, the Cronbach's alpha coefficient was 0.80.

Unmet supportive care needs

The Cancer Survivors' Unmet Need Measure (CaSUN) was used to assess unmet needs and the strength of unmet needs of cancer survivors.^[18] This measure comprises 35 questions on unmet needs divided into the following six areas: existential survivorship or psychosocial care (14 items); comprehensive cancer care (6 items); information (3 items); QoL (2 items); relationships (3 items); and other areas (4 items).

For each item, the cancer survivors replied whether needs were unmet using a five-level numerical rating scale (0 = no need or not applicable; 1 = have a need, but the need is being met; 2 = weak unmet needs; 3 = moderate unmet needs; and 4 = strong unmet needs). The CaSUN questionnaire is well validated and has a Cronbach's alpha coefficient of 0.96.^[19] In the current study, the Cronbach's alpha coefficient was 0.95.

QoL perception

A single-item measure of global QoL scale was used to assess overall QoL perception in the past week. It is a 10-point numerical rating scale (ranging from 0 = worst QoL to 10 = best QoL). This QoL measurement scale is accepted for its validity and reliability in assessing overall QoL among patients with chronic diseases, including cancer patients. In addition, it is suggested as a promising tool that can be easily incorporated into routine clinical practice to assess a patient's QoL.^[19]

All of the above-mentioned questionnaires were translated into Thai by the research team using the standardized protocol of the World Health Organization,^[20] including the forward and backward translation to establish linguistic equivalence and to confirm the accuracy of the meaning in the translated instrument. Finally, the translated tool was pretested with 10 cancer survivors to assess face validity. Minor changes in some items were made for language suitability before using the tools on the Thai cancer survivors in this study.

Ethical approval

The study was approved by the Institutional Review Board, Faculty of Nursing, Mahidol University, and Lopburi Cancer Hospital (COA No. IRB-NS 2015/312.1510). The cancer survivors were informed about the research purpose, risk, and benefits and were assured that they were able to refuse or withdraw at any time in the study. Written

informed consent was obtained from each participant before starting data collection.

Data collection

After receiving approval from the Institutional Review Board and receiving permission for data collection, the researcher recruited participants meeting the eligibility criteria by coordinating with staff nurses to publicize the study and assess initial interest. If patients undergoing follow-up treatment at Lopburi Cancer Hospital were interested in participation, the nurse researcher approached them, explained the objectives, risk, and benefits of the study and obtained written informed consent. The participants completed the questionnaires individually while waiting to meet the doctor in their oncology follow-up visit at the clinic in the hospital's outpatient department. In cases where the subject had poor eyesight, the researcher read the questionnaires to them and filled in their responses to each question. The total time for data collection took approximately 30–40 min/participant.

Statistical analysis

All data were analyzed using SPSS version 18.0 (SPSS Inc., Chicago, USA). Descriptive statistics, including the mean, standard deviation (SD), range, and frequency of personal data, were determined. Differences in symptom concerns, unmet needs, and QoL in participants with different types of cancer were compared using one-way ANOVA and Welch's ANOVA.

Results

Participant characteristics

The mean age of the participants was 57.08 years (SD = 10.31; range 33–82 years). More than 50% of participants were between 46 and 60 years old. The majority of participants (73.3%) were female. The mean length of survival of all cancer survivors was 3.41 years (SD = 2.5; range 1–16 years). The largest proportion of cancer survivors participating in the current study had breast cancer (38.1%), followed by colorectal cancer (21.2%). The participants' demographic and clinical characteristics are presented in Table 1.

Physical symptom concerns in cancer survivors after the completion of treatment

The majority of cancer survivors who had completed treatment had no physical symptoms during the week preceding data collection (51.7%–99%). The four most frequently reported symptoms presented in the past week (determined by the mean severity scores of 1 and above) were sleep disturbances (47.1%; mean = 1.28, SD = 1.66),

Table 1: Participants' background and clinical characteristics (n=236)

Characteristics	Total, n (%)	Breast, n (%)	Colorectal, n (%)	Lung, n (%)	Reproductive, n (%)	Head and neck
No./Type of cancer survivors ¹	236	90 (38.1)	50 (21.2)	20 (8.5)	50 (21.2)	26 (11.0)
Age (years)						
30-45	33 (14.0)	20 (22.2)	2 (4.0)	1 (5.0)	8 (16.0)	2 (7.7)
46-60	125 (53.0)	51 (56.7)	22 (44.0)	10 (50.0)	28 (56.0)	14 (53.8)
61-75	63 (26.7)	17 (18.9)	21 (42.0)	7 (35.0)	10 (20.0)	8 (30.8)
Older than 75	15 (6.4)	2 (2.2)	5 (10.0)	2 (10.0)	4 (8.0)	2 (7.7)
Mean±SD	57.1±10.3	54.1±9.8	61.8±9.2	55.9±10.6	58.0±10.4	60.5±10.1
Gender						
Male	63 (26.7)	0 (0.0)	29 (58.0)	13 (65.0)	0 (0.0)	21 (80.8)
Female	173 (73.3)	90 (100.0)	21 (42.0)	7 (35.0)	50 (100.0)	5 (19.2)
Length of survival (years)						
Not > 1	43 (18.2)	18 (20.0)	6 (12.0)	4 (20.0)	6 (12.0)	9 (34.6)
1-5	153 (64.8)	56 (62.2)	34 (68.0)	14 (70.0)	34 (68.0)	15 (57.7)
>5	40 (16.9)	16 (17.8)	10 (20.0)	2 (10.0)	10 (20.0)	2 (7.7)
Mean±SD	3.4±2.5	3.5±2.5	3.5±2.3	4.0±3.0	2.3±1.6	2.8±1.8
Treatment (> 1 answer possible)						
Chemotherapy	215 (91.1)	85 (94.4)	47 (94.0)	19 (95.0)	45 (90.0)	19 (73.1)
Surgery	158 (66.9)	87 (96.7)	48 (96.0)	4 (20.0)	11 (22.0)	8 (30.8)
Radiotherapy	144 (61.0)	144 (61.0)	50 (55.6)	18 (36.0)	44 (88.0)	26 (100.0)
Hormone therapy	55 (23.3)	54 (60.0)	0 (0.0)	0 (0.0)	1 (2.0)	55 (23.3)
Number of treatment						
1	30 (12.7)	4 (4.4)	5 (10.0)	13 (65.0)	5 (10.0)	3 (11.5)
2	108 (45.8)	17 (18.9)	27 (54.0)	5 (25.0)	40 (80.0)	19 (73.1)
3	66 (28.0)	38 (42.2)	18 (36.0)	2 (10.0)	4 (8.0)	4 (15.4)
4	32 (13.6)	31 (34.4)	0 (0.0)	0 (0.0)	1 (2.0)	0 (0.0)
Mean±SD	2.4±0.9	3.1±0.8	2.3±0.6	1.5±0.7	2.0±0.5	2.0±0.5

SD: Standard deviation

peripheral neuropathy (48.3%; mean = 1.18, SD = 1.49), pain (37.3%; mean = 1.03, SD = 1.53), and fatigue (43.2%; mean = 1.02, SD = 1.41). All 19 physical symptom concerns (mean = 0.61, SD = 0.55) are presented in Table 2.

Comparison between common physical symptoms, unmet supportive care needs, and quality of life (classified by the type of cancer)

When divided by the type of cancer and all four common physical symptom concerns (pain, fatigue, sleep disturbances, and numbness in the hands/feet), lung cancer survivors reported significantly more pain than other cancer survivor groups. Furthermore, gynecological cancer survivors reported significantly more pain than colorectal cancer survivors. With regard to fatigue, sleep disturbances, and numbness in the hands/feet, no significant differences were found among the different types of cancer survivors. Nevertheless, all three of the above-mentioned symptoms were more severe among the lung cancer and gynecological cancer groups.

Regarding unmet supportive care needs, 80.1% of all survivors reported at least one unmet need, and those with at least one unmet need reported, on average, 6.53 needs. However, the overall unmet needs scores across all five cancer survivor groups were considered low (mean = 22.45, SD = 26.70, score range 0–112), with the subscale scores

of existential survivorship (mean = 7.41, SD = 11.04), comprehensive cancer care (mean = 7.09, SD = 7.11), information (mean = 2.88, SD = 4.04), QoL (mean = 1.32, SD = 2.40), and relationships (mean = 0.51, SD = 1.62). The highest score of an unmet need reported by all cancer survivors was the concern of the cancer returning (44.5%). The top 10 unmet supportive care needs (moderate-to-strong needs) are presented in Table 3. When the unmet needs in all five subscales were compared between each type of cancer survivor group, head and neck cancer survivors were found to have the highest unmet needs (mean 10.96, SD = 10.39), followed by gynecological (mean 8.28, SD = 8.29), breast (mean 6.81, SD = 7.56), lung (mean 4.20, SD = 5.55), and colorectal (mean 2.88, SD = 4.04) cancer survivors (in descending order). Furthermore, the cancer survivor groups of head and neck, gynecological, and breast cancers had more unmet needs than those of colorectal cancer, reaching statistical significance [Table 4].

The participants were found to have good QoL (mean = 8.53, SD = 1.65). When QoL was compared between each group, breast, colorectal, and gynecological cancer survivors reported significantly better QoL than lung cancer and head and neck cancer survivors ($P < 0.001$). Furthermore, the colorectal cancer and gynecological cancer groups reported significantly better QoL than the head and neck cancer group ($P < 0.001$). A comparison

Table 2: Physical symptom concerns in the past week of cancer survivors (n=236)

Symptom concerns in the past week	Mean ±SD	Percentage some concerns (score 1-2)	Percentage extreme concerns (score 3-5)	Percentage total
1. Tingling or numbness in hands/feet (neuropathy)	1.18 ² (1.49)	66 (28.0)	48 (20.3)	48.3
2. Sleep disturbances	1.28 ¹ (1.66) ^a	49 (20.8)	62 (26.3)	47.1
3. Fatigue	1.02 ⁴ (1.41)	61 (25.8)	41 (17.4)	43.2
4. Pain	1.03 ³ (1.58)	39 (16.5)	49 (20.8)	37.3
5. Memory and concentration	0.85 (1.38)	48 (20.3)	37 (15.7)	36.0
6. Balance/walking/mobility	0.65 (1.19)	47 (19.9)	25 (10.6)	30.5
7. Dental and mouth problem	0.74 (1.38)	38 (16.1)	33 (14.0)	30.1
8. Poor appetite	0.61 (1.11)	41 (17.4)	27 (11.4)	28.8
9. Osteoporosis/bone health	0.66 (1.21)	44 (18.6)	24 (10.2)	28.8
10. Hot flashes	0.63 (1.28)	28 (11.9)	29 (12.3)	24.2
11. Loss of strength	0.52 (1.09)	33 (14.0)	23 (9.7)	23.7
12. Weight changes	0.55 (1.21)	32 (13.6)	22 (9.3)	22.9
13. Hair or skin care issues	0.46 (1.15)	29 (12.3)	17 (7.2)	19.5
14. Body changes	0.41 (1.06)	20 (8.5)	19 (8.1)	16.6
15. Swelling in legs or arms (lymphedema)	0.35 (0.96)	27 (11.4)	27 (11.4)	16.1
16. Nausea/vomiting	0.23 (0.71)	23 (9.7)	7 (3.0)	12.7
17. Trouble swallowing	0.29 (0.90)	16 (6.8)	13 (5.5)	12.3
18. Sexual issues	0.06 (0.46)	4 (1.7)	2 (0.8)	2.5
19. Fertility issues	0.00 (0.07)	1 (0.4)	0 (0.0)	0.4

SD: Standard deviation. Numbers in superscript indicate the ranking of the mean symptom severity score for the top four symptoms

Table 3: Top ten (moderate-to-strong) unmet needs across all types of cancer survivors

Rank	Unmet need	Percentage	Domain
1	Concern about the cancer coming back	44.5	Existential survivorship
2	Need for best medical care	43.6	Comprehensive cancer care
3	Need for local health-care services when necessary	39.8	Comprehensive cancer care
4	Need for accessible hospital parking	34.3	Comprehensive cancer care
5	Need for understandable information	28.4	Information
6	Need for up-to-date information	27.9	Information
7	Need for doctors to talk to each other	25.8	Comprehensive cancer care
8	Need to talk to others who have experienced cancer	25.0	Existential survivorship
9	Need for managing health with the team	24.5	Comprehensive cancer care
10	Need for relevant information for the family and/or partner	21.2	Information

of frequently reported physical symptom concerns, unmet needs, and QoL among the five cancer survivor groups is presented in Table 4. Relationships between unmet needs, symptom concerns, and QoL among different cancer survivor groups are presented in Table 5.

Discussion

All five cancer survivor groups perceived to have high QoL after the completion of treatment (mean = 8.53, SD = 1.65), which was higher than the QoL reported among Australian cancer survivors after the completion of treatment using the same instrument (mean = 7.80, SD = 2.00).^[14] Gynecological cancer survivors were found to have the highest mean QoL score, while lung cancer survivors had the lowest QoL score. This finding can be explained by lung cancer survivors having to cope with intense side effects and symptoms after treatment, including fatigue, sleep disturbances, and numbness in the hands/feet,

as well as a poor prognosis. Pain, in particular, was more severe among lung cancer survivors than among other cancer survivors in this study. Suffering caused by pain may have triggered more severe fatigue and sleep disturbances among lung cancer^[21] and mixed cancer^[22] survivors, with influences on QoL. Furthermore, the pain was found to be significantly correlated with low QoL among colorectal cancer survivors in this study ($r = -0.46, P < 0.01$). Pain in cancer survivors may be caused by comorbidities and various cancer treatments, particularly chemotherapy (which may lead to peripheral neuropathy pain), radiation therapy (which may cause long-term side effects related to treatment), and surgery, which may cause postoperative pain.^[23] The current study's finding is consistent with a previous study revealing pain in colorectal cancer survivors that resulted in diminished QoL.^[24]

Head and neck cancer survivors are another group of individuals with significantly lower QoL than

Table 4: Comparison of frequently reported symptoms, unmet needs, and quality of life among participants by different types of cancer

Study variable	Cancer survivor group	n	Mean ±SD	Minimum, maximum	F or Welch's
Pain ^a	1. Breast cancer	90	0.94 ± 1.44	0, 5	3.98; P=0.006 3 > every group 4 > 2
	2. Colorectal cancer	50	0.60 ± 1.21	0, 5	
	3. Lung cancer	20	2.30 ± 2.03	0, 5	
	4. Gynecological cancer	50	1.30 ± 1.81	0, 5	
	5. Head and neck cancer	26	0.62 ± 1.30	0, 5	
	Total	236	1.03 ± 1.58	0, 5	
Fatigue ^a	1. Breast cancer	90	0.80 ± 1.27	0, 5	2.10; P=0.089
	2. Colorectal cancer	50	0.78 ± 1.17	0, 4	
	3. Lung cancer	20	1.30 ± 1.22	0, 3	
	4. Gynecological cancer	50	1.36 ± 1.66	0, 5	
	5. Head and neck cancer	26	1.38 ± 1.75	0, 5	
	Total	236	1.02 ± 1.41	0, 5	
Sleep disturbances ^b	1. Breast cancer	90	1.19 ± 1.64	0, 5	2.07; P=0.086
	2. Colorectal cancer	50	0.92 ± 1.41	0, 5	
	3. Lung cancer	20	1.60 ± 1.67	0, 5	
	4. Gynecological cancer	50	1.78 ± 1.89	0, 5	
	5. Head and neck cancer	26	1.12 ± 1.61	0, 5	
	Total	236	1.28 ± 1.66	0, 5	
Numbness in hands/feet ^b	1. Breast cancer	90	1.06 ± 1.41	0, 5	1.09; P=0.361
	2. Colorectal cancer	50	1.00 ± 1.46	0, 5	
	3. Lung cancer	20	1.50 ± 1.39	0, 4	
	4. Gynecological cancer	50	1.48 ± 1.61	0, 5	
	5. Head and neck cancer	26	1.12 ± 1.63	0, 5	
	Total	236	1.18 ± 1.49	0, 5	
Unmet needs ^a	1. Breast cancer	90	0.58 ± 0.63	0, 2.54	9.80; P<0.001 2 < 1, 4, 5
	2. Colorectal cancer	50	0.23 ± 0.33	0, 1.54	
	3. Lung cancer	20	0.34 ± 0.49	0, 2.12	
	4. Reproductive cancer	50	0.70 ± 0.68	0, 2.61	
	5. Head and neck cancer	26	0.94 ± 0.96	0, 2.73	
	Total	236	0.55 ± 0.65	0, 2.73	
QoL ^b	1. Breast cancer	90	8.58 ± 1.72	3, 10	5.52; P<0.001 3 < 1, 2 and 4 > 52 and 4
	2. Colorectal cancer	50	8.84 ± 1.30	6, 10	
	3. Lung cancer	20	7.25 ± 1.80	5, 10	
	4. Gynecological cancer	50	8.94 ± 1.45	5, 10	
	5. Head and neck cancer	26	7.92 ± 1.72	5, 10	
	Total	236	8.53 ± 1.65	3, 10	

^aCompared using Welch's ANOVA due to unequal variation (heterogeneity of variance). ^bCompared using one-way ANOVA. QoL: Quality of life, ANOVA: Analysis of variance, SD: Standard deviation

Table 5: Relationships between unmet supportive care needs, symptom concerns, and quality of life among different cancer survivor groups (n=236)

Measure	Cancer type				
	1	2	3	4	5
	Breast QoL (n=90)	Colorectal QoL (n=50)	Lung QoL (n=20)	Reproductive QoL (n=50)	Head and neck QoL (n=26)
1. Unmet supportive care needs	-0.25*	-0.02	-0.05	-0.12	-0.29
2. Pain	-0.08	-0.46**	-0.40	-0.23	-0.22
3. Fatigue	-0.2**	-0.40**	-0.54*	-0.26	-0.16
4. Sleep disturbances	-0.20	-0.17	-0.49*	-0.16	-0.45*
5. Numbness in hands/feet	-0.04	-0.40**	-0.35	-0.11	-0.17

Spearman's rank correlation. *P<0.05, **P<0.01

gynecological and colorectal cancer survivors. This study also found that sleep disturbances had a significant correlation with low QoL among participants in this group, possibly because head and neck cancer patients

receive multimodality treatments with potential for both early complications and late side effects, such as dry mouth, sticky saliva, problems with mouth opening, sleep disturbances, and shoulder disability,^[25] causing head and

neck cancer survivors to have lower QoL than cancer patients treated by surgery only.^[25]

Overall, symptom concerns in the past week reported by all cancer survivors in this study were at a low level. However, the four most severe symptoms reported by more than one-third of all cancer survivors (37.3%–48.3%) were pain, fatigue, sleep disturbances, and peripheral numbness in the hands/feet. When comparing these symptoms between different groups of cancer survivors, we found that pain was significantly worse in lung cancer survivors than in the other groups, possibly because most of the lung cancer survivors experienced several symptoms and were diagnosed when the cancer was already at an advanced stage. These findings are consistent with those of a previous study by Yang *et al.*^[26] who found that over 50% of lung cancer survivors reported suffering from pain.

Furthermore, fatigue was one of the symptoms frequently reported in this study that was significantly correlated with low QoL in lung, breast, and colorectal cancer survivors, corroborating previous studies' findings among lung cancer survivors^[26] and breast cancer survivors.^[27] In addition, numbness in the hands/feet (neuropathy) was another symptom found to be significantly correlated with low QoL among colorectal cancer survivors, possibly because these individuals were treated with oxaliplatin or taxanes, thereby causing peripheral numbness from chemotherapy. Similarly, Beijers *et al.* assessed QoL 6 months after the completion of chemotherapy treatments among patients who received oxaliplatin or taxanes and found that chemotherapy had side effects causing peripheral neuropathy and poor QoL among cancer survivors in general.^[28] Although all cancer survivors in this study generally reported low symptom distress, almost one-fifth to one-fourth (17.4%–26.3%) of them experienced high symptom distress (score 3–5) of the four most common symptoms, namely, fatigue, pain, numbness in the hands/feet, and sleep disturbances, consistent with previous literature.^[29] These symptoms, therefore, are a priority that needs to be the focus of supportive care intervention to help patients in this particular group who are at risk of having poor QoL.

In the current study, the majority of all cancer survivors (80.1%) reported at least one unmet need in the past month, with an average of 5–6 unmet needs at a moderate-to-strong level. The top unmet need was related to concerns about cancer recurrence. The top 10 supportive care needs reported by 21.2%–44.5% of all survivors were related to existential survivorship, comprehensive cancer care, and information domains [Table 3], similar to other studies using the same instrument.^[14,30] These findings confirm a service gap of cancer survivorship care that requires further attention from health-care professionals and health-care

systems. Among the five cancer groups analyzed in this study, the participants that reported the highest unmet needs were head and neck cancer survivors. This finding can be explained by the patients having to cope with suffering and discomfort from the early and late side effects of treatment, including after completion, with direct impacts on their usual lives and well-being, including fatigue, appetite loss, cough, dry mouth, dental problems, and problems with mouth opening, all of which affect QoL among cancer survivors in general.^[25] This finding also reflects head and neck cancer survivors' tendency to need more supportive care from doctors and nurses related to adjustment to their daily lives compared to other cancer survivors to enhance their QoL.

In this study, unmet needs in the breast cancer group were significantly correlated with low QoL, possibly because most breast cancer survivors were treated by surgery combined with chemotherapy and/or radiotherapy, causing physical and psychological symptoms after treatment. In addition, breast cancer survivors had changes in their body image after surgery, causing many of them to require care in diverse issues to manage physical and psychological problems. When needs are not met, breast cancer survivors may have low QoL. A previous study of unmet needs and QoL among young breast cancer survivors revealed that significant unmet information needs are correlated with low QoL.^[31]

Limitations and implications

To the best of our knowledge, this is the very first report on symptom burden, unmet supportive care needs, and QoL evaluated together in Thai cancer survivors after the completion of primary treatment. The information obtained from this study would be beneficial to help improve cancer supportive care in Thai cancer survivors. However, a number of methodological limitations are acknowledged. First, the study was conducted only among cancer survivors from a single cancer hospital. Second, by including study participants of different types of cancer with unequal numbers and a relatively small number of patients in each group, differences in treatment plans and stages of survivorship may have affected the study's results and their interpretations.

Despite these limitations, the findings of this study have important implications for clinical practice and further research. In clinical practice, oncology practitioners can be advised that although the majority of cancer survivors after the completion of treatment generally have good QoL, low symptom distress, and low supportive care needs, many of them have high needs in certain areas and high distress from common symptoms (fatigue, pain, sleep disturbances, and numbness in the hands/feet). Oncology practitioners should

be aware of these symptoms and specific unmet supportive care needs. These findings can be useful to guide discussion for patient consultation, and importantly, a survivorship care plan tailored to their specific unmet needs and focused on their physical and psychosocial care following cancer treatment must be designed to help cancer survivors. From a research perspectives, longitudinal studies across different periods of cancer survivorship posttreatment are required to map the trajectory of symptom concerns, unmet supportive care needs, and QoL. Importantly, future research might include a qualitative study to obtain in-depth information regarding Thai cancer survivors' perceptions and experiences of survivorship in different cancer groups posttreatment.

Conclusion

This study adds support to the findings of research revealing the presence of frequently reported symptoms (e.g., fatigue, pain, sleep disturbances, and numbness in the hands/feet) and their influence on diminishing QoL among different types of cancer survivors after the completion of first-line treatment. Similarly, a fear of cancer recurrence was the most reported unmet need, further supporting previous literature. These findings can be used to further develop an individual survivorship care plan targeted toward different cancer survivor groups focusing on managing major physical symptoms and providing supportive and psychosocial care tailored to the needs of specific cancer survivor groups, to enhance their QoL after the completion of treatment.

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Conflicts of interest

There are no conflicts of interest.

References

- World Health Organization. World Cancer Report. Geneva: World Health Organization; 2014. Available from: https://www.who.int/cancer/publications/WRC_2014/en/. [Last accessed on 2017 Dec 26].
- History of NCCS, The National Coalition for Cancer Survivorship. Silver Spring (MD): National Coalition for Cancer Survivorship; 1986. Available from: <https://www.canceradvocacy.org/about-us/our-history/>. [Last accessed on 2018 Jul 02].
- Lebel S, Rosberger Z, Edgar L, Devins GM. Emotional distress impacts fear of the future among breast cancer survivors not the reverse. *J Cancer Surviv* 2009;3:117-27.
- Rosedale M. Survivor loneliness of women following breast cancer. *Oncol Nurs Forum* 2009;36:175-83.
- Dirksen SR, Belyea MJ, Epstein DR. Fatigue-based subgroups of breast cancer survivors with insomnia. *Cancer Nurs* 2009;32:404-11.
- Porter LS, Clayton MF, Belyea M, Mishel M, Gil KM, Germino BB. Predicting negative mood state and personal growth in African American and white long-term breast cancer survivors. *Ann Behav Med* 2006;31:195-204.
- Sivarux C, Pongthavornkamol K, Wattanakitkrileart D, Tanticharoensin S. Factors predicting quality of life for breast cancer survivors at 1 year post-treatment, and thereafter. *Thai Cancer J* 2012;32:2-14.
- Siu M, Catton P, Jones J, Jadad AR. A pilot study examining the unmet needs of cancer survivors living with polypathology. *Curr Oncol* 2013;20:e266-9.
- Edib Z, Kumarasamy V, Binti Abdullah N, Rizal AM, Al-Dubai SA. Most prevalent unmet supportive care needs and quality of life of breast cancer patients in a tertiary hospital in Malaysia. *Health Qual Life Outcomes* 2016;14:26.
- Lekdamrongkul P, Pongthavornkamol K, Chompoobubpa T, Siritanaratkul N. Relationships among information needs, information received, self-care behaviors and quality of life in hematologic cancer patients receiving chemotherapy. *J Nurs Sci* 2012;30:64-73.
- Faller H, Koch U, Brähler E, Härter M, Keller M, Schulz H, *et al.* Satisfaction with information and unmet information needs in men and women with cancer. *J Cancer Surviv* 2016;10:62-70.
- Husson O, Mols F, van de Poll-Franse LV. The relation between information provision and health-related quality of life, anxiety and depression among cancer survivors: A systematic review. *Ann Oncol* 2011;22:761-72.
- Committee on Cancer Survivorship: Improving Care and Quality of Life National Cancer Policy Board, Institute of Medicine and National Research Council. From Cancer Patient to Cancer Survivor: Lost in Transition. Washington: National Academies Press; 2005.
- Molassiotis A, Yates P, Li Q, So WK, Pongthavornkamol K, Pittayapan P, *et al.* Mapping unmet supportive care needs, quality-of-life perceptions and current symptoms in cancer survivors across the Asia-Pacific region: Results from the international STEP study. *Ann Oncol* 2017;28:2552-8.
- Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behav Res Methods* 2009;41:1149-60.
- Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, New Jersey: Lawrence Erlbaum Associates; 1988.
- Filsinger S, Burkhalter R, Campbell S. Survivor Unmet Needs Survey: User Guider: Codebook, Analysis, etc., Waterloo (ON): PROPEL; 2011.
- Hodgkinson K, Butow P, Hunt GE, Pendlebury S, Hobbs KM, Lo SK, *et al.* The development and evaluation of a measure to assess cancer survivors' unmet supportive care needs: The caSUN (Cancer survivors' unmet needs measure). *Psychooncology* 2007;16:796-804.
- Yohannes AM, Dodd M, Morris J, Webb K. Reliability and validity of a single item measure of quality of life scale for adult patients with cystic fibrosis. *Health Qual Life Outcomes* 2011;9:105.
- Process of Translation and Adaptation of Instruments. Geneva: World Health Organization; 2014. Available from: https://www.who.int/substance_abuse/research_tools/translation/en/. [Last accessed on 2016 Oct 20].

21. Hoffman AJ, Given BA, von Eye A, Gift AG, Given CW. Relationships among pain, fatigue, insomnia, and gender in persons with lung cancer. *Oncol Nurs Forum* 2007;34:785-92.
22. Deshields TL, Potter P, Olsen S, Liu J. The persistence of symptom burden: Symptom experience and quality of life of cancer patients across one year. *Support Care Cancer* 2014;22:1089-96.
23. Brown MR, Ramirez JD, Farquhar-Smith P. Pain in cancer survivors. *Br J Pain* 2014;8:139-53.
24. Esnaola NF, Cantor SB, Johnson ML, Mirza AN, Miller AR, Curley SA, *et al.* Pain and quality of life after treatment in patients with locally recurrent rectal cancer. *J Clin Oncol* 2002;20:4361-7.
25. Chaukar DA, Walvekar RR, Das AK, Deshpande MS, Pai PS, Chaturvedi P, *et al.* Quality of life in head and neck cancer survivors: A cross-sectional survey. *Am J Otolaryngol* 2009;30:176-80.
26. Yang P, Cheville AL, Wampfler JA, Garces YI, Jatoi A, Clark MM, *et al.* Quality of life and symptom burden among long-term lung cancer survivors. *J Thorac Oncol* 2012;7:64-70.
27. Kluthcovsky AC, Urbanetz AA. Fatigue and quality of life in breast cancer survivors: A comparative study. *Rev Bras Ginecol Obstet* 2015;37:119-26.
28. Beijers A, Mols F, Dercksen W, Driessen C, Vreugdenhil G. Chemotherapy-induced peripheral neuropathy and impact on quality of life 6 months after treatment with chemotherapy. *J Community Support Oncol* 2014;12:401-6.
29. Cheng KK, Wong WH, Koh C. Unmet needs mediate the relationship between symptoms and quality of life in breast cancer survivors. *Support Care Cancer* 2016;24:2025-33.
30. Lo WT, Yates P, Chan RJ. Unmet supportive care needs and symptom burden in Taiwanese cancer survivors who have completed primary treatment. *Eur J Oncol Nurs* 2018;35:79-84.
31. Miyashita M, Ohno S, Kataoka A, Tokunaga E, Masuda N, Shien T, *et al.* Unmet information needs and quality of life in young breast cancer survivors in Japan. *Cancer Nurs* 2015;38:E1-11.