JOURNAL OF
GYNECOLOGIC
ONCOLOGY

Original Article

Check for updates

Fear of cancer recurrence and its predictors among cervical cancer survivors

Jitti Hanprasertpong [iD],[1] Alan Geater [iD],[2] Ingporn Jiamset [iD],[1]
Laaong Padungkul [iD],[3] Phongchawee Hirunkajonpan [iD],[3] Nartya Songhong [iD] [4]

[1]Department of Obstetrics and Gynecology, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand
[2]Epidemiology Unit, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand
[3]Division of Nursing Service, Songklanagarind Hospital, Songkhla, Thailand
[4]Songkhla Rajanagarindra Psychiatric Hospital, Department of Mental Health, Ministry of Public Health, Songkhla, Thailand

OPEN ACCESS

ORCID iDs
Jitti Hanprasertpong [iD]
https://orcid.org/0000-0002-0640-6824
Alan Geater [iD]
https://orcid.org/0000-0003-1219-9814
Ingporn Jiamset [iD]
https://orcid.org/0000-0002-5771-2557
Laaong Padungkul [iD]
https://orcid.org/0000-0001-8704-5006
Phongchawee Hirunkajonpan [iD]
https://orcid.org/0000-0002-5399-8981
Nartya Songhong [iD]
https://orcid.org/0000-0002-4202-1956

ABSTRACT

Objective: To identify the characteristics of fear of cancer recurrence (FCR) in cervical cancer survivors (CCSs) and investigate the relationship of FCR with demographic and medical characteristics, level of quality of life (QOL), and psychological distress. We also aimed to determine the predictors of FCR.

Methods: The short version of the Fear of Progression Questionnaire (FoP-Q-SF), the Hospital Anxiety and Depression Scale (HADS), and the Functional Assessment of Cancer Therapy-Cervical (FACT-Cx) questionnaire were administered to 699 CCSs who had complete treatment at Songklanagarind Hospital between 2006 and 2016. Analysis was performed to determine potential predictors associated with FCR.

Results: Among the 12 items of the FoP-Q-SF, the 3 greatest fears were 1) worrying about what would happen to their family; 2) being afraid of pain; and 3) fear of disease progression. The prevalences of anxiety and depression disorder were 20.46% and 9.44%, respectively. CCSs who had FCR at the 5th quintile were more likely to have medical co-morbidities, low FACT-Cx scores in all domains and a high HADS scores (anxiety and depression disorder). Multivariate analysis showed that only anxiety disorder (odds ratio [OR]=4.99; p<0.001) and low FACT-Cx score (total) (OR=6.14; p<0.001) were identified as independent predictors for FCR at the 5th quintile.

Conclusion: FCR is an important problem in cervical cancer which should be addressed during post-treatment care. Only anxiety disorder and low QOL were independently associated with high FCR.

Keywords: Uterine Cervical Neoplasms; Survivors; Fear; Recurrence; Risk Factors

INTRODUCTION

In Thailand, cervical cancer is the second most common cancer and the leading cause of cancer mortality in Thai women, with an age standardized incidence rate of 14.4 per 100,000 women [1]. Cervical cancer is also the one of the important public health problems among adult women worldwide. With advances in earlier diagnosis, treatment (surgery, radiotherapy, and chemotherapy), and understanding of the epidemiology and molecular biology of human papilloma virus infection and cervical cancer offering novel approaches to

Conflict of Interest
No potential conflict of interest relevant to this article was reported.

Author Contributions
Conceptualization: H.J., G.A., S.N.; Data curation: H.J., G.A., J.I., P.L., H.P., S.N.; Formal analysis: H.J., G.A.; Funding acquisition: H.J.; Investigation: H.J., J.I., P.L., H.P., S.N.; Methodology: H.J., G.A.; Project administration: H.J.; Resources: H.J., J.I., P.L., H.P.; Supervision: H.J., G.A.; Validation: H.J., G.A., S.N.; Visualization: H.J., G.A., J.I., P.L., H.P., S.N.; Writing - original draft: H.J.; Writing - review & editing: H.J., G.A.

improve clinical outcomes, the number of cervical cancer survivors (CCSs) has continued to grow over the past several years [2,3].

Although radical hysterectomy with pelvic node dissection (RHND) and radiation therapy (radiation alone or concurrent chemoradiation) represent proven-effective treatment for cervical cancer, up to one third of patients will develop progressive or recurrent disease [4]. Previous research has established that the recurrent rate for International Federation of Gynecology and Obstetrics (FIGO) stages IB–IIA and stages IIB–IVA are 11%–22% and 28%–64%, respectively [5]. Although the majority of recurrences occur within the first 2–3 years after treatment, a Takehara et al. [6] study found that late recurrence (at 5 years or more after treatment) was seen in 21 of 569 (3.7%) patients who had survived 5 years. Recently, Hanprasertpong and Jiamset [7] reported that recurrence beyond 5 years after RHND was seen in 11 of 229 (4.8%) patients with early-stage cervical cancer who remained tumor-free for at least 5 years. In addition, they suggest that regular follow-up assessments in early-stage cervical cancer should be continued until at least 8.6 years of tumor-free survival, especially in patients with lymph node metastasis and/or deep stromal invasion at RHND. With longer survival times of this cancer, one of the emerging problems we are seeing is fear of cancer recurrence (FCR).

Traditionally, FCR has been defined as the fear that cancer could return or progress in the same place or in another part of the body [4,8-11]. FCR is one of the most prevalent psychological burdens experienced by cancer patients and survivors, with previous researches reporting prevalence rates of FCR ranging between 39% and 97%, and manifestations of that fear ranging from a normal response to cancer to a pathological response associated with behavioral dysfunctions, depressive syndromes, and psychosocial distress [11-13]. When FCR becomes severe, it is concurrent with a significantly lower quality of life (QOL), functional impairments, and increased use and cost of health care [11,14,15]. However, very little is known about the specific nature and cognitive mechanisms of FCR [8].

In several prior studies in a variety of cancer survivors (such as breast, gynecological, colon, and head and neck cancers), higher levels of FCR have been associated with demographic, medical, and psychological characteristics such as female gender, cancer diagnosed at a young age, shorter times since diagnosis, advanced disease, anxiety, low QOL, and medical co-morbidity. However, these findings are not always consistent [10,13,14,16,17]. Greater knowledge of factors associated with higher FCR in cancer survivors may help the clinician to better understand the nature and cognitive mechanisms of this fear, and is necessary to inform intervention development and improve patient care and satisfaction. In addition, until recently, no previous study has characterized FCR and potential predictors of FCR in CCSs. Therefore, this prospective cross-sectional study and its descriptive questionnaire were designed to identify characteristics of FCR in CCSs up to 10 years after treatment and to investigate the relationship of FCR with demographic and medical characteristics, level of QOL, and psychological (anxiety and depression) distress, and see if such factors could be used to determine patients more likely to suffer severe FCR, allowing early identification of such patients and timely treatment.

MATERIALS AND METHODS

1. Setting and participants
This study was approved by the Ethics Committee for Research Involving Human Subjects of the Faculty of Medicine, Prince of Songkla University. The trial protocol was

registered with the Thai clinical trials registry via www.clinicaltrials.in.th (identifier No. TCTR20160805001). We recruited women with cervical cancer who had been treated with curative intent at Songklanagarind Hospital between 2006 and 2016. Eligibility criteria included: 1) a prior diagnosis of cervical cancer stages IA2–IVA at any age between 20 and 70 years; 2) completion of primary treatment at least 3 months prior to enrollment in the study, but not exceeding 10 years; 3) no history of other cancers; and 4) agreement to sign the consent form, and ability to complete a questionnaire (Thai language). We excluded patients who had developed cancer recurrence.

All CCSs who met all eligibility criteria and came for a follow-up visit at the outpatient clinic of our hospital were asked if they would agree to participate in the study. After a thorough routine physical examination, radiological examination, and laboratory tests, the CCSs were informed about the purposes and details of the study. Those who were agreed to participate were requested to provide written informed consent. Patients were compensated 200 baht (approximately 5.88 USD) for participation.

2. Instruments

1) Demographic and medical characteristics

Demographic and medical characteristics were collected by self-reported questionnaires and from both inpatient and outpatient medical records. The collected data included current age, marital status, number of children living with CCS, religious affiliation, education, employment status, family income, medical co-morbidities, initial stage, type of primary treatment, and time since diagnosis of CCS.

2) FCR

We used the short version of the Fear of Progression Questionnaire (FoP-Q-SF) (English version) with the permission of Professor Anja Mehnert, who developed the original questionnaire (German version). The FoP-Q-SF is a 12-item short form of the original 43-item Fear of Progression Questionnaire (FoP-Q) [4,14]. This questionnaire was developed and comprehensively validated in a large sample of breast cancer survivors [14]. The items are scored on a 5-point Likert scale, ranging from 1 "never" to 5 "very often." The resulting sum score of the questionnaire ranges from 12 to 60. In this study, the FoP-Q-SF index scores were divided into quintiles. Patients in the 5th quintile were classified as having a high level of FCR and others as having a low level of FCR.

The Thai-version of the FoP-Q-SF was developed according to the World Health Organization (WHO) translation guidelines. After translation from English into Thai, the questionnaire was then back-translated into English by 2 independent clinicians (a gynecologic oncologist and a psychiatrist) and a native English speaker with good Thai language ability. A pilot cognitive debriefing test was given to 40 Thai CCSs to assess their understanding and interpretation of the questionnaire. The results of this pilot indicated that these questionnaires were well accepted, and all items were easy to use and understand, with a Cronbach's alpha value of 0.870.

3) Anxiety and depression

We used the Hospital Anxiety and Depression Scale (HADS) (Thai version) to assess the anxiety and depression of CCSs [18]. The HADS consists of 14 items, 7 items indicating anxiety and 7 items indicating depression. Each item is rated on a 4-point scale from 0 "never" to 3 "almost always," with a maximum of 21 points each for anxiety and depression

[19]. CCSs who achieved a score equal to or more than 8 were considered as suffering from HADS defined anxiety and depression disorder. In this study, the Cronbach's alpha values of the HADS subscales of anxiety and depression were 0.708 and 0.747, respectively.

4) QOL

QOL was assessed by the Functional Assessment of Cancer Therapy-Cervical (FACT-Cx) (version 4). The FACT-Cx questionnaire (Thai version) was provided by the Functional Assessment of Chronic Illness Therapy (FACIT) organization. The FACT-Cx comprises the FACT-General (27 items) and the cervical cancer specific subscale (15 items). The FACT-General questionnaire consists of 4 subscales (physical, social, emotional, and functional well-being). The cervical cancer specific subscale contains 15 additional items specifically related to cervical cancer and its treatment sequelae [20]. The items are scored on a 5-point Likert scale, ranging from 0 "not at all" to 4 "very much." High scores indicate better QOL. In this study, the Cronbach's alpha value of the FACT-Cx was 0.866.

3. Statistical analysis

Statistical analyses were performed using STATA version 14 statistical software (StataCorp LP, College Station, TX, USA). Descriptive statistics were used to describe the overall demographic and medical characteristics of the study sample and were summarized as mean with standard deviation (SD), or frequency with percentage. Scores for FoP-Q-SF, HADS, and FACT-Cx were calculated according to their respective manuals. The Pearson's χ^2 test was used to test the significance of differences between groups. Multivariate logistic regression was used to identify independent predictors of high FCR. Covariates included in the multivariate models were those deemed to be relevant according to our literature review. The p-values less than 0.05 were considered significant. In this study, all FACT-Cx scores in all domains were significant in univariate analysis; however, only the total FACT-Cx score was selected for further multivariate analysis.

RESULTS

Seven hundred and twenty-nine CCSs met all inclusion criteria and were invited to participate. A total of 699 completely responded (95.88%), of whom 700 agreed to participate (96.02%). The mean age of these survivors at the time of the survey was 52.78±9.32 years (range=21–70). **Table 1** shows the mean value scores of the CCSs responses to the different

Table 1. The FoP-Q-SF item responses (n=699)

FoP-Q-SF	Score	
	Mean	SD
1. Being afraid of disease progression	2.25	1.10
2. Being nervous prior to doctors' appointments or periodic examinations	1.98	1.05
3. Being afraid of pain	2.28	1.24
4. Being afraid of becoming less productive at work	2.05	1.14
5. Having physical symptoms (e.g., rapid heartbeat, stomach ache, nervousness)	2.13	1.08
6. Being afraid by the possibility that the children could contract cancer	1.88	1.04
7. Being afraid of relying on strangers for activities of daily living	1.44	0.78
8. Being afraid of no longer be able to pursue hobbies	1.73	1.01
9. Being afraid of severe medical treatments in course of the illness	2.10	1.18
10. Worrying that medications could damage the body	1.94	1.08
11. Worrying about what will become of the family if something should happen to the patient	2.34	1.28
12. Being afraid of not being able to work anymore	2.04	1.17

FoP-Q-SF, short version of the Fear of Progression Questionnaire; SD, standard deviation.

items of the FoP-Q-SF. Among the 12 items, the 3 greatest fears were 1) worrying about what would happen to their family (mean score=2.34); 2) being afraid of pain (mean score=2.28); and 3) fear of disease progression (mean score=2.25). The most infrequent fear was being afraid of relying on strangers for activities of daily living (mean score=1.44).

Table 2 shows the demographic and medical characteristics, level of QOL, and psychological distress among the CCSs for FCR at the 1st–4th quintiles and the 5th quintile. The majority of CCSs were Buddhist (85.26%), and more than half (66.52%) had only primary school or under education. Overall, about 80% of the survivors had family income less than 300,000 baht (approximately 8,827.15 USD) per year and were diagnosed with stages I–II cervical cancer. A minority of CCSs (29.90%) had a medical co-morbidity. At the time of analysis, 331 (47.35%) of the CCSs had been followed for 3 years or less, while 21.32% had been followed more than 3 years, but less than or equal to 5 years, and 31.33% had been followed more than 5 years. The prevalences of HADS-defined anxiety and depression disorder in this study were 20.46% and 9.44%, respectively.

The results of univariate analysis for the entire group are shown in **Table 2**. There were no significant differences between the 2 groups in age, marital status, number of children living with CCS, religious affiliation, education, employment status, family income, initial stage, primary treatment, or time since diagnosis for CCS. However, the CCSs who had FCR at the 5th quintile were more likely to have a medical co-morbidity (p=0.019), low FACT-Cx scores in all domains (p<0.001 for FACT-Cx [total]), and high HADS scores (p<0.001 for anxiety and depression disorder).

Table 2. Demographic and medical characteristics, level of QOL, and psychological distress among CCSs comparing FCR between the 1st–4th quintiles and 5th quintile

Variables	Total	FCR at 1st–4th quintile	FCR at 5th quintile	p-value
Age (yr)				1.000
≤50	267 (38.20)	218 (38.25)	49 (37.98)	
>50	432 (61.80)	352 (61.75)	80 (62.02)	
Marital status				0.511
Single	22 (3.15)	20 (3.51)	2 (1.55)	
Married or cohabitating	557 (79.68)	452 (79.30)	105 (81.40)	
Divorced or separated	120 (17.17)	98 (17.19)	22 (17.05)	
Children living with CCS				1.000
No children	34 (4.86)	28 (4.91)	6 (4.65)	
≥1 children	665 (95.14)	542 (95.09)	123 (95.35)	
Religious affiliation				0.889
Buddhist	596 (85.26)	485 (85.09)	111 (86.05)	
Other	103 (14.74)	85 (14.91)	18 (13.95)	
Education				0.453
Primary school or under	465 (66.52)	380 (66.67)	85 (65.88)	
Secondary school	130 (18.60)	105 (18.42)	25 (19.38)	
High school	53 (7.58)	46 (8.07)	7 (5.43)	
College	22 (3.15)	15 (2.63)	7 (5.43)	
University or more	29 (4.15)	24 (4.21)	5 (3.88)	
Employment status				0.269
Housewife	184 (26.32)	146 (25.61)	38 (29.46)	
Employed	160 (22.89)	130 (22.81)	30 (23.26)	
Retired/unemployed/other	39 (5.58)	31 (5.44)	8 (6.20)	
Business	116 (16.60)	90 (15.79)	26 (20.16)	
Agriculturist	200 (28.61)	173 (30.35)	27 (20.92)	
Family income (annual)				0.594
<300,000 baht	546 (78.11)	448 (78.6)	98 (75.97)	
≥300,000 baht	153 (21.89)	122 (21.4)	31 (24.03)	

Table 2. Demographic and medical characteristics, level of QOL, and psychological distress among CCSs comparing FCR between the 1st–4th quintiles and 5th quintile (Continued)

Variables	Total	FCR at 1st–4th quintile	FCR at 5th quintile	p-value
Medical co-morbidity				0.019
No	490 (70.10)	411 (72.11)	79 (61.24)	
Yes	309 (29.90)	159 (27.89)	50 (38.76)	
FIGO stage				0.836
I	223 (31.90)	178 (31.23)	45 (34.88)	
II	353 (50.50)	290 (50.87)	63 (48.84)	
III	114 (16.31)	95 (16.67)	19 (14.73)	
IV	9 (1.29)	7 (1.23)	2 (1.55)	
Primary treatment				0.755
Surgery	205 (29.33)	164 (28.77)	41 (31.78)	
Radiation	30 (4.29)	24 (4.21)	6 (4.65)	
Concurrent chemoradiation	464 (66.38)	382 (67.02)	82 (63.57)	
Time post diagnosis (yr)				0.435
≤3	331 (47.35)	264 (46.32)	67 (51.94)	
>3 and ≤5	149 (21.32)	126 (22.11)	23 (17.83)	
>5	219 (31.33)	180 (31.57)	39 (30.23)	
FACT-Cx				
Physical well-being				<0.001
>median	334 (47.78)	313 (54.91)	21 (16.28)	
≤median	365 (52.22)	257 (45.09)	108 (83.72)	
Social/family well-being				0.005
>median	346 (49.50)	297 (52.11)	49 (37.98)	
≤median	353 (50.50)	273 (47.89)	80 (62.02)	
Emotion well-being				<0.001
>median	238 (34.05)	224 (39.30)	14 (10.85)	
≤median	461 (65.95)	346 (60.70)	115 (89.15)	
Functional well-being				<0.001
>median	302 (43.20)	274 (48.07)	28 (21.71)	
≤median	397 (56.80)	296 (51.93)	101 (78.29)	
Cervix cancer subscale				<0.001
>median	302 (43.20)	277 (48.60)	25 (19.38)	
≤median	397 (56.80)	293 (51.40)	104 (80.62)	
FACT-Cx TOI				<0.001
>median	341 (48.78)	323 (56.67)	18 (13.95)	
≤median	358 (51.22)	247 (43.33)	111 (86.05)	
FACT-G				<0.001
>median	343 (49.07)	325 (57.02)	18 (13.95)	
≤median	356 (50.93)	245 (42.98)	111 (86.05)	
FACT-Cx (total)				<0.001
>median	342 (48.93)	324 (56.84)	18 (13.95)	
≤median	357 (51.07)	246 (43.16)	111 (86.05)	
HADS				
Anxiety				<0.001
Yes	143 (20.46)	77 (13.51)	66 (51.16)	
No	556 (79.54)	493 (86.49)	63 (48.84)	
Depression				<0.001
Yes	66 (9.44)	39 (6.84)	27 (20.93)	
No	633 (90.56)	531 (93.16)	102 (79.07)	

Values are presented as number of patients (%).
CSS, cervical cancer survivor; FACT-Cx, Functional Assessment of Cancer Therapy-Cervical; FACT-G, Functional Assessment of Cancer Therapy-General; FCR, fear of cancer recurrence; FIGO, International Federation of Gynecology and Obstetrics; HADS, Hospital Anxiety and Depression Scale; QOL, quality of life; TOI, trial outcome index.

A further multivariate analysis was subsequently performed (**Table 3**). Interestingly, only anxiety disorder (odds ratio [OR]=4.99; p<0.001) and low FACT-Cx score (total) (OR=6.14; p<0.001) were identified as independent predictors for FCR at the 5th quintile.

Table 3. Multivariate analysis of predictors for CCSs for FCR at the 5th quintile

Variables	OR	95% CI	p-value
HADS			
Anxiety			<0.001
Yes	4.99	2.89–8.61	
No	1.00	-	
FACT-Cx (total)			<0.001
≤median	6.14	2.67–14.08	
>median	1.00	-	

CCS, cervical cancer survivor; CI, confidence interval; FACT-Cx, Functional Assessment of Cancer Therapy-Cervical; FCR, fear of cancer recurrence; HADS, Hospital Anxiety and Depression Scale; OR, odds ratio.

DISCUSSION

To the best of our knowledge, this is the first study to identify characteristics and determine predictors of FCR among CCSs. We found that the 3 greatest fears were 1) worrying about what would happen to their family; 2) being afraid of pain; and 3) fear of disease progression. The most infrequent fear was being afraid of relying on strangers for activities of daily living. These findings are different from a previous study from Germany, which found that the most prevalent fears in 1,083 breast cancer survivors were being nervous prior to doctors' appointments or periodic examinations and being afraid of relying on strangers for activities of daily living [14]. A possible explanation for these discrepancies might be that in Southeast Asia, and especially Thailand, there is a much stronger family connection compared to Western cultures, with commonly up to 3 or 4 generations living together in one home [21]. Therefore, the Thai CCSs in our study were concerned about possible cancer progression or recurrence, and its consequences in regard to disturbing their extended family, for example, causing financial hardships regarding money or obligations to take care of a patient with recurrent cancer or pain. In Thailand, loyalty to the family is the first and primary obligation. The family obligation means that members must care for each other. Children, especially the younger daughter, are often the ones required to take care of their elderly parents or other family members with chronic illnesses including cancer [21]. This is likely why the most infrequent fear of our patients was being afraid of relying on strangers for activities of daily living.

This study did not determine a prevalence of FCR due to unknown real or validated cut-off score on FoP-Q-SF. However, 1 study from the USA found that 47% of women newly diagnosed with gynecologic cancer (including cervical cancer) reported moderate to high fears on the concerns about recurrence questionnaire [22]. We were able to examine the prevalences of anxiety and depression disorder, which were 20.46% and 9.44%, respectively, and which were lower than in a prior study from Korea [2]. Kim et al. [2] investigated the prevalence of anxiety and depression disorder among 828 CCSs in Korea, and found that the prevalences of anxiety and depression disorder were 39.5% and 34.6%, respectively. Possible explanations for these differences in the prevalences of anxiety and depression disorder may be patient selection, timing of measurements, race (Korean vs. Thai), different stages of disease, and complexity of treatments offered [2,23,24]. According to the study of Kim et al. [2], they commented that the reason for the high prevalence of depression in their study was probably "hwa-byung", a Korean term for an illness caused by suppressed anger [24]. They noted that Koreans tend not to show their emotions but rather suppress their anger when faced with trouble. Previous research has established that coping with anger in silence is associated with depression in general [25].

In this study, we investigated the possible predictors associated with FCR in 699 CCSs. In univariate analysis, we were able to show that CCSs with medical co-morbidity, low FACT-Cx scores in all domains, and high HADS scores (anxiety and depression disorder) were associated with a significantly increased risk of high FCR. However, after controlling for other variables, only anxiety disorder and low FACT-Cx score (total) were independently associated with high FCR. These results indicate that FCR has an important impact on mental status (anxiety disorder) and QOL, and clearly suggest the clinical considerable of FCR after primary treatment of cervical cancer and underlines the need for specific information, intervention, and therapies.

Despite the fact that no previous studies involving CCSs have demonstrated an association between FCR and anxiety disorder, our results are consistent with data obtained from survivors of many types of cancer (such as pancreatic and periampullary, head and neck, and testicular cancers), where it has been shown that anxiety disorder was independently associated with high FCR [10,16,26,27]. Therefore, we agree with the conclusion of the van de Wal et al. [17] study that FCR seems to be a universal concern of cancer survivors rather than a cancer type-specific problem. The observed association between anxiety disorder and high FCR might be explained by noting that inadequate or low quality information is correlated with more anxiety. Anxiety has also been associated with inhibition of information processing leading to difficulty understanding medical information and less satisfaction [28]. Therefore, poorer emotional functioning and poorer mental health have been associated with higher FCR [17]. Concerning factors related to anxiety, Iyer et al. [29] found that CCSs who exercised at least 3 hours per week experienced less depression and anxiety. Furthermore, Kim et al. [2] reported anxiety in CCSs was commonly associated with financial difficulty, poor body image, sexual inactivity, low existential well-being and insomnia. Thus, we can infer that adherence to physical activity guidelines, changes in lifestyle behaviors during cancer survivorship, an education program to promote good body image and/or sexuality, financial counseling, supportive therapy or cognitive existential group therapy may be effective in decreasing FCR. However, FCR may be a precipitating factor of anxiety too.

As this study also found, QOL is one frequently reported as a predictor for high FCR. There is evidence that higher levels of FCR are associated with poorer QOL among several types of cancer survivors such as breast, colorectal, lung, pancreatic and periampullary, urogynecologic, and testicular cancers [10,14,27,30,31]. Petzel et al. [10] conducted a cross-sectional study of FCR in survivors of pancreatic and periampullary tumors, and found that anxiety disorder and low QOL were independently associated with a clinically significant level of FCR. Myers et al. [22] demonstrated a negative correlation between FCR and all areas of QOL among women newly diagnosed with gynecological malignancies. Relative to worries about health, womanhood and death, worries about the effect that recurrence could have on one's role had the strongest relationship with reduced QOL in one study on women with breast cancer [32]. Conversely, FCR can be precipitated by problems in these domains of functioning [17].

Until now, there has been limited study of psychosocial intervention for reducing or managing FCR [33-35]. A pilot study from Canada determined the feasibility and preliminary efficacy of the Fear of Recurrence Therapy (FORT) intervention (a brief, 6-week group cognitive-existential [CE] intervention) for 56 survivors with either breast or ovarian cancer. They found that this intervention appeared feasible and showed promising results. Specifically, women who took part in the intervention demonstrated significant reductions in both the primary outcome, FCR, and the secondary outcomes of uncertainty, cancer-specific distress, QOL, and coping as measured before and intermediately after the intervention [33].

They are now testing the effectiveness of a CE group intervention, the FORT intervention, in reducing FCR among breast or gynecologic cancer survivors [34].

A key strength of the present study was the relatively large number of CCSs in one university teaching hospital. All survivors received primary cancer treatment and supportive care consistently at a single hospital with uniform guidelines or surgical techniques. In addition, the questionnaire response rate of our study was satisfactory. However, the study was limited by the fact that all of the participants were from an Asian ethic group. Also, some variables that could potentially affect FCR were not available. For these reasons, the results should be interpreted with caution when applying these findings to the larger cervical cancer population. Further longitudinal studies with larger sample sizes should be undertaken to determine clinically significant levels of the FCR with appropriate cut-off scores.

In conclusion, we found that only anxiety disorder and low QOL were independently associated with high FCR. Regardless of its limitations, we believe that this study has improved the understanding of FCR in CCSs, and confirms that FCR is an important problem in cervical cancer which needs to be addressed during post-treatment care.

REFERENCES

1. Pongnikorn D, Suwanrungrung K, Buasom R. Cancer incidence in Thailand. In: Imsamran W, Chaiwerawattana A, Wiangnon S, Pongnikorn D, Suwanrungrung K, Sangrajrang S, et al. editors. Cancer in Thailand: vol. VIII, 2010–2012. Bangkok: National Cancer Institute Thailand; 2015. p. 6-72.

2. Kim SH, Kang S, Kim YM, Kim BG, Seong SJ, Cha SD, et al. Prevalence and predictors of anxiety and depression among cervical cancer survivors in Korea. Int J Gynecol Cancer 2010;20:1017-24.
   PUBMED | CROSSREF

3. Ferrandina G, Mantegna G, Petrillo M, Fuoco G, Venditti L, Terzano S, et al. Quality of life and emotional distress in early stage and locally advanced cervical cancer patients: a prospective, longitudinal study. Gynecol Oncol 2012;124:389-94.
   PUBMED | CROSSREF

4. Thewes B, Butow P, Zachariae R, Christensen S, Simard S, Gotay C. Fear of cancer recurrence: a systematic literature review of self-report measures. Psychooncology 2012;21:571-87.
   PUBMED | CROSSREF

5. Quinn MA, Benedet JL, Odicino F, Maisonneuve P, Beller U, Creasman WT, et al. Carcinoma of the cervix uteri. FIGO 26th Annual Report on the Results of Treatment in Gynecological Cancer. Int J Gynaecol Obstet 2006;95 Suppl 1:S43-103.
   PUBMED | CROSSREF

6. Takehara K, Shigemasa K, Sawasaki T, Naito H, Fujii T. Recurrence of invasive cervical carcinoma more than 5 years after initial therapy. Obstet Gynecol 2001;98:680-4.
   PUBMED

7. Hanprasertpong J, Jiamset I. Late recurrence of early stage cervical cancer more than 3 years after radical hysterectomy with pelvic node dissection. Oncol Res Treat 2017;40:270-6.
   PUBMED | CROSSREF

8. Custers JA, van den Berg SW, van Laarhoven HW, Bleiker EM, Gielissen MF, Prins JB. The Cancer Worry Scale: detecting fear of recurrence in breast cancer survivors. Cancer Nurs 2014;37:E44-50.
   PUBMED | CROSSREF

9. Hinz A, Mehnert A, Ernst J, Herschbach P, Schulte T. Fear of progression in patients 6 months after cancer rehabilitation-a- validation study of the fear of progression questionnaire FoP-Q-12. Support Care Cancer 2015;23:1579-87.
   PUBMED | CROSSREF

10. Petzel MQ, Parker NH, Valentine AD, Simard S, Nogueras-Gonzalez GM, Lee JE, et al. Fear of cancer recurrence after curative pancreatectomy: a cross-sectional study in survivors of pancreatic and periampullary tumors. Ann Surg Oncol 2012;19:4078-84.
   PUBMED | CROSSREF

11. Simard S, Thewes B, Humphris G, Dixon M, Hayden C, Mireskandari S, et al. Fear of cancer recurrence in adult cancer survivors: a systematic review of quantitative studies. J Cancer Surviv 2013;7:300-22.
    PUBMED | CROSSREF

12. Lebel S, Ozakinci G, Humphris G, Mutsaers B, Thewes B, Prins J, et al. From normal response to clinical problem: definition and clinical features of fear of cancer recurrence. Support Care Cancer 2016;24:3265-8.
    PUBMED | CROSSREF

13. Koch L, Jansen L, Brenner H, Arndt V. Fear of recurrence and disease progression in long-term (≥ 5 years) cancer survivors--a systematic review of quantitative studies. Psychooncology 2013;22:1-11.
    PUBMED | CROSSREF

14. Mehnert A, Berg P, Henrich G, Herschbach P. Fear of cancer progression and cancer-related intrusive cognitions in breast cancer survivors. Psychooncology 2009;18:1273-80.
    PUBMED | CROSSREF

15. Lebel S, Tomei C, Feldstain A, Beattie S, McCallum M. Does fear of cancer recurrence predict cancer survivors' health care use? Support Care Cancer 2013;21:901-6.
    PUBMED | CROSSREF

16. Mehnert A, Koch U, Sundermann C, Dinkel A. Predictors of fear of recurrence in patients one year after cancer rehabilitation: a prospective study. Acta Oncol 2013;52:1102-9.
    PUBMED | CROSSREF

17. van de Wal M, van de Poll-Franse L, Prins J, Gielissen M. Does fear of cancer recurrence differ between cancer types? A study from the population-based PROFILES registry. Psychooncology 2016;25:772-8.
    PUBMED | CROSSREF

18. Nilchaikovit T, Lortrakul M, Phisansuthideth U. Development of Thai version of hospital anxiety and depression scale in cancer patients. J Psychiatr Assoc Thai 1996;41:18-30.

19. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361-70.
    PUBMED | CROSSREF

20. Cella DF, Tulsky DS, Gray G, Sarafian B, Linn E, Bonomi A, et al. The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. J Clin Oncol 1993;11:570-9.
    PUBMED | CROSSREF

21. Detzner D, Xiong B, Eliason PA. Background on Southeast Asian parenting [Internet]. Minneapolis, MN: University of Minnesota Extension; 2010 [cited 2017 May 1]. Available from: http://www.extension.umn.edu/family/families-with-teens/resources-parents/bicultural-parenting/background/.

22. Myers SB, Manne SL, Kissane DW, Ozga M, Kashy DA, Rubin S, et al. Social-cognitive processes associated with fear of recurrence among women newly diagnosed with gynecological cancers. Gynecol Oncol 2013;128:120-7.
    PUBMED | CROSSREF

23. Kobayashi M, Ohno T, Noguchi W, Matsuda A, Matsushima E, Kato S, et al. Psychological distress and quality of life in cervical cancer survivors after radiotherapy: do treatment modalities, disease stage, and self-esteem influence outcomes? Int J Gynecol Cancer 2009;19:1264-8.
    PUBMED | CROSSREF

24. Park YJ, Kim HS, Schwartz-Barcott D, Kim JW. The conceptual structure of hwa-byung in middle-aged Korean women. Health Care Women Int 2002;23:389-97.
    PUBMED | CROSSREF

25. Goodwin RD. Association between coping with anger and feelings of depression among youths. Am J Public Health 2006;96:664-9.
    PUBMED | CROSSREF

26. Ghazali N, Cadwallader E, Lowe D, Humphris G, Ozakinci G, Rogers SN. Fear of recurrence among head and neck cancer survivors: longitudinal trends. Psychooncology 2013;22:807-13.
    PUBMED | CROSSREF

27. Skaali T, Fosså SD, Bremnes R, Dahl O, Haaland CF, Hauge ER, et al. Fear of recurrence in long-term testicular cancer survivors. Psychooncology 2009;18:580-8.
    PUBMED | CROSSREF

28. 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.
    PUBMED | CROSSREF

29. Iyer NS, Osann K, Hsieh S, Tucker JA, Monk BJ, Nelson EL, et al. Health behaviors in cervical cancer survivors and associations with quality of life. Clin Ther 2016;38:467-75.
    PUBMED | CROSSREF

30. van de Wal M, van Oort I, Schouten J, Thewes B, Gielissen M, Prins J. Fear of cancer recurrence in prostate cancer survivors. Acta Oncol 2016;55:821-7.
    PUBMED | **CROSSREF**

31. Hart SL, Latini DM, Cowan JE, Carroll PRCaPSURE Investigators. Fear of recurrence, treatment satisfaction, and quality of life after radical prostatectomy for prostate cancer. Support Care Cancer 2008;16:161-9.
    PUBMED | **CROSSREF**

32. Simonelli LE, Siegel SD, Duffy NM. Fear of cancer recurrence: a theoretical review and its relevance for clinical presentation and management. Psychooncology. Forthcoming 2016.
    PUBMED | **CROSSREF**

33. Herschbach P, Book K, Dinkel A, Berg P, Waadt S, Duran G, et al. Evaluation of two group therapies to reduce fear of progression in cancer patients. Support Care Cancer 2010;18:471-9.
    PUBMED | **CROSSREF**

34. Lebel S, Maheu C, Lefebvre M, Secord S, Courbasson C, Singh M, et al. Addressing fear of cancer recurrence among women with cancer: a feasibility and preliminary outcome study. J Cancer Surviv 2014;8:485-96.
    PUBMED | **CROSSREF**

35. Maheu C, Lebel S, Courbasson C, Lefebvre M, Singh M, Bernstein LJ, et al. Protocol of a randomized controlled trial of the fear of recurrence therapy (FORT) intervention for women with breast or gynecological cancer. BMC Cancer 2016;16:291.
    PUBMED | **CROSSREF**