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■ Original Article

Association between Complementary and Alternative Medicine Use and Fear of Cancer Recurrence among Breast Cancer Survivors

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Background: This study aimed to evaluate the association between complementary and alternative medicine (CAM) use and fear of cancer recurrence (FCR) among breast cancer survivors, using a validated multidimensional FCR-assessing instrument. Despite the debate over its medical effects, the use of CAM in breast cancer survivors is increasing.

Methods: We recruited 326 breast cancer survivors who had completed the primary cancer treatment. Information on CAM use was obtained using a self-administered questionnaire, and FCR was assessed using the Korean version of the FCR Inventory (FCRI). Multivariate linear regression analysis was performed to evaluate the association between CAM use and FCR.

Results: CAM users had higher total FCR scores than CAM non-users after covariate adjustment (CAM users: 74.6 vs. CAM non-users: 68.7; P=0.047). Among the FCRI subscales, CAM users showed higher coping strategy scores (CAM users: 22.3 vs. CAM non-users: 20.6; P=0.034) in the multivariable adjusted analysis. The use of multiple types of CAM was associated with increased FCR in a dose-dependent manner (P=0.002).

Conclusion: Breast cancer survivors who used CAM had a higher FCR than CAM non-users. The dose-response relationship between the use of multiple types of CAM and FCR suggests that breast cancer survivors who use multiple types of CAM should be provided with appropriate psychological interventions to decrease FCR.

Keywords: Complementary Medicine; Alternative Medicine; Fear of Cancer Recurrence; Fear of Cancer Recurrence Inventory; Cancer Survivors; Breast Neoplasms

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INTRODUCTION

Despite controversies regarding the effectiveness of complementary and alternative medicine (CAM), its use is substantially increasing among cancer survivors.[1] Breast cancer survivors more commonly use CAM, compared to other types of cancer survivors,[2] with approximately 82% of US breast cancer survivors and 61% of Korean breast cancer survivors using CAM.[3] Several demographic and cancer-related factors, such as age,[3-5] level of education,[3,4] and time since breast cancer diagnosis,[4] are associated with CAM use. Furthermore, psychological problems, including anxiety[5] and depression,[6] have been identified as predictors of CAM use among breast cancer survivors.

Fear of cancer recurrence (FCR) is the emotional concern of cancer survivors that cancer will return to or progress in the same or another part of the body.[7] This emotional concern is the most frequent unmet psychological need of cancer survivors, and breast cancer survivors have a greater degree of FCR than other cancer survivors.[8] All cancer survivors who have been diagnosed and treated for cancer have varying degrees of this natural psychological response.[9] Adapted FCR could encourage cancer survivors to pursue healthy behaviors and adhere to the recommended preventive measures.[10] However, without psychological intervention, persistent and excessive FCR can result in anxiety, depression, and low quality of life.[11] In addition, an emerging body of evidence indicates that the effects of FCR are not only restricted to the psychological state of cancer survivors but are also implicated in decision-making regarding treatment options,[12] cancer-related health services use,[13] and compliance with surveillance programs.[13]

Although FCR has gained research interest in the field of cancer survivorship, limited literature is available on the use of CAM in relation to FCR. A previous US study showed that CAM users had a higher FCR than non-users among early-stage breast cancer survivors[14] and colorectal cancer survivors.[15] An Iranian study also revealed that high FCR was a predictor of CAM use in cancer survivors.[16] However, another study on breast cancer survivors did not find a significant association between CAM use and FCR.[17]

Despite these previous studies, there is a knowledge gap regarding the association between CAM use and FCR among East Asian cancer survivors because most previous studies were conducted in Western countries.[14,15,17] Furthermore, because these studies assessed FCR in cancer survivors using a single question[16] or a limited number of questions,[14,15,17] they provided little insight into the components of FCR that play important roles in the use of CAM among cancer survivors. Considering the complexity and multidimensionality of FCR, a comprehensive approach to assess FCR among breast cancer survivors who use CAM is necessary. Accordingly, the aim of the present study was to evaluate the association between CAM use and FCR among breast cancer survivors using a validated multidimensional FCR assessment instrument.

METHODS

1. Participants

We assessed 421 eligible breast cancer patients aged ≥19 years who visited Kosin University Gospel Hospital between March 2018 and December 2018, of whom 389 consented to participate in the survey, with a response rate of 92%. Among the participants, 63 were excluded for the following reasons: incomplete answers to the Fear of Cancer Recurrence Inventory (FCRI) (n=22), missing data on breast cancer characteristics (n=12), and missing data on anthropometric measures or socioeconomic variables (n=29). Ultimately, 326 patients were included in this study. We defined breast cancer survivors as patients who had been diagnosed with breast cancer by histopathology and who had undergone at least one treatment modality since diagnosis. All participants were recruited, and surveys were conducted when participants visited the Department of Breast Surgery and/or the Department of Family Medicine in Kosin University Gospel Hospital, Busan, South Korea.

Written informed consent was obtained from all participants before the survey, and all the study protocols complied with the Declaration of Helsinki. This study was reviewed and approved by the institutional review board of Kosin University Medical School (KUGH-2018-05-023).

2. Data Collection and Measurements

The questionnaire developed for this study was composed of 14 questions regarding general characteristics, such as anthropometric measurements, socioeconomic status, and health behaviors; five questions regarding cancer-related information; two questions regarding CAM use; and 42 questions from the FCRI. The questionnaire was pre-tested by two medical assistants to check for any difficulties in understanding the questions and to assess the time required to complete it. There were three trained interviewers who assisted the study participants in the outpatient clinics; if participants had any difficulty understanding the questions, the interviewers helped the participants complete the questionnaire.

Information regarding anthropometric measurements (weight, height, and body mass index [BMI]), socioeconomic status (marital status and education), and health behaviors (smoking status and alcohol consumption) was obtained from medical records after the survey was completed. BMI was calculated as kg/m^2 and categorized into three groups based on the criteria tailored to the East Asian population (<23.0, 23.0–24.9, and ≥25.0 kg/m^2).[18] Marital status was categorized into three groups (single, married, and other) and education was categorized into two groups (≤high school and ≥college). Smoking status was categorized into three groups based on the World Health Organization (WHO) classification (non-smokers, past smokers, and current smokers). Alcohol consumption was estimated by calculating the pure alcohol content of all alcoholic beverages consumed per week, which was categorized into three groups (none, <70 g/wk, and ≥70 g/wk). Physical activity was defined based on the WHO recommendation of

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at least 150 minutes of moderate exercise or 75 minutes of vigorous exercise per week.[19] Moderate exercise was defined as physical activity during which one could talk to someone who was next to them but would have difficulty singing, and vigorous exercise was defined as physical activity during which it would be difficult to speak. Religious belief/activity was categorized into four groups (no; yes, but no activity; yes, irregular activity; and yes, regular activity).

Breast cancer-related information, such as time since breast cancer diagnosis, cancer stage, metastasis, treatment history, and recurrences, was first gathered using a self-administered questionnaire. Subsequently, an independent investigator reviewed the participants' medical records and verified the information obtained using a self-administered questionnaire. Breast cancer stage was classified based on the American Joint Committee on Cancer classification, 7th edition,[20] and data regarding the use of available treatment options, such as surgery, chemotherapy, radiotherapy, hormone therapy, and targeted therapy, were dichotomously categorized into two groups (yes and no).

CAM use was surveyed with the question: "Have you ever used any type of CAM during the trajectory of your breast cancer treatment?" If participants answered yes to this question, a follow-up question asked them to choose all types of CAM that they had used, including biologically and non-biologically based CAM, during their survivorship trajectory.

3. Fear of Cancer Recurrence and the Fear of Cancer Recurrence Inventory

FCR is defined as fear or worry about the possibility that cancer will return or progress to the same or another part of the body; this concept was suggested by Vickerg.[7] The FCRI is a multidimensional instrument specifically designed to assess FCR. The FCRI was originally developed by Simard and Savard[21] for assessing FCR among French-Canadian cancer patients and was translated and validated to produce the English version of the FCRI.[22] Based on this English version, the FCRI was translated into a Korean version by Shin et al.[8] The Korean version of the FCRI has shown high internal consistency (α=0.85 for the total scale and α=0.77–0.87 for the subscales) and test-retest reliability (r=0.90 for the total scale and r=0.54–0.84 for the subscales) in a validation study.[8]

Due to the complexity and multi-dimensionality of FCR, the FCRI was composed of 42 questions and seven subscales reflecting the prin-

Table 1. General characteristics of study participants

Characteristic	Total (N=326)	CAM user (N=216)	CAM nonuser (N=110)	P-value
Age (y)	51.7±8.9	51.3±8.2	52.4±10.2	0.302
Body mass index (kg/m^2)*				0.704
<23	180 (66.2)	120 (55.6)	60 (54.5)	
23–24.9	74 (22.7)	51 (23.6)	23 (20.9)	
≥25	72 (22.1)	45 (20.8)	27 (24.5)	
Marital status				0.681
Single	24 (7.4)	14 (6.5)	10 (9.1)	
Married	261 (80.1)	174 (80.6)	87 (79.1)	
Others	41 (12.6)	28 (13.0)	13 (11.8)	
Education				0.035
≤High school	190 (58.3)	117 (54.2)	73 (66.4)	
≥College degree	136 (41.7)	99 (45.8)	37 (33.6)	
Smoking status				0.442
Current smoker	2 (0.6)	2 (0.9)	0	
Past smoker	27 (8.3)	16 (7.4)	11 (10.0)	
None smoker	297 (91.1)	198 (91.7)	99 (90.0)	
Alcohol consumption				0.332
No	292 (89.6)	197 (91.2)	95 (86.4)	
<70 g/wk	28 (8.6)	15 (6.9)	13 (11.8)	
≥70 g/wk	6 (1.8)	4 (1.9)	2 (1.8)	
Physical activity†				0.279
Yes	138 (42.3)	96 (44.4)	42 (38.2)	
No	188 (57.7)	120 (55.6)	68 (61.8)	
Religion				0.670
No	96 (29.4)	62 (28.7)	34 (30.9)	
Yes, but no activity	80 (24.5)	55 (25.5)	24 (22.7)	
Yes, irregular activity	73 (22.4)	45 (20.8)	28 (25.5)	
Yes, regular activity	77 (23.6)	54 (25.0)	23 (20.9)	

Values are presented as mean±standard deviation or number (%). P-value were calculated with the use of t-test for a continuous variable and chi-square test for categorical variables.
CAM, complementary and alternative medicine.
*Body mass index was categorized based on criteria tailored for the East Asian population. †Physical activity was defined as ≥150 minutes of moderate activity per day or ≥75 minutes of vigorous activity per day based on the World Health Organization recommendation.

cipal characteristics and anxious features of FCR; each question in the FCRI was answered using a 5-point Likert scale from 0 to 4 (very unlikely to very likely).

The first subscale, triggers, measured the potential stimuli that evoked FCR. The second subscale, severity, evaluates the severity of FCR-related intrusive thoughts and images. The third subscale, psychological distress, asked about the factors that caused mental disturbance or suffering associated with FCR. The fourth subscale, coping strategies, measures how patients deal with severe FCR. The fifth subscale, functional impairment, evaluates the consequences of FCR, such as difficulty performing ordinary daily activities as before. The sixth subscale, insight, measured self-criticism regarding intense FCR. The last subscale, reassurance, assessed reassurance seeking behavior as a coping strategy. Each subscale has been described in detail previously.[21] Before starting this study, permission was obtained from Simard and Savard[21] and Shin et al.[8] to use the FCRI in this survey.

4. Statistical Analysis

We compared the general characteristics of the study participants according to CAM use (CAM users and non-users). The Student t-test was used for normally distributed continuous variables, and the chi-square test was used for other categorical variables. Descriptive statistics were used to present the types of CAM used by the breast cancer survivors.

The total and subscale scores of the FCRI were compared between CAM users and non-users using a general linear model. Variables with P-values of <0.1 in the univariate model and variables associated with FCRI scores in previous reports were selected as potential covariates. Thus, the analysis model was adjusted for age and time since breast cancer diagnosis as continuous variables, and education, history of radiotherapy, and history of hormone therapy as categorical variables.

The association between CAM use and FCR was evaluated using multivariable linear regression analysis. The number of types of CAM

Table 2. Breast cancer related information of study participants

Variable	Total (N=326)	CAM user (N=216)	CAM nonuser (N=110)	P-value
Time since breast cancer diagnosis (y)				<0.001
<1	71 (21.8)	30 (13.9)	41 (37.3)	
1–3	135 (41.4)	101 (46.8)	34 (30.9)	
≥3	120 (36.8)	85 (39.4)	35 (31.8)	
Stage of primary cancer*				0.612
0 & I	146 (44.8)	95 (44.0)	51 (46.4)	
II	127 (39)	82 (38.0)	45 (40.9)	
III & IV	47 (14.4)	34 (15.7)	13 (11.8)	
Unknown	6 (1.8)	5 (2.3)	1 (0.9)	
Distant metastasis				0.554
Yes	12 (3.7)	7 (3.2)	5 (4.5)	
No	314 (96.3)	209 (96.8)	105 (95.5)	
Received treatment				
Surgery				0.219
Yes	239 (73.3)	163 (75.5)	76 (69.1)	
No	87 (26.7)	53 (24.5)	34 (30.9)	
Chemotherapy				0.749
Yes	226 (69.3)	151 (69.9)	75 (68.2)	
No	100 (30.7)	65 (30.1)	35 (31.8)	
Radiotherapy				0.003
Yes	194 (58.5)	141 (65.3)	53 (48.2)	
No	132 (40.5)	75 (34.7)	57 (51.8)	
Hormone therapy				0.057
Yes	181 (55.5)	128 (59.3)	53 (48.2)	
No	145 (44.5)	88 (40.7)	57 (51.8)	
Target therapy				0.242
Yes	62 (19.0)	45 (20.8)	17 (15.5)	
No	264 (81.0)	171 (79.2)	93 (84.5)	
Recurrence of breast cancer				0.183
Yes	32 (10.4)	26 (12.0)	8 (7.3)	
No	292 (89.6)	190 (88.0)	102 (92.7)	
Family history of breast cancer				0.987
No	68 (20.9)	171 (79.2)	87 (79.1)	
Yes	258 (79.1)	45 (20.8)	23 (20.9)	

Values are presented as number (%). P-value were calculated with the use of chi-square test.
CAM, complementary and alternative medicine.
*Stage of breast cancer was categorized according to the American Joint Committee on Cancer 7th edition.

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used (0, 1, 2, or ≥3) was inserted into the analysis model as a continuous variable to assess the dose-dependent relationship between CAM use and FCR. All tests were two-tailed, and statistical significance was set at P<0.05. All statistical analyses were performed using the IBM SPSS Statistics for Windows ver. 24.0 (IBM Corp., Armonk, NY, USA).

RESULTS

1. General Characteristics and Breast Cancer-Related Information

The general characteristics of the participants are listed in Table 1. The mean age of the study participants was 51.7 years (standard deviation=8.9), and no difference in age between CAM users and non-users was observed. Although CAM users had a higher level of education than CAM non-users, there were no differences in marital status, smoking status, alcohol consumption, physical activity, or religion between the two groups.

Survivors with a longer duration since breast cancer diagnosis were more likely to use CAM than patients with breast cancer less than 1 year after their diagnosis. Patients who received radiotherapy tended to use CAM more frequently than those who did not undergo radiotherapy. Patients who received hormone therapy were also more likely to use CAM than those who did not undergo hormone therapy. Other breast cancer-related variables, such as stage, distant metastasis, surgery, chemotherapy, targeted therapy, cancer recurrence, and family history of breast cancer, were not associated with CAM use (Table 2).

Breast cancer patients tended to use biologically based CAM more than non-biologically based CAM. Among biologically based CAMs, vitamins (88%) are the most widely used CAM, followed by minerals (72%), probiotics (70%), mushrooms (64%), thymosin alpha-1 (42%), mistletoe (35%), and ginseng (34%). Mind-body interventions (47%), including yoga and meditation, were the most prevalently used type of non-biologically based CAM, followed by hyperthermia (38%) and acupuncture (16%) (Table 3).

CAM users had higher total FCR scores compared to CAM non-users after adjustment for covariates: CAM users: 74.6 (95% confidence interval [CI], 71.1–78.1) versus CAM non-users: 68.7 (95% CI, 63.9–73.4); P=0.047. Among the subscale scores, although CAM users had higher scores for triggers, severity, and coping strategies than CAM non-users in the crude analysis, statistical significance was only retained for coping strategy scores following multivariable adjustment: CAM users: 22.3 (95% CI, 21.1–23.3) versus CAM non-users: 20.6 (95% CI, 19.2–21.9); P=0.034. The triggers and severity scores were slightly higher among CAM users than among CAM non-users, with marginal significance (Table 4).

The association between the number of CAM types used and FCR is shown in Figure 1. The use of multiple types of CAM was associated with an increased FCR in a dose-dependent manner (P_{trend}=0.002). Higher scores for triggers (P_{trend}=0.025), severity (P_{trend}=0.002), and insight (P_{trend}=0.003) were observed as the number of CAM types used increased.

DISCUSSION

The present study showed that CAM use was associated with a higher

Table 3. Prevalence of use of complementary alternative medicine

Type of CAM	Frequency (%)
Biologically based CAM	
Vitamin	88 (40.7)
Probiotics	70 (32.4)
Mineral	72 (33.3)
Mushrooms	64 (29.6)
Ginseng	34 (15.7)
Mistletoe	35 (16.2)
Thymosin alpha-1	42 (19.4)
Herbal medicine	7 (3.2)
Non-biologically based CAM	
Acupuncture	16 (7.4)
Hyperthermia	38 (17.5)
Mind body interventions (yoga, meditation)	47 (29.1)
Others	33 (15.2)

CAM, complementary and alternative medicine.

Table 4. Comparison of fear of cancer recurrence between CAM user and non-user

Subscale components	Crude model			Multivariate-adjusted model*		
	CAM user (N=216)	CAM nonuser (N=110)	P-value	CAM user (N=216)	CAM nonuser (N=110)	P-value
F1. Triggers	**18.3 (17.3–19.3)**	**16.3 (14.9–17.7)**	**0.037**	17.9 (16.9–18.9)	16.3 (14.9–17.7)	0.065
F2. Severity	**15.6 (14.6–16.5)**	**13.7 (12.3–15.0)**	**0.025**	15.2 (14.2–16.2)	13.6 (12.3–15.0)	0.061
F3. Psychological distress	5.3 (4.8–5.9)	4.9 (4.1–5.6)	0.332	5.3 (4.7–5.8)	4.9 (4.1–5.7)	0.489
F4. Coping strategies	**22.4 (21.4–23.3)**	**20.4 (19.0–21.7)**	**0.029**	**22.3 (21.4–23.3)**	**20.6 (19.2–21.9)**	**0.034**
F5. Functioning impairments	6.1 (5.3–6.8)	6.0 (5.0–7.0)	0.959	6.0 (5.2–6.7)	5.9 (4.9–7.0)	0.961
F6. Insight	2.4 (2.1–2.8)	2.0 (1.5–2.5)	0.136	2.4 (2.0–2.7)	1.9 (1.4–2.4)	0.112
F7. Reassurance	5.4 (4.9–5.8)	5.5 (4.8–6.1)	0.830	5.5 (5.1–6.0)	5.4 (4.8–6.1)	0.780
Total score	**75.5 (72.1–78.9)**	**68.7 (63.9–73.5)**	**0.036**	**74.6 (71.1–78.1)**	**68.7 (63.9–73.4)**	**0.047**

Values are presented as mean (95% confidence interval). P-value were calculated with the use of general linear model. Statistically significant results are marked in bold.
CAM, complementary and alternative medicine.
*Age and time since breast cancer diagnosis were adjusted as continuous variable, and education, history of radiotherapy, and history of hormone therapy were adjusted as categorical variable in the analysis model.

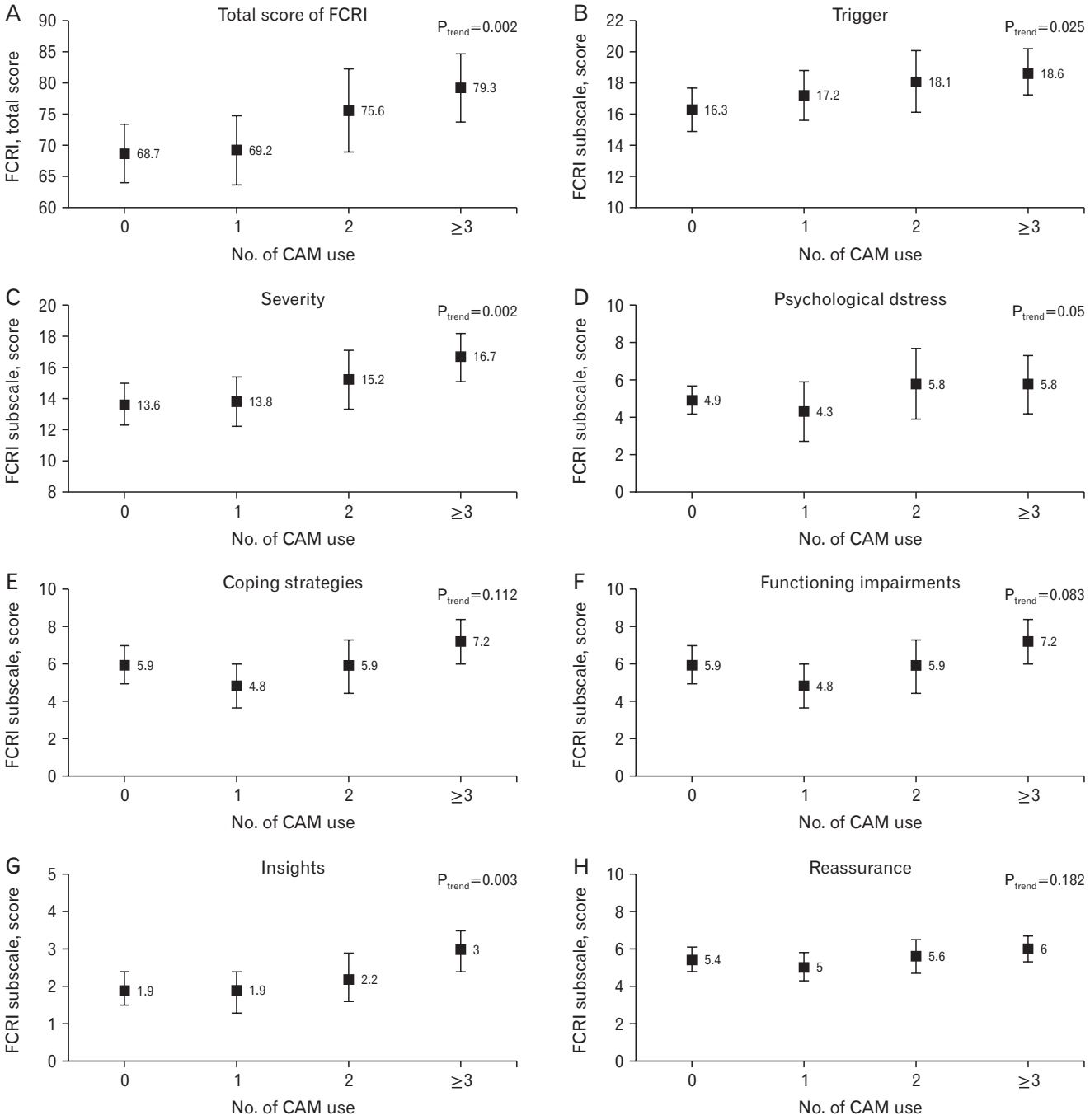

Figure 1. (A–H) Association between number of complementary and alternative medicine (CAM) use and subscale components of Fear of Cancer Recurrence Inventory (FCRI). Data are presented with mean and 95% confidence interval. P trend were calculated by inserting the number of CAM use as a continues variable in the general linear model. Age and time since breast cancer diagnosis were adjusted as continuous variable, and education, history of radiotherapy, and history of hormone therapy were adjusted as categorical variable in the analysis model.

level of education, more than 1 year after breast cancer diagnosis, radiotherapy, and hormone therapy. In addition, CAM users showed higher FCR than CAM non-users, and the use of multiple types of CAM was positively associated with FCR in a dose-response manner, especially regarding the subscales of triggers, severity, and insight. To our knowledge, this is the first study to evaluate the relationship between CAM use and FCR in breast cancer survivors.

The proportion of CAM users among participating breast cancer survivors was 66.8% (216/362), which was consistent with the prevalence of CAM use reported in a previous Korean study (60.6%)[3] but slightly lower than that reported in a Canadian study of breast cancer patients (81.9%).[1] Factors associated with CAM use have been previously reported.[3,4] Similar to the results of a previous study, which reported that the use of CAM was higher in patients with higher educa-

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tion levels,[3-5] the patients in our study who had higher education levels were more likely to use CAM. The higher educational level of CAM users might indicate that household income plays an important role in the decision-making regarding CAM use. Because most CAMs are not covered by the national health insurance program, accessibility to CAM might be affected by the economic status of breast cancer survivors. Previous studies reporting positive association between household income and CAM use also, at least in part, support the role of household income in the use of CAM.[23] However, although age has been considered an important predictor of CAM use in previous studies,[3,4] there was no difference in age between CAM users and non-users in this study.

Regarding cancer-related variables, years since cancer diagnosis, radiation therapy, and hormone therapy were positively associated with an increased prevalence of CAM use. This is consistent with a previous study that showed that the rate of CAM use increased 12 months after breast cancer diagnosis.[4] The relatively lower rate of CAM use in the first 12 months of breast cancer diagnosis is possibly related to physicians' attitudes toward the CAM modality. Considering the treatment trajectory of breast cancer, the first 12 months are likely to be the period of active cancer treatment, such as surgery, chemotherapy, and radiotherapy, and physicians might not want to incorporate CAM into the primary treatment modality because they do not expect the use of CAM to cure cancer or prolong life.[24] In addition, in a previous study, approximately 75% of physicians never referred their patients to CAM practitioners, and most physicians were not comfortable in counseling CAM use with the patients.[25] However, previous studies failed to show a significant association between CAM use and the type of treatment received by patients. In previous studies, vitamins and minerals were the most prevalent types of CAM among breast cancer survivors,[2,26] which was also the case in our study. However, the proportion of breast cancer survivors who used herbal medicine in our study was relatively lower than that reported in other studies.[3]

Breast cancer survivors who used CAM had higher overall FCRI scores than CAM non-users, which was consistent with previous studies that revealed that CAM use was associated with increased FCR.[14,16] The results of another study, which showed that clinical anxiety was a significant predictor in using CAM among high-risk breast cancer survivors (odds ratio, 1.92; 95% CI, 1.16–3.16),[5] were, at least in part, consistent with our study results. In addition, the results of a previous Canadian study, which reported that CAM users were more likely to perceive a risk of recurrence and death from cancer than non-users,[26] support our study results. However, a US study failed to show a significant association between CAM use and FCR.[17] Several previous studies have not shown any significant association between CAM use and anxiety,[27,28] and one study suggested an inverse relationship between CAM use and anxiety.[3] The reason for this discrepancy is unclear but may be attributable to the heterogeneous methods used to assess FCR among cancer survivors.[29] Another possible explanation for the inconsistent findings among previous studies could be related to the timeframe of CAM use. Considering that a common expectation of CAM use is improvement of emotional or physical well-being[30] and that CAM use for 6 weeks was associated with improvements in anxiety (P<0.001) and quality of life anxiety (P<0.001) among Israeli breast cancer survivors,[31] the timing and duration of CAM use among breast cancer survivors could play a significant role in the degree of FCR. However, further longitudinal studies are required to address the issue of temporality regarding CAM use and FCR.

With respect to the subscales of the FCRI, higher scores on the triggers, severity, and coping strategy subscales were observed in CAM users than in CAM non-users. CAM use seems to provide psychological stimuli that make survivors think more about the recurrence or progression of cancer compared to the control group. Moreover, compared with CAM non-users, breast cancer survivors who used CAM were more likely to experience intrusive thoughts or images related to cancer recurrence. According to a previous study that evaluated the correlations between FCRI scores and anxiety and depression, trigger and severity subscale scores were moderately correlated with anxiety.[21] Our results indicate that tailored psychological support addressing these anxiety aspects of FCR may be needed by breast cancer survivors who use CAM. In addition, the higher coping strategy score among CAM users compared to non-users suggests that various coping skills, such as cognitive avoidance, denial, and wishful thinking, are widely used by breast cancer survivors who use CAM.[32] The use of CAM might be a way to decrease FCR in these survivors. However, interestingly, scores for subscales such as psychological distress or functional impairments, which measure the potential consequences of FCR, did not differ between CAM users and non-users.

The use of multiple types of CAM was associated with increased scores on the FCRI and its subscales of triggers, severity, and insight in a dose-response manner. This finding indicates that the more types of CAM used, the more intense the FCR experienced by breast cancer survivors. Thus, supportive psychological interventions focused on the anxious features of FCR should be provided to breast cancer patients who use multiple types of CAM. Notably, the insight subscale scores related to self-criticism regarding FCR increased as the number of CAM types used increased. Although it is difficult to explain the underlying mechanism of the observed association, the use of CAM might, at least indirectly, have a positive influence on self-criticism regarding FCR among breast cancer survivors.

Accordingly, physicians who encounter breast cancer survivors who use multiple types of CAM should assess the degree of FCR and provide cognitive behavioral therapy-based psychological interventions, which have been shown to have robust effects on improving FCR among cancer survivors.[33]

This study had several limitations. First, because the study design could not address the issue of temporality, caution is required when interpreting the study results. In particular, it is unclear whether breast cancer survivors with high levels of FCR are more likely to use CAM or vice versa. Second, because the study participants were recruited from only a single tertiary hospital in South Korea, the results of this study cannot be generalized to the non-institutionalized general population,

non-Korean population, and breast cancer survivors who did not visit tertiary hospitals for treatment. Third, although the FCRI assesses the anxious features of FCR, other forms of psychological distress commonly observed in breast cancer survivors, such as depression, body image disorder, and low quality of life, were not assessed in this study; therefore, comparisons of other unmet psychological needs between CAM users and non-users were limited.

In conclusion, breast cancer survivors who used CAM showed higher levels of FCR than CAM non-users. The higher levels of FCR observed among CAM users were derived from the high levels of stimuli that triggered FCR and high levels of intrusive thoughts and images related to FCR. In addition, the dose-response relationship between the number of types of CAM used and FCR suggests that physicians who encounter breast cancer survivors who use multiple types of CAM should provide them with appropriate interventions to decrease FCR.

CONFLICT OF INTEREST

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

DATA SHARING

The Institutional Review Board of Kosin University Gospel Hospital does not allow research data sharing because it compromises the ethical standards of the institute.

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