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Exploring characteristics, predictors, and consequences of fear of cancer recurrence among Asian-American breast cancer survivors

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Abstract

Background To address the fear of cancer recurrence (FCR) research gap, we used prospective data to explore FCR predictors and FCR associations with health-related quality of life among Asian-American breast cancer survivors (BCS).

Methods A total of 208 diverse Asian-American BCS completed T1 survey, and 137 completed T2 survey after 1 year.

Results Fear of cancer recurrence scores (range = 0-4) were 2.01 at T1 and 1.99 at T2 reflecting low-to-moderate FCR. Scores of FCR were stable over the 1-year period ($t(126) = .144, P = .886$). Multiple regression analyses showed that Chinese women reported lower FCR both at T1 ($t(193) = -2.92, P = .004$) and T2 ($t(128) = -2.56, P = .012$) compared to other Asian women. Also, more positive health care experience at T1 predicted lower FCR at T2 ($\beta = -.18, P = .041$). Controlling for other covariates, greater FCR at T1 predicted poorer outcomes 1 year later including lower physical ($\beta = -.31, P < .001$), emotional ($\beta = -.37, P < .001$) and functional ($\beta = -.16, P = .044$) well-being and health-related quality of life specific to breast cancer at T2 ($\beta = -.31, P < .001$).

Conclusions We found substantial consistencies and some divergences between our findings with Asian-American BCS and the existing literature. This prospective investigation reveals new information suggesting that Asian-American subgroup variation exists and health care system factors may influence FCR. Thus, FCR studies should consider Asian subgroupings, cultural aspects, ie, level of acculturation and health care system factors including provider-patient communication and treatment setting. Future research may benefit from contextualizing FCR within a broader distress framework to advance the science and practice of patient-centered and whole-person care.

KEYWORDS

Asian-American cancer survivors, cancer, fear of cancer recurrence (FCR), health care satisfaction, health-related quality of life (HRQOL), oncology

1 | BACKGROUND

To date, a myriad of qualitative and quantitative research have been conducted directly or indirectly regarding fear of cancer recurrence (FCR), and at least 5 literature reviews have been published. Thus, much has been known in measures,^{1,2} covariates/predictors,^{1,3-5} prevalence, scores, changes over time, and

consequences of FCR.⁵ Nevertheless, FCR is still an understudied subject in several ways, and notably, there is a huge gap between research and practice, and especially the inclusion of racial/ethnic minorities. In an attempt to begin the fill, the existing gap in our understanding of FCR, based on previous studies, we examined scores, predictors, and outcomes of FCR among a diverse (with respect to level of education, income, origin of country, language

preference, and acculturation) sample of Asian-American breast cancer survivors (BCS).

1.1 | Asian cancer survivors are understudied with respect to fear of cancer recurrence

Asians are the fastest growing population in the United States because of immigration,⁶ and cancer is the leading cause of death in Asian-Americans.^{7,8} Thus, it is reasonable to expect that there will be a growing need to understand the impact of cancer and its treatments and to address survivorship care for Asian-Americans. Nevertheless, very few research has been conducted regarding FCR, and results are not consistent. A qualitative study found that more Chinese immigrant BCS reported unresolved symptoms than European-American BCS; such physical stressor prompted Chinese survivors' emotional anxiety about recurrence.⁹ In contrast, another study found that Chinese women reported less help regarding fear of cancer spreading than German women.¹⁰ Finally, a study conducted among Korean survivors found that the mean score of FCR was minimal.¹¹

Thus, virtually no research investigating FCR comprehensively among Asian-American cancer survivors exists and its subgroup differences even with a substantial heterogeneity among Asian-Americans regarding culture, language, acculturation, and so on.

1.2 | Predictors and consequences of FCR

According to the above-mentioned reviews, much research has found covariates/determinants of FCR including demographics (eg, age, gender, and education), treatment (eg, types of cancer and treatment), psychological factors (eg, emotional distress and religion/spirituality), and physical symptoms (eg, side effects and physical concerns). However, relatively few studies have investigated effects of health care experience on FCR (see previous studies^{11, 12-14, 5} for a review). Although these studies reported that positive health care experience was negatively correlated with FCR, only 1 study¹² showed that the relationship was significant when other covariates were controlled. Moreover, only 2 studies were longitudinal, prospective research.^{13,14} Thus, whether health care satisfaction "predicts" FCR is largely unknown.

With respect to outcomes of FCR, many studies investigated effects of FCR on health-related quality of life (HRQOL). However, the association between FCR and HRQOL differs across the domains of HRQOL. Fear of cancer recurrence was negatively associated with a subdomain of HRQOL, emotional/mental functioning, whereas it was not significantly associated with subdomains of HROQL such as physical functioning and social functioning (see previous study⁵).

1.3 | Gaps in the literature and the present study

The FCR literature is heavily based on cross-sectional studies; thus, FCR was often assessed at 1 time point only (see previous study⁴), although, we found 1 longitudinal study that measured FCR for 6 years.¹⁵ Likewise, the majority of studies investigated the relationship between covariates and FCR and between FCR and consequences at the same time point. Moreover, no study, to date, focused on Asian-American populations. In response to these gaps in the literature, we

investigated scores, change over time, predictors, and consequences of FCR over a 1-year period among Asian-American BCS. To fully use the prospective, longitudinal research design and to examine whether FCR predict HRQOL, we investigated associations between baseline FCR and 1-year post baseline HRQOL. The predictors and consequences of FCR were chosen on the basis of the previous reviews.^{4,5}

This paper reports on secondary data analyses of a 1-year longitudinal study examining functional strain on psychological/family functioning and follow-up care among Asian-American BCS. In this exploratory study, first, we examined the scores and frequency of FCR at T1 (baseline) and T2 (1 year later) and its change from T1 to T2. We hypothesized that scores of FCR would be small-to-moderate at both T1 and T2. However, because of the lack of research in Asian-American survivors, we did not formulate a specific hypothesis regarding the change of FCR. Second, we explored whether FCR differed across subgroups of Asian BCS given that reported variations in breast cancer experience/HRQOL within Asian-American subgroups.¹⁶ Because of the dearth of research, likewise, we did not formulate a specific hypothesis regarding the subgroup difference. Third, we hypothesized that more positive health care experience at baseline would predict lower FCR at T2, even after controlling for other covariates. Finally, we hypothesized that baseline FCR would predict lower HRQOL at T2, especially emotional well-being, when other covariates were taken into account.

2 | METHODS

2.1 | Participants and procedures

Asian-American BCS were recruited from community-based health organizations that serve lower socioeconomic status (SES) persons living in the West Coast of the United States from 2007 to 2009. Participants were eligible if they met the following criteria: (1) were Asian adults (≥ 18 years old); (2) were at least ≥ 6 months of a breast cancer diagnosis; (3) did not have any other major disabling medical or psychiatric condition (eg, psychosis); and (4) had ability to read or speak English, Chinese, Korean, or Vietnamese. All contact materials (eg, recruitment letter, flyers, survey questionnaire, and consent forms) were translated into Chinese, Korean, and Vietnamese, given that our previous experience with multiethnic Asian-American BCS indicated that most Filipina and Japanese are bilingual and possess English literacy.

Institutional Review Board approval from participating entities was obtained, and all participants provided written informed consent for study participation. Recruitment letters were mailed to potential participants directly from the community-based agency to comply with patient privacy and Health Insurance Portability and Accountability Act (HIPAA) regulations. Two weeks after the letters were sent, a brief telephone screening to assess eligibility was conducted with interested individuals. Those who were eligible and verbally consented to participate in the study were mailed 2 copies of the consent form, the questionnaire, and a postage-paid return envelope. A total of 208 survivors completed the baseline survey, and 137 (retention rate: 66%) completed the follow-up survey. Each participant received a \$40 grocery gift certificate upon completion of each assessment.

2.2 | Measures

2.2.1 | Demographics and cancer treatment

At baseline, participants' current age, age at diagnosis, origin of country, language preference to talk about emotional issues, years living in the United States, and level of education and household income were assessed. Having undergone chemo and radiation therapy, stage of cancer, and years since diagnosis were also assessed.

2.2.2 | Health care experience

Health care experience was assessed with items adapted from the Adherence Determinants Questionnaire—interpersonal aspects of care subscale.¹⁷ The interpersonal aspects of care consist of 8 items (eg, “The doctors and other health professionals answer all my questions,” “The doctors and other health professionals act like I'm wasting their time”). However, we added items tailored for Asian-American BCS such as “I feel the doctors are providing me with the best medical treatment available for cancer,” “The doctors and other health professionals were sensitive to my cultural values.” We used a total of 13 items. Participants were asked to report to the extent to which they agreed or disagreed with each statement from 1 (strongly disagree) to 5 (strongly agree). Cronbach alpha in the present sample was .93.

2.2.3 | Health-related quality of life

The Functional Assessment of Cancer Treatment (FACT;¹⁸) for breast cancer (FACT-B, version 4), a reliable and valid instrument,¹⁹ composed of 5 subdomains: 7 items of physical well-being (range = 0-28) (eg, “I have a lack of energy”), 7 items of social/family well-being (range = 0-28) (eg, “I get emotional support from my family”), 6 items of emotional well-being (range = 0-24) (eg, “I feel nervous”), 7 items of functional well-being (range = 0-28) (eg, “I am able to work including work at home”), and 9 items of breast cancer subscale (range = 0-36) (eg, “I am bothered by hair loss”) assessing HRQOL specific to breast cancer. Participants were asked to indicate how true each statement has been for them during the past 7 days from 0 (not at all) to 4 (very much). Cronbach alphas in the present sample ranged from .72 to .92.

2.2.4 | Fear of cancer recurrence

Fear of cancer recurrence was examined with 1 item, “I worry about my cancer coming back or spreading” from 0 (not at all) to 4 (very much). This item is included in the FACT-B as one of the additional items, but is not currently calculated for scoring any subdomains of HRQOL.

2.3 | Analytic strategy

First, we conducted chi-square and t test to examine whether the noncompleters differed from completers with respect to T1 demographics, cancer treatments, FCR, and HRQOL. Second, a descriptive analysis was conducted to investigate scores of FCR at each time point. Third, a paired t test was conducted to examine whether FCR changed from T1 to T2. Fourth, a Pearson (or point-biserial, if appropriate) correlation analysis between T1 predictors and T2 FCR and between T1 FCR and T2 HRQOL was conducted. Fifth, a multiple regression analysis with significant predictors in the correlation

analysis was conducted to investigate T1 factors predicting T2 FCR. Finally, multiple regression analyses were conducted to examine whether T1 FCR predicted T2 HRQOL. Missing data were listwise deleted. Significance level was set $P < .05$. All analyses were conducted with SPSS 19.

3 | RESULTS

3.1 | Attrition from T1 to T2

Seventy-one participants did not complete the T2 survey (attrition rate = 34%). There was no difference (all P s > .05) between noncompleters and completers regarding baseline age ($t(196) = -.24$), ethnicity ($\chi^2(3) = .655$), years living in the United States ($t(184) = -1.31$), language preference ($\chi^2(1) = 2.38$), income ($\chi^2(3) = 2.67$), education ($\chi^2(1) = .302$), age at diagnosis ($t(189) = -1.10$), years since cancer ($t(185) = 1.12$), having undergone chemo ($\chi^2(1) = .570$) and radiation therapy ($\chi^2(1) = .975$), health care satisfaction ($t(193) = .18$), FCR ($t(193) = 1.31$), and HRQOL (physical well-being [$t(176) = -.06$]; social/family well-being [$t(189) = .48$], emotional well-being [$t(187) = .45$], and functional well-being [$t(193) = .01$]; breast cancer subscale [$t(193) = .30$]).

3.2 | Final sample characteristics

In the final sample, mean age and age at diagnosis was 54.84 (SD = 9.56; range = 31-83 years) and 52.50 years (SD = 9.23; range = 30-81 years), respectively. Mean time since diagnosis was 2.76 years (SD = 2.55) indicating that they are short-term survivors; about 87% were diagnosed within 5 years. Approximately 40% of participants reported that their household income was below \$25 000, and 53.8% reported that their highest level of education was below college. More than half were Chinese (51.1%), followed by Koreans (18.2%), Filipinas (13.1%), Vietnamese (6.6%), Japanese (5.8%), and mixed (.7%). Mean years living in the United States were 21.64 (SD = 11.05), but many (62.0%) reported that they preferred to talk about emotional issues with their own language. Most of the participants were diagnosed with cancer stages 0-II (81.9%) and had undergone chemotherapy (72.0%) or radiation (53.2%). Most participants completed their primary treatments. Specifically, only 2 participants were under chemotherapy, and 3 were under radiation therapy at the time of recruitment. Detailed information regarding participant characteristics was presented in Table 1.

3.3 | Scores of FCR and its transition from T1 to T2

At T1, FCR score was 2.01 (SD = 1.36; item range = 0-4); 11.8% reported “not at all,” 27.7% reported “a little bit,” 22.1% reported “somewhat,” 17.4% reported “quite a bit,” and 21.0% reported “very much” FCR. At T2, FCR score was 1.99 (SD = 1.43; item range = 0-4); 16.1% reported “not at all,” 29.2% reported “a little bit,” 16.8% reported “somewhat,” 13.9% reported “quite a bit,” and 24.1% reported “very much.” Fear of cancer recurrence score was not significantly changed from T1 to T2, $t(126) = .144$, $P = .886$.

TABLE 1 Participant characteristics (n = 137)

Variable	Statistics
Mean age, years (SD)	54.84 (9.56; range = 31-83)
Age at diagnosis, years (SD)	52.50 (9.29; range = 30-81)
Ethnicity, %	
Chinese	70 (51.1%)
Korean	25 (18.2%)
Filipina	18 (13.1%)
Vietnamese	9 (6.6%)
Japanese	8 (5.8%)
Mixed	1 (.7%)
Missing	6 (4.4%)
Language preference, %	
Native language preference	85 (62.0%)
No Native language preference (English or Bilingual)	38 (27.7%)
Missing	14 (10.2%)
Mean years living in the United States (SD)	21.64 (11.05)
Income, %	
<\$25 000	51 (37.2%)
≥\$25 000, <\$45 000	27 (19.7%)
≥\$45 000, <\$75 000	20 (14.6%)
>\$75 000	29 (21.2%)
Missing	10 (7.3%)
Education, %	
Below college	70 (51.1%)
At least college	60 (43.8%)
Missing	7 (5.1%)
Stage of diagnosis, %	
0	11 (8.0%)
1	34 (24.8%)
2	59 (43.1%)
3	21 (15.3%)
4	2 (1.5%)
Missing	10 (7.3%)
Mean years since diagnosis (SD)	2.76 (2.55)
Chemotherapy, %	
No	35 (25.5%)
Yes	90 (65.7%)
Missing	12 (8.8%)
Radiation, %	
No	59 (43.1%)
Yes	67 (48.9%)
Missing	11 (8.0%)
FCR score (SD)	
Time 1 FCR	1.99 (1.37)
Time 2 FCR	2.01 (1.44)
Mean Time 2 HRQOL (SD)	
Physical well-being	19.57 (6.34)
Social/family well-being	17.80 (6.83)
Emotional well-being	17.57 (5.15)
Functional well-being	18.38 (6.59)
Breast cancer subscale	21.25 (6.43)

Abbreviations: FCR, fear of cancer recurrence; HRQOL, health-related quality of life.

Time 1 = baseline; Time 2 = 1 year later.

3.4 | FCR across subgroups of Asian-Americans

Because of small sample size in subgroups, we divided participants into 2 ethnic groups: Chinese (51%) vs others (49%). These 2 groups did not differ in age ($t(127) = -.04, P = .97$), age at diagnosis ($t(124) = .52, P = .60$), level of income ($\chi^2(1) = .02, P = .100$) and education ($\chi^2(1) = .42, P = .515$), length living in the United States ($t(119) = -1.43, P = .156$), years since diagnosis ($t(120) = -1.69, P = .094$), undergone chemo ($\chi^2(1) = .04, P = .836$) and radiation therapy ($\chi^2(1) = .00, P = .973$), and stage of cancer ($t(125) = -1.65, P = .102$). However, there was a significant difference regarding language preference ($\chi^2(1) = 5.65, P = .017$); Chinese women more preferred their own language to talk about emotional issues.

Results showed that Chinese survivors reported significantly lower scores of FCR than survivors from other Asian countries at T1 ($t(193) = -2.92, P = .004$) and at T2 ($t(128) = -2.56, P = .012$). This significant difference remained when language preference was taken into account: at T1 ($F(1119) = 6.94, P = .010$) and at T2 ($F(1119) = 8.52, P = .004$).

3.5 | Correlations among demographics, treatments, health care satisfaction, FCR, and HRQOL

Correlations among T1 demographics, cancer treatments, health care satisfaction, and T2 FCR were presented in Table 2. Results showed that only T1 stage of cancer ($r = .22, P = .015$) and health care satisfaction ($r = -.19, P = .032$) were significantly associated with T2 FCR.

Correlations among T1 demographics, cancer treatments, FCR, and T2 HRQOL were presented in Table 3. T1 FCR was associated with T2 physical ($r = -.33, P < .001$), emotional ($r = -.43, P < .001$) and functional well-being ($r = -.25, P = .004$), and HRQOL specific to breast cancer ($r = -.35, P < .001$), but not with social/family well-being ($r = -.03, P = .728$).

TABLE 2 Correlations among Time 1 demographics, cancer characteristics, health care experience, and Time 2 fear of cancer recurrence

Time 1 Predictors of FCR	Time 2 FCR
Current age	-.09
Age at diagnosis	-.10
Ethnicity (reference: Chinese)	.22*
Income (reference: <\$45 000)	-.06
Education (reference: below college)	-.08
Language preference (reference: their own language)	-.08
Years living in the United States	.01
Years since diagnosis	.07
Chemotherapy (reference: no chemotherapy)	.06
Radiation (reference: no radiation therapy)	.07
Cancer stage	.22*
Health care satisfaction	-.19*

Abbreviation: FCR, fear of cancer recurrence.

Time 1 = baseline; Time 2 = 1 year later.

* $P < .05$.

TABLE 3 Correlations between Time 1 demographics, cancer characteristics, health care experience, fear of cancer recurrence, and Time 2 health-related quality of life

Time 1 Covariates/Predictors	Time 2 Health-related Quality of Life				
	Physical well-being	Social/family well-being	Emotional well-being	Functional well-being	Breast cancer subscale
Current age	-.03	.07	.11	.08	.13
Age at diagnosis	-.07	.11	.16	.08	.10
Ethnicity (reference: Chinese)	-.04	-.06	-.05	.07	.06
Income (reference: <\$45 000)	.28**	.06	.14	.20*	.13
Education (reference: below college degree)	.26**	.23**	.12	.25**	.20*
Language preference	.35***	.24**	.25**	.29**	.28**
Years living in the United States	-.04	-.17	-.09	-.02	.02
Years since diagnosis	.14	-.08	-.20*	.01	.06
Chemotherapy (yes/no)	-.07	.05	-.06	-.10	-.03
Radiation (yes/no)	-.07	-.03	-.19*	-.08	.03
Cancer stage	-.13	-.04	-.01	-.11	-.10
Health care satisfaction	.30**	.48***	.43***	.49***	.37***
Fear of cancer recurrence	-.33***	-.03	-.43***	-.25**	-.35***

Time 1 = baseline; Time 2 = 1 year later.

* $P < .05$.** $P < .01$.*** $P < .001$.

TABLE 4 Multiple regression analyses for Time 2 fear of cancer recurrence and health-related quality of life

Time 2 Outcome	Time 1 Predictors	B	SE B	β	Model Statistics
Fear of cancer recurrence	Ethnicity	.59	.25	.20*	F (3, 119) = 5.21, $P = .002$, Adj $R^2 = .09$
	Cancer stage	.27	.14	.16	
	Health care satisfaction	-.39	.19	-.18*	
Physical well-being	Income	2.07	1.11	.16	F (5, 101) = 9.27, $P < .001$, Adj $R^2 = .28$
	Education	.70	1.16	.06	
	Language preference	3.48	1.29	.26**	
	Health care satisfaction	1.49	.82	.16	
	Fear of cancer recurrence	-1.40	.40	-.30**	
Emotional well-being	Language preference	2.30	.86	.21**	F (5, 105) = 15.05, $P < .001$, Adj $R^2 = .40$
	Years since diagnosis	-.41	.15	-.21**	
	Radiation	-.81	.81	-.08	
	Health care satisfaction	2.34	.60	.31***	
	Fear of cancer recurrence	-1.43	.30	-.38***	
Functional well-being	Income	1.64	1.11	.12	F (5, 110) = 11.44, $P < .001$, Adj $R^2 = .31$
	Education	1.24	1.16	.09	
	Language preference	2.17	1.28	.15	
	Health care satisfaction	4.04	.81	.41***	
	Fear of cancer recurrence	-.81	.40	-.16*	
Breast cancer subscale	Education	1.35	1.17	.11	F (4, 111) = 11.59, $P < .001$, Adj $R^2 = .27$
	Language preference	2.75	1.29	.20*	
	Health care satisfaction	2.19	.80	.23*	
	Fear of cancer recurrence	-1.56	.39	-.33***	

Time 1 = baseline; Time 2 = 1 year later.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

3.6 | T1 factors predicting T2 FCR

We conducted a multiple regression analysis to predict T2 FCR by including only significant factors in the above *t* test and correlation analysis. Thus, T1 origin of country (China vs others), stage of cancer, and health care satisfaction were included as predictors. Results (see Table 4) showed that T1 origin of country ($\beta = .20$, $P = .022$) and health care satisfaction ($\beta = -.18$, $P = .041$) were significantly associated with T2 FCR, whereas T1 stage of cancer was not ($\beta = .16$, $P = .066$).

3.7 | T1 FCR and other factors predicting T2 HRQOL

We conducted multiple regression analyses to predict T2 HRQOL including factors significantly correlated with T2 HRQOL in the above correlation analysis. Given that FCR was not associated with social/family well-being, we did not conduct a multiple regression analysis for social/family well-being. Results are presented in Table 4.

T1 FCR ($\beta = -.30$, $P = .001$) and language preference ($\beta = .26$, $P = .008$) predicted T2 physical well-being. T1 FCR ($\beta = -.38$, $P < .001$), health care experience ($\beta = .31$, $P < .001$), language preference ($\beta = .21$, $P = .009$), and years since cancer diagnosis ($\beta = -.21$, $P = .007$) predicted T2 emotional well-being. T1 FCR ($\beta = -.16$, $P = .044$) and health care experience ($\beta = .41$, $P < .001$) predicted T2 functional well-being. Finally, T1 FCR ($\beta = -.33$, $P < .001$), health care experience ($\beta = .23$, $P = .007$), and language preference ($\beta = .20$, $P = .035$) predicted T2 HRQOL specific to breast cancer. When T1 HRQOL was controlled, however, T1 FCR did not predict T2 HRQOL.

4 | CONCLUSIONS

The increasing representation of Asian-American in the general United States and global populations as well as among cancer patients and

survivors suggests an expected corresponding need for research to better understand the impact of cancer and its treatments including FCR and address survivorship care for Asian-Americans. Nevertheless, we could locate very few studies examining FCR among Asian survivors, and virtually nothing has been known regarding experiences of FCR among Asian-American BCS. Thus, on the basis of existing reviews, we investigated scores, predictors, and consequences of FCR among diverse Asian-American BCS.

Fear of cancer recurrence characteristics (scores, change over time) in our sample of Asian-American BCS were consistent to those reported in the existing literature. Fear of cancer recurrence scores were small-to-moderate in our sample both at the baseline and 1 year later. Also, their FCR scores were not significantly changed from baseline to 1 year later, although we are not sure about temporal fluctuations of their FCR across the 1 year (cf. a recent research showed that FCR may fluctuate even a short-time period; see previous study²⁰).

Because experiencing FCR is natural to some extent and not all FCR is abnormal, it is essential to measure/screen clinical level of FCR (see previous study²¹) to identify those who would benefit from psychosocial interventions. We found that even with the low scores of FCR, more than one-third reported moderate-to-high level of FCR: 38.4% at T1 and 38.0% at T2. However, it should be noted that this moderate-to-high level does not indicate that it is clinical level. Identifying clinical FCR can be guided by the following 5 possible characteristics recently suggested by a group of experts in FCR²²: (1) high levels of preoccupation, worry, rumination, or intrusive thoughts; (2) maladaptive coping; (3) functional impairments; (4) excessive distress; and (5) difficulties making plans for the future. Assessing clinical FCR can be essential in clinical settings. Distress screening is currently mandated by the Commission on Cancer in accredited facilities (see previous study²³), and National Comprehensive Cancer Network developed a distress thermometer and problem list. Although the problem list

includes general emotional problems such as fears, nervousness, and worry, FCR is not specifically enlisted. Given evidence showing that cancer-specific distress questionnaires gave a more precise insight into survivors' experience than general or psychiatric questionnaires²⁴, routine FCR screening in clinical setting might be required.

Previous reviews consistently reported that age was negatively associated with FCR (see previous study⁵); younger BCS reported higher FCR (eg, under 34 or ages 35-49 compared to other groups;²⁵). However, age was not significantly associated with FCR in the present study. In fact, most demographic and medical factors at baseline were not associated with participants' later FCR. These inconsistent findings might be due to a sample composition. Our sample comprised relatively older BCS: about 65% and 70% reported that their age at diagnosis and current age was over 50 years, respectively.

Further, our study revealed that baseline FCR predicted later physical, emotional, and functional well-beings and HRQOL specific to breast cancer, even when other covariates were taken into account, whereas the existing literature reported that FCR did not predict physical well-being.⁵ Note that when baseline HRQOL was included, FCR was no longer significant; however, because many survivors are usually well adjusted to post-cancer life,²⁶ this 1-year prospective study following treatment could provide a fairly strict test. Thus, our findings show that FCR is an important psychological sequela among Asian-American BCS that influences diverse subdomains of HRQOL and support the notion that FCR should receive more focused research attention in this population to provide better and tailored survivorship care.

Compared with Chinese women, women from other countries (eg, Korea, Philippines, Vietnam) reported more FCR at baseline and 1 year later. There are more than 4 millions of Chinese in the United States, which makes up the largest among all Asian groups.⁸ Given that about 41% of Asians reported that all or most of their friends in the United States are from their same country of origin,²⁷ we assume that Chinese women might receive the greatest amount of support from their fellow Chinese and community, which probably influenced their lower scores of FCR. However, it is also possible that Chinese women overall might be more optimistic regarding their treatment and progress than women from other Asian countries. However, this finding could be interpreted cautiously given that the present study was conducted in a convenience sample, and these 2 groups did differ with respect to language preference. This result implies that we may need to attend to subgroups of Asian-American BCS (see previous study¹⁶) given their potential heterogeneity regarding culture, beliefs, available social support/facilities, and so on. Further, we found that Asian-American BCS who preferred their own language to talk about emotional issues reported lower physical and emotional well-beings and HRQOL specific to breast cancer than those who preferred English or both (either English or their own language). Thus, level of acculturation should also be considered in research and psychosocial care to improve Asian-Americans' HRQOL.

As hypothesized, baseline positive health care experience predicted lower FCR at 1 year later. Because previous studies regarding the association between health care factors and FCR were supported with only cross-sectional designs or bivariate correlation analyses, our results, for the first time, showed that positive health care experience negatively predicted later FCR among Asian-American BCS. Thus,

this result might emphasize that there should be efforts at the health care providers to provide improved quality care to Asians BCS to lower their FCR and improve their survivorship outcomes. Although there was no systematic research conducted for Asian BCS, given previous studies conducted in BCS^{28,29} and assessed health care experience in the present study, informative and supportive communication with the physician and providing culturally sensitive care (physician training and translation service) appear to be critical for positive health care experience in Asian-American BCS.

The present research has several limitations. First, we assessed FCR with only 1 item, "worry about my cancer coming back or spreading," thus, reliability of the item could not be assessed. Although this item well aligns with the agreed definition of FCR, "fear, worry, or concern relating to the possibility that cancer will come back or progress,"²² it does not assess multidimensional aspects of FCR (see previous studies^{30,31}). Although several validated FCR scales are available (eg, previous studies^{30,32}), to date, FCR measures vary (eg, longer or brief scales developed specifically for FCR, FCR subscales within HRQOL questionnaires, single item) and often, their psychometric property is not available (see previous study⁵). Also, none of the available scales was specifically developed for diverse Asian-American survivors. Thus, results of the present study should be cautiously interpreted given that the FCR indicates only worry in the present study, and it may not well reflect unique FCR experiences (if any) in Asian-American survivors. Future studies using reliable and valid measures of FCR among Asian-American survivors can advance the science of FCR. Second, because of the homogenous (breast cancer) and convenience sample, results from the present study may not be generalizable to other Asian-American survivors with different cancer types and/or male survivors, although recent population-based research found that there was no difference in severity of FCR across cancer types implying that FCR is a universal concern across cancer survivors³³. Moreover, the participant recruitment took place about 10 years ago. Thus, the present result might not reflect the FCR experiences in current Asian-American BCS cohort. Finally, even though we followed up survivors to 1 year, we assessed FCR and HRQOL only twice. Longitudinal, prospective research followed up FCR, and HRQOL more than 2 time points is highly required to examine how FCR and its relationships with HRQOL unfold over time.

Nevertheless, to our best knowledge, this is the first longitudinal, prospective research to investigate FCR among Asian-American BCS, especially including diverse Asian-American subgroups regarding the origin of country and level of education and income. Our unique investigation reveals that future FCR studies should attend to Asian subgroups and consider other appropriate healthcare factors including communication and treatment setting and cultural aspects including level of acculturation.

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ETHICAL APPROVAL

This study was approved by the appropriate ethics committee and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

CONFLICT OF INTEREST

The authors have no financial disclosures to report.

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