Breast Cancer Among Asian Americans: Is Acculturation Related to Health-Related Quality of Life?

Jinsook Kim, PhD, MPH, DDS, Kimlin T. Ashing-Giwa, PhD, Marjorie Kagawa Singer, PhD, MA, MN, RN, and Judith S. Tejero, MPH

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Purpose/Objectives: To examine the association of acculturation with health-related quality of life (HRQOL) among Asian American breast cancer survivors.

Design: Cross-sectional.

Setting: Analysis of an Asian American subsample of breast cancer survivors from a larger multiethnic study.

Sample: 206 Asian Americans, including Chinese, Filipinos, Koreans, and Japanese. Most were diagnosed with early-stage breast cancer (stage 0–II) and were an average of 54 years old.

Methods: Participants completed a mailed questionnaire or answered a telephone survey in English, Mandarin, or Korean. HRQOL was measured using the Functional Assessment of Cancer Therapy–Breast Version 4. Acculturation was measured using an eight-item scale adapted from Marin's Short Acculturation Scale.

Main Research Variables: HRQOL, acculturation, health insurance, life stress, and social support.

Findings: Acculturation was significantly associated with HRQOL when demographic, medical, socioecologic, and healthcare access factors were controlled. However, the significant association between acculturation and HRQOL disappeared when Asian subgroup membership was considered. Subgroup differences in HRQOL remained after controlling for covariates, with Korean Americans reporting lower HRQOL than the other Asian American subgroups.

Conclusions: The absence of a significant association between acculturation and HRQOL in the final model is likely a result of the strong association between acculturation and Asian American subgroup membership. The results suggest that the correlation between acculturation and HRQOL is not an effect of having health insurance, life stress, and social support.

Implications for Nursing: Closer attention is needed regarding acculturation level; Asian American subgroup differences, including language capacity; and socioecologic characteristics in nursing practice and research.

Key Points . . .

➤ The correlation between acculturation and health-related quality of life (HRQOL) is not associated with the effect of health insurance, life stress, and social support.

➤ Acculturation is not significantly associated with HRQOL when Asian American subgroup membership is considered.

➤ Subgroup differences in HRQOL remained after controlling for covariates, with Korean American breast cancer survivors showing lower HRQOL than the other Asian subgroups.

Jinsook Kim, PhD, MPH, DDS, is an assistant professor in the public health and health education programs in the College of Health and Health Sciences at Northern Illinois University in DeKalb; Kimlin T. Ashing-Giwa, PhD, is a professor and director in the Center for Community Alliance for Research and Education at the City of Hope Division of Population Sciences in Duarte, CA; Marjorie Kagawa Singer, PhD, MA, MN, RN, is an associate professor in the School of Public Health and Asian American Studies Department at the University of California, Los Angeles; and Judith S. Tejero, MPH, is a project coordinator at the City of Hope Division of Population Sciences. (Submitted January 2006. Accepted for publication April 20, 2006.)

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Although the mortality rates from breast cancer have significantly declined among almost all racial and ethnic groups in the United States from 1992–2002, no significant decline was found among Asians and Pacific Islanders (Ries et al., 2005). The limited epidemiologic data on breast cancer among Asian Americans suggest important subgroup differences in incidence and cancer stage. The Los Angeles (California) County Cancer Surveillance Program reported that Japanese American women had the highest incidence of breast cancer compared to all ethnic groups, although Chinese and Filipino

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Among women of all racial and ethnic groups, breast cancer is the most common form of cancer and the second-leading cause of cancer death in the United States (American Cancer Society, 2006). Breast cancer rates are increasing dramatically for specific Asian American subgroups (Deapen, Liu, Perkins, Bernstein, & Ross, 2002).

women experienced significant increases in incidence rates (Deapen et al.). Japanese Americans have higher rates of stage 0–II breast cancer at presentation, and Filipino, Indian, and Pakistani Americans and Native Hawaiians have a higher risk of presenting with stage III and IV tumors compared with European Americans (Li, Malone, & Daling, 2003).

Health-Related Quality of Life of Breast Cancer Survivors

Breast cancer is characterized by high survival rates for individuals diagnosed with early-stage disease (I and II) (Gotay, Holup, & Pagano, 2002). Because of high survival rates, the effect of breast cancer on health-related quality of life (HRQOL) for the growing number of breast cancer survivors has been of great concern. HRQOL is a multifarious framework that appraises physical, functional, emotional, and social well-being in relation to health (Cella et al., 1993; Gill & Feinstein, 1994; McQuellon, Kimmick, & Hurt, 1997).

Cancer-related QOL is an individual's assessment of his or her management of day-to-day activities and sense of well-being after cancer and its treatments. The physical domain includes disease-related, treatment-related, and general bodily concerns. The functional domain includes the ability to work and perform other usual responsibilities. The emotional domain includes the presence or absence as well as levels of depression, anxiety, and general emotional well-being. The social domain includes the ability to participate in usual family and social activities (Cella et al., 1993).

A variety of factors, including those related to cancer and socioecology, have been suggested to affect the HRQOL of breast cancer survivors (Ashing-Giwa, 2005; Ashing-Giwa, Padilla, Tejero, Kraemer, et al., 2004; Lehto, Ojanen, & Kellokumpu-Lehtinen, 2005). Socioecologic factors, such as life stress and social support, may influence HRQOL by mediating the effect of cancer-specific factors on breast cancer survivors' well-being. Life stress is likely to disturb a person's ability to cope with the stresses of cancer and its treatment (Baider, Kaufman, Ever-Hadani, & De-Nour, 1996). In contrast, social support may have positive effects on breast cancer survivors' well-being by alleviating the negative consequences of breast cancer diagnosis and treatment (Kagawa-Singer, Wellisch, & Durvasula, 1997; Lehto et al.; Wellisch et al., 1999).

As with many other research areas, disparities exist in the inclusion of ethnic minority women in cancer survivorship studies. The vast majority of studies on breast cancer survivors is comprised primarily of European American and middle- to upper-class samples (Ashing-Giwa, 1999; Ashing-Giwa & Ganz, 1997). A few researchers have explored possible ethnic and cultural influences on HRQOL (Ashing-Giwa, Ganz, & Petersen, 1999; Gotay et al., 2002), and a dearth of quantitative studies have addressed HRQOL among Asian American survivors. Even fewer studies exist documenting subgroup differences in the quality-of-life experiences of Asian immigrant breast cancer survivors (Ashing, Padilla, Tejero, & Kagawa-Singer, 2003). Kagawa-Singer et al. (1997) reported differences in medical and psychosocial distress between Asian Americans of high and low acculturation. Their results suggest that Asian Americans with low acculturation expressed higher distress related to medical problems than their highly acculturated counterparts or European Americans, but

the lowest psychosocial distress. To date, no study was found with sufficient sample sizes to conduct meaningful quantitative data analyses on the relationship between acculturation and HRQOL among Asian breast cancer survivors in the United States.

Acculturation and Health-Related Quality of Life

Studies have found relationships between acculturation and the health of immigrant populations (Arcia, Skinner, Bailey, & Correa, 2001; Salant & Lauderdale, 2003). The term "acculturation" is used most often to define an immigrant's process of adaptation to a new home country in which varying elements of the newcomer and dominant cultures are retained and internalized (Trimble, 2003). In the current study, the authors defined acculturation as an immigrant's process of readjustment and integration of beliefs and practices through interaction with other ethnic groups and exposure to the culture of the host society. Acculturation is not necessarily considered a beneficial or morally correct process. Immigrants may experience either positive or negative consequences with acculturation. Because acculturation may affect immigrants' health differently, depending on immigrant characteristics and health outcomes, no single direction of health outcomes can be predicted by acculturation level.

Acculturation may be linked to health outcomes through its association with factors such as access to health care, adjustment stress, and social support (Berry, 2003; Hyman & Dussault, 2000; Ku & Freilich, 2001; Kuo & Tsai, 1986; Shen & Takeuchi, 2001; Yeh, 2003). Research suggests that a low level of acculturation is an important barrier to health care (Maxwell, Bastani, & Warda, 2000; Sarna, Tae, Kim, Brecht, & Maxwell, 2001). For example, when acculturation is measured by length of residency or English fluency, acculturation is associated with the health insurance coverage of immigrants: Increased length of residency in the United States or English fluency has been found to be positively correlated with health insurance ownership (Jang, Lee, & Woo, 1998; Jenkins, Le, McPhee, Stewart, & Ha, 1996; Kim & Shin, 2006; Thamer, Richard, Casebeer, & Ray, 1997).

Researchers posit that adjustment stress and social support are associated with immigrants' health outcomes (Baider et al., 1996; Hyman & Dussault, 2000; Shen & Takeuchi, 2001). The degree of adjustment stress and social support may change with levels of acculturation. The trajectory of adjustment stress and social support with acculturation has not been identified clearly. However, studies suggest that the severe adjustment stress at the beginning of immigration decreases as the length of residence increases (Kuo & Tsai, 1986; Shen & Takeuchi). Support from close ethnic networks may decline as time elapses (Hyman & Dussault), but support from other social networks may increase as immigrants get involved in new social networks. Adjustment stress and social support also may affect the HRQOL of immigrant breast cancer survivors. Because immigration-related adjustment stress is daunting itself, recent immigrant breast cancer survivors are likely to experience greater psychological distress than nonimmigrants as a result of the dual burden of adjusting to a new society and being a patient with cancer (Baider et al.). The psychological distress, however, could be alleviated by

support from family and nonfamily social networks, improving the HRQOL of breast cancer survivors.

Aims of the Study

The aims of the current study were to explore the association of acculturation with HRQOL among Asian American breast cancer survivors and to examine the association of demographic, medical, and socioecologic characteristics with HRQOL. The authors expected that highly acculturated breast cancer survivors would be more likely to present with favorable HRQOL compared to less acculturated breast cancer survivors because of acculturation's correlation with access to health care, life stress, and social support. Therefore, the authors expected that acculturation would not be associated with high HRQOL when access to health care, life stress, and social support are considered.

Methods

Design and Sample

The present study was conducted as part of a larger study to examine the HRQOL of African, Latino, Asian, and European American breast cancer survivors. The analysis focuses on only Asian American respondents to better understand the role of ethnic, cultural, and socioecologic factors on the HRQOL of Asian American breast cancer survivors.

Approval was obtained from the University of California, Los Angeles, institutional review board. Female breast cancer survivors in southern California were recruited from various cancer-related community agencies, hospitals, and the California Cancer Surveillance Program from January 2001–June 2003 to obtain a sample diverse in cultural background and socioeconomic status. Eligible participants were within one to five years of a breast cancer diagnosis, currently cancer free, diagnosed with stage 0–III breast cancer, not diagnosed with another type of cancer, free of any other major disabling medical or psychiatric conditions, and 18 years of age or older. Vulnerable subjects (e.g., pregnant women, institutionalized women) and individuals with stage IV breast cancer or major medical (e.g., stroke, heart disease, degenerative illnesses) or psychiatric (e.g., schizophrenia, major depression) conditions were excluded because of significantly different disease progression and prognosis or HRQOL concerns.

Women were randomized to complete either a telephone interview or mailed survey questionnaire to assess whether HRQOL levels differ by survey mode. Potential participants were mailed a recruitment packet available in English, Spanish, Chinese (Mandarin), or Korean describing the study and emphasizing that participation was confidential and voluntary. Before the mailing, participants were asked to choose a preferred survey language during screening calls. The languages were selected to reflect those of the largest ethnic groups of breast cancer survivors in the selected cancer and hospital registries. The Japanese and Filipino American populations as a whole in the Los Angeles area have greater English facility than the Chinese and Korean American populations. The majority of Filipino (75%) and Japanese Americans (72%) speaks English only or very well (Asian Pacific American Legal Center of Southern California [APALCSC] & United Way of Greater Los Angeles [UWGLA], 2004). Among Japanese Americans, 51% reported that they speak only English. In contrast, 57% of Chinese and 63% of Korean Americans

reported that they do not speak English very well, with 39% and 47%, respectively, belonging to linguistically isolated households (i.e., those that speak only an Asian language) (APALCSC & UWGLA). For participants who chose their native languages (Mandarin or Korean) as the preferred survey language during screening calls, questionnaires in native languages were mailed or telephone interviews with bilingual native language speakers were arranged. Recruitment methods have been discussed in detail elsewhere (Ashing-Giwa, Padilla, Tejero, & Kim, 2004).

Measures

At the time of survey, HRQOL was measured using the **Functional Assessment of Cancer Therapy–Breast (FACT-B)** Version 4. FACT-B is a standardized instrument that consists of a 27-item general cancer concerns scale (FACT-General [FACT-G]) and a nine-item breast cancer–specific scale **(Breast Cancer Subscale)** (Brady et al., 1997; Cella et al., 1993). Items are rated from 0 (not at all) to 4 (very much), with higher scores indicating better HRQOL. The FACT-G generates subscale scores (scores ranging from 0–28) on four dimensions (physical, social/family, emotional, and functional well-being) and an overall HRQOL score (FACT-G score) that is obtained by averaging the items (scores ranging from 0–108). Breast cancer subscale scores range from 0–36.

FACT-B has been translated in many languages, including Spanish, Chinese, Japanese, and Korean. High reliability of the FACT-G subscales (part of FACT-B) has been reported for the English, Spanish, Chinese, and Korean versions (Brady et al., 1997; Dapueto et al., 2003; Lee, Chun, Kang, & Lee, 2004; Yoo et al., 2005; Yu et al., 2000). Cross-cultural validity of the instrument among different Asian subgroups cannot be determined using the current study's sample because of small sample sizes of ethnicity or language subgroups. To establish the equivalence of the HRQOL instrument among Asian subgroups (e.g., Chinese-speaking Chinese, English-speaking Chinese, Japanese-speaking Japanese, English-speaking Japanese Americans), a much larger sample of each ethnicity or language subgroup than the current sample would be needed. However, previous studies using translated FACT-G in Chinese (Yu et al.), Japanese (Fumimoto et al., 2001), and Korean (Lee et al.; Yoo et al.) have found good validity of FACT-G, indicating its cross-cultural validity.

Acculturation was measured using responses to eight questions adapted from the **Short Acculturation Scale** (Marin, Sabogal, Marine, Otero-Sabogal, & Perez-Stable, 1987) through three domains: cultural orientation, interethnic interaction, and language use. The Short Acculturation Scale is a 12-item measure focusing on language use, media use, food preference, and ethnic social relations. A reduced number of items were used in the current study to measure acculturation in a limited amount of time. Although originally developed for Latinos, several studies have adapted and validated the scale for use among Chinese and Filipino American populations (dela Cruz, Padilla, & Agustin, 2000; Gupta & Yick, 2001).

The eight questions that were adapted from the Short Acculturation Scale asked the ethnic background of close friends and people visited, preference for ethnic background of children's friends and individuals with whom respondents attend social gatherings or parties, preference for types of food and media, and languages used with family and friends.

For the current study, the answer choices were modified to apply to all ethnic groups. For example, in response to the question, "What language(s) do you usually speak at home?" the answer choice "only Spanish" was changed to "only your ethnic group's language." Respondents answered the items on a five-point Likert-type scale. The answers ranged from "all from your own ethnic group" to "all from other ethnic groups" for ethnic contact, "only of your own ethnic group" to "only of other ethnic groups" for food and media preference, and "only your ethnic group's language" to "only English" for language use.

Sample characteristics, healthcare access, and socioecologic factors (i.e., life stress and social support) were examined. Sample characteristics included Asian subgroup membership (i.e., Chinese, Filipino, Korean, Japanese, and other Asian), age, marital status (partnered or not), education, annual household income, occupation, and language used in the survey. Respondents who were married or in a committed relationship were considered partnered. The researchers also investigated medical characteristics, such as age at diagnosis, years since cancer diagnosis, cancer stage, surgery type, and degree of comorbidity. Stage was ascertained from cancer registry information when available; otherwise, women self-reported their stage at diagnosis. Those who were not sure were asked to contact their doctor to obtain the information. The degree of comorbidity (possible range = 0–15) was obtained by counting self-reported medical conditions from a list of 15 nonmajor disabling medical conditions (e.g., arthritis, allergies, diabetes). Health insurance coverage (uninsured, public insurance only, and private insurance [employment-based or privately purchased health insurance]) was examined to assess breast cancer survivors' access to health care.

Socioecologic contexts were examined using two scales: the **Urban Life Stressor Scale** and the adapted **Social Support Scale.** The Urban Life Stressor Scale measures levels of stress associated with various aspects of life (i.e., finances, housing, employment, family environment, neighborhood environment, public services, community relations, discrimination or racism, and crime or violence) (Sanders-Phillips, 1996). The scale consists of 19 items that are rated from 1 (extreme stress) to 5 (no stress). The items are averaged into a mean life stress score, with higher scores indicating less life stress. The adapted Social Support Scale was comprised of three items, one item each from the emotional or informational, tangible, and affectionate support subscales of the Medical Outcomes Social Support Survey (Sherbourne & Stewart, 1991). The items are rated from 1 (lowest) to 5 (highest) and averaged into a mean social support score. In a previous study (Ashing-Giwa, Padilla, Tejero, & Kim, 2004), reliability of standard and adapted scales was examined for the total sample and ethnic group samples. The results indicate good internal consistency ($\alpha > 0.7$) of scales and subscales for the Asian American sample. Instrument development and reliability of the instruments are discussed in detail elsewhere (Ashing-Giwa, Padilla, Tejero, & Kim).

Analysis Procedures

Frequencies and means were examined to describe demographic and medical characteristics. Analysis of variance was used to test whether the means of overall HRQOL, specific domains of HRQOL, and other scale scores were the same across five Asian ethnic groups, between English-speaking and Chinese- (Mandarin-) speaking Chinese Americans, and by survey mode (mail or telephone). Aggregating all Asians except four major subgroups (Chinese, Filipino, Korean, and Japanese) into "other Asians" was inevitable in the analysis because of the small sample sizes of other Asian subgroups. Because the group was not homogeneous, clear interpretation of findings is not possible. Bivariate associations of HRQOL and acculturation with other measures were examined using correlation analyses and analysis of variance. Distribution of categoric variables was examined by survey mode and language (for the Chinese sample).

Based on previous research, the study's hypotheses, and results from preliminary analyses, a multivariate model was constructed in a stepwise fashion to assess the association between acculturation and HRQOL, as measured by FACT-G scores, controlling for demographic, medical, socioeconomic, healthcare access (measured by type of health insurance), and socioecologic characteristics (life stress and social support). First, a regression model using acculturation as a primary predictor was estimated with demographic, socioeconomic (income), and medical variables included (Model 1). Then, health insurance status, life stress, and social support variables were added (Model 2). Lastly, Asian subgroup indicator variables (Chinese as a reference group) were included in the model to determine whether additional variation existed in the HRQOL outcome by ethnicity (Model 3). All analyses were performed with STATA 7 statistical package (STATA, 2000).

Results

Sample Characteristics

Among 349 accessible Asian American breast cancer survivors, 88 (25%) were ineligible, 26 (8%) refused, 29 (8%) agreed to participate but did not complete the survey, and 206 (59%) survivors completed the survey. The sample was composed of 85 Chinese Americans (41%), 39 Filipino Americans (19%), 29 Korean Americans (14%), 26 Japanese Americans (13%), and 27 other Asians (13%) (i.e., Indian, Thai, Vietnamese). A majority of participants (66%) completed the survey via mail because some (16%) who were randomly assigned to telephone surveys chose to complete the mail surveys. Participants in two survey modes were comparable in most characteristics and measures, including HRQOL. Therefore, samples from mail and telephone surveys were pooled in data analyses. A majority of participants (67%) completed the survey in English. Reporting results for Korean Americans by survey language is not possible because of the small number that completed the English-version survey (n = 7). Thus, the researchers have reported results by language only for the Chinese American sample. Medical characteristics of the Chinese sample are not reported by language because no difference existed by language. Internal consistency was assessed by the reliability coefficient Cronbach's alpha (α) for scales and subscales.

Table 1 presents the sample characteristics by Asian subgroup and by language for the Chinese sample. Socioeconomic status varied by subgroup. Japanese American breast cancer survivors showed the most favorable socioeconomic status profile, followed by the Chinese and Filipino American survivors, whereas Korean American survivors reported the least favorable status. For example, although 73% of Japanese American breast cancer survivors had a college education or

Table 1. Sample Characteristics by Asian American Subgroup and Survey Language

	All Asians (N = 206)		Chinese						Korean (N = 29)		Filipino (N = 39)		Japanese (N = 26)		Other (N = 27)	
			All (N = 85)		English (N = 40)		Chinese (N = 45)									
Characteristic	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD
Age (years)	54	11	54	12	54	12	55	12	53	9	55	12	57	11	52	10
Characteristic	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Partnered																
Yes	155	75	61	72	30	75	31	69	25	86	29	74	19	73	21	78
No	51	25	24	28	10	25	14	31	4	14	10	26	7	27	6	22
Education																
High school or less	37	18	15	18	2	5	13	29	14	48	1	3	2	8	5	19
As much as an associate degree	52	25	20	23	7	17	13	29	9	31	12	31	5	19	6	22
College or more	117	57	50	59	31	78	19	42	6	21	26	67	19	73	16	59
Income ($)																
≤ 25,000	49	25	19	23	2	5	17	39	14	50	6	16	2	8	8	31
25,000–45,000	37	19	19	23	8	21	11	26	7	25	6	16	1	4	4	15
45,000–75,000	49	25	21	26	13	34	8	19	4	14	13	35	8	34	3	12
> 75,000	61	31	22	27	15	40	7	16	3	11	12	33	13	54	11	42
Occupation																
Homemaker	47	23	21	25	8	20	13	29	13	45	6	15	3	12	4	15
Manager or professional	71	35	31	37	19	49	12	27	4	14	13	33	13	50	10	37
Technical, administrative, or sales	46	22	19	23	7	18	12	27	4	14	13	33	6	23	4	15
Service, operator, or factory	33	16	21	14	5	13	7	15	7	24	6	15	2	8	6	22
Other	8	4	1	1	–	–	1	2	1	3	1	3	2	8	3	11
Insurance at diagnosis																
No insurance	25	12	4	5	–	–	4	9	14	50	2	5	–	–	5	19
Public only	19	9	8	9	3	8	5	11	14	14	3	8	1	4	3	11
Private	161	79	73	86	37	92	36	80	10	36	34	87	25	96	19	70
Language used in the survey																
English	139	67	40	47	40	100	–	–	7	24	39	100	26	100	27	100
Native language	67	33	45	53	–	–	45	100	22	76	–	–	–	–	–	–

Note. Because of rounding, not all percentages total 100.

more, only 21% of Korean American breast cancer survivors had a comparable education. Subgroup variation in health insurance status also was observed. Most Asian American breast cancer survivors, except Korean Americans, had health insurance at diagnosis. The language in which the survey was taken differed by subgroup: All Japanese, Filipino, and other Asian Americans participated in English, whereas 47% of Chinese and 24% of Korean Americans chose to take the survey in English.

No prominent subgroup variation existed in medical characteristics except years since diagnosis ($p < 0.01$) (see Table 2). The number of years since diagnosis was longest for Japanese Americans (3.8 years) and shortest for Chinese (2.7 years) and Korean Americans (2.6 years).

Internal Consistency of Scale Measures

Overall, internal consistency of the standard and adapted scales was good for Asian American breast cancer survivors (see Table 3). Reliability coefficients of the FACT-B subscales for the entire Asian sample showed acceptable levels of internal consistency (α ranging from 0.77–0.91) except for the Breast Cancer Subscale ($\alpha = 0.64$). Some subgroup variation in internal consistency of the FACT-B subscales existed. The Japanese American and other Asian American sample showed lower than acceptable levels of internal consistency ($\alpha < 0.7$) in three subscales. Reliability coefficients of the Acculturation, Life Stress, and Social Support Scale items indicated good internal consistency for subgroup samples in general.

Health-Related Quality of Life

HRQOL scores differed by demographic, medical, socioeconomic, and healthcare access characteristics and language used in the survey and were correlated with socioecologic characteristics (life stress and social support). Between-ethnic variation was found in the FACT-G score ($p < 0.0001$) and most FACT-B subscale scores (see Table 4). Korean American breast cancer survivors scored the lowest for every subscale, whereas Japanese American breast cancer survivors scored the highest for most subscales. HRQOL was correlated with socioeconomic status, health insurance coverage, comorbidity, years since diagnosis, language in which the survey was taken, life stress, and social support in expected directions. For instance, the number of comorbidities and high levels of life stress were negatively correlated with HRQOL, but education, income, years since diagnosis, and social support were positively correlated with HRQOL. Breast cancer survivors

Table 2. Medical Characteristics by Asian American Subgroup

Characteristic	All Asians (N = 206) $\bar{X}$	SD	Chinese (N = 85) $\bar{X}$	SD	Korean (N = 29) $\bar{X}$	SD	Filipino (N = 39) $\bar{X}$	SD	Japanese (N = 26) $\bar{X}$	SD	Other (N = 27) $\bar{X}$	SD
Age at diagnosis (years)	51.0	11.0	51.0	12.0	50.0	9.0	52.0	12.0	53.0	11.0	49.0	10.0
Years since diagnosis*	2.9	1.5	2.7	1.3	2.6	1.5	3.0	1.3	3.8	2.2	3.1	1.3
Number of comorbidities	2.0	1.5	1.0	1.2	2.0	1.9	2.0	1.4	2.0	1.2	2.0	1.9

Characteristic	n	%	n	%	n	%	n	%	n	%	n	%
Stage												
0	37	18	17	21	8	27	5	13	4	15	3	11
I	80	40	26	31	11	38	15	38	13	50	15	55
II	70	34	36	43	6	21	15	38	5	20	8	30
III	17	8	4	5	4	14	4	11	4	15	1	4
Surgery												
Lumpectomy or other	92	45	36	42	13	45	15	38	16	62	12	44
Mastectomy	80	39	33	39	14	48	18	46	6	23	9	33
Mastectomy plus reconstruction	34	16	16	19	2	7	6	15	4	15	6	22

* $p < 0.01$

Note. Because of rounding, not all percentages total 100.

who had private health insurance reported the highest level of HRQOL ($p < 0.0001$). However, the HRQOL of uninsured breast cancer survivors did not differ from that of breast cancer survivors who were covered by public health insurance only. Thus, later in multivariate analyses, health insurance status was categorized into two groups: private insurance versus uninsured or public insurance.

The mean FACT-G score of all Asians in the present study (89.3) was similar to the mean score (88.8) from a multicenter validation study by the authors of the FACT-G scale (Brady et al., 1997). Although the participants in the validation study were predominantly Caucasian and African American breast cancer survivors, a two-sample t test showed no significant difference in FACT-G scores between two studies. In contrast, the mean standardized FACT-G score of the Asian American sample in the current study (64.5) was significantly lower ($p < 0.0001$) than the mean standardized score from another study

(77.4) of mostly Caucasian breast cancer survivors who had completed cancer treatments (Wenzel et al., 1999). The current study's investigators used an immediate t-test command (ttesti) in STATA 7 that enables the comparison of means for two studies when the mean, standard deviation, and sample size of two studies are available.

Acculturation

Asian American subgroups showed different levels of acculturation, and acculturation was correlated with access to health care and levels of social support. Unlike a previous study that found lower psychosocial distress among Asian breast cancer survivors with low acculturation than among their highly acculturated counterparts (Kagawa-Singer et al., 1997), no significant correlation existed between acculturation and life stress. Acculturation levels were lowest for Korean Americans, followed by Chinese Americans ($p < 0.0001$).

Table 3. Internal Consistency of Scales (Reliability Coefficient Cronbach's Alpha) by Asian American Subgroup and Survey Language

Scale	All Asians (N = 206)	Chinese All (N = 85)	Chinese English (N = 40)	Chinese Chinese (N = 45)	Korean (N = 29)	Filipino (N = 39)	Japanese (N = 26)	Other (N = 27)
FACT-B								
FACT-G	0.91	0.88	0.85	0.88	0.93	0.83	0.76	0.88
Physical	0.83	0.80	0.74	0.83	0.81	0.72	0.89	0.67
Social or family	0.80	0.77	0.82	0.79	0.86	0.72	0.66	0.62
Emotional	0.77	0.78	0.80	0.77	0.86	0.77	0.56	0.60
Functional	0.87	0.84	0.90	0.78	0.86	0.84	0.73	0.86
Breast Cancer Subscale	0.64	0.65	0.64	0.65	0.77	0.47	0.66	0.70
Acculturation	0.88	0.88	0.85	0.84	0.84	0.76	0.80	0.87
Life Stress	0.84	0.86	0.88	0.83	0.87	0.83	0.74	0.77
Social Support	0.77	0.74	0.73	0.74	0.85	0.67	0.76	0.79

FACT-B—Functional Assessment of Cancer Therapy–Breast; FACT-G—Functional Assessment of Cancer Therapy–General

Table 4. Scale and Subscale Scores by Asian American Subgroup and Survey Language

Scale	All Asians (N = 206)		Chinese All (N = 85)		English (N = 40)		Chinese (N = 45)		Korean (N = 29)		Filipino (N = 39)		Japanese (N = 26)		Other (N = 27)	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
FACT-B																
FACT-G****	89.3	15.1	89.8	13.2	91.8	11.3	88.0	14.6	72.1	19.9	93.6	10.0	95.4	9.4	94.5	12.5
Physical****	24.2	4.7	24.9	4.3	25.4	3.3	24.4	5.0	19.3	5.9	24.4	3.9	25.4	4.2	25.6	3.0
Social or family****	22.8	5.3	22.6	4.8	22.9	4.1	22.3	5.3	17.9	6.7	24.2	4.7	25.2	3.2	24.4	4.2
Emotional	19.5	4.3	19.3	4.4	19.4	4.4	19.3	4.5	17.8	5.3	20.5	4.2	19.9	3.3	20.3	3.5
Functional****	22.9	5.3	23.0	4.7	24.1	4.3*a	22.0	4.7	17.1	6.5	24.6	4.0	24.9	3.3	24.2	5.0
Breast Cancer Subscale*	25.3	5.9	26.1	5.8	28.4	5.2***a	24.1	5.6	22.2	7.3	24.8	4.9	26.5	5.3	25.8	5.9
Acculturation**b**	2.7	0.7	2.5	0.7	2.9	0.6****a	2.1	0.5	2.1	0.6	3.0	0.5	3.3	0.6	3.0	0.7
Life Stressb	4.4	0.5	4.5	0.5	4.4	0.5	4.6	0.4	4.3	0.6	4.3	0.5	4.4	0.4	4.4	0.4
Social Supportb**	3.9	1.0	3.6	0.9	3.7	0.9	3.4	1.0	3.9	1.1	4.2	0.8	4.2	0.8	4.0	1.0

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$

a The mean for English-speaking Chinese Americans is larger than that for Chinese-speaking counterparts based on analysis of variance.

b Possible range = 1–5

FACT-B—Functional Assessment of Cancer Therapy–Breast; FACT-G—Functional Assessment of Cancer Therapy–General

Note. Higher scores indicate a favorable outcome for the FACT-G scale or subscales, Life Stress, and Social Support scores.

Filipino, Japanese, and other Asian American breast cancer survivors had similar levels of acculturation. Acculturation levels of Asian American breast cancer survivors who used English in the survey were significantly higher than those of Asian American breast cancer survivors who used their own ethnic language (i.e., Mandarin or Korean) (3.0 versus 2.0, $p < 0.0001$). Although acculturation was positively correlated with private health insurance ($r = 0.34$, $p < 0.05$) and social support ($r = 0.16$, $p < 0.05$) as a whole, the magnitude of the correlations was not strong because of subgroup variation. The researchers observed a positive correlation of acculturation with private health insurance only among Filipino and Japanese Americans and positive correlation with social support only among Chinese American breast cancer survivors.

Acculturation and Health-Related Quality of Life

Acculturation was significantly and positively correlated with HRQOL ($r = 0.34$, $p < 0.05$). However, the association between acculturation and the HRQOL outcome became nonsignificant when Asian American subgroup membership was considered. In the stepwise model-building process, the association between acculturation and HRQOL remained significant until the social support variable was entered into the model (Models 1 and 2 of Table 5). Acculturation was a significant predictor of HRQOL when health insurance, life stress, and social support were considered, with age, cancer stage, years since diagnosis, number of comorbidities, and income controlled (Model 2 of Table 5). However, the significant association between acculturation and HRQOL decreased when the Asian American subgroup indicator variables were added in the final model (Model 3 of Table 5). The results of the final multivariate regression indicated that acculturation did not have an independent association with HRQOL after controlling for age, cancer stage, time since cancer diagnosis, comorbidity, income, health insurance, life stress, social support, and Asian American subgroup membership (Model 3 of Table 5). In the final model, however, life stress ($p < 0.001$) and social support ($p < 0.05$) showed positive associations with HRQOL when other characteristics were the same (i.e., less life stress and greater social support are related to better HRQOL). When other factors are the same (i.e., controlled), being Korean American still is significantly associated with poor HRQOL ($p < 0.001$). The final multivariate model explained more than half of the total variance in HRQOL score ($n = 191$, $R^2 = 0.54$).

Discussion

To the authors' knowledge, the current study is the first quantitative study to examine the relationship between acculturation and HRQOL of Asian American breast cancer survivors with a sizable number of Asian Americans from diverse ethnic groups. Moreover, almost a third of the data collection was done in native languages (Mandarin or Korean) with monolingual Asian American breast cancer survivors. Although immigration-related information (e.g., place of birth, length of residency in the United States) was not available, participants likely were foreign-born or recent immigrants and had been excluded in other surveys conducted in English only. The final multivariate analysis demonstrated that acculturation was not significantly associated with HRQOL when Asian subgroup membership was considered. However, the absence of a significant association between acculturation and HRQOL in the final model is likely a result of the strong association between acculturation and Asian American subgroup membership. The findings from the model-building process indicate that the correlation between acculturation and HRQOL is not the effect of health insurance status, life stress, and social support.

Although the acculturation scale used in the study's analysis is a simplified version with only eight items, it appears to be an adequate, but imperfect, measure of acculturation. The scale shows good internal consistency for all Asian subgroups

Table 5. Regression Results of Health-Related Quality of Life (Functional Assessment of Cancer Therapy–General)

Predictor	Model 1 (n = 192, R^2 = 0.33)			Model 2 (n = 191, R^2 = 0.47)			Model 3 (n = 191, R^2 = 0.54)		
	β	SE	p	β	SE	p	β	SE	p
Acculturation	5.30	1.30	< 0.001	4.70	1.20	< 0.001	2.10	1.30	0.11
Age (years)	0.25	0.09	0.005	0.13	0.08	0.13	0.07	0.08	0.41
Cancer stage II or higher	−3.50	1.80	0.057	−2.00	1.70	0.25	−2.50	1.60	0.13
Years since diagnosis	0.90	0.60	0.13	1.10	0.60	0.06	1.00	0.50	0.07
Number of comorbidities	−3.00	0.70	< 0.001	−2.50	0.60	< 0.001	−2.10	0.60	< 0.001
Income (reference group: ≤ $25,000)									
• $25,000–$45,000	10.80	2.90	< 0.001	5.40	3.00	0.07	6.40	2.80	0.02
• $45,000–$75,000	7.00	2.80	0.013	2.70	2.90	0.34	3.60	2.70	0.19
• > $75,000	10.30	2.70	< 0.001	5.70	2.80	0.04	5.50	2.70	0.04
Private health insurance (reference group: uninsured or public insurance)	–	–	–	3.60	2.60	0.17	0.20	2.60	0.94
Life stress	–	–	–	11.00	1.90	< 0.001	10.40	1.80	< 0.001
Social support	–	–	–	1.80	0.90	0.04	1.80	0.90	0.04
Ethnicity (reference group: Chinese)									
• Filipino	–	–	–	–	–	–	4.30	2.30	0.07
• Korean	–	–	–	–	–	–	−11.60	2.90	< 0.001
• Japanese	–	–	–	–	–	–	1.80	2.90	0.53
• Other Asian	–	–	–	–	–	–	4.80	2.60	0.07

SE—standard error

(α > 0.7), and the high correlation (r = 0.61, p < 0.05) between acculturation scores and the language in which the survey was taken (ethnic language or English) indicates good validity of the scale. The concurrence between acculturation levels of Asian subgroups in the sample and the overall acculturation levels of the subgroups in the general U.S. population also seems to support the utility of the scale. China and Korea are among the top 10 countries of birth for the U.S. foreign-born population (U.S. Census Bureau, 2003), and both are non–English-speaking countries. Therefore, at the group level, Chinese and Korean Americans are less likely to be acculturated than other Asian American subgroups, such as Japanese or Filipino Americans, who are less likely to be foreign born or more likely to have better English facility in general. The small numbers of subgroups by ethnicity and language, along with the lack of immigration-related information, hindered further validation of the acculturation scale using factor analyses and correlation analyses.

Asian subgroup differences in HRQOL remained significant after controlling for a variety of characteristics. Korean American breast cancer survivors showed lower HRQOL than the other Asian subgroups when demographic, medical, healthcare access, and socioecologic factors (life stress and social support) were comparable. The negative association did not disappear even when the language factor (ethnic language or English) was considered (results not shown). However, researchers must be careful in interpreting the results as evidence that poorer HRQOL among a sample of Korean American breast cancer survivors is related to ethnic group membership. Korean American survivors' lower HRQOL compared to other Asian American survivors may be explained by other HRQOL-related characteristics that were considered in the current study. For example, poorer HRQOL may be a result of greater adjustment stress related to limited English language skills among Korean Americans. Lower English fluency is an important source of stress among immigrants (Constantine, Okazaki, & Utsey,

2004), and, in general, Korean Americans are more likely to report lower levels of English fluency than other Asian American subgroups (APALCSC & UWGLA, 2004). In the present study, approximately 50% of Chinese Americans preferred the Chinese-language survey, whereas 75% of Korean Americans preferred a questionnaire in their native language. Although the life stress score is included in the current study's models, the Urban Life Stressor Scale was not designed to measure immigration-specific stress. Therefore, Korean American survivors' lower HRQOL may be the result of unmeasured factors, including adjustment stress.

The findings of the current study may not be generalizable beyond the current sample because of some limitations. Although the sample recruited from cancer registries is primarily population based, potential selection bias exists for monolingual non–English-speaking participants. A sizable number of monolingual Chinese and Korean American breast cancer survivors were recruited through community hospitals and support groups, and they are likely to have certain characteristics that are different from participants identified through the cancer registries. The absence of other non–English-speaking Asian Americans, such as non–English-speaking Japanese or Filipino Americans, is another source of selection bias that weakens the representativeness of the groups in the analysis. Additionally, Asian American breast cancer survivors with fewer symptoms and barriers to completing the survey may be more likely to participate in the study than those with severe symptoms and less resources. Another limitation was the small sample sizes of the Asian subgroups. In particular, the smaller sample sizes of subgroups by ethnicity and language (e.g., English, native-language–speaking Chinese, native-language–speaking Koreans) not only reduced statistical power to detect differences and limited the generalizability of the findings but also prevented the researchers from evaluating cross-cultural equivalence of HRQOL and acculturation measures. Third, the data have limited immigrant-specific information such

as birthplace, length of residency, and acculturative stress because the original study was not specifically designed to address immigration issues. Finally, cross-sectional design limits the ability to capture HRQOL changes over time, preventing establishment of causal relationships.

Implications

Findings and limitations of the current study suggest implications for future research and intervention. First, studies of Asian subgroups with larger and more representative samples and detailed immigrant-specific information are warranted. With richer information and larger samples, assessing the cross-cultural validity of HRQOL and acculturation measures with more confidence will be possible. Second, despite some study limitations, the significant variation in HRQOL within Asian American groups suggests the need for studies of more vulnerable populations and tailored intervention programs for specific ethnolinguistic groups.

The variations in HRQOL among different Asian American groups and significant predictors of HRQOL identified in the study have implications for nursing practice as well as nursing research. The observed lower HRQOL among less acculturated Asian American breast cancer survivors and among Korean American survivors warrants closer attention of oncology nurse practitioners and researchers to these populations. Certain Asian American ethnic groups may experience compromised quality of care as a result of limited communication with their healthcare providers. Thus, nurses' sensitivity to cultural and linguistic barriers that Asian American cancer survivors face may serve as one of the keys to better quality of care. In addition, given the robust association of life stress and social support with HRQOL, oncology nurses and researchers may need to assess patients' socioecologic conditions to correctly identify factors affecting QOL.

Author Contact: Jinsook Kim, PhD, MPH, DDS, can be reached at jkim4@niu.edu, with copy to editor at ONFEditor@ons.org.

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