

Breast and Cervical Cancer Screening Practices and Interventions Among Chinese, Japanese, and Vietnamese Americans

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Purpose/Objectives: To review research on breast and cervical cancer screening practices among Chinese, Japanese, and Vietnamese Americans.

Data Sources: MEDLINE® and the Cumulative Index to Nursing and Allied Health Literature databases.

Data Synthesis: Of the 28 studies reviewed, 19 (68%) were descriptive and 9 (32%) were interventions. Instruments were developed or translated into the native language. Inconsistent operational definitions for positive facilitators and negative barriers made comparisons across studies difficult.

Conclusions: Research about breast and cervical cancer screening is limited in these groups. All of the studies reviewed indicated low adherence to cancer screening guidelines. Some interventions showed promising results. Poor awareness about cancer was reported; positive facilitators and negative barriers were identified.

Implications for Nursing: The rapidly increasing number of Asian Americans in the United States underscores the need for further research in this area. Future studies should focus on each population as a disaggregated subgroup. Cancer control interventions should be culturally competent.

Key Points . . .

- Asian Americans constitute the fastest-growing ethnic group in the United States, increasing 72% from 1990–2000.
- Breast cancer is the most commonly diagnosed cancer among Asian American women in the United States. Asian women have higher incidence and mortality rates of cervical cancer compared to Caucasian women in the United States.
- Based on the findings of studies conducted to date, breast and cervical cancer screening among Chinese, Japanese, and Vietnamese women in the United States is consistently low.

Asian Americans constitute the fastest-growing ethnic group in the United States (U.S. Census Bureau, 2000). In 1990, 6.9 million Asians and Pacific Islanders were living in the United States, representing 3% of the U.S. population (Coughlin & Uhler, 2000). By 2000, 11.9 million, or 4.2% of the total U.S. population, was Asian, indicating a 72% increase over 10 years. In comparison, the total U.S. population grew only 13% from 1990–2000 (U.S. Census Bureau, 2000). By 2050, estimates predict that Asians will comprise 8% of the U.S. population (U.S. Census Bureau, 2004). The rapidly increasing numbers suggest the need for rigorous health promotion in this population. According to Pasick et al. (1996), this issue must be addressed immediately because of growing health disparities, such as breast and cervical cancer morbidity and mortality among Asian American women.

Asian Americans represent more than 25 ethnicities, with origins in East Asia, Southeast Asia, the Indian subcontinent, Polynesia, Melanesia, Hawaii, Guam, Samoa, and other Pacific islands (National Cancer Institute, 2004). Although people tend to group all Asian Americans and Pacific Islanders into a large ethnic cluster, in actuality, each group is unique and differs in language, culture, and health beliefs. They also may

have differences or similarities in cancer beliefs and cancer screening practices. Simple targeting of broad groups of Asian Americans and other ethnic groups resulted in interventions that were insensitive to within-group differences in language, culture, and health (Pasick et al., 1996). Underscoring such differences is the fact that cancer survival rates vary among Asian American groups. When compared with other Asian groups, Chinese women consistently experience lower survival rates with advanced disease and worse survival rates even with an early-stage diagnosis of cervical cancer (Lin et al., 2002). On the other hand, Japanese Americans tend to be diagnosed at an earlier stage of cancer and are more likely to experience better survival rates with prostate, colorectal, and breast cancers (Lin et al.). These data indicate the importance of examining cancer statistics for each subgroup of Asian Americans.

Breast cancer is the most commonly diagnosed cancer among Asian American women in the United States. However, cervical cancer is the most common cancer in Vietnamese American women (Yu, Kim, Chen, & Brintnall, 2001). According to the

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American Cancer Society ([ACS], 2005a), the age-adjusted annual incidence rate has reached 96.8 per 100,000 women for breast cancer among Asian Americans and Pacific Islanders. The mortality rate is 12.6 per 100,000 women with breast cancer. From 1992–2000, breast cancer incidence rates increased 2.1% overall (0.9% for Caucasians) per year in Asians and Pacific Islanders (ACS, 2003). Furthermore, Asian-born women were found to have a larger tumor size (i.e., > 1 cm) at diagnosis compared to U.S. Caucasian women or U.S.-born Asian women; this difference is believed to result from underuse of breast cancer screening among Asian immigrants (Hedeen, White, & Taylor, 1999).

Asian women have a higher incidence rate of cervical cancer (9.5 per 100,000) compared to Caucasian women (8.9 per 100,000). The death rate from cervical cancer also is higher than for Caucasian women (2.8 versus 2.6 per 100,000) (ACS, 2005a). Most Asian women are diagnosed with cancer at a later stage than Caucasian women (Kagawa-Singer & Pourat, 2000). The higher cancer rates in Asian groups may be because healthcare providers now are beginning to screen a previously underscreened population. Further education and promotion for breast and cervical cancer screenings and early detection and treatment are important for this group.

Breast and cervical cancer screening rates for Asian Americans are consistently much lower than the Healthy People 2000 goals (Kagawa-Singer & Pourat, 2000; Taylor, Hislop, et al., 2002). However, Coughlin and Uhler (2000) reported that 72% and 74% of Asian women in their sample had a mammogram or a Pap test, respectively, in the previous two years. The Healthy People 2010 goals for breast and cervical cancer screening are that (a) 70% of women aged 40 and older will have received a mammogram within the prior two years and (b) 90% of women aged 18 and older will have received a Pap test within the prior three years (National Cancer Institute, 2001). In Coughlin and Uhler's study, Pap test rates were well below the Healthy People 2010 goals. Cancer screening plays a vital role in reducing the mortality and morbidity of breast and cervical cancers (Tang, Solomon, Yeh, & Worden, 1999).

The purpose of this article is to review the published literature on breast and cervical cancer screening practices among Chinese, Japanese, and Vietnamese Americans. Specifically, the review addresses the prevalence of breast and cervical cancer screening among Chinese, Japanese, and Vietnamese Asian subgroups; reviews interventions to increase adherence to breast and cervical cancer screening among these three Asian subgroups; and identifies common facilitators and barriers to cancer screening among these three Asian American subgroups.

Methods

MEDLINE® and the Cumulative Index to Nursing and Allied Health Literature (CINAHL®) computerized databases were searched for research studies written in English from 1982–July 2004 that addressed breast and cervical cancer screening practices among Asian Americans. The MEDLINE search yielded 71 articles, whereas CINAHL yielded 61. Thirty-one of the articles were duplicated between the two databases. An additional 88 articles related to cancer screening among Asian Americans were found based on a careful review of the reference lists from the studies identified through the MEDLINE and CINAHL searches. Most of the studies were conducted after 1996; only four articles were published from

1982–1996. Many articles were related to nonspecific Asian American groups or those other than Chinese, Japanese, or Vietnamese Americans. These three groups were chosen for study because (a) among the different Asian American groups, Chinese Americans comprise the largest population; (b) Japanese Americans are considered long-term immigrants of the United States but were least likely to appear in published cancer screening research and were most likely to be grouped with one or more other races (U.S. Census Bureau, 2000); and (c) Vietnamese women have the highest incidence rate of cervical cancer and were least likely to be grouped with one or more other races or Asian groups. Furthermore, the Vietnamese have been considered to be relatively new immigrants to the United States (U.S. Census Bureau, 2000). The articles that involved nonspecific Asian populations were excluded from this review; therefore, a total of 28 articles were reviewed for this article. See Table 1 for a summary of the studies reviewed.

Of the 28 articles examined, 13 focused on Chinese Americans, 2 on Japanese Americans, and 13 on Vietnamese Americans. Table 2 summarizes the overall study designs, of which 68% were descriptive, as well as the types of cancer screening. In Table 3, the adherence rates to breast cancer and cervical cancer screening identified in the studies are summarized.

Breast Cancer Screening

Chinese American Women

Only one study reported a breast cancer prevalence of 9 per 1,000 Chinese women in San Francisco's Chinatown, which is three times higher than in Caucasian women (Lovejoy, Jenkins, Wu, Shankland, & Wilson, 1989). Five studies described mammogram-screening adherence rates, which were reported in three different ways: "have had/at least once," "in the past year," and "in the past two years" (Lee, Lee, & Stewart, 1996; Tang, Solomon, & McCracken, 2000; Tu et al., 2003; Yu et al., 2001; Yu, Seetoo, Tsai, & Sun, 1998). Four studies reported that 12%–74% of participants had mammography at least once (Lee et al., 1996; Tang et al., 2000; Tu et al.; Yu et al., 2001), whereas 53%–61% reported having mammograms in the past two years (Lee et al., 1996; Tang et al., 2000; Tu et al.; Yu et al., 1998). In Yu et al.'s (2001) sample, one of the lowest mammography rates (12%) was reported. Although the average age was similar to that of other samples, Yu et al.'s (2001) sample was drawn from Chinatown, whereas other studies recruited from more integrated communities.

Three articles that evaluated the use of clinical breast examination (CBE) and breast self-examination (BSE) rates reported that 35%–75% of participants received a CBE at least once (Lee et al., 1996; Tang et al., 2000; Yu et al., 2001). Tang et al. (2000) also reported that 48% of participants had one CBE in the past year. In addition, 26%–70% of study participants performed BSE at least once (Lee et al., 1996; Tang et al., 2000; Yu et al., 2001). Tang et al. (2000) also reported a rate of 51% for regular BSE performance in their sample.

Japanese American Women

For Japanese Americans, the two studies reviewed showed that 21%–30% (Nakamura, 2001) and 13%–60% (Sadler, Takahashi, Ko, & Nguyen, 2003) of the participants had ever performed BSE. The wide percentage ranges in Sadler et al.'s (2003) study are attributed to data reported by various

Table 1. Breast and Cervical Cancer Screening Studies on Chinese, Japanese, and Vietnamese Americans

Study	N	Setting or Location	Research Design	Type of Program
Chinese Americans				
Lovejoy et al., 1989	109	San Francisco's Chinatown YMCA, CA	Descriptive	Breast cancer screening
Lee et al., 1996	775	San Francisco, CA	Descriptive	Knowledge of, attitudes toward, beliefs about, and practices of breast and cervical cancer screening
Yu et al., 1998	176	Southeastern Michigan	Descriptive	Pap test and mammography use
Lee et al., 1999	51	San Francisco, CA	Descriptive	Attitudes, beliefs, and practices regarding breast, cervical, and colon cancer screening of primary care physicians who serve the Chinese community; to identify barriers or factors influencing the use of cancer screening tests
Sadler, Thomas, et al., 2000	302 (baseline) 203 (follow-up)	San Diego, CA	Intervention	Asian grocery store-based health education program and breast cancer screening
Tang et al., 2000	100	Senior centers in two metropolitan cities	Descriptive	Mammography, clinical breast examination, and breast self-examination among older (> 60 years) Chinese women
Do et al., 2001	647	Seattle, WA	Descriptive	Cervical cancer screening
Yu et al., 2001	332	Chicago's Chinatown, IL	Descriptive	Breast and cervical cancer screening
Jackson et al., 2002	87	North America	Qualitative interviews, focus groups	Culturally relevant video and a pamphlet on cervical cancer education
Taylor, Hislop, et al., 2002	482	Seattle, WA, and Vancouver, BC	Randomized controlled trial, intervention	To evaluate the impact of two culturally and linguistically appropriate cervical cancer education interventions
Taylor, Jackson, et al., 2002	432	Seattle, WA	Descriptive	To examine Pap-testing barriers and facilitators
Tu et al., 2003	473	Seattle, WA	Descriptive	Mammography screening survey in 1999
Wong-Kim et al., 2003	798	San Francisco, CA	Focus groups, descriptive	To assess cancer beliefs in a Chinese immigrant community
Japanese Americans				
Nakamura, 2001	25 (in 1997) 18 (in 1998)	Cincinnati, OH	Descriptive	Healthcare providers' education on breast cancer
Sadler et al., 2003	47 (baseline) 38 (follow-up)	San Diego, CA	Intervention	Asian grocery store-based health education program and breast cancer screening
Vietnamese Americans				
Pham & McPhee, 1992	107	San Francisco, CA	Descriptive	To learn about knowledge of, attitudes toward, and practices regarding breast and cervical cancer screening
Yi, 1994	141	Western Massachusetts	Descriptive	To learn more about attitudes toward and beliefs about breast cancer screening and acculturation factors
McPhee et al., 1997	933	Orange, Los Angeles, Santa Clara, and Alameda counties, CA	Descriptive	To investigate predictors of breast and cervical cancer screening tests; cross-sectional telephone survey
Bird et al., 1998	645 (baseline) 717 (follow-up)	A low-income district in San Francisco, CA, and a control group from Sacramento, CA	Three-year period; lay health workers; intervention study	Community outreach intervention to promote clinical breast examinations, mammograms, and Pap tests
Yi, 1998	207	Houston, TX	Descriptive	Prevalence of Pap test screening among college-aged women
Jenkins et al., 1999	933 (baseline) 876 (follow-up)	Santa Clara and Alameda counties, CA (intervention), and Los Angeles and Orange counties, CA (control)	24-month period (1992–1994), midpoint surveys and randomized postintervention telephone interviews	Media-led community education campaign on breast and cervical cancer
Phipps et al., 1999	38	Philadelphia, PA	Pilot study, qualitative telephone interviews	Cancer knowledge and screening

(Continued on next page)

Table 1. Breast and Cervical Cancer Screening Studies on Chinese, Japanese, and Vietnamese Americans (Continued)

Study	N	Setting or Location	Research Design	Type of Program
Schulmeister & Lifsey, 1999	96	Five Vietnamese churches in southeastern Louisiana	Descriptive	Knowledge of, beliefs toward, and practices regarding cervical cancer screening
Nguyen et al., 2000	20	San Francisco, CA	Three-year intervention targeting Vietnamese physicians	Early cancer detection and promotion
Nguyen et al., 2001	807	Alameda County, CA, and Los Angeles and Orange counties, CA (controls)	Neighborhood-based intervention activities	To promote early detection of breast cancer and continue medical education seminars for Vietnamese physicians
Sadler et al., 2001	275	Asian grocery stores in California	Intervention	Breast cancer knowledge, attitudes, and screening adherence
Nguyen et al., 2002	1,566	Santa Clara County, CA, and Harris County, TX	Descriptive	Predictors of cervical screening: awareness, intention, and receipt
Lam et al., 2003	400	Santa Clara County, CA	Intervention	To compare a media education campaign and a lay health worker outreach program to increase women's cervical cancer awareness, knowledge, and screening

age groups. In addition, Sadler et al. (2003) reported that 38%–63% of participants had a CBE in the prior 12 months, whereas 78% of the participants in Nakamura's study had a CBE and 56% had one within the prior year. As many as 74% of the Japanese Americans in Sadler et al.'s (2003) study reported having had a mammogram in the prior 12 months; however, no mammogram screening data were available in Nakamura's study.

Vietnamese American Women

Three studies provided data on mammography use among Vietnamese American women, of which 30%–66% reported having at least one (McPhee et al., 1997; Pham & MCPhee, 1992; Yi, 1994). No data were reported about mammography use in the previous two years. Only two studies reported CBE screening rates: 50% and 70% reported having had a CBE once, and 36% reported having had one in the previous year (McPhee et al.; Yi, 1994). No BSE data were reported.

Cervical Cancer Screening

Five studies reported screening adherence in Chinese American women and five in Vietnamese Americans. No cervical cancer screening studies were found with Japanese Americans. Approximately 36% (Yu et al., 2001) to 81% of

Chinese Americans (Do, Taylor, Yasui, Jackson, & Tu, 2001; Lee et al., 1996; Taylor, Hislop, et al., 2002) reported having had a Pap test at least once, and 49%–64% reported that they had received Pap testing within the prior two years (Do et al.; Lee et al., 1996; Taylor, Hislop, et al.; Yu et al., 1998). For Vietnamese Americans, 37%–76% reported having had at least one prior Pap test (McPhee et al., 1997; Nguyen, MCPhee, Nguyen, Lam, & Mock, 2002; Pham & MCPhee, 1992; Schulmeister & Lifsey, 1999; Yi, 1998). However, Schulmeister and Lifsey conducted the only study to examine screening adherence among Vietnamese American women. They reported that 46% had a Pap test at some point previously and only 13% had Pap tests annually and in the previous year.

Facilitators and Barriers to Screening Chinese Americans

Fluency in English or a higher education (Yu et al., 1998, 2001), insurance coverage or a usual source of health care (Tang et al., 2000; Tu et al., 2003; Yu et al., 1998, 2001), knowledge of cancer-warning signs, knowledge of mammography and BSE (Yu et al., 2001), recommendations by physicians and nurses, owning a home, prenatal or family-planning services received, belief in early detection (Tu et al.), and acculturation (Tang et al., 2000) frequently were reported

Table 2. Study Designs and Types of Cancer Screening

Study	Chinese Americans (N = 13)	Japanese Americans (N = 2)	Vietnamese Americans (N = 13)	Total Screening (N = 34 ^a Studies)
Breast cancer	7	2	7	16 (47%)
Cervical cancer	7	–	8	15 (44%)
General cancer belief, knowledge, and screening behaviors	1	–	2	3 (9%)
Descriptive	11 ^b	1	7	19 (68%)
Intervention	2	1	6 ^b	9 (32%)

^a Total number is greater than 28 because some of the studies covered breast and cervical screenings.

^b Total includes one study that focused on Chinese American or Vietnamese American physicians, respectively.

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Table 3. Breast and Cervical Cancer Screening Adherence Rates Among Chinese, Japanese, and Vietnamese Americans

Study	N	Breast Cancer Screening (%)						Cervical Cancer Screening (%)		
		Mammography		CBE		BSE		Pap Test		
		At Least Once	In Past Two Years	At Least Once	In Past Year	At Least Once	Regularly	At Least Once	In Past Year	In Past Two Years
Chinese Americans										
Lee et al., 1996	775	70	53 ^a	75	—	70	—	67	49	—
Yu et al., 1998	176	—	57	—	—	—	—	—	—	49
Tang et al., 2000	100	63	54 ^a	70	48	56	51	—	—	—
Do et al., 2001	647	—	—	—	—	—	—	76	—	60
Yu et al., 2001	332	12	—	35	—	26	—	36	—	—
Taylor, Jackson, et al., 2002	432	—	—	—	—	—	—	81	—	64
Tu et al., 2003	473	74	61	—	—	—	—	—	—	—
Japanese Americans										
Nakamura, 2001	25 (1997)	—	—	78	56	30 (1997)	—	—	—	—
	18 (1998)	—	—	—	—	21 (1998)	—	—	—	—
Sadler et al., 2003	47	—	70–74 ^b	—	38–63 ^b	13–60 ^b	—	—	—	—
Vietnamese Americans										
Pham & McPhee, 1992	107	66	—	—	—	—	—	46	—	—
Yi, 1994	141	65	—	50	36	—	—	—	—	—
McPhee et al., 1997	933	30	—	70	—	—	—	53	—	—
Yi, 1998	207	—	—	—	—	—	—	37	—	—
Schulmeister & Lifsey, 1999	96	—	—	—	—	—	—	46	13	—
Nguyen et al., 2002	1,566	—	—	—	—	—	—	76	—	—

^a Performed in past year^b Reported by various age groups

BSE—breast self-examination; CBE—clinical breast examination

among Chinese Americans as facilitating factors for having a mammogram.

Acculturation, modesty, recent physical examination (Tang et al., 2000), and higher education or English fluency (Yu et al., 2001) were reported as facilitating factors for CBE. Higher education or English fluency (Yu et al., 2001) and reliance on medical professionals for screening (Tang et al., 2000) reportedly were facilitating factors for BSE. Even though higher education frequently was a facilitator for breast cancer screening, some Chinese Americans with a higher education degree (i.e., graduate degree) still expressed difficulty understanding medical terminology (Yu et al., 1998). Acculturation primarily was assessed with the Suinn-Lew Asian Self-Identity Acculturation Scale.

Most commonly identified barriers for breast cancer screening included forgetting, lack of time, poor cancer knowledge, not being told by a physician, not having a recent physical examination, a perceived lower need, lack of fluency in English or no interpreter, cost, living less than 25% of their lives in the United States, and lack of symptoms (Sadler, Wang, Wang, & Ko, 2000; Tang et al., 2000; Tu et al., 2003; Yu et al., 1998, 2001). Tu et al. also found that 32% of participants did not know that a mammogram is the best method for detecting breast carcinoma.

For cervical cancer screening, being married, being fluent in English or having a higher education, owning a house, lacking embarrassment, being recommended by a physician, having prior family-planning or obstetrics care, and having a regular

healthcare provider all were facilitating factors for having a Pap test. In addition, among sexually inactive women, believing that a Pap test is necessary for sexually inactive women was a strong predictor that they would seek cervical cancer screening (Do et al., 2001; Taylor, Hislop, et al., 2002; Yu et al., 1998, 2001). Yu et al. (1998) reported that the number of years living in the United States was a significant predictor of Pap test use; however, Do et al. found that younger age at immigration, not length of stay, was predictive of future cervical cancer screening participation. Extrapolating age of immigration versus years in the United States is difficult. The degree of acculturation probably has a stronger influence on screening behaviors.

Lee, Lee, Stewart, and McPhee (1999) specifically examined the attitudes, beliefs, and practices regarding breast, cervical, and colon cancer screening of 51 primary care physicians who served Chinese Americans in San Francisco, CA. Eighty-four percent of the physicians reported performing regular CBE and teaching BSE, and 63% reported ordering annual mammograms for patients older than 50 years. For cervical cancer screening, only 61% of the physicians reported performing Pap tests in their offices. No information was given about whether the women for whom the physicians cared received Pap tests from other gynecologic providers.

Another study assessed the beliefs of 798 Chinese immigrants living in San Francisco, CA, regarding cancer and patients with cancer (Wong-Kim, Sun, & DeMattos, 2003). A quarter of the participants believed that cancer was conta-

gious. Logistic regression analysis indicated that women with low incomes who lived in the United States for an extended period of time were more likely to believe that cancer was contagious. The length of time spent in the United States without significant contact with Western society may solidify long-held beliefs. In addition, participants also reported that the stigma and negative beliefs in the Chinese immigrant community made a cancer diagnosis very difficult for patients. Stigma caused by a cancer diagnosis and the disease itself may be contributing factors in late detection and increased mortality.

Vietnamese Americans

For breast cancer screening in Vietnamese Americans, two out of the three studies reported that having health insurance coverage was positively associated with prior mammography but not with CBE (McPhee et al., 1997; Yi, 1994). Higher education, longer length of U.S. residence, higher sociocultural status, younger age, having a regular location for health care, having a regular doctor, and having ever married (McPhee et al.; Yi, 1994) were identified as facilitating factors for breast cancer screening. McPhee et al. reported having a Vietnamese doctor, being unemployed, and being of Chinese Vietnamese background were negatively associated with cervical and breast cancer screening.

For cervical cancer screening, Pham and McPhee (1992) identified having Medicaid, lack of health insurance, and poor cancer knowledge as negatively associated with having a Pap test. However, acculturation, being married, being sexually active, a longer length of U.S. residence, and fluency in English all were associated with prior cervical screening (Yi, 1994, 1998). Schulmeister and Lifsey (1999) found that length of time in the United States was not significantly associated with Pap test utilization. Being married, being sexually active, having a job outside the home, and being younger were important positive facilitators for prior Pap testing. Not having a gynecologist, cost, and fears regarding the Pap test were identified as reasons for not having cervical cancer screening (Schulmeister & Lifsey). In addition, Nguyen et al. (2002) conducted a telephone survey of 1,566 Vietnamese women aged 18 and older living in California and Texas. Being married, having a higher education, having a female doctor, having a respectful doctor, having requested a Pap test, and receiving a physician recommendation all were positively associated with having a Pap test. Vietnamese women older than 65 years had the lowest rates of all age groups (i.e., ages 18–39, 40–64, and 65+) for awareness, intention, and receipt of Pap testing in Nguyen et al.'s (2002) study. When asked whether they ever had Pap test, 72% of those aged 18–39, 82% of those aged 40–64, and 65% of those aged 65 and older ($p < 0.01$) responded positively.

Qualitative Studies

Two qualitative studies were conducted on Chinese and Vietnamese Americans. A culturally relevant video and educational materials on cervical cancer screening, which were used in a later intervention study (Taylor, Jackson, et al., 2002), were developed from qualitative interviews and nine focus groups for Chinese Americans (Jackson et al., 2002). The other was a pilot study that explored cancer knowledge and screening behaviors of Vietnamese and Cambodian women.

The researchers found that 71% could not explain what cancer was and 74% were not able to name a way to prevent cancer. Greater knowledge about prevention and practiced prevention measures was associated with employment outside the home, higher education, and younger age but not with length of stay in the United States (Phipps, Cohen, Sorn, & Braitman, 1999).

Intervention Studies

Two intervention studies were conducted with a Chinese population, one with a Japanese population, and six with a Vietnamese population.

Chinese Americans

One breast health education program that focused on 19 Asian grocery stores was designed to reach Chinese women in San Diego, CA (Sadler, Wang, et al., 2000). Only 34% of the Chinese participants reported having enough knowledge about breast cancer. At follow-up interviews, 36% of women aged 40 and older ($n = 95$) reported that they scheduled a breast cancer screening appointment during the interval. For Chinese women 50 years and older ($n = 49$), 43% reported scheduling a screening appointment during the interval; however, 64% of women ($n = 61$) had not set up a screening. Lack of time (8%) was the most frequently cited reason for not scheduling screening. The most common barriers to participating in additional breast cancer education sessions were lack of time (49%), language (14%), and cost (6%).

The second intervention study was a randomized, controlled trial that evaluated the impact of two culturally and linguistically appropriate cervical cancer education interventions for North American Chinese women (Taylor, Jackson, et al., 2002). Outreach workers, a direct mailing intervention approach, and a control group were compared for their effectiveness in enhancing cervical cancer screening. All three of the pairwise comparisons were statistically significant. Seventy-two percent of the outreach workers, 59% of the direct-mail recipients, and 48% of the control group were planning to have a Pap test in the next two years.

Japanese Americans

Only one Asian grocery store-based breast health education intervention study was conducted that targeted Japanese Americans ($N = 47$) in San Diego, CA (Sadler et al., 2003). Of the 19 women who were 40 years and older, only one woman was in compliance with CBE and mammography guidelines at baseline and none of the women who were out of compliance had attempted to set up a breast cancer screening test after the intervention. The most common barriers to scheduling a screening appointment identified by these 19 Japanese women were language (28%), cost (17%), and fear (5%). The top three barriers to participating in additional breast cancer education sessions were lack of time (57%), language (15%), and cost (9%).

Vietnamese Americans

More intervention studies have been conducted among Vietnamese American women, which may result from the higher incidence rate of cervical cancer in this population. A lay health worker (i.e., a nonhealthcare provider recruited from an ethnic community) model was more effective in

increasing cancer screening awareness than a media-led model or a neighborhood-based educational activities model (Bird et al., 1998; Jenkins et al., 1999; Lam et al., 2003; Nguyen, Vo, McPhee, & Jenkins, 2001). Trained Vietnamese lay health workers significantly increased Vietnamese women's recognition, receipt, and maintenance of breast and cervical cancer screening tests in the targeted community (Bird et al.). The media-led community education campaign caused an increase in screening immediately after completion of the intervention, but screening participation declined sharply by post-test 24 months later (Jenkins et al.). A media education campaign and a lay health worker outreach program were compared for increasing Vietnamese American women's awareness, knowledge, and screening of cervical cancer. By postintervention, the number of women who had undergone a Pap test increased significantly in both groups, but considerably more were screened in the health worker and media education group. Furthermore, significantly more of the women in the health worker and media education group reported that they planned to have a Pap test (Lam et al.).

Two other intervention studies have been conducted to promote breast cancer education among Vietnamese American women (Nguyen et al., 2001; Sadler, Dong, Ko, Luu, & Nguyen, 2001). Twelve health fairs were sponsored in various locations throughout California to promote early detection of breast cancer. Women in the intervention community significantly increased their recognition, plans, and currency of mammography, but the rate also increased in the control community (Nguyen et al., 2001). Sadler et al. (2001) conducted surveys and a multilingual breast cancer education intervention in grocery stores targeting Vietnamese American women. Of women aged 40 and older ($n = 116$), 48% had scheduled a CBE after the intervention. Among women aged 50 and older ($n = 67$), 48% reported that they set up a mammogram in the interval. The most common barriers to participating in additional breast cancer education sessions were lack of time (48%), language (21%), and cost (11%).

A three-year intervention study focused on promoting prevention and early detection of cancer among Vietnamese physicians in California (Nguyen et al., 2000). Postintervention, the performance rates increased significantly for smoking cessation counseling, Pap testing, and pelvic examinations but not for mammography or CBEs.

Reliability and Validity of Measures

Reliability and validity testing are important components of most health behavior research, but they are not applicable to the exploratory descriptive studies reviewed in which qualitative data were obtained. A particular challenge in cross-cultural comparisons is the inadequate development of valid and reliable measures (Pasick et al., 1996). The research studies reviewed in this article exemplify this challenge. Most studies did not report reliability or validity of the measurements used. The two studies on Japanese Americans used a health-risk appraisal and pre- and postsurveys on cancer screening adherence and beliefs, respectively (Nakamura, 2001; Sadler et al., 2003), and neither reported reliability or validity of their instruments. Of the studies on Chinese Americans, only Tang et al. (2000) reported reliability on the instruments used. Poor access and avoidance were common barriers to mammography and had good internal consistency reliability (Cronbach's

$\alpha = 0.77$). The measure of physician recommendation as a common barrier to mammography also had good internal consistency reliability (Cronbach's $\alpha = 0.79$). Factor analysis and item loadings were presented for cultural barriers to screening inventory. Additionally, adequate reliability was reported for each of the modesty, crisis orientation, use of Eastern medicine, and lack of family support factors with Cronbach's alphas of 0.72, 0.61, 0.72, and 0.54, respectively. Do et al. (2001) and Tu et al. (2003) found that their instruments previously had been used successfully in several Asian American populations.

Studies of Vietnamese Americans were similar in that only three reported some form of psychometric testing. Schulmeister and Lifsey (1999) described content validity testing (100%) and interrater reliability (90%) in recording subjects' responses. Yi (1998) discussed construct validity (factor analysis) using a factor loading of 0.50 as the inclusion criterion for items in the scale. Bird et al. (1998) cited a previous publication for psychometric information on their scales but failed to report it in their study.

Although most studies appeared to use some formative assessment for instrument development, such as focus groups or pilot testing, few reported on actual psychometric properties of the instruments, which makes them difficult to compare or evaluate for effectiveness. Furthermore, many of the studies reviewed did not state how sample sizes were determined or the power of the study. The underpowered study findings are much more difficult to generalize than studies with adequate sample sizes and power.

Discussion

ACS (2005b) recommended that women aged 40 and older have an annual mammogram and CBE and perform monthly BSE and women aged 20–39 have a CBE every three years. BSE is an option for women in their 20s and beyond. Cervical cancer screening should begin about three years after a woman starts having sexual intercourse or by age 21 and should be conducted annually for women aged 30 and older. For women who have had three normal test findings in three consecutive years, the Pap test can be performed once every two to three years. In addition, the Healthy People 2010 national goals for breast and cervical cancer screening have recommended that 70% of women aged 40 and older should have had one mammogram within the past two years and 90% of women should have had a Pap test once every three years (U.S. Department of Health and Human Services, n.d.). In the studies reviewed, the rates of adherence were reported in various formats, especially for breast cancer screening, with a great range of differences. In addition, sample sizes ranged from 18–933 and screening rates were consistently below the ACS (2005b) recommendations and national goals for Chinese, Japanese, and Vietnamese Americans.

Among the intervention studies, the high intensive and personal interaction provided to Vietnamese Americans in the lay health worker model (Bird et al., 1998; Lam et al., 2003) and to Chinese Americans in the outreach worker model (Taylor, Jackson, et al., 2002) were more successful than a media-led educational campaign (Jenkins et al., 1999; Lam et al.) and countywide neighborhood-based activities (Nguyen et al., 2001). Perhaps individual contact from a peer was significant in helping Chinese women seek and maintain cancer

screening; however, the low-intensity direct-mail intervention (Taylor, Hislop, et al., 2002) and Asian grocery store-based health education programs (Sadler et al., 2001, 2003; Sadler, Wang, et al., 2000) were found to be effective as well for all three groups.

Strengths of the Studies

Among these studies, the Health Belief Model and Suinn-Lew Asian Self-Identity Acculturation Scale were used commonly. All of the questionnaires and interview instruments were developed in or translated into the participants' native language; in addition, back translations (i.e., when a person translates an English-language version into another language and a second person translates the text into English), focus group meetings, and pretests regularly were used to ensure culturally appropriate tools. Data were collected by bilingual workers. The choice of using English or a native language was given to participants. For data analysis, both bivariate and multivariate statistics were used.

Limitations

In addition to a great range of sample sizes and various reporting formats of screening rates, all studies except Taylor, Hislop, et al.'s (2002) randomized, controlled, intervention study used self-reported cancer screening as an outcome with no verification of Pap testing, CBE, and mammogram utilization. Inconsistent operational definitions of barriers and facilitators also made comparisons across studies difficult. Both the length of U.S. residence and the age of immigration were not conclusive predictors for having breast or cervical screenings. Another major limitation is that very few studies exclusively were devoted to each Asian group; only two studies solely focused on Japanese Americans. Further descriptive and intervention studies about Japanese Americans' cancer screening practices and beliefs are needed. The two studies reviewed had small, nonrandom samples, thus generalizations could not be made about Japanese women in the United States (Nakamura, 2001; Sadler et al., 2003). Fourteen out of 28 studies (50%) were completed in California; further studies in other geographic regions in the United States are needed to make generalizations about Chinese, Japanese, and Vietnamese Americans.

No cost-effectiveness comparisons were conducted for these interventions. Therefore, an economic and effective in-

tervention is needed to educate minority groups and promote cancer screening and practices.

Conclusions

This review suggests that breast and cervical cancer screening is consistently low among Chinese, Japanese, and Vietnamese American women. The low rates of cancer screening reduce the likelihood of early detection and treatment of breast and cervical cancers. Screening for other cancers, including colorectal and prostate cancers, also should be examined among Asian groups. Because Asian Americans have high incidence rates of liver and stomach cancer, health promotion should focus on these areas. Breast and cervical cancer screening should be assessed in other Asian groups, such as Korean, Filipino, Indian, and Cambodian women. In addition, future studies should examine risk factors for cervical cancer (e.g., human papillomavirus infection). National funds for cancer control and research should be increased for this ethnic population. Qualitative research also should be conducted to develop culturally sensitive cancer education materials in Asian people's native languages.

Primary care physicians continue to be in the best position to emphasize the importance of cancer screening, but the lack of physician referrals has been found to be a critical factor in the low use of breast and cervical cancer screening (Tang et al., 2000; Taylor, Hislop, et al., 2002; Yu et al., 2001). More intervention studies need to target physician groups, providing adequate training and a reminder system for cancer screening. Further research should be planned for nurses to take a more vital role in the cancer screening process. Future research also should be designed to evaluate the cost and effectiveness of lay health workers, media, health education brochures, telephone and mailing, and other possible interventions. Moreover, Sadler et al.'s (2001, 2003) studies reported a high desire from Asian Americans to learn and a willingness to share cancer screening information with others. Appropriate, adequate, and persistent cancer screening education will promote cancer awareness among Asian women living in the United States and may improve cancer screening rates.

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