

# Cervical Cancer Beliefs and Pap Test Screening Practices Among Chinese American Immigrants

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**Purpose/Objectives:** To examine beliefs and Pap test utilization among Chinese American women, the largest Asian female population in the United States.

**Research Approach:** Cross-sectional descriptive, correlational study.

**Setting:** Metropolitan areas of Portland, OR.

**Participants:** 100 foreign-born Chinese women aged 40 years and older.

**Methodologic Approach:** Three questionnaires were modified, translated, combined, and pretested. Participants completed the self-administered questionnaire in a group setting.

**Main Research Variables:** Utilization of Pap test screening, health beliefs, and cultural and sociodemographic variables.

**Findings:** Sixty-eight percent reported having a Pap test within the prior three years (adherence), and 84% reported ever having a Pap test. The odds of Pap test use and adherence decreased with increasing age. Women with insurance or a regular healthcare provider had better odds of Pap test use and adherence. Older age, older age when a participant moved to the United States, and increased modesty were negatively associated with ever having had a Pap test.

**Conclusions:** Age and cultural beliefs influence Pap test use and adherence. The strength of provider recommendation and healthcare access as predictors suggest areas for interventions designed to increase screening for cervical cancer.

**Interpretation:** Nurses play a vital role in preventive health care, especially with the growing number of advanced practice nurses delivering primary care. Primary healthcare providers should be reminded of their influential role in increasing adherence to cancer screening. Further health policy action is necessary to extend screening coverage to those who do not have adequate health insurance.

## Key Points . . .

- ▶ Asian women have higher incidence and mortality rates of cervical cancer than Caucasian women.
- ▶ The majority of the participants (84%) reported that they had obtained at least one Pap test; however, only 68% reported that their last Pap test was within the previous three years.
- ▶ Older age, older age when immigrated to the United States, and increased modesty were negatively associated with ever having had a Pap test and regular Pap adherence.

cancer is attributed to the routine use of the Pap screening test. However, in 2000, Asian women (77%) had the lowest “ever receiving a Pap test” rates when compared with Caucasian (95%), African American (95%), and Hispanic (87%) women. Asian women also reported the lowest rate of receiving a Pap test within the previous three years (66%) compared with Caucasian (83%), African American (84%), and Hispanic (77%) women (Intercultural Cancer Council [ICC], 2001). Healthy People 2010 aims to increase the percentage of women ever receiving a Pap test to 97% and the percentage of women having received a Pap test within the past three years to 90%. Pap test screening rates for Asian American women are well below the target rates.

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Despite decades of progress in cancer prevention and early detection in the United States, cancer health disparities persist among racial and ethnic minorities. Cancer mortality rates often are higher among ethnic minorities than Caucasians. Cancer continues to be the leading cause of death for Asian American women. Asian women in the United States have a higher incidence rate of cervical cancer (8.9 per 100,000) compared to Caucasian women (8.7 per 100,000). The death rate from cervical cancer also is higher (2.7 versus 2.5 per 100,000) (American Cancer Society [ACS], 2006). In addition, more Asian women are diagnosed with cervical cancer at later stages compared to Caucasian women (Kagawa-Singer & Pourat, 2000).

Early detection of cancer through regular screening plays a vital role in reducing mortality from cervical cancer. Cervical cancer is highly curable if it is detected early. In the United States, the significant decline in deaths related to cervical

The Asian American population is the fastest-growing racial or ethnic population in the United States (U.S. Census Bureau, 2000b). In 2000, 4.2% of the total U.S. population self-reported as Asians, a 72% increase from 1990. In contrast, the total U.S. population grew only 13% from 1990–2000 (U.S. Census Bureau, 2000b). About 8% of the U.S. population will consist of Asians by the year 2050 (U.S. Census Bureau, 2004b). Although a tendency exists to classify all Asian Americans and Pacific Islanders into one large ethnic cluster, Asian Americans include more than 25 separate ethnicities (ICC, 2001; National Cancer Institute, 2000). Each group is unique and differs from the others in language, culture, and health beliefs.

Among the Asian American subgroups, the Chinese American group is the largest (ICC, 2001). Limited studies are available in the literature regarding Pap screening adherence rates among Chinese Americans (Do, Taylor, Yasui, Jackson, & Tu, 2001; Lee, Lee, & Stewart, 1996; Taylor et al., 2002; Yu, Kim, Chen, & Brintnall, 2001; Yu, Seetoo, Tsai, & Sun, 1998), and reported rates ranged from 36%–81% (Lee-Lin & Menon, 2005). The wide range may be because of variations in socioeconomic status and acculturation of participants.

The Portland, OR, metropolitan area includes a diverse population of Asian Americans. In Oregon, Asians represent 3% of the population (U.S. Census Bureau, 2000a), including individuals who trace their origins to China (0.6%), Japan (0.4%), Korea (0.4%), Vietnam (0.6%), Laos and Cambodia (0.5%), and Hawaii and other Pacific Islands (0.2%). Asian Pacific Islanders have the highest cervical cancer rates (11.0 per 100,000) among Oregonian women (Oregon State Cancer Registry, 2002). This article describes a cross-sectional, descriptive, correlational study that explored sociodemographic characteristics, knowledge, and beliefs (perceived risk factors, benefits, and common cultural barriers) related to Pap screening practices among Chinese female immigrants in Portland. The specific aims were to (a) describe sociodemographic characteristics, knowledge, and beliefs related to Pap test screening practices among foreign-born Chinese immigrant women aged 40 or older; (b) examine the associations of sociodemographic characteristics, knowledge, and beliefs related to Pap test screening practices; and (c) explore the association between mammography and Pap test screening practices.

The Health Belief Model (HBM) was selected as the conceptual model for the study because of its focus on individuals' perceptions about an illness, their beliefs about actions related to prevention of the disease, and how those factors affect their health actions. The HBM has been one of the most commonly used conceptual frameworks in health behavior studies (Janz, Champion, & Strecher, 2002) and has provided the conceptual framework for some studies of Asian Americans (Schulmeister & Lifsey, 1999; Tang, Solomon, & McCracken, 2000; Yi, 1994). The HBM emphasizes individual health beliefs and can be used to explain and intervene in cancer screening behaviors. A number of HBM variables are believed to influence cancer screening beliefs and practices, such as perception of susceptibility and perceived benefits and barriers. The HBM claims that people are more likely to participate in health-promoting behaviors if they believe they are susceptible to a health condition and that the condition is serious. An increase in perceived susceptibility and severity has been linked to an increase in breast cancer screening (Champion, 1999). In addition, perceived benefits refer to an individual's perception of positive outcomes of health-promoting behaviors (e.g., mammography,

Pap test screening). On the other hand, perceived barriers refer to an individual's perception of negative attributes related to health-promoting behaviors. A perception of more benefits to screening for breast and cervical cancer, combined with a perception of few barriers, is significantly associated with increased screening behaviors (Champion).

## Methods

### Sample

The target population was Chinese Americans in the Portland metropolitan area who were born outside the United States. One hundred Chinese American immigrant women aged 40 or older were recruited from Asian community centers and churches. The participants completed a self-administered questionnaire that assessed sociodemographic characteristics, knowledge and beliefs about cervical cancer and screening, and Pap test practices.

Eligibility criteria included (a) Chinese women who were born outside the United States, (b) aged 40 years or older, (c) no history of cervical cancer, and (d) ability to understand and complete the questionnaire in English or Chinese. One subject who could not read the questionnaire was assisted by the first author, who read the questions to the subject and marked the answers for her.

To determine the sample size needed, the researchers computed power calculations based on a logistic model using a conservative odds ratio (OR) of 2.0, which was determined by reviewing ORs reported in the literature. The significant ORs for sociodemographic and cancer belief and knowledge variables ranged from 1.48–7.51 for Pap test screening (Do et al., 2001; Tang, Solomon, Yeh, & Worden, 1999; Taylor et al., 2002). The investigators estimated that 100 participants could be recruited for the study; a relatively low attrition rate was anticipated given the one-time data collection. However, the researchers estimated that 10% of the responses might be unusable as a result of missing data. Given the sample size of 90, the study had an 82% statistical power of detecting an OR of 2.0 at  $\alpha \leq 0.05$ .

### Tools

The survey items were adapted and modified from Champion's (1999) Breast Health Survey, Taylor et al.'s (2002) tool to assess cervical cancer screening among Chinese Americans, and Tang et al.'s (2000) women's health survey. Taylor et al.'s survey included cervical cancer knowledge and belief items adapted from the Pathways to Early Detection questionnaire that has been used successfully with several Asian American populations (Hiatt et al., 1996; Lee et al., 1996; McPhee et al., 1996). Tang et al. (2000) addressed cultural barriers among Chinese Americans. The tool was tested for reliability and validity for this group of Chinese American women. The Cronbach alphas ranged from 0.54–0.72. The final version of the cervical cancer survey consisted of 65 items that assessed the following variables.

- **Knowledge** was measured by nine multiple-choice items; a score was obtained by summing the correct number of responses (range = 0–9). A higher score indicated greater degree of knowledge concerning cervical cancer and Pap test screening. A mean score was calculated.
- **Perceived cancer risk factors** were measured with seven items (responses were “increase risk,” “decrease risk,” or

“not sure”). Results were reported as frequency counts and percentages and were not included in the logistic regression analysis.

- **Perceived benefit** of detecting cervical cancer early was assessed with a single item answered with “yes,” “no,” or “not sure.” A mean score from 100 subjects was calculated.
- **Perceived common barriers** to obtaining a Pap test were assessed with four items (responses were “yes,” “no,” or “not sure”); mean scores were calculated (Cronbach alpha = 0.80).
- **Perceived cultural barriers** were assessed with 17 items scored on a Likert scale. Scores were summed for each scale; a higher score indicated a greater degree of the component except for the crisis/prevention scale, where a higher score indicated a low degree of crisis orientation and higher degree of prevention orientation. Subscales were crisis/prevention orientation (five items, range = 5–25), modesty (five items, range = 5–25), family support (four items, range = 4–20), and use of Eastern medicines (three items, range = 3–15). Overall Cronbach alpha was 0.72.
- **Sociodemographic variables** (21 items) included age, age when the participant moved to the United States, ability to speak English, use of a regular healthcare provider (HCP), gender of HCP, and healthcare coverage.
- **Pap test screening** (six items) was self-reported as history of a hysterectomy, pelvic examination, or Pap test; a Pap test in the previous three years; results of Pap test screening; and intent to have Pap test in the next six months if not adherent. Results were reported as frequency counts and percentages.
- Participation in **mammography screening** was self-reported as ever having a mammogram and having a mammogram within the previous year, results of mammography, and intent to have a mammogram in the next six months if not adherent. Results were reported as frequency counts and percentages.

## Translation

The questionnaire was translated into Chinese (both traditional and simplified character writings) using a modified Committee Approach (Schoua-Glusberg, 1992, 2004; U.S. Census Bureau, 2004a). The translation team was made up of three bilingual translators, all of whom were HCPs or educators with many years of work experience in the United States. Each translated one-third of the questionnaire initially. After completion of their individual translations, the group met to settle discrepancies and agreed on translated language that combined the best of their independent translations. The process has been found to produce more accurate text translations than translation by a single person or back translation by a pair of individuals. The U.S. Census Bureau’s (2004a) guidelines for survey translation recommended the team approach.

The translation committee and the first author reviewed the linguistic and cultural accuracy of the translation; only items that reached complete (100%) agreement among all reviewers were retained. The instrument was pretested by 10 Chinese American respondents who resembled the study population. Revisions to the Chinese and English versions were made following the pretest to improve the clarity of the survey. The English and two Chinese versions (traditional and simplified character writing) of the instrument were available to participants depending on their language and reading preferences. The participants self-selected which version of the survey they wanted to answer.

## Procedures

After obtaining approval from the institutional review board, the first author visited five community sites (Asian Health Services Center [AHSC], Chinese Evangelic Church [CEC], Valley Baptist Chinese Fellowship, Chinese American Semi-conductor Professional Association, and Taiwanese Lutheran Church) to confirm permission to recruit participants from their sites. The two largest recruitment sites were the AHSC and CEC. The AHSC has been serving the Asian community in Oregon since 1983 and provides weekly cultural events for Asian Americans. More than 600 Asians attended the sixth annual AHSC community health fair in September 2006. The AHSC encounters more than 13,000 Asian Americans each year. The CEC has been serving the Chinese community in Portland for 30 years. The church has 200–300 members and conducts weekly Chinese and English services and outreach meetings. The first author attended 16 community meetings and gatherings for Chinese women at the Asian community centers and Chinese community churches over a seven-week period. She explained the study to eligible women and told them that the study was about women and health screening behaviors, that their participation would be voluntary and confidential, and that they would receive a small gift for their time. However, the specific amount of money (\$10) was not explicitly stated because Chinese participants do not like to feel that they participate because of monetary remuneration. Those who volunteered were asked to remain after the meeting to complete a 20- to 30-minute, self-administered questionnaire in a group setting. The first author was present and available for questions.

## Data Analysis

Researchers conducted data analysis using SPSS® Version 11.5 (SPSS Inc.). First, descriptive frequencies were run for all variables. Next, bivariate analyses were conducted with each independent variable (sociodemographic characteristics, knowledge of cervical cancer and screening, perceived benefits, perceived barriers, and cultural barriers) and each dependent variable (women who had ever had a Pap test and women who had had a Pap test within the prior three years). To determine which of the independent variables were associated most strongly with the two dependent variables, initial bivariate analyses were undertaken using binomial logistic regression for continuous variables and chi square for categorical variables. In keeping with the exploratory nature of the research, variables associated at  $p \leq 0.1$  were included in the final logistic regression analysis. Stepwise forward and backward logistic regression analyses were conducted for each dependent variable and selected statistically significant independent variables. The results were the same with each approach. Checks were made for missing data, and missing values were excluded on a test-by-test basis (Pett, 1997). Minimal data were missing because all data collection was conducted with the investigator present. Most missing data were household incomes (23%); data were recoded and analyzed as reported versus missing household income.

## Results

Of the 102 women who initially agreed to participate in the study, 100 completed the survey (98% response rate). Most

(93%) of the respondents in the sample chose to complete the questionnaire in Chinese, with 67% choosing the traditional Chinese version, 26% the simplified Chinese version, and 7% the English version.

## Sample

The mean age of the participants was 56.5 years (range = 40–91). The mean age of the women when they immigrated to the United States was 38.8 years (range = 9–70). The average length of residence in the United States was 17.5 years (range = 1 month–43 years). Fifty-four percent of the participants immigrated from China, 30% from Taiwan, 7% from Hong Kong, 6% from Vietnam, and 1% each from Macau, Indonesia, and Thailand.

Seventy-two percent of the respondents were married. Forty-eight percent had a college or graduate school degree; 18% of the respondents reported having had no formal education or only an elementary education. Fifty-eight percent of the women did not have outside employment; 24% reported having a full-time job. Forty-three percent of the women reported that their ability to speak English was average; 39% of the participants reported that they could not speak English at all or could speak it poorly. Of those who reported their annual household income (77%), 47% reported it as less than \$30,000.

Seventy-seven percent of the participants reported that they had a regular HCP, and 57% of them had a female regular HCP. Sixty percent of the respondents preferred to see a female regular HCP for a Pap test. Seventy-six percent reported having a non-Asian regular HCP. Eighty-four percent reported that they usually understood what the regular HCP said to them, and 83% believed that the regular HCP usually understood them. The women who did not speak English well indicated that they used interpreters to help them communicate with a regular HCP. Sixty-seven percent reported that in the previous year or two, an HCP had recommended that they have a Pap test.

Thirteen percent of the participants did not have health insurance of any type or were not sure whether they had it. Of those who had health insurance, 89% reported that their healthcare plans covered Pap tests. Thirty-six percent of the respondents reported knowing someone with cervical cancer, and 12% of the participants had an immediate family member (mother, sister, or daughter) who had been diagnosed with cervical cancer.

## Cervical Cancer Knowledge and Beliefs

The mean score on the knowledge scale was 5.41 (SD = 2.33, range = 0–9). The participants knew that having human papilloma virus (HPV) (42%), having intercourse at an early age (41%), having multiple sexual partners (58%), and engaging in sexual activity with a man who had had multiple partners (60%) were associated with increased risk. Eighteen percent of the women believed that women did not need a Pap test if they had no symptoms. Twenty-two percent of the women believed that women did not need a Pap test if they were not having intercourse with a man, and 20% believed that women did not need a Pap test after menopause.

The top five risk factors that women believed increased their risk of developing cervical cancer were as follows: having poor hygiene (82%), using birth control pills for a long time (59%), using an intrauterine device (39%), having several

miscarriages (38%), and having very frequent sexual activity with the same man (25%).

The mean score for perceived barriers was 0.44 (SD = 0.84, range = 0–4), and the mean benefit score about Pap test screening was 0.75 (SD = 0.44, range = 0–1), based on 100 subjects. For the specific cultural components, a higher score of modesty, family support, or use of Eastern medicine indicated a stronger degree of modesty, family support, or use of Eastern medicine. The mean score for modesty was 13.93 (SD = 3.62, range = 6–24), family support 11.76 (SD = 3.03, range = 5–18), and use of Eastern medicine 8.70 (SD = 2.40, range = 3–15). For the crisis orientation cultural barrier, a higher score indicated a lower degree of crisis orientation and a higher degree of prevention orientation. The mean score for crisis orientation was 20.05 (SD = 2.25, range = 15–25).

## Factors Associated With Pap Test Screening

Eighty-four percent of the participants reported that they had obtained at least one Pap test, whereas 68% reported that their last Pap test was within the prior three years.

The four sociodemographic, knowledge, and belief variables significantly associated with ever having had a Pap test on a logistic regression model were younger age ( $\beta = -0.06$ ,  $p = 0.004$ ), younger age when the participant moved to the United States ( $\beta = -0.06$ ,  $p = 0.002$ ), lower modesty scores ( $\beta = -0.22$ ,  $p = 0.016$ ), and a prevention orientation ( $\beta = 0.27$ ,  $p = 0.05$ ). Older age, older age at immigration, increased modesty, and a crisis orientation were negatively associated with ever having had a Pap test.

Chi-square analyses indicated eight categorical variables significantly associated with ever having had a Pap test: having a regular HCP, having insurance that covers Pap tests, being told by a regular HCP to have a Pap test, having a non-Asian HCP, communicating well with a regular HCP, being understood by the regular HCP, having been born in Taiwan, and having been born in China.

Forward and backward stepwise logistic analyses indicated that increased age, increased modesty, prevention orientation, being told by a regular HCP to have a Pap test, being born in Taiwan, and having health insurance that covers Pap tests were significantly associated with ever having had the test. Large confidence intervals (CIs) for being born in Taiwan (1.56–262.28) and regular HCP recommendation (3.73–109.30) indicated that the two variables were too highly correlated with the outcome variable, causing a small standard error. Therefore, the variables were dropped from the model (Tabachnick & Fidell, 2001) and further logistic regression analysis was performed again. In addition, the age variable OR was very close to 1.0 (OR = 0.96, CI = 0.92–1.00), indicating that the outcome was equally likely in women with one-year difference in age. The age variable then was recoded by decades (e.g., 40–49, 50–59).

The logistic analysis indicated that for every advancing decade, the log odds would decrease 0.50 from ever having had a Pap test (OR = 0.50, CI = 0.33–0.77). For example, the odds of ever having had a Pap test would decrease 0.50 for women aged 50–59 as compared to women aged 40–49. Women who reported having a regular HCP had approximately seven times the odds of ever having had a Pap test than those without a regular HCP (OR = 6.73, CI = 1.93–23.54). For women with health insurance that covered Pap test screening, the odds of

having had a Pap test was four times the OR of women without insurance (OR = 4.19, CI = 1.38–12.67).

### Pap Test Within the Prior Three Years

The five sociodemographic, knowledge, and belief variables significantly associated with having had a Pap test within the prior three years were younger age ( $\beta = -0.058$ ,  $p = 0.001$ ), younger age when the participant moved to the United States ( $\beta = -0.053$ ,  $p = 0.001$ ), higher knowledge about cervical cancer ( $\beta = 0.288$ ,  $p = 0.006$ ), lower modesty ( $\beta = -0.154$ ,  $p = 0.033$ ), and better spoken English ability ( $\beta = 0.713$ ,  $p = 0.003$ ). Once again, older age, older age at immigration, and increased modesty were negatively associated with having had a Pap test within the previous three years.

Chi-square analyses indicated that the eight categorical variables significantly associated with having had a Pap test within the previous three years were being married or living with a partner, having a higher than elementary education, being employed, being born in Taiwan, being born in China, having a regular HCP, being told by an HCP to have a Pap test, and having health insurance that covers Pap tests.

The independent variables that were significant in bivariate analysis with each outcome variable were entered into the logistic regression models. Table 1 summarizes those variables. Logistic regression analyses then were conducted, modeling

the odds of ever having had a Pap test and of having had a Pap test within the previous three years.

Forward and backward stepwise logistic analyses indicated that increased age (every one-year interval), having greater knowledge of cervical cancer, being told by a regular HCP to have a Pap test, having insurance that covers Pap testing, and having been born in Taiwan were significantly associated with having had a Pap test in the previous three years. Because a large CI (17.29–554.63) was noted for the regular HCP recommendation variable, the variable was dropped from the model (Tabachnick & Fidell, 2001) and further logistic regression analysis was performed again. Similarly, every year in age interval had an OR very close to 1.0 (OR = 0.93, CI = 0.88–0.97). Therefore, a new age variable (every decade) was used in further logistic regression analysis. For every advancing decade, the log odds decreased 0.51 in having had a Pap test within the previous three years (OR = 0.51, CI = 0.37–0.71). Women who reported having an HCP had approximately five times the odds of having had a Pap test within the previous three years when compared to women without an HCP (OR = 4.75, CI = 1.83–12.30).

### Correlations Between Pap Test and Mammography Practices

Positive associations were found between ever having had a mammogram and ever having had a Pap test ( $\chi^2 = 8.74$ ,  $p = 0.003$ ) and between regular adherence to mammography (every year) and Pap testing (every three years) ( $\chi^2 = 9.29$ ,  $p = 0.002$ ). Of the 86% who reported ever having had a mammogram, 88% reported having had at least one Pap test. Of the 49% who reported adherence with yearly mammography, 83% reported adherence with Pap test screening every three years.

**Table 1. Logistic Regression Model**

Characteristic	$\beta$	$p$	$\chi^2$	$p$
<b>Ever had a Pap test</b>				
Age	-0.06	0.004	-	-
Age at immigration	-0.06	0.002	-	-
Prevention orientation	0.26	0.095	-	-
Modesty	-0.22	0.016	-	-
Have a regular healthcare provider	-	-	7.84	0.0050
Healthcare provider told you to have a Pap test.	-	-	15.39	0.0001
Insurance covers Pap testing.	-	-	7.36	0.0070
Born in Taiwan	-	-	5.12	0.0240
Born in China	-	-	3.38	0.0660
Ethnicity of healthcare provider (Asian or non-Asian)	-	-	5.24	0.0220
You understand what your healthcare provider says.	-	-	3.12	0.0770
Your healthcare provider understands what you say.	-	-	3.07	0.0800
<b>Pap test within previous three years</b>				
Age	-0.06	0.001	-	-
Age at immigration	-0.05	0.001	-	-
Cervical cancer knowledge	0.29	0.006	-	-
Modesty	-0.15	0.033	-	-
English ability (five levels)	0.71	0.003	-	-
Have a regular healthcare provider	-	-	8.85	0.0030
Healthcare provider told you to have a Pap test.	-	-	37.28	0.0001
Insurance covers Pap testing.	-	-	8.99	0.0030
Born in Taiwan	-	-	3.78	0.0520
Born in China	-	-	3.17	0.0750
Education	-	-	6.01	0.0140
Marital status	-	-	4.15	0.0420
Employment	-	-	4.53	0.0330

## Discussion

### Sociodemographic Variables

In general, the sociodemographic profiles of the sample were quite diverse, ranging from women who were extremely well educated with high family household incomes to those with limited education and lower household incomes. The respondents were relatively older immigrants who had lived in the United States for a fairly long period of time. Although the average length of U.S. residence was approximately 18 years, most of the respondents (93%) were more comfortable with the Chinese language, as evidenced by the high use of the Chinese language survey, suggesting that the group retained a strong Chinese cultural affiliation.

Being married or living with a partner, having a higher education, and being employed were significantly associated with having had a Pap test in the prior three years. Those findings were consistent with previous studies (Do et al., 2001; Lee-Lin & Menon, 2005; Yu et al., 1998). However, despite the fact that being born in Taiwan was significantly associated with ever having had a Pap test, Pap testing adherence was not reported in any of the previous studies. Although Chinese immigrants come to the United States from many points of origin, they often are considered as one large group. The findings of the current study suggest that the place of origin of Chinese women is important. Targeting broad groups of Chinese women without knowing their backgrounds, health beliefs, and cultural practices may lead to interventions that may be insensitive to within-group differences (Hiatt et al., 1996).

## Knowledge and Beliefs

Even though the participants had overall average knowledge about cervical cancer and Pap test recommendations, many did not know the risk factors for cervical cancer (HPV, early intercourse, multiple sexual partners, partner with multiple sexual partners). Some of them still believed that they did not need screening if they had no symptoms, were menopausal, or were not sexually active. In addition, the sample had some beliefs that were not accurate and did not influence risk of cervical cancer. For example, they believed that poor hygiene (82%), use of birth control pills (58%), use of an intrauterine device (39%), history of several miscarriages (38%), and frequent sexual activity with the same man (25%) would increase the risk of getting cervical cancer. Proper cervical cancer and Pap test education is necessary for this group of women.

Many of the beliefs reported in the study suggest that the length of time spent in the United States without adequate cancer knowledge and information may reinforce long-held cultural beliefs that may not be accurate. Chinese American women need education about risk factors and screening for cervical cancer because women with higher prevention orientation were more likely to have had a Pap test and women with higher cervical cancer knowledge were more likely to adhere to screening guidelines. The group should be targeted for further education and promotion regarding cervical cancer screening and early detection. In addition, the study confirmed the finding from Do et al. (2001) that younger age at immigration, not length of stay in the United States, was predictive of future participation in cervical cancer screening. Women living longer in the United States without proper cancer screening knowledge may not improve their use of Pap test screening. Chinese women who immigrated to the United States at younger ages may be better adapted to Western culture, not as modest as traditional Chinese women, and more open to screening for cervical cancer.

The new HPV vaccine has been hailed as a breakthrough in cervical cancer prevention. The vaccine has been shown to be very effective in preventing cervical cancer and genital warts caused by four strains of HPV: HPV-16, -18, -6, and -11 (Gupta, 2006; Tiffen & Mahon, 2006). However, the vaccine is not effective against all strains of HPV; regular cervical cancer screening still is necessary. Currently, the vaccine only prevents HPV infection; it does not prevent disease in a person who already is infected with the virus. The vaccine has been approved only for girls and women aged 9–26. Older women may have less benefit because they may have been exposed to the virus already. Further studies are needed to look at the long-term safety and efficacy of the vaccine in older women. Teaching about the vaccine and evaluating acceptance of the vaccine by general populations and minority populations such as Asian women also are needed.

## Limitations

The study had several limitations. First, it used self-reported measurements of Pap test screening, which may have been over- or under-reported. Self-reporting methods are particularly vulnerable to socially desirable behavior biases (Yi, 1994). Therefore, the actual occurrence of Pap test screening among Chinese American women may be lower than what was reflected in the current study. Review of medical records

can help researchers verify self-reported information; however, because subjects were recruited from a large Chinese community, such review would not have been cost effective. Further studies with adequate verification of self-reported information are warranted.

Second, the convenience sample was recruited exclusively from the Chinese community residing in the Portland area; the sample size was small. Thus, the results cannot be generalized to the population of Chinese immigrants. However, the findings of the descriptive study can provide a foundation for future intervention studies of Chinese women and comparisons with other Asian subgroups.

## Implications for Nursing

Participants reported a higher rate of ever having had a Pap test (84%) compared with other studies (Lee-Lin & Menon, 2005). However, the rate for those having had a Pap test within the previous three years (68%) remained low, emphasizing the need to assess the timing of the most recent Pap test. In addition, the Pap test rates were below the goal established by Healthy People 2010 (97% for ever receiving a Pap test and 90% for having received a Pap test within three years). Routine Pap test screening ensures early detection of cervical cancer. Nurses play a critical role in educating women regarding the importance of adhering to the cervical cancer screening guidelines of the ACS.

Consistent with previous studies, the findings of younger age, younger age at immigration, low modesty, having a regular HCP, having a recommendation from an HCP, and having health insurance that covers Pap tests were significantly associated with ever having had a Pap test and having a Pap test within the previous three years. Knowledge of those factors is of great value to nurses as they plan evidence-based programs to promote participation in cervical cancer screening. Provider recommendation and healthcare access, especially insurance coverage and having a regular HCP, must be incorporated into interventions designed to increase Pap test screening, along with a focus on older women and cultural barriers such as modesty. To help improve access for uninsured and low-income women, proven programs such as the National Breast and Cervical Cancer Early Detection Program should be protected and expanded. Advocacy for new programs focused on underserved populations also is needed. Many deaths could be avoided with the proper funding of such programs.

Women who had an Asian HCP were less likely than those who had a non-Asian HCP to report ever having had a Pap test. The finding is somewhat consistent with prior research. Lee, Lee, Stewart, and McPhee (1999) surveyed a group of primary care physicians who were affiliated with the Chinese Community Health Plan in San Francisco, CA, or who had a Chinese surname. The rate of performing Pap tests was only 61%. Nguyen et al. (2000) conducted another study on Vietnamese physicians. Before the intervention, the annual performance rate for Pap tests was 14%. After the intervention, screening performance rates increased significantly for Pap tests. Given that HCP recommendation is a strong predictor for having had a Pap test and for adherence to testing, Asian HCPs should be educated to overcome barriers to using cancer screening tests. In general, Chinese people have tremendous respect for authority; therefore, recommendation from their HCPs about Pap test screening would be valuable

and effective (Lee et al., 1999). Nurses play a critical role in preventive health care, especially with the rising number of advanced practice nurses delivering primary care. Primary HCPs should be reminded of their powerful position in increasing cancer screening adherence.

The study found positive associations between ever having had a mammogram and ever having had a Pap test and also between adherence to mammography (every year) and Pap test (every three years) screening practices. Increased awareness and adoption of one screening practice was positively correlated with the other screening practice in the current study. This raises an interesting and important question—whether interventions should address several cancer screening needs rather than focus on a single type of cancer screening.

Asian Americans make up the fastest-growing ethnic group in the United States. Chinese American women's low rate of adherence to Pap test screening is a major health concern. Routine screening can detect cervical cancer early and prevent the deaths of many Chinese American women. The findings of

this descriptive, correlational study are consistent with current literature. New variables that may influence cervical cancer screening in the Chinese community were identified (i.e., place of birth, prevention orientation, and positive association between mammography and Pap test screening practices). Future studies should extend this information and develop strategies to improve cervical cancer screening in Asian immigrant women. The findings that women with insurance coverage for Pap tests were more likely to have ever had a Pap test and more likely to have had a Pap test within the previous three years can guide advocacy and policy-making efforts to increase healthcare access and reduce health disparities.

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