Published in final edited form as:

J Immigr Health. 2001 January ; 3(1): 15–21.

Cervical Cancer Screening Among Chinese Immigrants in Seattle, Washington

H. Hoai Do^{1,2}, Victoria M. Taylor^{3,4,5}, Yutaka Yasui³, J. Carey Jackson^{1,2}, and Shin-Ping Tu^{1,2}

¹ Department of Medicine, University of Washington, Seattle, Washington.

² International Medicine Clinic, Harborview Medical Center, Seattle, Washington.

³ Division of Public Health Sciences, Fred Hutchinson Cancer Research Center, Seattle, Washington.

⁴ Department of Health Services, University of Washington, Seattle, Washington.

Abstract

Introduction—Chinese American women have high rates of invasive cervical cancer, compared to the general population. However, little is known about the Pap testing behavior of ethnic Chinese immigrants.

Methods—We conducted a community-based survey of Chinese immigrants living in Seattle, Washington, during 1999. Two indicators of cervical cancer screening participation were examined: at least one previous Pap smear and Pap testing in the last 2 years.

Results—The overall estimated response rate was 64%, and the cooperation rate was 72%. Our study sample for this analysis included 647 women. Nearly one quarter (24%) of the respondents had never had a Pap test, and only 60% had been screened recently. Factors independently associated with cervical cancer screening use included marital status, housing type, and age at immigration.

Conclusion—Our findings confirm low levels of cervical cancer screening among Chinese immigrants to North America. Culturally and linguistically appropriate Pap testing intervention programs for less acculturated Chinese women should be developed, implemented, and evaluated.

Keywords

Chinese immigrants; cervical cancer; Pap testing

INTRODUCTION

Census Bureau information shows that by 1990 there were 1.6 million ethnic Chinese living in the United States, and Chinese are now the largest Asian American subgroup (1). Chinese immigrants came to North America during several time periods and under diverse circumstances. The earliest group of Chinese immigrated to North America from Mainland China in the mid-1800s to work on railroads and farms. Following the liberalization of U.S. immigration policies in 1965, a number of students from Hong Kong and Taiwan migrated to North America. The next group of Chinese, predominantly from Vietnam, Cambodia, and Laos, fled persecution in Southeast Asia following the fall of Saigon in 1975. When political ties between the United States and China normalized in 1979, many Mainland Chinese sought

⁵ Author to whom correspondence should be addressed at Fred Hutchinson Cancer Research Center, 1100 Fairview Avenue North (MP-702), Seattle, Washington 98109. Telephone: (206) 667-5114. Facsimile: (206) 667-5977, e-mail: vtaylor@fhcr.org..

reunion with family members. The Tiananmen Square incident, together with internal political turmoil in Mainland China, provoked another exodus in 1989. Finally, the return of Hong Kong to Mainland China in 1997 stimulated a unique movement of families from both Hong Kong and Taiwan (2–4).

Worldwide, cervical cancer is one of the three most common female cancers and accounts for over 370,000 new cases each year (nearly 10% of all cancers) (5). In Mainland China, invasive cervical cancer is the second leading cause of cancer death among women (6). Further, Los Angeles data indicate that the rates of invasive cervical cancer are 12.3 per 100,000 for Chinese women compared to 7.2 per 100,000 for non-Latina whites (7). According to the U.S. Department of Health and Human Services, nearly 90% of American women have had at least one Pap smear, and about 75% have been screened recently (8). Few reports have addressed cervical cancer screening among Chinese immigrants. One ethnically focused behavioral risk factor survey conducted in Oakland during 1989–90 showed nearly one half (45%) of the participating Chinese women had never been screened (9). In addition, Lee et al. reported that only 37% of Chinese Americans who responded to a 1994 San Francisco survey were routinely obtaining Pap smears (4,10).

Given the history of Chinese immigration to North America, it is not surprising that the population is diverse in terms of country of origin, customs, beliefs, and acculturation (4). While the early Chinese immigrants have assimilated well, more recent arrivals face multiple social, economic, and health challenges. Many require special attention from public health professionals because of low levels of acculturation, difficulties learning English, and residence in “Chinatowns” (11). We are currently conducting a randomized controlled trial to evaluate the impact of a cervical cancer control intervention targeting less acculturated Chinese women. As part of this project, a community-based survey was conducted in Seattle during 1999. This brief report examines two indicators of cervical cancer screening participation among ethnic Chinese immigrants: at least one previous Pap smear and Pap testing within the last 2 years.

METHODS

Study Sample

In Seattle, more than 50% of the ethnic Chinese population live in the central and southern parts of the city (12). We sought to recruit a representative sample of women from these areas. Two complementary sampling methods were used to identify Chinese households within our target zip codes. First, we used multiple data sources (e.g., published articles and cancer registry data) to compile a list of Chinese surnames (13,14). This list was then linked to a computerized version of the 1998 Seattle telephone book. Second, we purchased a commercially available listing of Chinese households from the American List Council of New Jersey. This marketing company uses driver's license, motor vehicle, and voter registration listings as well as warranty card information, market research survey data, and telephone directories to identify various racial/ethnic subgroups of the population. All databases are updated monthly using the National Change of Address System (Personal Communication: Joseph Borelli, American List Council of New Jersey). Records from each source were merged by street address to eliminate duplicates. We randomly selected 714 Chinese households in our target zip codes from the telephone book. A further 1,231 households were randomly selected from the marketing company list. Therefore, the final study sample included 1,945 women.

SURVEY RECRUITMENT

This work was approved by the human subjects review board of Fred Hutchinson Cancer Research Center. To publicize the survey, project staff distributed posters and flyers in community locations (e.g., Chinese grocery stores, restaurants, and beauty salons). An

introductory letter, printed in both English and Chinese, was mailed to each household. The letter was signed by two physicians from Seattle's International Medicine Clinic, and incorporated a logo of bamboo and Chinese calligraphy (representing health and happiness). Our bicultural Chinese American female interviewers conducted surveys in respondents' homes. Those women who agreed to participate were given the option of completing the survey in Cantonese, Mandarin, or English. They were also offered a stipend of \$10 as a token of appreciation for their time.

Women were eligible for the study if they were 20 years of age or older. Due to cost constraints, women who did not speak Cantonese, Mandarin (the two most common Chinese dialects), or English were excluded. When a household had two or more eligible women, interviewers asked to speak with the oldest woman. However, if she refused or was not available, the interviewers asked if a younger woman would participate in the survey. We used this method, rather than a random selection algorithm, because attempts to enumerate household members have been shown to reduce response rates in Asian immigrant communities (Personal Communication: Stephen McPhee, University of California at San Francisco). The survey workers made at least five attempts (including at least 1 day time, one evening, and 1 weekend attempt) at contacting each household.

Survey Instrument

All survey questions were developed in English, translated into Chinese, back translated to ensure lexical equivalence, reconciled, and pre-tested (15). Pap testing items were taken from the Pathways to Early Detection questionnaire which has previously been successfully used in several Asian American populations (4,10,16). We asked women whether they had ever had a Pap smear and, if so, whether they had been screened within the last two years. Because there is a lack of consensus about the need for Pap testing among women without uteri, we also asked each woman if she had a history of hysterectomy (17,18). Other questions addressed age, country of birth, religion, marital status, educational level, household income, housing type (owned, rented, or government-subsidized), and employment outside the home. Women were also asked to specify how many years they had lived in North America and which of the following languages they spoke fluently: Cantonese, Mandarin, and English.

Data Analysis

We compared the characteristics of women who reported at least one prior Pap smear to those who had never been screened. In a second analysis, we compared women who had and had not received recent screening (i.e., within the past 2 years). Age at immigration was computed from women's responses with respect to age and years since immigration. Chi-square tests and, when necessary, Fisher's exact tests were used to assess statistical significance in bivariate comparisons (19). We used unconditional logistic regression models to summarize the independent effects of sociodemographic and acculturation factors on cervical cancer screening participation (20). As a tool to build a summary model, we used a forward variable-selection method; that is, we entered the most significant variables (in terms of deviance change) sequentially into our models until no other variable changed the deviance significantly (21). Because 43% of the income data were missing, we did not consider this variable in our multiple logistic regression analyses.

RESULTS

Study Group

Seven hundred and ten women completed the survey. Two hundred and forty of these women were identified through the telephone book and 470 through the marketing company list. The total estimated household response rate was 64%, and 72% of the households that were

reachable and eligible agreed to participate (Table I). Because this study focused on immigrants, 45 respondents who were born in North America (i.e., Canada or U.S.) and one respondent who failed to specify her birthplace were excluded from the analysis. We also excluded six women who reported a history of invasive cervical cancer and one 19-year-old participant (who had been interviewed in error). Finally, 10 participants were excluded because they did not answer the Pap testing history questions, leaving 647 women for the analysis.

Table II provides a detailed summary of the study group characteristics. The average age in years was 53.9 and the standard deviation (*SD*) was 15.1. Means for years of education, years in North American, and age at immigration were 8.7 (*SD* 4.5), 16.7 (*SD* 11.3), and 37.2 (*SD* 14.2), respectively. All respondents were Asian-born. A majority of women were currently married (78%), owned their own homes (79%), were recent immigrants (i.e., had been in the United States less than 10 years) (70%), came to North America when they were less than 40 years old (59%), and did not speak English fluently (91%). Only 8% of the survey participants reported a history of hysterectomy.

Pap Testing Behavior

Four hundred and ninety four (76%) of the 647 women in our study sample reported they had received Pap testing on at least one occasion, and 387 (60%) had been screened recently. We found significant differences in our bivariate comparisons between “ever” and “never” screened women for age, marital status, educational level, income, housing type, years in North America, and age at immigration (Table II). The bivariate analyses also showed associations between recent Pap testing use and age, marital status, educational level, income, housing type, age at immigration (but not years since immigration), religion, and employment outside the home. English fluency and a history of hysterectomy were not significantly associated with either indicator of Pap testing participation. The multiple logistic regression results are summarized in Table III. Three variables were found to be independently associated with a history of at least one Pap test as well as recent cervical cancer screening participation: marital status, housing type, and age at immigration.

DISCUSSION

Immigrant populations present a challenge to the public health system because they often differ from the general U.S. population in their patterns of disease, knowledge, and utilization of early detection services (22). The levels of Pap testing use among our study respondents (76% ever screened and 60% screened in the last 2 years) were reasonably comparable to those reported from the 1994 Pathways to Early Detection survey of Chinese women in San Francisco (67% ever screened and 57% screened in the last 3 years), and to findings from a 1997–98 survey of Cambodian refugees living in Seattle (76% ever screened and 47% screened in the previous 12 months) (4,23). These cervical cancer screening rates, however, do not even approach the year 2000 national goals that specify at least 95% of women should have received a Pap smear (24).

Marital status was strongly associated with cervical cancer screening use in our study. Compared to women who were never married, currently married women had a nearly seven times odds of having ever had a Pap test, and over five times the odds of having been screened recently. Yi has suggested that unmarried Asian immigrants are less sexually active than unmarried U.S.-born women and, therefore, may not perceive themselves as being at risk for cervical cancer or other gynecologic problems (25). In addition, the relationship between marital status and cervical cancer screening participation may be explained, at least in part, by the fact that pregnancy and childbirth motivate women to access the U.S. health care system; Pap smears may be linked to obstetrics and gynecological care during the reproductive years

(25,26). (These factors may have contributed to the large uncertainty in our estimates of marital status effects on screening rates.)

Housing type was also significantly associated with cervical cancer screening in our multiple regression analysis. Specifically, women who reported owning their homes had higher Pap testing rates than women who reported living in rented accommodation or government-subsidized housing. This finding is consistent with previous reports that have documented a strong correlation between cancer screening participation and socioeconomic status (27). Immigrant women who come to the United States at a younger age have more exposure to Western culture (e.g., through work, school, or social activities) and, consequently, are more likely to adopt behaviors of the general U.S. population (28). Therefore, it is not surprising that younger age at immigration was significantly associated with cervical cancer screening use after adjusting for marital status and housing type.

There are several limitations that should be considered in interpreting the results from our community-based survey. First, we only included Seattle areas with a high density of Chinese residents. It is unclear to what extent our findings can be generalized to other geographic regions or Chinese who do not live in neighborhoods with a high proportion of Asian Americans. Second, women who did not speak Cantonese, Mandarin, or English (and are particularly linguistically isolated) were excluded from the study. Third, self-reports of cervical cancer screening use may be inaccurate due to faulty recall or acquiescence bias (i.e., over-reporting a behavior perceived as desirable). However, good correlations have been documented between Pap testing rates derived from surveys and chart audits in other populations (26). Finally, it is possible that our survey respondents had a different cervical cancer screening experience than women who were unreachable or refused to participate. Specifically, the Pap smear rates among women who responded to the survey may have been higher than those among nonrespondents.

Cultural beliefs and attitudes toward cancer have been shown to influence foreign-born women's preventive care practices (23,29). For example, a recent qualitative study showed that many Cambodian immigrants believe cervical cancer is an American disease and, consequently, do not consider Pap testing to be personally relevant; and women are only at risk for cervical cancer if they have a vaginal discharge, have had sexually transmitted diseases in the past, are currently sexually active, or are pre-menopausal (29). Therefore, cancer control interventions targeting less acculturated immigrant groups should be based on a thorough understanding of each population. A recently developed Pap testing videotape for Cambodian women recognized traditional approaches to disease prevention, minimized the use of biomedical terminology, and emphasized role modelling by members of the community (30).

The National Institutes of Health Cervical Cancer Consensus Development Panel has documented the importance of outreach using culturally sensitive and linguistically compatible program staff (31). Indeed, one successful cervical cancer control project, targeting Vietnamese women in San Francisco, involved small group educational meetings offered by indigenous lay health workers; the intervention significantly increased the recognition, receipt, and maintenance of Pap testing (32). Finally, a strong association between physician recommendation and women's use of cancer screening tests has been documented in diverse populations (23). However, a recent study reported that physicians serving Chinese women in San Francisco only provide routine Pap testing for about 60% of their female patients (33). Intervention programs should also target the health care providers who serve Chinese and other foreign-born communities (23,33). Lee *et al.* have suggested that physician interventions might include information about strategies to help overcome patient-specific barriers, assistance with setting up office reminder systems, and provision of linguistically appropriate education materials (33).

Acknowledgements

This work was supported by grant CA74326 from the National Cancer Institute. Our project works closely with a coalition from Seattle's Chinese community. We would like to acknowledge the coalition's contribution to questionnaire development and survey implementation. Additionally, we thank the Chinese interviewers for their outstanding work.

References

1. U.S. Department of Commerce. We the Asian Americans. Washington DC: US Department of Commerce; 1993.
2. Lasky, E.; Martz, C. The Asian/Pacific Islander population in the United States: cultural perspectives and their relationship to cancer prevention and early detection. In: Frank-Stromberg, M.; Olsen, S., editors. Cancer Prevention in Minority Populations—Cultural Implications for Health Care Professionals. St. Louis: Mosby; 1993.
3. Mo B. Modesty, sexuality, and breast health in Chinese-American women. Western Journal of Medicine 1992;157:260–264. [PubMed: 1413766]
4. Lee M, Lee F, Stewart S. Pathways to early breast and cervical cancer detection for Chinese American women. Health Education Quarterly 1996;23 (Suppl):76–78.
5. Parkin D, Pisani P, Ferlay J. Global cancer statistics. CA Cancer Journal for Clinicians 1999;49:33–64.
6. Guo W, Hsing A, Li J, Chow W, Blot W. Correlation of cervical cancer mortality with reproductive and dietary markers, and serum markers in China. International Journal of Epidemiology 1994;23:1127–1132. [PubMed: 7721512]
7. Parkin, D.; Muir, C.; Whelan, S.; Gao, Y.; Ferlay, J.; Powell, J. Cancer Incidence in Five Continents, volume 6. Lyon: International Agency Cancer Research; 1993.
8. United States Public Health Service. The National Strategic Plan for the Early Detection and Control of Breast and Cervical Cancers. Washington, DC: US Department of Health and Human Services; 1992.
9. Centers for Disease Control. Behavioral Risk Factor Survey of Chinese—California, 1989. Morbidity and Mortality Weekly Reports 1992;41:266–270.
10. Hiatt R, Pasick R, Perez-Stable E, McPhee SJ, Engelstad L, et al. Pathways to early cancer detection in the multi-ethnic population of the San Francisco Bay area. Health Education Quarterly 1996;23 (Suppl):10–27.
11. Gould-Martin, K.; Ngien, C. Chinese Americans. In: Harwood, A., editor. Ethnicity and Medical Care. Cambridge: Harvard University Press; 1981.
12. United States Department of Commerce. Washington DC: United States Department of Commerce; 1993. 1990 Census of Population and Housing: Population and Housing Characteristics for Census Tracts and Block Numbering Areas: Seattle, WA PMSA.
13. Hage B, Oliver G, Powles J, Wahlquist M. Telephone directory listings of presumptive Chinese surnames: an appropriate sampling frame for a dispersed population with characteristic surnames. Epidemiology 1990;1:405–408. [PubMed: 2078618]
14. Choi B. Use of surnames to identify individuals of Chinese ancestry. American Journal of Epidemiology 1993;138:723–734. [PubMed: 8237987]
15. Eyton J, Neuwirth G. Cross-cultural validity: ethnocentrism in health studies with special reference to the Vietnamese. Social Science and Medicine 1984;18:447–445. [PubMed: 6729523]
16. McPhee S, Bird J, Ha N, Jenkins C, Fordham D, Le B. Pathways to early detection for Vietnamese women (health is gold). Health Education Quarterly 1996;23 (Suppl):60–75.
17. Fink, D. Atlanta: American Cancer Society; 1991. Guidelines for the Cancer-related Checkup: Recommendations and Rationale.
18. United States Preventive Services Task Force. Guide to Clinical Preventive Services. Baltimore: Williams and Wilkins; 1996.
19. Rosner, B. Fundamentals of Biostatistics. Boston: Duxbury; 1995.
20. Breslow, N.; Day, N. Statistical Methods in Cancer Research. Lyon, France: International Agency Cancer Research; 1980.

21. Draper, N.; Smith, H. *Applied Regression Analysis*. New York: John Wiley & Sons; 1981.
22. Fruchter R, Nayeri K, Remy J, Wright C, Feldman JG, et al. Cervical and breast cancer incidence in immigrant Caribbean women. *American Journal of Public Health* 1990;80:722–724. [PubMed: 2343960]
23. Taylor V, Schwartz S, Jackson C, Kuniyuki A, Fischer M, et al. Cervical cancer screening among Cambodian-American women. *Cancer Epidemiology Biomarkers and Prevention* 1999;8:541–546.
24. United States Public Health Service: *Healthy People 2000. National Health Promotion and Disease Prevention Objectives*. Washington, DC: Department of Health and Human Services; 1990.
25. Yi J. Factors associated with cervical cancer screening behavior among Vietnamese women. *Journal of Community Health* 1994;19:189–200. [PubMed: 8089269]
26. McPhee S, Bird J, Ha N, Jenkins C, Pham G. Factors associated with breast and cervical cancer screening practices among Vietnamese-American women. *Cancer Detection and Prevention* 1997;21:510–521. [PubMed: 9398991]
27. Hiatt R, Pasick R. Unsolved problems in early breast cancer detection: focus on the underserved. *Breast Cancer Research and Treatment* 1996;40:37–51. [PubMed: 8888151]
28. Jenkins C, Le T, McPhee S, Stewart S, Ha N. Health care access and preventive care among Vietnamese immigrants: do traditional beliefs and practices pose barriers? *Social Science and Medicine* 1996;43:1049–1056. [PubMed: 8890405]
29. Jackson C, Taylor V, Chitnarong K, Mahloch J, Fischer M, Sam R, Seng P. Development of a cervical cancer control intervention program for Cambodian American women. *Journal of Community Health* 2000;25:359–377. [PubMed: 10982010]
30. Mahloch J, Jackson C, Chitnarong K, Sam R, Ngo L, Taylor V. Bridging cultures through the development of a cervical cancer screening video for Cambodian women in the United States. *Journal of Cancer Education* 1999;14:109–114. [PubMed: 10397488]
31. National Institutes of Health Consensus Development Panel. National Institutes of Health consensus development conference statement: cervical cancer, April 1– 3, 1996. *Journal of the National Cancer Institute* 1996;21:vii–xix. [PubMed: 9023821]
32. Bird J, McPhee S, Ha N, Le B, Thomas D, Jenkins C. Opening pathways to cancer screening for Vietnamese-American women: lay health workers hold a key. *Preventive Medicine* 1998;27:821–829. [PubMed: 9922064]
33. Lee M, Lee F, Stewart S, McPhee S. Cancer screening practices among primary care physicians serving Chinese Americans in San Francisco. *Western Journal of Medicine* 1999;170:148–155. [PubMed: 10214101]

Table I

Summary of Survey Response

Addresses attempted	
A. Not a residential address	163
B. Eligibility not established (no contact after five attempts)	196
C. Verified to be ineligible	598
D. Eligible but refused	278
E. Completed	710
Estimates ^a	
F. Estimated proportion of eligibles among households where eligibility was not established	62%
G. Estimated number of eligibles among households where eligibility was not established	122
Response rates ^b	
H. Estimated total households response rate	64%
I. Cooperation rate	72%

^a $F = (D + E)/(C + D + E)$; $G = F \times B$.

^b $H = E/(D + E + G)$; $I = E/(D + E)$.

Table II
Pap Testing Behavior in Relation to Sociodemographic and Acculturation Characteristics^a

Characteristic	Ever screened (%)		Recently screened ^b (%)		All women (n = 647)
	Yes (n = 494)	No (n = 153)	Yes (n = 387)	No (n = 260)	
Age					
20–39 years	19	18 ^{**}	21	16 ^{**}	19
40–59 years	48	31	48	38	44
60+ years	33	51	32	46	37
Marital status					
Currently married	84	61 ^{**}	86	67 ^{**}	78
Previously married	13	26	12	23	16
Never married	3	13	2	10	5
Educational level					
0–5 years	17	31 ^{**}	15	27 ^{**}	20
6–11 years	50	42	53	41	48
12+ years	33	28	32	31	32
Income ^c					
<\$10,000	21	50 ^{**}	18	41 ^{**}	28
\$10,000–19,999	20	21	20	21	21
\$20,000–29,999	26	11	29	13	23
\$30,000+	32	18	32	25	29
Religion					
Buddhism ^d	32	32	31	33 [*]	32
Christianity	17	20	15	22	18
None	51	48	54	45	50
Housing type					
Owned	84	64 ^{**}	86	70 ^{**}	79
Rented	9	18	9	14	11
Subsidized	7	18	6	16	10
Employment					
Yes	58	51	61	50 ^{**}	56
No	42	49	39	50	44
Place of birth					
Mainland China	74	78 [†]	74	77 [†]	75
Hong Kong	10	4	11	5	9
Southeast Asia ^e	13	14	13	14	13
Years in North America					
<10 years	27	41 ^{**}	28	34	70
10+ years	73	59	72	67	30
Age at immigration					
0–39 years	66	39 ^{**}	68	47 ^{**}	59
40+ years	34	62	33	53	41
Other	3	4	3	4	3

^a Percentages for some items do not add up to 100% because of rounding.

^b Last 2 years.

^c 278 women either did not know their household income or chose not to answer the income question.

^d Includes three women who reported another "Eastern" religion.

^e Burma (Myanmar), Cambodia, Laos, Thailand and Vietnam.

** $P < 0.01$.

* $0.01 < P \leq 0.05$.

† $0.05 < P \leq 0.10$.

Table III

Multiple Logistic Regression Results^a

Variable	Ever screened (<i>n</i> = 622 ^b)		Recently screened (<i>n</i> = 622 ^b)	
	OR	95%CI	OR	95%CI
Marital status				
Currently married	6.9	3.1–15.1	5.3	2.3–12.0
Previously married	4.3	1.8–10.5	3.3	1.3–8.3
Never married	1.0		1.0	
Age at immigration				
0–39 years	2.9	1.9–4.4	2.1	1.5–3.0
40+ years	1.0		1.0	
Housing type				
Owned	1.8	1.0–3.3	2.2	1.2–4.0
Rented	0.8	0.4–1.7	1.3	0.6–2.7
Subsidized	1.0		1.0	

^aOR, odds ratio; CI, confidence interval.

^bA total of 25 missing cases with one or more missing values (4 marital status, 10 housing type, and 15 age at immigration) were excluded from this multiple regression analysis.