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PERCEIVED RISKS OF CERTAIN TYPES OF CANCER AND HEART DISEASE AMONG ASIAN AMERICAN SMOKERS AND NON-SMOKERS

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Abstract

This study assessed knowledge levels of health risks of tobacco use among the Asian American (AA) community in the Delaware Valley region of Pennsylvania and New Jersey, including metropolitan Philadelphia. A cross-sectional self-report survey was conducted to collect the information, and a stratified-cluster proportional sampling technique was used to obtain a representative sample size of the target population of Chinese, Korean, Vietnamese, and Cambodians. 1374 AA were recruited from 26 randomly selected community organization clusters; of the total recruited, 1174 completed the survey, which consisted of 410 Chinese, 436 Korean, 196 Vietnamese, 100 Cambodian and 32 other-group. Other-group was excluded for this study. Ten questions were asked to determine the knowledge level of the sample population. Results indicated that the vast majority of respondents (82.2%) recognized the association between smoking and increased risk of developing various types of cancers and heart disease. Between 81.3% and 93.3% of respondents recognized the increased risk for lung, mouth, throat and esophageal cancer and heart disease. For these variables, there were statistically significant differences between the ethnic groups: Koreans were the most knowledgeable, followed by Chinese, Vietnamese, and Cambodians. For bladder, pancreatic, cervical, and kidney cancers, the percentage of respondents indicating an association between these cancers and smoking ranged from 49.2 to 56.8. There were no statistically significant differences among the four ethnic groups for these variables. Generally, however, results showed that the awareness level was higher among women and the more educated respondents, non-smokers and former smokers, and Chinese and Korean groups.

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Keywords

perceived risks; tobacco; cancer; Asian-Americans

INTRODUCTION

Numerous studies have established the relationship between cigarette smoking and health risks that include lung cancer, coronary heart disease, chronic obstructive pulmonary disease and other cancers and diseases.¹ According to the National Cancer Institute, cigarette smoking continues to be the leading cause of preventable death in the U.S.²

Lung cancer is the leading cause of death among Asian American and Pacific Islanders (AAPI). Lung cancer rates among Southeast Asian men are 18% higher than among White males and are expected to increase due to high smoking rates.³ Cancer is also the leading cause of death for Asian American (AA) women.⁴ As a group, Chinese Americans have the highest rate of nasopharyngeal cancer among U.S. racial and ethnic groups; among males, it is fourteen times higher than among White males and among Chinese females, eleven times higher than among White females. Lung and nasopharyngeal cancers are directly related to tobacco use.⁵

Despite discrepancies in rates among racial and ethnic groups and the cause-effect relationship between smoking and certain types of cancer, a gap in knowledge exists in the general population, including AA, regarding this relationship and the preventable nature of this disease.⁶ Studies have shown, for example, that low perceptions of cancer risk and severity as well as low levels of knowledge about cancer are prevalent among African American and White adolescents.⁷

The recent rapid increase in the population of AA has underscored both the health needs of this racial/ethnic group and its relative impact on U.S. public health programs at the federal and state levels. This is particularly evident in the large metropolitan areas of U.S. cities where AA appear to settle. Asians presently account for approximately 4% of the U.S. population, a proportion that varies by state. Philadelphia and the surrounding area are representative of the nation: about 3% of the area's residents are of Asian decent, the nation's fastest growing Asian community.⁸ This growth in a population that has elevated smoking rates has not been accompanied by tobacco control, prevention, and cessation programs, and remains one of the most understudied group among the various U.S. racial/ethnic groups. The dearth of information on this group has led to limited understanding of tobacco-related health risks in this population, a population that has been consistently described as lacking in health insurance coverage, low average annual incomes, and a concomitant lower levels of knowledge about cancers, preventable causes of the disease, and the relationship between first-hand and second-hand smoking and cancer.⁹

Various factors have been associated with low levels of health knowledge, important among which is low educational levels.¹⁰⁻¹² A study by Manfredi and associates¹⁰ found that women with low educational levels failed to recognize the relationship between cancer risk and smoking. Smoking status may also have an impact on knowledge.^{11,13} Findings in other

studies showed that positive smoking status correlates with lower levels of knowledge regarding the risk of tobacco use.^{11,12} One study on Vietnamese males (n = 774) in Massachusetts revealed that smokers were less likely than non-smokers to acknowledge the general and heart-related health risks of smoking, the addictiveness of smoking, and the adverse effects of environmental tobacco smoke on children.¹³ Other studies indicated gender-related as well as cultural or racial/ethnic differences in health knowledge. In one study by Kauffman and associates, women were described as more likely to accept the risks of substance abuse and to perceive higher estimates for the prevalence of substance abuse.¹⁴ A study by Ganley and associates focused on preadolescents showed that boys were more likely to have lower scores on a knowledge scale and attitudes promoting smoking, as well as to have smoked more than girls.¹⁵ Parallel studies on cultural or racial/ethnic groups reflected low levels of health knowledge especially among AA.^{16,17}

Health knowledge may also influence tobacco-related behaviors. A study by Riley et al. concluded that acceptance of the risks of tobacco use is associated with lower levels of smokeless tobacco use, and a relationship that is significantly correlated with race.¹⁸ Low levels of knowledge have further been related to inadequate cervical cancer screening behaviors especially among different ethnic women.^{16,17}

Public education on the health risks of smoking has attracted substantial attention in professional, governmental and lay circles over the past several decades. The percentage of adults who recognize the relationship between smoking and lung cancer, for example, has increased significantly during this period.¹¹ Much of the literature on the knowledge level of respondents regarding the adverse effects of smoking has focused on the relationship between smoking and lung cancer. There is today a dearth of information on tobacco-related cancers in general. This dearth of information is particularly observed in AA communities where smoking rates among adults are especially high.^{19–21}

The purpose of this study was to obtain information on perceived risks of heart disease associated with smoking, as well as other tobacco-related cancers among AA residing in the Delaware Valley region of Pennsylvania and New Jersey, including the city of Philadelphia. The study was part of a broader investigation titled “Knowledge, Attitudes and Behaviors on Tobacco Use and Cancer Awareness among Asian Americans.”²² The objective of the latter study was to determine smoking and quitting behaviors, extent of exposure to secondhand smoke, social influences on smoking, and knowledge of and attitudes toward tobacco use among the AA population of the region.

METHODS

The seven counties of PA and NJ selected for the survey are populated by a diverse mix of AA who represent various socioeconomic statuses, educational levels, and employment. The largest Asian subgroups in these counties include Chinese, Koreans, Vietnamese, and Cambodians and, collectively, comprise 87% of the AA population of the region.²³

A cross-sectional self-report survey method was used in this study. In order to obtain a representative sample size, a stratified-cluster proportional sampling technique was applied.

The sample size was determined by using a statistical power analysis and inflated by an anticipated response rate to ensure an adequate number of participants. The Cambodian subgroup, representing the lowest percentage of the targeted population, was oversampled to ensure that the sample was adequately representative.

Fifty-two community organizations serving AA in the target region were identified by Temple University Asian Tobacco Education, Cancer Awareness and Research Project (ATECAR) and 26 were randomly selected for the survey. The sample was stratified based on the four race/ethnicity or language groups—Chinese, Korean, Vietnamese, and Cambodians. A proportional allocation process, based on the population proportion data obtained from the Census Bureau, was also used to determine the subgroup size.

Participants

1374 AA were recruited from 26 randomly selected organizations. 1174 completed the survey, which consisted of 410 Chinese, 436 Korean, 196 Vietnamese, 100 Cambodian and 32 other-group. Other-group was excluded for this study. Distribution by gender and age were as follows: 55% were males and 44% females, ranging in age from 14 to 80 years. The mean age for the sample was 41 years. About 40% of participants completing the survey questionnaire reported using some form of tobacco during their lifetime, while 29% reported being current tobacco users. The educational level of participants ranged from less than high school to graduate level training. All participants 1) were of Asian descent, 2) were affiliated with the selected community organizations, 3) were 14 years of age or older, and 4) were voluntary participants in the survey. To conduct the survey, an approval was obtained from the Institutional Review Board in Temple University.

Data Collection

Standard survey administration training was provided to all survey administrators and onsite bilingual translators. The Temple University ATECAR staff, in collaboration with community organizations representatives, administered the self-reported surveys at each of the 26 community organizations locations. The survey was administrated by using both one-on-one and group face-to-face instruction methods. The questionnaires were translated into four languages: Chinese, Korean, Cambodian, and Vietnamese. Participants had the option of completing the questionnaire in English or in the appropriate translated version. On-site translators assisted individuals or groups as needed. The questionnaire took approximately 25 minutes to complete and was collected on site by either ATECAR or community organization staff.

Instrument and Measures

The questionnaire was based on survey instruments used in previous studies which included the 2000 National Health Interview Survey, the 1998 National Household Survey on Drug Abuse, the 1999 Youth Risk Behavior Survey, the Florida Youth Tobacco Survey, and the American Indian Cancer Control Project. The instrument was further modified for the purpose of the study. The variables in this investigation were based on the Health Belief model.²⁴ This model is one of the most applied theoretical frameworks in health behavior science. It asserts that individuals will take action to change behavior only when they

perceive a health risk with its concomitant adverse consequences, and the benefits accruing from their action.

To test the reliability and validity of the questionnaire, a pilot-test was conducted to verify data collection methods and to determine appropriateness of the questionnaire format, content validity, level of difficulty, and length of time to complete the survey. The sample for the pilot-test consisted of 50 AA adults and 10 health professionals. This cohort was excluded from the main study. The 50 adults were selected from AA community-based organizations, while the 10 professionals were selected from among a group of smoking prevention and intervention specialists in the private sector. Face and content validity were determined by an expert panel. Reliability was estimated using the Guttman split half internal consistency method. The split half reliability (.67) indicated that, overall, participants responded consistently to items throughout the questionnaire.

The knowledge level was measured by comparing questions of self-descriptions to health risks related to smoking. In measuring perceived risks of heart disease and cancer among Asian subgroups, variables of self-description that included age, gender, ethnic group, and smoking status (former, current, or non-smoker) were compared against the participant's 1) greater perceived risk of any cancer, and 2) awareness of the link between smoking and diseases associated with: lungs, mouth, throat, esophagus, bladder, pancreas, cervix, kidneys, and heart. Each item required the participant to check the appropriate answer. The participant was asked if the risk for smokers in developing cancer would be lower, the same, or higher than that for nonsmokers. Participants were also asked if smoking associated (or not) with lungs, mouth, throat, esophagus, bladder, pancreas, cervix, kidneys, and heart disease.

Data Analysis

Ten questions measuring the perceived risks of tobacco use were compared for Chinese, Korean, Vietnamese, and Cambodian respondents using the Pearson χ^2 test of significance. In multivariate analyses, we controlled for age, gender, educational level, and smoking status. Educational level was measured using five categories for the highest level completed: elementary school, high school, trade school or associate degree, college, and graduate school. Respondents were categorized as nonsmokers if they had never smoked; former smokers if it had been one year or more since they last smoked; and current smokers if they smoked cigarette within the last 30 days. Due to participants' similar responses to questions about perceived risks, Vietnamese and Cambodian respondents were combined for multiple regression analysis into a single group called Southeast Asians. SPSS software was used to create a multiple logistic regression model for each of the ten perceived risk variables.

RESULTS

Table 1 shows the percent of all respondents who perceived an increased risk for each of the ten diseases, as well as the corresponding percentages for each of the four racial/ethnic groups. The overall level of knowledge ranged from a low of 49.2% for bladder cancer to a high of 93.3% for lung cancer. In general, the vast majority (82.2%) respondents recognized that smoking would increase the risk of any cancer. 93% believed that smoking was related

to lung cancer. The respondents who were aware of the relationship between smoking and mouth cancer, throat cancer, esophageal cancer and heart disease were 89.9%, 91.5%, 81.3% and 88.1%, respectively. Results of Pearson χ^2 test indicated, for all the six variables, any cancer (overall risk), lung cancer, mouth cancer, throat cancer, esophageal cancer, and heart disease, there were statistically significant differences between racial/ethnic groups. In addition, on these six variables, there was a general pattern of Korean respondents being the most knowledgeable, followed by Chinese, Vietnamese, and Cambodian respondents. For example, knowledge of the increased risk for smokers to develop any cancer ranged from a high of 91.1% for Korean respondents to a low of 50.6% for Cambodians ($p < .001$). Koreans had the greatest knowledge of the risk of esophageal cancer, 88.8%. Vietnamese and Cambodian respondents had similarly low knowledge levels, at 70.4% and 69.9%, respectively. For bladder, pancreatic, cervical, and kidney cancers, the percentage of respondents was 49.2, 51.9, 50.4 and 56.8 correspondingly. For these four variables, there were no statistically significant differences between the groups ($p > .05$), indicating an equally low level of perceived risk among all four ethnic groups under study.

Table 2 shows the logistic regression models for each of the ten risk variables. Chinese and Korean respondents were compared to Southeast Asian (Vietnamese and Cambodians combined) respondents, while controlling for age, gender, educational level, and smoking status.

The analyses revealed that age has little impact on perceived risk. Age has a statistically significant positive effect on perceived overall cancer risk, but a negative effect on perception of lung cancer risk. The effect of age on the other eight variables is not significant. Females were more knowledgeable than males on all ten variables, and six of these—esophageal, pancreatic, cervical, and kidney cancers, and heart disease—are statistically significant. For example, the odds ratios for pancreatic cancer (1.900) and heart disease (1.984) indicate that women are almost twice as likely as men to perceive the increased risks of these two diseases. Educational level had mixed results with respect to its effect on perceived risk, and it held a positive, statistically significant effect on only two variables, overall cancer and heart disease. Regarding the differences between groups, Chinese respondents were significantly more knowledgeable than Southeast Asians about the overall cancer risk and the risk of mouth cancer. Korean respondents were significantly more knowledgeable about both of these variables, as well as about lung, throat, and esophageal cancers, and heart disease than Southeast Asians. In fact for four of the diseases—overall cancer and lung, mouth, and throat cancers—Korean respondents were more than three times as likely than Southeast Asians to be aware of the risk. Interestingly, both Chinese and Korean respondents were significantly less knowledgeable than the reference group about the risk of cervical cancer. Both former smokers and nonsmokers were more knowledgeable than current smokers about the risk of disease. Former smokers were almost three times as likely as current smokers to know the risk of lung cancer, and were also significantly more knowledgeable about the risks of throat, esophageal, and kidney cancers, and heart disease. Non-smokers were approximately three times more knowledgeable than current smokers about lung and throat cancers, and were also significantly more likely to know the risk of overall cancer risk, mouth, esophageal, and kidney cancers, as well as heart disease.

DISCUSSION

Relatively few studies have investigated sociodemographic differences among AA knowledge about health effects of smoking. According to our review of the literature, none has compared the knowledge levels among AA subgroups to date. Results of this study provide some valuable insights on comprehensive knowledge about health risk of smoking among the four AA subgroups—Korean, Chinese, Vietnamese and Cambodian. We found the awareness to be higher among women, higher educated respondents, non-smoking and former smokers, and Chinese and Korean groups. Age has a statistically significant positive effect on perceived overall cancer risk, but a negative effect on perception of lung cancer risk. Racial differences were found for any cancer (overall cancer risk), lung cancer, mouth cancer, throat cancer, esophageal cancer, and heart disease. In general however, Korean respondents were the most knowledgeable, followed by Chinese, Vietnamese, then Cambodian respondents. For bladder, pancreatic, cervical, and kidney cancers, the awareness level was low among all ethnic groups.

Regarding the impact of age, education and smoking status, similar findings were reported in previous studies.^{11,12,25} Brownson et al., Price et al., and Loehrer et al. found that respondents who were older, less educated, and who smoked were less likely to recognize the health risk of smoking.^{11,12,25} In contrast, Brownson et al.'s study found that knowledge level was lower among women.¹¹

The percentage (93.3%) of respondents in our study who believed that smoking causes lung cancer and heart disease was slightly higher than those found in two previous studies.^{25,26} 87% of respondents recognized that smoking could cause lung cancer according to the American Lung Association's survey²⁶; whereas 89% was reported in Loehrer et al.'s study.²⁵ However, those studies estimated only the knowledge about smoking and lung cancer rather than a comprehensive understanding on the knowledge about all tobacco-related cancers and disease. Our findings suggested that the majority of respondents had a reasonable understanding on the increased risk on any cancer (overall risk)-lung cancer, mouth cancer, throat cancer, esophageal cancer, and heart disease (average percentage 87.7%). These results suggest that tobacco education efforts were somewhat successful among the sample population. Yet the overall lower knowledge among all subgroups about the risk of smoking on bladder, pancreatic, cervical, and kidney cancers strongly suggest that the message that smoking increases the risk of these cancers has not reached or been accepted by a large proportion of the sample population. Special emphasis should be given to the areas identified in this study and others when designing educational programs for this population.

The Health Belief Model asserts that before making behavior change, people must perceive the susceptibility to a health risk.²⁴ Regarding personal health risk, Kreuter suggested a concept, 'optimistic bias', to explain why many people are likely to undervalue their risk.²⁷ People with 'optimistic bias' about risk of smoking will have lower perceived susceptibility and are probably unlikely to change their health behaviors. Results of this study show that for either general health effects or specific diseases threats, smokers are significantly less likely than nonsmokers or former smokers to be aware of the health risk of smoking. Former

smokers were almost three times as likely as current smokers to know the risk of lung cancer, and were also significantly more knowledgeable about the risks of throat, esophageal and kidney cancers, and heart disease. Nonsmokers were approximately three times more knowledgeable than current smokers about lung and throat cancers, and were also significantly more likely to recognize the risk of overall cancer risk, and mouth, esophageal and kidney cancers, as well as heart disease.

Results also indicated that race is an important factor which can affect knowledge level among different ethnic groups. For any cancer (overall risk), lung cancer, mouth cancer, throat cancer, esophageal cancer, and heart disease, generally, Korean respondents were the most knowledgeable, followed by Chinese, Vietnamese, and Cambodian respondents. The category of Asian American/Pacific Islander is composed of more than 60 different ethnic/racial subgroups. These subgroups differ greatly in language, religion, culture, immigration and generation histories in the US, socioeconomic status, places of birth, nationality and the extent to which they are acculturated or assimilated into the White Anglo American culture.^{28,29} For example, the study by McPhee et al. found that Vietnamese immigrant women were likely to stay close to their family or neighborhoods and unlikely to respond to health information coming from outside their family or friendship circle.¹⁷

Culturally inappropriate educational materials can also affect the knowledge level. Many AA were born outside the U.S., and those who were born in the U.S. retain certain aspects of the their original cultures. While most AA share a common language, e.g., English, they differ among each other, and from the dominant culture, in the manner in which they perceive and interpret health messages. A nationwide literature review study that examined more than 275 public education print materials specific to breast and cervical cancer concluded that most were not race or ethnic group sensitive, either in text or graphic representation; in most, the target audience and the message were often not clear.¹² Kreuter, reviewing a large quantity of educational materials available to the public, found that much of this material is replete with technical language about cancer prevention that is not easily understood by the ordinary citizen.²⁷ When these materials are presented to a diverse population, the linguistic and cultural barriers are compounded. These observations and conclusions must be taken into consideration in the design of intervention, prevention and cessation programs for AA.

Lack of knowledge may also be related to an absence of advice from health professional.^{27,30,31} Tomar et al., Zapka et al., and Walsh et al., in various studies and reviews, underscored the beneficial effects of professional counseling on smoking cessation and on smokeless tobacco use.^{32–35} Smokers who received physicians' recommendations to quit smoking, for example, were more likely to report plans to quit smoking during the six months following counseling.³² The findings of Temple University ATECAR study underscore the importance of Tomar's observations: nearly 70% of AA smokers in the ATECAR study had not received advice on the risk of smoking from either medical or other health professional.²² Compounding this problem in AA communities is that 30% of the ATECAR study participants lacked health insurance. While the issue of health insurance requires both state and federal attention and intervention and is not amenable to a quick resolution, the question of counseling is amenable to resolution at local levels.

Finally, the authors of this study caution the reader against inferences that transcend the limitations of the study design and the target population studied. In particular, the authors wish to underscore the fact that sampling for the study was not accomplished by a systematic random selection process; this was neither feasible, nor possible considering the costs involved and the manpower needed to accomplish the task. This fact raises questions regarding the certainty that the results actually represent the knowledge and perceptions of health risk of smoking in the population, or that the overall results are generalizable to the AA communities across the U.S.

Despite its shortcomings and a relatively lower response rates (about 50%) to the perceived risk questions for bladder, pancreatic, cervical, and kidney cancers, this study gives unique insights into smoking behaviors and perceived risks associated with smoking among a large subset of a rapidly developing, understudied racial/ethnic community. One would assume that because there is a high level of perceived risk associated with smoking among the large majority of the sample studied, prevention, intervention and cessation programs may not only be appropriate, but more effective in this target population. The variability in perceived risk among the racial/ethnic subgroups also points to a variety of short-term and long-term prevention, intervention and cessation programs that might include physician counseling and referral for those who are highly sensitized to the adverse effects of smoking, and community/organization based structured programs for those who are less sensitized.

REFERENCES

1. US Dept of Health and Human Services. Reducing the Health Consequences of Smoking: 25 Years of Progress: A Report of the Surgeon General. Washington, DC: US Dept of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health; 1989 DHHS publication CDC 89-8411.
2. National Cancer Institute. Smoking and Tobacco Control Monograph 8: Changes in Cigarette-Related Disease Risks and Their Implication for Prevention and Control. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 1997 NIH Publication No. 97-4213.
3. Chen MS, Hawks BL. A debunking of the myth of the healthy Asian American and Pacific Islander. *Am J Health Promotion* 1995; 9:261-268.
4. Doong T A message on behalf of David Satcher, surgeon general. *Asian Am Pac Isl J Health* 1998; 6:408-409. [PubMed: 11567471]
5. Chu KC. Cancer data for Asian Americans and Pacific Islanders. *Asian Am Pac Isl J Health* 1998; 6:130-139. [PubMed: 11567423]
6. National Cancer Institute. Smoking and Tobacco Control Monograph 11: State and Local Legislative Action to Reduce Tobacco Use. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2000 NIH Publication No. 00-4804.
7. Price JH, Desmond SM, Wallace M, Smith D, Stewart PM. Differences in Black and White adolescents' perceptions about cancer. *J Sch Health* 1988; 58(2):66-70. [PubMed: 3352228]
8. U.S. Census Bureau. Census 1999 Available online at: <http://factfinder.census.gov/servlet/BasicFactsServlet>
9. Frank-Stromborg M Changing demographics in the United States: implications for health professionals. *Cancer* 1991; 67:1772-1778. [PubMed: 2001576]
10. Manfredi C, Lacey L, Warnecke R, Buis M. Smoking-related behavior, beliefs and social environment of young Black women in subsidized public housing in Chicago. *Am J Public Health* 1992; 82:267-272. [PubMed: 1739162]

11. Brownson RC, Jackson-Thompson J, Wilkerson JC, Davis JR, Owens NW, Fisher EB. Demographic and socioeconomic differences in beliefs about the health effects of smoking. *Am J Public Health* 1992; 82:99–103. [PubMed: 1536345]
12. Price JH, Everett SA. Perceptions of lung cancer and smoking in an economically disadvantaged population. *J Community Health* 1994; 19:361–375. [PubMed: 7836557]
13. Wiecha JM, Lee V, Hodgkins J. Patterns of smoking, risk factors for smoking, and smoking cessation among Vietnamese men in Massachusetts (United States). *Tob Control* 1998; 7:27–34. [PubMed: 9706751]
14. Kauffman SE, Silver P, Poulin J. Gender differences in attitudes toward alcohol, tobacco and other drugs. *Soc Work* 1997; 42:231–241. [PubMed: 9153092]
15. Ganley BJ, Young M, Denny G, Wood E. Fourth graders: Tobacco attitudes, behaviors, and knowledge. *Am J Health Beh* 1998; 22:39–45.
16. Coyne CA, Hohman K, Levinson A. Reaching special populations with breast and cervical cancer public education. *J Cancer Educ* 1992; 7:293–303. [PubMed: 1305416]
17. McPhee SJ, Bird JA, Ha N, Jenkins CN, Fordham D, Le D. Pathway Early Cancer Detection for Vietnamese Women: Suc Khoe La Vang! (Health is Gold!). *Health Educ Q* 1996; 23(supplement): 60–75.
18. Riley WT, Barenie JT, Mabe PA, Myers DR. Smokeless tobacco use in adolescent females: Prevalence and psychosocial factors among racial/ethnic groups. *J Behav Med* 1990; 13:207–220. [PubMed: 2348458]
19. Center for Diseases Control and Prevention. Behavioral risk factor survey of Chinese: California, 1989. *MMWR Morb Mortal Wkly Rep* 1992A; 41:266–270.
20. Centers for Disease Control and Prevention. Behavioral risk factor survey of Vietnamese: California, 1991 *MMWR Morb Mortal Wkly Rep* 1992B; 41:69–72.
21. Centers for Disease Control and Prevention. Behavioral risk factor survey of Korean American: California, 1994. *MMWR Morb Mortal Wkly Rep* 1997; 46:774–777. [PubMed: 9272585]
22. Ma GX, Shive S, Tan Y. Prevalence and Predictors of Current Tobacco Use among Asian Americans in the Greater Philadelphia Area. In preparation. 2001.
23. U.S. Census Bureau. Census 2000. Available online at: <http://factfinder.census.gov/servlet/BasicFactsServlet>
24. Strecher V, Rosenstock IM. The Health Belief Model In: Glanz K, Lewis FM, Rimer BK, eds. *Health behavior and Health Education—Theory, Research, and Practice*. San Francisco, California: Jossey-Bass Inc, 1997, pp. 41–56.
25. Loehrer P, Greger H, Weinberger M, et al. Knowledge and Beliefs about cancer in a socioeconomically disadvantaged population. *Cancer* 1991; 68:1665–1671. [PubMed: 1893368]
26. American Lung Association. Smokers know risks but don't say "no" to cigarettes. (press release). New York: American Lung Association; December 4, 1987.
27. Kreuter MW. Dealing with competing and conflicting risks in cancer communication. *J Natl Cancer Inst* 1999; 25:27–35.
28. Sue D, Sue S. Cultural factors in the clinical assessment of Asian-Americans. *J Consult Clin Psychol* 1987; 55:479–487. [PubMed: 3624604]
29. Kitano HHL, Daniels R. *Asian Americans: Emerging minorities*. Englewood Cliffs, NJ: Prentice Hall; 1988.
30. Uba L Cultural barriers to health care for Southeast Asian refugees. *Public Health Rep* 1992; 107: 544–548. [PubMed: 1410235]
31. McPhee SJ, Jenkins CN, Wong C, et al. Smoking cessation intervention among Vietnamese Americans: a controlled trial. *Tob Control* 1995; 4:16–24.
32. Tomar SL, Husten CG, Manley MW. Do dentists and physicians advise tobacco users to quit? *J Am Dent Assoc* 1996; 127:259–265. [PubMed: 8682997]
33. Zapka JG, Fletcher KE, Ma Y, Pbert L. Physicians and smoking cessation. *Eval Health Prof* 1997; 20:407–427. [PubMed: 10183332]
34. Walsh RA, Redman S, Brinsmead MW, Byrne JM, Melmeth A. A smoking cessation program at a public antenatal clinic. *Am J Public Health* 1997; 87:1201–1204. [PubMed: 9240113]

35. Stevens VJ, Severson H, Lichtenstein E, Little S, Leben J. Making the most of a teachable moment: a smokeless-tobacco cessation intervention in the dental office. *Am J Public Health* 1995; 85:231–235. [PubMed: 7856783]

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TABLE 1Perceptions of Increased Risks Among Four Ethnic Groups by Percentages^a

	N	Chinese	Korean	Vietnamese	Cambodian	Overall	Sig.
Any Cancer	1043	86.2	91.1	68.4	50.6	82.2	***
Lung Cancer	1071	92.7	96.4	89.6	89.5	93.3	**
Mouth Cancer	794	90.3	94.6	83.1	81.2	89.9	***
Throat Cancer	833	91.7	95.7	87.0	81.0	91.5	***
Esophageal Cancer	695	81.5	88.8	70.4	69.9	81.3	***
Bladder Cancer	512	51.4	49.1	47.3	46.5	49.2	n.s.
Pancreatic Cancer	509	48.6	54.3	52.7	52.9	51.9	n.s.
Cervical Cancer	508	48.0	46.4	59.2	52.9	50.4	n.s.
Kidney Cancer	523	53.5	58.8	58.6	57.1	56.8	n.s.
Heart Disease	875	90.5	90.9	77.3	87.6	88.1	***

^aThe 4 groups were compared using Pearson χ^2 test.*
p < .05;**
p < .01;***
p < .001.

TABLE 2
Perceptions of Increased Risks Controlling for Age, Gender, Ethnic Group, Educational Level, and Smoking Status

Independent Variables	Any Cancer	Lung Cancer	Mouth Cancer	Throat Cancer	Esophageal Cancer	Perceived Risks					Kidney Cancer	Heart Disease
						Bladder Cancer	Pancreatic Cancer	Cervical Cancer				
Age	1.017 **	0.979 *	0.998	0.995	1.008	1.002	1.004	1			0.991	0.989
Female v Male	1.534 *	1.496	1.816	1.469	1.6288	1.1421	1.900 **	1.590 *			1.714 *	1.984 *
Chinese v Southeast Asian	2.508 ***	1.233	1.943 *	1.414	1.316	0.956	0.657	0.597			0.739	1.647
Korean v Southeast Asian	3.555 ***	3.009 **	3.696 ***	3.103 **	2.537 ***	0.836	0.828	0.524 *			1.047	2.028 *
Educational Level	1.303 ***	1.110	0.945	1.176	0.999	1.070	1.052	1.027			0.961	1.287 *
Former Smoker v Current Smoker	1.742	2.869 *	1.613	2.619 *	2.461 *	1.560	1.327	1.884			2.540 **	2.207 *
Nonsmoker v Current Smoker	1.691 *	3.034 ***	1.919 *	2.936 **	2.364 ***	1.466	1.514	1.385			2.091 **	1.928 *
Number	989	1013	755	794	665	487	485	483			498	830

Logistic Regression Derived Odds Ratio:

*
p < .05;

**
p < .01;

p < .001.