



Published in final edited form as:

Ann Epidemiol. 2009 October ; 19(10): 718–723. doi:10.1016/j.annepidem.2009.03.022.

Cardiovascular Risk Factors among Asian Americans: Results from a National Health Survey

YE JIALI, PhD, GEORGE RUST, MD, MPH, PETER BALTRUS, PhD, and ELVAN DANIELS, MD
National Center for Primary Care, Morehouse School of Medicine, Atlanta

Abstract

PURPOSE—We assessed the prevalence of major cardiovascular disease (CVD) risk factors among Chinese, Asian Indian, Filipino, and other Asian populations compared to non-Hispanic Whites in the United States.

METHODS—We analyzed aggregated data from the National Health Interview Survey (NHIS) from 2003 to 2005. Bivariate analyses were used to determine differences in the prevalence of CVD risk factors among Asian subgroups and white adults. Logistic regression analyses were also conducted to compare each Asian subgroup with white adults after taking sociodemographic variables into account.

RESULTS—The unadjusted prevalence of physical inactivity was highest among Asian Indians and other Asians. After we controlled for covariates, Asian Indians still had higher odds of physical inactivity than Whites (odds ratio [OR] = 1.50, 95% confidence interval [CI] = 1.22–1.84). All Asian ethnic groups were significantly less likely than Whites to report smoking, obesity, and binge drinking. Compared with Whites, Filipinos were more likely to have hypertension (OR = 1.18, 95% CI = 1.02–1.44) and Asian Indians were more likely to have diabetes (OR = 2.27, 95% CI = 1.63–3.20).

CONCLUSION—Although Asian race was generally associated with lower risk for CVD, certain risk factors were particularly high among some Asian subgroups. Future interventions should specify the needs of specific subgroups and design culturally specific programs to reduce health risk behaviors in each Asian subpopulation.

Keywords

Cardiovascular Risk Factors; Hypertension; Diabetes; Physical Inactivity; Asian American

INTRODUCTION

Asian Americans are one of the fastest growing minority populations in the United States (1). The 2000 U.S. Census showed that about 11.9 million Americans reported themselves as having either full or partial Asian heritage (2). In 2006, the Asian population increased to 14.6 million, accounting for 4.9% of the U.S. population. The largest ethnic subgroups are

Address correspondence to: Dr. Jiali Ye, National Center for Primary Care, Morehouse School of Medicine, 720 Westview Dr., Atlanta, GA 30310. Tel: (404) 752-5262. jye@msm.edu.

Chinese, Filipinos, and Asian Indians (3). Although the Asian population represents a diverse and multifaceted group of individuals, in epidemiologic research, Asian Americans have traditionally been identified as a homogeneous group or labeled as “other” (1, 4–6). The small sample size of the Asian population in national surveys adds more difficulties for researchers to evaluate health profiles for Asian subgroups.

Cardiovascular disease (CVD) is the leading cause of death among Asian Americans in the United States (1). Major risk factors for heart disease include high blood cholesterol, hypertension, diabetes, cigarette smoking, binge drinking, obesity, and physical inactivity (7–10). There is very limited evidence on cardiovascular risk factors in subgroups of Asian Americans. Some local studies have indicated variation in CVD risk factors among Asian American subgroups. For example, a study using data from Asian Americans in northern California showed Filipino persons to be at greater risk of hypertension as compared to other ethnic groups (11). Another study on smoking prevalence among California’s Asian Americans found that Korean and Vietnamese males had higher smoking prevalence rates than males in other subgroups. Although Asian females generally had low smoking prevalence rates, there were significant differences between subpopulations, ranging from 1.1% (Vietnamese women) to 12.7% (Japanese women) (12).

To date, no prior study has comprehensively examined CVD risk factors among Asian American subgroups using nationally representative samples. By using 3 years of aggregated data from the National Health Interview Survey (NHIS; 2003–2005), this study assessed the prevalence of major CVD risk factors among Chinese, Asian Indian, Filipino, and other Asian populations compared to non-Hispanic Whites in the United States.

METHODS

Data Sources

The data for this study were derived from the 2003–2005 NHIS. The NHIS is an annual household interview of the civilian non-institutionalized population in the United States conducted by the National Center for Health Statistics (<http://www.cdc.gov/nchs/nhis.htm>). The NHIS used a multistage sampling method and collected data using computer-assisted personal interviewing, with a new sample of respondents interviewed each year. The sample was weighted to account for the complex sampling design and for nonresponse. Three years of data were aggregated to yield sufficient statistical power to explore CVD risk factors among specific Asian American subgroups. The public-use NHIS data were provided for Chinese, Asian Indians, and Filipinos, while “Other Asian” categories combined the remaining subgroups. The comparison group was the non-Hispanic White adult population of the same time period. The total sample of this study was 77,267 respondents, including 74,424 non-Hispanic white adults, 534 Asian Indian, 559 Chinese, 633 Filipino and 1,117 other Asian adults, which included the remaining Asian subgroups, such as Japanese, Korean, and Vietnamese.

Variables

The CVD medical risk factors we examined were diabetes and hypertension. The participants answered yes-no to questions asking whether they had been told by a doctor or health professional that they had diabetes or hypertension. The survey did not provide data on hypercholesterolemia.

The CVD behavioral risk factors included current smoking, obesity, physical activity, and binge drinking. A current smoker was defined as an individual who had reported ever smoked at least 100 cigarettes in their lifetime and reported currently smoking every day or some days. Body mass index was calculated with the formula weight (in kilograms)/height (in square meters), using self-reported height and weight. Persons with body mass index of 30 kg/m² were considered obese. People reporting no vigorous activity or moderate activity per week were deemed physically inactive. Binge drinking during the past year was defined as having five or more drinks of any alcoholic beverage on any one occasion in the previous year.

The sociodemographic variables included in the analysis were age, sex, education, marital status, and health status. We used three age groups: 18–44, 45–64, and 65 years and older. Educational attainment was determined by asking respondents the highest level of school completed. Responses were grouped into less than high school, high school, and more than high school. Self-reported health status was categorized as good to excellent, and poor to fair. These variables were selected as covariates in the multiple logistic regressions that examined whether ethnicity was independently related to CVD risk factors. It has been well recognized that sociodemographic variables such as age and gender were associated with differences in cardiovascular risk factor levels (9, 13–15).

Statistical Methods

We conducted descriptive analyses of Asian ethnic groups and non-Hispanic Whites for sociodemographic characteristics. Bivariate analyses were used to determine differences of the prevalence of CVD risk factors among Asian subgroups and white adults. Separate multiple logistic regression models that controlled for sociodemographic factors were also used to compare the Asian population of each ethnic group with Whites. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were computed. All calculations were performed using the Statistical Package for the Social Sciences (SPSS), version 16.0, with the Complex Samples add-on module that adjusted for the sample design including stratification, clustering, and weight. The SPSS Complex Samples module provides the specialized planning tools and statistics needed for data of complex sample designs (16). We adjusted the weights in the combined data file by dividing each sample weight in the pooled data set by the number of years (3 years) that were being pooled (17). Statistical significance was determined as $p < 0.05$.

RESULTS

The sociodemographics of non-Hispanic Whites and Asian ethnic groups are shown in Table 1. Asian Indian and Chinese persons were more likely to be married. Asian Indian, Chinese,

and Filipino subgroups had higher percentage of people who had high school or higher than high school education and had better reported health status as compared to Whites and other Asians.

The unadjusted prevalence estimates of CVD risk factors among different ethnic groups are presented in Table 2. White and Filipino persons were more likely than persons from Asian Indian, Chinese, and other Asian origins to have hypertension. Among all ethnic groups, Asian Indians were most likely to have diabetes and other Asian persons were least likely to have this disease. The most common behavioral risk factor was physical inactivity. The unadjusted prevalence of physical inactivity was highest among Asian Indians and other Asian adults. All Asian ethnic groups were less likely to be current smokers or to be binge drinkers compared with white adults. However, among Asian groups, Filipinos and other Asian adults had higher percentages of current smokers and binge drinkers compared with the other two Asian groups. In addition, Filipinos were most likely to be obese among all four Asian ethnic groups.

Table 3 shows the results of logistic regressions for CVD risk factors after controlling for age, gender, education, marital status, and health status. Compared with non-Hispanic Whites, Asian Indians (OR = 0.58, 95% CI = 0.41–0.80), Chinese adults (OR = 0.75, 95% CI = 0.59–0.96) and other Asian adults (OR = 0.69, 95% CI = 0.54–0.85) were less likely to have hypertension, whereas Filipinos were more likely to have hypertension (OR = 1.18, 95% CI = 1.02–1.44). Other Asian adults were less likely to have diabetes (OR = 0.63, 95% CI = 0.44–0.91) than Whites, whereas Asian Indians were about 130% more likely to have diabetes (OR = 2.27, 95% CI = 1.63–3.20). All Asian ethnic groups were significantly less likely than Whites to report CVD risk factors of smoking, obesity, and binge drinking. Asian Indians had higher odds of physical inactivity than Whites (OR = 1.50, 95% CI = 1.22–1.84), whereas the other three Asian ethnic groups did not differ significantly from their White counterparts in this category.

As Table 3 shows, all the selected sociodemographic characteristics were associated with some CVD risk factors. For example, women were less likely than men to have all the risks except for physical inactivity. Young people (18–44 years of age) had fewer risks of hypertension, diabetes, or physical inactivity than old people (65 years and older), but they were much more likely to be binge drinkers or smokers. In addition, lower education and poor/fair health status were related to higher CVD risks except for binge drinking.

DISCUSSION

Using national survey data, our study found important differences in CVD risk factors among Asian Indian, Chinese, Filipino, other Asian, and non-Hispanic white adults. Asian Americans examined in this study shared some similarities in sociodemographics. However, there were obvious variations among these subgroups in education level and reported health status. These findings confirm the findings of several previous studies that Asian communities are diverse in many social and cultural areas and such differences can influence health care and health outcome (1, 2, 18).

In general, even though Asian populations scored lower in the majority of the CVD risk factors compared with white Americans, physical inactivity was a prevalent health problem for many Asian ethnic groups. This finding is in agreement with those of a previous report showing that Asian Americans, especially immigrants, are at risk for high levels of physical inactivity (19). According to the Centers for Disease Control and Prevention reports, the proportion of Asian adults who met the recommended levels of lifestyle physical activity was substantially lower than that for the overall U.S. population (20, 21). There is a great need to develop effective interventions to promote physical activity adoption and maintenance among Asian Americans. Increasing physical activity may be key in improving the health of this rapidly growing population (19).

Filipinos were the only Asian ethnic group examined in this study that had higher rates of hypertension than White Americans. Local studies have found that hypertension is a main health problem among the Filipino-American population (11, 22, 23). A study on the knowledge and treatment of hypertension among Asians and Pacific Islanders found that Filipinos had a prevalence rate (26.6%) second only to that of black adults (33.8%). In addition, hypertension was poorly controlled by medicine among Filipino patients, with only 8% of these patients taking antihypertensive medicines that could control their blood pressure levels (23). It is possible that the high prevalence is a result of both ethnic traits and poor knowledge on risk factors related to hypertension prevention and treatment. Our current data, however, did not allow us to make any firm conclusions.

People from India had a 2.3-fold higher risk of diabetes as compared with white adults despite having such low rates of obesity ($OR = 0.23$) and only modestly increased risk of physical inactivity. It has been demonstrated before that Asian Indians have an unusually high rate of diabetes mellitus and they often develop the disease at an earlier age and at lower body mass index than people of European origin (24, 25). In addition to the commonly recognized risk factors, metabolic causes of the high susceptibility of Asian Indians have been postulated. For example, a recent study showed that regardless of their diabetes status, Indians were substantially less insulin sensitive than their White counterparts (24). More epidemiological and prospective studies are needed to investigate dietary or genetic causes of the disparity in diabetes prevalence within this subset of the Asian population.

Our evidence also showed that in addition to race, a variety of sociodemographic factors were related to the development of CVD risks. The likelihood of medical risk factors increased with age and decreased with education and was higher for men or married individuals than women or unmarried individuals. In addition, the likelihood of smoking and obesity decreased with age and education, and was higher for men than women.

Our study had several strengths. The sample in our study was a large, nationally representative sample from NHIS. The survey oversampled Asian American adults, allowing more precise estimates of factors that might explain CVD risks. In addition, our study focused on the heterogeneity across Asian subpopulations. The data were collected in a manner to allow for comparisons across Asian ethnic subgroups.

One limitation of this study is that the data were based on self-reported risk factors rather than actual physical examinations, which in some cases may be less accurate. For example, our study used self-reported height and weight for the calculation of body mass index. In one validation study, self-reported weight was highly correlated with measured weight (26). Although the correlation was high, the tendency was for both men and women to underreport their weight. Rothman (27) found that substantial misclassification of obesity may occur because of the use of self-reported weight and height in the calculation of body mass index. There have not been validation studies on Asian American populations; therefore it cannot be determined whether or not this bias is a concern in the present study.

In addition to lack of data on hypercholesterolemia, a recognized CVD risk factor, this study did not take into account life-style-related factors such as dietary habits. Previous studies on several Asian ethnic groups have indicated high sodium intake among Asian adults (28–30). Furthermore, sociocultural factors that may indirectly affect CVD risks also need to be considered when evaluating the health condition of Asian populations. For example, one highly prevalent challenge borne by many Asian communities is linguistic isolation (31), which can negatively affect their reception of health information and effective use of health care (32).

CONCLUSIONS

Our study suggests that even though Asian ethnicities are generally associated with lower risks for CVD, certain risk factors were particularly high among some Asian ethnic groups. It is important for future research to consider the high degree of heterogeneity across subpopulations and to examine in detail the specific health concerns of the most vulnerable groups.

The paucity of health data and information for Asian Americans has created a significant problem in accurately assessing health status and specifying health needs of Asian subgroups. Conclusions based on aggregated data of Asian Americans may be misleading and may result in greater gaps in our knowledge of the health condition and health needs of Asian Americans. Public health educators are encouraged to establish prevention and health education programs geared to this population and to take their differences into account when designing programs.

Selected Abbreviations and Acronyms

CVD	cardiovascular disease
NHIS	National Health Interview Survey
OR	odds ratio
CI	confidence interval

References

1. National Institutes of Health. [Accessed August 7, 2008] Addressing cardiovascular health in Asian Americans and Pacific Islanders. Available at: <http://www.nhlbi.nih.gov/health/heart/other/aapibkgd/aapibkgd.pdf>
2. Barnes, JS.; Bennett, CE. Census 2002 Brief. Washington (DC): US Dept of Commerce; 2002. The Asian Population: 2000. Available at: <http://www.census.gov/prod/2002pubs/c2kbr01-16.pdf> [Accessed August 7, 2008]
3. U.S. Census Bureau. [Accessed August 7, 2008] Table 3: Annual Estimates of the Population by Sex, Race, and Hispanic or Latino Origin for the United States: April 1, 2000 to July 1, 2006. Available at: <http://www.census.gov/popest/national/asrh/NCEST2006/NCEST200603.xls>
4. Ro M. Moving forward: Addressing the health of Asian American and Pacific Islander women. *Am J Public Health.* 2002; 92:516–519. [PubMed: 11919042]
5. Srinivasan S, Guillermo T. Toward improved health: disaggregating Asian American and Native Hawaiian/Pacific Islander data. *Am J Public Health.* 2000; 90:1731–1734. [PubMed: 11076241]
6. Uehara ES, Takeuchi DT, Smukler M. Effects of combining disparate groups in the analysis of ethnic differences: variations among Asian American mental health service consumers in level of community functioning. *Am J Community Psychol.* 1994; 22:83–99. [PubMed: 7942645]
7. Chaturvedi N. Ethnic differences in cardiovascular disease. *Heart.* 2003; 89:681–686. [PubMed: 12748237]
8. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA.* 2004; 291:1238–1245. [PubMed: 15010446]
9. Vasan RS, Larson MG, Leip EP, Evans JC, O'Donnell CJ, Kannel WB, et al. Impact of high-normal blood pressure on the risk of cardiovascular disease. *N Engl J Med.* 2001; 345:1291–1297. [PubMed: 11794147]
10. Wei M, Mitchell BD, Haffner SM, Stern MP. Effects of cigarette smoking, diabetes, high cholesterol, and hypertension on all-cause mortality and cardiovascular disease mortality in Mexican Americans: The San Antonio Heart Study. *Am J Epidemiol.* 1996; 144:1058–1065. [PubMed: 8942437]
11. Klatsky AL, Armstrong MA. Cardiovascular risk factors among Asian Americans living in north California. *Am J Public Health.* 1991; 81:1423–1428. [PubMed: 1951798]
12. Tang H, Shimizu R, Chen MS. English language proficiency and smoking prevalence among California's Asian Americans. *Cancer.* 2005; 15:2982–2988. [PubMed: 16276539]
13. Dewailly E, Blanchet C, Lemieux S, Sauvè L, Gingras S, Ayotte P, et al. n-3 Fatty acids and cardiovascular disease risk factors among the Inuit of Nunavik. *Am J Clin Nutr.* 2001; 74:464–473. [PubMed: 11566644]
14. Gliksman MD, Lazarus R, Wilson A, Leeder SR. Social support, marital status and living arrangement correlates of cardiovascular disease risk factors in the elderly. *Soc Sci Med.* 1995; 40:811–814. [PubMed: 7747215]
15. Stevens J, Cai J, Pamuk ER, Williamson DF, Thun MJ, Wood JL. The effect of age on the association between body-mass index and mortality. *N Engl J Med.* 1998; 338:1–7. [PubMed: 9414324]
16. SPSS Inc. SPSS Complex Samples 16.0. Chicago: SPSS Inc; 2004.
17. National Center for Health Statistics. Variance Estimation and Other Analytic Issues in the 1997–2005 NHIS. Hyattsville (MD): National Center for Health Statistics; 2007. Available at: <http://www.cdc.gov/nchs/data/nhis/9705var.pdf> [Accessed January 14, 2009]
18. Sadler GR, Ryuji L, Nguyen T, Oh G, Paik G, Kustin B. Heterogeneity within the Asian American Community. *Int J Equity Health.* 2003; 2:12. [PubMed: 14697098]
19. Kandula NR, Lauderdale DS. Leisure time, non-leisure time, and occupational physical activity in Asian Americans. *Ann Epidemiol.* 2005; 15:257–265. [PubMed: 15780772]
20. Centers for Disease Control and Prevention. Prevalence of physical activity, including lifestyle activities among adults—United States, 2000–2001. *MMWR Morb Mortal Wkly Rep.* 2003; 52:764–768. [PubMed: 12917582]

21. Centers for Disease Control and Prevention. Physical activity among Asians and Native Hawaiian or Other Pacific islanders—50 States and the District of Columbia, 2001–2003. *MMWR Morb Mortal Wkly Rep.* 2004; 53:756–760. [PubMed: 15329650]
22. Angel A, Armstrong M, Klatsky A. Blood pressure among Asian Americans living in Northern California. *Am J Cardiol.* 1989; 64:237–240. [PubMed: 2741833]
23. Stavig GR, Igra A, Leonard AR. Hypertension and related health issues among Asians and Pacific Islanders in California. *Public Health Rep.* 1988; 103:28–37. [PubMed: 3124194]
24. Nair KS, Bigelow ML, Asmann YW, Chow LS, Coenen-Schimke JM, Klaus KA, et al. Asian Indians have enhanced skeletal muscles mitochondrial capacity to produce ATP in association with severe insulin resistance. *Diabetes.* 2008; 57:1166–1175. [PubMed: 18285554]
25. Venkataraman R, Nanda NC, Baweja G, Parikh N, Bhatia V. Prevalence of diabetes mellitus and related conditions in Asian Indians living in the United States. *Am J Cardiol.* 2004; 94:977–980. [PubMed: 15464696]
26. Stewart AL. The reliability and validity of self-reported weight and height. *J Chronic Dis.* 1982; 35:295–309. [PubMed: 7061685]
27. Rothman KJ. BMI-related errors in the measurement of obesity. *Int J Obes (Lond).* 2008; 32(Suppl 3):S56–59. [PubMed: 18695655]
28. Choi-Kwon S, Kim J. Lifestyle factors and risk of stroke in Seoul, South Korea. *J Stroke Cerebrovasc Dis.* 1998; 7:414–420. [PubMed: 17895120]
29. Nagata Y, Suzue R. Comparison of young women's salt intake between Japan and England: consideration of different measurement methods in national nutrition surveys. *J Nutr Sci Vitaminol.* 1996; 42:19–26. [PubMed: 8708818]
30. Woo J, Leung SS, Lam TH, Janus ED. Dietary intake and practices in the Hong Kong Chinese population. *J Epidemiol Community Health.* 1998; 52:631–637. [PubMed: 10023462]
31. Reeves, T.; Bennett, CE. We the people: Asians in the United States [article online]. U.S. Census Bureau; 2004. 2000 Special Reports (CENSR-17). Available at: <http://www.census.gov/prod/2004pubs/censr-17.pdf> [Accessed October 11, 2008]
32. Wilson E, Wardle EV, Chandel P, Walford S. Diabetes education: an Asian perspective. *Diabet Med.* 1993; 10:177–180. [PubMed: 8458197]

Sociodemographic characteristics of non-Hispanic Whites and Asian ethnic groups (2003–2005)

TABLE 1

Characteristics	Whites (%)	Asian Indians (%)	Chinese (%)	Filipinos (%)	Other Asians (%)	χ^2	<i>p</i> Value
Age, yr						177.07	<0.001
18–44	50.8	70.4	57.8	56.2	58.6		
45–64	33.7	26.2	30.6	31.3	32.0		
65	15.5	3.4	11.7	12.5	9.5		
Women	51.2	45.3	47.2	53.5	51.5	14.56	0.07
Married (yes)	64.5	74.8	70.0	64.6	63.2	36.33	0.001
Education						153.41	<0.001
Lower than high school	15.7	9.4	11.6	9.9	15.0		
High school	29.6	12.5	15.0	19.0	23.4		
Higher than high school	54.7	78.1	73.4	71.1	61.6		
Health status (good to excellent)	88.2	95.3	93.9	92.0	90.9	53.26	<0.001

Distribution of CVD risk factors among non-Hispanic Whites and Asian ethnic groups (2003–2005)

TABLE 2

CVD risks	Whites (%)	Asian Indians (%)	Chinese (%)	Filipinos (%)	Other Asians (%)	χ^2	<i>p</i> Value
<i>Medical risk factors</i>							
Hypertension	24.4	10.4	16.9	23.9	16.3	123.12	<0.001
Diabetes	6.7	8.2	5.5	6.1	3.8	20.15	0.008
<i>Behavioral risk factors</i>							
Smoking	27.5	7.6	9.2	17.7	18.4	281.64	<0.001
Obesity	22.1	6.1	4.2	13.2	6.9	331.42	<0.001
Physical inactivity	37.2	41.8	33.3	38.2	41.0	16.27	0.04
Binge drinking	22.5	5.7	5.5	13.5	10.2	309.72	<0.001

CVD = cardiovascular disease.

TABLE 3
Multiple logistic regression of CVD risk factors among non-Hispanic Whites and Asian ethnic groups (2003–2005)

	Medical risk factors			Behavioral risk factors		
	Hypertension OR (95% CI)	Diabetes OR (95% CI)	Smoking OR (95% CI)	Obesity OR (95% CI)	Physical inactivity OR (95% CI)	Binge drinking OR (95% CI)
Race/ethnicity						
Asian Indians	0.58 (0.41–0.80)	2.27 (1.63–3.20)	0.24 (0.17–0.34)	0.23 (0.15–0.34)	1.50 (1.22–1.84)	0.16 (0.11–0.23)
Chinese	0.75 (0.59–0.96)	0.90 (0.54–1.48)	0.29 (0.18–0.43)	0.11 (0.06–0.21)	0.99 (0.77–1.27)	0.16 (0.10–0.25)
Filipinos	1.18 (1.02–1.44)	1.09 (0.76–1.56)	0.66 (0.49–0.87)	0.58 (0.42–0.80)	1.21 (0.97–1.49)	0.48 (0.35–0.66)
Other Asians	0.69 (0.54–0.85)	0.63 (0.44–0.91)	0.59 (0.47–0.74)	0.26 (0.19–0.37)	1.20 (1.02–1.41)	0.33 (0.25–0.44)
Non-Hispanic Whites	1	1	1	1	1	1
Age, yr						
18–44	0.10 (0.09–0.10)	0.13 (0.12–0.15)	2.24 (2.05–2.44)	0.97 (0.91–1.03)	0.75 (0.70–0.80)	8.29 (7.36–9.35)
45–64	0.42 (0.40–0.44)	0.58 (0.54–0.63)	2.57 (2.36–2.81)	1.36 (1.27–1.44)	0.83 (0.78–0.88)	3.95 (3.49–4.47)
65	1	1	1	1	1	1
Gender						
Female	0.93 (0.88–0.97)	0.81 (0.75–0.86)	0.67 (0.64–0.70)	0.89 (0.85–0.93)	1.07 (1.04–1.12)	0.31 (0.29–0.33)
Male	1	1	1	1	1	1
Marital status						
Not married	0.95 (0.90–0.99)	0.92 (0.85–1.00)	1.51 (1.43–1.59)	0.83 (0.78–0.85)	0.98 (0.94–1.02)	1.56 (1.47–1.65)
Married	1	1	1	1	1	1
Education						
Lower than high school	1.05 (1.10–1.11)	1.14 (1.04–1.25)	1.53 (1.43–1.64)	1.16 (1.09–1.23)	2.75 (2.59–2.90)	0.66 (0.61–0.72)
High school	1.11 (1.02–1.20)	0.95 (0.84–1.07)	1.80 (1.67–1.94)	1.11 (1.03–1.20)	1.52 (1.42–1.63)	0.95 (0.87–1.04)
Higher than high school	1	1	1	1	1	1
Health status						
Poor–fair	3.00 (2.82–3.20)	4.57 (4.12–4.98)	1.93 (1.80–2.07)	1.97 (1.83–2.11)	2.36 (2.22–2.52)	0.71 (0.64–0.78)
Good–excellent	1	1	1	1	1	1

OR = odds ratio; CI = confidence interval.