Risk Behaviors Associated with Cigarette Use Among Asian American Adolescents

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Abstract

English:

Asian Americans are one of the fastest growing minority groups in the United States. This study examined the association between several common youth risk behaviors, including cigarette use among Asian American adolescents, using data (N=408) from the 2001 Youth Risk Behavior Survey (YRBS). The weighted univariate and multivariate logistic regression analyses were performed with Survey Data Analysis (SUDAAN) to adjust the standard error estimate of the multistage sampling. The main outcome variable was cigarette smoking behavior (past 30 days), reported as a binary (dichotomous) variable. The significant predictors from the univariate model were alcohol use, marijuana use, academic grades, multiple sex partners, and weight (p<.01). The multivariate logistic regression revealed that Asian American adolescents who engaged in alcohol use (OR=10.43, 95% CI=5.02, 21.68), used marijuana (OR=4.90, 95% CI=1.91, 12.59), and had mostly C or lower academic grades (OR=5.86, 95% CI=2.66, 12.90) were more likely to report cigarette use. Common risk factors and adolescent behaviors play a role in cigarette use, and this information can be applied in developing health education programs for Asian American high school students.

Spanish*:*

Los americanos asiáticos son uno de la minoría cada vez mayor más rápida grupos en los Estados Unidos. Este estudio examinó la asociación en medio varios comportamientos comunes del riesgo de la juventud, incluyendo uso del cigarrillo entre asiático Adolescentes americanos, usando los datos (N=408) del comportamiento 2001 del riesgo de la juventud Examen (YRBS). La regresión logística univariate y multivariate cargada los análisis fueron realizados con el análisis de datos del examen (SUDAAN) para ajustar estimación del error de estándar del muestreo gradual. La variable principal del resultado era el comportamiento del tabaquismo (más allá de 30 días), divulgado como binario variable (dicótoma). Los predictors significativos del modelo univariate era el uso del alcohol, uso de la marijuana, grados académicos, socios múltiples del sexo, y peso (p<.01). La regresión logística multivariate reveló a ese asiático Adolescentes americanos que engancharon al uso del alcohol (OR=10.43. el 95% CI=5.02. 21.68), marijuana usada (OR=4.90. el 95% CI=1.91. 12.59), y tenía sobre todo C o baja grados académicos (OR=5.86. el 95% CI=2.66. 12.90) era más probable divulgar uso del cigarrillo. Los factores de riesgo comunes y los comportamientos adolescentes desempeñan un papel adentro el uso del cigarrillo, y esta información se pueden aplicar en salud que se convierte programas de la educación para los estudiantes americanos asiáticos de la High School secundaria.

Key Words: Asian American, adolescents, tobacco use, cigarette use

Introduction

Tobacco use is one of the most important causes of preventable death in the United States. Approximately 440,000 people die each year because of smoking, and it is responsible for one in five deaths in the United States (American Lung Association, 2003). Further, it is estimated that 80 percent of those who use tobacco begin before the age of 18 (U.S. Department of Health and Human Services, 1994). In 2002, the prevalence of tobacco use was 28.4 percent among high school students (Centers for Disease Control and Prevention, 2003). As a significant modifiable risk factor, tobacco use prevention has become a key public health initiative. The concern of tobacco use among adolescents has prompted the creation of several Healthy People 2010

objectives, especially among ethnic and racial groups.

Asian Americans are one of the fastest growing minority groups in the United States, increasing by 48 percent between 1990 and 2000 (U.S. Census Bureau, 2002). According to the 1998 U.S. Surgeon General's report, some of the factors associated with smoking among Asian Americans include having recently moved to the United States, living in poverty, having limited English proficiency, and knowing little about the health effects of tobacco use (U.S. Department of Health and Human Services, 1998). Sociological changes in lifestyle patterns, such as acculturation and assimilation to the dominant society (American culture), are inevitable because of the high number of first-generation parents and children. In a study by Ma et al. (2004), acculturation was shown to affect adolescent smoking behavior; more acculturated adolescents had higher smoking rates than did less acculturated adolescents. Lew and Tanjasiri (2003) suggest that the prevalence of tobacco use among Asian Americans is due to social norms and targeted marketing by the tobacco industry. This is supported by Muggli, Pollay, Lew, and Joseph (2002), who reported that in the 1980s, a tobacco company targeted Asian Americans because of their rapid population growth, high purchasing power, and high smoking rates in their countries of origin.

Asian American adolescents are at risk for developing risk behaviors, such as cigarette use. Trinidad, Gilpin, Lee, and Pierce (2004) found that most Asian Americans initiated smoking when they were young adults. Similarly, a study on tobacco use rates among 1,174 Asian American adults found that the mean initiation age of tobacco use was 18.3 years, over 40 percent had a history of tobacco use, and men were more likely than women to smoke (Ma, Shive, Tan, & Toubbeh, 2002). According to the American Lung Association (2003), an analysis of the 2000 National Youth Tobacco Survey (NYTS) revealed that almost 21 percent of Asian American high school students reported using cigarettes. One study estimated that one-third of Asian American adolescents in their last year of high school were smokers (Appleyard, Messeri, & Haviland, 2001). The American Legacy Foundation concluded from the 2000 NYTS that Asian American adolescents had the sharpest rate of increase in smoking behavior during high school among all racial groups (American Legacy Foundation, 2001). Further, in an analysis of a youth tobacco survey administered to Florida adolescents, the Asian/Pacific Islander group was the only racial/ethnic group that did not have a significant decline in cigarette use in comparison with statewide data trends (Kershaw, 2001).

Several risk behaviors have been identified as risk factors for tobacco use by adolescents. In a study of 93 adolescents, Busen, Modeland, and Kouzekanani (2001) found significant relationships between cigarette use and ethnicity, alcohol use, marijuana use, age at first intercourse, and emotional issues. Others found that risk factors associated with higher rates of smoking included the use of other drugs, aggression, family disapproval of behavior, and self-behavior concern (Moberg & Rettammel, 2001). Marijuana, alcohol, and other drug use accounted for 40 percent of the variance in tobacco use among ethnic adolescent groups in California (De Moor, Elder, Young, Wildey, & Molgaard, 1989). These risk factors are prevalent across various ethnic and racial groups.

The minimal literature that exists on Asian American adolescents suggests that they are engaging in cigarette use. However, little data exist on Asian American adolescents and the various risk factors associated with this group. There is also a lack of reliable data on tobacco use among Asian Americans (Wong, Klingle, & Price, 2004). Existing data show relatively low rates of tobacco use among Asian Americans, but this information is often based on small sample sizes or the combination of Asian Americans with other racial categories. Data are needed to support the development of culturally and linguistically appropriate tobacco prevention and control programs for Asian Americans. This information should help to increase the impact of such programs (Lew & Tanjasiri, 2003). The purpose of this study was to examine the risk factors associated with cigarette use among a national sample of Asian American adolescents.

Methods

Sample

Data were extracted from the 2001 national school-based Youth Risk Behavior Survey (YRBS). The YRBS is a national survey administered to high school students to collect data on health risk behaviors. The YRBS is a component of the Youth Risk Behavior Surveillance System (YRBSS) established by the Centers for Disease Control and Prevention. The YRBSS is used to assess prevalence, patterns of behavior over time, age of initiation, and a variety of other important information for public health use (Centers for Disease Control and Prevention, 2002).

The YRBS Public-Use Data Documentation form provided the following information (Centers for Disease Control and Prevention, 2002). The 2001 YRBS used a three-stage cluster sample design to produce a nationally representative sample of students in grades 9 through 12. The first-stage sampling frame contained 1,256 primary sampling

units (PSUs), which consisted of large counties, subareas of very large counties, or groups of smaller, adjacent counties. From these, 57 PSUs were selected from 16 strata formed on the basis of the degree of urbanization and the relative percentage of Hispanic and African American students in the PSU. The second-stage sampling frame consisted of 199 schools that were selected with probability proportional to school enrollment size. The third-stage sampling frame consisted of one or two randomly selected, intact classes of a required subject (e.g., English or social studies from grades 9 through 12 at each chosen school). All students in the selected classes were eligible to participate in the survey. Of the 199 sampled schools, 150 of them participated in the national survey. There were 13,601 usable questionnaires received from the 16,398 students sampled. The school response rate was 75 percent, and the student response rate was 83 percent, resulting in an overall response rate of 63 percent.

A weighting factor was applied to each student record to adjust for nonresponse and for the varying probabilities of selection, including those resulting from the oversampling of Hispanic and African American students. The weights were scaled so that 1) the weighted count of the students was equal to the total sample size and 2) the weighted proportions of students in each grade matched national population proportions. The data are representative of students in grades 9 through 12 in public and private schools in the United States.

Survey Procedures and Methods

Survey procedures were designed to protect students' privacy, allowing for anonymous and voluntary participation. Students completed the self-administered questionnaire in their classrooms during a regular class period and recorded their responses directly on a computer-scannable booklet or answer sheet. Local parental permission procedures were followed prior to survey administration.

The YRBS focused on priority health risk behaviors established during youth that result in the most significant mortality, morbidity, disability, and social problems during both adolescence and adulthood. This survey also served to monitor progress in achieving three leading health indicators and 15 Healthy People 2010 national health objectives. Results were also used to help develop programs and policies for comprehensive school health education on the behaviors that contribute most to the leading causes of mortality and morbidity.

Statistical Analyses

We examined several predictor variables in the analysis. These categorical type variables included alcohol use during the past 30 days, marijuana use during the past 30 days, multiple sex partners, and academic grades. Demographic variables of grade level, gender, and weight were also examined as independent variables. The main outcome (dependent) variable was cigarette smoking behavior (past 30 days) reported as a binary (dichotomous) variable.

All statistical analyses were computed with Survey Data Analysis (SUDAAN) statistical software (Shad, Barnwell, & Bieler, 1997). SUDAAN can account for multistage sampling by including design factors (i.e., stratum and PSU levels) in the analytical model. To examine relationships between each individual predictor variable and the dependent variable, univariate logistic models were analyzed. Unadjusted odds ratios (OR) and 95 percent confidence intervals (CI) were examined. A multivariate logistic regression was computed to identify the most significant risk factors associated with cigarette use. Reference categories reflected normal or healthy behaviors.

Results

A total of 13,601 questionnaires were usable data sources. We selected Asian American respondents which consisted of a total of 408 completed responses. We computed frequency statistics for selected variables and found the following results. According to our sample, approximately 51 percent of the sample was male, and age- and grade-level statistics displayed a relative distribution of range. The median age range was between 13 and 16 years old. In the completed responses, 169 Asian American high school students (42.7%) reported "ever smoking." Further, when asked about "age when first smoked," 3.0 percent reported 8 years or younger, 8.3 percent at 9 to 12 years, 16.2 percent at 13 to 16 years, and 3.0 percent at 17 years or older. The highest reported number of cigarettes smoked per day was 2 to 5 (6.7%), and 9.9 percent of the respondents indicated that they smoke on a daily basis. The three highest reported access to cigarettes were by "store" (4.9%), "someone else bought for them" (3.4%), and "borrowed" (3.1%). Missing data analysis revealed that, overall, the range of missing data was relatively low, with the variable of multiple sex partners reporting the highest percentage (7.8%). With an indicator of 10 percent for missing data, the overall missing data values were acceptable for our analyses.

We computed additional frequencies and percentages to summarize key data. Table 1 displays the frequencies of reported risk factors among Asian American adolescents participating in the 2001 YRBS. In our sample, approximately 4 to 24 percent reported experience in the highest level of risk behaviors assessed in the YRBS. These variables

involved recoding transformations into dichotomous variables to develop simpler computation conditions and to reflect behavioral patterns. The main outcome variable of "number of days smoked cigarettes" was recoded into a dichotomous variable: zero smoking days and smoking cigarette(s) one or more days. Reported cigarette use by day was assumed to establish a pattern of cigarette smoking behavior. Similar dichotomous or quantitative recodings were initiated for alcohol use, marijuana use, multiple sex partners, and academic grades. No adjustments were made among the demographic variables.

Table 1. Frequency (by Percentage) of Reported Risk Factor Among Asian American High School Students Participating in the 2001 YRBS

Risk Factor	Frequency of Factor	Percentage
Cigarettes smoked	1 or more days [a]	14.4
Alcohol use	1 or more days [a]	24.7
Marijuana use	1 or more times [a]	24.0
Multiple sex partners	2 or more [b]	3.9
Academic grades	Grades C or lower [c]	18.1

[a] During the past 30 days.
[b] During the past 3 months.
[c] During the past 12 months

Bivariate Relationships

Table 2 displays the unadjusted odds ratios for relationships between risk factors and reported cigarette use. The reference category for the dependent variable was no cigarette use. Asian American adolescents who engaged in alcohol and other drug use (marijuana) were more likely to report cigarette use. Those who drank alcohol at least 1 or more days during the past 30 days were more than 15 times as likely to report cigarette use, as compared with reported cigarette use by those who did not drink. Asian American adolescents who smoked marijuana at least one or more times during the past 30 days were 16.48 times as likely to report cigarette use, as compared with reported cigarette use by those who did not smoke marijuana. Moreover, the reported cigarette use of those involved in promiscuous behavior (multiple sex partners) was more than six times that of those who did not have multiple sex partners.

Nonbehavioral risk factors also were associated with increased cigarette use among Asian American adolescents. Asian American adolescents who reported academic grades that were mostly C or lower were 5.23 times more likely to report cigarette use, compared with those with higher grades. Although grade level did not present any statistically significant results, Asian American 12th graders were more likely to report cigarette use at a probability higher than that of any other grade level. Tenth graders were more likely than those in other grades to report a protective factor towards cigarette use.

We examined additional demographic variables for their effect on the analytical model. For example, those who indicated that weight was a factor were 1.03 times as likely to report cigarette use, compared with those for whom weight was not a factor. Asian American female adolescents reported lower odds of cigarette use and this characteristic may be viewed as a protective factor.

Table 2. Prevalence Rates and Unadjusted Odds Ratios for Relationships Between Cigarette Use and Demographics, and Behavioral Risk Factors Among Asian American High School Students Participating in the 2001 YRBS

Risk Behavior	Prevalence (%)	Odds Ratio	95% CI
Alcohol Use			
1+ days	50.28	15.35**	6.80-34.63
0 days	6.18	1.00	
Marijuana Use			
1+ times	71.08	16.48**	5.40-50.26
0 times	12.98	1.00	
Multiple Sex Partners			
2+ partners	57.86	7.66**	3.29-17.85
0 partners	15.20	1.00	
Academic Grades			
Mostly C or lower	43.58	6.23**	2.97-13.08
Mostly B	18.36	1.81	0.97-3.38
Mostly A	11.03	1.00	
Grade Level			
12th grade	33.69	2.54	0.81-7.99
11th grade	22.15	1.42	0.42-4.86
10th grade	9.92	0.55	0.17-1.78
9th grade	16.68	1.00	
Gender			
Female	19.67	0.93	0.49-1.78
Male	20.77	1.00	
Weight	n/a[a]	1.03**	1.01-1.04

***p< .01, last category was used as the reference*
[a]The category of weight is reported as a continuous variable.

Multivariate Relationships

To identify the most significant risk factors associated with cigarette use, we computed a multivariate logistic regression. Adjusted odds ratios account for the overlapping effects of including all the predictor variables in the model. The results show that reported cigarette use was significantly

associated with three variables (Table 3). The odds of reported cigarette use by Asian American adolescents were greatest for those who drank alcohol, used marijuana, and had academic grades that were mostly C or lower.

Table 3. Multivariate Logistic Regression (Adjusted Odds Ratios) for Relationships Between Cigarette Use and Demographics, and Behavioral Risk Factors Among Asian American High School Students Participating in the 2001 YRBS

Risk Behavior	Odds Ratio	95% CI
Alcohol Use		
1+ days	10.43**	5.02-21.68
0 days	1.00	
Marijuana Use		
1+ times	4.90**	1.91-12.59
0 times	1.00	
Multiple Sex Partners		
2+ partners	1.11	0.15-8.19
0 partners	1.00	
Academic Grades		
Mostly C or lower	5.86**	2.66-12.90
Mostly B	0.70	0.19-2.62
Mostly A	1.00	
Grade Level		
12th grade	1.31	0.42-4.14
11th grade	0.44	0.09-2.21
10th grade	0.40	0.13-1.22
9th grade	1.00	
Gender		
Female	1.83	0.58-5.76
Male	1.00	
Weight	1.01	0.98-1.04

***p< .01, last category was used as the reference*

Discussion

Several key findings emerged from the analysis of data. First, a large proportion of Asian American adolescents (42.7%) reported "ever" cigarette use. Second, 16.2 percent of Asian American adolescents initiated smoking during their mid teenage years (ages 13–16). Third, there was no systematic pattern for cigarette use on the basis of grade level. Twelfth grade Asian American adolescents had the highest prevalence of cigarette use, but differences across the four grade levels were not significant. Fourth, the bivariate analyses indicated a profile of Asian American adolescents who are at higher risk for cigarette use. Behaviorally, Asian American adolescents who engaged in alcohol use, marijuana use, and risky sexual behavior were at greater risk for cigarette use. Nonbehavioral factors, such as low academic grades and weight, also played an important part in increasing the risk of cigarette use. Finally, after being adjusted for the effects of all significant risk behaviors, the multivariate analyses revealed a risk profile of Asian American adolescents who reported cigarette use.

Some of the key findings in our study correlate with findings from previous studies in other populations. We found that 14.4 percent of Asian American adolescents currently smoke cigarettes, and the 2002 NYTS showed that 20.6 percent of Asian American high school students were current cigarette smokers (Centers for Disease Control and Prevention, 2003).

Also, findings from the 2000 NYTS (American Legacy Foundation, 2001), which indicate that 33.1 percent of Asian American adolescents in their last year of high school were smokers, correlate with our findings of the high prevalence of cigarette smoking behavior reported among 12th grade Asian American students (33.69%). The protective factor of being female corresponds to the findings by Wiecha (1996), who found that Vietnamese boys were more likely than Vietnamese girls to report smoking in high school.

The risk profiles established by the bivariate and multivariate analyses also correlate with findings from previous studies. Academic orientation, which included academic grades, personal and classmate attitudes toward school, and educational goals, was a protective factor toward tobacco use among American Indian adolescents (LeMaster, Connell, Mitchell, & Manson, 2002). In our study, we found that those with academic grades at C or lower were more likely to report smoking behavior. Among high school students in a rural region, students who have lower grade point averages, are male, have friends who drink, and experience peer pressure to drink have an increased likelihood of being a smoker (Ritchey, Reid, & Hasse, 2001). In a survey of 93 adolescents, statistically significant relationships were found among current cigarette use and ethnicity, alcohol use, marijuana use, and age at first sexual intercourse (Busen et al., 2001). In a study of high-risk behaviors associated with early smoking, Ellickson, Tucker, and Klein (2001) found that early smokers were at least three times more likely by grade 12 to use tobacco, use marijuana, use illicit drugs, drop out of school, and experience early pregnancy.

The high rates of smoking in this group may be attributable to acculturation effects. Chen, Unger, Cruz, and Johnson (1999) found that a high level of acculturation among Asian American adolescents was associated with increased smoking prevalence rates. Acculturation was thought to be a link to increased risk of smoking experimentation among Asian American adolescents in California (Unger et

al., 2000). Further, acculturation was found to be an important factor in a study comparing smoking onset between Chinese American adolescents and Caucasian adolescents (Chen, Unger, & Johnson, 1999). Although not studied in our analysis, social networks and family dynamics are areas to examine in adolescent cigarette use etiology. Tobacco use by parents, siblings, and friends were predictors for tobacco use among eighth grade students (Johnson et al., 2002). Peer social influences were observed as protective factors of tobacco use among adolescents (Beal, Ausiello, & Perrin, 2001).

Limitations

There are several limitations to our study. First, a relatively small proportion of the entire YRBS sample was used in the analyses. Even though data from 408 respondents were used, this only constitutes about 3 percent of the entire study population. However, this percentage is comparable to the overall Asian American population in the United States, which is 3.6 percent of the overall population (U.S. Census Bureau, 2002). A second limitation is due to the survey design. Causal inferences cannot be achieved from surveys that utilize a cross-sectional design. Further, measurement of cigarette use with single-item, self-report questions may be less valid than measurement with multiple items. Using self-report data are often subject to bias. For example, with respect to academic grades, it is common for students to report higher grades when asked about their academic performance. Therefore, the academic grades reported might have been inflated, which may have influenced its presence in the analytical model. Finally, although the YRBS serves as an excellent survey for adolescent risk behavior, culturally tailored survey instruments and controlled sampling designs will need to be implemented to better assess the specific population of interest.

Future Implications and Research

The results from this study indicate that common risk factors and adolescent behaviors play a role in cigarette use among Asian American adolescents. Parents, teachers, and counselors can use this risk profile to identify youth at-risk for cigarette smoking behavior or other risk behaviors. Further, the results from this study provide evidence that cigarette use and risk behaviors are common among Asian American adolescents as compared to other groups. Future interventions should focus on Asian American adolescents who present a risk profile that includes alcohol use, marijuana use, low academic achievement, and multiple sex partners. Such information can be used to effectively establish health communication and education programs that focus on all high school grade levels and, more importantly, on earlier grade levels such as elementary and middle school. More work must be done to understand cigarette use among Asian American adolescents. Future studies should examine parental involvement and cultural links as they relate to Asian American adolescent cigarette use (Spigner & Gran-O'Donnell, 2001; Kuramoto & Nakashima, 2000). Finally, more research on the effects of acculturation, family, and social networks should be conducted to examine their contributions as risk or protective factors toward Asian American adolescent cigarette use.

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