Published in final edited form as:

Asia Pac J Public Health. 2011 September ; 23(5): 672–681. doi:10.1177/1010539509352200.

Socioeconomic Status and Smoking Among Thai Adults: Results of the National Thai Food Consumption Survey

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Abstract

The authors examined the relationship between socioeconomic status and smoking in Thai adults. A nationally representative sample of 7858 Thais adults (18 years and older) was surveyed during 2004 to 2005. Four demographic/socioeconomic indicators were examined in logistic models: gender, education, occupational status, and annual household income. Overall, 22.2% of the participants were smokers. Men were more likely to be smokers across all age groups and regions. Compared with nonsmokers, current smokers were less educated, more likely to be employed, but had lower household income. When stratified by gender, education and job levels were strongly associated with smoking prevalence among males. A significant relationship was found between annual household income and smoking. Those who lived under the poverty line were more likely to smoke than persons who lived above the poverty line in both genders. The present study demonstrated that socioeconomic factors, especially education level and occupational class, have a strong influence on smoking behavior in Thai adults.

Keywords

education; family income; gender; occupational status; smoking; socioeconomic status; Thailand

Cigarette smoking is a problem that is increasing in Thailand and worldwide. In Thailand, smoking is still considered as an important public health issue although the proportion of cigarette smokers has decreased during the past 3 decades, from 30.1% in 1976 to 20.3% in 2006. Although the vast majority of smokers are men, a recent report from the Thailand Ministry of Public Health found that smoking has become more widespread among youth and women.¹ A study conducted by Hammond et al² found that among Thai youth aged between 13 and 17 years, approximately 3% were current smokers and nearly 12% had tried to smoke cigarettes. A similar trend was observed in Thai females, showing that the proportion of cigarette smokers changed slightly, increasing from 2.2% in 2001 to 2.6% in

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2006.¹ Goel and Nelson³ suggested that the prevalence rate of adult smokers and the stage of the development of a country are inversely related. For example, low- and middle-income countries tend to have higher percentages of adult smokers than high-income countries.

Cigarette smoking as a mortality risk has been studied and well documented worldwide, with studies demonstrating that smoking significantly increases the risk of death from cancers or other fatal and nonfatal diseases such as cardiovascular disease, tuberculosis, chronic obstructive pulmonary disease, and a decreased quality of life and life expectancy.⁴ In Thailand, smoking was 1 of the top 5 leading causes of burden of disease for males and females.¹ Approximately 9% of nation tobacco-disability adjusted life years were due to smoking. In addition, it was noteworthy that cigarette smoking causes considerable economic and social loss. In 2006, annual health care cost for treating smoking-related patients was approximately 9.9 million baht (or \$US 300 000) or accounted for 0.5% of the gross domestic product.⁵ Interestingly, in households with smokers, around 150 baht (or \$US 3) were spent on cigarettes monthly or accounted for 15.1% of the total monthly income.¹ In addition to its impact on smokers, nonsmokers in smoking households (or secondhand smokers) tended to have an increased risk of smoking-related diseases, disabilities, and death.⁴ A recent survey on exposure to secondhand smoke undertaken by Thongthai et al⁶ showed that the prevalence of secondhand smoke exposure in the investigated population was 40.1%, mostly among children and women.

Numerous studies conducted in developed countries have indicated that socioeconomic status (SES) indicators, such as education, employment and/or occupational status, and household income, are inversely associated with smoking.^{7–9} Generally, individuals with lower SES are more likely to smoke than those with higher SES. However, few nationally representative studies in developing countries, particularly Thailand, have examined the prevalence of smoking in relation to SES.¹⁰ Although the findings from these studies are consistent with the studies conducted in developed nations, better understanding the relationship between socioeconomic pattern and smoking behavior in the Thai population is needed to inform public health initiatives. The aim of this study was to address and examine the relationship of SES and smoking prevalence in a nationally representative sample of Thai adults. The specific interest was in determining which socioeconomic indicator most strongly influenced smoking behavior in this population.

Methods

Study Design and Selection Procedures

The 2004–2005 Thai Food Consumption Survey, a nationally representative, cross-sectional population-based survey, was carried out from January 2004 to February 2005 in Thailand using a stratified 3-stage sampling design. It was funded by the National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperative, Thailand. The primary aim of this survey was to evaluate food and nutrient consumption patterns and general health status in Thai population as a whole and the regional differences.

11

Participants were randomly drawn from the local government registers of households, and only 1 individual was recruited from a household, without replacement. Eligible participants who were more than 18 years of age were asked to participate in the study. For each individual who agreed to participate, an institutionally approved consent form was signed, and the study protocol was described. Trained staff conducted all assessments including a structured questionnaire at participants' homes. Informed consent was obtained from eligible participants.

Measurements

A total of 7858 adults, aged 18 years and older, were interviewed. The structured questionnaire included questions regarding their basic demographic and SES factors (eg, age, gender, marital status, basic education, and occupations), cigarette smoking habit, and alcohol consumption. Cigarette smoking status was determined by asking, "Have you ever smoked a cigarette in your lifetime?" (yes/no answer). Participants who ever smoked were asked, "How old were you when you started smoking cigarettes?" "On averaged, how many cigarettes do you smoke per day?" and "How old were you when you stopped smoking cigarettes?" Never smokers were defined as individuals who never smoked; current smokers were defined as those who were currently smoking at the time of the study; and former smokers were defined as persons who did not smoke at the time of the survey but reported prior history of smoking.

Education level was divided into 3 groups based on years of education completed: (a) basic education (1–6 years), (b) secondary education (7–12 years), and (c) higher education (more than 12 years). For occupational status, participants were classified into 4 occupational status groups: (a) managers and professionals, (b) semiprofessionals, (c) routine nonmanual workers, and (d) manual workers. Individuals who were retired, unable to work, students, and housewives were excluded. Participants were also asked to report their household income excluding taxes. Gross household income from all sources was converted from Thai Bath to the US dollars (\$), and the Thailand poverty line was applied to categorize participants into 2 groups: households that had an annual income below and above the poverty line (the recent Thailand poverty line was US equivalent of \$508.1 per year).¹²

Statistical Analyses

Statistical analyses were performed using SPSS (version 16.0; SPSS Inc, Chicago, IL). For the smoking prevalence data among genders, sample size and percentages were reported, and χ^2 was used to test the differences between males and females. χ^2 and ANOVA were applied to examine differences in SES characteristics. For χ^2 analyses based on factors with more than 2 levels (ie, education and employment status), follow-up tests were conducted when a significant association with smoking status was found. To simplify the results, we chose to dichotomize these 2 factors based on logical categories that would be culturally valid in Thailand. Education was dichotomized into basic (6 years of education and lower) versus greater than basic education (more than 6 years), and employment status was simplified to unemployed versus other. The associations between being a current smoker (where 0 = *not smoking* and 1 = *currently smoking*) and each of the SES indicators were examined in overall and gender-stratified multivariate binary logistic regression models.

Analyses were gender stratified because of the substantial differences in current smoking prevalence commonly reported in studies with Asian samples.^{13,14} For each SES indicator, the most advantaged group was used as the reference group. The results are presented as age-adjusted odds ratios (ORs) and their 95% confidence intervals (CIs). The critical level for α was set at $P < .05$.

Results

Tables 1 through 4 present descriptive analyses of smoking patterns of male and female Thai adults. A random sample of 7858 (49.1% male and 50.9% female) adults aged 18 years and older participated in this study. Overall, 22.2% of all participants were smokers (see Table 1).

Among men, approximately 41.3% were current smokers whereas 12.0% and 46.7% were former and never smokers, respectively. In contrast, there was a very high percentage of women who never smoked (95.0%) compared with those who already quit smoking (1.2%) and those currently smoking (3.8%). The proportion of smokers was higher in men than women (20.3% vs 1.9%; $\chi^2(2) = 2237.0$, $P < .001$) in the total sample. Overall, there was no statistically significant association between smoking status and place of residence (ie, urban vs rural). However, the relationship between smoking status and places of residence was significant when stratified by gender ($\chi^2(2) = 8.2$, $P < .05$ and $\chi^2(2) = 7.57$, $P < .05$, for men and women, respectively). For urban areas, smoking prevalence was 22.1% for men and 2.5% for women compared with 19.2% and 1.3% in rural areas.

Tables 2 and 3 present the demographic characteristics of male and female participants by smoking status.

In both genders, the mean age of never smokers and current smokers was quite similar. Former smokers were older than either never smokers or current smokers, with approximately 15 years difference in males ($P < .001$) and almost 20 years difference in females ($P < .001$). There were significant differences in smoking prevalence based on place of residence. In both genders, the percentage of current smokers was higher in urban areas than those in rural areas (ie, 53.5% and 66.9% for men and women, respectively).

There was a statistically significant association between smoking status and the socioeconomic variables in both genders (see Tables 2 and 3). Among men, there were differences in smoking status for different education levels ($\chi^2(4) = 128.2$, $P < .001$), employment status ($\chi^2(4) = 115.8$, $P < .001$), and annual household income ($F(2) = 11.1$, $P < .001$). Follow-up χ^2 analysis suggested that a higher percentage of those who had only basic education (6 years and lower) were smokers compared with those who had higher education (more than 6 years; 26.6% vs 14.7%, $P < .001$). Smoking prevalence also was higher among those who were employed or retired than those who were unemployed (34.9% vs 6.6%, $P < .001$). In addition, current smokers had lower annual household income compared with their nonsmoking counterparts ($P < .001$).

Significant differences in smoking status was also found among females based on education level ($\chi^2(4) = 47.0$, $P < .001$), employment status ($\chi^2(4) = 10.4$, $P < .05$), and household

income (H_2) = 3.50, $P < .05$; Table 3). Follow-up χ^2 tests suggested that women who had basic education reported smoking more than those who had higher education (3.2% vs 0.6%, $P < .001$), and those who were employed or retired smoked more than those who were unemployed (2.4% vs 1.4%, $P < .01$). When considering occupational status groups, male manual workers reported the highest prevalence of smoking (24.5%), whereas higher managerial levels and professionals reported the lowest (0.9%). A similar result also was found among female smokers. However, there were no statistically significant differences in cigarette smoking prevalence between occupational groups in women.

A binary logistic regression model was conducted to examine the multivariate relationship of smoking status, gender, and socioeconomic factors (see Table 4). Men were more than 20 times more likely to smoke than women (odds ratio [OR] = 21.1; 95% confidence interval [CI] = 16.6-26.8). Smoking also decreased with increasing education; the OR of smoking among people who had basic and secondary education was 2.6 (95% CI = 1.7-4.0) and 2.6 times (95% CI = 1.6-3.9) greater than that of those who had higher education. In addition, occupational status was statistically related with smoking only when considering the manual workers category. Compared with those who were working in higher management and professionals, manual workers were 1.7 (95% CI = 1.1-2.7) times as likely to be current smokers.

When logistic models were developed separately for each gender, education levels were strongly associated with smoking prevalence only in male participants. Among men, those who had basic education (OR = 2.3; 95% CI = 1.5-3.6) and secondary education (OR = 2.4; 95% CI = 1.5-3.7) were more likely to smoke than those who had higher education. A similar relationship also was found for the manual workers (OR = 1.8; 95% CI = 1.1-2.9) when compared with managers and professionals. A significant relationship was found between annual household income categorized by poverty line and smoking in women. Women who lived under the poverty line were 3.7 (95% CI = 1.5-9.1) times more likely to smoke than women who lived above the poverty line; for men, the relationship was not statistically significant (OR = 1.3; 95% CI = 0.7-2.3).

Discussion

In this population-based cross-sectional study of Thai adults, 22.2% of participants were smokers. However, there were large gender differences, with 41.3% of men and 3.8% of women classified as current smokers (OR = 21.1; 95% CI = 16.6-26.8). In addition, smoking prevalence was much higher in men than in women across all age groups. Other data regarding prevalence of cigarette smoking in Thailand also demonstrated larger gender differences in smoking.^{1,10,15} A similar pattern has been commonly observed in other Asian countries such as China, Singapore, Vietnam, Philippines, Indonesia, and Malaysia, with smoking rates for males between 30% and 55% but only between 4% and 10% for females.¹⁶⁻¹⁹ In contrast, the disparity between genders in smoking prevalence in Western countries and some industrialized Asian countries, such as Japan, was much smaller than those observed in Southeast Asian countries. For example, in Europe, approximately 46% of men and 26% of women smoked,²⁰ and in the United States, 23.9% of men and 18% of women were current cigarette smokers.²¹ It was believed that cultural and traditional values and

gender-based norms significantly influence female smoking behaviors in Asian societies.^{22,23}

There was a higher proportion of current smokers in urban areas compared with rural areas, although this difference was not statistically significant. However, when stratified by gender, urban/rural inequalities in smoking were larger among urban versus rural women (OR = 2.0; 95% CI = 1.1-2.3) than men (OR = 1.2; 95% CI = 0.8-1.0). However, other Thai survey data reported that the prevalence of cigarette smoking was higher among rural than urban areas in both genders, and the difference between urban and rural men was significant.^{10,15,24} It might be because of the differences in criteria and classifications to measure areas of residence as well as in the sampling method. In addition, there has been an effort to reduce smoking in rural population at the policy level, including clean air policies, pictorial health warnings on the upper area of the packs, a medium-intensity media campaign highlighting local tobacco control activities, and other tobacco control policies focusing on rural areas.²⁵ Interestingly, it was found that monks in rural communities play an important role in anti-smoking activities, which could lower the smoking prevalence in those communities.²⁶ The findings of the study are consistent with other Western studies indicating that people from urban areas are more likely to be current smokers when compared with those living in rural or nonurban areas.^{27,28} Several hypotheses have been examined to explain the association between residential area and smoking pattern. Stress from physical and social environment factors might be one explanation for smoking inequalities,²⁹ that is, people in urban areas experience more stress and may be more likely to use smoking to cope with stress. In addition, urban residents are likely to have more liberal social attitudes than those in rural areas, which could shift the norm toward cigarette smoking. Cigarette availability and advertisements also are more common in the urban areas, which could influence the higher smoking prevalence in this area.³⁰ Because there are few studies that explore the smoking prevalence based on geographical variation, further investigation regarding the associations between residential area and smoking in Thailand needs to be conducted.

In the present study, a significant relationship was found between SES and smoking prevalence among men, with lower SES males being more likely to smoke. Educational attainment, occupational status, and household income were examined as SES predictors of smoking status. Among men, smoking was statistically related to educational level, occupation, and household income. Smoking was more common among those with lower educational attainment, and this finding is consistent with previous studies.^{10,16,31} Theoretically, people with better education are more likely to be health conscious and have more opportunities to access information about healthy lifestyles, which could result in less smoking.^{32,33} Because occupational status is closely related to individual educational level, the association between occupational status and smoking in men also was found to be significant. In this study, semiprofessionals and manual workers tended to smoke more often than those in managerial and professional groups. This finding was consistent with data from previous studies.^{9,34,35} This suggests that low-level occupational groups were more involved in both physical and psychosocial risks than those in the managerial and professional classes. Therefore, they are likely to engage in risky health behaviors such as smoking.³⁶

An inverse association between household income and smoking was found in this study. In both genders, participants who had household income below the poverty line were more likely to smoke than those who had income above the poverty line. In addition, there were significant differences in household income among men by smoking status, indicating that smokers had lower household income than their nonsmoking male counterparts. Smoking patterns observed in other countries are similar to the finding of this study,^{7,9,16,34} with low SES inversely associated with smoking. It is likely that individuals with less education, lower occupation level, and lower household income have less access to adequate health care or health information resulting in a greater likelihood of becoming involved in unhealthy lifestyle or health risks, such as smoking. Therefore, social disparities in smoking needs to be addressed in health policy, particularly in developing and middle-income nations where health care services may be more difficult to obtain.

Several potential limitations to this study should be considered. First, the small sample size of female smokers (ie, 151 smokers among 3997 women) limited the statistical power and ability to detect differences in the various study outcomes among women. In addition, smoking could be underreported among women. Unlike Western countries, female smoking is not well accepted in Asian societies, and it is not culturally appropriate for women to admit to smoking, mainly because of sociocultural beliefs and social norms.^{22,33}

The definitions of smoking status used in this present study were different from those currently used by the Society for Research on Nicotine and Tobacco (SRNT), Centers for Disease Control and Prevention (CDC), and other organizations, and it may affect the estimates of the outcomes in either former or current smokers in this sample. In this present study, smoking status was categorized based on questions of whether or not participants have smoked regardless of the numbers of cigarettes they smoked in his or her lifetime. Current smokers were defined as those who reported currently smoking cigarettes; never smokers were defined as those who reported never smoking or smoking only once in their lifetimes; and former smokers were defined as those who had quit smoking before the time of interview. However, both the SRNT and the CDC defined smoking status based on the numbers of cigarettes the participants smoked in their lifetimes. For example, smokers are defined as those who have smoked at least 100 cigarettes during their lifetimes and currently smokes cigarettes; never smokers are defined as those who have never smoked or who have smoked less than 100 cigarettes in their lifetimes; and former smokers are defined as those who have smoked at least 100 cigarettes in their lifetimes but have quit smoking at the time of interview.

Despite these limitations, the results from this study provided important insight into the issue of improving and enriching Thai's health with regard to smoking. Importantly, the data are based on interviewer-administered questionnaires. It has been demonstrated that using interviewer-administered questionnaires yields more accurate results of smoking prevalence.³⁷ Furthermore, with SES information and their statistically significant associations with smoking, the present results provide the most up-to-date useful data to explain the relationship between social class and smoking in Thai population.

In conclusion, the present study demonstrated a strong relationship between SES indicators and smoking behavior in Thai population. Although men were more likely to smoke than women, policies regarding antismoking should address both genders to prevent the rise in smoking among women. A public health policy regarding smoking issues is still required to address the differences in smoking prevalence due to socioeconomic inequalities. In addition, health care professionals and health policy makers could use the findings from this study for further health promotion, antismoking strategies, and smoking cessation programs.

Acknowledgments

The Thai Food Consumption Survey was undertaken and conducted by the Institute of Nutrition, Mahidol University. We would like to thank staff members of the Biostatistics and Computer Service Division, Institute of Nutrition, Mahidol University, for their valuable contribution. The survey was financially supported by the National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperative, Thailand.

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Table 1

Smoking Status Stratified by Gender

Smoking Status	Male (%; n = 3861)	Female (%; n = 3997)	Total (%; N = 7858)
Never smokers	1805 (46.7)	3798 (95.0)	5803 (71.3)
Former smokers	463 (12.0)	48 (1.2)	511 (6.5)
Current smokers	1593 (41.3)	151 (3.8)	1744 (22.2)

Table 2Demographic Characteristics of Male Participants According to Smoking Status^a

Variables	Smoking Status				F/ χ^2 (P)	Total (N = 3861)
	Never (n = 1805)	Former (n = 463)	Current (n = 1593)			
Age (years)	44.9 ± 21.6	60.4 ± 17.2	45.6 ± 19.3	F = 115.0 (<.001)		47.1 ± 20.8
Any alcohol consumption	460 (25.9)	157 (34.3)	893 (56.3)	$\chi^2 = 329.6$ (<.001)		1510 (39.5)
Place of residence				$\chi^2 = 8.2$ (<.05)		
Urban	1053 (58.3)	253 (54.6)	853 (53.5)			2159 (55.9)
Rural	752 (41.7)	210 (45.4)	740 (46.5)			1702 (44.1)
Education level				$\chi^2 = 128.2$ (<.001)		
Elementary	934 (52.0)	334 (72.5)	1024 (64.4)			2292 (59.6)
Secondary	676 (37.6)	112 (24.3)	513 (32.2)			1301 (33.8)
High	186 (10.4)	15 (3.2)	54 (3.4)			255 (6.6)
Employment status				$\chi^2 = 115.8$ (<.001)		
Employed	1084 (61.0)	252 (55.1)	1186 (74.9)			2522 (66.0)
Retired	193 (10.9)	126 (27.6)	147 (9.3)			466 (12.2)
Unemployed	501 (28.1)	79 (17.3)	251 (15.8)			831 (21.8)
Annual household income (\$)	3451.7 ± 3327.6	3235.9 ± 4234.6	2913.4 ± 2887.1	F = 11.1 (<.001)		3203.0 ± 3289.0

^aValues are means ± standard deviation or n (%).

Table 3

Demographic Characteristics of Female Participants According to Smoking Status

Variables	Smoking Status				F/ χ^2 (P)	Total (N = 3997)
	Never (n = 3798)	Former (n = 48)	Current (n = 151)			
Age (years)	46.6 ± 20.4	66.6 ± 14.0	54.2 ± 17.2	F = 32.8 (<001)		47.12 ± 20.34
Any alcohol consumption	231 (6.2)	6 (12.8)	44 (29.5)	$\chi^2 = 120.4$ (<001)		281 (7.1)
Place of residence				$\chi^2 = 7.6$ (<05)		
Urban	2110 (55.6)	27 (56.2)	101 (66.9)			2238 (56.0)
Rural	1688 (44.4)	21 (43.8)	50 (33.1)			1759 (44.0)
Education level				$\chi^2 = 47.0$ (<001)		
Elementary	2453 (64.8)	45 (93.8)	129 (85.4)			2627 (65.9)
Secondary	1049 (27.7)	2 (4.2)	22 (14.6)			1073 (26.9)
High	285 (7.5)	1 (2.1)	0 (0.0)			286 (7.2)
Employment status				$\chi^2 = 10.4$ (<05)		
Employed	1918 (56.2)	21 (43.8)	80 (53.3)			2019 (55.9)
Retired	416 (12.2)	12 (25.0)	14 (9.3)			442 (12.2)
Unemployed	1078 (31.6)	15 (31.2)	56 (37.3)			1149 (31.8)
Annual household income (\$)	3130.1 ± 3135.0	2410.5 ± 2348.1	2558.9 ± 3344.9	F = 3.5 (<05)		3099.6 ± 3137.0

^aValues are means ± standard deviation or n (%).

Associations Between Socioeconomic Indicators and the Likelihood of Being a Current Smoker, Adjusted for Age

Table 4

Characteristics	Overall Model (ie, Both Genders; N = 7858)			Male (n = 3861)			Female (n = 3997)		
	OR	95% CI		OR	95% CI		OR	95% CI	
Gender									
Female	1.0								
Male	21.1	16.6–26.8 ^a							
Education level									
High	1.0			1.0			1.0		
Secondary	2.6	1.6–3.9 ^a		2.4	1.5–3.7 ^a		NA		
Elementary	2.6	1.7–4.0 ^a		2.3	1.5–3.6 ^a		NA		
Occupational class									
Managers and professionals	1.0			1.0			1.0		
Semiprofessionals	1.8	1.0–3.5		1.9	1.0–3.8		NA		
Routine nonmanual workers	1.1	0.7–1.7		1.1	0.7–1.7		0.9	0.1–6.8	
Manual workers	1.7	1.1–2.7 ^b		1.8	1.1–2.9 ^b		0.9	0.1–7.2	
Household income									
Above poverty line	1.0			1.0			1.0		
Below poverty line	1.7	1.0–2.8		1.3	0.7–2.3		3.7	1.5–9.1 ^c	

Abbreviations: OR, odds ratio; CI, confidence interval.

^aP < .001.^bP < .05.^cP < .01.