

The Socio-demographic Determinants of Smoking and Alcohol Consumption: A Cross Sectional Study in Penang, Malaysia

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ABSTRAK

Kajian ini bermatlamat meninjau faktor-faktor sosio-demografi yang mempunyai impak pada merokok and penggunaan arak di kalangan orang dewasa di Pulau Pinang (Malaysia). Data tinjau selidik keratan rentas yang mengandungi 398 responden telah digunakan untuk menjalankan analisis. Kajian ini menggunakan model regresi logistik untuk memeriksa faktor-faktor yang mempengaruhi kemungkinan merokok dan penggunaan arak. Keputusan menunjukkan jantina, kaum dan pendidikan dapat mempengaruhi merokok. Lelaki (OR: 26.678) menunjukkan kemungkinan yang lebih untuk merokok berbanding dengan wanita. Manakala, kaum Cina (OR: 0.177), kaum India/lain-lain (OR: 0.331) dan individu yang berpendidikan tinggi (OR: 0.258) menunjukkan kemungkinan yang kurang untuk merokok berbanding dengan yang lain. Dari segi penggunaan arak, jantina, kaum dan taraf perkahwinan dapat mempengaruhi kemungkinan penggunaan arak. Lelaki (OR: 5.051), kaum Cina (OR: 37.796) dan kaum India/lain-lain (OR: 10.863) menunjukkan kemungkinan yang lebih untuk menggunakan arak berbanding dengan lain. Manakala, individu yang berkahwin (OR: 0.380) menunjukkan kemungkinan yang kurang untuk menggunakan arak berbanding dengan individual yang belum berkahwin. Berpandukan penemuan kajian ini, pelbagai tindakan pencegahan telah dicadangkan.

Kata kunci: arak, demografi, penentu, merokok, sosio

ABSTRACT

The primary objective of the present study was to investigate the impact of socio-demographic factors on smoking and alcohol consumption among adults in Penang (Malaysia). A cross-sectional primary survey data with 398 respondents was used for analysis. The present study applied logistic regression models to examine

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the factors affecting the odds of smoking and alcohol consumption. The results showed that gender, ethnicity and education could significantly affect smoking. In particular, males (OR: 26.678) had a higher likelihood of smoking compared to the females, whereas Chinese (OR: 0.177), Indians/others (OR: 0.331) and individuals with tertiary education (OR: 0.258) had a lower likelihood of smoking than others. In terms of alcohol, gender, ethnicity and marital status were found to have a significant influence on the likelihood of alcohol consumption. Specifically, males (OR: 5.051), Chinese (OR: 37.796) and Indians/others (OR: 10.863) were more likely to consume alcohol than others, while married individuals (OR: 0.380) were less likely to consume alcohol than unmarried individuals. Based on the findings of the present study, numerous population-based intervention measures were suggested.

Keywords: alcohol, demography, determinants, smoking, social

INTRODUCTION

World Health Organization (2012) reported that at least one in every ten adults die everyday due to smoking induced diseases. This is equivalent to seven people dying every minute, which translates to about 4 million mortalities, worldwide. Globally, approximately 80% and 40% of lung cancers and chronic respiratory disease, respectively, are caused by smoking. To add, around 2.5 million deaths worldwide are related to harmful use of alcohol. Of these total deaths, over 300,000 happen in youngsters, accounting for 9% of all types of mortality in that age cohort (World Health Organization 2011a). Moreover, World Health Organization (2011a) reported that about 22% of cardiovascular diseases and 20% of cancers in the world are caused by alcohol.

In today's fast paced and busy lifestyle, smoking and alcohol consumption have become a serious public health concern in Malaysia. Each year, about 20% of total mortalities in

Malaysia are associated with smoking (Lim et al. 2009; Tan et al. 2009b). This translates to approximately 10,000 deaths in the nation. In 2006, about one fourth of hospitalisations in Malaysia were associated with smoking related diseases (Lim et al. 2009). With regard to economic burden, Malaysian government spends more than RM 3 billion yearly on treating smoking induced diseases, such as, lung cancer, cardiovascular diseases and chronic respiratory diseases (Tan et al. 2009b).

In terms of alcohol, Malaysia was among the top rankings in alcohol consumption in the world in 2011, which had high per capita alcohol consumption (World Health Organization 2011b). Each year, Malaysian adults spend a total of USD 500 million on alcohol (World Health Organization 2011b). Besides, alcohol is also a leading factor causing poverty in Malaysia, as a rural worker may spend all his monthly individual income (approximately USD 80) just on alcohol (Tan et al. 2009a). Worse still, the Road Safety Council of Malaysia reports that

at least three out of every ten road accidents throughout the country are related to alcohol consumption (World Health Organization 2004; Tan et al. 2009a).

There is a growing literature investigating the socio-demographic determinants of smoking and alcohol drinking in western and well-developed countries (Zhao & Harris 2004; Manrique & Jensen 2004; Aristei & Pieroni 2008; Bilgic et al. 2010; Lin 2010; Yuan & Yen 2012; Redonnet et al. 2012). The studies have consistently found that age, income, gender, marital status and education are significantly correlated to the likelihood of smoking and alcohol consumption. It is, however, that the literature is nearly silent on whether there are socio-demographic differences in smoking and alcohol drinking in Malaysia, where chronic diseases are prevalent.

Although Tan et al. (2009a) (2009b) have investigated the socio-demographic determinants of smoking and alcohol consumption in Malaysia, the studies appears to have several limitations. First, analysis of the studies is done by using household expenditure data, which only possesses information about household head's socio-demographic profile and the aggregate amount of tobacco and alcohol products purchased by the household. In fact, use of individual health survey data may seem more suitable than household data because it provides more detailed information about individuals' smoking and drinking behaviours. Second, the studies do not take account of hereditary factor for analysis. Since, presence of hereditary

illnesses may affect individuals' health awareness, studies that neglect such factor may seem incomprehensive.

The objective of the present study was to fill this research void by undertaking an in-depth investigation on the socio-demographic determinants of smoking and alcohol drinking among Malaysian adults. Two main research questions were addressed—(1) what socio-demographic factors have a significant effect on individuals' decision to smoke and drink alcohol? and (2) what policy can be proposed based on the findings of the present study? Overall, the present study creates two substantial contributions to the existing literature. First, the focus of the present study is on a developing country, Malaysia, where only few studies exist. Second, in addition to socio-demographic variables, the present study includes a hereditary variable (i.e. history of serious family illnesses) with the aim of examining its impact on smoking and alcohol drinking.

MATERIALS AND METHODS

DATA

Penang is a state in Malaysia located on the north-west coast of Peninsular Malaysia. Among all the states in Malaysia, the prevalence of alcohol consumption in Penang is the highest, placing it the fourth highest alcohol consumption state in Malaysia in 2011 (Institute for Public Health 2011). Besides, Penang is also regarded as one of the most developed states in Malaysia (The Star 2012), where people often live a hectic and unhealthy life. Given these

reasons, it seems worthwhile to base the present study on Penang.

A cross-sectional primary survey data of Penang was used in the present study. Owing to time, budget and geographical constraints, the data was collected based on a non-probabilistic convenient sampling approach. Nonetheless, efforts were made to stratify the sample in proportion to the ethnic structure of Penang population (41.6% Malays, 40.9% Chinese and 17.5% Indian/others) (SERI 2011). Several public settings in the urban areas of Penang Island, such as, universities, streets, shopping malls, offices and cafes, which comprised various ages, income, races and education levels of individuals were selected to carry out the survey. The survey period was from August to October 2010. The inclusion criteria were those aged 21 years old and above, and who resided in Penang for no less than 12 months. Ethical approval was obtained for this study.

Piloted bi-lingual (*Bahasa Malaysia* and English) questionnaires were distributed to the selected respondents for self-administration. Nevertheless, some brief explanations were provided by the interviewers upon giving out the questionnaires. During the survey, two main questions were addressed – (1) “Did you smoke any cigarettes in the past 30 days?” (2) “Did you consume any alcohol in the past 30 days?” Besides, the respondents’ socio-demographic and health profiles, such as, age, income, education, ethnicity, gender, marital status and history of serious family illnesses were also elicited. Based on 95% confidence level, the calculated target sample size was

400 respondents which represented 1,609,900 adults in Penang. The overall response rate of the survey was 99.50% (398 respondents).

DEPENDENT VARIABLES

The present study used ‘smoking’ and ‘alcohol consumption’ as dependent variables. Following the guideline of Institute for Public Health (2008), smoking referred to the respondents who smoked in the past 30 days preceding the survey, while alcohol consumption referred to the respondents who consumed alcohol in the past 30 days preceding the survey. The dependent variables were thus included in the current models as two categorical variables. For smoking variable, a value of 1 was coded if the respondents smoked and 0 otherwise, whereas, for alcohol consumption variable, a value of 1 was coded if the respondents consumed alcohol and 0 otherwise.

INDEPENDENT VARIABLES

Owing to the paucity of in-depth empirical studies examining the socio-demographic determinants of smoking and alcohol consumption in Malaysia, the independent variables of the present study were selected based on previous studies that were conducted elsewhere (Zhao & Harris 2004; Manrique & Jensen 2004; Aristei & Pieroni 2008; Bilgic et al. 2010; Lin 2010; Yuan & Yen 2012; Redonnet et al. 2012). In particular, the independent variables of the present study were: (i) age; (ii) gender; (iii) ethnicity; (iv) marital status; (v)

income; (vi) education; and (vii) history of serious family illnesses.

Age was included as a continuous variable to allow for a linear relationship. Ethnicity was divided into three categories: Malay, Chinese and Indian/others. Marital status was grouped into two groups: married and unmarried (i.e. single/ divorced/widow). Following Cheah (2011), the respondents' monthly individual income was segmented into four categories: low (RM999), lower-middle (RM1,000 – RM2,999), upper-middle (RM3,000 – RM5,999), and high (RM6,000). One USD is approximately 3.2 RM. Education was categorised into three categories: primary, secondary and tertiary. History of serious family illnesses referred to the respondents whose parents were diagnosed with chronic diseases, such as, cancers, hypertension, hypercholesterolemia, diabetes, heart disease and stroke.

STATISTICAL ANALYSIS

The present study applied logistic regression models to examine the factors affecting the odds of smoking and alcohol consumption among the respondents. Both Likelihood Ratio (LR) and Pearson χ^2 tests were conducted to assess the goodness-of-fit of the regression models. In addition, correlation coefficients between income and education variables were also calculated in order to detect the potential multicollinearity problem. The level of significance of all the tests was based on p-value of less than 0.05 (two-tailed). A total of 398 respondents were used for analysis. The statistical analysis was performed

using Stata statistical software (Stata Corp 2005).

RESULTS

CHARACTERISTICS OF THE SURVEY RESPONDENTS

Of the total respondents, 14.57% were smokers and 31.91% were alcohol drinkers. The average age of the respondents was approximately 37 years. Although, more than half (55.78%) of the entire sample were females, the majority of smokers (91.38%) and alcohol drinkers (62.99%) were males. The ethnic breakdown consisted of 37.94% Malays, 40.95% Chinese and 21.10% Indian/others. This ethnic distribution closely mirrors the structure of Penang population, which comprises 41.6% Malays, 40.9% Chinese and 17.5% Indian/others (SERI 2011) (Table 1).

The distribution of married (49.75%) and unmarried respondents (50.25%) was almost equal. The majority of the respondents were in the lower-middle income group (44.97%), followed by those in the low (32.16%), upper-middle (18.59%) and high income groups (4.27%). Also, the majority of smokers (46.55%) and alcohol drinkers (40.16%) were in the lower-middle income group. A large proportion of the respondents had tertiary education (64.82%), followed by those with secondary (30.40%) and primary education (4.77%). The majority of smokers had secondary education (50.02%), whilst a large percentage of alcohol drinkers had tertiary education (77.17%). About half of the respondents

Table 1: Sample statistics of smoking and alcohol drinking by variables in the statistical model

Variables	Percentage or mean (SD)*		
	Those who smoked (n = 58)	Those who drank alcohol (n = 127)	Total sample (n = 398)
Age	35.34 (11.66)	35.06 (12.95)	36.56 (13.59)
Gender			
Male	91.38	62.99	44.22
Female	8.62	37.01	55.78
Ethnicity			
Malay	58.62	7.09	37.94
Chinese	20.69	70.08	40.95
Indian/others	20.69	22.83	21.10
Marital status			
Married	46.55	37.01	49.75
Unmarried	53.45	62.99	50.25
Income			
Low	25.86	25.20	32.16
Lower-middle	46.55	40.16	44.97
Upper-middle	24.14	26.77	18.59
High	3.45	7.87	4.27
Education			
Primary	1.7	2.36	4.77
Secondary	50.02	20.47	30.40
Tertiary	48.28	77.17	64.82
Family illnesses			
Yes	53.45	51.97	50.50
No	46.55	48.03	49.50

Note: *For age variable, the value refers to mean (standard deviation). For other variables, the value refers to percentage.

in the entire sample had history of serious family illnesses (50.50%).

LOGISTIC REGRESSION ANALYSIS OF SMOKING AND ALCOHOL DRINKING

In terms of goodness-of-fit, the LR χ^2 for both smoking and alcohol drinking models had a p-value of less than 0.05. Hence, the null hypothesis can be

rejected, and this concludes that both of the models were very well fitted. In addition, the Pearson χ^2 for smoking and alcohol drinking models had a p-value of more than 0.05. Thus, the null hypothesis was unable to be rejected, further indicating that both of the models fitted the data well (Table 2 and 3). The correlation coefficients between income and education variables were

Table 2: Results of the logistic regression analysis of smoking

Variables	Odds Ratio	95% CI	Z-statistic	P-value
Age	0.995	0.957, 1.034	-0.280	0.782
Gender				
Male	26.678	9.637, 73.854	6.320	<0.001
Female	1.000	–	–	–
Ethnicity				
Malay	1.000	–	–	–
Chinese	0.177	0.071, 0.438	-3.740	<0.001
Indian/others	0.331	0.139, 0.783	-2.510	0.012
Marital status				
Married	0.410	0.164, 1.022	-1.910	0.056
Unmarried	1.000	–	–	–
Income				
Low	1.000	–	–	–
Lower-middle	1.637	0.707, 3.789	1.150	0.250
Upper-middle	2.151	0.767, 6.037	1.460	0.146
High	1.977	0.306, 12.789	0.720	0.474
Education				
Primary	0.415	0.040, 4.275	-0.740	0.460
Secondary	1.000	–	–	–
Tertiary	0.258	0.111, 0.602	-3.130	0.002
Family illnesses				
Yes	1.618	0.799, 3.280	1.340	0.182
No	1.000	–	–	–
LR χ^2 (11)	105.660			
P> χ^2	<0.001			
Pearson χ^2 (327)	309.000			
P> χ^2	0.755			

Note: CI refers to confidence interval and LR refers to likelihood ratio.

less than 0.8, thus suggesting that there was no serious multicollinearity problem in the models (Studenmund 2006) (Table 4).

The results illustrate that the males had higher odds of smoking (OR: 26.678) and drinking alcohol (OR: 5.051) than the females. On one hand, Chinese (OR: 0.177) and Indians/others (OR: 0.331) were found to have a lower

likelihood of smoking than Malays. On the other hand, Chinese (OR: 37.796) and Indians/others (OR: 10.863) had a higher likelihood of consuming alcohol relative to Malays. The present study found that married individuals had lower odds of drinking alcohol than unmarried individuals (OR: 0.380). In terms of education, individuals with tertiary education are found to have

Table 3: Results of the logistic regression analysis of alcohol drinking

Variables	Odds Ratio	95% CI	Z-statistic	P-value
Age	0.971	0.943, 1.000	-1.960	0.050
Gender				
Male	5.051	2.744, 9.295	5.200	<0.001
Female	1.000	–	–	–
Ethnicity				
Malay	1.000	–	–	–
Chinese	37.796	15.715, 90.901	8.110	<0.001
Indian/others	10.863	4.462, 26.447	5.250	<0.001
Marital status				
Married	0.380	0.193, 0.746	-2.810	0.005
Unmarried	1.000	–	–	–
Income				
Low	1.000	–	–	–
Lower-middle	0.834	0.425, 1.635	-0.530	0.597
Upper-middle	1.654	0.719, 3.805	1.180	0.236
High	1.482	0.390, 5.626	0.580	0.563
Education				
Primary	0.460	0.100, 2.127	-0.990	0.321
Secondary	1.000	–	–	–
Tertiary	1.146	0.541, 2.428	0.350	0.723
Family illnesses				
Yes	1.540	0.876, 2.707	1.500	0.134
No	1.000	–	–	–
LR χ^2 (11)	168.560			
P> χ^2	<0.001			
Pearson χ^2 (327)	346.990			
P> χ^2	0.218			

Note: CI refers to confidence interval and LR refers to likelihood ratio.

a lower probability of smoking than their counterparts with only secondary education (OR: 0.258).

DISCUSSION

The present study found that gender, ethnicity and education can significantly affect smoking. In particular, males, Malays and individuals with secondary

education had a higher likelihood of smoking compared to others. In terms of alcohol, gender, ethnicity and marital status were found to have a significant influence on the likelihood of alcohol drinking. Specifically, males, Chinese, Indians, individuals from other ethnic backgrounds and unmarried individuals were more likely to consume alcohol than others.

Table 4: Correlation coefficients between income and education variables

Variables	Low	Lower-middle	Upper-middle	High
Primary	0.174 (0.001)	-0.084 (0.094)	-0.077 (0.127)	-0.047 (0.347)
Secondary	0.200 (0.001)	-0.016 (0.757)	-0.147 (0.003)	-0.140 (0.005)
Tertiary	-0.270 (0.001)	0.053 (0.296)	0.176 (0.001)	0.156 (0.002)

Note: P-value in parentheses.

The findings of the present study showed that gender plays a significant role in affecting smoking as males have a higher likelihood of smoking than females, which lends support to those of Bilgic et al. (2010) based on the Turkish Household Expenditure Survey and Lin (2010) using a nationwide panel data of Taiwan. Also, the present study found significant gender differences in alcohol consumption as males were more likely to consume alcohol than females, which is consistent with the findings of previous studies (Manrique & Jensen 2004; Yuan & Yen 2012; Redonnet et al. 2012). The differences in risk and social preferences across gender may be a plausible explanation for these outcomes (Croson & Gneezy 2009). In actual fact, females are more risk averse and socially sensitive than males. Since smoking and alcohol consumption are risky health behaviours, women tend to avoid them. Furthermore, smoking and alcohol consumption by females are less acceptable to the society than males (Cheah 2012). Thus, females who are sensitive to social cues, are less likely to smoke and drink alcohol than males. In light of these phenomena, public health authorities are suggested to pay special attention to reducing smoking

and alcohol drinking among males. For example, public health authorities can use nationwide health awareness campaigns to advertise the information about the harmful effects of smoking and alcohol drinking on men’s health, such as, erectile dysfunction and low sperm count.

The present study found a significant impact of ethnicity on smoking and alcohol drinking, which supports the findings of previous studies conducted in Malaysia (Tan et al. 2009a; Tan et al. 2009b; Tan 2012; Cheah & Naidu 2012). Comparing among the ethnic groups, Malays were found to have the highest likelihood of smoking, whereas Chinese have the highest propensity to consume alcohol. This is likely attributable to the cultural and socioeconomic differences across ethnic groups. For instance, Malays (Muslims) in Malaysia are strictly prohibited from consuming alcohol because of their Islamic religious background, whereas Chinese often incorporate alcohol in their traditional festivals and celebrations. The main implication of this finding is that public health authorities should focus primarily on Malay and Chinese ethnic groups. As a measure towards reducing smoking and alcohol

drinking among Malays and Chinese, respectively, a successful policy should use spokespersons from Malay and Chinese ethnic groups, as well as language-based mass media, such as, radio, newspaper and magazine to highlight the adverse effects of smoking and alcohol consumption on health.

In line with the findings of Zhao and Harris (2004), married individuals are less likely to consume alcohol than unmarried individuals. The study drew on the Australian National Drug Strategy Household Surveys to explore the factors associated with household purchase decisions of several types of drugs, such as, marijuana, alcohol and tobacco, and found married individuals to be 1.1% less likely to consume alcohol than single individuals. A plausible factor that can explain such finding is that married individuals have more family commitments than their unmarried counterparts, and also often carry more responsibilities to look after their family (Cheah 2013). Hence, they are generally more aware of their health and the risks of unhealthy lifestyle than unmarried individuals. Besides, married individuals also tend to play a good healthy role model as they do not want their children to engage in unhealthy behaviours.

Education is found to be significantly correlated to smoking. This finding is consistent with those of Yen (2005), Aristei & Pieroni (2008), Bilgic et al. (2010) and Lin (2010) that higher educated individuals are less likely to smoke than lower educated individuals. Perhaps, this is because education can improve health by enhancing individuals' health knowledge (Grossman 1972; Kenkel

1991). Well-educated individuals tend to be aware of the harmful effects of smoking on health, thus, they are likely to avoid smoking. Another plausible rationale is that a high level of education is associated with a low rate of time preference (van der Pol 2011). Individuals' with a lower rate of time preference tend to be more patient and future oriented than individuals' with a higher rate of time preference, and consequently have a lower likelihood of indulging in unhealthy behaviours (van der Pol 2011). In terms of policy implication, government should urgently introduce a nationwide health education programme with a focus on the less-educated segment of the population. In particular, the programme should provide workshops and seminars to educate the public about the risks and disadvantages of smoking.

Given the budget, time and geographical constraints, the present study had two inherent limitations. First, the collected sample could not represent the Malaysian populations as a whole. Hence, the findings may not be able to be generalised to the entire country. Second, several important variables, such as, household size and employment status could not be included for analysis. A future study is, therefore, suggested to seek data that can overcome these limitations when examining the factors affecting smoking and alcohol consumption in Malaysia.

CONCLUSION

Drawing on a cross-sectional sample of adults in Penang (Malaysia), the present

study has thrown new light on the factors associated with smoking and alcohol drinking. The present study has found socio-demographic factor to be able to influence individuals' decision to smoke and drink alcohol. The findings of the present study appear to have an important implication for the Ministry of Health Malaysia in terms of formulating population-based intervention measures.

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