

ORIGINAL ARTICLE

DO ADOLESCENTS OVERESTIMATE THE PREVALENCE OF SMOKING AMONG THEIR PEERS? FINDINGS FROM A STUDY IN PETALING DISTRICT, SELANGOR, MALAYSIA

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ABSTRACT

Adolescents who overestimate the prevalence of smoking among their peers or other teens are at higher risk to take up smoking. The purpose of this study is to elucidate the factors which are related to adolescents' overestimation of smoking. We surveyed four (16 years old) students in Petaling District, Selangor. A sample was selected using two-stage stratified sampling, and data were collected using standardised, self-administered questionnaires. A response rate of 80.4% (n=1045/1298) was obtained, and a total of 943 students were included in the final analysis. About 73 percent (n=688/943) of the respondents overestimated the prevalence of smoking among their peers. The odds of overestimating increased as the number of close friends who smoke increased [Two close friends, OR=3.10(1.67-5.75), three close friends OR=10.81(4.44-26.3) and four-five close friends OR= 12.91(5.31-31.43)]. Those who had an elder brother who smoked (OR=1.95 (1.18-3.24)) and females [2.08(1.37-3.33)] were more likely to overestimate peer smoking prevalence. Intervention programmes to correct the misperception of peer smoking prevalence are recommended, in addition to measures to modify the other factors that are amenable to intervention, so as to reduce the risk of smoking initiation among adolescents.

Key words: Overestimation of peer smoking, adolescents, Petaling District, Malaysia.

INTRODUCTION

It is well-established that smoking contributes to numerous diseases and deaths. Smoking-related diseases have been the main causes of morbidity and mortality in Malaysia since the 1980s¹. Adolescence is a critical period for initiating smoking. Eighty percent of adult American and British smokers interviewed began smoking during adolescence^{2,3}. Thus, studies on the factors that cause adolescents to initiate smoking are crucial.

Studies conducted earlier have revealed that a relationship exists between overestimation of peer smoking prevalence and adolescents smoking. Perceived high prevalence of peer smoking increase the risk of smoking initiation among adolescents^{4,5}. These perceptions contribute to smoking experimentation initially and then progression to being a regular smoker ultimately^{6,7} and act as a mediator to smoking initiation among adolescents^{8,9}. Applying the Theory of Reasoned Action¹⁰ to the initiation of smoking habit among adolescents,

smoking initiation is influenced by behavioural intent to smoke, which in turn are influenced by attitude and perception that smoking is prevalent among their peers.

Adolescents tend to overestimate the smoking prevalence among their peers^{8,9,11}. Therefore, correcting this overestimation might contribute to reducing future smoking initiation among adolescents. Research in developed countries identified that being a smoker^{12,13}, having close friends^{10,11,13} and family members who smoke¹¹, poor academic achievement¹³ and gender^{13,14,15} influence the overestimation of peer smoking prevalence.

In Malaysia, however, prevalence of overestimation of peer/other teens smoking and its associated factors have not been given due attention. This study aims to provide some information on overestimation of smoking prevalence among peers and factors related to it.

MATERIALS AND METHOD

Study design

A sample of form four students were selected using two-stage stratified proportionate to size sampling. The first stage consisted of selecting secondary schools from five zones namely Puchong/Seri Kembangan, Shah Alam, Petaling, Damansara and Subang. Three schools were selected randomly from each respective zone of Subang, Petaling and Damansara. Four schools were selected randomly from Puchong/Seri Kembangan and another 2 from Shah Alam, adding up to a total of 15 schools selected. The second stage consisted of selecting a sample of form four students from the selected schools by simple random sampling using random numbers generated by Epilinfo software version 6.04d. A total of 1300 male and female students were selected. The number of students selected was proportionate to the total number of students in each school. Details of the sampling method have been published previously¹⁶.

Study instrument

A validated self-administered questionnaire comprised of two sections was used. The first section consisted of questions on socio-demographic characteristics, smoking status, number of cigarettes smoked per day, age started smoking, academic performance, percentage of close friends and peer/cohorts who smoke, and father and elder brother's smoking status^{17,18}. The second section assessed the overestimation of peer smoking prevalence¹¹.

Data collection

A briefing was given prior to administration of the questionnaire where the importance and objectives of the study were explained in detail. The principal investigator or a trained research team member clarified each item in the questionnaire. Participation in the study was voluntary and those who agreed to participate were asked to sign a consent form. Anonymity was assured by the researchers. Students were not required to disclose their names or any other information that would reveal their identity. No school staff or teachers were present at the venue (school hall/ class rooms) at the time the study was conducted. The study protocol had been approved by the Malaysian Ministry of Education and the Selangor State Education Department prior to data collection.

Measurements

Smoking status was categorized into current smoker

and non-current smoker. Current smoker is defined as those who smoked at least once in the last 30 days² while non current smokers consist of former smokers (who had taken at least a puff on a cigarette but had stopped smoking during the past one month) and never smokers. Academic performance was assessed based on the students' achievement in the Lower Secondary Assessment (PMR) they had sat for in the previous year. The academic achievement was classified into four categories (excellent, good, fair and poor) based on the grades they obtained. Percentage of close friends who smoked was measured by the question "Out of five of your closest friends, how many of them smoked?" Family smoking status was evaluated by asking respondents "Does your elder brother/s smoke?" and "Does your father smoke?"

The overestimation of peers who are current smokers was assessed by the following question: "In your opinion, how many of your peers smoke?" The response options for students to choose were categorically given (in 10% point ranges): 0-10%, 11-20%, 21-30%, 31-40%, 41-50%, 51-60%, 61-70%, 71-80%, 81-90% or 91-100%. The actual prevalence of smoking in the study area was 14.1%. Those who selected the range (11-20%) containing the actual prevalence and one range above (21-30%) were classified as "Non overestimator", Those who choose more than one range above (31-40%, 41-50%, 51-60%, 61-70%, 71- 80%, 81-90% , 91-100%) were classified as "Overestimator". This method was adopted from Reid et al¹¹.

Data analysis

The Chi square test were performed to determine associations between categorical independent variables (gender, smoking status, percent of close friends who smoked, academic achievement, family smoking status) and overestimation of smoking prevalence. In order to determine the effect of independent variable on the overestimation of peer smoking, multivariable analysis was carried out using back-ward likelihood logistic regression, The final model showed that, number of close friends smoking, brother who smoked and gender were all associated with overestimation of peer smoking. The fit of the final model was checked using Hosmer-Lemeshow Goodness of Fit test. A non significant p-value (0.365) indicated that the model had good fit. Tests for possible two-way interactions (Gender x number of close friends who smoked, gender x brother who smoked, brother who smoked x number of closed friends who smoked) in the final model showed there were no

significant interactions. All analyses were done using SPSS version 11.5 at 95% confidence level.

RESULTS

Profile of respondents

A total of 1045 out of 1300 students responded, consisting of 52.8% (n=552) male and 47.1% (n=493) female giving a response rate of 80.4%. Reasons for non-response were: refusal to participate, absent from school at time of study and attending concurrent a sports event. Of the 1045 respondents, 102 respondents were excluded from the analysis due to incomplete information given by respondents and final analysis was done on 943 respondents.

Prevalence and factors associated with overestimation

Out of the 943 respondents, 73.04 (n=688) overestimated their peer smoking prevalence. The prevalence of overestimation among female students (73.9%) was higher than among male students (72.3%), but this difference was not statistically significant (p=0.600). Smoking status, number of close friends who smoke, father's smoking status, elder brother's smoking status and academic achievement were significantly associated with overestimation of peer smoking. Among these variables, number of close friends who smoke showed the highest association with overestimation of peer smoking ($\chi^2=147.49$, p<0.001) (Table 1).

Table 1. Factors associated with overestimation of peer smoking

Variable	Overestimation of prevalence rate of smoking among peers		χ^2 Value	p value
	Yes n(%)	No n(%)		
Smoking status (n= 938)				
Non smoker	561(70.0)	240(30.0)	23.01	<0.001
Current smoker	127(89.4)	15(10.6)		
Academic achievement (n= 896)				
Excellent	167(63.5)	96(36.5)	17.65	0.001
Good	148(74.4)	51(23.6)		
Moderate	50(74.6)	17(25.4)		
Poor	287(78.2)	80(21.8)		
Number of close friends who smoke (n=938)				
One	263(55.7)	209(44.3)	147.49	<0.001
Two	117(81.8)	26(18.2)		
Three	139(93.3)	10(6.7)		
Four-Five	164(94.3)	10(5.7)		
Gender (n=942)				
Male	366(72.3)	140(27.7)	0.28	0.60
Female	322(73.9)	114(26.1)		
Father smoked (n=943)				
Yes	413(70.1)	176 (29.9)	6.41	0.011
No	275(77.7)	79(22.3)		
Elder brother smoked(n=933)				
Yes	280(69.3)	115(30.7)	21.78	<0.001
No	176(86.6)	27(13.4)		

Multivariable analysis showed that respondents who had more than one close friend, had an elder brother who smoked and females were more likely

to overestimate prevalence of peer smoking, after the effect of other independent variables were controlled for (Table 2).

Table 2. Factors associated overestimation of peer smoking (Multivariate model)

Variable	Crude Odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Smoking status		
Non smoker	1	
Current smoker	3.62(2.08-6.32)	
Academic achievement		
Excellent	1	
Good	2.06(1.45-2.93)	
Moderate	1.69(0.93-3.10)	
Poor	1.67(1.11-2.50)	
Number of close friends who smoke		
One	1	1
Two	3.58(2.25-5.68)	3.10(1.67-5.75)
Three	11.05(5.67-21.52)	10.81(4.44-26.3)
Four-Five	13.03(6.71-25.31)	12.91(5.31-31.43)
Gender		
Male	1	1
Female	1.08 (0.81-1.45)	2.08(1.37-3.33)
Father Smoked?		
Yes	1.48(1.09-2.22)	
No	1	
Elder brother smoked		
No	1	1
Yes	2.87(1.81-4.55)	1.95(1.18-3.24)

Hosmer Lemeshow $\chi^2 = 8.85$ $df=8$ $p=0.356$.

DISCUSSION

Our study reveals that a majority of the respondents overestimated peer smoking prevalence. The prevalence of overestimation reported in this study is higher than among American adolescents' rate of 43%¹⁴ (Unger & Rohrbach, 2002), and lower than 78% and 80% prevalence of overestimation reported by in Reid *et al.* (2008)¹¹ in their study among Canadian adolescents in 2008 and Franca *et al.* (2010)¹⁵. The finding in this study which reveal that females is tend to overestimation of peer smoking is consistent with the finding reported by Unger and Rohrbach (2002)¹⁴ and reported by Franca *et al.* (2010)¹⁵ in France.

Our findings show that close friends smoking is highly associated with overestimation of peer smoking. Adolescents with more than one close friend who smoke tend to overestimate their peers' smoking prevalence. This is consistent with reports by Reid *et al.* (2008)¹¹ Sussman *et al.* (1988)¹², Lai *et al.* (2004)¹³ and Unger and Rohrbach (2002)¹⁴. Magnitude of close friends influence also consistent with the finding of Unger and Rohrbach (2002)¹⁴ who reported that smoking among friends explained the largest/highest proportion of the variance (standardized beta of 0.306). The dose-response relationship of number of close friends which is increased from three to thirteen times was consistent with the same findings¹⁴ which revealed that prevalence of overestimation of peer smoking increased from 32.1% (None of close friends), 42.5%

(a few close friends smoking, 52.6% (some close friends smoking) to 66.3% (a lot of close friends smoking). This may be explained by the human cognitive process of “available heuristic” or overgeneralization effect, in which adolescents who have more than one close friend who smoke may tend to perceive it as a behavior practiced by a majority of the public, thus they tend to overestimate peer smoking⁹.

Elder brother who smoked was a significant variable after effect of other independent variables were controlled, while father’s smoking status which was significant in bivariate analysis was not significant in multivariate analysis. This finding is in contrast with Otten et al. (2008)⁹ who reported that respondents whose parents were smokers were 29% more likely to overestimate teen smoking. The finding in this study may be because adolescents have closer relationship with their brothers who are closer in age, and can better understand and communicate more effectively with them compared to their parents^{19,20,21}. The mechanism by which adolescents are influenced by their siblings is the same as that of close friends, which is through available heuristic and overgeneralisation.

The significant association between current smoking and overestimation of peer smoking in bivariate analysis diminished after effect of other independent variables were controlled in the multivariate analysis. This contradicts several previous reports which suggested that an individual would interpret social data, such as smoking, in a way that is compatible with his own behavior^{22,23,24}. However it is in agreement with findings from Reid et al.¹¹ and Unger and Rohrbach¹⁴ who reported no association between smoking behaviour among respondents with overestimation of peer smoking after effect of best friends smoking was taken into consideration. This suggests that adolescents do not make generalization or inferences about their peers based on their own behavior, but tend to assume peers’ behaviour are similar to their close friends.

Gender was also found to be a significant factor in this study. Females are at significantly higher risk of overestimating peer smoking compared to males, as reported in previous studies^{11,13,14,15}. The possible explanation for this is females tend to interpret the question of smoking among peers as smoking among males, since smoking is more common among males and rare among females in the context of Malaysia²⁵. However, further studies

from the psychosocial and cultural perspectives are recommended to explore the actual reasons for this gender difference.

Academic achievement was not significant after effect of other independent variables were controlled for. This finding contradicted the findings by Unger and Rohrbach (2002)¹⁴. This may be due to different criteria being applied to categorize academic achievements of the respondents, given that they came from different countries with different technological, developmental and cultural settings. Furthermore, the different socio-demographic backgrounds of the respondents in this study might have produced unreliable results if standardized criteria had been used. More studies to investigate the cause of the contrasting findings should yield useful information.

There were several limitations in this study. Firstly, social factors which have an effect on social norms, such as banning smoking in the home²⁶, positive attitude towards smoking, receptivity to both direct and indirect tobacco advertisements²⁷ all of which are established factors, were not included in this study. It is suggested that future studies should include these factors to strengthen the findings. Secondly, being a cross-sectional study, it can only distinguish associations between dependent and independent variables, but not to establish causation where, a longitudinal study is required. In addition we relied on self-reported smoking status for estimation of smoking prevalence using a questionnaire, and this may be susceptible to under or over-reporting. Previous studies, however, have reported on the validity of this method when anonymity is assured²⁸.

CONCLUSION

Our findings show that a majority of students overestimate the prevalence of smoking among their peers. Being female, elder brother who smoked and having more than one close friend who smoke were associated with overestimation of peer smoking. These findings suggest that appropriate interventions are necessary to encourage adolescents to have an accurate perception of the smoking rate among their peers. Interventions can include providing truthful accounts of prevalence of peer smoking and emphasis should be on those who are more likely to overestimate peer smoking prevalence.

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