ORIGINAL ARTICLE

Factors Influencing Smoking Initiation among School-Age Children and Adolescents in a Malay Settlement Village: A Cross-Sectional Study.

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Abstract

Smoking initiation among children and adolescents is a pressing global health concern. This study investigates the prevalence and factors influencing smoking initiation among school-age children and adolescents in a Malay settlement village. The research utilized a cross-sectional design and collected data from all school-going children and adolescents aged 7 to 17 in a Malay settlement village through face-to-face interviews. Smoking was defined as currently using cigarettes, vapes or both. Predictor variables were assessed using the univariate analysis followed by multivariate logistic regression analysis. Out of 187 respondents, a total of 33.7% were identified as smokers. The study revealed that peer pressure (aOR=7.0, 95% CI [2.49, 19.83]), parental permission to smoke (aOR=3.9, 95% CI [1.10, 13.88]), adults frequently asking children to buy cigarettes (aOR=3.9, 95% CI[1.68, 9.07]), and having siblings who smoke (aOR=2.7, 95% CI[1.11, 6.61]) were significant factors influencing smoking initiation. Peer influence was the most significant factor among male participants (aOR=9.3, 95% CI [2.58, 33.70]). Peer influence was found to be the most significant factor, increasing the likelihood of starting to smoke nearly seven times among all participants, and almost nine times among male participants alone when peer influence was present. Family factors, such as sibling smokers, no parental restriction and adults asking children to buy cigarettes, were among the significant factors. This study recommends stricter regulations on retailers selling cigarettes and vapes to school-aged children, preventing adults from involving children in cigarette purchases, and utilizing peer influence for targeted health education.

Keywords: *adolescent, influencing factors, peer influence, school-age children, sibling smokers, smoking initiation.*

Introduction

Smoking is a harmful habit affecting millions of people's health worldwide. Children and adolescents are the age group that is particularly susceptible to initiating smoking, partly due to their high curiosity and urge to experiment. Initiating smoking during such early years of life is associated with a range of immediate health problems and paves the way for the development of serious illnesses in later life [1]. In Malaysia, as well as in many other countries, preventing young people from smoking remains a major challenge for public health authorities. No-smoking campaigns, education programs, and law enforcement efforts have not proven sufficient to curb the attraction to smoking. In fact, many countries continue to experience an increasing trend of smoking among adolescents [2].

Reports on the prevalence of smoking among adolescents vary. The variability of the age group that each study includes is one of the main factors that affect this variation, along with geographical location and study design. According to a recent report, East Malaysia reported the highest prevalence of current smokers among adolescents (n = 1040, 25.4%), adolescents who tried a cigarette at a young age of less than 14 years old (n = 692, 26.2%) and those who had tried an e-cigarette at the age of less than 14 years old (n = 398, 27.2%)[3]. Another study on the prevalence of drugs and substance use among youth reported the prevalence of current tobacco use among those aged 15-18 years old was 6.6% [4].

Several factors contribute to this initiation, including peer pressure or peer influence [5,6], media influence [7], family environment, and personal curiosity. Peers play a crucial role in shaping adolescent behaviour, as the desire to fit in and be accepted can lead young individuals to experiment with smoking. Additionally, media portrayals of smoking as glamorous and rebellious further entice impressionable minds. Moreover, personal curiosity drives some individuals to experiment with tobacco use [8].

Smoking confers serious health risks. The initiation of smoking among children and teenagers has severe implications for their health and well-being. Smoking at an early age significantly increases the risk of developing numerous health problems, such as respiratory diseases, cardiovascular disorders, and various types of cancer. Furthermore, it sets the stage for a lifelong addiction, making it challenging to quit smoking in later years [1].

To reduce the incidence of tobacco use-related health outcomes such as cardiovascular diseases, respiratory diseases, and premature death in adulthood, it is crucial for precise public health intervention to prevent the initiation of smoking at such a young age. By addressing these factors, public health authorities can work towards protecting children and adolescents from the harmful effects of tobacco and promoting healthy choices.

This cross-sectional study investigates the factors influencing the likelihood of smoking among the school-age group in a Malay settlement village in Larut Matang and Selama District.

This research contributes valuable insights into understanding and addressing smoking initiation among school-age children and adolescents in the context of a Malay settlement village, highlighting the need for comprehensive strategies to combat this serious public health issue.

Methodology

This research employed an analytical cross-sectional design to investigate the prevalence of smoking initiation among children and adolescents and explore potential predictors of childhood and adolescent smoking. The study was conducted within the context of the Field Residential Program (FRP) involving third-year medical students, situated in a village approximately 16 kilometres away from Taiping Town in the Larut Matang and Selama District,

and about 45 km from Ipoh City, the capital of Perak State. During this program, students resided within the community and conducted Rapid Rural Assessments to identify community health concerns as part of their medical school curriculum.

The study's participants ranged in age from 7 to 17 years old. Given that the study was conducted in a small settlement village comprising 230 households, all individuals within the specified age group were included in the research. Details of the study were explained to parents or guardians and respondents, and informed consent was obtained from them. The study exclusively involves respondents who have provided their consent. Both parents and respondents are guaranteed confidentiality, with the assurance that the information will be used exclusively for academic purposes.

Data collection was accomplished through the use of a pre-tested questionnaire, and the interviews were conducted face-to-face. With parental consent, medical students conducted interviews with the participants in informal settings, most often during recreational activities co-organised together with the local community. This is expected to minimise the bias due to Hawthorn effects. A smoker is defined as using cigarettes, vapes or both, including other tobacco products, and still smoking during the survey.

The predictor variables investigated were the demographic characteristics, the family factors, and the respondent's factors. Demographic factors are the age groups which fall into three categories, i.e., primary, lower secondary and upper secondary age groups, schooling status, gender, and parent's occupation. Family factors investigated were smoker parents, smoker siblings, parents allowing them to smoke, and adults frequently asking them to buy cigarettes on their behalf, The respondents' factors explored were being pressured or influenced by others and their perceptions about smoking. They were asked whether smoking is cool, whether smoking can relieve stress, and whether smoking shows rebellion or independence.

Statistical analyses were performed using RStudio version 2023.06.1+524 (Mountain Hydrangea). We initially conducted a univariate analysis to investigate the factors linked to smoking among the study participants. The chi-square test was used to assess the association between categorical predictor variables and the categorical outcome variable (smoker or non-smoker). We employed simple logistic regression to determine the predictors' crude odds ratio (cOR). Subsequently, a multiple logistic regression model was employed in a multivariate analysis to delve into the predictors of smoking, taking into account the interplay between various predictor variables and their impact on the likelihood of becoming a smoker. The multivariate analysis model included predictor variables with a p-value <0.25 from the univariate analysis. The p-value of <0.05 is considered significant. Hosmer-Lemeshow tested the best-fitted models for goodness-of-fit and ROC for the accuracy of the model. A similar analysis was performed for the sub-group of males only. Sub-analysis for females was not conducted due to small sample size.

Results

Based on the initial community survey in this village, there was a total of 189 eligible school-age respondents between 7 and 17 years old. About 187 voluntarily participated in this study, resulting in a 98.9% response rate. Of these respondents, 33.7% (63 individuals) were smokers, and 66.3% (124 individuals) were non-smokers. This indicates the smoking prevalence among the school-age group in this village was 33.7%.

The demographic profile of the respondents

The ratio of female to male was 1:1.4. About half (50.8%) of the participants were in the primary school age group, between 7-12 years old, and the remainder were in the secondary school age group. Six of them dropped out of school. Most of their fathers were self-employed, while 11.8% were

unemployed. More than half of their mothers were unemployed and self-employed. The remainder were either working in the government sector or the private sector.

The chi-square test shows a significant association between smoking and gender ($p < 0.05$), and the age group of primary or secondary school-going age groups ($p < 0.05$) (Refer to Table 1); however, no significant association between paternal or maternal employment with the smoking status.

The majority of smokers were either vaping or using both vaping and cigarettes, with 55.6% and 25.4% respectively (refer to Table 1).

The predictors of smoking

Model 1: The full model includes all respondents.

In the univariate analysis, significant predictors included being male (cOR=9.2), peer pressure or influence, including influence from smoker siblings (cOR=7.4), parents allowing to smoke (cOR=3.7), having smoker siblings (cOR=2.9), age-groups whether they were in primary school, lower secondary (cOR=2.2) or upper secondary (cOR=2.8), adults asking to buy cigarettes (cOR=3.8), and perceiving smoking as cool (cOR=3.5) (refer to Table 2).

However, in the final multivariate logistic regression model, with an overall model accuracy of 86.2% (AUC=0.862), five factors showed statistical significance, i.e. being male (aOR=8.9), peer pressure or influence to smoke by their peers (aOR=7.0), parents allowing smoking (aOR=3.9), adults frequently asking them to buy cigarettes (aOR=3.9), and having smoker siblings s (aOR=2.7) (refer to Table 2).

Model 2: Sub-analysis of male respondents

The univariate analysis among the male respondents showed the significant predictors were age group of lower secondary and upper secondary school (cOR=3.0 and 3.3 respectively), their siblings are smokers (cOR=3.8), adults asking them to buy cigarettes(cOR=3.5) and peer pressure (aOR=8.2).

In the final multivariate logistic regression model, with an overall model accuracy of 80.8% (AUC=0.808), three factors show the strongest predictors among the male respondents; peer pressure (aOR=9.3, 95%CI[2.58, 33.70]), adults asking them to buy cigarettes(aOR=4.2, 95% CI [1.57, 11.16]), and if their siblings are smokers (aOR=4.6, 95% CI [1.52, 13.90]) (refer to Table 3).

Discussion

Smoking among school-age children is a serious public health issue in this small Malay settlement village. The smoking rate among secondary school children and adolescents in this village exceeds the national average of 15.9% (95% CI: [14.72,17.26]) [9], indicating a potential epidemic problem that requires immediate intervention. Some children start smoking as young as in primary school. Although a direct comparison is not feasible, the higher prevalence in a small area like this small village showed the magnitude of epidemic phenomena that should grant a serious intervention. This study and other reports showed that most smokers were males, although smoking among females is also prevalent [9–11].

The primary factors influencing the smoking behaviour of children and teenagers in this village included peer pressure or influence from friends, parental permission, adults frequently asking them to buy cigarettes, and having smoking siblings. Many studies showed that peer pressure or influence plays a key role in starting or increasing smoking among adolescents [5,6,12,13]. Similarly, in this study, peer pressure or influence emerged as the strongest predictor, significantly affecting the odds of smoking among these school-age groups. When peer pressure and influence were present, the odds of smoking among all school-going age groups increased by sevenfold, and among the males alone increased by ninefold compared to when it was absent.

Another most persistently relevant factor is tobacco use among parents. Parents who smoke were said to be one of the factors influencing them to smoke [14]. Research has shown that

smokers who are parents can significantly predict the initiation of smoking among their children and adolescents. Children growing up in households where one or both parents smoke are more likely to be exposed to tobacco use and may lead them to perceive smoking as a normative behaviour. Having smoking role models within the family increases the likelihood of experimentation and initiation of smoking at a young age[15,16]. In contrast to this study's findings, there was no significant association if their parents were smokers; however, the odds of smoking among males were almost 5-fold if their siblings were smokers. Additionally, the odds of smoking were almost 4-fold if adults frequently asked them to buy cigarettes on their behalf. This showed that exposure to smoking within the family environment is a major factor leading to smoking initiation in this village at a very young age, consistent with other reports [18].

Selling cigarettes to the underage is a violation of the law that prohibits the sale of tobacco products to anyone under 18 years old, as specified in the tobacco control regulation [19]. The ability of children and adolescents to access cigarettes highlights the need to strengthen the enforcement strategy in the village setting. Shopkeepers who refuse to sell tobacco to adolescents can play a crucial role in protecting them from smoking initiation, as they would not have access the tobacco or vapes [20].

Some studies reported that smoking can make individuals feel more confident, and cool, and can relieve stress [21]. However, this study did not show a similar view among the respondents.

Conclusion and recommendation

In this Malay settlement village, the prevalence of smoking among the school-age group is alarmingly high. The primary factors contributing to this trend are peer influence, adults asking them to purchase cigarettes, and having siblings who smoke. Furthermore, the lack of parental prohibition against smoking also plays a significant role.

We recommend the authorities enforce stricter regulations on retailers selling cigarettes and vapes to school-aged children and take measures to prevent adults from involving children in the purchase of cigarettes on their behalf. Given that peer influence is the most significant factor, it could be utilized as a means to deliver targeted health education more effectively by positively reinforcing this influence. This approach should also address the issue of siblings who smoke.

Strength and limitation of the study

The advantage of this study lies in its informal setting, which we believe fostered a stronger rapport with the participants, encouraging them to respond more sincerely to the questions. Another strength is the inclusion of all eligible respondents, which allowed for a more accurate estimate of smoking prevalence.

However, there were limitations related to the study design. A case-control study would have been a more suitable design for this type of research, as it provides stronger estimates of risk measures.

Conflict of interest

This study did not receive additional funding besides the Field Residential Program stipend for the students. We declare there is no conflict of interest.

Ethical approval

This study is approved under the UniKL-RCMP ethical committee.

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medical students from the 2022-2023 FRP group in Taiping.

Table 1. The characteristics of the respondents

Variables	Total		Smoker		Non-smoker		Chi-Square	*p*-value
	n	(%)	n	(%)	n	(%)		
Gender								
Male	108	57.6	55	87.3	53	42.7	33.998	**<0.01***
Female	79	42.3	8	12.7	71	57.3		
Age group (years)								
7-12 (Primary school)	95	50.8	23	24.2	72	75.8		
13-15 (lower secondary school)	58	31.0	24	41.4	34	58.6	8.077	**0.018***
16-17 (Upper secondary school)	34	18.2	16	47.1	8	52.9		
Paternal employment								
Employed	164	88.2	56	34.2	108	65.9	0.412	0.521
Unemployed	22	11.8	6	27.3	16	72.7		
Maternal employment								
Employed	88	47.1	31	35.2	57	64.8	0.176	0.675
Unemployed /housewife	99	52.9	32	32.3	67	67.7		
Schooling								
Still schooling	181	96.8	61	33.7	120	66.3	0.000	0.985
School dropped-out	6	3.2	2	33.3	4	66.7		
Type of cigarette use								
Cigarette only			12	19.1				
Vape only			35	55.6				
Cigarette and vape			16	25.4				

*p-value <0.05 is significant.

Table 2. The univariate and multivariate analysis (Model 1) of factors influencing smoking among all school-going age groups in a Malay settlement village in LMS District, Perak

Variables	Total N=187	Univariate Logistic Regression crude OR (95% CI)	*p*-value	Multivariate Logistic Regression adjusted OR (95% CI)	*p*-value
Gender					
Female	79	1		1	
Male	108	9.2 (4.05 , 20.97)	**<0.001***	8.9 (3.43 , 23.02)	**<0.01****
Age group (years)					
7-12 (Primary school)	95	1			
13-15 (lower secondary school)	58	2.2 (1.10 , 4.46)	**0.027***		
16-17 (Upper secondary school)	34	2.8 (1.22 , 6.32)	**0.015***		
Smoker parents					
No	66	1			
Yes	121	1.6 (0.82 , 3.04)	**0.172***		
Smoker siblings					
No	141	1		1	
Yes	46	2.6 (1.44 , 5.67)	**0.003***	2.7 ((1.11 , 6.61)	**0.028****
Parents allow smoking					
No	171	1		1	
Yes	16	3.7 (1.28 , 10.74)	**0.016***	3.9 (1.10 , 13.88)	**0.035****
Adults asked to buy cigarette					
No	86	1		1	
Yes	101	3.8(1.95 , 7.44)	**<0.001***	3.9 (1.68 , 9.07)	**0.002****
Peer Pressure or influence, including by siblings					
No	155	1		1	
Yes	32	7.4 (3.14 , 17.20)	**<0.001***	7.0 (2.49 , 19.83)	**<0.01****
Perception					
a. Smoking is cool					
No	160	1		1	
Yes	27	3.5 (1.51 , 8.10)	**0.003***	2.1 (0.72 , 6.14)	0.172
b. Smoking help coping stress					
No	149	1			
Yes	38	1.8 (0.88 , 3.75)	**0.109***		
c. Smoking shows rebellion or independency					
No	122	1			
Yes	63	0.7 (0.34 , 1.26)	**0.207***		

Note: OR=1 indicates reference group; CI, confidence interval; OR, Odds ratio; * Variables significant at p< 0.25 following univariate analysis were included in multivariate analysis. Forward stepwise was used for variable selection; ** Significant level is set at p<0.05 following multivariate analysis. Hosmer-Lemeshow goodness-of-fit test chi-square= 2.18 (df=6), p=0.903. AUC=0.862

Table 3. The univariate and multivariate analysis (Model 2) of factors influencing smoking among male school-going groups in a Malay settlement village in LMS District, Perak

Variables	Total	Univariate Logistic Regression		Multivariate Logistic Regression	
	N=108	Crude OR (95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Age group (years)					
7-12 (Primary school)	52	1		1	
13-15 (lower secondary school)	33	3.0 (1.23 , 7.52)	**0.016***		
16-17 (Upper secondary school)	23	3.3 (1.17 , 9.10)	**0.024***	1.7 (0.94 , 3.12)	0.077
Parent smokers					
No	43	1			
Yes	65	2.2 (0.98 , 4.72)	**0.056***		
Siblings smokers					
No	78	1		1	
Yes	30	3.8 (1.49 , 9.46)	**0.005***	4.6 (1.52 , 13.90)	**0.007****
Parents allow smoking					
No	98	1			
Yes	10	2.4 (0.59 , 9.95)	**0.217***		
Adults asked to buy cigarette					
No	45	1		1	
Yes	63	3.5 (1.56 , 7.78)	**0.002***	4.2 (1.57 , 11.16)	**0.004****
Peer Pressure (friends including siblings)					
No	82	1		1	
Yes	26	8.2 (2.58 , 25.87)	**<0.01***	9.3 (2.58 , 33.70)	**0.001****
Perception					
a. Smoking is cool					
No	88	1			
Yes	20	2.0 (0.74 , 5.58)	**0.168***		
b. Smoking help coping stress					
No	85	1			
Yes	23	2.1 (0.81 , 5.50)	**0.127***		
c. Smoking shows rebellion or independency					
No	81	1			
Yes	27	1.3 (0.53 , 3.07)	0.579		

Note: OR=1 indicates reference group; CI, confidence interval; OR, Odds ratio; * Variables significant at p< 0.25 following univariate analysis were included in multivariate analysis. Forward stepwise was used for variable selection; ** Significant level is set at p<0.05 following multivariate analysis. Hosmer-Lemeshow goodness-of-fit test chi-square= 10.71 (df=6), p=0.218. AUC=0.808

References

[1]. Office of the Surgeon General and National Center for Chronic Disease Prevention and Health Promotion (US). Preventing tobacco use among youth and young adults: A report of the surgeon general. US Government Printing Office; 2012.

[2]. Ma C, Xi B, Li Z, Wu H, Zhao M, Liang Y, et al. Prevalence and trends in tobacco use among adolescents aged 13–15 years in 143 countries, 1999–2018: Findings from the global youth tobacco surveys. The Lancet Child & Adolescent Health. 2021;5(4):245–55.

[3]. Mushaddik IL, Khalid K, Anuar A, Che Hat SZ, Jamaluddin R. Lifestyle practices and mental health in adolescents: Explorative analysis from Malaysian Health and Morbidity Survey 2017. Adolescents. 2022;2(4):459–65.

[4]. Ismail R, Abdul Manaf MR, Hassan MR, Mohammed Nawi A, Ibrahim N, Lyndon N, et al. Prevalence of drug and substance use among Malaysian youth: A nationwide survey. International Journal of Environmental Research and Public Health. 2022;19(8):4684.

[5]. East K, McNeill A, Thrasher JF, Hitchman SC. Social norms as a predictor of smoking uptake among youth: A systematic review, meta-analysis and meta-regression of prospective cohort studies. Addiction. 2021;116(11):2953–67.

[6]. Alexander C, Piazza M, Mekos D, Valente T. Peers, schools, and adolescent cigarette smoking. Journal of Adolescent Health. 2001;29(1):22–30.

[7]. Vannucci A, Simpson EG, Gagnon S, Ohannessian CM. Social media use and risky behaviours in adolescents: A meta-analysis. Journal of Adolescence. 2020;79:258–74.

[8]. Nodora J, Hartman SJ, Strong DR, Messer K, Vera LE, White MM, et al. Curiosity predicts smoking experimentation independent of susceptibility in a US national sample. Addictive Behaviors. 2014;39(12):1695–700.

[9]. IPH. National health and morbidity survey (NHMS) 2017: Adolescent health survey 2017, Malaysia. Institute for Public Health (IPH), Ministry of Health; 2017.

[10]. Radzi NAM, Saub R, Yusof ZYM, Dahlui M, Sujak SL. Socio-demographic characteristics of nicotine dependence among Malaysian adolescent smokers. Southeast Asian Journal of Tropical Medicine and Public Health. 2022;53(2):173–91.

[11]. Jafari A, Rajabi A, Gholian-Aval M, Peyman N, Mahdizadeh M, Tehrani H. National, regional, and global prevalence of cigarette smoking among women/females in the general population: A systematic review and meta-analysis. Environmental Health and Preventive medicine. 2021;26(1):1–13.

[12]. Henneberger AK, Mushonga DR, Preston AM. Peer influence and adolescent substance use: A systematic review of dynamic social network research. Adolescent Research Review. 2021;6:57–73.

[13]. Leshargie CT, Alebel A, Kibret GD, Birhanu MY, Mulugeta H, Malloy P, et al. The impact of peer pressure on cigarette smoking among high school and university students in Ethiopia: A systemic review and meta-analysis. PLoS One. 2019;14(10):e0222572.

[14]. Trucco EM, Cristello JV, Sutherland MT. Do parents still matter? The impact of parents and peers on adolescent electronic cigarette use. Journal of Adolescent Health. 2021;68(4):780–6. Available from: https://www.sciencedirect.com/science/article/pii/S1054139X20306984

[15]. Badham J, McAneney H, Dunne L, Kee F, Thurston A, Hunter RF. The importance of social environment in preventing smoking: An analysis of the dead cool intervention. BMC Public Health. 2019;19:1–7.

[16]. Tate C, Kumar R, Murray JM, Sanchez-Franco S, Montgomery SC, Montes F, et al. Socio-environmental and psychosocial predictors of smoking susceptibility among adolescents with contrasting socio-cultural characteristics: A comparative analysis. BMC Public Health. 2021;21(1):1–12.

[17]. Foo JC, Streit F, Frank J, Zachrias N, Zillich L, Sirignano L, et al. Polygenic risk scores for nicotine use and family history of smoking are associated with smoking behaviour. MedRxiv. 2022;2022–12.

[18]. Oztekin C, Batra M, Abdelsalam S, Sengezer T, Ozkara A, Erbas B. Impact of individual, familial and parental factors on adolescent smoking in Turkey. International Journal of Environmental Research and Public Health. 2021;18(7):3740.

[19]. Government M. Peraturan-peraturan kawalan hasil tembakau. Vol. 48. Government of Malaysia; 2004.

[20]. Mishu MP, Siddiqui F, Shukla R, Kanaan M, Dogar O, Siddiqi K. Predictors of cigarette smoking, smokeless tobacco consumption, and use of both forms in adolescents in South Asia: A secondary analysis of the global youth tobacco surveys. Nicotine and Tobacco Research. 2021;23(6):956–65.

[21]. Nurmansyah MI, Umniyatun Y, Jannah M, Syiroj AT, Hidayat DN. Knowledge, attitude and practice of cigarette smoking among senior secondary school students in Depok, Indonesia. International Journal of Adolescent Medicine and Health. 2019;33(2):20180124.