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Smoking Among Adolescents and Associated Factors in Rural Areas

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Abstract

Smoking among adolescents is the major health-related issues in Malaysia. However, information concerning recent smoking rates and how they correlate among adolescents in rural areas is still limited. This study aimed to determine the percentage of adolescent smokers among high school students, examine their level of nicotine dependence, and study the association between sociodemographic data and smoking status. A cross-sectional study was conducted at one of the high schools located in the rural area of Bandar Tun Abdul Razak, Pahang, Malaysia. A convenience sampling method was used to select the participants, as only Form 2 students were available during the data collection. In total, 113 respondents were recruited for the study. The data, which were collected using self-administered questionnaires were analyzed using chi-square analysis and Fisher's exact test analysis. The results showed that the prevalence of adolescent smokers among high school students was quite high (25.7%). Among the adolescent smokers, 65.5% had low nicotine dependence, and 34.5% had moderate nicotine dependence. Moreover, 21.4% of them admitted that they had tried other substances or drugs in addition to cigarettes. Peer pressure was the major factor in smoking (69.0%), followed by curiosity (27.6%), and then smoking family members' influence, stress or tension, and others (3.4% each). The only significant association ($p < 0.001$) was between gender and smoking status. These findings showed that the proportion of smokers among adolescents is increasing over the years; thus, effective strategies, such as peer advocacy of smoking cessation, may be needed among this population.

Keywords: adolescent, peer influence, rural areas, smoking, students

Abstrak

Merokok di Kalangan Remaja dan Faktor-faktor yang Memengaruhinya di Daerah Pedesaan. *Merokok di kalangan remaja adalah masalah kesehatan utama di Malaysia. Namun, informasi mengenai tingkat perokok saat ini dan korelasinya di kalangan remaja di daerah pedesaan masih terbatas. Penelitian ini bertujuan untuk mengetahui persentase remaja perokok di kalangan siswa sekolah menengah atas (SMA), mengetahui tingkat ketergantungan nikotin, dan mempelajari hubungan antara data sosiodemografi dengan status merokok. Sebuah studi* cross-sectional *dilakukan di salah satu SMA yang terletak di daerah pedesaan Bandar Tun Abdul Razak, Pahang, Malaysia. Metode* convenience sampling *digunakan untuk memilih peserta, hanya siswa* Form 2 *yang bersedia selama pengumpulan data. Sebanyak 113 responden direkrut untuk penelitian ini. Data yang dikumpulkan menggunakan kuesioner yang dikelola secara mandiri, dan dianalisis menggunakan analisis* Chi-square *dan analisis* Fisher's exact test. *Hasil penelitian menunjukkan bahwa prevalensi perokok remaja pada siswa SMA cukup tinggi (25,7%). Di antara remaja perokok, 65,5% memiliki ketergantungan nikotin tingkat rendah, dan 34,5% memiliki ketergantungan nikotin tingkat sedang. Terlebih, 21,4% di antaranya mengaku pernah mencoba zat atau obat lain selain rokok. Tekanan dari orang terdekat (teman) merupakan faktor utama dalam merokok (69,0%), diikuti oleh rasa ingin tahu (27,6%), dan pengaruh anggota keluarga yang merokok, stres atau ketegangan, dan lain-lain (masing-masing 3,4%). Satu-satunya hubungan yang signifikan ($p < 0,001$) adalah antara jenis kelamin dan status merokok. Temuan ini menunjukkan bahwa proporsi perokok di kalangan remaja meningkat dari tahun ke tahun; oleh karena itu, strategi yang efektif, seperti advokasi sejawat untuk berhenti merokok, diperlukan di kalangan populasi ini.*

Kata Kunci: *daerah pedesaan, merokok, pengaruh teman sebaya, remaja, siswa*

Introduction

Smoking among adolescents ranks among the major health-related issues in Malaysia. Multiple studies have been conducted regarding smoking among adolescents. Based on many sources, rural areas have higher smoking rates compared to urban areas. The National Health and Morbidity Survey: Adolescent Health Survey in 2017 recorded that the smoking prevalence was higher in rural areas (18.9%) compared to urban localities (13.6%) (Institute for Public Health Malaysia, 2017).

Several studies have stated that people generally begin smoking in the adolescence period when teenagers' brains are still developing (Abiola et al., 2016; Al-Naggar & Alshaikhli, 2018; Grapatsas et al., 2017; Patiño-Masó et al., 2019). In Malaysia, the prevalence of adolescents who smoke was 13.8% in 2019, which was higher than 11.5% in 2012, and most of these smokers were Malay, Muslim, and male (Ling et al., 2019; Institute for Public Health Malaysia, 2017). This percentage is quite alarming, as smoking might induce them to try other harmful substances, such as marijuana and other drugs, and they may be prone to engage in fighting and other risky behaviors in the future (World Health Organization [WHO], 2020).

In the United States, 83% of smokers began smoking before the age of 18 (Grapatsas et al., 2017). Furthermore, a study in a poor urban setting in Malaysia by Al-Naggar and Alshaikhli (2018) found that the mean age to start smoking was 11 years old. According to Abiola et al. (2016) and Patiño-Masó et al. (2019), the mean age for smoking initiation was 12 years old. According to these data, adolescents are exposed to smoking at a young age, which is a worrisome trend, as adolescents are more likely to continue smoking into adulthood once they initiate their smoking activity. This is due to nicotine dependence, which makes smoking cessation more difficult.

Other than age, gender, and race, there are many other correlates of smoking among adolescents. Cremers et al. (2014) stated that smoking is influenced by socioeconomic status (SES), as there is a higher prevalence of smoking in low SES groups, who are mostly predisposed to smoking due to the smoking habits of their father, mother, or other family members. This is complemented by the study by Lim et al. (2018), which found that individuals with higher incomes were less likely to be current smokers.

In addition, curiosity triggers high school students to take up smoking (Al-Naggar & Alshaikhli, 2018; Anjum et al., 2016). This is supported by the study of Abiola et al. (2016), which found that the adolescence period is the stage during which teenagers form their own identities and attempt to belong to a particular stratified social group. Moreover, peer influence is a factor contributing to smoking initiation (Abiola et al., 2016; Robalino & Macy, 2018). Adolescents' initiation of smoking is also caused by environmental factors, such as exposure to parents who smoke (Al-Naggar & Alshaikhli, 2018; Bobo et al., 2018; Grapatsas et al., 2017). Since parents are the closest people to adolescents from childhood onward, parents are undeniably among the most influential persons on whom teenagers model their behavior. As mentioned by Al-Zalabani (2015), family contextual factors, such as family structure, parental support, and parental supervision, also affect smoking behavior.

To summarize, more studies need to be conducted to determine the prevalence, factors, and sources of exposure to smoking among adolescents so that further prevention and treatment measures can be implemented. Early detection of adolescent smokers or adolescents who have the tendency to smoke can help us curb this emerging issue. Smoking rates among those who live in rural areas are more prominent compared to those in urban areas. Therefore, secondary school students from the rural area of Pahang, Malaysia, were chosen to participate in this study. This study adds to the pool of data regarding smoking among adolescents and

smoking in rural areas. The school examined in this study was chosen due to the school's concern about this issue and its need to obtain data regarding the prevalence of smoking at the school, as no study had yet been conducted at this school. Thus, this is the first time that a study regarding smoking was conducted in this setting. The study is also in line with the Sustainable Development Goal on "Good Health & Well-Being."

Methods

A cross-sectional study was conducted at one of the high schools located in a rural area: the Federal Land Development Authority (FELDA) settlement in Pahang, Malaysia. The FELDA is a Malaysian government agency that was founded to manage the resettlement of the rural poor in newly developed areas and to organize smallholder farms growing cash crops. A convenience sampling method was used to select the participants, as only Form 2 students were available during the data collection. Thus, 113 respondents were recruited for the study, with a response rate of 96.6%. The instrument used in this study was a self-administered questionnaire adapted from the *Pengendalian Murid Sekolah Merokok* Assessment Form (PMSM 1-2016), which is found in the PMSM Guidelines (Unit Kawalan Tembakau & Sekretariat FCTC, 2017). The questionnaires consisted of three parts: Part A (sociodemographic data), Part B (smoking behavior), and Part C (Fagerstrom Test for Nicotine Dependence form). Part A was answered by all the respondents, while Parts B and C were answered only by the respondents who smoked. This study obtained approval from the Kulliyyah of Nursing Postgraduate Research Centre (KNPGRC), the International Islamic University Malaysia Research Ethics Committee (IIUM IREC), the Ministry of Education (MOE), and the school. Informed consent was obtained from the respondents prior to their involvement in this study. The data collection was carried out during a workshop held at the school. Entitled Tobacco Free Together, the workshop was conducted by final Year 4 students in the Discovery of Specialization in Nursing: Smoking Cessation group. Students who met the inclusion criteria (smokers and non-smokers, Forms 3 and 4, and parental consent) were approached by the researcher and invited to voluntarily answer the self-administered questionnaire. Attached to the questionnaire was a consent form, which contained an explanation of the purpose and procedures of the study, the confidentiality mechanisms, and the right to withdraw, as well as the researcher's contact information. The analysis was conducted using Chi-square analysis and Fisher's exact test analysis.

Results

The study was conducted in 2020 among Form 3 and Form 4 students. Table 1 shows the descriptive statistics for the sociodemographic data among the students (N = 113).

Among the respondents, 46.9% were 15 years old, while 53.1% were 16 years old. There were more females compared to males (61.1% and 38.9%, respectively). As for race, a majority of the respondents were Malay (88.5%), and the rest were non-Malay, including Chinese (1.8%) and Indigenous (9.7%). The mean daily pocket money that they were given was 4.31 RM (± 1.12 RM). Approximately 80.5% of the respondents lived with both parents, 10.6% lived with one parent, and 8.8% lived with others. In addition, 39.8% of the respondents recorded having smoking family members, while 59.3% did not.

Among the 113 respondents, it was identified that there were 29 (25.7%) students who smoked and 84 (74.3%) who did not (Table 2). Among the 29 students who smoked, the mean Fagerstrom test score obtained was 2.480 (± 1.883). Based on the Fagerstrom test score categories, 19 (65.5%) had low nicotine dependence, and 10 (34.5%) had moderate nicotine dependence. However, there were no respondents who had high nicotine dependence (Table 3).

Table 1. Descriptive Statistics of Sociodemographic Data

Characteristics	Mean (SD)	Freq (%)
Age	15.53 (0.501)	
15		53 (46.9)
16		60 (53.1)
Gender		
Male		44 (38.9)
Female		69 (61.1)
Race		
Malay		100 (88.5)
Chinese		2 (1.8)
Indian		0 (0)
Indigenous		11 (9.7)
Daily pocket money	4.31 (1.12)	
Less than 5 RM		42 (37.2)
5 RM or above		67 (59.3)
Living with whom		
Parents		91 (80.5)
Father or mother		12 (10.6)
Others		10 (8.8)
Smoking family members		
Yes		45 (39.8)
No		67 (59.3)

Table 2. Percentage of Adolescent Smokers Among Students

Characteristics	Mean (SD)	Freq (%)
Smoking status		
Yes		29 (25.7)
No		84 (74.3)

Table 3. Level of Nicotine Dependence Among Students Who Smoke

Characteristics (n = 29)	Mean (SD)	Freq (%)
Fagerstrom test score	2.480 (1.883)	
Fagerstrom test score categories		
Low nicotine dependence (0–3)		19 (65.5)
Moderate nicotine dependence (4–5)		10 (34.5)
High nicotine dependence (6–10)		0 (0)

Table 4 provides a summary of the associations between the sociodemographic data and smoking status among the students. Based on the analysis, it was found that the only significant association was between gender and smoking status ($p < 0.001$). It was noted that a higher frequency of smokers were males compared to females (61.4% and 2.9%, respectively). Meanwhile, there was no significant association between smoking status and age, race, daily pocket money, living with whom, and family members smoking.

Based on the data obtained (Table 5), the mean age for initiating smoking among the respondents who smoked was 13 years old (± 2 years old). Most of the respondents who smoked obtained cigarettes through friends (48.3%) and usually smoked with friends (78.6%) and at gatherings (58.6%). The places where they

smoked also varied, but home (34.5%) and other places (34.5%), such as gathering places with friends, were the most popular. The major factor influencing smoking was peer pressure (69.0%), followed by curiosity (27.6%), and then smoking family members' influence, stress or tension, and others (3.4% each).

Among the respondents who smoked, 96.3% stated that they had tried to stop smoking, with a mean of 3 (± 0.524) attempts. Furthermore, 82.1% expressed that they wanted to quit smoking, and 42.9% needed help to quit. In addition, 21.4% admitted that they had tried other substances or drugs in addition to cigarettes.

Table 4. Summary of the Association Between Sociodemographic Data and Smoking Status Among Students

Variable	Smoking status		x^2	p
	Smoker Freq (%)	Non-smoker Freq (%)		
Age			0.067	0.795
15	13 (24.5)	40 (75.5)		
16	16 26.7)	44 (73.3)		
Gender			48.139	<0.001*
Male	27 (61.4)	17 (38.6)		
Female	2 (2.9)	67 (97.1)		
Race			0.814	0.509
Malay	27 (27)	73 (73)		
Non-Malay	2 (15.4)	11 (84.6)		
Daily pocket money			1.584	0.208
Less than 5 RM	14 (33.3)	28 (66.7)		
5 RM or above	15 (22.4)	52 (77.6)		
Living with whom			0.802	0.371
Both parents	25 (27.5)	66 (72.5)		
Single parent or others	4 (18.2)	18 (81.8)		
Family members smoking			2.170	0.141
Yes	15 (33.3)	30 (66.7)		
No	14 (20.9)	53 (79.1)		

*Chi-square test, $p < 0.05$

Table 5. Descriptive Statistics on Smoking Profiles of Students Who Smoke

Characteristics (n = 29)	Mean (SD)	Freq (%)
Age of smoking initiation	13.45 (2.384)	
Sources of obtaining cigarettes:		
Buy a pack		12 (41.4)
Buy per stick		5 (17.2)
Through friends		14 (48.3)
Through family members		1 (3.4)
Others		0 (0)
Factors that trigger smoking:		
Peer pressure		20 (69)
Family influence (smoker)		1 (3.4)
Stress/tension		1 (3.4)
Curiosity		8 (27.6)
Others		1 (3.4)
Places to smoke:		
At home		10 (34.5)
At school		0 (0)
At shopping complex		1 (3.4)

Characteristics (n = 29)	Mean (SD)	Freq (%)
At food stall		7 (24.1)
At bus stop		2 (6.9)
Others		10 (34.5)
When they usually smoke:		
When experiencing stress		2 (6.9)
When bored / no activity		4 (13.8)
After eating		8 (27.6)
When gathering with friends		17 (58.6)
When studying		3 (10.3)
Others		1 (3.4)
With whom they usually smoke:		
Alone		6 (21.4)
With family members		0 (0)
With friends		22 (78.6)
Others		3 (10.7)
Attempted to quit smoking		
Yes		26 (96.3)
No		1 (3.7)
Number of attempts at quitting smoking	3 (0.524)	
Intention to quit smoking		
Yes		23 (82.1)
No		5 (17.9)
Need help to quit smoking		
Yes		12 (42.9)
No		16 (57.1)
Tried any other substances/drugs		
Yes		6 (21.4)
No		22 (78.6)

Discussion

The smoking prevalence has continued to increase in adolescents over the world but more to urban area and limited studies on the rural area. A study done in the rural area at Yogyakarta Indonesia, revealed the prevalence rate of adolescents smoking were 22.8% (Ekawati et al., 2024). The prevalence rate is nearly similar with the current study as this was the first study that has been conducted in a school located in the FELDA settlement area of Bandar Tun Abdul Razak, Pahang, Malaysia, in a rural area. Based on the descriptive findings of the study, it was found that 25.7% of the respondents were smokers, which is a high prevalence of smoking. However, this percentage is lower than the prevalence of smoking among lower secondary school male students in Kota Tinggi district, Johor, which was 35.5% (Lim et al., 2015). This may be due to the different sample size, but this number of respondents who smoked cannot be ignored. In line with this finding, Lim et al. (2015) recorded that lower secondary students in schools located in FELDA settlement areas had twice the percentage of smoking prevalence (42.9%) compared to those in both rural and town schools (20.3%). The setting of this study was a school located in a rural area that was developed into a FELDA settlement area. Therefore, the students at the school were at higher risk of being influenced to smoke.

According to this study, the mean age to start smoking among the study respondents was 13 years old (± 2 years old). This is consistent with the findings of a national survey conducted in 2016 among Malaysian adolescents aged 10–19 years old (Tobacco and Electronic Cigarette Survey among Malaysian Adolescents [TECMA]), in which 78.7% of current smokers had their first cigarette before the age of 14 years (Tobacco Control Unit & FCTC Secretariat, 2016). This study also showed that the prevalence of

adolescent smokers among students was higher among males and Malays, which is similar to the findings of the National Health and Morbidity Survey: Adolescent Health Survey 2017, in which Malay males were found to dominate the smoking prevalence among adolescents in Malaysia (Institute for Public Health Malaysia, 2017). Several other studies also mentioned similar findings in terms of gender, including Lim et al. (2017), 27.9% males vs. 2.4% females; Al-Naggar and Alshaikhli (2018), 60% males vs. 40% females; and Jeganathan et al. (2013), 87.3% males vs. 12.7% females. In terms of Malays being the majority of smokers compared to other races, these data are supported by records from the National Health and Morbidity Survey 2015 (Institute for Public Health, 2015), in which Malays (24.6%) outnumbered Indians (19.7%) and Chinese (15.4%). These findings are also supported by a study in Shah Alam, Selangor, with 79.7% Malay smokers and 20.3% Indian smokers (Al-Naggar & Alshaikhli, 2018). They also correspond with a study conducted in Kinta, Perak, which found that Malays (60.0%) comprised the highest prevalence of smokers compared to Chinese (23.0%), Indians (10.8%), and others (6.3%) (Jeganathan et al., 2013). However, in this study, there was no significant association between race and smoking status among the students. This might be due to the non-normally distributed sample, which could have affected the findings.

Contrary to the findings of Cremers et al. (2014) and Lim et al. (2018), this study found no significant association between daily pocket money obtained and smoking status. Cremers et al. (2014) found that smoking rates were higher in low SES groups, while Lim et al. (2018) showed that those with higher incomes were less likely to be current smokers. This may be because those people with low SES have lower knowledge levels regarding smoking compared to those with high SES.

In terms of the living with whom variable, there was no significant association between this and smoking status. In other studies, no evidence has been found connecting adolescents who live with parents or others to smoking. This suggests that it does not matter with whom adolescents live as long as they are properly supervised to ensure that they do not become involved in this type of negative and harmful behavior.

There was also no significant association between family members' smoking behavior and smoking status. However, Al-Naggar and Alshaikhli (2018), Bobo et al. (2018), Grapatsas et al. (2017), and Kleinjan et al. (2015) found that environmental factors, such as exposure to parents smoking, influenced the initiation of smoking among adolescents. In this study, it is understandable that the family members' influence was not so significant, as this study emphasized that the main factor that influenced the students to smoke was peer influence, followed by curiosity and other factors. This finding is supported by a study of Abiola et al. (2016), which mentioned that peer influence was the most significant reason to begin smoking (21.9%). However, Al-Naggar and Alshaikhli (2018) and Anjum et al. (2016) reported different results, finding curiosity to be the main factor for adolescents to take up smoking.

Regarding the level of nicotine dependence, this can be classified into three categories: low nicotine dependence, moderate nicotine dependence, and high nicotine dependence. In this study, the percentage of adolescent smokers who had developed low or moderate nicotine dependence was high compared with the data from a national survey TECMA conducted in 2016 among Malaysian adolescents aged 10–19 years old (Tobacco Control Unit & FCTC Secretariat, 2016). That survey recorded that 28.5% of current adolescent smokers had already developed low nicotine dependence. The biggest concern in this study is that there are adolescents who have already developed moderate nicotine dependence. As nicotine dependence worsens over time, the fear is that the adolescent respondents will develop higher levels of nicotine dependence during adulthood.

In addition, this study found that most of the respondents who smoked obtained cigarettes through friends, and they usually smoked with friends during social gatherings. The places to smoke also varied, but the home and other locations, such as social gathering places with friends, were the most popular. This is a predisposing factor explaining why peer pressure was the most frequent reason for adolescents to smoke, as they spent a lot of their time with their friends compared to with others.

It was found that the majority of adolescent smokers had attempted to stop smoking and stated that they wanted to quit smoking. About half of them also mentioned that they needed help to stop smoking. According to a national survey conducted in 2016, almost 80% of former smokers quit without any professional intervention or assistance. Quitting without any professional assistance has the lowest success rate of the various approaches to becoming smoke free (The Royal Australian College of General Practitioners, 2021). That is why many smokers need seven or eight attempts before finally succeeding (Tobacco Control Unit & FCTC Secretariat, 2016).

Among the respondents in this study, a similar pattern was found, as the mean number of attempts to quit smoking was three. This showed that they had the desire to quit smoking and had already tried several times, but they had failed in becoming smoke free due to their nicotine addiction. It could be worse, as some of the smokers had also tried other substances or drugs that could do more damage to them. This is why proper assistance and aid need to be offered to help them liberate themselves from nicotine dependence and thus smoking.

A limitation of this study is that the findings could not be generalized, as this study contained a small sample size and a limited number of respondents, focusing only on Form 3 and Form 4 students. This was due to a specific school request, as the Form 5 students needed to be excluded from the study because of upcoming national examinations. As for the Form 1 and Form 2 students, they were partaking in evening school sessions and thus did not participate in the program held.

Conclusion

This cross-sectional study has achieved its objectives, which were to determine the percentage of adolescent smokers among high school students, examine their level of nicotine dependence, and study the association between the sociodemographic data and smoking status. The study showed that the prevalence of adolescent smokers among students located in the FELDA area was quite high, with males reporting a significantly higher prevalence of smoking than females. The fact that there were also females who smoked is crucial, as females may be future mothers. Therefore, a concern is that if females do not cease smoking and become pregnant in the future, their habit will harm their baby during pregnancy. Furthermore, there were also adolescent smokers who had already achieved a moderate nicotine dependence. Most of them had tried to quit smoking and stated that they wanted to quit smoking. Moreover, about half of them needed help to quit. Some of them also admitted that they had tried substances or drugs other than cigarettes, but to date, no formal intervention has been carried out to help them. Finally, this study determined that peer influence was the major correlated factor for smoking among these students. It is recommended that more programs regarding smoking be held among students to help them obtain proper information about smoking, including the various harmful effects to smokers and others around them. It is important to ensure that they understand their obligation to stay away from smoking, as prevention is better than cure. In addition, smoking cessation services and professional guidance should be introduced and offered to adolescents who are already involved in smoking behavior and substance abuse to assist them in quitting. Finally, guidelines and policies need to be established and implemented by the health authorities, and the whole

community needs to give its full support to control this issue. With such interventions, it is hoped that smoking rates among adolescents can be reduced.

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