Journal of Pediatric Nursing 48 (2019) 92–97

Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

Special Issue on Addictive Behaviors

Personal and Family Factors Associated With High-risk Behaviours Among Adolescents in Malaysia

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ARTICLE INFO

Article history:
Received 26 April 2019
Revised 21 July 2019
Accepted 21 July 2019

Keywords:
Adolescent
Drinking
Health
Risk
Smoking

ABSTRACT

Purpose: The objective of this study was to investigate the relationships between high-risk behaviours and personal and family factors among adolescents in Malaysia.
Methods: A nationwide data set was examined for this secondary data analysis. The dependent variable was the degree of risk, which was measured based on the number of high-risk behaviours in which adolescents participated. Age, gender, ethnicity, self-rated academic performance, family size, parental marital status and parental academic attainment were included as independent variables. Analyses stratified by educational level were conducted. Odds ratios (ORs) were calculated using ordered logit.
Results: The most common high-risk behaviour among Malaysian adolescents was physical inactivity (35.97%), followed by smoking (13.27%) and alcohol consumption (4.45%). The majority of adolescents had low risks (52.93%), while only a small proportion had high risks (6.08%). Older age was associated with increased odds of having high risks (OR: 1.26). Male adolescents had higher odds of being in a high-risk category compared to female adolescents (OR: 1.28). Compared to Malays, Chinese adolescents had higher odds of being in a high-risk category (OR: 1.71), whereas Indian adolescents had lower odds (OR: 0.65). Excellent academic performance was associated with reduced odds of participating in high-risk behaviours (OR: 0.41).
Conclusion: Personal factors are important determinants of high-risk behaviours. This study provides a better understanding of those adolescent groups that are at greater risk.
Practical implications: An intervention directed towards reducing participation in high-risk behaviours among adolescents who have both poor academic performance and less-educated parents may yield promising outcomes.

Introduction

High-risk behaviours, such as smoking, drinking, maintaining an unhealthy diet and physical inactivity, are common among school-aged adolescents (Jin, 2014; Johansen, Rasmussen, & Madsen, 2006). Such behaviours have short-term as well as long-term adverse effects on health and well-being. Studies have shown that adolescents who engage in high-risk behaviours are more likely to experience poor health and diminished well-being in their adulthood compared to their peers with healthy lifestyles (Faeh, Viswanathan, Chiolero, Warren, & Bovet, 2006). Therefore, early intervention to reduce participation in high-risk behaviours among adolescents is crucial, as it will improve population health and reduce the prevalence of various diseases. To ensure that this intervention yields an effective outcome, policy makers should understand which groups of adolescents engage in high-risk behaviours. Previous studies have demonstrated that the likelihood of participating in high-risk behaviours varies across adolescent characteristics (Azmawati et al., 2015; Nik Farid et al., 2016).

In 2012, about 11.5% of adolescents in Malaysia had smoked cigarettes, 8.9% had consumed alcohol, 8.3% had engaged in sex, and 1.5% had used illicit drugs (Institute for Public Health, 2012). In response to these worrying facts and figures, researchers made an effort to examine factors associated with participation in high-risk behaviours among adolescents. High-risk behaviours that were examined included smoking (Dahlui et al., 2015; Lim et al., 2014; Lim et al., 2017; Tee & Kaur, 2014), alcohol consumption (Manickam, Abdul Mutalip, Abdul Hamid, Kamaruddin, & Sabtu, 2014), sexual activity (Ahmad, Awaluddin, Ismail, Samad, & Nik Abd Rashid, 2014; Cheah, Lim, & Kee, 2018b; Cheah, Lim, Kee, & Ghazali, 2016a), illicit drug use (Yusoff et al., 2014) and physical inactivity (Baharudin et al., 2014; Cheah, Lim, & Kee, 2018a; Cheah, Lim, Kee, & Ghazali, 2016b). Adolescent males were associated with an increased likelihood of smoking, drinking, using illicit drugs, engaging in unprotected sex and being physically active (Azmawati et al., 2015; Cheah et al., 2016b; Cheah et al., 2018a; Lim et al., 2017; Nik Farid et al., 2016; Tee & Kaur, 2014). Older adolescents and adolescents with poor academic performance were more likely to

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https://doi.org/10.1016/j.pedn.2019.07.012
0882-5963/

smoke, engage in sexual behaviour and indulge in a physically inactive lifestyle compared with their counterparts who were younger and had strong academic performance (Cheah et al., 2016b; Cheah et al., 2018a; Cheah et al., 2018b; Lim et al., 2017). Family factors, such as parental marital status and educational level, had significant influences on high-risk behaviours (Azmawati et al., 2015; Burusic, Sakic, & Koprtla, 2014; Cheah et al., 2016a; Cheah et al., 2016b). For instance, having well-educated parents was correlated with reduced odds of participating in underage sexual activity.

Our review reveals that previous studies only examined high-risk behaviours individually and did not examine the level of risk. The fact is that adolescents who do not smoke do not necessarily have a lower risk than adolescents who smoke because they may be physically inactive or engage in other high-risk behaviours, such as alcohol consumption and participation in unprotected sex. Similarly, adolescents who are physically active may not be healthier than their physically inactive counterparts because they may be more likely to drink alcohol or smoke cigarettes. As argued by Calvert, Bucholz, and Steger-May (2010) and Nik Farid et al. (2016), high-risk behaviours are closely related and seldom exist in isolation. Thus, it is important to analyse them together. The objective of the present study was to fill this gap by examining factors associated with the degree of risk among adolescents. The degree of risk was measured based on the number of high-risk behaviours in which adolescents participate.

To our knowledge, the present study is the first to utilise a rigorous statistical method to examine personal and family factors associated with the degree of risk among adolescents in Malaysia. It can determine which groups of adolescents have high, medium or low risks. While previous studies have investigated those factors that influence participation in high-risk behaviours, they have not analysed the degree of risk. In addition, the present study expects that the degree of risk varies across adolescents' educational level, i.e., lower-secondary grades and upper-secondary grades. As such, analyses stratified by adolescents' educational level were conducted. Findings indicating any differences or similarities in associated factors represent significant contributions to existing knowledge and policy development.

Methods

Data

The present study used secondary analysis of data from the Malaysian Adolescent Health Risk Behaviour (MyAHRB) study. MyAHRB was a cross-sectional study carried out by the Ministry of Health Malaysia. The survey covered all of the states in Peninsular Malaysia. The survey period spanned from May to September 2013. The targeted respondents were secondary school students aged 13–17 years. In terms of sampling, a two-stage stratified proportional-to-size sampling approach was adopted. In the first stage, 10 urban and rural districts with a Clinical Training Centre (CTC) for public health paramedics were selected. In the second stage, two secondary schools were randomly selected from each district using a simple random sampling method. Overall, 40 secondary schools were selected to conduct the survey. The primary objective of MyAHRB was to obtain a better understanding of health behaviours among adolescents in Malaysia.

Passive consent was sought from the students' parents seven days before the survey. The selected students were given a consent form to take home to their parents or guardians, with instructions for it to be returned to the schools. If the students returned an unsigned consent form, they were not allowed to participate in the survey. If the students returned a signed consent form, they were allowed to participate in the survey. If the students did not return a consent form, passive consent was assumed and they could participate in the survey. The structured questionnaire was designed based on the Global School-based Students Health Survey (GSHS) and was distributed to consenting students for self-administration. Students were briefed before they answered the questionnaire. They were also assured that whatever information they provided would be treated with confidentiality and could only be used for research purposes. Teachers and other school staff were barred from the venue during the survey session. MyAHRB was approved by the Ministry of Education Malaysia and the Ministry of Health Malaysia. Ethical approval was obtained from the Malaysia Research Ethics Committee. Additional details about MyAHRB are provided elsewhere (Lim et al., 2017).

Dependent variable

According to Jin (2014), there are six major high-risk behaviours: unintentional injuries, smoking, drinking alcohol, unsafe sex, an unhealthy diet and physical inactivity. Given the data limitations, the present study only examined smoking, drinking and physical inactivity. These high-risk behaviours are common among adolescents in Malaysia (Institute for Public Health, 2012). In the survey, adolescents were asked to answer three questions related to high-risk behaviours (Table 1). If adolescents answered "yes" to the questions related to smoking and drinking, they were deemed to have smoking and drinking behaviours. For the question related to physical activity, if adolescents answered less than two days, which was equivalent to <120 min of physical activity per week, they were considered to be physically inactive. This classification followed the guidelines of the Ministry of Health Malaysia that a person needs to spend at least 150 min engaging in physical activity per week in order to stay physically active (Institute for Public Health, 2015).

The dependent variable of the present study, the degree of risk, was derived from participation in high-risk behaviours and was formatted as a three-category ordinal outcome variable: low risks, medium risks and high risks. Adolescents who did not engage in any high-risk behaviours were considered to have low risks, while those who engaged in one high-risk behaviour were considered to have medium risks. Adolescents who engaged in at least two high-risk behaviours were considered to have high risks.

Table 1
Survey questions and answers.

Variables	Questions	Answers
Smoking	In the past 30 days, did you smoke any tobacco?	Yes, no
Drinking	In the past 30 days, did you consume any alcohol?	Yes, no
Physical activity	In the last seven days, how many days were you physically active for at least 60 min per day?	0, 1, 2, 3, 4, 5, 6, 7
Age	How old are you?	13, 14, 15, 16, 17
Gender	What is your gender?	Male, female
Ethnicity	What is your ethnicity?	Malay, Chinese, Indian, others
Self-rated academic	In general, how would you rate your academic performance?	Poor, fair, excellent
Family size	How many family members are staying with you (including yourself)?	Small, medium, large*
Parent marital status	What is your parent's marital status?	Married, divorced
Father education	What is your father's highest education level?	Primary, secondary, tertiary#
Mother education	What is your mother's highest education level?	Primary, secondary, tertiary#

Note: *Small refers to <5 members, medium refers to 5–7 members, and large refers to >7 members (Mok & Maclean, 2011). #Primary has 1–6 years of schooling, secondary has 7–11 years of schooling, and tertiary has ≥12 years.
Source: Malaysian Adolescent Health Risk Behaviour (MyAHRB).

Table 2
Summary statistics of degree of risk, personal and family variables.

Variables	Total ($n = 2991$)	Low-risk ($n = 1583$)	Medium-risk ($n = 1226$)	High-risk ($n = 182$)
Degree of risk				
Low-risk	1583 (52.93)	–	–	–
Medium-risk	1226 (40.99)	–	–	–
High-risk	182 (6.08)	–	–	–
Personal factors				
Age				
13	54 (1.81)	37 (2.34)	17 (1.39)	0 (0)
14	157 (5.25)	102 (6.44)	52 (4.24)	3 (1.65)
15	164 (5.48)	96 (6.06)	66 (5.38)	2 (1.10)
16	2343 (78.34)	1225 (77.38)	980 (79.93)	138 (78.57)
17	273 (9.13)	123 (7.77)	111 (9.05)	39 (21.43)
Gender				
Male	1586 (53.03)	716 (45.23)	540 (44.05)	149 (81.87)
Female	1405 (46.97)	686 (55.95)	686 (55.95)	33 (18.13)
Ethnicity				
Malay	2374 (79.37)	1299 (82.06)	950 (77.49)	125 (68.68)
Chinese	395 (13.21)	143 (9.03)	205 (16.72)	47 (25.82)
Indian	204 (6.82)	129 (8.15)	67 (5.46)	8 (4.40)
Others	18 (0.60)	12 (0.76)	4 (0.33)	2 (1.10)
Self-rated academic				
Poor	111 (3.71)	38 (2.40)	53 (4.53)	20 (10.99)
Fair	1025 (34.27)	490 (30.95)	464 (37.85)	71 (39.01)
Excellent	1855 (62.02)	1055 (66.65)	709 (57.83)	91 (50.00)
Family factors				
Family size				
Small	618 (20.66)	310 (19.58)	265 (21.62)	43 (23.63)
Medium	1885 (63.02)	1004 (63.42)	763 (62.23)	118 (64.84)
Large	488 (16.32)	269 (16.99)	198 (16.15)	21 (11.54)
Parent marital status				
Married	2838 (94.88)	1509 (95.33)	1158 (94.45)	171 (93.96)
Divorced	153 (5.12)	74 (4.67)	68 (555)	11 (6.04)
Father education				
Primary	310 (10.36)	149 (9.41)	137 (11.17)	24 (13.19)
Secondary	1734 (57.97)	856 (54.07)	756 (61.91)	119 (65.38)
Tertiary	947 (31.66)	578 (36.51)	330 (26.92)	39 (21.43)
Mother education				
Primary	320 (10.70)	153 (9.67)	138 (11.26)	29 (15.93)
Secondary	1926 (64.39)	977 (61.72)	826 (67.37)	123 (67.58)
Tertiary	745 (24.91)	453 (28.62)	262 (21.37)	30 (16.48)

Note: The entries refer to frequency. Percentages in parentheses.
Source: Malaysian Adolescent Health Risk Behaviour (MyAHRB).

Table 3
Frequency and proportion for degree of risk, personal and family variables, by specific high-risk behaviours (smoking, drinking and physical inactivity).

Variables	Smoking ($n = 397$) (Prop. $=13.27$)#		Drinking ($n = 133$) (Prop. $= 4.45$)#		Inactivity ($n = 1076$) (Prop. $=$ 35.97)#	
	Freq.	Prop.	Freq.	Prop.	Freq.	Prop.
Degree of risk						
Low-risk	0	0.00	0	0.00	0	0.00
Medium-risk	255	20.80	55	4.49	916	74.71
High-risk	142	78.02	78	42.86	160	87.91
Chi-square	965.44*		705.63*		1900.00*	
Age						
13	1	1.85	1	1.85	15	27.78
14	4	2.55	1	0.64	53	33.76
15	16	9.76	2	1.22	52	31.71
16	329	14.04	94	4.01	845	36.06
17	47	17.22	35	12.82	111	40.66
Chi-square	28.46*		56.33*		5.82	
Gender						
Male	365	25.98	84	5.98	400	28.47
Female	32	2.02	49	3.09	676	42.62
Chi-square	371.57*		14.64*		64.79*	
Ethnicity						
Malay	369	15.54	39	1.64	803	33.82
Chinese	17	4.30	82	20.76	204	51.65
Indian	8	3.92	11	5.39	64	31.37
Others	3	16.67	1	5.56	5	27.78
Chi-square	53.91*		291.79*		49.28*	
Self-rated academic						
Poor	28	25.23	11	9.91	56	50.45
Fair	173	16.88	62	6.05	379	36.98
Excellent	196	10.57	60	3.23	641	34.56
Chi-square	37.15*		20.40*		12.17*	
Family size						
Small	86	13.92	34	5.50	235	38.03
Medium	248	13.16	83	4.40	679	36.02
Large	63	12.91	16	3.28	162	33.20
Chi-square	0.30		3.19		2.77	
Parent marital status						
Married	22	14.38	129	4.55	1011	35.62
Divorced	375	13.21	4	2.61	65	42.48
Chi-square	0.171		1.27		2.97	
Father education						
Primary	31	10.00	18	5.81	138	44.52
Secondary	243	14.01	97	5.59	667	38.47
Tertiary	123	12.99	18	1.90	271	28.62
Chi-square	3.78		21.17*		36.75*	
Mother education						
Primary	39	12.19	29	9.06	133	41.56
Secondary	267	13.86	85	4.41	727	37.75
Tertiary	91	12.21	19	2.55	216	28.99
Chi-square	1.63		22.36*		22.73*	

Note: Pearson chi-squared test for independence is conducted. *$p < 0.05$. Proportion of adolescents engaging in smoking and drinking, and being physically inactive.
Source: Malaysian Adolescent Health Risk Behaviour (MyAHRB).

Independent variables

Based on the extant literature related to high-risk behaviours, the present study hypothesised that personal and family factors could affect the degree of risk (Ahmad et al., 2014; Baharudin et al., 2014; Manickam et al., 2014; Tee and Kaur, 2014; Lim et al., 2014; Yusoff et al., 2014; Dahlui et al., 2015; Cheah et al., 2016a; Cheah et al., 2016b; Lim et al., 2017; Cheah et al., 2018a; Cheah et al., 2018b). Independent variables used in the present study were categorised into two main groups: personal and family. Personal variables consisted of adolescents' age, gender, ethnicity and self-rated academic performance. Family variables were comprised of family size, parental marital status, father's educational level and mother's educational level (Table 1).

Statistical analysis

The descriptive statistics for the degree of risk and all of the independent variables were calculated (Table 2). Prior to employing regression to analyse factors associated with the degree of risk, a two-way contingency table was constructed to examine the relationships between high-risk behaviours (smoking, drinking and physical inactivity) and personal and family factors (Table 3). Since the sample size was large, Pearson's chi-squared test for independence was conducted. In terms of multivariate analysis, an ordered logit model proportional odds model was used to examine factors associated with the degree of risk (McCullagh, 1980). The analysis was conducted for all study participants, with separate analyses conducted for participants in lower-secondary grades and for participants in upper-secondary grades. Educational level was determined based on adolescents' age. Adolescents aged 13–15 years were categorised in lower-secondary grades, while adolescents aged 16–17 years were categorised in upper-secondary grades. The significance level of all of the tests was $p < 0.05$.

Results

The degree of risk and the personal and family characteristics of the respondents can be found in Table 2. An additional year of age in adolescents increased the odds of having high risks by 26%. Male adolescents had 28% higher odds of having high risks than female adolescents. Compared with Malays, the odds of having high risks among Chinese adolescents were 71% higher, while the odds of having high risks among Indian adolescents were 35% lower. Achieving fair or excellent self-rated academic performance, as opposed to poor performance, lowered the odds of having high risks by 49% and 59%, respectively (Table 4).

In terms of gender, upper-secondary male adolescents had 38% higher odds of having high risks than upper-secondary female adolescents. Compared to Malays, Chinese adolescents had 196% (lower-secondary) and 64% (upper-secondary) higher odds of having high risks, whereas Indian adolescents (upper-secondary) had 32% lower odds of having high risks. Self-rated academic performance was associated with having high risks among upper-secondary adolescents. In particular, having fair or excellent academic performance, as opposed to poor performance, reduced the odds of having high risks by 53–65%. Among lower-secondary school adolescents, those having a well-educated father (tertiary) had 83% lower odds of having high risks than those having a less-educated father (primary) (Table 5).

Discussion

Overall, findings from the present study lend support to those of previous studies related to factors associated with high-risk behaviours. Previous studies exclusively devoted their attention to a particular high-risk behaviour, whereas our study focused on the degree of risk. The high-risk behaviours examined in the present study include smoking, drinking and physical inactivity. Our findings suggest that the most common high-risk behaviour among Malaysian adolescents is physical inactivity, whereas the least common high-risk behaviour is alcohol consumption. Perhaps this is because of the alcohol prohibition in Islam. As a consequence, Malays may be unlikely to confess to consuming alcohol. Results of ordered logit show that personal factors (age, gender, ethnicity and self-rated academic performance) are significantly associated with the degree of risk. An analysis of the odds of having high risks among adolescents in different grades shows that only a few variables are significant for lower-secondary adolescents. This may be attributable to the small sample size and the low prevalence of high-risk behaviours. Our findings contribute to policy development that concentrates primarily on promoting healthy lifestyles among adolescents who have high risks. However, because the analysis of policies is beyond the scope of the present study, we do not provide unrealistic extrapolations to address possible anti-high-risk behavioural policies.

The present study identifies a positive relationship between age and the degree of risk, which is consistent with the findings of Manickam et al. (2014). The authors found that the odds of drinking alcohol increased with the age of adolescents. The explanation provided by Cheah et al. (2016a) is worth highlighting and may be the reason for this finding. The authors claimed that older adolescents were less likely to be monitored by their parents when compared with younger adolescents. Thus, they have a greater opportunity to indulge in high-risk behaviours. In terms of policy implications, our findings provide policy makers with a better understanding of the issue, which indicates that to reduce adolescent risks, special attention should be paid to adolescents who are 16 or 17 years old. The policy should focus on reducing smoking and drinking instead of physical inactivity.

In terms of gender, the results of the present study reveal that male adolescents have higher risks than female adolescents. This finding is interesting and important. It leads to the conclusion that although males are more likely than females to engage in a physically active lifestyle, they face a greater risk. This is because they have a higher tendency to indulge in smoking and alcohol consumption. Previous findings based

Table 4
Results of ordered logit for degree of risk.

Variables	Estimates	SE	OR	95% CI	*p*-value
Age (in years)	0.229	0.055	1.26	1.13, 1.40	<0.001
Gender					
Male	0.248	0.074	1.28	1.11, 1.48	<0.001
Female	–	–	–	–	–
Ethnicity					
Malay	–	–	–	–	–
Chinese	0.535	0113	1.71	1.37, 2.13	<0.001
Indian	−0.438	0.153	0.65	0.48, 0.87	0.004
Others	−0.338	0.511	0.71	0.26, 1.94	0.509
Self-rated academic					
Poor	–	–	–	–	–
Fair	−0.678	0.200	0.51	0.34, 0.75	<0.001
Excellent	−0.897	0.198	0.41	0.28, 0.60	<0.001
Family size					
Small	–	–	–	–	–
Medium	−0.010	0.094	0.99	0.82, 1.19	0.919
Large	−0.021	0.125	0.98	0.77, 1.25	0.864
Parent marital status					
Married	−0.131	0.167	0.88	0.63, 1.22	0.432
Divorced	–	–	–	–	–
Father education					
Primary	–	–	–	–	–
Secondary	0.017	0.138	1.02	0.78, 1.33	0.900
Tertiary	−0.287	0.162	0.75	0.55, 1.03	0.076
Mother education					
Primary	–	–	–	–	–
Secondary	−0.027	0.137	0.97	0.75, 1.27	0.846
Tertiary	−0.161	0.167	0.85	0.61, 1.18	0.334
Thresholds					
τ_1	2.847	0.923	–	–	–
τ_2	5.561	0.927	–	–	–
Observations			2991		

Note: SE refers to standard errors. OR refers to odds ratio. CI refers to confidence interval.
Source: Malaysian Adolescent Health Risk Behaviour (MyAHRB).

Table 5
Ordered logit odds ratios for degree of risk, by education level.

Variables	Lower-secondary		Upper-secondary	
	OR	95% CI	OR	95% CI
Age (in years)	1.19	0.86, 1.65	1.27	0.98, 1.64
Gender				
Male	0.61	0.38, 0.98	1.38*	1.18, 1.61
Female	–	–	–	–
Ethnicity				
Malay	–	–	–	–
Chinese	2.96*	1.14, 7.72	1.64*	1.30, 2.06
Indian	0.42	0.12, 1.43	0.68*	0.50, 0.92
Others	0.21	0.02, 1.92	1.20	0.35, 4.06
Self-rated academic				
Poor	–	–	–	–
Fair	0.58	0.22, 1.56	0.47*	0.30, 0.72
Excellent	0.81	0.32, 2.07	0.35*	0.22, 0.54
Family size				
Small	–	–	–	–
Medium	0.64	0.32, 1.29	1.02	0.84, 1.23
Large	0.48	0.21, 1.09	1.07	0.82, 1.38
Parent marital status				
Married	1.11	0.34, 3.62	0.87	0.62, 1.22
Divorced	–	–	–	–
Father education				
Primary	–	–	–	–
Secondary	0.29	0.07, 1.10	1.05	0.80, 1.39
Tertiary	0.17*	0.04, 0.71	0.80	0.58, 1.12
Mother education				
Primary	–	–	–	–
Secondary	2.47	0.62, 9.86	0.95	0.72, 1.25
Tertiary	2.00	0.46, 8.77	0.86	0.61, 1.21
Observations	375		2616	

Note: OR refers to odds ratio. CI refers to confidence interval.
Source: Malaysian Adolescent Health Risk Behaviour (MyAHRB).
* $p < 0.05$.

upon various data sources are similar to ours, which demonstrates that the likelihood of smoking is greater among males than females (Dahlui et al., 2015; Lim et al., 2014; Lim et al., 2017; Tee & Kaur, 2014). Furthermore, Azmawati et al. (2015), in examining factors affecting adolescents' risk-taking behaviours in both urban and rural settings, found that males were more likely to engage in risk-taking behaviours than females. Using longitudinal data, Nik Farid et al. (2016) arrived at similar results. With respect to physical activity, the findings of Baharudin et al. (2014), Cheah et al. (2016b) and Cheah et al. (2018a) correspond to ours, which reveal that males are more physically active than females. There are three reasons to explain the association between being male and high risks. First, in the Asian culture, smoking among males is more acceptable than smoking among females (Lim et al., 2017). Second, female adolescents tend to receive more attention from their parents compared to male adolescents. Thus, they are generally well-behaved (Lim et al., 2017). Third, given the generally accepted masculine characteristics, males are more likely than females to take risks (Cheah et al., 2018b). Based on the present study's findings, we suggest that policy makers should pay special attention to male adolescents, especially those in upper-secondary grades, because the primary high-risk behaviours among upper-secondary grade students are drinking and smoking, and male students tend to engage in these activities more frequently. Concerted efforts should be made to reduce the tendency to smoke and drink instead of focusing on physical inactivity if the target group is male adolescents.

An interesting finding from the present study is the role of ethnicity in the degree of risk. Manickam et al. (2014) found that ethnicity was significantly related to high-risk behaviours, with Malays being less likely to drink alcohol than Chinese and Indians. In addition, Ahmad et al. (2014) and Dahlui et al. (2015) found that Malays had a lower likelihood of engaging in smoking and unprotected sex than Indians. In the present study, we find that Malays have a lower risk than Chinese, but they have a higher risk than Indians. Comparing between ethnic groups, Malays have the highest prevalence of smoking but have the lowest prevalence of drinking, whereas Chinese have the highest prevalence of drinking and physical inactivity. Because the analysis in the present study is based on secondary data, the explanation for the relationship between ethnicity and high-risk behaviours cannot be well-identified unless an in-depth qualitative study is conducted. Nevertheless, we are able to draw the conclusion that religious and cultural differences may affect high-risk behaviours. For instance, owing to the prohibition of alcohol in Islam, that is, the religion of the vast majority of Malays in Malaysia, Malay adolescents are least likely to consume alcohol. In stark contrast, alcohol is very common in the traditional festivals and celebrations of the Chinese, such as the New Year's festival and wedding ceremonies. An implication of our findings is that policy makers should consider the influence of ethnic factors on high-risk behaviours when designing intervention measures directed towards reducing risk among adolescents.

Another personal factor that determines the degree of risk among adolescents is self-rated academic performance. The results derived from the total sample and the sample of upper-secondary adolescents reveal that adolescents with excellent and fair self-rated academic performance have a lower risk than adolescents with poor self-rated academic performance. In particular, smoking, drinking and physical inactivity are most prevalent among adolescents who self-rate their academic performance as poor, but they are least prevalent among adolescents who self-rate their academic performance as excellent. Inclusion of the self-rated academic performance variable in the analysis is important, because it reveals how education or knowledge influences high-risk behaviours. Because data used in the present study is cross-sectional in nature, the causal effect of self-rated academic performance on risks cannot be well-identified. However, at the very least, we understand that strong academic performance reduces risks. A plausible explanation for this finding is that adolescents who have a strong academic background tend to know more about the adverse effects of high-risk behaviours (Cheah et al., 2016a; Cheah et al., 2016b; Lim et al., 2017). Previous studies that have reported results related to the associations between academic performance and smoking, physical activity and sexual behaviour revealed similar findings (Cheah et al., 2016a; Cheah et al., 2016b; Lim et al., 2017). In terms of policy implications, an intervention directed towards reducing participation in high-risk behaviours among adolescents with poor academic performance, especially those in upper-secondary grades, appears beneficial.

A less significant finding from the present study is the relationship between parental education and the degree of risk. It appears that lower-secondary adolescents who have a well-educated father have a lower risk than their peers who have a less-educated father. This relationship, however, is not evidenced in the total sample and the sample of upper-secondary adolescents. Our findings appear to be consistent with previous studies that identified negative relationships between parental education and physical inactivity (Cheah et al., 2016b), as well as smoking and drinking (Azmawati et al., 2015). A likely explanation for our findings is that well-educated parents know how to educate their children regarding the negative consequences of unhealthy lifestyles. This explanation is somewhat similar to the explanation related to self-rated academic performance, which indicates that education improves health awareness. Based on our findings, it appears that having a policy that can only improve knowledge about health among adolescents may not be adequate. Instead, the policy should work in tandem with other policies that provide adolescents' parents with additional information about health and wellness.

Although the present study makes important contributions to the extant literature and policy development initiatives, it has several limitations. First, the data used in the present study is cross-sectional instead of longitudinal. Hence, causal relationships between the degree of risk and personal and family factors cannot be well-identified. Second, reporting errors are unavoidable given that all of the information is self-reported. For instance, some adolescents may be unlikely to confess to indulging in smoking and alcohol consumption, as these behaviours are illegal for consumers under 18 years of age. Third, underage sex is considered to be a common high-risk behaviour, but it is not examined in the present study because of data limitations. Finally, other variables that may affect participation in high-risk behaviours, such as psychological and social variables, are not considered in the present study. Despite these inherent limitations, the present study has cast new light on factors associated with the degree of risk among adolescents and has also provided policy makers with information that will assist in the development of more effective intervention measures.

Conclusion

Age, gender, ethnicity and self-rated academic performance are correlated with adolescent risks. More specifically, the odds of having high risks are significantly higher among older adolescents, males, Chinese and adolescents who self-rate their academic performance as poor when compared to younger adolescents, females, Malays and adolescents who self-rate their academic performance as fair or excellent. Public health administrators must work to improve lifestyles among adolescents who are at high risk.

CRediT author statement

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Declaration of Competing Interest

The authors have no competing interests to declare.

Acknowledgments

The authors would like to thank the Director General of Health, Malaysia for sharing data from the Malaysian Adolescent Health Risk Behaviour (MyAHRB) and Dezheng Huo for his feedback and comments. This research received funding from the Fundamental Research Grant Scheme (FRGS) (KOD SO 14218), which is sponsored by the Ministry of Education Malaysia.

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