



Research article

Association of prosocial behavior with ever smoking and alcohol drinking among school-going adolescents



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ABSTRACT

Background: Smoking and consuming alcohol remain hazardous acts to health, which are important to prevent in adolescents. Prosocial behavior has increasingly being noticed to be related with substance use. This study investigated the association between the trying of smoking and alcohol with prosocial behavior among school-going adolescents in Terengganu, Malaysia.

Methods: This cross-sectional study was conducted among 732 school adolescents aged between 13 and 18 years from 12 secondary schools in Terengganu. Cluster sampling was applied. A validated questionnaire adopted from Global Health School Survey (GSHS) was used and prosocial behavior was assessed using the validated Malay self-rated version of Strength and Difficulty Questionnaire (SDQ). Data were analyzed using SPSS ver25, using multiple logistic regressions for both dependent variables of ever smoking and ever alcohol drinking.

Results: Ever smoking was significantly inversely associated with prosocial behavior ($p = 0.010$, OR: 0.84, CI: 0.74, 0.96); together with other significantly associated factors; namely older age, male gender, poorer family income, and smoking in immediate family members. However, there was no association of the between prosocial behavior with ever alcohol drinking ($p = 0.628$).

Conclusion: Prosocial behavior is negatively associated with the trying of smoking in adolescents. Future longitudinal study should be done to investigate the effects of promoting prosocial behavior among adolescents towards the hazardous act.

1. Introduction

Smoking and consuming alcohol are hazardous acts to health, which are important to be prevented in adolescents. Epidemiological data has shown smoking-related diseases to be main contributors to disability-adjusted life years (DALYs) [1] while alcohol intake is a major risk factor for non-communicable diseases and death due to injury [2]. Adolescents, a group with age-span from 10 years of age to 19 years [3] are vulnerable to try all types of substances. During the adolescent phase, the frontal cortex responsible for making complex decisions is still developing, while parts of the brain processing feelings of rewards are more mature. This condition makes them vulnerable to impromptu decision-making such as trying different substance due to curiosity and social pressure [4]. This may affect their future health, as the risks to be among those addicted to substances are highest among the ones who start during adolescence [3].

A significant portion of substance users start experimenting at an early age. Epidemiological studies in the United States showed that almost 70% of 18 years old high school students have tried alcoholic drinks, 50% involved in illegal substances, almost 40% have smoked a cigarette and 20% and more have misused a prescription drug [4]. Studies done in Malaysia showed that 19.3% of adolescent have tried alcoholic drinks [5] and 21.4% have smoked a cigarette [6]. A survey among Malaysian adult smokers revealed that 51.8% of smokers started smoking daily before 18 years old [7]. It showed that the smokers and substance users experimented and started during their school days. Therefore, the school-going period in adolescents represent a golden window of opportunity for prevention of substance and tobacco use.

As with other substances, finding out the protective and contributing factors for adolescents to try alcohol and smoking would help in the identification of potential preventive measures that can be done to curb these hazardous acts. Psychological factors are indeed one of the factors that need further evaluation. For example, conduct disorder was found to

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be associated with early smoking [8], while prosocial behavior was found to significantly moderate Conduct Disorders symptoms negative effects [9].

Prosocial behavior is exceedingly being noticed to have an influence towards substance use. Prosocial behavior consists of a range of actions that one does to benefit others; such as sharing food or belongings with other people, comforting and helping others. Exhibition of prosocial behavior depends on one's ability to recognize a negative experience in another person, the ability to decide the appropriate response to such situation, and thus resulting in the motivation to intercede [10]. There are multiple validated tools measuring prosocial behavior in adolescents, which are varying in complexity and can be in the form of self-rated or rated by other people such as peers or guardian. The examples of relatively brief self-rated instruments are Prosocial Behaviour Questionnaire with seven items and the Strength and Difficulties Questionnaire (SDQ) with five items in prosocial behaviour subscale. Other instruments are more elaborate, such as The Teenage Inventory of Social Skills with 40 items measuring both prosocial and antisocial behavior [11]. In this study, the prosocial behavior subscale of SDQ was chosen to be used due to its availability in the Malay language, brevity and good psychometric properties.

Preliminary studies showed that rural adolescents who exhibit low levels of prosocial behavior are more likely to be involved in substance use in young adulthood compared to those who exhibit relatively high levels of prosocial behavior. The result of this study showed that prosocial behavior may have positive health consequences, and lead to behavioral trajectories that reduces risky health behaviors levels in rural adult populations [12]. There were also other studies which found that positive prosocial peer association was correlated to a decline in substance use, violence and misbehavior among adolescents [13,14]. Prosocial behavior seem to serve as protective factor especially when applied outside the family settings [15]. Promotion of successful youth development also involved strengthening of prosocial behavior as an integral aspect of the intervention goals [16].

Although previous scientific work highlighted the association between prosocial behavior and substance use disorders, particularly alcohol use disorders; markedly less information has been available on its association with tobacco use and its disorders. More evidence is further needed to support the prosocial behavior effects on substance use. Therefore, this study investigates the prevalence of ever smoking and ever drinking of alcohol and the association between the trying of smoking and ever drinking with prosocial behavior among school-going adolescents in Terengganu, Malaysia.

2. Methods

2.1. Study design and participants

This cross-sectional study was done from December 2018 to September 2019 in Terengganu state, which is situated in eastern Peninsular Malaysia. Permission to hold the research activities in schools was obtained from Ministry of Education Malaysia, Terengganu Department of Education, and the selected schools authorities. The research acquired ethical approval from Universiti Sultan Zainal Abidin Human Research Ethics Committee (UHREC) (UniSZA/UHREC/2019/104) and the involvement of students were entirely voluntary.

The sample size of 780 was obtained using the following single proportion formula in determining the prevalence of ever smoking among school-going adolescents:

$$n = (Z/\Delta)^2 P(1 - P)$$

n = Minimal sample size required.

Z = 1.96 (95% CI)

Δ = Precision = 0.05

P = Prevalence of ever smoking school-going adolescence = 21.4% [6].

$$n = (Z/\Delta)^2 P(1 - P) = (1.96/0.05)^2 \cdot 0.214(1 - 0.214)$$

$$n \approx 260$$

Considering the effect of cluster sampling, the sample size was doubled; $260 \times 2 = 520$. Another 50% was added to make-up for non-response; making the total required subjects $n = 780$.

Inclusion criteria was students aged 13–18 years old who can read and write. Those who were illiterate and could not understand Malay language were excluded from the study. The participants were recruited from twelve selected secondary schools in Terengganu, Malaysia. There are 151 government funded national secondary schools and 15 private schools in the state. Cluster sampling was done to select a total of eleven public schools and one private school. The schools were randomly selected from a list of secondary schools from Terengganu state, Malaysia for both cluster of public and private schools. A pre-visit was done to each school to brief the Principals of the schools regarding the study and distribute the research information to selected classes of Form One, Two and Four students. The number of classes selected to be involved in the study was 36 classes based on an estimation of a minimum of 20 students per class. The classes were randomly selected from the list of all available classes using computerized random sampling with no particular distribution between the forms; based on a list of classes provided by school administration offices before the pre-visit. All the students who fulfilled the inclusion and exclusion criteria in the selected classes were given the research information sheets together with the study consent forms to be brought back and signed by their parents. During the data collection visit, self-administered questionnaires were distributed to students who provided parental consent.

2.2. Tools

Self-administered questionnaires in Malay language were used for the data collection and were completed by the participants in their respective classrooms. The researchers were available to provide assistance. The questionnaire consisted of questions from the Global school-based student health survey (GSHS) and the Strength and Difficulties Questionnaire (SDQ).

The GSHS questionnaire is a self-administered questionnaire developed to collect data on health behavior of young people and some protective factors related to the major causes of worldwide adult and children morbidity and mortality. It was a measure used in the Global Student Health Survey, which is a joint surveillance project that measured the behavioral risk factors and protective factors among young people aged 13–17 years for 10 key areas [17]. This study only used the part of the questionnaire that screens for substance use. Ever alcohol drinking was defined as any alcoholic beverage intake in the respondents' lifetime and ever smoking was defined as any smoking of cigarettes in their lifetime. The information for ever smoking was taken from the question "How old were you when you first tried a cigarette?" with seven response options. The response "I have never smoked a cigarette" was classified as "no" and coded as 0 while other responses were classified as "yes" and coded as 1. Similarly, the information for alcohol taking was taken from "How old were you when you had your first drink of alcohol other than a few sips?". The response "I have never had a drink of alcohol other than a few sips" was classified as "no" and was coded as 0 while other responses were classified as "yes" and coded as 1.

The SDQ is a widely used behavioral screening tool, which has been validated in multiple languages [18]. It was developed by Goodman and colleagues as an open access screening tool. It has 25 items that give rise to five subscales of five items each; which are Prosocial Behavior, Peer

Problem, Emotional Problem, Conduct Problem and Hyperactivity subscales. For each of the five subscales the score ranges from zero to 10. The SDQ is generally considered an instrument with good psychometric properties and its construct validity has been supported in the literature [20,21]. The Malay Self-rated SDQ version has been validated with reliable internal consistency, showing a Cronbach's alpha coefficient of 0.70 [22]. In this validation study, the Prosocial Behavior subscale was the most psychometrically sound among all the subscales; with a Cronbach alpha of 0.70 for and all the subscale items loading only on the particular subscale. The other subscales were less reliable with Cronbach alpha ranging from 0.20 to 0.62. Therefore, the Malay self-rated Prosocial Behavior subscale was used in this study. The five items in the prosocial behavior scale are as follows with a scoring of 0 (not true) to 2 (certainly true) for each item: (1) "I try to be nice to other people" (2)"I usually share with others..." (3) "I am helpful is someone is hurt..." (4)"I am kind to younger children" (5) "I often volunteer to help others". For the purpose of data analysis, the total score for each subgroup can be taken as continuous variables; or the scores can be categorized into 'normal', 'intermediate' and 'abnormal' based on the scores of 0–4 for 'abnormal', 5 for 'intermediate' and more than 5 for 'normal' for prosocial behavior. However, these categories were defined based on the United Kingdom population [19]. Therefore, for the analysis in this study, we used the total score for prosocial behavior as a continuous variable.

2.3. Data analysis

Data were entered into SPSS version 25 from the collected questionnaires. Data were then checked for completeness. Those with any missing data were excluded, leaving completed ones for analysis. Descriptive statistics were done using frequencies (n) and percentages (%) for categorical data and means and standard deviations calculated for continuous data. Simple and Multiple Logistic Regression were used to delineate the associated factors for ever smoking and drinking alcohol for both dependent variables of smoking and alcohol drinking. Independent variables analyzed were age, gender, race, marital status of parents, household income, presence of family members smoking/drinking alcohol and SDQ score for Prosocial Behavior. For the multivariate analysis, variables from the univariate analysis that had $p \leq 0.25$ were

included; those with $p < 0.05$ and confidence interval (CI) not including 1 remained in the final model.

3. Results

Response rate was 94.6% as 732 adolescents out of 774 completed the questionnaire. However, one response was excluded due to missing data; leaving 731 analyzed.

Ever trying of smoking in our population was 13% (95% CI: 0.11, 0.16) while 5.2% (95% CI: 0.04, 0.07) had drank alcohol at least once.

Descriptive and univariate analysis is presented in Table 1 for ever smoking, and Table 2 for ever alcohol drinking. Majority of the respondents were Malay (93.7%) and female (54.3%).

Adolescents who never tried smoking had a higher mean score of prosocial behavior (7.18) compared to those who had tried (6.31) with $p < 0.001$ in univariate analysis. However, this observation was not seen in adolescents with ever alcohol drinking. In fact, there is a lesser mean for prosocial behavior score for adolescents who had consumed alcohol (6.92) compared to those who did not (7.07). However, this difference was not statistically significant even in univariate analysis ($p = 0.628$).

For further multivariate analysis, responses for the variable of 'Household Income' were regrouped into 'Less than 3000' and 'RM3000 and more' as some cells had a count value of 5 and less with the four original grouping.

Table 3 shows the associated factors of smoking by simple and multiple logistic regression models. Age increases the odds for ever smoking by 24% with 1-year increase in age. Male adolescents had 8.37 times higher odds to try smoking compared to their female counterparts. Having a family income of less than RM3000 increases the odds for ever smoking by 1.88 times. Adolescents who had immediate family members who smoked were at 2.45 higher odds to try smoking compared to those who did not. Finally, a 1-point higher score in prosocial behavior scale reduces the odds for ever smoking by 16%. Race and parental status were not included in the final model as the adjusted p-values were more than 0.050.

4. Discussion

The prevalence of ever smoking and alcohol drinking in this study were lower compared to the previous national data. In our study, the

Table 1. Descriptive characteristic of respondents according to ever-smoking and no smoking respondents.

Variable	Total n (%)	No smoking n (%)	Smoking n (%)	t statistics (df)	χ^2 (df)	p-value
Gender						
Male	334 (45.7%)	252 (75.4%)	82 (24.6%)		70.28 (1)	<0.001
Female	397 (54.3%)	383 (96.5%)	14 (3.5%)			
Age	14.8 (1.40) ^a	14.2 (1.6) ^a	15.8 (1.7) ^a	2.89 (123.95)		0.007
Race						
Malay	685 (93.7%)	589 (86.4%)	96 (13.4%)		16.07 (1)	0.059
Others	46 (6.3%)	46 (97.8%)	1 (2.2%)			
Household Income (RM)						
More than 10 000	27 (3.9%)	48 (90.6%)	5 (9.8%)		12.99 (3)	0.005
3000–10 000	227 (32.8%)	207 (91.2%)	20 (8.8%)			
1000–2999	252 (36.5%)	220 (87%)	32 (12.7%)			
Less than 1000	186 (26.8%)	148 (79.6%)	38 (20.4%)			
Marital Status						
Married	666 (91.2%)	584 (87.7%)	82 (12.3%)		4.68 (1)	0.031
Divorced/separated/widowed	64 (8.8%)	50 (78.1%)	14 (21.9 %)			
Family members smoking						
None	429 (58.1%)	395 (92.1%)	34 (7.9%)		24.87 (1)	<0.001
Present	301 (41.2%)	239 (79.4%)	62 (20.6%)			
Prosocial Behaviour	7.06 (1.88) ^a	7.18 (1.84) ^a	6.31 (1.94) ^a	4.10 (122.4)		<0.001

^a Mean (SD).

Table 2. Descriptive characteristic of respondents according to ever-drinking alcohol and no alcohol respondents.

Variable	No alcohol n (%)	Alcohol n (%)	t statistics (df)	χ^2 (df)	p-value
Gender					
Male	317 (94.9%)	17 (5.1%)		0.015 (1)	0.903
Female	376 (94.7%)	21 (5.3%)			
Age	14.7 (1.38) ^a	13.76 (1.38) ^a	14.08 (41.12)		<0.001
Race					
Malay	675 (98.5%)	10 (1.5%)		293.87 (1)	<0.001
Others	19 (45.3%)	27 (54.7%)			
				14.63 (3)	
Household Income (RM)					
More than 10 000	48 (90.6%)	5 (9.8%)			0.002
3000–10 000	209 (92.1%)	18 (7.9%)			
1000-2999	241 (95.6%)	11 (4.4%)			
Less than 1000	185 (99.5%)	1 (0.5%)		4.68 (1)	
Marital Status					
Married	633 (95%)	33 (5%)			0.031
Divorced/widowed	59 (92.2%)	5 (7.8 %)		222.95 (1)	
Family members drinking alcohol					
None	677 (97.7%)	16 (2.3%)			<0.001
Present	15 (41.7%)	21 (58.3%)			
Prosocial Behaviour Score	7.07 (1.88) ^a	6.92 (1.95) ^a	0.48 (725)		0.628

^a Mean (SD).

Table 3. Associated factors of ever smoking by simple and multiple logistic regression models.

Variable	Simple Logistic Regression			Multiple Logistic Regression		
	b	Crude OR (95% CI)	p	b	Adjusted OR (95% CI)	p
Age	0.15	1.16 (0.99, 1.37)	0.049	0.21	1.24 (1.03, 1.48)	0.022
Gender						
Female	0	1		0	1	
Male	2.18	8.90 (4.94, 16.04)	<0.001	2.13	8.37 (4.52, 15.50)	<0.001
Household Income						
RM3000 and more	0	1		0	1	
Less than RM3000	0.66	1.94 (1.20, 3.15)	0.001	0.63	1.88 (1.10, 3.20)	0.020
Family Members Smoking						
Absent	0	1		0	1	
Present	1.10	3.01 (1.93, 4.72)	<0.001	0.91	2.45 (1.52, 4.05)	<0.001
Prosocial behavior score	-0.25	0.78 (0.64, 0.88)	<0.001	-0.171	0.84 (0.74, 0.96)	0.010
Race						
Malay	0	1		-	-	-
Non-Malay	1.10	3.01 (1.93, 4.72)	0.059			
Parents marital status						
Married	0	1				
Divorced/Widowed/Separated	0.69	1.99 (1.06, 3.77)	0.030	-	-	-

Multicollinearity and interaction term were checked and not found.

Classification table (overall correctly classified percentage = 87.1%, which is >70%), Hosmer-Lemeshow test (not significant) and area under the ROC curve proved the model fitness.

Forward LR Multiple Logistic Regression model was applied.

prevalence of ever smoking among school-going adolescents was 13%, compared to 21.4% in a previous nationwide Malaysian study in 2015 [6]. This may mean that the tobacco public health prevention measures has succeeded to bear effects on the adolescent population. Prevalence of ever consumption of alcohol among adolescents was 5.2%, compared to 19.3% in the National Health and Morbidity Survey 2017 [5]. While this also may be a success of the public health measures, this finding may also be due to the overtly predominant Malay population (93.7%) compared to the national survey, where the composition of Malay race adolescents

was 69.8%. Malaysians of Malay race are generally of Islamic religion; which prohibits alcohol consumption thus exerting some prohibitive effect towards the trying of alcoholic drinks. However, data regarding religion were not collected in the study. However, the previous national survey did not find race as a significant factor associated with adolescent alcohol consumption [5].

Preventative science suggests that negative health outcome such as substance use disorders and the complications, are possible to be prevented by reduction of the known risk factors and augmentation of the

protective factors [23]. Therefore, the National Institute of Drug Abuse (NIDA) stresses on the targeting of modifiable risk factors for substance use and improving the protective factors for it through community, family and school prevention programs [4]. Tobacco smoking still represents a public health challenge due to the significant morbidity caused by tobacco-associated diseases and the prevalence still remains high despite all the public health measures implemented. Specifically tailored evidenced based targeted measures are needed especially to prevent onset of smoking among younger generations and this may be the key to reduce the public health burden caused by tobacco smoking.

This study showed the potential of prosocial behavior as a protective factor for smoking cigarettes. Ever smoking was significantly associated with lower prosocial behavior scores together with other significantly associated factors; namely older age, male gender, poorer family income, and smoking in immediate family members. Previous studies on adolescent substance use in Malaysia also found a relationship between adolescents' substance use with increasing age and substance misuse in relatives [24,25]. The type of school and disciplinary problems in school were also found to be significant factors associated with substance use [24], which were not assessed in this study. A more recent Malaysian nationwide study also found current smoking to be more in males and in those having family members who smoke [25,26] and also in those with history of drinking, drug use and being bullied [25]. A review of Malaysian smoking research noted that smoking was significantly associated with having family and peers who smoke, race, religion, alcohol intake, and having risk-behaviours such as truancy, loitering, bullying and stealing [27]. Other studies have shown substance use, including alcohol was associated with delinquency [28]. No previous research has analyzed the relationship of prosocial behavior with cigarette smoking [27].

In this study, there was significant inverse association of prosocial behavior with ever smoking among the respondents. This association may be due to the lack of manifestation of prosocial behavior as part of a personality trait associated with smoking. Personality traits have been given special attention in previous research that showed it as potential mediator for the development and onset of nicotine dependence [29]. The health behavior model of personality is one of the top theories that points out the role of personality in the determination of health in a person [30,31]. This model highlights certain personality traits such as conscientiousness and neuroticism as being associated with either health promoting or health debilitating behaviors (for example smoking, drinking or drug use), thus determining the individual health outcomes [32].

However, the association of prosocial behaviour with ever alcohol consumption was not found in our study. This shows that there are differences in the population who tried alcohol compared to those who tried cigarettes. The low prevalence of alcohol consumption in our study population may be one of the cause and thus this finding should be further evaluated in a sample more representative of the national population. This finding was nevertheless similar to a previous study done in college students which showed prosocial tendencies had no significant correlations with any alcohol use [33]. However, studies looking at the relationship of prosocial behaviour with the dose or amount of alcohol intake did show mixed evidence of relationship of prosocial behaviour with alcohol intake frequency and rate. This may be due to the role or response of alcohol in different individuals with different levels of conflict. An experimental study previously showed that a mild dose of alcohol improved the helping rate of high-conflict subjects pressured helping with a task they disliked, but similar result were not achieved in a sample of low-conflict subjects who either weakly pressured to help or favored the task [34]. A reverse association between alcohol intake rate and prosocial behavior however emerged in a different study, which showed that adolescents who were involved in prosocial activities took alcohol significantly less frequently and use fewer substances than those who were not involved [35].

The relationship of prosocial behavior and substance use may also be due to peer association as peer association was shown to be related to prosocial behavior and substance use [35]. Peer association is likely to have an influence in the development of prosocial behavior and other behaviours. A previous longitudinal study did show that increase in prosocial behavior was inversely related with aggressive behavior and delinquency, which was also related to peer influence [13]. Furthermore, prosocial behavior was shown to be associated with the development of other behaviors. Adolescents with high prosocial behaviour from childhood were shown to have less externalizing behavior during adolescence as opposed to the low prosocial behaviour group. The study also suggested that prosocial behavior tend to be stable during middle childhood up to late adolescence [36]. These findings suggest the significant impact that prosocial behaviour may have towards the psychological and behavioural aspects of an adolescent.

Therefore, the promotion of prosocial behaviors during childhood and adolescents has a potential impact towards smoking initiation and the development of other positive psychological effect. Efforts to inculcate prosocial behaviours have been shown to be effective and possible. The development of prosocial behavior can be influenced by training and skill expansion. It requires emotional competence, which takes place through skill expansion in the developmental process during childhood and adolescents [37]. A previous study, which carried out a school-based culturally adapted intervention, proved that this kind of intervention could be effective in enhancing resilience and promote prosocial behaviors among students [38]. Thus, efforts to promote prosocial behaviour do seem worthwhile in prevention of adolescents from substance use and curb the ill-effects from substance use disorders later on.

The main limitation in the current study is the cross sectional design of the study, as it cannot be used to imply causality. Future longitudinal study should be carried out which is more effective to determine the effect of prosocial behavior towards substance use. The sample used in this study was limited to school-going adolescents in Terengganu state only, which may affect generalizability. Data regarding religion and accessibility towards tobacco and alcohol were not taken into account in the study, which may have some influence in the low prevalence of ever smoking and alcohol drinking. Reliance towards self-report data was also one of the limitations of the study. However, the strength of the study include the adequate sample size and multivariate analysis. Future studies should use a longitudinal study design using a national representative samples. Hence, a more comprehensive prevention program could be proposed using prosocial behavior as a target intervention.

5. Conclusion

Ever smoking among school-going adolescents was significantly associated with reduced prosocial behavior scores; together with other significantly associated factors; namely older age, male gender, poorer family income, and smoking in immediate family members. However, there was no association between prosocial behavior score with ever alcohol drinking. Prosocial behavior may be protective towards the trying of smoking in adolescents. Future longitudinal study should be done to investigate the effects of promoting prosocial behavior among adolescents towards the hazardous act.

Declarations

Author contribution statement

N. M. Hassan: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

A. A. Aziz: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

R. Husain: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

N. Daud: Conceived and designed the experiments; Wrote the paper.

S. N. Juhari: Conceived and designed the experiments; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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References

- [1] Institute for Public Health (IPH), Malaysian Burden of Disease and Injury Study, Health Prioritization: Burden of Disease Approach, Institute of Public Health, Ministry of Health Malaysia, 2018.
- [2] K. Shield, J. Manthey, M. Rylett, et al., National, regional, and global burdens of disease from 2000 to 2016 attributable to alcohol use: a comparative risk assessment study, *Lancet Public Health* 5 (1) (2020) E51–E61.
- [3] World Health Organization (WHO), Adolescent Health in the South-East Asia Region, WHO, 2020. <https://www.who.int/southeastasia/health-topics/adolescent-health>. (Accessed 16 January 2020).
- [4] National Institute on Drug Abuse (NIDA), Principles of Adolescent Substance Use Disorder Treatment: A Research-Based Guide, 2014. <https://www.drugabuse.gov/publications/principles-adolescent-substance-use-disorder-treatment-research-based-guide>. (Accessed 17 January 2019).
- [5] Institute for Public Health (IPH), Adolescent Health Survey 2017, National Health and Morbidity Survey 2017, Institute of Public Health, Ministry of Health Malaysia, 2017.
- [6] Institute for Public Health (IPH), Tobacco & E-Cigarette Survey Among Malaysian Adolescents (TECMA), Institute of Public Health, Ministry of Health Malaysia, 2016.
- [7] Institute for Public Health (IPH), Report of the Global Adult Tobacco Survey (GATS) Malaysia 2011, Ministry of Health Malaysia, 2012.
- [8] K.S. Bagot, J.M. Berarducci, F.H. Franken, M.J. Frazier, M.E.T. Eric, Adolescents with conduct disorder: early smoking and treatment requests, *Am. J. Addict.* 16 (1) (2007) 62–66. Available from, <https://pubmed.ncbi.nlm.nih.gov/17364424/>.
- [9] B.F. Andrade, D.T. Browne, R. Tannock, Prosocial skills may be necessary for better peer functioning in children with symptoms of disruptive behavior disorders, *Peer J.* 2 (2014). Available from, <https://pubmed.ncbi.nlm.nih.gov/25083349/>.
- [10] K.A. Dunfield, A construct divided: prosocial behavior as helping, sharing, and comforting subtypes, *Front. Psychol.* 5 (2014) 958, 2014 Sep 2.
- [11] Martí-Villar M, Corell-García L & Merino-Soto C. Systematic review of prosocial behavior measures. *Rev. Psicolog.*, 37(1), 349377.
- [12] G. Carlo, L.J. Crockett, J.L. Wilkinson, et al., The longitudinal relationship between rural adolescents' prosocial behaviors and young adult substance use, *J. Youth Adolesc.* 40 (9) (2011) 1192–1202.
- [13] M.J. Prinstein, J. Boegers, A. Spirito, Adolescents and their friends' health-risk behaviour: factors that alter or add to peer influence, *J. Pediatr. Psychol.* 26 (2001) 287–298.
- [14] L.M. Padilla-Walker, R.A. Bean, Negative and positive peer influence: relations to positive and negative behaviors for African American, European American, and Hispanic adolescents, *J. Adolesc.* 32 (2009) 323–337.
- [15] National Institute on Drug Abuse, Preventing Drug Use Among Children and Adolescents: A Research Based-Guide for Parents, Educators and Community Leaders, second ed., U.S. Department of Human and Health Services, Maryland, US, 2003, pp. 8–9.
- [16] G.V. Caprara, B.P. Luengo Kanacri, A. Zuffianò, et al., Why and how to promote adolescents' prosocial behaviors: direct, mediated and moderated effects of the CEPIDEA school-based program, *J. Youth Adolesc.* 44 (12) (2015) 2211–2229.
- [17] World Health Organization (WHO), Global school-based student health survey (GSHS), Available from: <https://www.who.int/ncds/surveillance/gshs/en/>.
- [18] R. Goodman, T. Ford, H. Simmons, R. Gatward, H. Meltzer, Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample, *Br. J. Psychiatry* 177 (2000) 534–539.
- [19] Youth-in-mind, SDQ_English(UK)_4-17scoring. Scoring the SDQ, 2016. Available from, <https://www.sdqinfo.org/py/sdqinfo/c0.py>.
- [20] A. Björnsdotter, P. Enebrink, A. Ghaderi, Psychometric properties of online administered parental strengths and difficulties questionnaire (SDQ), and normative database on combined online and paper-and-pencil administration, *Child Adolesc. Psychiatr. Ment. Health* 7 (1) (2013) 40. Available from, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3898053/>.
- [21] W.C. Dickey, S. Blumberg, Revisiting the factor structure of the strengths and difficulties questionnaire: United States, 2001, *J. Am. Acad. Child Adolesc. Psychiatr.* 43 (2004) 1159–1167.
- [22] M.H. Nurulhuda, R. Husain, A.A. Aziz, N.N. Mazubir, S.N. Juhari, D. Norwati, Validation of the Malay version of the self-rated strength and difficulties (SDQ) questionnaire, *Int. J. Acad. Res. Bus. Soc. Sci.* 9 (11) (2019) 358–373.
- [23] G. Carlo, L.J. Crockett, J.L. Wilkinson, et al., The longitudinal relationships between rural adolescents' prosocial behaviors and young adult substance use, *J. Youth Adolesc.* 40 (2011) 1192.
- [24] M.N. Mohamed, S. Marican, N. Elias, Y. Don, Pattern of substance and drug misuse among youth in Malaysia, *J. Antidadah Malaysia* 3 (2008) 1–55.
- [25] G.H. Tee, G. Kaur, Correlates of current smoking among Malaysian secondary school children, *Asia Pac. J. Publ. Health* 26 (5 Suppl) (2014) 70S–80S.
- [26] M.M.T. Aung, S.S. Oo, A. Hassan, S. Amaran, M.M.M. Iskandar, A.A. Aziz, R.M. Amin, T.M.A.R. Hussin, V. Bhagat, Prevalence study on tobacco smoking and related factors of among residents of a suburb Kuala Terengganu, Malaysia, *Res. J. Pharm. Technol.* 12 (5) (2019) 2430–2438.
- [27] W.L. Huan, C.C.M. Hsien, Y.S. Nantha, A review of smoking research in Malaysia, *Med. J. Malaysia* 71 (2016).
- [28] M. Mohamad, M. Mohammad, N.A. Mat Ali, Z. Awang, The impact of life satisfaction on substance abuse: delinquency as a mediator, *Int. J. Adolesc. Youth* 23 (1) (2018) 25–35.
- [29] C. Hakulinen, M. Hintsanen, M.R. Munafo, M. Virtanen, M. Kivimäki, G.D. Batty, et al., Personality and smoking: individual-participant meta-analysis of nine cohort studies, *Addiction* 110 (11) (2015 Aug) 1844–1852. Available from, <https://pubmed.ncbi.nlm.nih.gov/26227786/>.
- [30] H.S. Friedman, Long-term relations of personality and health: dynamisms, mechanisms, tropisms, *J. Pers.* 68 (2000), 1089–1081081. Available from, <https://pubmed.ncbi.nlm.nih.gov/11130733/>.
- [31] T.W. Smith, Personality as risk and resilience in physical health, *Curr. Dir. Psychol. Sci.* 5 (2006) 227–231.
- [32] N.A. Turiano, D.K. Mroczek, J. Moynihan, B.P. Chapman, Big 5 personality traits and interleukin-6: evidence for “healthy neuroticism” in a US population sample, *Brain Behav. Immun.* 28 (2013) 83–89.
- [33] I. Gabriella, C.D. Sneed, Prosocial Behavior and Alcohol Use Among College Students: A Correlational Study, Western Psychological Association, 2018.
- [34] C.M. Steele, B. Critchlow, T.J. Liu, Alcohol and social behavior II: the helpful drunkard, *J. Pers. Soc. Psychol.* 48 (1) (1985 Jan) 35–46.
- [35] B.K. Barber, L.D. Erickson, Adolescent social initiative: antecedents in the ecology of social connections, *J. Adolesc. Res.* 16 (2001) 326–354.
- [36] E. Flynn, S.E. Ehrenreich, K.J. Beron, M.K. Underwood, Prosocial Behavior: Long-Term Trajectories and Psychosocial Outcomes, *Soc. Dev.* 24 (3) (2015) 462–482. Available from, <https://pubmed.ncbi.nlm.nih.gov/26236108/>.
- [37] V. Bhagat, N. Simbak, K. Jaalam, Promoting awareness of emotional development to endorse emotional competence, *Res. J. Pharm. Technol.* 11 (7) (2018) 3216–3218.
- [38] R. Berger, J. Benatov, R. Cuadros, J. VanNattan, M. Gelkopf, Enhancing resiliency and promoting prosocial behavior among Tanzanian primary-school students: a school-based intervention, *Transcult. Psychiatr.* 55 (6) (2018) 821–845. Available from, <https://pubmed.ncbi.nlm.nih.gov/30091688/>.