Depression Severity and its Associated Factors among School-Going Adolescents in Malaysia

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ABSTRACT

Objective: Depression is the single largest contributor to the global burden of disease. Depression was found as a common disorder among children lower than 18 years old. The aim of this study is to determine the prevalence and factors associated with depression severity among adolescents in Malaysia.

Study design: A cross-sectional study

Methods: In order to achieve the objective of this study, secondary data analysis from Malaysian National School Based Health Survey 2012 was carried out, involving a total of number of 21,764 eligible school adolescents between the ages of 12 to 18 years old. Additionally, complex sample ordinal logistic regression was also employed for analysing and quantifying the odds ratio, in which 95% confidence interval was achieved.

Results and Discussion: This study discovered that the prevalence of mild, moderate and severe depression was 16.6%, 12.8% and 3.8% respectively. The result of the multivariable analysis showed that females have 32% more risk in having more severe depression as compared to males. Indians ethnics have 73% higher odds in developing more severe depression as compared to Malays. Those who were smoker and drink alcohol have 30% higher risk in having more severe depression as compared to non-smoker and who do not drink alcohol. Adolescent who ever used drug had 81% higher chance in having more severe depression as compared to those who never used drug. Adolescent who ever had suicidal ideation had 3-time greater chance in having more severe depression as compared to whom don't. Adolescent who involved in truancy activity had 31% higher chance in having more severe depression as compared to those who didn't. Adolescent who ever being bullied had 84% higher chance in having more severe depression as compared to those who never been bullied. Adolescent who have parent or guardian never or rarely know what they were doing had 33% greater risk in having more severe depression as compared to who have parent or guardian know what they do. Lastly, adolescent who have parent or guardian never or rarely understand what their problems and worries had 29% greater risk in having more severe depression as compared to who have parent or guardian understand their problems and worries.

Conclusion: The submission of this study is that there is need for prevention and intervention programs, which must be designed and targeted towards adolescents who are exposed to various risks identified in this study.

Keywords: Adolescent; Depression severity; Ordinal regression

INTRODUCTION

Adolescents are individual aged 10-19 years who have been estimated to be about 1.2 billion people which constituted 18% of the global populations [1]. Based on this, research shows the need of good mental health for adolescents in building normal emotional and mental development, and to develop their potential in fulfilling relationship with peers and families in order to be able to deal with the challengers of the future [1].

There are different studies that have proven depression to be a common mental disorder and major contributor to the overall

global burden of disease [2-5]. It is also a common disorder among children that are below 18 years old [1,4]. Furthermore, Avenevoli et al. [6] employed the National Comorbidity Survey Adolescents Supplement (NCS-A) data in their study and discovered that about 11% of adolescents possess depression disorder before reaching the age of 18 years old. As such, this has given serious impact on the socialization, family relations, and performance at school of these categories of individuals, which could further result to fatal situation [7]. Recent events have shown that depression in adolescents poses a greater risk of frequent hospitalizations, recurrent depressive episodes, psychosocial impairment, alcohol abuse, drug abuse, violence and anti-social behavior as they grow up. Prospectively, it will contribute to the negative attributes in adolescents, such as weakened interpersonal relationships, impairment in the overall function, teenage pregnancy and increased physical problems even after been recovered from such mental disorder [8-10]. Nowadays, major depression disorder in adolescents has become a major cause in leading to the common suicidal behavior exhibit by this set of people [11]. Based on this, researchers have stated that adolescents who are affected with depression in the early stage of life often suffer throughout their lifetime. This is because early depression in one's life predicts more severe depression during adulthood as seen in many cases.

Conversely, majority of available studies have reported the prevalence of depression among adolescents, which is estimated to be about 8% to above 20% of their population [12-19]. Although, there are various report on the prevalence of depression, but it majorly depends on which symptoms and degree of severity used to measure it. However, according to the report of the World Health Organization (WHO), the severity of depression and can be classified as mild, moderate or severe [5]. A study carried out in Saudi Arabia showed that among 490 secondary school students, 33.9% of them were found to have mild depression, 22.4% have moderate depression and 11% have severe depression [15]. Additionally, in a cross-sectional study carried out in Sri Lanka to screen depression and anxiety among students aged 14-18 years old during the school mental health programs discovered that among the 445 students involved in this study, 36% of them were screened positive for depression, 17% with mild depression and 19% with severe depression [19]. Furthermore, in city of Chandigarh, India, a community-based cross-sectional study was carried out among 542 adolescents (13-18 years old) using the Patient Health Questionnaire (PHQ-9). This study showed the overall prevalence of depression was 40.1%, in which 29.7% of them have mild depression, 15.5% have moderate depression and 4.8% have moderate severe to severe depression [18].

In Malaysia, a study was carried out by Latiff et al. [20], in which they employed the use of validated Depression, Anxiety and Stress Scale (DASS) of 12 questionnaires among secondary school students (13-17 years old), and the study reported 42.5% of prevalence of moderate to extremely severe depression symptoms among this group. In their report, 33.2% of them have mild depression, followed by 21.5%, 18.1% and 3.0% who having moderate, severe and extremely severe depression respectively. As such, depression among Malaysia adolescents has been seen to be increasing based on previous studies on adolescents and its associated factors [21-23]. Although, most of these studies focused on depression among higher institutions and university students rather than secondary

school [24-26]. However, there have not been much studies on depression by severity and the associated factors among adolescents neither in other countries nor in Malaysia. Hence, the purpose of this study is to determine the prevalence and factors associated with severity of depression among school-going adolescents in Malaysia.

METHODS

Source of data

This study adopted from The National School-Based Health Survey 2012. The National School-Based Health Survey of 2012 was a nationwide cross-sectional study of secondary school students in Malaysia. The Global School Health Survey (GSHS) and the Mental Health Survey was part of the main survey. The National School-Based Health Survey 2012 was implemented as a multistage stratified cluster sampling method. The states within Malaysia were stratified and included into the survey. There were two stages involved in the survey. The first-stage selection was the school within states and the second stages were the classes from the selected schools. A total of 234 schools were randomly selected from 2,112 secondary schools, while three to 11 classes were randomly selected proportionate to the size of the school. All students in the selected classroom were invited to participate in the survey. The selection of both stages was done by the Centre for Disease Control and Prevention (CDC). A total of 21,764 school-going adolescents aged 12 to 18 years in Malaysia participated in this study. The study was carried out through all states in Peninsular and East Malaysia, in order to produce a representative sample of school-going adolescents aged 12 to 18 years. Field data collection was done from March 2012 to May 2012. The detailed of the methodology can be found elsewhere [27].

The Global School Based Health Survey questionnaire consisted of 10 modules, which included alcohol use, dietary behaviors, drug use, hygiene, mental health, physical activity, protective factors, sexual behaviors, tobacco use, and violence and unintentional injury with 77 statements. A bilingual self-administered (Malay and English) pre-coded questionnaire was designed, pre-tested and piloted prior to the administration of the survey. While, for Mental Health Survey, The Depression, Anxiety, and Stress Scale (DASS-21) questionnaire, Malay version was been used in measuring the severity of a range of symptoms common to depression, anxiety, and stress. DASS-21 questionnaires have 21 statements; 7 items for each depression, anxiety and stress. Students with written parental consent were eligible in the survey and the data collection was implemented using self-administered questionnaire. The questionnaires were anonymized, and each student were given enveloped to put in the completed copies. Once the questionnaire completed, trained research assistant obtained their anthropometric measurement. A portable body meter (SECA Stadiometer 213) was used to measure the adult's height to the nearest 0.1 cm and for body weight was measured using Tanita Personal Scale HD 319 to the nearest 0.1kg. Both tools had been validated and calibrated and both measurements were taken twice per respondent.

Dependent variables

Depression was defined as respondents having moderate to extremely severe depressive symptoms by the Depression, Anxiety and Stress Scale (DASS-21) scoring system. There were 7 items

to measure depressive symptoms. The answer for each item was scored as 0 (did not apply to me at all-never),1 (Applied to me some degree, or some of the time-sometimes), 2(Applied to me a considered degree, or good part of the time-often), or 3 (Applied to me very much or most of the time-almost always). Scoring for the depression items in DASS-21 were ranged from 0 to 28. Severity of depression were classified from the total score of depression scale which 0-9 was considered as normal, 10-13 was mild, 14-20 was moderate, 21-27 was severe and 28 and above was considered as extremely severe. The sum of scores of depression items was multiplied by 2 and it was categorized to severity group by original DASS Scale (DASS-42). However, for the purpose of this study, severity of depression (dependent variable) was categorized as normal, mild, moderate and severe.

Independent variables

The demographic information included in this study were age, sex, ethnicity (Malay, Chinese, Indian, Other Bumis and Others) and Form (Form 1 to Form 5). This study also refers to substance use (tobacco, alcohol, or drugs) as "Yes" when the response is positive to smoking at least 1 cigarette, drinking at least little alcohol, and used drug at least once (heroin, morphine, glue, amphetamine, ecstasy, syabu, ice and cannabis) in the past 30 days prior to the survey. Additionally, have been bullied in this study was defined as "Yes" when the respondents are reported to have been bullied on 1 or more days in the last 30 days prior to the survey. Furthermore, truancy was coded as "Yes" when the response to the question, (During the past 30 days, on how many days did you miss classes or school without permission?) was at least 1 day prior to the survey. Lack of parental bonding was categorised to those whose parents or guardian had never or rarely knew what their children were doing in their free time in the last 30 days prior to the survey. This study also categorised lack of parental connectedness to those who reported that their parents or guardians never or rarely understood their problems and worries in the last 30 days prior to the survey [23]. Finally, BMI was calculated and categorised as severe thinness, thinness, normal, overweight and obese using the WHO Growth Chart of 2007 (BMI for age 5-19 years old) guideline [28]. However, for the purpose of this study, BMI status was recorded into 3 categories (thin, normal and overweight).

STATISTICAL ANALYSIS

The data of this study were analyzed using Stata (SE) version 14 (Stata Corp, 2015), while descriptive statistics were also employed (frequency, mean and standard deviation). As such, complex sample (CS) descriptive analysis was used for the prevalence of depression considering severity in the population with 95% confidence interval. Accordingly, Uni-variable (CS Ordinal Logistic Regression) and multivariable analysis (CS Ordinal Logistic Regression) were carried out in this study. In which a Wald test was also conducted to assess each variable's contribution to the model employed in this study, vis a vis the check of multicollinearity and interaction respectively. Hence, a final model was created, including all the predictors and interactions that were significantly associated at the level of p <0.05 thereby able to check their overall fitness using a weighted classification table and ROC (receiver operating characteristic) curve for each binary logit model. This was followed by a regression diagnostic in order to identify any influential and extreme outliers.

The findings are presented as crude and adjusted odds ratios with their 95% confidence intervals. All statistical analysis employed in this study utilized the complex sampling design so as to account for the sample weightage and study design properties.

RESULTS

Descriptive statistics

The total number of eligible respondents aged 12 to 18 years old in this study was 21,764, representing 1,891,602 estimated populations of Malaysian adolescents. Based on this, their overall mean age was 14.19 years old, and the standard deviation was 1.47. However, this study took into cognizance the participation of equal number of males and females. While in terms of form, 20.8% of the respondents were recruited from form 1, 20.7% form 2, 22.0% form 3, 18.2% form 4, in which the remaining 18.3% were from form 5. The ethnicities population of this study are as follows; 67.0% were Malays, followed by 18.1% Chinese, 7.8% other Bumis, 5.5% Indians, and 1.6% others.

Interestingly, more than 90% of the respondents claimed they were non-smokers while the remaining 9.9% reported as being smokers. While a total of 1536 (7.1%) and 157 (0.7%) respondents reported taking alcohol and drugs respectively. It was also discovered that more than 70% of the respondents had no experience of truancy. About 16.1% of these respondents were found to have been bullied, with more than a quarter of them reported lack of parental bonding. As such, approximately 30% of these adolescents reported lack of parental connectedness in this study. Overall, most of the respondents have normal BMI (68.2%), followed by overweight (25.1%) and thin (6.7%) (Table 1).

Prevalence of depression status according to severity

The overall prevalence of depression of this study among the respondents was 33.2% (95% CI: 32.00, 34.37), representing 627,577 of the total population of school-going adolescents in Malaysia. While the prevalence for normal, mild, moderate and severe depression were 66.8%, 16.6%, 12.8% and 3.8% respectively.

Complex sample simple and multivariable ordinal regression

Univariable analysis was employed in this study by testing all the 13 variables from descriptive analysis in order to screen for the important independent variables. By the univariable analysis of Simple Ordinal Logistic Regression carried out in this study, it was discovered that 10 out of these 13 variables, such as gender, ethnicity, smoking status, alcohol use, drug use, truancy, have been bullied, lack of parental bonding and lack of parental connectedness were found to be significant to the model (p<0.05). In addition, the multiple ordinal regression analysis revealed that all these 9 variables were found vulnerable to experience more severe depression as shown in Table 2.

DISCUSSION

Our result showed a similar pattern with other previous studies conducted in Saudi Arabia 15 and India. 18 A previous study conducted among Malaysian secondary school students had

Table 1: Socio-demographic characteristics and risk factors of sample based on severity of depression (Unweighted Count n = 21,764).

Variables	Overall n (%)	Stages of Depression			
		Normal n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Age (year)[a]	14.19 (1.47)	14.17 (1.47)	14.27 (1.47)	14.21 (1.48)	14.12 (1.46)
Gender					
Male	10718 (49.2)	7547 (70.4)	1604 (15.0)	1178 (11.0)	389 (3.6)
Female	11046 (50.8)	7218 (65.3)	1928 (17.5)	1491 (13.5)	409 (3.7)
Form					
1	4517 (20.8)	3074 (68.1)	691 (15.3)	567 (12.6)	185 (4.1)
2	4500 (20.7)	3067 (68.2)	724 (16.1)	540 (12.0)	169 (3.8)
3	4790 (22.0)	3339 (69.7)	716 (14.9)	556 (11.6)	179 (3.7)
4	3973 (18.2)	2618 (65.9)	704 (17.7)	519 (13.1)	132 (3.3)
5	3984 (18.3)	2667 (66.9)	697 (17.5)	487 (12.2)	133 (3.3)
Ethnicity					
Malay	14592 (67.0)	1023 (70.1)	2341 (16.0)	1584 (10.9)	444 (3.0)
Chinese	3929 (18.1)	2510 (63.9)	642 (16.3)	589 (15.0)	188 (4.8)
Indian	1195 (5.5)	704 (58.9)	189 (15.8)	221 (18.5)	81 (6.8)
Other Bumis	1704 (7.8)	1101 (64.9)	303 (17.8)	232 (13.6)	68 (4.0)
Others	344 (1.6)	227 (66.0)	57 (16.6)	43 (12.5)	17 (4.9)
Smoking status					
Yes	2158 (9.9)	1326 (61.4)	385 (17.8)	332 (15.4)	115 (5.3)
No	19606 (90.1)	13439 (68.5)	3147 (16.1)	2337 (11.9)	683 (3.5)
Alcohol use					
Yes	1536 (7.1)	854 (55.6)	287 (18.7)	286 (18.6)	109 (7.1)
No	20228 (92.9)	13911 (68.8)	3245 (16.0)	2383 (11.8)	689 (3.4)
Drug Use					
Yes	157 (0.7)	62 (39.5)	33 (21.0)	43 (27.4)	19 (12.1)
No	21607 (99.3)	14703 (68.0)	3499 (16.2)	2626 (12.2)	779 (3.6)
Truancy					
Yes	6163 (28.3)	3777 (61.3)	1133 (18.4)	947 (15.4)	306 (5.0)
No	15601 (71.7)	10988 (70.4)	2399 (15.4)	1722 (11.0)	492 (3.2)
Have been bullied					
Yes	3510 (16.1)	1869 (53.2)	696 (19.8)	679 (19.3)	266 (7.6)
No	18254 (83.9)	12896 (70.6)	2836 (15.5)	1990 (10.9)	532 (2.9)
Lack of parental bonding					
Yes	9433 (42.3)	5850 (62.0)	1715 (18.2)	1410 (14.9)	458 (4.9)
No	12331 (56.7)	8915 (72.3)	1817 (14.7)	1259 (10.2)	340 (2.8)
Lack of parental connectedness					
Yes	6477 (29.8)	3878 (59.9)	1221 (18.9)	1032 (15.9)	346 (5.3)
No	15287 (70.2)	10887 (71.2)	2311 (15.1)	1637 (10.7)	452 (3.0)
BMI status					
Thin	1453 (6.7)	982 (67.6)	234 (16.6)	178 (12.3)	59 (4.1)
Normal	14852 (68.2)	10089 (67.9)	2412 (16.2)	1816 (12.2)	535 (3.6)
Overweight	5459 (25.1)	3694 (67.7)	886 (16.2)	675 (12.4)	204 (3.7)

[a]Mean (SD)

showed a higher prevalence of severe depression than as reported in present study. This might be due to the fact that, the recruitment of respondents was done only among selected secondary school students and in one city - Pasir Gudang, Johor, Malaysia [20]. On the other hand, it might be as a result of the fact that the selected respondents are from 10 schools, which are from urban areas; thereby it doesn't truly represent the actual population of the Malaysian adolescents.

This study was discovered that female adolescents were found to be more prone to having the severe form of depression as compared to male counterpart. This is supported by another study on adolescents which also indicated that females are more likely to report severe depression symptoms than their males' folks [29]. Conversely, previous studies had reported the higher prevalence of depression to be due to the lack of parents' care of some adolescents, as some parents were found to behave very restrict to females' adolescent

Table 2: Factors associated with depression severity among adolescents in Malaysia.

Variables	Complex Sample Simple Ordinal Logistic Regression				Complex Sample Multiple Ordinal Logistic Regression			
	b (SE)	Adjusted OR (95% CI)	Adjusted Wald Statistics	p-value	b (SE)	Adjusted OR (95% CI)	Adjusted Wald Statistics	p-value
Age (year) [a]	0.006 (0.017)	1.01 (0.97, 1.04)	0.37	0.710	-	-	-	-
Gender								
Male	0	1	-	-	0	1	-	-
Female	0.20	1.23 (1.13, 1.33)	5.07	<0.001	0.33	1.38 (1.27,1.51)	7.69	<0.001
Ethnicity								
Malay	0	1	-	-	0	1	-	-
Chinese	0.25	1.29 (1.12, 1.48)	3.63	<0.001	0.14	1.15 (1.01,1.32)	2.10	0.037
Indian	0.71	2.04 (1.68, 2.47)	7.28	<0.001	0.63	1.89 (1.57,2.27)	6.83	<0.001
Other Bumis	0.22	1.25 (1.03, 1.52)	2.27	0.024	0.14	1.15 (0.96,1.37)	1.51	0.133
Others	0.25	1.28 (0.97, 1.68)	1.78	0.076	0.12	1.13 (0.87,1.47)	0.90	0.367
Form								
1	0	1	-	-	-	-	-	-
2	-0.02	0.98 (0.83, 1.15)	-0.29	0.774	-	-	-	-
3	-0.10	0.91 (0.79, 1.05)	-1.34	0.181	-	-	-	-
4	-0.002	1.00 (0.86, 1.17)	-0.00	0.997	-	-	-	-
5	-0.004	0.96 (0.82, 1.13)	-0.46	0.644	-	-	-	-
Smoking status								
No	0	1	-	-	0	1	-	-
Yes	0.31	1.36 (1.22, 1.52)	5.44	<0.001	0.28	1.33 (1.18, 1.49)	4.74	<0.001
Alcohol use								
No	0	1	-	-	0	1	-	-
Yes	0.56	1.74 (0.70, 0.80)	8.28	<0.001	0.32	1.37 (1.20,1.56)	4.81	<0.001
Drug use								
No	0	1	-	-	0	1	-	-
Yes	1.23	3.43 (2.22, 5.30)	5.58	<0.001	0.68	1.97 (1.34,2.89)	3.47	0.001
Truancy								
No	0	1	-	-	0	1	-	-
Yes	0.40	1.49 (1.37, 1.63)	8.99	<0.001	0.29	1.34 (1.23,1.46)	6.58	<0.001
Have been bullied								
No	0	1	-	-	0	1	-	-
Yes	0.79	2.19 (2.00, 2.41)	16.49	<0.001	0.69	1.99 (1.82,2.18)	15.09	<0.001
Lack of parental bonding								
No	0	1	-	-	0	1	-	-
Yes	0.48	1.62 (1.49, 1.76)	11.30	<0.001	0.31	1.34 (1.25,1.49)	6.98	<0.001
Lack of parental connectedness								
No	0	1	-	-	0	1	-	-
Yes	0.43	1.54 (1.43, 1.66)	11.18	<0.001	0.28	1.33 (1.22,1.45)	6.52	<0.001
BMI status								
Thin	-0.01	0.99 (0.87, 1.13)	-0.18	0.859	-	-	-	-
Normal	0	1	-	-	-	-	-	-
Overweight	-0.01	0.99 (0.91, 1.07)	-0.32	0.750	-	-	-	-

[a]Regression coefficient; The Complex Sample Enter method was used for variable selection; The multi-collinearity and interaction were unlikely; Assumptions of parallel regression assumption were met (F (18,199) = 0.54, p=0.938); Overall fit of the model was checked and reported Archer-Lemeshow test (first binary model p=0.637, second binary model: p<0.001, third binary model: p<0.001), Correctly classified table (first binary model: 80.07%, second binary model: 84.13%, third binary model: 94.66%), Area under ROC curve (first binary models: 0.59, second binary model: 0.66, third binary model: 0.71) model were consider fit according to classification table and area under curve; A regression diagnostic was performed and no influential outlier effect the overall model. Hence, the observations were not removed from the model.

as compared to males' counterpart. In addition, there is also the idea of low expectations from the females' adolescents in terms of competencies and achievements compared to the males [30].

Finally, another reason could be attributed to gender and cultural background, because it is discovered that the males' adolescents usually try to accommodate the depression symptoms unless they

are very severe, contrary to females who usually express theirs at earlier stages [15].

Adolescents who smoked were 1.33 times more in having severe depression as compared to non-smokers. As suggested in several previous studies that the severity of depressive symptoms usually contributed to the number of cigarettes smoked per day or eventually turned these adolescents to become heavy smokers [31-34] and in some cases, the number of days involved in smoking [35]. Furthermore, it was also discovered that nicotine dependent smokers were having more severe depression than non-dependent smokers [36]. This is in line with the study of Vogel et al. [31] who reported adolescents to be unlikely to seek help when their emotional needs are not met, which explains why they are involved in such behavior. According to their study, adolescents with emotion will then prefer to resolve smoking as self-medication to their depression symptoms. This is because, to them, the trend of smoking would have relieved their feelings but on the contrary it increased adverse symptoms [31]. This finding was supported by Murphy et al. [37].

Adolescents who drink alcohol had 37% higher odds in developing more severe depression as compared to those who do not drink, and this result was comparable with the study of Latiff et al. [20]. In addition, the Ireland study found that hazardous drinkers among adolescents were more likely to fall within the moderate to very severe range of depression symptoms [38]. This has been proven to be as a result of the state of depression thereby leading to the consumption of alcohol as a way of self-medication by these group of adolescents [39]. However, this is in line with some studies that have suggested the consumption of alcohol to be a result of depression [40,41], thereby increasing the occurrence of major depression as a result of exposure to neurophysiological and metabolic changes [40].

Adolescents who have experience in using drug in one way or the other were found approximately two times more likely to develop severe depression as compared to those who have never been engaged in it. As such, this finding follows a similar pattern of a local study, which reported that students who are engaged in drug have greater odds in having more severe depression 4 times compared to those who do not take drug (OR:4.61, 95% CI:1.50,14.11) [21]. In another study by Kmett Danielson et al. [42], it was reported that depressed adolescents usually turned to the use of substance as a coping mechanism.

The findings of this study also discovered that bullying among students within the school environment has been a major issue of concern. This is because; it was found that 99% adolescents to have been bullied, thereby having higher chance in having more severe depression as compared to those who have never been bullied. The study of Kaltiala-Heino et al. [43] also revealed that those who were always been bullied have approximately 4 times fold being depressed compared to those who have never being bullied. A different finding from a Western country also supported the evidence that adolescents who have been bullied have higher chance of being depressed [44]. As such, depression could be as a result of being bullied [45,46].

Truancy has been defined as any intentional unauthorized or illegal absence from school, which is associated with a variety of adverse behavioral and health outcomes [47,48]. As such, this study found

it as another factor contributing to severe depression. Furthermore, school truancy was reported to be greater among adolescents with mild (AOR = 1.57, 95% CI: 1.22, 2.01) and severe depression (AOR = 1.80, 95% CI: 1.04, 3.13).49 Again, school truancy among adolescents was found as a complex phenomenon often resulting from variety of factors, including community, home environment and mental health problems [49,50].

In this study, in terms of the home environment factor, it was discovered that adolescents who reported lack of parental bonding and lack of parental connectedness were 1.34 and 1.33 times more likely to develop severe depression as compared to those who have parental bonding and connectedness respectively. Similarly, several studies have reported highly significant association between depression and relationship with family [51,52]. For example, a study in Oman found that poor relationship with family was associated with a greater chance of having severe depression by at least more than two-fold, which is more highly observed in females [53]. Hence, poor relationship of parents with their children (e.g. increased strictness to children) was also reported as a risk factor for depression among adolescents as identified in another study [54].

As faced by every research, this study also encountered few limitations. Firstly, the data employed in this study were self-reported by the participants. As such, they were not diagnosed further by health care provider, thereby may incur some recall or reporting bias. Secondly, this study is cross-sectional, thereby limiting the determination of the temporal relationship between the studied independent variables and depression severity, in order to establish the cause-effect relationship. Thirdly, the survey was implemented based on Global School Based Health Survey (GSHS) methodology which only has quantitative components. Lastly, the present study is based on the DASS-21, which is a screening tool, and we do not use other diagnostic tool to confirm the depression. As such, it might contribute to the discrepancies in the results gained in this study. However, it should be noted that this study was using a big secondary data that representative to adolescent populations in Malaysia.

CONCLUSION

In summary, females, Indians, those who smoke, drink alcohol, take drug, involve in truancy, have been bullied and have poor relationship with parents or guardians were found more likely to have severe depression. Therefore, it is advisable that the problems of mental health disorders like depression in adolescents should be addressed with urgency. As such, prevention and intervention programs must be designed urgently and targeted to at-risk adolescents especially females. Also, more interventions are needed in school level, because depression symptoms are likely to co-exist with other adolescent's behaviors, such as have been bullied, truancy and substance use. Educating stakeholders like parents and teachers about mental health should be required. Encouragement to help adolescents enhance their social skills, increase their problem-solving capacity and help them to gain self-confidence should also be conducted. Finally, a prospective cohort research is recommended for future studies, in order to establish the causal and effects on depression among adolescents with more added variables.

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CONFIDENTIALITY

To ensure the confidentiality each student was identified by unique ID and only the researcher was able to assess the personal particular of participants and the data were conserved. All related documents will be disposed-off properly after two years study is completed. In addition, for the confidentiality in publication, the results will be presented in aggregate data and any personal information will not be published for any reason.

ETHICAL APPROVAL

Ethical approval was obtained from the Human Research Ethics Committee of the School of Medical Sciences USM (HREC) and Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia. The permission to use the National Health Morbidity Data was obtained from the Director of General Health Malaysia.

FUNDING

COMPETING INTERESTS

This study has clarified that there is no conflict of interest in any form

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