Depressive symptoms among high school adolescents in Oman

M. Afifi,[1] A. Al Riyami,[1] M. Morsi[1] and H. Al Kharusil[1]

أعراض الاكتئاب لدى المراهقين من طلبة المدارس الثانوية، في سلطنة عُمان

مصطفى عفيفي، آسية الريامي، مجدي مرسي، هلال الخروصي

الخلاصة: قام الباحثون بالاعتماد على القائمة التفقدية   الإبلاغ التي تشمل 27 بنداً لأعراض الاكتئاب لـدى الأطفال، بغرض دراسة معدل وترابُط الأعراض الاكتئابية لدى 5409 مراهقاً من طلبة المـدارس الثانويـة في سـلطنة عُمان. وتبيَّن أن مجرد كون الطالبة أنثى يُعَدُّ مؤشراً هاماً لاكتئاب المراهقات وفقاً للتحليل الثنائي المتغيِّرات، ولكنه يفقد أهميته كعامل اختطار مستقل، إذا ما تم تضبيطه مع المؤشِّرات الأخـرى للتحليـل المتعـدِّد المتغيِّـرات. وشملـت المؤشِّرات التي تساعد بشكل كبير في التنبؤ بأعراض الاكتئاب في نموذج التحوُّف اللوجستي كلاً من: وجود سابقة مرض نفسي، وتسجيل نقاط مرتفعة ضمن النتائج السلبية لاختبار المعتقدات الشخصية، أو نقاط منخفضة ضـمن النتائج الإيجابية لهذا الاختبار، أو عدم تناول وجبة الإفطار، أو تردِّي العلاقة مع أفراد الأسرة والرِّفاق والمعلمين، أو الانتهاك البدني خلال فترة المراهقة. كما أن وجود هواية لدى الطالب والمواظبـة على حـضور الـدروس تُعَدُّ مـن المتغيِّرات الوقائية.

ABSTRACT We used the self-reported 27-item Child Depression Inventory to investigate the rate and correlates of depressive symptoms among 5409 secondary school adolescents in Oman. Being female was a significant predictor of adolescent depression in bivariate analysis, but adjusting to other predictors in multivariate analysis, it was no longer a significant independent risk factor. History of mental illness, high score in negative health locus of control, low score in positive health locus of control, not taking breakfast, poor relationship with family members, friends and teachers and physical abuse during adolescence significantly predicted depressive symptoms in the logistic regression model. Having a hobby and never dropping a class were protective variables.

Symptômes dépressifs chez des adolescents du secondaire à Oman
RÉSUMÉ Nous avons utilisé l'inventaire de dépression chez l'enfant à 27 items auto-administré pour étudier le taux et les corrélats des symptômes dépressifs chez 5409 adolescents du secondaire à Oman. Le fait d'être de sexe féminin constituait un facteur prédictif significatif de dépression de l'ado-lescent dans l'analyse bivariée, mais après ajustement sur d'autres facteurs prédictifs dans l'analyse multivariée, cela ne constituait plus un facteur de risque indépendant significatif. Des antécédents de maladie mentale, un score élevé pour les croyances négatives en fonction du lieu de contrôle de la santé, un score faible pour les croyances positives en fonction du lieu de contrôle de la santé, le fait de ne pas prendre de petit déjeuner, de mauvaises relations avec les membres de la famille, les amis et les enseignants et des violences physiques pendant l'adolescence prédisaient significativement les symptômes dépressifs dans le modèle de régression logistique. Avoir un passe-temps et ne jamais avoir abandonné de matière à l'école étaient des variables constituant des facteurs de protection.

[1]*Department of Research and Studies, Ministry of Health, Muscat, Oman (Correspondence to Mustafa Afifi: afifidr@yahoo.co.uk).*

Introduction

A significant body of research has shown that major depression is one of the most common psychiatric disorders of adolescence, and has also indicated the comorbidity of depression in adolescents and several health risk behaviours or mental conditions, including tobacco use [1], substance use [2], sexual activity [3], obesity [4,5], intention to use violence [6], conduct disorder, anxiety and attention deficit/hyperactivity disorder [7]. However, a 2004 study also demonstrated the comorbidity of sub-threshold depression with other mental disorders [8]. Other studies have concluded that diagnosable clinical depression exists on a continuum with sub-threshold depressive symptoms [9,10]. Lewinsohn et al. pointed that the clinical significance of depressive symptoms does not depend on crossing the major diagnostic threshold of depression [9]. They also concluded that the results of their studies suggest that clinical depression is not categorically distinct from other degrees and patterns of depressive symptoms. Their data also showed that the greater the level of depressive symptoms among adolescents, the greater the risk of developing problematic patterns of substance abuse. Lewinsohn et al. [10] stated "the fact that sub-threshold depressive symptoms predicted future major depressive disorders is consistent with findings reported in previous studies" [11,12].

Hence, the investigation of depressive symptoms among Omani adolescents is as important as studying major depression among this dynamic age group. Our aim in this study was to estimate the rate and investigate the correlates of depressive symptoms among high school adolescents in a national representative sample of 5409 students in Oman.

Methods

Sample

The sample size was determined for males and females separately using *EpiInfo*, assuming a prevalence rate of 1% for depressive disorders among adolescents and a confidence interval of 99%. Accordingly, 2885 male adolescents and 2731 female adolescents, 5616 students in total were randomly selected (about 5% of the 111 849 secondary school students for the academic year 2004); these covered 43 *wilayat* (districts) (73% of the 59 *wilayat* in Oman). Of these, 5409 (2739 boys and 2670 girls) were screened and entered in statistical analysis (response rate 93% overall, 95% for boys, 97% for girls). The 207 missing students were absent at the time of screening, had dropped classes or had transferred to another school.

We used a multi-stage, stratified random sampling technique. All the regions of the country were selected at the first stage and sample size for each sex was determined in proportion to the total number of adolescent students aged 14–20 years. Then, in each region, male and female sub-samples were selected in proportion to the secondary school adolescent population in each of the 5 grades (I; II and III Arts and II and III Science) in Omani secondary schools. In the next stage, ≥ 1 schools were chosen randomly from each region, and then from each school ≥ 1 classes were randomly selected to cover the number of adolescents needed for the sample.

Questionnaire and measurements

The total sample completed the 27-item Child Depression Inventory and a questionnaire including demographic data, health locus of control and other factors associated with depression. The self-reported

questionnaire covered sociodemographic data, chronic physical illness (e.g. diabetes, cardiovascular disease) and mental disorders (e.g. depression, schizophrenia) diagnosed by a doctor. Relationships with father, mother, siblings, friends and schoolteachers were assessed on a 5-item scale with a score ranging from 1–5 where 5 represents an excellent relationship. It took around 40–50 minutes for each student to complete the whole questionnaire (around 1 class session).

The questionnaire also included a group of questions adapted from Takakura and Sakihara on health practices such as sleeping habits and hours of sleep, eating breakfast regularly, smoking and physical activities [13]. Each of the following was considered a positive health practice: sleeping 7–8 hours/night; eating breakfast every day; not currently smoking; and doing physical activity outside school premises ≥ 3 times per week.

The students were also asked about their health locus of control beliefs, whether internal or chance external, adapted from the multi-dimensional Health Locus of Control form A [14]. The first 2 subscales: internal health locus of control and chance health locus of control were translated into Arabic by the author who also calculated Cronbach's α to assess the internal consistency as reliability in a previous study. Both subscales showed an accepted level of internal consistency i.e. > 0.4 (0.5111 and 0.4636 for the 2 subscales respectively). Each subscale contained 6 questions and for each question study participants chose 1 of 6 answers ranging from strongly agree (= 6) to strongly disagree (= 1). The scores for each subscale ranged from 6–36 [14].

The Arabic translation of the 27-item Children's Depression Inventory [15] has been used in previous studies [16,17]. Each of the 27 items of the inventory assesses 1 symptom by presenting 3 choices ranging from 0–2 in the direction of increasing psychopathology and total score ranges from 0–54. Those who scored ≥ 20 were considered as having at least mild depressive symptoms. The cut-off score of 20 is suggested for screening in a general population, such as in a school setting, in which the prevalence of depression is likely to be low [18]. Reliability of Cronbach's α was 0.8.

Training and piloting

Three days training was tailored to the school health doctors who would undertake the screening process. In addition, a medical officer (regional coordinator) was recruited in each health region of the country to manage the administration and logistics of the survey and to ensure the implementation of all phases of the survey according to plan. During training a pilot study was conducted in Muscat by school health doctors on 400 secondary school students from both sexes in 2 randomly selected secondary schools (1 boys and 1 girls) not included in the study sample.

Data processing and statistical analysis

Data coding, entry and management were done using *EpiInfo* followed by data analysis using *SPSS* for Windows, version 9. Data are given as counts, percentages and means. Group means were compared using analysis of variance and chi-squared test was used to examine the distribution of data using the likelihood ratio χ^2. After doing bivariate analysis between the dependent variable and its predictors, all variables were then entered in a logistic regression model to determine the most significant variables adjusted for the others. The dependent dichotomous variable was coded to 0 = normal and 1 = having depressive symptoms (Child Depression Inventory

score $\geq$ 20). The odds ratio which shows the change in the odds of dependent variable(s) when the independent variable changed from 0 to 1 in the case of binary variables, or the next category or score in the case of categorical or continuous variables adjusted for age, sex and all other variables in the model. *P*-value $\leq$ 0.05 was considered significant in all statistical tests.

Ethical issues

The study was approved by the Ethical Committee in the Ministry of Health before commencing the training and fieldwork. Confidentiality for the study participants was maintained as no direct or indirect identification was used. Verbal consent was obtained from the adolescent participants as well as the school headmasters.

Results

The age of the study group ranged between 14 and 20 years with about 75% aged 16–18 years (Table 1). Less than 8% reported having had a chronic physical illness (diagnosed by a doctor) and 2.3% reported having had a mental disorder (diagnosed by a doctor). The majority had parents whose education was below secondary level (84.1% for fathers and 92.2% for mothers). The mean [standard deviation (SD)] for birth order was 4.87 (SD 2.9). Around 25% of the sample was subjected to physical abuse during adolescence by their parents or those who raised them and 7.5% the sample were also physically abused during their childhood (Table 1).

The mean (SD) score for the Child Depression Inventory was 13.16 (6.69).

In bivariate analysis, all 25 independent variables were significantly associated with the dependant variable, having depressive symptoms, except for 3 variables: age, birth order and mother's education.

Table 1 **Characteristics of the study sample (*n* = 5409[a])**

Variable	Overall sample	
	No.	Valid %
Age (n = *5389*)		
14–	39	0.7
15–	415	7.7
16–	1291	24.0
17–	1562	29.0
18–	1208	22.4
19–	622	11.5
20–	252	4.7
Sex		
Male	2739	50.6
Female	2670	49.7
Region		
Muscat	1118	20.7
Dhofar	575	10.6
Al Dakhlia	789	14.6
North Sharqiya	437	8.1
South Sharqiya	426	7.9
North Batinah	1132	20.9
South Batinah	582	10.8
Al Dhahira	350	6.5
Grade		
First	2150	39.6
Second Arts	762	14.1
Second Science	931	17.2
Third Arts	726	13.4
Third Science	840	15.5
Father's education (n = *4634*)		
Illiterate	1236	26.7
Can read and write	1332	28.7
Primary school	650	14.0
Preparatory school	682	14.7
Secondary school	326	7.0
Diploma	111	2.4
University +	297	6.4
Mother's education (n = *4789*)		
Illiterate	2412	50.4
Can read and write	867	18.1
Primary school	773	16.1
Preparatory school	363	7.6
Secondary school	191	4.0
Diploma	59	1.2
University +	124	2.6

Table 1 **Characteristics of the study sample (n = 5409ᵃ)** *(concluded)*

Variable	Overall sample	
	No.	Valid %
Personal history of mental illness	125	2.3
Personal history of physical illness	411	7.6
Having a hobby (n = 5333)	4866	91.2
Ever dropped a class (n = 5345)	1817	34.0
Has breakfast daily (n = 5361)	3223	60.1
Sleeps 7–8 hours/night (n = 5350)	2318	43.3
Physical activity outside school ≥ 3 times/week (n = 5329)	1025	19.2
Current smoker (n = 5327)	161	3.0
Physical abuse during adolescence (n = 5345)	397	7.6
Physical abuse during childhood (n = 5260)	1324	24.7
Recites Quran daily (n = 5389)	1717	31.9
	Mean score (SD)	
Relationship (range 1–5)		
With father	4.08 (1.26)	
With mother	4.36 (0.99)	
With siblings	3.91 (1.25)	
With friends	3.93 (1.09)	
With teachers	3.02 (1.16)	
Locus of control (range 6–36)		
External	22.25 (5.06)	
Internal	24.32 (5.12)	

ᵃMany of the variables had values missing; total is indicated where appropriate.
SD = standard deviation.

Overall, 17.0% of our sample had depressive symptoms, 19.4% of girls and 14.7% of boys (χ^2 21.58; $P < 0.01$). Those with a personal history of mental illness were more likely to have depressive symptoms (39.2%) than those who did not (16.5%) ($\chi^2 = 35.56$; $P < 0.01$). Similarly, those with a personal history of chronic physical illness were more likely to have depressive symptoms (27.0%) than those with no history (16.2%).

Having a hobby, taking breakfast regularly, not smoking, enough hours night sleeping, doing physical exercises ≥ 3 times/week and having a high score in relationships with social contacts protected against having depressive symptoms (Tables 2 and 3).

All variables, including the 3 non-significant variables, were entered into a forward stepwise logistic regression model. This was done because of the importance of adjusting for age and because education of parents is a proxy for social class. Birth order was also introduced in the model due to its demonstrated importance as a predictor of adolescent mental health [*19*]. Only 13 variables were significantly found to predict having depressive symptoms in the multivariate analysis. These could be grouped into a protective variables group and a risky variables group. The protective variables group comprised those with healthy practices: taking breakfast daily; sleeping 7–8 hours a night; having a hobby; and having good relationships with social contacts. The risky variables group comprised those who scored high for external health locus of control, those who scored low for internal health locus of control, those with a positive personal history of mental illness, those who ever dropped a class, and those who were abused by their parents during adolescence (Table 4).

Discussion

The current study spotlights the rates and correlates of adolescent depressive symp-

Table 2 **Association of sociodemographic variables with having depressive symptoms (score ≥ 20 on the Child Depression Inventory, Arabic version)**

| Variable | Depressive symptoms | | | | Total[a] | Likelihood χ^2 | P |
| | Yes | | No | | | | |
	No.	%	No.	%			
Age (years)							
14–	32	82.1	7	17.9	39	10.48	0.11
15–	343	83.3	69	16.7	412		
16–	1095	85.4	187	14.6	1282		
17–	1286	82.4	274	17.6	1560		
18–	999	82.7	209	17.3	1208		
19–	496	79.7	126	20.3	622		
20–	207	82.5	44	17.5	251		
Total	4458	83.0	916	17.0	5374		
Sex							
Male	2332	85.3	401	14.7	2733	21.58	< 0.01
Female	2136	80.6	515	19.4	2651		
Total	4468	83.0	916	17.0	5384		
Region							
Muscat	920	82.7	193	17.3	1113	52.88	< 0.01
Dhofar	516	89.7	59	10.3	575		
Al Dakhlia	667	86.2	107	13.8	774		
North Sharqiya	361	82.6	76	17.4	437		
South Sharqiya	365	85.7	61	14.3	426		
North Batinah	888	78.6	242	21.4	1130		
South Batinah	454	78.4	125	21.6	579		
Al Dhahira	297	84.9	53	15.1	350		
Total	4468	83.0	916	17.0	5384		
Grade							
First	1742	81.7	389	18.3	2131	19.01	< 0.01
Second Arts	655	86.1	106	13.9	761		
Second Science	781	84.0	149	16.0	930		
Third Arts	622	85.9	102	14.1	724		
Third Science	668	79.7	170	20.3	838		
Total	4468	83.0	916	17.0	5384		
Father's education							
Illiterate	1008	81.8	225	18.2	1233	15.77	0.02
Can read and write	1126	84.9	200	15.1	1326		
Primary school	549	84.6	100	15.4	649		
Preparatory school	575	84.4	106	15.6	681		
Secondary school	248	76.5	76	23.5	324		
Diploma	92	82.9	19	17.1	111		
University +	246	82.8	51	17.2	297		
Total	3844	83.2	777	16.8	4621		

Table 2 **Association of sociodemographic variables with having depressive symptoms (score ≥ 20 on the Child Depression Inventory, Arabic version)** *(continued)*

Variable	Depressive symptoms				Total[a]	Likelihood χ^2	P
	Yes		No				
	No.	%	No.	%			
Mother's education							
Illiterate	2011	83.6	394	16.4	2405	6.77	0.34
Can read and write	737	85.3	127	14.7	864		
Primary school	629	81.5	143	18.5	772		
Preparatory school	295	81.5	67	18.5	362		
Secondary school	154	81.1	36	18.9	190		
Diploma	51	86.4	8	13.6	59		
University +	101	81.5	23	18.5	124		
Total	3978	83.3	798	16.7	4776		
Personal history of mental illness							
No	4392	83.5	867	16.5	5259	35.56	< 0.01
Yes	76	60.8	49	39.2	125		
Total	4468	83.0	916	17.0	5384		
Personal history of physical illness							
No	4168	83.8	805	16.2	4973	28.03	< 0.01
Yes	300	73.0	111	27.0	411		
Total	4468	83.0	916	17.0	5384		
Having hobby							
No	351	75.6	113	24.4	464	17.76	< 0.01
Yes	4063	83.7	792	16.3	4855		
Total	4414	83.0	905	17.0	5319		
Ever dropped a class							
No	3005	85.5	511	14.5	3516	46.19	< 0.01
Yes	1415	78.0	400	22.0	1815		
Total	4420	82.9	911	17.1	5331		
Has breakfast daily							
No	1628	76.3	506	23.7	2134	111.2	< 0.01
Yes	2811	87.5	403	12.5	3214		
Total	4439	83.0	909	17.0	5348		
Hours of sleep/night							
< 7 or > 8 hours	2357	77.9	667	22.1	3024	128.06	< 0.01
7–8 hours	2070	89.5	244	10.5	2314		
Total	4427	82.9	911	17.1	5338		
Physical activity outside school							
None or < 3 days/week	3532	82.3	761	17.7	4293	8.62	< 0.01
≥ 3 days/week	881	86.0	143	14.0	1024		
Total	4413	83.0	904	17.0	5317		
Current smoker							
No	4300	83.4	853	16.6	5153	16.76	< 0.01
Yes	113	70.2	48	29.8	161		
Total	4413	83.0	901	17.0	5314		

Table 2 **Association of sociodemographic variables with having depressive symptoms (score $\geq$ 20 on the Child Depression Inventory, Arabic version)** *(concluded)*

Variable	Depressive symptoms				Total[a]	Likelihood χ^2	P
	Yes		No				
	No.	%	No.	%			
History of physical abuse during adolescence							
No	4132	85.2	717	14.8	4849	186.51	< 0.01
Yes	218	54.9	179	45.1	397		
Total	4350	82.9	896	17.1	5246		
History of physical abuse during childhood							
No	3495	87.2	515	12.8	4010	180.2	< 0.01
Yes	930	70.4	391	29.6	1321		
Total	4425	83.0	906	17.0	5331		
Recites Quran							
Daily	1489	87.0	222	13.0	1711	30.51	< 0.01
Not regularly	2971	81.1	694	18.9	3665		
Total	4460	83.0	916	17.0	5376		

[a]*Values differ as missing values did not match for each variable in the cross tabulation.*

toms in Oman; 17.0% of the adolescents we surveyed had depressive symptoms indicating that depressive symptoms is a public health problem among Omani adolescents.

Fergusson et al. investigated the association between extent of depression (asymptomatic, sub-threshold, and major depression) and rates of subsequent mental health problems [20]. They found that adolescents with sub-threshold depression had elevated risk of later depression and suicidal behaviours. Depressive symptoms

Table 3 **Association of some sociodemographic variables with having depressive symptoms by analysis of variance**

	Depressive symptoms				F statistic	P
	No		Yes			
	Mean	(SD)	Mean	(SD)		
Birth order	4.88	(2.89)	4.84	(2.98)	0.11	0.74
External locus of control	22.04	(4.95)	23.27	(5.48)	45.14	< 0.01
Internal locus of control	24.40	(5.01)	23.96	(5.63)	5.68	0.017
Relationship with father	4.24	(1.13)	3.29	(1.53)	465.80	< 0.01
Relationship with mother	4.51	(0.83)	3.63	(1.37)	662.29	< 0.01
Relationship with siblings	4.11	(1.10)	2.93	(1.47)	769.49	< 0.01
Relationship with friends	4.06	(0.99)	3.27	(1.34)	433.65	< 0.01
Relationship with teachers	3.16	(1.07)	2.31	(1.30)	445.38	< 0.01

SD = standard deviation.

Table 4 **Odds ratios for predictors of having depressive symptoms in adolescents by logistic regression**

Variable	Overall sample	
	OR	95% CI
Personal history of mental illness[a]	2.48	1.41–4.34
External locus of control	1.04	1.02–1.06
Internal locus of control	0.98	0.96–0.99
Having a hobby[a]	0.65	0.46–0.90
History of dropping classes[a]	1.26	1.02–1.56
Taking breakfast daily[a]	0.62	0.51–0.76
Sleep 7–8 hours/night[a]	0.57	0.45–0.71
Relationship with father	0.77	0.71–0.74
Relationship with mother	0.76	0.68–0.83
Relationship with siblings	0.69	0.63–0.75
Relationship with friends	0.69	0.63–0.76
Relationship with teachers	0.75	0.69–0.81
Physical abuse during adolescence[a]	1.43	1.20–1.69

OR = odds ratio; CI = confidence interval.
[a]No (reference category) = 0; yes = 1.

range from none to severe, and those meeting diagnostic criteria for major depression represent the extreme of a continuum rather than a distinct group of individuals suffering from a specific disorder [20]. Lewinsohn et al. argued whether to treat persistent sub-threshold depression or not by mentioning the possible iatrogenic risks such as stigmatization and financial hardship. They also mentioned the "stepped care" model in which clinicians should strive to provide the least aggressive and least costly treatment to resolve clinical symptoms and any underlying vulnerability to depression [8]. Investigating the factors associated with depressive symptoms would help in early management of adolescents with such symptoms and would reduce future risk of undesirable mental health outcomes.

The rate of depressive symptoms in adolescents in this study was not comparable with rates in previous studies in Oman [16] or other Arab countries. Shaaban and Baashar [21] in Sudan used the Beck Depression Inventory (BDI) to screen for depressive symptoms in 1107 girls aged 12–19 years; 11% reported severe depression. Daradkeh et al. used the Composite International Diagnostic Interview on 1394 participants from Al Ain in the United Arab Emirates: the lifetime prevalence of major depression was significantly higher among females than males, 10.3% and 2.8% respectively [22]. Using the 13-item Beck Depression Inventory for screening, a similar depression rate was found in a Finnish study: 17.2% of 16 464 adolescents aged 14–16 years had at least mild depression [23].

Some studies have shown that frequency of depression in children and adolescents increased with age [24]. Our study did not show the same results. Female preponderance has been found in a previous study as well as in our study [23], although in multivariate analysis we did not find being female was a significant predictor. There could be a number of explanations for this; it could be related to the weak (or lack of) association of sex with depressive symptoms, as indicated in a previous study in Oman [25]. It could also be attributed to the significant independent variables in the model which explain or mediate sex differences in adolescent depression. Depression among adolescents results in impaired cognitive, interpersonal and academic functioning [26] and that could explain the significant association with both poor relations with the teacher and ever dropping a class with having depressive symptoms in this study.

There was a strong positive association between current smoking and having depressive symptoms in our study as well

as other studies. Depressed adolescents are more likely to begin smoking, to smoke more and to continue smoking as young adults. Smokers with mild or major depression find it hard to quit smoking [27,28].

The association between health locus of control and depressive symptoms was significant. Adolescents who were oriented toward chance locus of control were more likely to report having depressive symptoms in the bivariate and multivariate analysis. The same has been found in other studies. A high score for external locus significantly increased the risk for behavioural problems in general [29,30].

Adolescents with past history of physical abuse during childhood have also been found to be more likely to score higher on external chance locus of control [30]. Both externality and child abuse are risk factors for depression. Psychopathology coexisting with history of physical abuse in adolescents has been encountered in a number of studies. Abused adolescents showed significantly higher prevalence rate of depression and conduct disorder [31]. It has also been shown that they have significantly greater exposure to risk factors for adolescent suicide, including family disintegration, diagnosis of depression, disruptive behaviour disorders and substance abuse and dependence [32].

The negative association of depressive symptoms with healthy practices and social support, evidenced by good relationships with social contacts in our study, has also been demonstrated [13]. It seems that social support and healthy practices could have a buffering effect on depressive symptoms.

Finally, we would like to mention the study limitations. The dearth of research on adolescent depression in the Arab world published in PubMed-indexed journals and the diversity of tools used to screen depressive symptoms and its correlates limited the chances for comparison of results. In addition, the use of self-reported questionnaires might elicit inflated or false responses, especially in such a sensitive age group. Self-reported questionnaire are easy to apply, however, and it is difficult logistically to conduct structured interviews for such a big sample. Another limitation was the cross-sectional design of our study where causality and/or temporal association could not be established and hence we could not determine why adolescents present with sub-threshold depressive symptoms.

Another limitation was the difficulty in demonstrating how representative this student sample in Oman was to Omani adolescents in general. Although education is universal in the country the possibility that some adolescents with depressive symptoms may have already dropped out of school should be always be taken into consideration. However, to the best of our knowledge, this was the first large, national study to investigate adolescent depressive symptoms and their correlates in Oman.

Conclusion

To conclude, depressive symptoms in children can be subtle and varied. Diagnosis in adolescents is often complicated by behavioural manifestations associated with hormonal changes, but evidence suggests secondary prevention can significantly reduce future psychosocial problems [33].

We recommend using the findings of the current study by taking into consideration the protective factors as well as the risk factors of adolescent depression in a future prevention programme, along with strengthening the mental health component of the school health programme.

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