Self-rated Psychiatric Symptoms and their Correlates among Senior High School Students in Hualien City

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Abstract: The association between mental health disorders beginning in adolescence and disorders in early adulthood is increasingly acknowledged. The mental health of adolescents has not been studied in the eastern area of Taiwan, where the mortality of teenagers is highest in Taiwan. The purpose of this study was to assess psychiatric symptoms among senior high school students in Hualien City, and to identify their associated factors. A total of 1,195 students were selected, via a stratified cluster sampling method, from nine high schools in Hualien City. A self-administered questionnaire was used to assess students' demographic characteristics, neurotic traits, perceived daily-life stress, social support, and psychiatric symptoms. There were 1,141 valid responses. From principal components analysis, depression-anxiety, impulsivity-paranoia, and psychoticism-obsession were found to be the most common self-rated psychiatric symptoms. About 70% of the students felt blue, 48.2% reported urges to injure someone, and 25% felt tense. Overall, about 5% to 10% of high school students had severe psychiatric symptoms. Stress from schoolwork, peer relationships, and neurotic traits were important predictors of psychiatric symptoms. The findings of this study imply that screening for psychiatric symptoms at senior high schools is essential for improving the mental health of students. The mental health care of adolescents should be school-based and in collaboration with medical professionals. Life skills must be taught at school.

(J Formos Med Assoc 1998;**97**:593–9)

Key words:
psychiatric symptoms
high school students
Hualien City

Adolescents have low rates of mortality and hospitalization, and relatively low rates of disability and chronic disease. While adolescence has traditionally been viewed as a time of optimal health, this view is being challenged [1, 2]. Increasingly, lifestyles and risk-taking behaviors are influencing the morbidity of youths, with associated sequelae of trauma, adolescent pregnancy, substance abuse, and other major health problems. The association between mental health disorders that begin in adolescence and disorders in early adulthood is increasingly recognized, and should be a research priority [1–6]. Mental disorders are the leading cause of disability among adolescents. The overall prevalence of mild mental disorders in adolescents is estimated at 14% to 20% in Western countries [7–10]. In the USA, there has been a sharp increase in reports of depression among adolescents [11]. In addition, the suicide rate has increased much more dramatically among adolescents than in the rest of the population. Most adolescents who commit suicide suffer from a psychiatric disorder. The most prevalent of these disorders include affective disorders, conduct disorders, and substance abuse [12].

Over the past 10 years, accidental injury, suicide, and homicide were responsible for three-quarters of all

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Received: 4 February 1998. Revised: 20 March 1998. Accepted: 5 May 1998.
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adolescent deaths in Taiwan [13]. Most causes of morbidity and mortality were preventable and related to mental disorders. Although a few adolescent health clinics have been launched recently, research on the mental health of adolescents is limited [14–16], relative to the focus on adults. The incidence and prevalence of psychiatric disorders and changes in psychologic functioning over the course of adolescence are not clear. The rates of mortality from injury (140.7), suicide (9.0), and homicide (7.6) per 100,000 population among adolescents aged 15 to 19 years are the highest in Hualien County, in eastern Taiwan. These three causes account for 84.5% of all deaths among adolescents [17]. Because a great deal of evidence supports that these mortality rates are related to poor mental health, studies on the mental health of adolescents in Hualien County are imperative.

Personality traits are characterized as persistent, habitual, and recurrent behaviors. They are prominent aspects of personality, and do not imply any pathology. Combinations of neurotic traits and interacting stresses have been shown to predict subjective well-being [18]. Because life stress, social support, and personality are interacting factors in individuals' problem-solving abilities and mental health, we included these factors in this study. The aims of this study were twofold, to obtain a factor structure for psychiatric symptoms among high school students and to identify factors associated with psychiatric symptoms.

Subjects and Methods

One class of students was sampled randomly from each grade of nine senior high schools. A total of 1,195 students were, thus, sampled. They filled in questionnaires in the classroom in December 1994. During administration of the test, a researcher was present to instruct students on answering the questionnaire.

A self-administered questionnaire was used to assess students' demographic characteristics, neurotic traits, social support, and stress perceived from daily events. The Brief Symptom Rating Scale (BSRS) was employed to assess perceived psychiatric symptoms [19]. Scales used in this study were previously verified to have good validity and reliability [19–25]. The BSRS was revised from the Symptom Checklist 90 (SCL-90). This scale consists of 50 items, each of which was self-rated by the students on a 5-point scale of symptom severity distress (0 for none and 4 for very severe) in the past week. It measured nine primary and one additional symptom dimensions of psychopathology, as well as three indices of distress: the General Severity Index (GSI), Positive Symptoms Distress Index (PSDI), and Total Number of Positive Symptoms (PST). The BSRS is a satisfactory global measure and case-finding screening instrument for psychopathology in high school settings, with a sensitivity of 79.0% and a specificity of 62.7% [22].

The scale of neurotic traits [22, 23] consisted of 10 items, with "yes" or "no" responses. "Yes" answers were summed to yield a total score, ranging from 0–10 (low to high level for neurotic traits).

The Social Support Scale was developed from the Family APGAR index [24, 25] to measure satisfaction with five components, identified as adaptation, partnership, growth, affection, and resolve, from family, teachers, and friends. Each of the five items was scored on a 5-point scale. The scores were constructed by summation of the following ratings of separate items: 1 = very unsatisfied; 2 = unsatisfied; 3 = okay; 4 = satisfied; and 5 = very satisfied, with scores ranging from 15 to 75.

The scale of perceived stress from daily events (PSDE) consists of 37 items [21, 22], regarding how often the individual had feelings of stress in the past week. The ratings of separate items were: 0 = never; 1 = 1–2 times; 2 = 3–4 times; 3 = 5–6 times; and 4 = daily, with scores ranging from 0–148. The questionnaire was pilot tested with 43 high school students in Hualien City. The reliability estimates were 0.64, 0.86, and 0.91 for neurotic traits, social support, and PSDE scales, respectively.

Data analysis was conducted with the Taiwan-registered SAS software for personal computers [26]. Results were analyzed using bivariate correlation and multiple regression. Means, standard deviations, and Pearson correlation coefficients were also calculated. Principal component analysis was employed because it provides a simplified and meaningful structure for self-rated psychiatric symptoms. Scale reliabilities were assessed by Cronbach's alpha.

Results

Background characteristics

We abandoned 54 responses with missing demographic data. Results were from 1,141 respondents, ranging in age from 15 to 17 years (87.6% were 15–17 years old) with a mean age of 16.4 years; 588 were male and 553 were female. Of the respondents 20% were Formosan aborigines. The distribution of students in each grade was even (grade 1, 34.8%; grade 2, 32.3%; and grade 3; 31.7%). About 70.6% of the respondents studied at vocational senior high schools and 50.2% had above-average school performance (data not shown).

Table 1. Structure of psychiatric symptoms of the Brief Symptoms Rating Scale (BSRS) and percentages of answers*

Factor structure of the BSRS	Factor loading	% None	Mild	Moderate	Severe	Very severe	No. of cases
Factor 1 Depression-anxiety							
Feeling lonely (D)	0.58	29.4	39.9	19.1	7.4	4.1	1,109
Feeling blue (D)	0.54	25.2	43.3	20.3	7.8	3.5	1,109
Feeling no interest (D)	0.57	37.5	42.0	14.3	4.1	2.0	1,109
Feeling fearful (A)	0.46	44.6	39.2	12.2	2.7	1.2	1,111
Feeling others do not understand you or are asympathetic (S)	0.53	33.1	43.1	16.5	4.7	2.6	1,106
Feeling inferior to others (S)	0.47	26.4	44.6	19.1	6.5	3.5	1,111
Feeling hopeless about the future (D)	0.62	46.2	36.3	12.3	3.2	2.1	1,106
Feeling lonely even when you are with people (PS)	0.55	46.8	36.4	10.7	3.8	2.3	1,092
Feeling so restless that you cannot sit still (A)	0.46	48.7	35.0	11.0	3.0	1.8	1,097
Feelings of worthlessness (D)	0.63	59.0	27.2	9.6	2.8	1.5	1,099
Feeling that something bad is going to happen to you (A)	0.52	54.1	30.8	9.5	3.7	1.9	1,099
Factor 2 Impulsivity-paranoia							
Having thoughts that are not your own (PS)	0.45	35.2	41.8	15.4	5.2	2.3	1,088
Having urges to beat, injure, or harm someone (H)	0.68	51.8	30.4	10.2	4.4	3.2	1,095
Having urges to break or smash things (H)	0.65	50.1	31.4	11.2	3.8	3.5	1,094
Feeling very self-conscious with others (S)	0.47	40.5	41.4	12.2	3.7	2.2	1,094
Feeling that people will take advantage of you if you let them (PA)	0.54	51.9	33.0	10.6	2.9	1.6	1,095
Idea that you should be punished for your sins (PS)	0.52	42.1	37.5	14.6	3.7	2.0	1,100
Feelings of guilt (AD)	0.49	51.1	32.3	10.6	3.3	2.7	1,075
Factor 3 Psychoticism-obsession							
Difficulty making decisions (O)	0.61	34.1	38.5	18.2	6.8	2.5	1,100
Having to avoid certain things, places, or activities because they frighten you (PH)	0.47	39.0	41.9	13.5	3.5	2.1	1,103
Trouble concentrating (O)	0.59	27.4	43.8	18.6	6.6	3.5	1,101
Feeling tense or keyed up (A)	0.55	41.7	39.3	13.5	4.0	1.5	1,098
Factor 4 Somatization							
Pains in the heart or chest (SO)	0.61	54.5	32.3	9.4	2.7	1.2	1,110
Poor appetite (AD)	0.50	46.0	40.0	9.8	2.4	1.9	1,116
Soreness of muscles (SO)	0.48	26.4	44.6	19.1	6.5	3.5	1,111
Trouble getting your breath (SO)	0.60	57.8	29.4	9.6	2.4	0.8	1,101
Numbness or tingling in parts of the body (SO)	0.56	55.4	31.2	9.2	2.7	1.4	1,105
Feeling weak in parts of the body (SO)	0.48	46.2	37.5	12.1	2.9	1.3	1,101
Thoughts of death or dying (AD)	0.56	62.7	24.2	8.2	3.3	1.5	1,097
Factor 5 Hostility							
Nervousness or shakiness (A)	0.46	31.7	47.5	16.3	3.2	1.3	1,120
Repeated unpleasant thoughts that will not leave your mind (O)	0.47	27.9	41.9	22.7	5.6	1.9	1,117
Worried about sloppiness or carelessness (O)	0.52	28.4	45.6	20.1	4.8	1.2	1,112
Feeling easily annoyed or irritated (H)	0.62	22.6	43.9	23.7	7.9	1.8	1,113
Uncontrollable temper outbursts (H)	0.56	35.0	43.5	14.7	4.4	2.3	1,113
Blaming yourself for things (D)	0.49	23.7	47.6	21.0	5.4	2.3	1,109
Feeling blocked in getting things done (O)	0.45	18.8	51.3	24.4	3.9	1.6	1,113
Factor 6 Phobia							
Feeling afraid in open space or on the streets (PH)	0.64	52.0	31.4	11.1	3.4	2.1	1,115
Feeling afraid to go out of your house alone (PH)	0.68	54.5	29.6	10.2	3.5	2.3	1,111
Feeling uneasy in crowds (PH)	0.52	55.7	30.9	9.3	2.8	1.3	1,094
Feeling of terror or panic (A)	0.61	57.6	30.8	7.8	0.3	0.8	1,096
Feeling nervous when you are left alone (PH)	0.62	45.7	37.3	11.3	3.9	1.8	1,099

D = depression; A = anxiety; S = sensitivity; PS = psychoticism; H = hostility; PA = paranoid; AD = additional; Ph = phobia; O = obsession; SO = somatization ; *symptoms perceived in last week.

The mean score was 5.2 for neurotic traits and 38.4 for perceived social support. About 40% of Han Chinese and 25% of Formosan aborigines perceived stress from daily life. Schoolwork, concern with prospects, parent-child relationships, and peer relationships were found to be their main sources of daily-life stress. High neurotic trait was common among stressed students. Low social support was found among the students with poor parent-child or peer relationships (data not shown).

Psychiatric symptoms

The mean BSRS score was 41.0 (standard deviation, 26.8; mode, 32), with males having significantly lower scores than Han Chinese females (38.7 vs 43.20; $t = 2.55$, $df = 913.5$, $p = 0.01$). No significant difference was found between Han Chinese and Formosan aborigines ($t = 1.07$, $df = 900$, $p = 0.28$), or between vocational and regular senior high school students ($t = 0.79$, $df = 930$, $p = 0.43$).

The results of self-rated psychiatric symptoms are presented in Table 1. More than 70% of the respondents felt mildly to very severely blue, lonely, or not interested in things. Half of the respondents felt worthless and hopeless about the future, while 48.2% of the respondents had urges to beat, injure, or harm someone. One out of four reported difficulty in making decisions, or in concentrating. Half of the respondents felt pain in the chest, had poor appetite, or shortness of breath. More than 60% felt easily annoyed, not in control, or nervous. Half reported phobic anxiety symptoms such as feeling afraid in open spaces, uneasy in crowds, or nervous when left alone.

Principal components of the BSRS and interrelations with other scales

Responses to the 50-item questionnaire were subjected to a principal component analysis using community estimates. The principal axis method was used to extract the components, and this was followed by a varimax (orthogonal) rotation. Only the first seven components matched the egienvalue-one criterion, and the results of a screen test suggested that only the first six components were meaningful. Therefore, only the first six components were retained for rotation. In interpreting the rotated factor pattern, an item was said to load on a given component if the factor loading was 0.4 or greater for that component, and less than 0.4 for the other. Questionnaire items with factor loadings greater than 0.5, and the corresponding factor loadings, are presented in Table 1. The original defined symptom catalogues are also shown for comparison. The six components were labeled as follows: depression-anxiety, impulsivity-paranoia, psychoticism-obsession, somatization, hostility, and phobia. Combined, the six components accounted for 50.6% of the total variance. Means, standard deviations, correlations, and reliability estimates of variables are presented in Table 2.

Table 2. Means (M), standard deviations (SD), intercorrelations, and Cronbach's alpha reliability estimates of variables

Variables (score range)	M	SD	Intercorrelation											
			1	2	3	4	5	6	7	8	9	10	11	12
Depression-anxiety (0–48)	10.5	7.9	(0.90)											
Impulsivity-paranoia (0–40)	8.2	6.2	0.77	(0.86)										
Psychotisim-obsession (0–20)	4.7	3.4	0.72	0.70	(0.74)									
Somatization (0–40)	6.9	53.0	0.72	0.71	0.64	(0.81)								
Hostility (0–32)	8.5	5.3	0.75	0.69	0.65	0.69	(0.84)							
Phobia (0–20)	3.4	3.2	0.63	0.58	0.53	0.59	0.60	(0.75)						
BSRS (0–200)	41.0	26.8	0.92	0.89	0.82	0.86	0.87	0.73	(0.90)					
Stress from school work (0–72)	24.8	10.4	0.59	0.51	0.52	0.49	0.57	0.42	0.62	(0.87)				
Stress from parent-child relationships (0–40)	9.1	6.2	0.46	0.43	0.35	0.39	0.44	0.26	0.48	0.51	(0.83)			
Stress from peer relationships (0–36)	7.9	4.8	0.65	0.53	0.46	0.48	0.56	0.46	0.63	0.61	0.45	(0.76)		
Social support (15–75)	38.4	8.0	-0.34	-0.28	-0.18	-0.26	-0.24	-0.14	-0.31	-0.21	-0.32	-0.32	(0.86)	
Neurotic traits (0–10)	5.3	2.2	0.50	0.44	0.41	0.49	0.49	0.40	0.55	0.37	0.38	0.38	-0.24	(0.64)

Correlations (statistically significant, $p < 0.001$) and reliability estimates appear on the diagonal.

Table 3. Beta weights and uniqueness indices (UI) obtained in multiple regression analysis predicting psychiatric symptoms

Predictor	Depression-anxiety	Impulsivity-paranoia	Psychoticism-obsession	Somatization	Hostility	Phobia	BSRS		
	β*	β*	β*	β*	β*	β*	β*	UI	F†
Gender (male 1, female 0)	–0.07‡	0.05	–0.04	0.01	–0.07§	–0.16§	–0.05§	0.0004	4.2§
Ethnicity (aborigine = 1, Hans 0)	0.02	0.05	0.03	0.07§	0.01	0.07§	0.05	0.0028	3.0
Stress from school work (0–72)	0.23†	0.22†	0.31†	0.22†	0.27†	0.14†	0.28†	0.0451	47.1†
Stress from parent-child relationships (0–40)	0.05	10†	0.04	0.07§	0.11†	0.01	0.08§	0.0004	4.3§
Stress from peer relationships (0–36)	0.37†	0.28†	0.17†	0.16†	0.23	0.30†	0.30†	0.0545	56.9†
Perceived social support (15–75)	–0.08†	–0.03	–0.01	–0.06	–0.01	–0.03§	–0.04	0.0024	2.5
Neurotic traits (0–10)	0.25†	0.22†	0.22†	0.31†	0.27†	0.24†	0.30†	0.0709	74.0†
Adjusted R square	0.55	0.41	0.33	0.37	0.46	0.32	0.57		
N	785	765	791	788	801	801	706		
F	140.6	77.5	57.3	66.0	98.0	56.0	132.9		

N = 707. β = standardized multiple regression coefficients obtained when psychiatric symptoms were regressed on all seven predictors. Uniqueness indices indicate the percentage of variance in psychiatric symptom scores accounted for by a given predictor variable beyond the variance accounted for by the other six predictors. *For *t* tests that tested the significance of the beta weights. †For F tests that tested the significance of the uniqueness indices, df = 1,696. ‡$p < 0.001$, §$p < 0.05$.

The reliability estimates ranged from 0.74 to 0.90 for the subscales of the BSRS. Variables significantly correlated with the BSRS were stress from schoolwork (r = 0.62), stress from parent-teen relationships (r = 0.48), stress from peer relationships (r = -0.63), neurotic traits (r = 0.55), and social support (r = –0.31). All correlation coefficients were significant ($p < 0.001$), and all were in the expected direction.

Significant predictors of psychiatric symptoms

In univariate analysis, school performance weakly correlated with self-rated symptoms (r = –0.04, $p = 0.24$), so we abandoned this variable in the multivariate analysis. The six independent emotional disturbance symptom scores and BSRS were then regressed independently using multiple regression, on the linear combination of gender, ethnicity, three perceived stresses, social support, and neurotic trait scores. The equation containing these seven variables accounted for 57% of the variance in the BSRS (df = 6, F = 132.9, $p < 0.001$; adjusted $R^2 = 0.57$) (Table 3), indicating that stress from school work, parent-child and peer relationships and neurotic traits displayed significant beta weight.

Beta weights and uniqueness indices were then reviewed to assess the relative importance of the four variables in the prediction of BSRS score (Table 3). Stress from peer relationships, neurotic traits, and stress from school work demonstrated somewhat larger beta weights at 0.30, 0.30, and 0.28 ($p < 0.005$), respectively, while the beta weight for stress in parent-child relationships was 0.08 ($p < 0.005$). Both coefficients were in the predicted direction.

The findings regarding uniqueness indices matched those for beta weights, in that only stress from schoolwork, stress from peer relationships, and neurotic traits displayed significant indices. Neurotic traits, stress from peer relationships and stress from school work accounted for approximately 7.1%, 5.5%, and 4.5%, respectively, of the variance in the BSRS, beyond the variance accounted for by the other six predictors. In contrast, gender and stress from parent-child relationships accounted for 0.04% of the unique variance in the BSRS.

According to the six-symptom model, female gender was an important predictor of self-rated psychiatric symptoms. Aboriginal ethnicity was a unique significant predictor of somatization and phobia symptom scores.

Discussion

Our sample was randomly selected, and the comparison of demographic characteristics with census data for this district reveals few substantial differences.

Because the instrument used in measuring psychiatric symptoms (BSRS) has a satisfactorily high reliability and applicability, our assessment of psychiatric symptoms at schools is reliable Overall, about 5% to 10% of high school students had psychiatric symptoms About 3% to 5% of students perceived feelings of impulsivity, paranoia, or hostility The estimates of prevalence of these disorders were similar to those of previous reports [4, 27, 28] Stress from schoolwork parent-child relationships, and neurotic traits are common important predictors of psychiatric symptom scores [14]

Among the six domains of psychiatric symptoms, depression-anxiety was most important, accounting for 37 8% of the total variance Variances of the remaining five symptoms ranged from 3% to 5% Therefore, we focused on the depression-anxiety symptoms One in 10 students reported feeling lonely, or blue This finding is comparable to that of Larsson and colleagues, who reported that 9% of Swedish adolescents experienced moderate to severe levels of depressive symptoms [4] They also found that 44% of those with depressive symptoms continued to experience moderate to severe depression for 4 to 6 weeks Approximately 3% of the adolescents had pronounced suicidal ideation and had made at least one previous suicide attempt There was a tendency for boys to show more stable depressive symptoms and suicidal ideation than girls [4] Because the third and fourth leading causes of death among adolescents aged 15 to 19 in Hualien County are suicide and homicide [17], screening for depressive symptoms among these students is critical

We included all significant independent variables in the multiple regression equation Neurotic traits and stress from school work and peer relationships were significant predictors of depression-anxiety scores Scores on depression-anxiety were positively associated with perceived stresses, with correlation coefficients ranging from 0 46 to 0 65 Our study provides strong evidence of the impact of stressful experiences among adolescents

The uniqueness index of a given predictor is defined as the percentage of variance in the criterion accounted for by that predictor, beyond the variance accounted for by the other predictive variables Thus, neurotic traits, stress from schoolwork, stress from peer relationships, and stress from parent-child relationships were the most significant independent predictors of psychiatric symptoms in our study This may indicate that adolescents have not yet learned how to employ social assets to cope with stressful circumstances, or that they do not perceive these psychosocial assets to be applicable to these stressful experiences These findings suggest that school-based mental health promotion and primary prevention programs that seek to enhance adolescents' self-esteem should substantially improve the psychologic well-being of adolescents Therefore, life-skills training for handling difficult situations is important for primary prevention Programs for improving parent-child relationships are also needed

Our results revealed a substantial gender difference in depressive symptomatology Studies in Western countries [4 8–10] and Taiwan [14, 16, 25, 29] found significantly higher levels of depressive symptoms among girls than among boys Gender variations in the experience of stressful life events, psychosocial resources, and in perceptions of parent-child relationships may explain the higher levels of depressive affect experienced by female adolescents Thus, programs that reinforce adolescents' sense of mastery or their perceptions of social support are likely to have particularly salutary effects among females Such programs may reduce the gender differential of depressive symptoms Individuals of this age group are primarily future-oriented and in the process of developing intimacy with members of the opposite sex [30] High school students will either begin work shortly or take the university entrance examination so perceived stress and depression-anxiety are to be expected Our findings reinforce the belief that there are a worrisome number of distressed students within the normal high school environment These results suggest that screening of students for mental health problems is essential to improve their mental health

Depression-anxiety impulsivity-paranoia, and psychoticism-obsession were the most commonly perceived symptoms among Hualien senior high school students However, hypersensitivity, obsession, and hostility are more common among ninth graders (grade 1 of high school) [22, 25] The difference may be due to the students' different developmental stages Ninth graders usually are 14 years old, but the mean age of our sample was 16 1 years, and about 45% were aged 17 or older

Somatization symptoms were the least common symptoms in our study, similar to the result of ninth graders in Taipei City [25] Because less than 3% had somatic symptoms, screening for mood disturbances did not seem appropriate

Schools may be an ideal setting for evaluation and treatment of psychiatric symptoms, because they are convenient and comfortable for students, and are without the stigma of psychiatric clinics Therefore physicians who are responsible for the health of adolescents should not restrict themselves to traditional clinics, but should work closely with school workers Health classes are a reasonable setting for screening of students Consultants and liaison nurses at schools helping to organize and conduct screening procedures could also interpret results and evaluate students for psychopathology

Group therapy could be used to help students develop effective handling of difficult situations, including constructive ventilation and control of anger School consultants could offer emotional support

and rational emotional therapy for those in need. Difficult students should be referred to mental health agencies. Setting up a referral system for professional mental health care for adolescents is also important.

In summary, self-rated psychiatric symptoms were not uncommon among high school students in Hualien City. Depression-anxiety, impulsivity-paranoia, and psychoticism-obsession were the most common. The students with perceived stress, high neurotic traits, or poor social support were more susceptible to psychiatric symptoms. Programs for life-skills training and improvement of parent-child relationships are essential. Schools may be the appropriate facility for screening and management. Medical professionals should collaborate with school workers and families for improving mental health care for adolescents.

ACKNOWLEDGMENTS: The authors wish to express their thanks to the teachers who were of great help in the administration of data collection, and to the 1,195 students who participated in this study.

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