

Original Article

Prevalence and risk factors of anxiety status among students aged 13-26 years

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Abstract: Previous study revealed that 8%-12% adolescents suffered from various types of anxiety disorders, and which had interfered with adolescent daily life function and affected adolescent social function. The aim of this study was to evaluate anxiety status and its related factors among students aged 13-26 years from Wuhu, China. This was a cross-sectional observational study. A sample of school students who come from a university, four high schools and four middle schools in Wuhu city were recruited, Self-Rating Anxiety Scale (SAS) was used to measure the anxiety status among students aged 13-26 years, and some demographic characteristics of students also was determined. A total of 5249 students were included in our study. The overall rate of anxiety status among students was 14.1%. A significant difference was observed between anxiety status and sex, mothers education level, dietary and siesta habit ($P < 0.05$), only-child family, gentle temper, regular breakfast habit, friend support was associated with lower scores on anxiety status. The findings indicated that anxiety status is common among school students. Preventive and treatment strategies are highly recommended.

Keywords: China, students, anxiety status, self-rating anxiety scale, influencing factors

Introduction

Anxiety disorder characterized by fluctuating levels of persistent, uncontrollable worry associated with fatigue, insomnia, muscle tension, poor concentration, and irritability, which can cause individuals to feel excessively frightened, distressed, or uneasy during situations in which most other people would not experience these same feelings. These disorders are common among adolescents and are associated with considerable distress and impairment in adaptive function [1-3]. Of course, Anxiety disorder is one of the most common psychological problems among teenagers [4]. Some researcher found that moderate anxiety has positive influence on human health, but sustaining severe anxiety can affect the immune function [5]. However, it is unclear about the status of mental health among students in Wuhu, China.

This cross-sectional study measures the level of anxiety among students aged 13-26 years from Wuhu, China. The aim of this study to have

a better understanding of the students' psychological and emotional situations, in order to effectively reduce the level of anxiety and simultaneously improve the educational performance in this group.

Methods

Study setting and procedure

Cluster sampling method was used to select participants who come from Anhui Province in China, the aim of the study is to measure the anxiety status among adolescents. The setting is Anhui Province in east of China with about 70 000 000 inhabitants, there are both public middle school, university and private middle school. In this study, we selected four middle schools and one university for classroom survey prior to the survey; we contacted the main heads of school and granted permission for the classroom survey. Before participation, students received written and oral information about the study, including information about confidential-

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Table 1. Characteristics of sample

Socio-demographic variables	n or mean	% or Standard deviation
Gender	5249	
Boy	2703	51.5
Girl	2546	48.5
Grade		
Grade one in junior middle school	806	15.3
Grade two in junior middle school	1221	23.3
Grade one in high middle school	1443	27.5
Grade two in high middle school	1010	19.2
Freshman	361	6.9
Sophomore	408	7.8
Location		
Rural	2850	54.3
Urban	2399	45.7
Whether only child family		
Yes	2468	47.0
No	2781	53.0
Age (years)		
Boy	19.31	2.47
Girl	19.16	2.40

ity and the right not to participate. The questionnaire took about 45 minutes to complete, and was finished during a school lesson. At the same time, the questionnaire was anonymous without records or codes.

Measure

The classroom questionnaire completed by participants had two sections: (1) socio-demographic background, (2) anxiety self-assessment scale (SAS) [6].

Socio-demographics

Socio-demographic background was described by gender, age, grade, nationality, family location, whether the one-child family, education level of parents, etc. The questionnaire comprised more areas than the present study.

Assessment of anxiety disorder

Self-Rating Anxiety Scale (SAS) was used to measure the anxiety status among students, which consisted of 20 questions, each question score 1-4 represents "never" to "always", for example, 1 = never, 2 = rarely/sometimes, 3 = quite a little one month, 4 = always, the higher level ticked by represents the more duration of the symptoms of anxiety. The total raw score was range 20 to 80, then, we transferred raw

score into standard score according to the formula: standard score = $\text{int} (1.25 \times \text{raw score})$. Although a cutoff point raw score of 36 was set by the original author to define the anxiety symptoms that were clinically significant [7], studies in the Chinese populations showed the upper limit for the normative populations was a raw score 40 or standard score 50 [8]. In this study, we defined the "anxiety status" as when the standard score became ≥ 50 [8, 9].

Medication

Because the aim of the study is to evaluate the anxiety status of students, we excluded the participants with organic disease or mental illness, which mainly based on the health screening record.

Statistics

EpiData3.1 software was used to establish the database, data were analyzed by the R [10] software programming language. A descriptive analysis of anxiety symptoms from socio demographic was carried out. The relationship between the anxiety score and demographic variables was evaluated by univariate logistic regression analysis. If a variable had a *P* value less than 0.1, then we considered inclusion for multivariable logistic regression analysis. Results were expressed as adjusted odds ratios and their 95% confidence interval. Statistical significance was set at *P* < 0.05 in all analysis.

Ethics statement

All subjects and/or guardians on behalf of the children agreed to provide their personal information regarding the purpose and the procedures of our study, and written informed consent. The study was performed in accordance with the Declaration of Helsinki. Approval was obtained from the Institutional Review Board of Wannan medical college.

Results

Baseline characteristics of participants

Of the 5362 respondents, the respondent rate was 97.89% (5249/5362), of which 48.5% were girls aged 13-26 years and 51.5% were boys aged 13-26; the average age of boys and girls were 19.31 ± 2.47 years and 19.16 ± 2.40

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Table 2. Socio-demographic of anxiety symptoms

Group		total	no symptoms % (n)	Anxiety symptoms % (n)	χ^2	P
Sex	boy	2703	88.2 (2384)	11.8 (319)	23.517	0.000
	girl	2546	83.5 (2127)	16.5 (419)		
Grade	Grade one in junior middle school	806	90.4 (729)	9.6 (677)	47.064	0.000
	Grade two in junior middle school	1221	88.5 (1081)	11.5 (140)		
	Grade one in high middle school	1443	85.2 (1230)	14.8 (213)		
	Grade two in high middle school	1010	84.8 (856)	15.2 (154)		
	Freshman	361	82.0 (296)	18.0 (65)		
	Sophomore	408	78.2 (319)	21.8 (89)		
Location	Rural	2850	84.1 (2398)	15.9 (452)	16.718	0.000
	Urban	2399	88.1 (2113)	11.9 (286)		
Whether only child	Yes	2468	88.6 (2187)	11.4 (281)	27.567	0.000
	No	2781	83.6 (2324)	16.4 (457)		
Disposition	introversion	1466	83.7 (1227)	16.3 (239)	8.625	0.013
	middle	2109	87.0 (1835)	13.0 (274)		
	extroversion	1674	86.6 (1449)	13.4 (225)		
Temper	quick	1813	79.4 (1439)	20.6 (374)	100.7	0.000
	middle	2131	88.8 (1892)	11.2 (239)		
	mild	1305	90.4 (1180)	9.6 (125)		
Dietary bias	Yes	2387	82.0 (2398)	18.0 (429)	55.462	0.000
	No	2862	89.2 (2553)	10.8 (309)		

Table 3. Code for relative variables of statistical analysis of influencing factors

Variables	Assignment	Variables	Assignment
Anxiety*	No = 0 Yes = 1	Siesta habit	No = 0 Yes = 1
Sex	Boy = 0 Girl = 1	High volume training	No = 0 Yes = 1
Whether only child	No = 0 Yes = 1	light training	No = 0 Yes = 1
Location	rural = 0 urban = 1	Dietary bias	No = 0 Yes = 1
Depression	No = 0 Yes = 1	Regular breakfast	No = 0 Yes = 1
Father's health	Bad = 1	Friends support	No = 1
	In general = 2		1-2 = 2
	good = 3		> 3 = 3
Mother's health	Bad = 1	Disposition	introversion = 1
	In general = 2		middle = 2
	good = 3		extroversion = 3
Family expectations	Low = 1	Temper	quick = 1
	Middle = 2		middle = 2
	High = 3		mild = 3
Daily sleep time	< 6 hours = 1	Body type	relatively thin = 1
	6 hours = 2		medium-sized = 2
	8 hours = 3		obese = 3
	> 10 hours = 4		

Note: *are dependent variables, the rest are independent variables.

years, respectively. The majority of respondents were middle school students (85.3%); 54.3% living in rural area and 45.7% living in urban area. In the aspect of whether only child family, 47% were from only child family and 53% were from multiple offspring family, the characteristics of participants was showed in **Table 1**.

Socio-demographic factors of anxiety status

The prevalence of anxiety status among students was estimated at 14.1% (738/5249). The study showed that there were significant differ-

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Table 4. Univariate Logistic regression analysis to the influencing factors of adolescents' anxiety

Variables	β	S.E (β)	Wald χ^2	P	OR	95% CI
Sex	0.333	0.101	10.962	0.001	1.396	1.146~1.700
Whether only child	-0.298	0.102	8.573	0.003	0.742	0.608~0.906
Location	-0.049	0.103	0.223	0.637	0.953	0.779~1.165
Smoking	0.223	0.316	0.496	0.481	1.249	0.672~2.321
Drinking	0.458	0.279	2.697	0.101	1.580	0.915~2.728
Depression	2.079	0.117	314.894	0.000	7.994	6.354~10.058
Father's health	0.146	0.091	2.574	0.109	1.157	0.968~1.384
Mother's health	0.225	0.081	7.658	0.006	1.252	1.068~1.468
Family expectations	0.054	0.110	0.237	0.627	1.055	0.850~1.310
Daily sleep time	-0.387	0.082	22.402	0.000	0.679	0.578~0.797
Siesta habit	0.206	0.101	4.203	0.040	1.229	1.009~1.498
High volume training	0.096	0.105	0.838	0.360	1.101	0.896~1.353
Light training	-0.112	0.098	1.298	0.255	0.894	0.737~1.084
Dietary bias	0.434	0.093	21.679	0.000	1.543	1.286~1.853
Regular breakfast	-0.367	0.108	11.630	0.001	0.693	0.561~0.855
Friends support	-0.221	0.082	7.260	0.007	0.802	0.683~0.942
Disposition	0.026	0.061	0.177	0.674	1.026	0.911~1.156
Temper	-0.313	0.062	25.577	0.000	0.731	0.647~0.825
Body type	0.009	0.066	0.020	0.887	1.009	0.887~1.148
Constant	-1.992	0.524	14.472	0.000	0.136	

Table 5. Multivariate unconditioned Logistic regression analysis of anxiety status

Variables	β	S.E (β)	Wald χ^2	P	OR	95% CI
Sex	0.287	0.093	9.534	0.002	1.332	1.110~1.598
Whether only child	-0.320	0.094	11.583	0.001	0.726	0.604~0.873
Depression	2.084	0.116	320.493	0.000	8.035	6.396~10.094
Mother's health	0.272	0.073	13.906	0.000	1.312	1.138~1.514
Daily sleep time	-0.387	0.081	22.811	0.000	0.679	0.579~0.796
Siesta habit	0.208	0.100	4.355	0.037	1.231	1.013~1.496
Dietary bias	0.437	0.092	22.621	0.000	1.548	1.293~1.854
Regular breakfast	-0.385	0.107	12.983	0.000	0.680	0.552~0.839
Friends support	-0.207	0.080	6.639	0.010	0.813	0.689~0.952
Temper	-0.315	0.062	26.149	0.000	0.730	0.647~0.823
Constant	-1.696	0.363	21.885	0.000	0.183	

ence between urban and rural, different gender, different grades, urban and rural, the only-child and non-only child, different disposition, different temperament, and dietary bias or not for the anxiety score ($P < 0.05$). As described in **Table 2**.

Related factors analysis of students anxiety status

We set whether you are anxious or not as the dependent variable, related factors as the independent variable, single factor and multi-factor

unconditioned logistic regression analysis were used. The standard of entering the model and exiting the model were 0.05 and 0.10 respectively. Assignments of specific variables are as follows, which described in **Table 3**.

Univariate logistic regression analysis to the influencing factors of student anxiety status

The results of university logistic regression analysis showed that gender, depression, mother's poor health status, dietary bias were the risk factors of anxiety status; While the one-child, the rural registered permanent residence, the sleep time of medium, regular breakfast, have friend support, mild temper were the protective factors of anxiety, and no statistical significance was found for other variables in this study ($P > 0.05$), as showed in **Table 4**.

Multivariate regression analyses of the dependent variable anxiety scores against demographic and menstrual variables

Based on the results of univariate logistic regression analysis, the following variables: sex, depression, mother health level, dietary bias, siesta habit, were enter into the multivariate regression analyses model (Forward Wald method), just as showed in **Table 5**.

Discussion

Our main finding in the study was that the prevalence of anxiety status among students was estimated at 14.1%. A higher anxiety score was found in girls, undergraduate and senior high

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students, rural students and the no-only children, partial introverted students extreme manic and dietary bias students, the reason may be that there are gender difference in coping press. The results in our study are consistent with previous national and international studies [11-13].

One striking result was the high prevalence of anxiety among adolescents, the girls in our study had a higher mean value of anxiety than that of boys [14, 15], the reason may be that the girls are sensitive and have the more tendencies of generalized anxiety symptoms easily. Increased levels of anxiety disorder may be an aspect of high stress arousal, reporting common psychosomatic symptoms are shared risk factors of later suicidal and self-injurious behaviors [16]. In the study undergraduate and senior high students had a higher mean value of anxiety disorder than that of junior middle school students, research results showed that two main stress sources learning pressure and interpersonal enhanced with the rise of grade; there were statistically significant differences for anxiety disorder between the rural students and urban students, the former had a higher mean value of anxiety than that of latter, the lower life satisfaction is an important factor of rural adolescents' anxiety [17, 18], urban students have more opportunity to get knowledge with the rapid economy development than that of rural students, and the family structure, parents' psychological quality and attitude of education are associated with the students' anxiety; the only child have lower anxiety score than non-only child, and the cause may be that the only child have better family status; in addition, the only child could get more spiritual care and have less economic burden, but it is different for non-only child; the students with grumpy or introverted had a higher anxiety detection rate, they were more easy to bad mood due to external stimuli in study or life [19]; Study showed anxiety score of students with dietary bias had higher anxiety score, which may be due to dietary bias cause students malnutrition, further affect the growth and development of body, leading to the occurrence of anxiety.

The study showed that gender, depression, mother's poor health status, dietary bias were the risk factors of anxiety; while the one-child, the rural registered permanent residence, the

sleep time of medium, regular breakfast, have friend support, mild temper were protective factors of anxiety disorder. Multivariate Logistic regression analyses (Forward Wald method) were performed after screened variables based on single factor Logistic regression analysis. Variables such as girls [14], depression, mother's poor health, dietary bias, siesta habit, the OR value were greater than 1, were considered as risk factors of anxiety. While the one-child, moderate sleep time, eating breakfast regularly, have friends support, neutral temper, the OR value were less than 1, were protective factors of anxiety. In addition, regular training had no significant difference which was different with De Moor, M.H.'s regular training is the protective factor of anxiety [20-22].

In conclusion, the results indicated that anxiety disorder were prevalent among adolescents, especially in girls, rural students and the non-only child. Parents are the important figure during teenagers' growing [23], whose consciousness and concept of mental health education will directly influence the development of students' mental health. To prevent and reduce children's psychological problems in the family, psychological interventions for both parents and children at the same time are needed. Higher education workers should guide the students at coordinating interpersonal relationships, make them adapt to the new environment faster and face side events in a positive way by strengthen the sense of responsibility [16], the students' psychological quality and the cultivation of non-intelligence factors, carrying out rich and colorful extracurricular activity, popularizing mental health knowledge.

Limitations and strengths

This study has a number of limitations, the participants were students but not include all grades, and thus cannot represent the total population features as adolescents. The further research should thus include students of grade three in junior middle school. Moreover, strengths of the study are relevant to the interpretation and robustness of the results.

However, even given these weaknesses, the participating students represented a relatively large sample, high response rate and low level of missing data.

Conclusions

The findings indicated that anxiety symptoms are common in school students. Especially in girls, students who study in rural areas and students in the families with more child. Preventive and treatment strategies are highly recommended.

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Disclosure of conflict of interest

None.

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