

Mental Disorders among Vietnamese Adolescents: A Cross-sectional Study

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ABSTRACT This study aimed to investigate prevalence of mental disorders among Vietnamese adolescents; comparison of levels of mental disorders between boys and girls, between rural and urban areas, and between grades. 822 adolescents in the Central and Central Highlands regions of Vietnam voluntarily took part in the survey. The Strengths and Difficulties Questionnaire was used to assess mental disorders among adolescents. Descriptive statistical analysis and Independent Sample T-Test were used to examine the hypotheses. Results showed that 37.7 percent of adolescents have mental disorders; girls have higher levels of emotional symptoms than boys; older adolescents have higher levels of peer problems than younger adolescents; adolescents in urban areas have higher levels of emotional disorders, conduct problems and hyperactivity than adolescents in rural areas.

INTRODUCTION

Ages 10 to 19 are considered adolescent. It is a particularly important time because of the rapid development, physical, psychological, and sexual maturity that take place during this time (Shekhawat et al. 2019). During adolescent development, the difficulty of adjusting to one's own changing physique and expectations of one's social role play a negative influence and contribute to mental disorders (Kaltiala-Heino et al. 2003). Mental disorders (psychiatric disorders) are behavioral, emotional, or cognitive dysfunctions that are difficult for a person to manage and are associated with clinically substantial distress or impairment in one or more domains, such as interpersonal, social, or vocational functioning (Elleker and O'Neill 2014). Adolescents around the world have a high rate of mental disorders (Polaczyk et al. 2015). Negative outcomes from these mental illnesses include poor academic perfor-

mance, dropout rates, depression, and even suicide (Shekhawat et al. 2019). Therefore, the promotion of mental health in adolescence is a top public health goal worldwide because these issues are likely to persist into adulthood (Duiinhof et al. 2020).

There are gender and age disparities in mental disorders in adolescents, according to epidemiological and clinical studies (Park et al. 2014). In addition, a growing body of evidence has shown that there are differences in mental disorders between adolescents in rural and urban areas (Mullick and Goodman 2005; Probst et al. 2006; Alyahri and Goodman 2008). A small number of studies in Vietnam have used the Strengths and Difficulties Questionnaire to examine the prevalence of mental disorders in adolescents (Trinh and Nguyen 2019) and the differences in mental disorders between boys and girls (Vu et al. 2018). However, previous studies were conducted in Hanoi and Ho Chi Minh City, two large cities in Vietnam (Vu et al. 2018; Trinh and Nguyen 2019). Research on mental disorders in adolescents in the Central and Central Highlands regions of Vietnam still has many gaps. Furthermore, there is still a lack of research investigating differences between rural and urban areas in adolescent mental disorders. In order to create a strong policy for the delivery of mental health care and other ser-

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vices, this study aimed to investigate (1) prevalence of mental disorders among Vietnamese adolescents, (2) comparison of levels of mental disorders between boys and girls, between rural and urban areas, and between grades.

Prevalence of Mental Disorders Among Adolescents

The prevalence of adolescents with mental disorders varies from country to country. According to the Strengths and Difficulties Questionnaire scale, the prevalence of adolescents at high risk of mental disorders was 8.35 percent to 10.1 percent (in India) (Bhola et al. 2016; Shekhawat et al. 2019); 15.35 percent (in Ireland) (Greally et al. 2010), 11.7 percent (in Israel) (Farbstein et al. 2010), 15.3 percent (in Russia) (Goodman et al. 2005), 9.49 percent - 16.2 percent (in China) (Guan et al. 2010; Xiaoli et al. 2014) and 9.3 percent (in Vietnam) (Vu et al. 2018). Prevalence of specific disorders has also been reported in previous studies. Such as, emotional disorders rate was 9 -10.36 percent (in India) (Bhola et al. 2016; Shekhawat et al. 2019) and 13.69 percent (in Vietnam) (Vu et al. 2018); conduct problems rate was 11.67 percent - 13.0 percent (in India) (Bhola et al. 2016; Shekhawat et al. 2019) and 8.94 percent (in Vietnam) (Vu et al. 2018); hyperactivity problems rate was 6.24 percent - 12.6 percent (in India) (Bhola et al. 2016; Shekhawat et al. 2019) and 3.76 percent (in Vietnam) (Vu et al. 2018); peer problems rate was 7.34 percent - 9.4 percent (in India) (Bhola et al. 2016; Shekhawat et al. 2019) and 7.60 percent (in Vietnam) (Vu et al. 2018); prosocial problems rate was 5.33 percent (in India) (Bhola et al. 2016; Shekhawat et al. 2019) and 15.92 percent (in Vietnam) (Vu et al. 2018). Differences in the prevalence of mental disorders among adolescents may be related to the economic, cultural and social characteristics of the countries, sample characteristics and time of the study.

Gender Differences in Mental Disorders

Gender differences in mental disorders have been repeatedly demonstrated in previous studies, but results have been inconsistent. Despite cultural differences, studies of adolescents in India, Germany, Ireland and China have revealed that the boys tend to report more hyperactivity

(Fajardo-Bullón et al. 2019; Ortuño-Sierra et al. 2018); peer problems (Becker et al. 2018; Shekhawat et al. 2019) and conduct problems (Bhola et al. 2016; Shekhawat et al. 2019) while the girls report more emotional symptoms (Bhola et al. 2016; Becker et al. 2018; Shekhawat et al. 2019) and prosocial problems (Bhola et al. 2016; Shekhawat et al. 2019). In contrast, Shekhawat et al. (2019) reported that the girls tend to report more hyperactivity than boys. However, in the sample of Indian adolescents, Bhola et al. (2016) reported that there were no significant gender differences in hyperactivity and conduct problems. In the sample of Vietnamese adolescents, boys have higher scores on conduct disorder, hyperactivity and peer problems than girls, while girls have higher scores on emotional disorders and prosocial problems than boys (Vu et al. 2018).

During childhood and adolescence, girls tend to be concerned with close relationships, while boys tend to be concerned with physical dominance (Brooks Holliday et al. 2017). Therefore, in general, girls presented with internalizing problems such as emotional symptoms (emotional symptoms and peer problems), while boys presented with more externalizing problems (conduct problems and hyperactivity). Boys with conduct disorder engage in physical aggression such as hostility, property destruction, deceit, theft, running away from home (Brooks Holliday et al. 2017; Shekhawat et al. 2019). Meanwhile, girls tend to score higher on internalizing symptoms, such as emotional problems (anxiety and depression) (Fajardo-Bullón et al. 2019). In addition, the foundation of prosocial behavior is concern for others' interests, which is associated with agreeableness and conscientiousness (Pursell et al. 2008), and girls are more strongly associated with agreeableness and conscientiousness than boys (Sneed 2002). That may be why girls have more prosocial problems than boys.

In literature, gender differences in mental disorders may be explained by low self-esteem (Kuehner 2017) and high rumination (Mezulis et al. 2002). Studies in the past found that females were more ruminated about negative events (body image, interpersonal, and achievement) (Mezulis et al. 2002; Eaton et al. 2012) and tend to have lower self-esteem (Agam et al. 2015) than males. In addition, the withdrawn and depressive tendencies of women were found to be much higher (Shek-

hawata et al. 2019). Females tend to have more sleep problems (Lewien et al. 2021; Schlarb et al. 2015) and fatigue (Rose et al. 2017) than males.

Grade Differences in Mental Disorders

The growth in mental problems among adolescents has also been linked to aging. Inconsistent findings have been found in the numerous studies that have examined the relationship between aging and mental problems (Barriuso-Lapresa et al. 2014; Park et al. 2014; Fajardo-Bullón et al. 2019; Shekhawat et al. 2019). In general, many studies have shown that older adolescents have higher levels of mental disorders than younger adolescents (Park et al. 2014; Shekhawat et al. 2019). However, a study on a sample of adolescents in Spain reported contradictory results with previous studies that the older adolescents are, the less likely they are to have mental disorders (Barriuso-Lapresa et al. 2014). With regard to specific disorders, the results of previous studies are also conflicting. For example, older adolescents (12 - 15 years) tended to self-report lower scores of emotional symptoms, conduct disorders, peer problems, hyperactivity problems and prosocial problems than youngsters (10 - 11 years) (Barriuso-Lapresa et al. 2014). Another example, Yao et al. (2009) found that in comparison to adolescents between the ages of 11 and 14, adolescents between the ages of 15 and 18 scored lower on the peer problems subscale and higher on the prosocial problems and hyperactivity problems subscales. According to another study, although peer problems and hyperactivity problems were fewer in 11-12 year old students than in 13-14 year old students, they experienced greater emotional symptoms, prosocial problems and conduct problems (Shekhawat et al. 2019). Suspected explanations for this variation include referral bias (Park et al. 2014), biological and psychological factors (Cyranowski et al. 2000), hormonal changes during puberty (Thapar et al. 2012), academic pressure or peer pressure (Mishra et al. 2018).

Difference of Living Area in Mental Disorders

It is usual to link living in an urban or rural area to an increased risk of developing depression and other mental disorders (Breslau et al. 2014). Previous studies have revealed that urban children/adolescents have higher mental disorders than rural children/adolescents (Mullick and

Goodman 2005; Alyahri and Goodman 2008). In contrast, there is also evidence of a higher risk of mental disorders in rural areas than in urban areas (Probst et al. 2006). These differences may be caused by social issues, such as concentrated poverty, a lack of networking, increased psychiatric morbidity and the relationship between higher social problems and environmental stressors in urban areas (Breslau et al. 2014; Vassos et al. 2016). Furthermore, there are often inequalities between urban and rural areas in terms of economy, health services and education (Li et al. 2018; Chen et al. 2021). Inequality in education and school environments between urban and rural areas, which can cause regional inequalities in mental health (Chen et al. 2021). However, several studies in China have shown that there is no difference in the level of mental disorders among urban and rural adolescents (Guan et al. 2010; Xiaoli et al. 2014). According to Xiaoli et al. (2014), the lack of noticeable difference between urban and rural areas may be the result of family dysfunction when many farmers move to the city, leaving their children behind (in rural), which has negatively impacted the lives of rural adolescents. In addition, rural urbanization may lead to an increase in mental disorders (Xiaoli et al. 2014).

Objectives of the Study

The purpose of this study was to determine the prevalence of mental disorders among Vietnamese adolescents, comparison of levels of mental disorders between boys and girls, between rural and urban areas, and between grades. Using prior research as a foundation, this study aimed to test the following hypotheses: (1) The prevalence of mental disorders among adolescents in Vietnam is comparable to that of other countries; (2) There are differences in mental disorders between boys and girls; (3) There are differences in mental disorders between urban and rural adolescents; and (4) There are differences in mental disorders between 6th - 7th graders and 8th - 9th graders.

METHODOLOGY

Sample

Data was collected from May to June 2022. The participants are 822 secondary school students from Thanh Hoa, Da Nang, and Kon Tum

provinces in Vietnam (The effective rate is 91.33%). Through school principals and homeroom teachers, the investigators had face-to-face meetings with students. At the meeting, the investigator introduced the purpose and method of participating in the study and asked the students for help. Students may participate in the study if both the student and the parent sign the Consent Form. Participants then completed “The Strengths and Difficulties Questionnaire” and demographic-related questions.

The demographic characteristics of the sample are presented in Table 1. By gender, the sample includes 409 girls and 413 boys. By grade level, the sample included 201 6th graders, 220 7th graders, 211 8th graders and 190 9th graders. By province, the sample included 276 students from Thanh Hoa, 265 students from Da Nang and 281 students from Kon Tum. In terms of living area, the sample includes 422 students living in urban areas and 400 students living in rural areas. By academic performance, 93 students have average academic performance, 477 students have good academic performance and 252 students have excellent academic performance.

Table 1: Sample characteristics

Variables		n	%
Gender	Male	413	50.2
	Female	409	49.8
Grades	6 th grade	201	24.5
	7 th grade	220	26.8
	8 th grade	211	25.7
	9 th grade	190	23.1
Provinces	Thanh Hoa	276	33.6
	Da Nang	265	32.2
	Kon Tum	281	34.2
Living Area	Urban	422	51.3
	Rural	400	48.7
Academic Performance	Average	93	11.3
	Good	477	58.0
	Excellent	252	30.7

Note: n: Number of participants; %: Percentage

Instruments

Mental Disorders

The Strengths and Difficulties Questionnaire (SDQ) (Goodman 1997) was used to assess men-

tal disorders among Vietnamese adolescents. SDQ is a brief but comprehensive screening instruments for adolescent psychopathology (Yao et al. 2009). This scale is a 25-item self-report measure that is broken down into 5 subscales, each of which comprises 5 items. Items like “I worry a lot” and “I have one good friend or more”. Each item is rated on a 3-point Likert scale, with the following options: 0 = “not true”; 1 = “somewhat true” and 2 = “certainly true”. Psychological difficulty was determined by summing up the scores on the subscales conduct problems, peer problems, emotional symptoms and hyperactivity. Each subscale’s scores ranged from 0 to 10, and the total difficulty score ranged from 0 to 40. Indicators of mental disorders are higher with higher scores. In numerous research conducted in Vietnam, SDQ is employed (Dang et al. 2017; Trinh and Nguyen 2019). In this study, the reliability of the subscales is as follows: conduct problems ($\alpha = 0.702$), prosocial behavior ($\alpha = 0.775$), peer problems ($\alpha = 0.741$), emotional symptoms ($\alpha = 0.704$) and hyperactivity ($\alpha = 0.723$).

Demographic Information

Demographic information includes: gender (coding: 1 = male, 2 = female); grade (1 = 6th grade, 2 = 7th grade, 3 = 8th grade, 4 = 9th grade); Academic performance (1 = average ($5.0 \leq \text{GPA} < 6.5$), 2 = Good ($6.5 \leq \text{GPA} < 8$) and 3 = Excellent ($\text{GPA} \geq 8.0$)); province (1 = Thanh Hoa 2 = Da Nang 3 = Kon Tum) and living area (1 = urban and 2 = rural).

Data Analyses

In this study, the researchers used SPSS 20 software to analyze the data. The data analysis process is carried out sequentially according to the following steps: First, the researchers checked the reliability of Cronbach’s Alpha of the subscales. Second, the researchers used descriptive statistics to calculate mean scores, standard deviations, and numbers (n), and proportions for main and demographic variables. Third, the researchers used t-test to examine whether there are differences in the demographic variables and mental disorders between groups. Fourth, the researchers used Cohen’s d to calculate the effect sizes for significant differences.

RESULTS

Prevalence of Mental Disorders among Vietnamese Adolescents

Table 2 indicated that 37.7 percent of Vietnamese adolescents have mental disorders (22.0% of low-risk adolescents and 15.7% of high-risk adolescents). The proportion of adolescents at risk of conduct problems, hyperactivity, emotional symptoms and peer problems were 26.5 percent (11.4 % low risk and 15.0 % high risk), 17.6 percent (10.2 % low risk and 7.4 % high risk), 29.2 percent (16.3 % low risk and 12.9 % high risk) and 51.7 percent (32.8% low risk and 18.9 % high risk), respectively.

Gender Differences in Mental Disorders among Vietnamese Adolescents

Findings related to gender differences in mental disorders presented Table 3. Results indicated that girls had significantly higher levels of emotional symptoms ($t = -2.249, p < 0.05, d = 0.157$). There were no significant gender differences ($p > 0.05$) in the levels of self-reported conduct problems, hyperactivity problems, peer problems, prosocial behavior and total problems.

Grade Differences in Mental Disorders among Vietnamese Adolescents

Findings related to grade differences in mental disorders presented Table 4. Results indicated that adolescents in grades 8th and 9th have more peer problems than adolescents in grades 6th and 7th ($t = -2.277, p < 0.05$ and $d = 0.158$). There were no significant grade differences ($p > 0.05$) in the levels of conduct problems, hyperactivity problems, emotional symptoms, prosocial behavior and total problems.

Difference of Living Area in Mental Disorders among Vietnamese Adolescents

Findings related to difference of living area indicated significantly higher levels of emotional symptoms ($t = 3.979, p < 0.001, d = 0.277$), conduct problems ($t = 4.322, p < 0.001, d = 0.299$), hyperactivity problems ($t = 4.158, p < 0.001, d = 0.290$) and total problems ($t = 4.386, p < 0.001, d = 0.306$) among adolescents living in urban areas (Table 5). There were no significant difference of living area ($p > 0.05$) in the levels of self-reported peer problems and prosocial behavior.

Table 2: Prevalence and pattern of mental disorders among Vietnamese adolescents

Variables	Normal		Low risk		High risk	
	n	%	n	%	n	%
Emotional symptoms	582	70.8	134	16.3	106	12.9
Conduct problems	605	73.6	94	11.4	123	15.0
Peer problems	397	48.3	270	32.8	155	18.9
Prosocial behavior	612	74.5	115	14.0	95	11.6
Hyperactivity	677	82.4	84	10.2	61	7.4
Total difficulties	512	62.3	181	22.0	129	15.7

Note: n: Number of participants; %: Percentage

Table 3: Gender differences in mental disorders

Variables	Boys	Girls	$t_{(820)}$	Effect size <i>d</i>
	<i>M ± SD</i>	<i>M ± SD</i>		
Emotional symptoms	3.969±2.236	4.313±2.153	-2.249*	0.157
Conduct problems	2.441±2.114	2.484±1.816	-0.316	0.022
Peer problems	3.535±2.294	3.479±2.238	0.353	0.025
Prosocial behavior	7.162±2.267	7.389±2.227	-1.480	0.101
Hyperactivity	3.373±2.165	3.575±2.050	-1.371	0.096
Total difficulties	13.317±6.568	13.851±5.700	-1.244	0.087

Note: M: Mean; SD: Standard deviation; *: $p < 0.05$

Table 4: Grade differences in mental disorders

Variables	Grade 6-7 th	Grade 8-9 th	$t_{(820)}$	Effect size <i>d</i>
	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>		
Emotional symptoms	4.074±2.219	4.210±2.182	-0.884	0.061
Conduct problems	2.441±1.902	2.516±2.041	-0.765	0.038
Peer problems	3.333±2.363	3.690±2.146	-2.277*	0.158
Prosocial behavior	7.245±2.129	7.306±2.265	-0.405	0.028
Hyperactivity	3.475±2.120	3.471±2.101	0.025	0.002
Total difficulties	13.292±6.072	13.888±6.231	-1.388	0.097

Note: M: Mean; SD: Standard deviation; *: $p < 0.05$. Grade (coded: 1= 6th - 7th grade, 2= 8th - 9th grade)

Table 5: Difference of living area in mental disorders

Variables	Rural	Urban	$t_{(820)}$	Effect size <i>d</i>
	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>		
Emotional symptoms	3.830±2.036	4.434±2.311	3.979***	0.277
Conduct problems	2.163±1.665	2.746±2.186	4.322***	0.299
Peer problems	3.538±2.201	3.475±2.334	0.398	0.028
Prosocial behavior	7.310±2.132	7.242±2.256	-0.446	0.031
Hyperactivity	3.163±2.039	3.768±2.135	4.158***	0.290
Total difficulties	12.630±5.599	14.486±6.516	4.386***	0.306

Note: M: Mean; SD: Standard deviation; ***: $p < 0.001$.

DISCUSSION

The study offers a snapshot of the vulnerability among Vietnamese adolescents, with 37.7 percent of the population at risk for mental disorders (15.7 % of high-risk adolescents). This prevalence tends to be higher than in other studies (Goodman et al. 2005; Farbstein et al. 2010; Grealley et al. 2010; Guan et al. 2010; Xiaoli et al. 2014; Bhola et al. 2016; Shekhawat et al. 2019) using The Strengths and Difficulties Questionnaire in India, Ireland, Israel, Russia and China. Compared with previous studies in Vietnam (Vu et al. 2018), the proportion of adolescents with mental disorders in this study was higher. The discrepancies between these studies may be a reflection of actual variances in the prevalence of mental disorders among adolescents from various regions of Vietnam. These results can be explained in terms of the following three aspects: First, earlier studies that the Strengths and Difficulties Questionnaire tends to overestimate prevalence in low and middle-income nations (Alavi et al. 2009; Bhola et al. 2016); meanwhile, Vietnam is a developing country with low income. Second, the data of this study were collected in the context of the complicated development of COVID-19 in Vietnam. The impact of COVID-19 may be responsi-

ble for the increased prevalence of mental disorders among adolescents and adults (Liao et al. 2021; Tran-Chi et al. 2021). Third, the survey time is close to the end-of-semester exam (early May) of Vietnamese adolescents, so the pressure from the end-of-term exam and academic stress may increase mental disorders for students (Hosseinkhani et al. 2020).

Consistent with other studies using the Strengths and Difficulties Questionnaire (Bhola et al. 2016; Grealley et al. 2010), the researchers found that girls had significantly higher levels of emotional symptoms than boys. Some evidence indicate that during adolescents, these gender differences in emotional problems grow more pronounced (Rudolph 2002). Compared to males, females ruminate more frequently, spending more time reflecting on their negative feelings and issues than actively tackling difficulties (Mezulis et al. 2002; Eaton et al. 2012). Furthermore, females are often more tired and lack energy (Ghaedi and Mohd Kosnin 2014). All of the above may be the reason why girls experience emotional problems more than boys. Interestingly, in contrast to previous research (Van Roy et al. 2006; Göran Svedin and Priebe 2008; Grealley et al. 2010), the researchers found that conduct problems, hyperactivity problems, peer problems, prosocial be-

havior and total problems did not differ significantly by gender. This result could be explained by a reduction in the gender gap for adolescent conduct disorder (Bhola et al. 2016).

In Vietnam, 6th and 7th grade students are aged between 12 and 13 years old, and 8th and 9th graders are 14 -15 years old. In this study, the researchers found that the total difficulties score and the components scores were higher in older adolescents than younger adolescents. However, significant differences were found in peer problems, with older adolescents having more peer problems. This finding are in line with earlier studies on adolescents in Korea (Park et al. 2014), India (Shekhawat et al. 2019) and Swedish (Lundh et al. 2008). According to earlier studies, older age groups were more knowledgeable about themselves and their symptoms and were able to answer more honestly (Mishra et al. 2018; Shekhawat et al. 2019). In addition, increased mental disorders among older adolescents may also be the result of hormonal changes during puberty (Thapar et al. 2012), academic pressure or peer pressure (Mishra et al. 2018).

In line with earlier findings (Mullick and Goodman 2005; Alyahri and Goodman 2008), the researchers discovered that adolescents in urban areas have higher levels of emotional disorders, conduct problems and hyperactivity than adolescents in rural areas, which increased their total difficulties. Like previous studies (Breslau et al. 2014; Vassos et al. 2016), the researchers suggest that this result may be related to lack of social network connectivity and environmental stressors (noise, garbage buildup, smoke-polluted air, and unhealthful surroundings...) in urban areas. Urban areas are characterized by a low frequency of social connections, whereas rural areas exhibit more social embeddedness, leading to close social networks (Sørensen 2016). Due to modern life, an abundance of knowledge, and the availability of several online entertainment options, social interaction in large cities is decreasing; meanwhile, the number of village exchanges is higher in rural areas. Consequently, mental illnesses are likewise less common in rural areas. Reality in Vietnam showed that after school, many rural adolescents can go with their friends to fly kites, ride bicycles and play folk games together; meanwhile, urban adolescents often have to take extra math, literature and foreign languages. This

may also be the cause of an increase in mental disorders among urban adolescents.

CONCLUSION

According to the researchers' findings, 37.7 percent of adolescents suffer from mental disorders. In comparison to girls, boys have higher levels of peer problems and lower levels of emotional symptoms. In comparison to adolescents in rural areas, adolescents in urban areas exhibit higher levels of emotional disturbance, behavioral problems, and hyperactivity. In comparison to younger adolescents, older adolescents have higher levels of peer problems. The findings of this study can be used to guide the creation of programs that shield adolescents in the Central and Central Highlands regions of Vietnam from mental disorders. In Vietnam, this is the first study to use the Strengths and Difficulties Questionnaire to explore the prevalence of mental disorders, differences in demographic variables (gender, grade, and living area) of mental disorders among adolescents in some Central provinces and Central Highlands. However, interpreting the current study needs taking into account its many limitations. First, the researchers were unable to include high school pupils in the sample (grades 10 through 12). As a result, there are no late adolescent data on mental disorders available for the current investigation. Second, the study used convenience sampling method to collect data in 2 Central provinces and 1 province in the Central Highlands of Vietnam. Therefore, the results of this study may not be representative of all adolescents in the entire Central and Central Highlands of Vietnam. Therefore, a large-scale study using random sampling may be needed to address the limitations of this study.

RECOMMENDATIONS

This study demonstrates that (1) the prevalence of mental disorders among adolescents in Vietnam is higher than in other countries and (2) there are differences in terms of gender, grade and living area (urban and rural) of mental disorders in adolescents. The results of this study suggest that specific measures are needed to reduce mental disorders in adolescents. Measures to reduce mental disorders in adolescents should

be established based on gender, grade and living area differences.

ETHICS STATEMENT

A Consent Form was signed by parents and students to take part in the study. Additionally, the Department of Psychology and Education, The University of Danang,

University of Science and Education and the Ministry of Education of Vietnam granted their ethical approval for the study.

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CONFLICTS OF INTEREST

Author declares that there is no conflicts of interest.

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INFORMED CONSENT

Informed consent was obtained from parents and participants.

DATA AVAILABILITY STATEMENT

Research data are not shared.

AUTHOR CONTRIBUTIONS

Son Quang Le contributed to the conception and design of the study. Hai The Hoang and Dieu Thi Thanh Bui organized the database. Hai The Hoang and Thi Truc Quynh Ho performed the statistical analysis. Hai The Hoang and Thi Truc Quynh Ho wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

REFERENCES

- Agam R, Tamir S, Golan M 2015. Gender differences in respect to self-esteem and body image as well as response to adolescents' school-based prevention programs. *Journal of Psychology and Clinical Psychiatry*, 2(5): 00092.
- Alavi A, Mohammadi M, Mahmoudi M, Tehranidost M, Shahriyar Z, Sadaat S 2009. The Farsi version of the strengths and difficulties questionnaire self-report form. The normative data and psychometric properties. *Iranian Journal of Child Neurology*, 3(1): 27-34.
- Alyahri A, Goodman R 2008. The prevalence of DSM-IV psychiatric disorders among 7-10 year old Yemeni schoolchildren. *Social Psychiatry and Psychiatric Epidemiology*, 43(3): 224-230.
- Barriuso-Lapresa LM, Hernando-Arizaleta L, Rajmil L 2014. Reference values of the strengths and difficulties questionnaire (SDQ) version for parents in the Spanish population. *Actas Esp Psiquiatr*, 42(2): 43-48.
- Becker A, Wang B, Kunze B, Otto C, Schlack R, Hölling H, Ravens-Sieberer U, Klasen F, Rogge J, Isensee C, Rothenberger A, BELLA study group T 2018. Normative data of the self-report version of the German strengths and difficulties questionnaire in an epidemiological setting. *Zeitschrift Für Kinder- Und Jugendpsychiatrie Und Psychotherapie*, 46(6): 523-533.
- Bhola P, Sathyanarayanan V, Rekha D, Daniel S, Thomas T 2016. Assessment of self-reported emotional and behavioral difficulties among pre-university college students in Bangalore, India. *Indian Journal of Community Medicine*, 41(2): 146.
- Breslau J, Marshall GN, Pincus HA, Brown RA 2014. Are mental disorders more common in urban than rural areas of the United States? *Journal of Psychiatric Research*, 56: 50-55.
- Brooks Holliday S, Ewing BA, Storholm ED, Parast L, D'Amico EJ 2017. Gender differences in the association between conduct disorder and risky sexual behavior. *Journal of Adolescence*, 56(1): 75-83.
- Chen W, Huang Y, Riad A 2021. Gender differences in depressive traits among rural and urban Chinese adolescent students: Secondary data analysis of nationwide survey CFPS. *International Journal of Environmental Research and Public Health*, 18(17): 9124.
- Cyranowski JM, Frank E, Young E, Shear MK 2000. Adolescent onset of the gender difference in lifetime rates of major depression. *Archives of General Psychiatry*, 57(1): 21.
- Dang HM, Nguyen H, Weiss B 2017. Incremental validity of the Child Behavior Checklist (CBCL) and the Strengths and Difficulties Questionnaire (SDQ) in Vietnam. *Asian Journal of Psychiatry*, 29: 96-100.
- Duinhof EL, Lek KM, de Looze ME, Cosma A, Mazur J et al. 2020. Revising the self-report strengths and difficulties questionnaire for cross-country comparisons of adolescent mental health problems: The SDQ-R. *Epidemiology and Psychiatric Sciences*, 29: e35.
- Eaton NR, Keyes KM, Krueger RF, Balsis S, Skodol AE, Markon KE, Grant BF, Hasin DS 2012. An invariant dimensional liability model of gender differences in mental disorder prevalence: Evidence from a national sample. *Journal of Abnormal Psychology*, 121(1): 282-288.

- Elleker D, O'Neill M 2014. Psychiatric disorders. In: *Encyclopedia of Quality of Life and Well-Being Research*. Netherlands: Springer, pp. 5134-5141.
- Fajardo-Bullón F, Rasskin-Gutman I, León-del Barco B, Ribeiro dos Santos EJ, Iglesias Gallego D 2019. International and Spanish Findings in scientific literature about minors' mental health: Predictive factors using the strengths and difficulties questionnaire. *International Journal of Environmental Research and Public Health*, 16(9): 1603.
- Farbstein I, Mansbach-Kleinfeld I, Levinson D, Goodman R et al. 2010. Prevalence and correlates of mental disorders in Israeli adolescents: results from a national mental health survey. *Journal of Child Psychology and Psychiatry*, 51(5): 630-639.
- Ghaedi L, Mohd Kosnin AB 2014. Prevalence of depression among undergraduate students: Gender and age differences. *International Journal of Psychological Research*, 7(2): 38-50.
- Goodman R 1997. The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38(5): 581-586.
- Goodman R, Slobodskaya H, Knyazev G 2005. Russian child mental health A cross-sectional study of prevalence and risk factors. *European Child and Adolescent Psychiatry*, 14(1): 28-33.
- Göran Svedin C, Priebe G 2008. The Strengths and Difficulties Questionnaire as a screening instrument in a community sample of high school seniors in Sweden. *Nordic Journal of Psychiatry*, 62(3): 225-232.
- Greally P, Kelleher I, Murphy J, Cannon M 2010. Assessment of the mental health of Irish adolescents in the community. *RCSI Student Medical Journal*, 3: 5-33.
- Guan BQ, Luo XR, Deng YL, Wei Z, Ye HS, Yuan XH et al. 2010. Prevalence of psychiatric disorders in primary and middle school students in Hunan Province. *Chinese Journal of Contemporary Pediatrics*, 12(2): 123-127.
- Hosseinkhani Z, Hassansabadi HR, Parsaeian M, Karimi M, Nedjat S 2020. Academic stress and adolescents mental health: A Multilevel Structural Equation Modeling (MSEM) study in Northwest of Iran. *Journal of Research in Health Sciences*, 20(4): e00496-e00496.
- Kaltiala-Heino R, Marttunen M, Rantanen P, Rimpelä M 2003. Early puberty is associated with mental health problems in middle adolescence. *Social Science and Medicine*, 57(6): 1055-1064.
- Kuehner C 2017. Why is depression more common among women than among men? *The Lancet Psychiatry*, 4(2): 146-158.
- Lewien C, Genuneit J, Meigen C, Kiess W, Poulain T 2021. Sleep-related difficulties in healthy children and adolescents. *BMC Pediatrics*, 21(1): 82.
- Li J, Shi L, Liang H, Ding G, Xu L 2018. Urban-rural disparities in health care utilization among Chinese adults from 1993 to 2011. *BMC Health Services Research*, 18(1): 102.
- Liao YH, Fan BF, Zhang HM, Guo L, Lee Y, Wang WX et al. 2021. The impact of COVID-19 on subthreshold depressive symptoms: A longitudinal study. *Epidemiology and Psychiatric Sciences*, 30: e20.
- Lundh LG, Wangby-Lundh M, Bjarenhed J 2008. Self-reported emotional and behavioral problems in Swedish 14 to 15-year-old adolescents: A study with the self-report version of the Strengths and Difficulties Questionnaire. *Scandinavian Journal of Psychology*, 49(6): 523-532.
- Mezulis AH, Abramson LY, Hyde JS 2002. Domain specificity of gender differences in rumination. *Journal of Cognitive Psychotherapy*, 16(4): 421-434.
- Mishra S, Srivastava M, Tiwary N, Kumar A 2018. Prevalence of depression and anxiety among children in rural and suburban areas of Eastern Uttar Pradesh: A cross-sectional study. *Journal of Family Medicine and Primary Care*, 7(1): 21.
- Mullick MSI, Goodman R 2005. The prevalence of psychiatric disorders among 5-10 year olds in rural, urban and slum areas in Bangladesh. *Social Psychiatry and Psychiatric Epidemiology*, 40(8): 663-671.
- Ortuño-Sierra J, Aritio-Solana R, Fonseca-Pedrero E 2018. Mental health difficulties in children and adolescents: The study of the SDQ in the Spanish National Health Survey 2011-2012. *Psychiatry Research*, 259: 236-242.
- Park JH, Bang YR, Kim CK 2014. Sex and age differences in psychiatric disorders among children and adolescents: High-risk students study. *Psychiatry Investigation*, 11(3): 251.
- Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA 2015. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*, 56(3): 345-365.
- Probst JC, Laditka SB, Moore CG, Harun N, Powell MP, Baxley EG 2006. Rural-urban differences in depression prevalence: Implications for family medicine. *Family Medicine*, 38(9): 653-660.
- Pursell GR, Laursen B, Rubin KH, Booth-LaForce C, Rose-Krasnor L 2008. Gender differences in patterns of association between prosocial behavior, personality, and externalizing problems. *Journal of Research in Personality*, 42(2): 472-481.
- Rose DM, Seidler A, Nübling M, Latza U, Brähler E et al. 2017. Associations of fatigue to work-related stress, mental and physical health in an employed community sample. *BMC Psychiatry*, 17(1): 167.
- Rudolph KD 2002. Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health*, 30(4): 3-13.
- Schlarb AA, Gulewitsch MD, Weltzer V, Ellert U, Enck P 2015. Sleep duration and sleep problems in a representative sample of German children and adolescents. *Health*, 07(11): 1397-1408.
- Shekhawat R, Sharma N, Sodha VS 2019. Prevalence of mental health problems by using strength and difficulty questionnaire in school going adolescents (11-17 years) of Jaipur city, Rajasthan. *International Journal of Community Medicine and Public Health*, 6(5): 2216.
- Sneed CD 2002. Correlates and implications for agreeableness in children. *The Journal of Psychology*, 136(1): 59-67.
- Sørensen JFL 2016. Rural-urban differences in bonding and bridging social capital. *Regional Studies*, 50(3): 391-410.
- Thapar A, Collishaw S, Pine DS, Thapar AK 2012. Depression in adolescence. *The Lancet*, 379(9820): 1056-1067.

- Tran-Chi VL, Ly TT, Luu-Thi HT, Huynh VS, Nguyen-Thi MT 2021. The influence of COVID-19 Stress and self-concealment on professional help-seeking attitudes: A cross-sectional study of university students. *Psychology Research and Behavior Management*, 14: 2081-2091.
- Trinh TH, Nguyen THD 2019. The relationship between family and school environment factors and mental health problems of students at Thuong Thanh junior high school, Long Bien, Hanoi. *Journal of Public Health*, 50: 27-35.
- Van Roy B, Grøholt B, Heyerdahl S, Clench-Aas J 2006. Self-reported strengths and difficulties in a large Norwegian population 10-19 years. *European Child and Adolescent Psychiatry*, 15(4): 189-198.
- Vassos E, Agerbo E, Mors O, Pedersen CB 2016. Urban-rural differences in incidence rates of psychiatric disorders in Denmark. *British Journal of Psychiatry*, 208(5): 435-440.
- Vu TL, Luong XH, Le TH, Thanh NM, Do MH 2018. Reality of mental health of Hanoi secondary students according to SDQ scale in 2015. *Ho Chi Minh City Journal of Medicine*, 22(4): 266-272.
- Xiaoli Y, Chao J, Wen P, Wenming X, Fang L, Ning L, Huijuan M et al. 2014. Prevalence of psychiatric disorders among children and adolescents in Northeast China. *PLoS ONE*, 9(10): e111223.
- Yao S, Zhang C, Zhu X, Jing X, McWhinnie CM, Abela JRZ 2009. Measuring adolescent psychopathology: Psychometric properties of the self-report strengths and difficulties questionnaire in a sample of Chinese adolescents. *Journal of Adolescent Health*, 45(1): 55-62.

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