An Analysis of the Influence of Novel Coronavirus Pneumonia Epidemic on Middle School Students' Mental Health

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Abstract

Objective: To explore the psychological health status of middle school students in China during the recent epidemic outbreak of “Novel Coronavirus Pneumonia” (NCP) and its influencing factors, and to provide a basis and suggestions for the adjustment of mental health of middle school students during the epidemic.

Methods: A total of 2,007 middle school students were randomly selected nationwide to fill out a questionnaire. The questionnaire included basic personal and family information, life status and family relations during the epidemic, attitudes and pressures in the face of the epidemic, created by Chinese professor Zung. The anxiety self-assessment scale (SAS) compiled by SPSS statistical analysis software was used for data analysis to explore the changes in mental health during the epidemic.

Results: Of the 2,007 valid questionnaires, according to the data using the self-rating anxiety scale, 424 students had anxiety, accounting for 21.1% of the total number; anxiety level of boys was higher than that of girls, and the anxiety level increased as the grade level increased. The student's personality, grade level, problem-solving methods, awareness and attention to the epidemic, parents' educational background, marital status, and family economic status all had an impact on the student's psychological status during the epidemic.

Conclusion: The Novel Coronavirus Pneumonia epidemic has a great impact on the mental health of some middle school students. Family, school and social departments should pay attention to this phenomenon, care for their mental health, and take reasonable measures to actively intervene.

Keywords: Middle school students, Novel Coronavirus Pneumonia, Mental health, Anxiety, Stress

Background

Stress is a cognitive and behavioral experience process composed of psychological stressors and psychological stress responses, including stressors, intermediary variables and psychophysiological responses [1]. Middle school students, as adolescents, have not yet matured physically and mentally, and their ability to withstand stress is still in development. When faced with sudden stressful events, they are prone to adverse psychological and physiological reactions [2]. People who are in a state of psychological stress will undergo drastic changes in their psychological experience, behavioral performance, and physiological and biochemical processes in their bodies. Youth in particular, will be affected physically and mentally in varying degrees. Anxiety, emotion, and stress are closely related. They are a group of emotional disorders with excessive anxiety and worry as the main symptoms. It is the most common emotional disorder in adolescents. At the same time, anxiety is also one of the most difficult areas in the study of children's psychopathology [3]. In the 6 to 18 years age group, anxiety disorders are the most common diagnosis amongst psychiatric diseases, and its impact are mainly in psychological, relational, and developmental dimensions, as well as academics [4]. Angold pointed out that adolescents themselves are the most reliable information providers for their mental state, and can provide more emotional experiences than parents and teachers [5]. In addition to their own ability to regulate emotions, studies have shown that positive psychological intervention can help people achieve physical and psychological security, relieve or even stabilize the strong fear, shock or sadness caused by emergencies, reduce stress and anxiety, promote and stimulate the psychological self-healing function, adjust the psychological state and restore psychological balance [6].

In December 2019, Wuhan City, Hubei Province found many cases of “unexplained pneumonia”, which was later confirmed by the Shanghai Public Health Clinical Center to be a new type of coronavirus pneumonia that has never been seen before. In the early stage of infection, patients have fever, fatigue, dry cough, and severe cases may have difficulty in breathing, respiratory distress syndrome or septic shock, metabolic acidosis that is difficult to correct, and coagulation dysfunction [7], which is a more serious Infectious disease. On January 9, 2020, the first fatality attributed to the novel coronavirus pneumonia

occurred in Wuhan. Subsequently, infections were found in Thailand, Japan, South Korea, and other provinces in mainland China, and the number of infections expanded rapidly. By the end of January 2020, all 31 provinces in mainland China had initiated the highest level of response procedures for major public health incidents. Productivity and daily routines of people across the country and the schooling of all students basically came to a halt. On February 11, the World Health Organization (WHO) assigned its English name Corona Virus Disease 2019 (COVID-19), which shows that a world-class infectious disease had begun.

In response to the outbreak of the novel coronavirus pneumonia epidemic, China has adopted many strict prevention and control measures. The implementation of nationwide home isolation, large-scale nucleic acid testing and epidemiological investigations, business closures, factory shutdowns, and suspension of in-class teaching have brought about a near-isolated living condition that poses challenges to the lives and physical and mental health of most people. Facing the possible psychological crisis in society during the epidemic, the National Health Commission issued the "Guiding Principles for Emergency Psychological Crisis Intervention of Pneumonia with Novel coronavirus Infection" on January 26, 2020 [8]. The overall deployment of the measure provided mental health services for different groups of people. Next, various departments and social organizations in various regions began to actively participate in the mental health counseling work of the people. Affected by this major public health emergency, the extended suspension of classes, and holidays spent in isolation will change the physical and mental health of middle school students, and how they respond to the spread of the epidemic. The possible crisis of life and study is the main focus of this study. Based on this, this paper conducts a sample survey on 2,007 middle school students nationwide to understand the real situation of life, study and mental health of middle school students during the epidemic, hoping to find problems in time and provide reliable psychological intervention basis for them.

Methods

Object

In March 2020, middle school students in 23 provinces were selected using the Internet to fill out the questionnaire. In the end, a total of 2,058 questionnaires were received, 51 invalid questionnaires were screened out and 2,007 valid questionnaires were kept. The response rate was 97.5%. The regions represented in the questionnaire are Guangdong (42.13%), Shandong (24.39%), Hainan (12.54%), Anhui (6.56%), Henan (5.34%), Sichuan (2.28%), Shanxi (2.09%), Guangxi (1.21%), Hubei (1.02%) and the remainder from other provinces.

General Information Questionnaire

The content of the general information questionnaire involves basic information such as the individual's gender, age, grade level, place of residence, family size, family economic situation, family relationship, study time, exercise time, leisure time, and knowledge of Novel Coronavirus Pneumonia.

Self-Rating Anxiety Scale (SAS)

The self-assessment scale of SAS anxiety prepared by Chinese-American professor Zung (1971) is mainly used for screening or assisting in evaluating the anxiety behavior of the respondents and the severity of anxiety [9]. There are 20 items in the scale, and the main statistical indicator is the total score. Totaling the scores of the 20 items results in a raw score. Multiplying the raw score by 1.25 and keeping the integer part results in the standard score. According to the results of the Chinese norm, the cut-off value of the SAS standard score is 50 points, of which 50-59 points indicate mild anxiety; 60-69 points indicate moderate anxiety; more than 70 points indicate severe anxiety. The Cronbach alpha coefficient of the scale is 0.888.

Self-assessment

The content of this part of the questionnaire is divided into four factor categories to investigate the students' living conditions and personal feelings during the epidemic. The scale was written and designed on the basis of the Likert scale improved by the American social psychologist Likert in 1932 on the basis of the original total addition scale [10]. The scale has a total of 18 items and consists of a set of statements. Each statement has five answers: "strongly agree", "agree", "not necessarily", "disagree", and "strongly disagree", which are divided into 5, 4, 3, 2, and 1. The total score of each respondent's agreement is the total sum of the scores of his answers to each question. This total score can indicate that his agreement is strong or that he is on this scale different situations. The Cronbach alpha coefficient of the scale is 0.864. In March 2020, the middle school students in 23 provinces were selected through the Internet to fill out the questionnaire. In the end, a total of 2,058 questionnaires were received, 51 invalid questionnaires were screened out, and 2007 valid questionnaires were retained. The questionnaire efficiency was 97.5%. The top regions in the questionnaire are mainly Guangdong (42.13%), Shandong (24.39%), Hainan (12.54%), Anhui (6.56%), Henan (5.34%), Sichuan (2.28%), Shanxi (2.09%), Guangxi (1.21%), Hubei (1.02%) and remainder other provinces.

Implementation procedures

Through the Wenjuanxing (a platform providing functions equivalent to Amazon Mechanical Turk), a questionnaire was prepared, and after a number of test feedback and improvements, the final questionnaire was formed. Afterwards, the snowball sampling of questionnaire is carried out through WeChat, friends circle, QQ, etc. The 1st year middle school students to the 3rd year students will answer the survey one time anonymously. Multiple submissions of the data are considered invalid.

Statistical methods

In this study, SPSS 22.0 statistical software was used for data analysis. The count data was expressed as a percentage (%), and the measurement data was expressed as mean $\bar{x} \pm s$. The comparison between groups was performed by χ^2 test and F test. Multiple regression analysis was used.

Results

Summary and breakdown of the research subjects

The effective number of participants in the questionnaire survey is 2,007, aged between 11 and 20 years, with an average age of 14.95 ± 1.85 years. For summary and breakdown, see Table 1.

Table1: Summary and breakdown of the research subjects

Basic Information		Count	Percentage(%)
Gender	Male	980	48.8
	Female	1027	51.2
Grade Level	1 st yr, 2 nd yr	1733	86.3
	3 rd yr,	274	13.7
City Size	Provincial and prefecture-level cities	1088	54.2

	County-level cities and below	919	45.8
Fathers Education	Bachelor degree or above	22	1.1
	Undergraduate (including college)	417	20.8
	High school (including secondary school)	576	28.7
	Junior high school and below	992	49.5
Mothers Education	Bachelor degree or above	25	1.2
	Undergraduate (including college)	337	16.8
	High school (including secondary school)	527	26.3
	Junior high school and below	1118	55.7
Parental Marital Status	Stable	1739	86.6
	Other	268	13.4
Family Economic Level	Wealthy	39	1.9
	Upper Middle Class	650	32.4
	Middle Class	1104	55
	Lower Class	185	9.2
	Poverty	29	1.4

Middle school students' attention degree, tendency of attention and information sources of the novel coronavirus pneumonia epidemic

Among the 2,007 research subjects, 775 (38.61%) were very concerned about the epidemic, 1,128 (56.20%) were moderately concerned, and only 10 (0.5%) were not concerned. Taken together, the total number of middle school students who chose to pay attention to the epidemic has reached 94.81%. The news they are most concerned about the NCP is the number of diagnoses, accounting for 25.16%, followed by the progress of drug and vaccine development, accounting for 24.12%. Most students' information sources are WeChat, Weibo, short videos and other online media, accounting for 84.21%; followed by TV news, accounting for 73.64%, and obtaining information through parents or family members, accounting for 50.82%.

Middle school students' feelings during the epidemic

Through the self-made Likert scale, the 20 questions answered by individuals during the epidemic were classified into 4 factors by factor analysis, which are positive future outlook, academic worries, life worries and negative feelings (Table 2 and Table 3).

Table2: Rotated component matrix

Statement	Factors			
	1	2	3	4

The outbreak has made my life very bad	.067	.231	.255	.627
I am very concerned about the epidemic, and check news reports almost every day	.411	-.032	.443	-.112
I am worried about being infected	.108	.118	.803	.263
I am worried about my family being infected	.121	.139	.834	.108
Can't go out all day, life is really boring	.238	.228	.189	.556
I am very worried about the financial situation of the family	.099	.271	.477	.443
I am very eager for life to return to normal	.781	.146	.207	.119
I hope to return to school as soon as possible	.857	.065	.019	.148
I miss my school and teacher very much	.866	-.008	.028	.124
I miss my classmates and friends	.828	.079	.109	.093
I spent more time with my family during the epidemic, and I am very happy	.380	.156	.414	-.319
To be at home often, there are more conflicts and conflicts with family members	-.066	.152	-.091	.668
Through this epidemic, I will pay more attention to personal hygiene habits (such as washing hands frequently, covering when sneezing, not spitting, wearing masks in crowded places)	.619	.230	.363	-.291
Hope for better medicines and effective vaccines developed as soon as possible	.634	.305	.329	-.267
Learning efficiency at home is not as good as learning at school	.310	.731	.053	.148
It is difficult for me to reasonably arrange my study and living time	.009	.808	.046	.243
I am worried about my academic performance	.265	.689	.264	.101
During the epidemic, I spent a lot of time playing games and surfing the Internet	-.066	.759	.103	.161

Table3: Comparison of analysis factors

Group	Factor	Negative Feeling	Life Worries	Academic Worries	Future Outlook
Gender	Male (<i>n</i> =980, 48.8%)	12.748**	1.393	1.883	11.659**
	Female (<i>n</i> =1027, 51.2%)				
Grade	1st, 2nd yr (<i>n</i> =1733, 86.3%)	6.116	60.461**	0.149	2.998
	3rd, 4th yr (<i>n</i> =274, 13.7%)				
City Size	County-level cities and below (<i>n</i> =919, 45.8%)	11.652**	29.607**	55.006**	10.909**
	Provincial and prefecture-level cities (<i>n</i> =1088, 54.2%)				

Father Education	Jr. High school and below ($n=992$, 49.5%)	3.404*	6.099**	9.161**	0.656
	High School and Technical Secondary 2.0($n=576$, 28.7%)				
	Undergraduate and College 3.0($n=417$, 20.8%)				
	Bachelor Degree or above 4.0($n=22$, 1.1%)				
Mother Education	Jr. High school and below ($n=1118$, 55.7%)	3.404*	6.099**	9.161**	0.656
	High School and Technical Secondary($n=527$, 26.3)				
	Undergraduate and College ($n=337$, 16.8%)				
	Bachelor Degree or above ($n=25$, 1.2%)				
Family Economic Status	Wealthy ($n=39$, 1.9%)	6.208**	8.128**	7.448**	4.351**
	Upper Middle Class ($n=650$, 32.4%)				
	Middle Class ($n=1104$, 55%)				
	Lower Class ($n=185$, 9.2%)				
	Poverty ($n=29$, 1.4%)				

* $p<0.05$ ** $p<0.01$

Comparison of scores of different factors between different genders: Among the four types of factors, the positive future outlook of girls is higher than that of boys, and the negative feeling of boys is higher than that of girls, the differences are significant ($P<0.005$). For academic worry and life score, the difference was not significant ($P>0.005$).

Comparison of the scores of various factors between different grade levels: The academic concerns of 3rd year students are significantly higher than those of 1st and 2nd year students, the difference is extremely significant ($P<0.001$), but there is no significant difference between the two in negative feelings, life worries and positive future outlook ($P>0.005$).

Comparing the scores of various factors in different living areas: County-level cities and township students have significant differences with provincial capital cities and prefecture-level cities in all four factors ($P<0.005$), and are higher than the latter.

Comparing the scores of various factors among parents with different educational backgrounds: Students with parents whose educational background is junior high school and below are significantly different from other classmates in life and academic concerns ($P<0.005$), and the average value is the highest.

Comparing the scores of various factors of the students' parents' marital relationships: students with stable parents' marital relationships have significantly lower negative feelings and academic concerns than other students, and have higher scores on positive future outlook with significant differences ($P < 0.005$).

Comparing of the scores of various factors between different families' economic levels: the economic level and the four factors are significantly different ($P < 0.005$). Students in poverty households have the highest scores on negative feelings, and the students in poverty households are worried about life and positive expectations. Wealthy families score the highest, and the economically wealthy students have the highest scores on academic concerns.

Sources of stress among middle school students

In the design of the questionnaire, the sources of stress experienced by the students are selected on a scale of 1-10, and a score of more than 5 points is considered to have a greater impact on the student during the epidemic. The main sources of stress over 5 points are academic performance, online learning methods, changes in learning environment, novel coronavirus pneumonia virus, parental control, and limited social activities (Table 4).

Table4: Scores of stressors during middle school students' outbreak

Item	Academic performance	Novel Coronavirus Pneumonia	E-learning	Change in learning environment	Limited social activity	Parental control	Changes in the laws of life	Family's financial situation	Living supplies	Parental Conflict
$\bar{x} \pm S$	6.632 ± 2.486	6.204 ± 2.846	5.725 ± 2.609	5.480 ± 2.757	5.315 ± 2.876	5.006 ± 2.747	4.947 ± 2.799	4.511 ± 2.763	4.193 ± 2.701	3.764 ± 2.809

The scores of middle school students' anxiety scale (SAS)

Through the statistical calculation of the 2,007 questionnaires, the anxiety self-assessment scale was divided into 42.23 ± 11.39 , and the method of demarcation was established according to $\bar{X} \pm SD$, that is, when the SAS standard score $\geq \bar{x} + SD = 40.65 + 9.47$ indicated a state of mild anxiety, and when the standard score $\geq \bar{X} + 2SD = 40.65 + 2 \times 9.47$, indicated a state of moderate or severe anxiety. With a total score greater than 50 as the dividing line, it was found that 424 (21.1%) of the 2,007 students were in a state of anxiety, of which 260 students were in a mild state of anxiety, 107 students were in a moderate state of anxiety, and 57 students in a severe state of anxiety. Among the students in a state of anxiety, there are 216 boys and 208 girls, and the average anxiety value of boys (42.53 ± 11.82) is slightly higher than that of girls (41.96 ± 10.96). At the same time, an increase in grade level, students' anxiety scores showed an upward trend.

Single factor difference analysis of middle school students' anxiety score

Taking anxiety as a dependent variable, we analyzed the grade levels, social support channels, stress index, positive future outlook, academic worries and negative feelings of middle school students and the situation of children in middle school students' families and their families' economic status. Positive future outlook are negatively correlated ($P < 0.01$), and other variables are positively correlated with anxiety (children's situation $P < 0.05$, other $P < 0.01$) (Table 5).

Table5: Anxiety correlation analysis

	Grade	Children	Family Level	Economic	Social channel	support	Stress Index	Positive future outlook	Academic Worries	Negative Feeling
Anxiety	0.194**	0.189*	0.213**		0.177**		0.261**	- 0.208**	0.18**	0.321**

* $p<0.05$ ** $p<0.01$

Analysis of factors affecting middle school students' anxiety during the new crown epidemic

Taking the total score of SAS anxiety as the dependent variable and using multiple stepwise regression analysis to explore the relevant factors affecting the anxiety level of middle school students, it was found that anxiety and students' grade level, personality, social support channels, positive future outlook, academic worries and negative feelings result in significant differences ($P<0.05$ for personality, $P<0.01$ for other variables), results in Table 6.

Table6: Anxiety Regression Analysis

	Non-standardized coefficient		Standardized coefficient	<i>t</i>	<i>p</i>	VIF	R^2	Adjusted R^2	<i>F</i>
	<i>B</i>	Std deviation	<i>Beta</i>						
Gender	0.387	0.465	0.017	0.831	0.406	1.028	0.191	0.186	<i>F</i> (13,1993)=36.211, $p=0.000$
Grade Level	2.154	0.689	0.065	3.125	0.002*	1.065			
Children	-0.408	0.522	-0.016	-0.782	0.434	1.053			
Parent Education	0.01	0.113	0.002	0.085	0.933	1.11			
Housing Situation	0.557	0.63	0.02	0.883	0.377	1.252			
Unanimous situation	0.398	0.528	0.017	0.754	0.451	1.227			
Family Economic Level	-0.07	0.346	-0.004	-0.202	0.84	1.124			

Character	- 0.78 2	0.381	-0.042	-2.051	0.040*	1.03 6			
Positive future outlook	- 2.26 9	0.234	-0.199	-9.694	0.000* *	1.04			
Learning Worries	1.81 8	0.236	0.16	7.693	0.000* *	1.06			
Negative Feelings	3.57 4	0.235	0.314	15.19 8	0.000* *	1.05			
Life Worries	0.09 4	0.231	0.008	0.408	0.684	1.01			
Social Support Channels	- 0.49 7	0.156	-0.066	-3.191	0.001* *	1.05 4			

* $p < 0.05$ ** $p < 0.01$

Discussion

Factors affecting the mental health of middle school students during the NCP epidemic

Anxiety exists in all kinds of situations, including quality anxiety and general anxious emotional responses in healthy people. Moderate anxiety can arouse alertness and improve learning and work efficiency. But adolescents are in a developing stage of body and mind. If pressures from the external environment and the confusion in their own growth are not dealt in a timely fashion and with appropriate psychological guidance, it will lead to the emergence of high anxiety [11]. The detection rate of anxiety among Chinese teenagers is 7% ~ 16% [12]-[13], and the results of this study show that the detection rate of anxiety is 21.1%, which is significantly higher than the detection rate of anxiety among adolescents in normal times, and some students are in a state of moderate to severe anxiety. It shows that during the period of home isolation, most middle school students have relatively stable emotions, but some middle school students have different levels of negative emotions. In order to control the spread of the NCP epidemic, work stoppages and school closures have been implemented nationwide, and home isolation measures have also prevented students from returning to school on a normal basis. From the perspective of students' personal feelings, students' worry about their own learning, negative feelings of the epidemic and future outlook of life will have an impact on anxiety. The more worried students are about learning, the more negative feelings and the lower future outlook, the higher the likelihood of students having anxiety. In terms of grade level, the anxiety level of students in 3rd year higher than that in 1st and 2nd year. Under the influence of the epidemic, students cannot return to school for review on time. Plus the mid-term and college entrance examinations are imminent, so that 3rd year students in the preparation state are subject to greater academic pressure and more anxiety. From the perspective of personality, there is a negative correlation between student personality and anxiety. In comparing the anxiety levels of students with different personalities, it is found that students with introvert personalities have higher anxiety level than students with intermediate and extrovert personalities. There is a negative correlation between anxiety levels, indicating that the more cheerful an individual's personality, the lower the probability of anxiety. Some studies have also found that introvert students are more likely to produce negative emotions and have a lower subjective well-being. These characteristics determine that the mental health level of introvert students is significantly lower

than that of extroverted students [14], and needs more attention during the epidemic. Students with introvert personality tend to be alone, not good at sharing their inner emotions with others, and are used to being stressed alone. The long-term existence of negative emotions such as anxiety and depression will not only affect their physical and mental health, but also affect and change the personality of the individual and affect their adulthood mental health [15]. In addition, their family economic status is related to the mental health of middle school students, which is consistent with previous studies [16]. Middle school students from wealthy and upper middle class families have a healthier family mental state, while students from lower and middle class families have a higher level of anxiety. Because of the NCP epidemic, almost all aspects of life are affected, life is no longer normal, which may cause some families to fall into a temporary family economic crisis. Middle school students' concerns about their own family economic problems are also likely to increase their inner pressure and anxiety. Finally, students' social support channels will also affect anxiety. Middle school students who are not good at asking for resources around them and cannot get social support, are more likely to experience anxiety [17].

The mental health of special groups among middle school students requires special attention and active intervention

This study measured 2,007 middle school students and found that during the outbreak, the SAS standard score was 42.53 ± 11.82 for boys and 41.96 ± 10.96 for girls, which was significantly higher than the survey data of Zhang Yuanyuan and Jing Pan on the anxiety of middle school students in Ningbo in 2015 (34.82 ± 6.86 , female: 35.07 ± 7.17) [18]. It shows that the psychology of the middle school students group is indeed affected by the stress NCP epidemic, which produces anxiety higher than usual. Therefore, it is necessary to take active measures to help students adjust mentally, especially for the introverted students, the freshmen, the disharmonious family relationship and the poor family economy. For example, the opening of online psychological counseling services and psychological adjustment courses for middle school students can help them correctly recognize their emotions and relieve psychological pressure. At present, some regions, social organizations and academic groups have opened free psychological counseling services, such as the "Qingqing Hotline" of South China Normal University, the psychological counseling service hotline and network counseling service of Beijing Normal University, and the crisis response mechanism for minors established in Changsha. Psychological crisis intervention team during the epidemic situation and so on. We should also actively use news media and online channels to achieve social support of social information and resources for families and students, open up communication channels for students, families, schools, and society, and achieve effective information transmission and resource sharing [19]. Schools can conduct periodic psychological health surveys on students by issuing questionnaires to keep abreast of the students' psychological status and their family situation. The interference of anxiety on the daily lives of children and adolescents is the main motivation for seeking psychological counseling and treatment [20], providing one-on-one online psychological counseling and difficulty assistance to students with anxiety symptoms. Especially for junior and senior students in the third grade, professional psychotherapists can also organize online mental health meetings for students, impart relevant psychological knowledge, prevent students' psychological problems, and help students improve self-regulation and problem coping ability. The community should play an active role in difficult investigation and family relationship mediation. Due to the inconvenience during the epidemic, some families have difficulties in life, and there are more contradictions in the family parent-child relationship or marriage relationship. At this time, the neighborhood committee and community service staff should actively investigate, provide timely material assistance and mental adjustment support, and help normalize their family life and family relations during the epidemic.

Guide middle school students to arrange their life scientifically and maintain interpersonal communication during the epidemic

Due to the epidemic, all students were isolated at home, lacking outside contact. Middle school students are young and have poor self-control, but they end up setting their own schedule for study, sports and leisure time during the epidemic while the daily routine of the entire family is not as regular as usual. Therefore, in the public media, in the connection between school and the family and students, should actively promote and give guidance for a reasonable daily routine and other time management, as maintaining a normal daily routine can be conducive to mental health [21]. For example, students can adjust school schedules and rest schedules for their own use. The family can set a schedule for rest and relaxation, allocates leisure and leisure time, develop family activities that family members can participate in, strengthen parent-child relationships, or learn together. In addition, it is necessary to maintain communication with the outside world using online programs. Schools can arrange and organize regular online class meetings through WeChat, QQ, and other online programs. They can ask students to share and exchange their own living situations and learning arrangements to help other students. We can encourage contact and communication with other students and teachers to express emotions and reduce psychological pressure.

Improve students' awareness of the epidemic and create a family and social environment that unites and fights against the epidemic

Due to the epidemic, the time students spend with their parents at home has greatly increased. Middle school students are in adolescence and rebellion, and the contact time between the two increases. In addition to paying attention to the emotions of students, the emotions of parents and other family members should also be valued. Both parties should pay attention to maintaining a good family environment and parent-child relationship. The Barratt study found that the anxiety of children and adolescents is related to the quality of parental relationships. The higher the level of conflict in parental relationships, the higher the level of child anxiety [22]. It is an important goal of child anxiety treatment [23]. Therefore, the parents' marital relationship and behavior at home will always affect the child's psychological state. A positive state will encourage the child to actively deal with external pressure, while a negative parental or family environment will increase the child's anxiety. Communities, schools, and social welfare organizations can all participate in family education, provide family charity lectures and counseling, encourage and educate parents and adolescent children to live in harmony, enhance family cohesion, and enhance family resilience. At the same time, the information propaganda of the news media should take into account the acceptance and understanding capabilities of different audiences, especially since the flood of media has resulted in a mix of true and false information, which is difficult to distinguish. Middle school students have poor self-identification ability and are easily misled by incorrect information. Therefore, families and schools should pay more attention to reports in mainstream media and not promote rumors. They should promptly dispel rumors and propagate scientific anti-epidemic measures through schools, communities, and public platforms, and convey correct social information to middle school students in a concise and easy-to-understand manner, so that middle school students have confidence in our country's anti-epidemic situation and overcome this battle with us.

Conclsion

This study shows that in the social disaster event, China should establish a social mental health emergency counseling mechanism. Especially for the vulnerable groups, such as middle school students and the students in the stage of entering school, help them to maintain a reasonable life and life to deal with the mutation, and avoid the psychological trauma to the future growth.

References

- [1] Coyne J C, Downey G. Social Factors and Psychopathology: Stress, Social Support, and Coping Processes [J]. *Annual Review of Psychology*, 1991, 42 (1): 401-425.
- [2] Zhang H, Zhou Y. On the impact of life stress events on adolescents' mental health and countermeasures [J]. *Xue Zhoukan*, 2017 (04): 187-188.
- [3] Costello EJ, Egger HL, Angold A. The Developmental Epidemiology of Anxiety Disorders: Phenomenology, Prevalence, and Comorbidity [J]. *Child & Adolescent Psychiatric Clinics of North America*, 2005, 14 (4): 631-648.
- [4] Denis H, Baghdadli A. Children and adolescents' anxiety disorders [J]. *Archives de Pédiatrie*, 2016, 24 (1).
- [5] Angold A, Rutter M. Effects of age and pubertal status on depression in a large clinical sample [J]. *Development & Psychopathology*, 1992, 4 (01): 5.
- [6] Huang Q. Intervention study of self-consciousness development of junior high school students based on positive psychology background [D]. Hebei Normal University.
- [7] Jasper Fuk-Woo C, Shuofeng Y, Kin-Hang K, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster [J]. *The Lancet*, 2020, 395(10223).
- [8] Health and Health Commission. Guiding Principles for Emergency Psychological Crisis Intervention of New Coronavirus Infected Pneumonia [S], [2020-03-16], http://www.gov.cn/zhengce/zhengceku/2020-01/27/content_5472433.htm.
- [9] Zung W W. A rating instrument for anxiety disorders. [J]. *Psychosom*, 1971, 12 (6): 371-9.
- [10] Qi L. Statistical analysis and fuzzy comprehensive evaluation of Likert scale [J]. *Shandong Science*, 2006 (02): 21-26 + 31.
- [11] Li J, Zhang M. Analysis of related factors of adolescent anxiety [J]. *Chinese Journal of Clinical Rehabilitation* (44): 148-149.
- [12] Chen J, Zhang D, Wu M. Anxiety survey of middle school students [J]. *Chinese School Doctor*, 014 (4): 257-258.
- [13] Liu X, Sun L. Analysis of the test results of the self-assessment scale of anxiety of 2462 adolescents [J]. *Chinese Mental Health Journal* (2 issues): 75-77.
- [14] Yue S, Zhang W, Huang H, et al. Adolescents' subjective well-being, mental health and their relationship with coping styles [J]. *Psychological Development and Education*, 2006 (03): 93-98.
- [15] Guo Huiping. Research on personality characteristics and mental health of middle school students [D]. Shanxi Medical University.
- [16] Xu Fulian, Chen Haiquan, Xu Luqin, et al. Analysis of influencing factors of depression among middle school students in Jiangmen [J]. *Chinese Journal of School Health*, 2015, 36 (1): 77-79.
- [17] Zhu Xueli, Sai Xueying, Shi Liping, et al. Current situation and influencing factors of anxiety and disturbing life of primary and middle school students in Henan Province [J]. *Chinese School Health*, 2019 (9).
- [18] Zhang Yuanyuan, Jing Pan, Qiao Zhengxue, et al. Analysis of anxiety status and influencing factors of middle school students [J]. *China Public Health*, 2018, 34 (03): 401-403.
- [19] Liu Shuai, Yang Lulu, Zhang Chenxi, et al. Online mental health services in China during the COVID-19 outbreak. [J]. *The lancet. Psychiatry*, 2020.
- [20] Jongerden L, Simon E, Bodden DHM, et al. Factors Associated with the Referral of Anxious Children to Mental Health Care: the Influence of Family Functioning, Parenting, Parental Anxiety and Child Impairment [J]. *International Journal of Methods in Psychiatric Research*, 2015, 24(1): 46-57.

- [21] Wang Xiaohong, Lin Chun. The psychological mechanism and adjustment of panic emotion during the period of SARS [J]. Journal of Military Medical College, 2003 (03): 173-174.
- [22] Adela A, Claire H, Cathy C. Parental responsibility beliefs: associations with parental anxiety and behaviours in the context of childhood anxiety disorders [J]. Journal of Affective Disorders, 2015, 188.
- [23] Barratt S. Marital Conflict and Children: An Emotional Security Perspective [J]. Child & Adolescent Mental Health, 2011, 16.

Statement

Ethics approval and consent to participate

The questionnaire of this study clearly explains the principle of privacy protection and informed consent. The questionnaire was completed anonymously and on the Internet, and no specific personal details were involved in the paper.

Consent for publication

Not applicable.

Availability of data and materials

The datasets analyzed in this study are available from the corresponding author on reasonable request.

Competing interests

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Authors' contributions

SW, XW and QG completed the data collection part together, and assisted XZ in data analysis. XZ mainly analyzes and writes the main content and discussion of the paper.

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