

Analysis of the Mental Health Status of University students after the COVID-19 Epidemic

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Abstract

Objective The aim of this study was to investigate the mental health status and sleep quality of university students after local outbreak of COVID-19, and to help them understand the psychological stress reaction and provide base for their mental health education.

Methods A cross-sectional survey was conducted on the mental health status of university students in a Wuhan-based university.

Results A total of 897 university students were enrolled in the study. Compared with the epidemic period, university students' mental health status and sleep quality has a great deal of difference in the aspects of gender, grade, discipline and specialty, physical exercise, as well as with their family relationships and so on. 64.26% students would like to talk to their peers or close friends, while only 2.71% would like to call a caring hotline or seek help from a psychologist.

Conclusion After the local outbreak of COVID-19 in Wuhan was contained, the mental health status and sleep quality of more than half of the students improved. However, priority attention and care should be given to female students, senior students, those undertaking literature and history majors and those dissatisfied with family relationships.

Highlights

1. This is the first cross-sectional study to analyze the the mental health status of college students after another local outbreak of COVID-19 in a Wuhan- based university.
2. The survey covers a representative sample of undergraduates, master and doctoral students, which can better reflect college students' the mental health status.
3. Both of these provide valuable clues for follow-up research and taking surveillance and control measures accordingly for our subjects.

1. Introduction

In early 2020, a novel coronavirus pneumonia outbreak (COVID-19)occurred, caused by infection with SARS-CoV-2^[1]. It was characterised by rapid transmission, a wide range of infection and difficulty to prevent and control, resulting in a major public health emergency^[2] that seriously affected work, study and other aspects of human life, as well as mental health^[3]. China responded rapidly to the development of the epidemic, implementing measures to control and prevent its further spread. From the onset of the outbreak through to the normalisation of epidemic prevention and control and then to the stage of local outbreaks, the psychological health of the semi-closed management university students will be affected to some extent^[4]. When an excessive psychological response occurs in response to major natural disasters or sudden public crisis events, psychological adjustment needs to occur within a certain timeframe; otherwise, a long period of loss, anxiety, depression and helplessness can ensue, with mental

health impacts also affecting physical health and potentially even leading to serious mental illness. Therefore, the education and support of university students in achieving this emotional adjustment are imperative [5].

This study was on the mental health of university students in Wuhan during the COVID-19 epidemic prevention and control period. It aimed to benchmark the mental health status of university students, help students understand the psychological stress response correctly, and provide a scientific basis for mental health education and psychological crisis intervention for university students. This study was in line with relevant research in the early and middle stages of the epidemic, forming a relatively complete data chain that tracked the psychological changes of university students throughout a major epidemic situation, and promoting longitudinal research on the psychological impacts of major social events on the psychological status of youth.

2. Methods

2.1 Research objects

Students from Wuhan University of Science and Technology were the research object. A questionnaire (<https://www.wjx.cn/vm/mIMoXcb.aspx>) was used to obtain 890 responses, of which 887 (an effective rate of 99.7%). These comprised responses from 462 males and 465 females.

2.2 Research methods

With reference to the existing literature and research results relating to COVID-19 in China and abroad, a 25 question questionnaire was designed using an online questionnaire platform. This was used to conduct online research from 27 to 31 January 2021 and was accessed by scanning a two-dimensional code. QQ, WeChat, microblog and other social media platforms were used as the main media channels. The content of the questionnaire included: 1) general demographic characteristics: gender, age, major, etc.; 2) life status during the post-epidemic period (work and rest, sleep, home sports, entertainment and communication); and 3) mental health status. This study met the requirements of medical ethics, relevant laws and regulations and competent departments, did not breach privacy requirements and avoided sensitive topics. To ensure the data quality, the same IP address could only respond to the survey once.

The study was approved by the Ethics Committees of the Wuhan University of Science and Technology Medical College. The ethical approval number is 2021010201. Informed consent was obtained from all subjects and/or their legal guardian(s). All methods were performed in accordance with the relevant guidelines and regulations.

2.3 Data statistics

The data was processed using Epidata 3.0 and statistical analysis was performed using SPSS 25.0. Demographic characteristics were described by classification variables and frequency analysis. The

factors influencing the psychological state of university students during the epidemic were explored using the chi-square test and rank sum test. $P < 0.05$ was statistically significant.

2.4 Quality control

Investigators underwent standardised training before the formal investigation. Based on existing questionnaires in China and abroad, the questionnaire was designed in-house following discussions with professional teachers. A pre-investigation was carried out to test the rationality of the questionnaire design. Secondly, the questionnaire set the length of time and the standard of the answer, and the time-out and wrong answer were all recorded as invalid questionnaires, which ensured the authenticity and effectiveness of the questionnaire. After the survey, the questionnaires were collected and sorted by the investigators, logical error checking was performed by the double entry method and invalid questionnaires were eliminated. These processes ensured the reliability and validity of the questionnaire responses.

3. Results

3.1 Basic information

The students who participated in the questionnaire were mainly sophomores (49.04%), followed by juniors (18.15%). The major disciplines represented were science and engineering, accounting for 43.18%, followed by medicine (33.82%), and literature and history (23.00%). The source distribution of the survey objects was relatively balanced, with similar proportions of students from rural areas, towns and cities. The demographics are shown in Table 1.

3.2 Negative emotions during COVID-19

In response to the question of 'From the most serious period to the basic control stage to the local epidemic stage, how has your attitude to the epidemic changed?', 64.83% of university students said that their attitude 'has become more positive', 31.45% said that their attitude 'has not changed', and 3.72% said that their attitude 'has become more negative'. In response to the question 'Has your mental health been affected by the epidemic?', 81.85% of university students said that their mental state has not been affected by the epidemic. Among the 18.15% of university students who said that their mental state had been affected by the epidemic, 52.8% identified feelings of fear and helplessness. These responses are shown in Figure S1.

3.3 Effect of gender on stress in university students

In response to the statement 'In the last two months, I have been feeling anxious or more stressed than before', for males 'significantly reduced' accounted for 3.46% of responses, 'slightly reduced' and 'unchanged' for 5.43% and 58.66%, respectively, and 'slightly increased' and 'significantly increased' for 26.62% and 5.84%, respectively. For females, 'significantly decreased' and 'slightly decreased' accounted for 1.88% and 4.71%, respectively, and 'no change', 'slightly increased' and 'significantly increased'

accounted for 52.94%, 35.29% and 5.18%, respectively. The frequency of feeling stressed was higher in females than in males ($Z = -2.34$, $P=0.17$). These results are shown in Table S1.

In response to the question 'Which of the following is your state of mind in the context of recurrent outbreaks?', 3.25% of males and 5.18% of females selected 'I feel more anxious and panic, fearing another large-scale outbreak', whereas 55.19% of males and 65.18% of females selected 'I have some concerns, but not panic'. The frequency of panic and helplessness for females was higher than for males ($P= 0.02$). These results are shown in Table S2.

3.4 Effect of college year on stress in university students

In response to the question 'How many times have I felt anxious or stressed in the last two months?', a slight increase was reported as follows: freshmen, 12.00%; sophomores, 29.66%; juniors, 30.43%; seniors, 44.00%; fifth year, 42.42%; and postgraduates, 28.04%. A significant increase was reported as follows: freshmen, 6.00%; sophomores, 4.83%; juniors, 4.35%; seniors, 9.00%; fifth year, 9.09%; and postgraduates, 5.61%. Therefore, after the outbreak, students in the later years were more likely to feel stress and anxiety than the students in the lower grades ($H = 25.654$, $P = 0.00$). These results are shown in Table S3 and S4 and Figure S2.

3.5 Effect of major on restlessness and depression in university students

In response to the statement, 'In the last two months, I have often felt restless, insecure and depressed', 2.94% of students in literature and history indicated that they 'agree' and 28.43% said that they 'somewhat agree'; in science and engineering the proportion who agreed and somewhat agreed were 3.92% and 16.45%, respectively; and in medicine, these proportions were 1.67% and 17.33%, respectively. The percentage of students majoring in literature and history was lower than that of students majoring in science and engineering. Overall, students majoring in literature and history were more likely to be restless and depressed than those majoring in science and medicine ($H = 6.60$, $P = 0.04$; Table S5).

3.6 Effect of satisfaction with family relationships on the sleep of university students during COVID-19

During the epidemic, the effect of students' relationship with their parents on their sleep was explored. 52.96% of the students were 'very dissatisfied', 54.37% were 'barely satisfied', 83.56% were 'satisfied' and 78.25% were 'very satisfied' with their family relationships. Students who were dissatisfied with their family relationships were more likely to have poor sleep and stay up late than those who were satisfied with their family relationships ($r = 67.30$, $P = 0.00$; Table S6).

3.7 Effect of satisfaction with family relationships during the outbreak on the psychological status of university students after the outbreak

Students who were less satisfied with their family relationships during the outbreak were more likely to be affected by the outbreak ($r=18.61$, $P=0.00$) than students who were satisfied with their family relationships during the outbreak (Table S7).

3.8 Impact of family involvement in outbreak control and prevention on university students' mental health status

University students who had family members involved in the control and prevention efforts were less likely to be affected by the outbreak ($r=13.09$, $P= 0.001$; Table S8).

3.9 Frequency of home exercises on university students' psychological status

Students who reported a high frequency of home exercise (more than three times a week and mostly daily adherence to exercises) were less vulnerable to mental health conditions compared to those who exercised less frequently (basically no exercise, one to two times a week) ($r = 8.454$, $P = 0.04$). These results are shown in Table S9.

3.10 Impact of level of concern about the state of the epidemic on university students' sleep status

The proportion of students with better napping and sleeping quality were 81.87% and 77.40% for those with 'great concern' and 'comparative concern' about the outbreak development status, respectively, and 64.62% and 50.00%, respectively, for those with 'little concern' and 'no concern' about the outbreak development status. The results of the survey showed that students who were more concerned about the latest status of the outbreak were more likely to experience disturbance in their napping and sleep quality than those who were less concerned about the latest status of the outbreak ($r = 32.93$, $P = 0.01$; Table S10).

3.11 Strategies employed by university students in the presence of negative emotions such as irritability

Of the coping strategies identified by university students, the highest percentage expressed their willingness to 'talk to peers or friends' (64.26%), followed by 'seek help from elders such as parents and teachers' (17.81%), 'talk to strangers through apps such as bar and Weibo' (6.99%) and 'call a support line or consult a psychologist for help' (2.71%). In the other 8.23% of students, 'self deconstruction' and 'perceiving that these emotions will not have a negative affect' made up the greatest proportion. These results are shown in Figure S3.

4. Discussion

This study investigated the mental health and sleep status of 887 university students during the period of normalisation during the COVID-19 epidemic prevention and control period and the recovery phase. It was found that 18.15% of students experienced negative effects on their emotions due to the epidemic. Of these, 3.94% felt irritable and depressed, 5.52% felt that in the past two months their stress levels had increased significantly, and 30.78% felt that their stress had slightly increased. Compared with during COVID-19, 20.00% of the respondents indicated a significant reduction in their anxiety symptoms^[6], which was not significantly different to during the normal period.

To help people get through an epidemic situation, the provision of specific psychological guidance is important to help maintain good morale^[7]. During the period of this study, it could be seen that the spread of the epidemic was being controlled and that its impacts were gradually improving. Additionally, the stress levels of university students had increased only slightly, which may have been due to the epidemic boosting the development of the digital economy^[8], accelerating the reconstruction of industrial structures and the impact of the digital economy on the labour market. Structural unemployment was prominent for a period, with high unemployment rates in traditional industries and labour shortages in emerging digital industries, and high unemployment rates in many middle-income countries^[9]. Accordingly, university students were uncertain about their future employment and direction, which brought greater challenges and resulted in some university students experiencing a slight increase in stress.

Additionally, student's relationships with their parents had a significant impact on their emotions and attitude ($P = 0.00$). Students who were satisfied or very satisfied with the relationship with their parents were more likely to have a more positive attitude and emotions. The largest predictor of self-esteem and depression in early young adults is perceived social support from the family of origin, which is also moderately correlated with perceived support from extended family members^[10]. Good family relationships also favourably impacted students' mental health. In this study, whether students went home during the second wave of the epidemic had an impact on whether university students had negative emotions; although only 17.81% of university students chose to seek help from their elders when they were in a low mood, it was undeniable that the family environment influenced university students' mood and psychological state. Furthermore, the degree of attention to the epidemic also affected the attitude of university students towards the epidemic. Students' negative emotions relating to the epidemic may also have been influenced by Internet rumours. Therefore, when paying attention to the status of the epidemic attention should be paid to the information source; rumours should be ignored and not spread, to help create and maintain a good network environment.

Other factors that increased the positive attitude of university students was whether they or their relatives and friends had been diagnosed or suspected of having COVID-19 and whether they or their parents had participated in work related to epidemic prevention-related work; these factors were also linked with university students paying more attention to the development of the epidemic situation. This result may have been related to their better understanding of COVID-19 and their greater confidence in the positive and effective national control policies. These students tended to use and trust official information sources and changed their behaviour in line with public health recommendations^[11]. Students who experienced isolation were more affected by the epidemic situation and experienced more negative emotions^[12]; indeed, the negative impact of isolation periods had a profound impact on university students' psychology.

Finally, the exercise frequency of university students in the past two months also affected their mental state and sleep quality, which further affected their mental state. A decline in outdoor recreation was

reported by 64% of students, as well as a decline in subjective well-being by 52%^[13]. The results also showed that students who did not pay attention to the development of the epidemic were more likely to experience work and rest disorders and a decline in sleep quality. This finding was supported by the results of the present study, which also found that students who did not pay attention to the development of the epidemic were more likely to have work and rest disorders and a decline in sleep quality. The degree of public concern about the epidemic significantly affects the public psychological state. Students who did not pay attention to epidemic information may have been addicted to the Internet rather than taking in valuable information, which affected their quality of sleep. Therefore, university students should maintain self-control and keep healthy to promote reasonable work and rest.

The study contained certain biases. Nearly half of the respondents were sophomores (49.04%), and the lowest proportions were fifth-year students (3.72%) and freshmen (5.64%). This lowest proportion of fifth-year students may have been related to the pressure of the postgraduate entrance examination, which meant that fifth-year students (as well as third- and fourth-year students) had less interest in the questionnaire. There were also relatively few freshmen, which may have been because they were in the review stage of the senior high school entrance examination for the period that the questionnaire was covering. These freshmen had just entered the university and it is possible that they misunderstood the concept of time during the epidemic period of this study and filled in the questionnaire without understanding its purpose.

5 Coping strategies

During the normalisation of the epidemic situation, the mental health status of university students in Wuhan improved relative to at the beginning of the outbreak, but in the face of the outbreak problems in the psychological state of university students may still have existed. Improvements can be made in the following areas.

5. Coping Strategies

During the normalisation of the epidemic situation, the mental health status of university students in Wuhan improved relative to at the beginning of the outbreak, but in the face of the outbreak problems in the psychological state of university students may still have existed. Improvements can be made in the following areas.

5.1 University aspects

First, universities should actively guide their students to obtain the latest official information on the epidemic through regular channels. It is necessary for university students to obtain authentic and reliable information and then take targeted measures to prevent the spread of rumours. If fake news fills the media, university students will be psychologically overwhelmed—especially those in the liberal arts who lack scientific understanding of viruses—increasing their psychological burden^[14]. Second, universities

should provide in-depth information on psychological epidemic prevention networks and strengthen messaging on the pathogenic mechanism and protection principles relating to COVID-19, so that university students have a correct understanding of COVID-19, thereby reducing their fear of the virus. Third, universities should strengthen their awareness of COVID-19 and their monitoring of changes in students' psychological states so that they can implement active interventions.

5.2 Family aspects

First, creating a good family atmosphere and promoting the healthy development of family relationships is a key aspect of the positive and healthy development of teenagers' psychology. Thus, to avoid an increase in psychological pressure arising from conflicts within the family, parents should strengthen communication with their children and ensure that they receive psychological support from their family [15]. Second, parents should listen to and respect their children's thoughts, treat them as equals and avoid violent language and behaviour. Third, more appropriate affirmation and support from their parents will help children to develop self-confident psychology and obtain a strong sense of identity.

5.3 Personal aspects

First, university students need to correctly understand the epidemic situation so that they can respond appropriately. Second, when students face challenges with a positive and optimistic attitude, this enhances their resilience. Third, when under great psychological pressure, students should communicate with trusted friends or elders promptly and ask for help from counsellors or psychologists if necessary. Fourth, students should participate in various sporting activities, use their gifts and abilities, cultivate interests and hobbies and constantly improve their wellbeing. Finally, the quality of the company they keep can have considerable impacts on how individuals contribute to the demands of the national political, economic and talent market under the impact of the epidemic.

Strengths and Limitations

As far as we know, this is the first cross-sectional study to analyze the mental health status and sleep quality of university students after local outbreak of COVID-19 in a Wuhan-based university. Moreover, the survey covers a representative sample of undergraduates, master and doctoral students, which can better reflect university students' mental health status and sleep quality. Both of these provide valuable clues for follow-up research and taking mental health intervention.

This study also has several limitations. First, it is only a cross-sectional study, and the analysis results of influencing factors have some limitations. Second, the effects of different school types on the university students' mental health, sleep quality, depression and anxiety were not considered in this study, and the differences in academic pressure and disciplines among key, ordinary, and vocational colleges may cause bias in the research results. Third, the participants were mainly concentrated in Hubei Province, so the sample is not representative and cannot be extended to the whole country.

In a word, future research needs to base upon more large survey sample in improving the university students' mental health, sleep quality, depression and anxiety condition from many aspects.

Declarations

Conflict of interest

The authors declare no conflicts of interest in this study.

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Author contributions

Jing Cheng conceived and designed the study. Jianbo Zhan drafted the paper. Shuliu Pan and Lu He analyzed the data. Fang Zhou,Yutong Zhang and Fen Wang finalized the manuscript. Aodi Huang,Yaqi Xu, lin Lv, Runming He, Jia Wang, Can Mei, Yujia Xu,Zelong Yang,Xiaoqi Ji and Qiang Geng performed the study. All authors contributed to discussions and the writing of the manuscript.

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Data Availability statement

All data generated or analysed during this study are included in this published article and its supplementary information files.

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Tables

Table 1 Basic demographics of the student group (n=887)

Attribute	Category	Number (n)	Constituent ratio(%)
Gender	Male	462	52.09%
	Female	425	47.91%
Grade	Freshman	50	5.64%
	Sophomore	435	49.04%
	Junior	161	18.15%
	Senior	100	11.27%
	Fifth year	33	3.72%
	Postgraduate	108	12.18%
Specialty	Literature and history	204	23.00%
	Science and Engineering	383	43.18%
	Medical class	300	33.82%
Residence	City	337	37.99%
	Town	252	28.41%
	Countryside	298	33.60%

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