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Research Article

A Study on Students' Public Stigma of COVID-19 and Its Influencing Factors in The Context of The Long Term Handling of The COVID-19 Pandemic

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Abstract

Objective: To understand the public stigma and associated factors of COVID-19 in Jingzhou adolescents relating to the prevention and containment of COVID-19 cases. Methods: From June to October 2021, an online survey was conducted in two junior high schools in Jingzhou City. A total of 2888 students participated in the survey, with 2800 being valid responses (effective rate 97.0%). The survey tools used the COVID-19 attitude questionnaire, and the related factors were analyzed by a stepwise multiple linear regression method. Results: 31.4% of the participants showed public stigma towards COVID-19, with a larger portion of those being in lower grades (P<0.01), only children (P<0.05), and those not quarantined during the outbreak (P<0.05). Multiple linear regression analyses showed higher levels of stress (P<0.01), lower levels of social support (P<0.05), younger age (P<0.01) and higher educational level of parents (P<0.05) during the pandemic correlated to stronger public stigma towards COVID-19. Conclusion: Participants' stigma of COVID-19 is widespread, and it is manifested in social isolation. The respondents' level of stress and social support during the pandemic is shown to be linked to their degree of stigma. Methods for reducing this public stigma for COVID-19 may include stopping the spread of misinformation, providing psychological support, and alleviating negative emotions.

Keywords: COVID-19, Adolescent, Student, Public Stigma.

Introduction

After the first identification of an unknown infectious disease, on January 30, 2020, the WHO defined the pandemic as a "public health emergency of international concern" and named the disease as "COVID-19" (1). As of February 2022, about 426 million people have been infected with COVID-19. In the past 2 years, the world has been shrouded in the shadow of COVID-19. The

rising number of cases has been accompanied by the spike of public mental health problems such as nervousness, anxiety, and depression (2). Countries around the world are accelerating research and development into COVID-19 drugs and vaccines while struggling with the constant variation of the novel coronavirus. Several studies have shown that the impact of COVID-19 on the world not only includes threats to individual health, but also consequent changes in social connections, disease perception, and mental health among individuals in different ethnic regions (3-5).

At the beginning of the outbreak, many countries implemented containment policies to prevent the spread of the pandemic, such as strict quarantine rules, limiting of business and education activity, and personnel movement restrictions. This forced quarantine blurs the line between protective behavior and social discrimination. It is well known that infectious diseases (6,7) often cause public discrimination and social segregation worldwide. Research shows that the fear, stress, and social isolation that COVID-19 brings also cause public stigma around COVID-19-related illnesses (5, 8, 9). A study in the United States has shown that people who suffer from COVID-19 also experience social, work, and psychological stress as well as social discrimination after recovery (10, 11), which affects patients' recovery and quality of life, and may have adverse consequences. Because of fear of stigma, patients tend to conceal their illness and refuse to accept testing and treatment, which not only harms their own health but also threatens the public health of their communities. Several studies have shown that the adolescent population suffers from more mental health problems during the COVID-19 epidemic (12,13). A US study has shown that the number of adults with depression in the United States has tripled since the start of the pandemic (14); A meta-analysis shows that a higher proportion of adolescents and children worldwide are experiencing anxiety and depression during the epidemic quarantine (2). In the past, many scholars have explored the stigma surrounding COVID-19 in the public, but less have studied the stigma present in adolescents. Therefore, this study will focus on middle school students and attempt to explore their public stigma of COVID-19 and its effect on the prevention and containment of COVID-19 and provide decision-making ideas for reducing COVID-19 stigma and providing "psychological-biological-social" prevention and control during the pandemic.

Objects and Methods

1.1 Subjects

Two junior high schools in Jingzhou were randomly selected, and the students served as a data set. A total of 2888 people participated in the survey. After eliminating invalid responses, the final usable group was 2800 people (effective rate 97.0%). The age of the survey subjects ranged from 11-16 years old, with an average of 12.9±1.0 years old. The data included 1066 first-year students (38.1%), the 935 second-years (33.4%), and 799 third-year students (28.5%)；there were 1427 male participants (51.0%) and 1373 females (49.0%).

1.2 Methods

From June to October 2021, a star-line survey was conducted, which included questions on (1) general demographic data, including gender, age, grade, family socio-economic level, number of siblings, parent education level, number of family members living together, quarantine during the epidemic, and psychological stress level during the epidemic. (2) The COVID-19 Perception Questionnaire was revised according to Mak's Scale of Stigma for Mental Disorders (15). The scale consists of 11 items, each item was asked with a 4 choice Likert scale (1=totally disagree, 2=comparatively disagree, 3=comparatively agree, 4=totally agree). The higher the total score of the 11 items, indicating a stronger stigma of COVID-19-infected persons. The questionnaire showed good internal

consistency, with a Cronbach's coefficient of 0.83 using the Likert 5 rating scale from ZhangTM's study of COVID-19 public stigma among Chinese residents (9). (3) The Generalized Anxiety Self-Rating Scale (Generalized Anxiety Disorder, GAD-7), edited by Spitzer (16), is widely used to assess anxiety symptoms. According to the scoring criteria, the higher the total score, the more severe the anxiety symptoms. The scale's Cronbach coefficient is 0.89, which indicates good reliability and validity. (4) The self-rating depression scale (Patient Health Questionnaire, PHQ-9), edited by Spitzer (17), is often used as an auxiliary tool to assess depressive symptoms or screen for depressive disorders. According to the scoring criteria, the higher the total score, the more severe the depressive symptoms. The Cronbach's coefficient was 0.89 (5). The Social Support Rating Scale (SSRS), edited by Xiao Shuiyuan (18), has 10 items, including three parameters: subjective support, objective support, and support utilization. A higher total score indicates a higher degree of social support. The Cronbach's coefficient of the scale is 0.74.

1.3 Quality control

(1) Using the online survey tool *Questionnaire Star*, the preliminary questionnaire was formed after systematically consulting and analyzing relevant documents and discussing and revising with experts. First, a small-scale test was carried out, then the questionnaire's content was revised and synchronized to *Questionnaire Star* according to the feedback, and a QR code linked to the questionnaire was made; (2) The survey passed the ethical review and was conducted with the informed consent of the subjects and institutions. (3) Training was conducted for the researchers, information was given to the participants before the survey, and the questionnaire was centrally administered by the schools. The students used WeChat or QQ to scan the QR code and fill in the survey, and researchers were arranged to be present to guide and answer questions (4) The responses that were incomplete, completed in less than 10 minutes, or that included inconsistent answers were eliminated. The data in the questionnaire were exported and coded with SPSS25.0 software.

1.4 Data processing

The measurement data was described using mean ± standard deviation. The counting data were described with composition ratio /rate. The Chi-square test was used to compare the differences in the rate of stigma within different demographic groups. The Spearman correlation matrix was used to analyze the correlation between stigma and other continuous variables. Multiple linear regression was used to analyze the related factors affecting stigma. The difference was statistically significant with $P<0.05$.

Result

2.1 Perception of COVID-19 among the participants

In each of the options of the scale, both "total agreement" and "comparative agreement" were counted as agreement with the question, while "total disagreement" and "comparative disagreement" were considered disagreement, representing disagreement with the question. The total score of the COVID-19 Perception Questionnaire was (22.1±6.2). COVID-19 stigma was confirmed by 31.4% of respondents and rejected by 68.6% of respondents (Table 1).

2.2 Comparison of the rate of COVID-19 stigma in different sociodemographic survey subjects

If the total mean score of the questionnaire was ≥3, it would represent the absence of stigma and a total mean score < 3 would represent the presence of stigma. The statistical results showed that lower grade students ($P<0.01$) had a higher rate of COVID-19 stigma than higher grade students. Students with siblings ($P<0.01$) and people who quarantined ($P<0.05$) showed a more tolerant attitude towards COVID-19. People with

knowledge of the psychological health field (P=0.049) showed a lower proportion of stigma than those without knowledge of the psychological health field (Table 2).

2.3 Analysis of the correlation between the total score of the COVID-19 Perception Questionnaire and continuous variables

The results showed that the levels of psychological stress (P<0.05), anxiety (P<0.01), depression (P<0.01), and parental education (P<0.01) were positively correlated with COVID-19 stigma. However, higher levels of social support (P<0.01) and older age showed lower stigma. Table 3.

2.4 Multiple stepwise linear regression analysis of COVID-19 stigma

Diving deeper, taking the total score of perception questionnaire of COVID-19 infected persons as a dependent variable and the variables with significant correlation in the univariate analysis as an independent variable, the multiple linear regression model was constructed step by step. After eliminating some invalid variables, the final regression model showed that participants with higher COVID-19 related psychological stress levels (B=0.161, P<0.01) showed more stigma. In contrast, participants who received more social support (B=-0.063, P<0.01) were more tolerant of COVID-19 attitudes. It also showed that the younger the age of the participant (B=-0.634, P<0.01), the stronger the stigma of the COVID-19 (Table 4).

Table 1. Participants' Attitudes to Covid-19 Questionnaire Scores (x ± s) and Attitudes Classification (%).

Entries	x ± s	Attitude	
		Disagree	Agree
1. I am concerned that people infected with the COVID-19 will cause harm to others.	3.1±0.9	20.0	80.0
2. I will try to keep my distance from people infected with the COVID-19 .	3.6±0.7	7.3	92.7
3. People infected with the COVID-19 are annoying.	1.6±0.9	85.8	14.2
4. People infected with COVID-19 are a burden to society.	1.5±0.8	89.3	10.7
5. People infected with the COVID-19 add trouble to others.	2.0±1.0	68.8	31.2
6. A person infected with COVID-19 should stay away from others even if he /she has been cured.	1.7±0.9	83.1	16.9
7. It is also normal for people infected with the COVID-19 to be discriminated against by others.	1.4±0.7	92.2	7.8
8. People who have been infected with the COVID-19 are not suitable for work related to cooking, education, medical care and childcare.	1.7±0.9	81.1	18.9
9. When dealing with a person infected with COVID-19, I fear that I will get COVID-19 even if he /she has been cured.	2.0±0.9	68.5	31.5
10. I will avoid socializing with a person infected with COVID-19 even if he /she has been cured.	1.8±0.9	77.6	22.4
11.I refuse to have physical contact with a person infected with COVID-19 even if he /she has been cured.	1.8±0.9	80.4	19.6
Total	22.1±6.2	68.6	31.4

Table 2. Differences in the proportion of COVID-19 stigma among respondents [number of cases (%)]

Variable		Number	Stigma（%）	X^2	P
Gender	Male	1427	253（17.7）	0.02	0.897
	Female	1373	246（17.9）		
Grade	First grade	1066	242（22.7）	30.06	<0.001
	Second grade	935	150（16.0）		
	Third grade	799	107（13.4）		
Family life member	Parents	1875	343(18.3)	4.32	0.229
	Parents grandparents	548	91(16.6)		
	single parent	158	34(21.5)		
	Other	219	31（14.2）		
Family financial situation	Poor	489	85(17.4)	0.12	0.940
	General	2061	368(17.9)		
	Good	250	46(18.4)		
Only child	No	1770	289(16.3)	7.33	0.007
	Yes	1030	210(20.4)		
Mental health knowledge or psychological intervention	None	1128	215(19.1)	6.05	0.049
	Understand mental health knowledge	1499	245(16.3)		
	Both	173	39(22.5)		
Isolation	No	2518	461(18.3)	4.05	0.044
	Yes	282	38(13.5)		

Table 3. Correlation between the total score of the COVID-19 Attitude Questionnaire and continuous variables.

COVID-19 Attitudes Questionnaire	Age	Father's Education	Mother's Education	Stress	Social Support	Anxiety	Depression
1	-.116**	.040*	.048*	.041*	-.082**	.060**	.051**

Table 4. Linear Regression Model of COVID-19 Stigma

Variable	Regression Model of COVID-19 Stigma B（95.0% CI）
Age	-0.634（-0.873，-0.395）**
Family financial situation	-0.123（-0.606，0.361）

Social support	-0.063（-0.094，-0.032）**
Pressure	0.161（0.048，0.274）*

Discussion

Jingzhou City, Hubei Province, is about 200 kilometers away from Wuhan City. During the epidemic period (January 24, 2020-March 16, 2021), the city was shut down for 52 days. All the city's residents were placed on quarantine as a preventative measure to limit the initial spread of the virus. This was classified as "not quarantined" in the investigation, while some who were infected with COVID-19, suspected to have been infected, or were close contacts with those infected were subjected to intense medical treatment or community quarantine. This was classified as "quarantined" in the investigation.

Although COVID-19 is a new type of disease, much attention has been paid at home and abroad to the study of COVID-19 stigma (19,20). The most direct manifestation of COVID-19 public stigma is public stereotyping, labeling, prejudice and discrimination against patients (21). The public's perception that COVID-19 patients are self-inflicted (22), unethical, incompetent, or dangerous, etc. (23) will be accompanied by degrading, blaming, angry, and rejecting patients (22), leading to greater public refusal to help patients, hindering their access to job search and housing, and affecting their recovery and quality of life (21). For COVID-19 persons who fear of isolation, unemployment, and discrimination, they may choose to avoid testing, lower treatment and management compliance.

In this study，the results show that 31.4% of participants have a discriminatory attitude towards COVID-19, which is similar to the results of a Zhang TM (9) survey on COVID-19 stigma in the general population of China; the items with the highest proportion of stigma in the COVID-19 Attitudes Questionnaire are "I will try to distance myself from people infected with COVID-19" (92.7%) and "I fear that people infected with COVID-19 will cause harm to others" (80.0%). It is well known that COVID-19 outbreaks show large spikes in cases and high mortality in the early stages of the epidemic, this pressing threat of death is more likely to trigger participants' fear of COVID-19 (24). In addition, under the guidance of China's COVID-19 prevention and control policy, repeated media publicity about the importance of social distance will inevitably further strengthen participants' avoidance of COVID-19-infected persons. At the same time, public condemnation and disgust for COVID-19 infected people will also increase public stigma. Just like in the beginning of the COVID-19 outbreak, the countries in the epidemic area and the people in the epidemic area suffered racial and regional discrimination (25, 26). However, as the COVID-19 pandemic continues, this social isolation of COVID-19-infected people has gradually blurred the boundaries between protective practices and discriminatory attitudes.

When comparing differences in the rate of stigma among different groups of participants, it was found that younger students and only children showed more stigma towards COVID-19. This may be due to the relative lack of knowledge of COVID-19, disease knowledge, and self-protection in the lower age group. It can be understood that when dealing with public health emergencies, family members will pay more attention to the protection of only children and may also strengthen their stigma towards COVID-19. In addition, individuals who were not quarantined showed more stigma than those who received medical care or underwent a neighborhood

quarantine during the pandemic, which may have provided an opportunity to learn more about COVID-19 and have a more rational perception of COVID-19. At the same time, those who have received mental health education had more tolerant attitudes towards COVID-19.(27,28) Several studies have shown that learning about mental health has a positive effect on reducing stigma.

The results of the linear correlation analysis matrix showed that negative emotions during the outbreak significantly affected the level of stigma of COVID-19. Participants with more educated parents showed a higher stigma for COVID-19. This may be related to the fact that parents are the primary caregivers and are also responsible for the education and safety of their children. Parents with high levels of education may indirectly reinforce participants' stigma about the disease through simultaneous learning with media information (29). The final correlation matrix also showed that stigma towards COVID-19 diminished with age. However, Zhang TM's (9) research on the general population shows that older people will show a stronger sense of stigma towards COVID-19. The age range of the survey subjects in this article is limited, and more abundant data is needed to support the differences in stigma of adolescents of different age groups.

A multivariate regression model was constructed to further verify that participants with higher levels of social support tended to be more tolerant in their attitudes towards COVID-19. Those with more stress during the outbreak showed stronger stigma. This echoes negative emotions due to the influence of the pandemic, such as stress and fear as risk factors for COVID-19 public stigma (9), and psychosocial support as a protective factor for public stigma (27). The difference is that the levels of depression and anxiety were positively correlated with the degree of stigma in univariate analysis, but this influence disappeared in multivariate analysis, which may be due to a mismatch between the participants' current anxiety-depression symptoms and the degree of stigma.

In conclusion, in the stressful environment of the pandemic, the included feelings of panic, fear, and anger are more likely to contribute to the public stigma aimed at COVID-19-infected persons (9). At the same time, the lack of knowledge about COVID-19 and mental health, the increase in misinformation(29), and the psychological moralization of epidemiological risk will cause people to distort the judgment of risk and avoid society, thus giving rise to the public stigma of COVID-19. It should be noted that teenagers, as active groups in the network information environment, are more likely to have a sense of stigma for COVID-19 due to distortion of information, lack of rationality, and lack of guidance (29). Therefore, it is of great significance for improving public stigma to ensure the objective authenticity of media information and provide corresponding social and psychological multi-dimensional support.

Limitations

There are some limitations to this study. Firstly, this study is a cross-sectional study and cannot deeply explore the intimate relationship between COVID-19 stigma and various variables. Secondly, in terms of research subjects, this study only used junior high school students and does not include representatives of other age groups. In the exploration of public stigma, there are certain cognitive limitations of participants. However, the results of this study still have some reference value for the current situation of some participants.

Expectation

In the context of the global fight against COVID-19, people are or will be in this chronically stressful quarantine environment, panic, and uncertainty and may face various life events at any time. Moreover, social isolation itself can lead to many emotional and behavioral problems (13, 30, 31). More than ever, we need mutual understanding and support here, both for those infected by

COVID-19 and for every ordinary citizen, to break down the barriers of prejudice and promote global cooperation in the fight against the COVID-19. We expect to further explore and improve the COVID-19 public stigma and its effect on young people and carry out targeted intervention measures. In the future, we want to study the causes and their relationships of the public stigma of COVID-19, expand the research subject size, cover the whole adolescent population, establish longitudinal continuous observation, and carry out adolescent mental health promotion and related psychological intervention cohort research.

Declarations

1) ***Consent to publication***
We declare that all authors agreed to publish the manuscript at this journal based on the signed Copyright Transfer Agreement and followed publication ethics.
2) ***Ethical approval and consent to participants***
The survey passed the institutional ethical review and was conducted with the informed consent of the participants.
3) ***Disclosure of conflict of interests***
We declare that no conflict of interest exists.
4) ***Funding***
None
5) ***Availability of data and material***
We declare that the data supporting the results reported in the article are available in the published article.
6) ***Authors' Contributions***
Authors contributed to this paper with the design (Lu Huang and Feng Liu), literature search (Lu Huang), drafting (Lu Huang), revision (Lu Huang and Feng Liu), editing (Bo Liu) and final approval (Lu Huang and Feng Liu).
7) ***Acknowledgement***
None
8) ***Authors' biography***
None

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