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Trauma exposure and the PTSD symptoms of college teachers during the peak of the COVID-19 outbreak

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Abstract

This study aimed to explore influencing factors for the psychological impact of coronavirus disease 2019 (COVID-19) on Wuhan college teachers, posttraumatic stress symptoms in particular, so as to inform evidence-based strategy development to ameliorate such adverse impacts. An online survey was conducted from 26 to 29 April 2020, and 1650 teachers (47.54% male; M = 40.28 years, SD = 8.3 years) enrolled in Wuhan universities and colleges participated. The results showed that the overall incidence of posttraumatic stress disorder (PTSD) among college teachers was as high as 24.55%, but the average level of PTSD score was low (M = 1.06, SD = 0.72). Logistic regression analysis showed that for those with confirmed COVID-19, the ratio was much higher, up to 2.814 (95% confidence interval [CI]: [1.542, 5.136], $p < 0.001$); that is, compared with those without symptoms, the ratio of PTSD increased by 181%. For those who had family members or relatives who died of COVID-19, the ratio was 5.592 (95% CI: [2.271, 13.766], $p < 0.001$), 459% higher than those who had no one who died. But the living places during the pandemic had no significant effect on PTSD. The findings suggest that mental health services reducing PTSD should be provided. Teachers who confirmed COVID-19 or lost loved ones to COVID-19 should be given particular care.

KEYWORDS
COVID-19 pandemic, mental health, psychological impact, PTSD, trauma exposure

1 | INTRODUCTION

1.1 | Background

On 11 March 2020, the World Health Organisation declared coronavirus disease 2019 (COVID-19) a pandemic (World Health Organisation, 2020). The various experiences and encounters during the pandemic, such as the pain of illness, the sadness of bereavement, the anxiety of isolation, the shock of unemployment and the uncertainty and fear of the future, have brought great distress to people (Duan & Zhu, 2020; Huang & Zhao, 2020; Jungmann & Witthöft, 2020; S. Li et al., 2020; Liu et al., 2020; McKay et al., 2020; Mertens et al., 2020; Qiu et al., 2020; Taylora et al., 2020; United Nations, 2020; Wang et al., 2020; J. Zhang, Wu et al., 2020; Y. Zhang & Ma, 2020). Particularly, the traumatic experiences of those who diagnosed with COVID-19 disease, lost loved ones to COVID-19, or lived in high-risk geographic areas probably damage their mental health. Previous studies have similarly revealed that people who experienced outbreaks of emerging infectious diseases such as severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and Ebola were prone to develop a series of psychological problems such as depression, anxiety and posttraumatic stress disorder (PTSD) (Cheng et al., 2004; Jalloh et al., 2018; Lau et al., 2010; Lee et al., 2018; Main et al., 2011; McMillan et al., 2017; Neria et al., 2008; Park et al., 2020; Saadatian-Elahi et al., 2010; Vyas et al., 2016; Wu et al., 2005; Xiang et al., 2014).

Since 2020, many studies have analysed the psychological impact of the COVID-19 pandemic in different populations, including medical workers (Hoorelbeke et al., 2021; W. R. Zhang, Wang et al., 2020), Chinese residents (Ahmed et al., 2020; Liu et al., 2020), older adults (Rutherford et al., 2021), children and adolescents (Tang et al., 2021) and college students (Benham, 2020; Cao et al., 2020; Tang et al., 2020); however, so far, there has not been any particular study on the educators, such as university teachers. Globally, teachers are a professional group with a large population, and they carry out educational activities with a much larger number of students. The traumatic experiences caused by COVID-19 not only affect the mental health of teachers, but also the quality of education, and even the mental health of students. Wuhan City in China, was the first city to be fiercely hit and severely affected by the large-scale COVID-19 outbreak (Sanche et al., 2020); Meanwhile, Wuhan is one of the cities with the largest number of university teachers and students in the world. According to Hubei Provincial Department of Education, Wuhan has more than 60,000 teachers and more than 1 million college students in 2019. On one hand, teachers have to conduct unprecedented remote online teaching during Wuhan lockdown. On the other hand, they have to face the risk of infection caused by in-person teaching in closed classrooms after the lockdown is lifted. Therefore, this study attempts to use survey data to analyse the impact of traumatic experience on the PTSD symptoms of Wuhan university teachers during the COVID-19 pandemic in 2020.

1.2 | Influencing factors of PTSD

Research on factors that influence the development of PTSD symptoms showed that the severity and incidence of PTSD vary with the degree of trauma exposure (Grubaugh et al., 2011). First, existing studies found that uncertainty of material losses or feelings of uncertainty is an important reason for PTSD caused by trauma exposure (Goto et al., 2006; Xie et al., 2011), and higher intolerance of uncertainty was associated with symptoms of generalised anxiety disorder, social anxiety disorder, panic disorder and obsessive-compulsive disorder (Boswell et al., 2013; Carleton et al., 2012; Rosser, 2019). The uncertainty of the pandemic not only is an important cause of psychological vulnerability (Mertens et al., 2020) but also induces negative emotions such as anxiety and depression (Zandifar & Badrfam, 2020). Looking back at the COVID-19 outbreak in Wuhan, we found that the outbreak caused a highly uncertain environment. SARS-COV-2, the virus of COVID-19 disease, is characterised by a long incubation period, large basic regeneration number and low fatality rate (Song et al., 2020). It can be seen that the virus spread is stealthy and rapid. In the early stage of the pandemic, most medical institutions in Wuhan had limited capacity for admission and treatment. At the same time, there was a major gap in nucleic acid testing capacity. As a result, a large number of infected people could not be effectively screened out. In addition, the local government lacked experience in dealing with such a large-scale pandemic. This situation led to exhaustion of medical resources and cross-infections in hospitals, and the infected people who were not hospitalised for medical treatment in time further caused cluster infections within their families. Thus, compared with those with no symptoms associated with COVID-19, those with mild symptoms are at a higher level of uncertainty during the pandemic, because they are kept at home for observation and are not allowed to leave home for medical treatment voluntarily. People with more severe symptoms have to go through the entire process of diagnosis and treatment, which, as mentioned earlier, is of high uncertainty due to the shortage of medical resources and the low accuracy of diagnosis and treatment. Clearly, the suffering associated with confirmed COVID-19 infection and symptoms similar to COVID-19 are severe trauma exposures that can lead to further psychological harm.

The second important manifestation of trauma exposure is the death of a loved one from COVID-19. The pandemic prevention and control measures require keeping a social distance. Therefore, when family members, relatives, friends, or neighbours are infected with the virus, people have to avoid the risk of infection on the one hand (Xiang et al., 2020); on the other hand, due to home quarantine control measures and the lack of effective protection, it is difficult to offer care and help for the infected (W. R. Zhang, Wang et al., 2020). If infected individuals fail to survive the pandemic, people not only have to suffer from the loss, but they also may have deep feelings of guilt and self-reproach. Relevant research showed that PTSD may occur after bereavement (Kaltman & Bonanno, 2003; Zisook et al., 1998). A study on adolescents showed that having relatives and friends injured in the earthquake, witnessing death in the earthquake were significant predictors for PTSD severity (He et al., 2011). In addition, we found a study showed that the death of family members due to MERS significantly increased the possibility of depression (Park et al., 2020).

The third important manifestation of trauma exposure is the risk of infection and disaster exposure that people endure during the pandemic. In most cases, people assess the risk based on what they heard or saw in their memory. If something is easy to recall, people will determine that it is likely to happen or happens frequently. Such perception strengthens people's fears (Slovic et al., 1982). Obviously, the closer to the severely affected areas an individual is, the greater the risk of infection, the greater the likelihood of witnessing the disaster scene, and the greater the emotional and psychological impact (Van Bortel et al., 2016). In the early stage of the pandemic, the psychological stress was particularly acute for those who lived in environments with rising infection and mortality rates, unpredictable prevention, control and treatment. The COVID-19 pandemic has completely disrupted people's lives and work. People in the pandemic centre are shrouded in an atmosphere of fear of being infected at any time. Stressful situations and fear can increase people's mental health problems (Dar et al., 2017; Mertens et al., 2020), and these problems may even develop into long-term adaptation disorders and PTSD (Banerjee et al., 2020).

Taking college faculty in Wuhan as the research object, We investigated the prevalence of PTSD among college faculty in Wuhan, and explored the effect of trauma exposure (such as suffering

symptoms relevant to COVID-19, the loss of loved one to COVID-19 and living in geographic areas with high infection risk) on PTSD, including intrusion, avoidance and hyperarousal symptoms when the pandemic was contained (i.e., 1 month after the Wuhan lockdown was lifted) using multistage random sampling.

2 | METHODS

2.1 | Participants and procedure

This study is part of a large-scale survey, COVID-19 Impact Survey of Faculty and Students of Wuhan Universities and Colleges (CFSW) (X. Li et al., 2021). Wuhan City was closed on 23 January 2020, followed by a nationwide lockdown of varying degrees until Wuhan announced the lifting of the lockdown early April. CFSW is a cross-sectional study that was conducted via an online survey from 26 to 29 April 2020. The survey took college students and in-service teachers from 83 higher education institutions (hereinafter referred to as 'colleges') in Wuhan as the participants, and a random sampling survey was conducted with the help of the administrative departments of colleges. The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Academic Board of Central China Normal University. The participants included noninfected college teachers, who were selected through random sampling, and infected college teachers, all of whom were included in the survey. The reasons why all infected teachers were included was that their numbers were relatively small and that it may be difficult to obtain sufficient samples through random sampling surveys.

The goals were to select 2000 affected college teachers by multistage random sampling and to include all infected college teachers in this survey. The term 'infected college teachers' was defined as those who were diagnosed with COVID-19, and the term 'noninfected teachers' was defined as those who suffered home quarantine, social distancing, college closure and anxiety during the COVID-19 outbreak. For noninfected teachers, a multistage random sampling approach was adopted. First, 13 colleges were randomly selected, and the sampled teacher size in each sampled college was proportional to the size of its teacher population. Second, 30% of the schools and departments of the sampled colleges were systematically selected, and the sampled teacher size in each sampled school and department was proportional to the size of its teacher population. Third, the size of the teacher population in each sampled school and department was proportional to the teacher size of different professional qualifications (i.e., assistant lecturer, lecturer, associate professor and professor). Finally, teachers were randomly selected in each group of different professional qualification. In addition, all the infected teachers in all sampled colleges were included in the survey.

The online survey via a professional data collecting platform (http://ringsurvey.com/platform) was used to collect data. The informed consent statement was shown at the beginning of the survey, and the teachers who provided consent were directed to the survey questionnaire. Participants who had not completed the survey received a warning on unanswered questions from the online platform; however, they were free to stop the survey without receiving a warning from the platform. As a result, a total of 1603 noninfected teachers, and all 47 infected teachers, with a total of 1650 teachers were surveyed. Compared with the planned sample size (i.e., 2000) of teachers, the completion rate was 80%.

2.2 | Measurements

2.2.1 | Impact of Event Scale-Revised

For PTSD symptoms, the question was: 'Since April 8, how is your mental state consistent with the following statements?' PTSD was assessed via the Chinese version of the Impact of Event Scale-Revised (IES-R) (Horowitz et al., 1979; Weiss & Marmar, 1997), a 25-item self-reported scale assessing the severity of posttraumatic disorder symptom due to traumatic events, such as the COVID-19 pandemic. Three dimensions, including intrusion, avoidance and hyperarousal symptoms, were assessed. Participants were asked to rate all the items using a 5-point scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always). The word 'event' was replaced with 'COVID-19 pandemic' in the items. For PTSD screening, a recommended cutoff of ≥1.5 was used for the average of each subscale score and the whole scale score for the subsequent analysis. This cutoff value was established against the PTSD Checklist PCL in a community sample, with an overall diagnostic power of 0.88, a sensitivity of 0.91, a specificity of 0.82, a positive predictive power of 0.90 and a negative predictive power of 0.84 (Creamer et al., 2003). The Cronbach coefficients were 0.92, 0.78, and 0.88, respectively, for the subscale of intrusion, avoidance and hyperarousal, and 0.93 for the whole scale of IES-R. Three items (two from avoidance and one from hyperarousal subscale) were removed from further analysis because the corresponding Cronbach coefficient of the subscale was higher if they were removed.

2.2.2 | Trauma exposure

Trauma exposure included three variables: symptoms associated with COVID-19 during the pandemic; the death of family members, relatives or friends due to COVID-19 and living places during the pandemic.

The question asked the participant's physical condition during the pandemic in four categories: no symptoms associated with COVID-19 (value = 0), mild undiagnosed symptoms associated with COVID-19 (including itchy throat, dry cough, fatigue, joint pain and fever, etc., value = 1), confirmed common influenza (including confirmed common influenza and pneumonia caused by common influenza, value = 2),and confirmed COVID-19 (value = 3). These questions are all reported by the participants based on their actual situation. Among them, the most severe trauma exposure is

confirmed COVID-19, followed by confirmed influenza and then mild symptoms.

The survey also asked the participants whether they had a loved one who had died of COVID-19. According to the relation closeness, the options were as follows: no one died of COVID-19 (value = 0), friends or neighbours died of COVID-19 (including friends, classmates, colleagues and neighbours, value = 1), and family members or relatives died of COVID-19 (including immediate relatives and other relatives, value = 2). If a participant had both 'friends or neighbours' and 'family members or relatives' who died of COVID-19, only the answer of 'family members or relatives' was recorded for analysis.

According to the severity of the geographical regions affected by COVID-19, the living places during the pandemic included three options: living in Wuhan City (value = 2), living in other places in Hubei Province (value = 1) and living in other provinces (value = 0). According to the pandemic information released by the National Health and Health Commission of China, as of 30 April 2020, a total of 82,862 cases have been confirmed nationwide, including 50,333 cases (60.74%) in Wuhan City, Hubei Province, 17,795 cases (21.48%) in other parts of Hubei Province, and 14,734 cases (17.78%) in other provinces (NHC, 2020); the risk of virus infection in these three places decreased sequentially.

2.2.3 | Sociodemographic characteristic

Sociodemographic characteristic variables (as seen in Table 1) include gender (male = 0, female = 1), age (50 years old and above = 0, 40–49 years old = 1, 30–39 years old = 2, 29 years old and below = 3), China Communist Party (CCP) membership (No = 0, Yes = 1), graduation university with highest education (Domestic university = 0, Overseas university = 1), highest education (Junior bachelor = 0, Bachelor = 1, Master's = 2, Doctor = 3), discipline with highest education (Liberal arts = 0, Science and engineering = 1), University category (Province or city-affiliated university = 0, State-affiliated university = 1),[1] professional qualification title (Assistant lecturer = 0, Lecturer = 1, Associate professor = 2, Professor = 3), whether they hold a concurrent administrative position (No = 0, Yes = 1), and whether they hold a talent or expert title at or above the provincial level (No = 0, Yes = 1).

2.3 | Statistical analyses

χ^2 Tests were used to compare group differences between the noninfected and infected teachers. Analysis of variance was used to analyse the mean differences of PTSD and three symptoms (including intrusion, avoidance and hyperarousal) between the groups of teachers, and Bonferroni correction was used to compare the mean differences between the categories. Multiple logistics models were used to examine the relationship between trauma exposure and PTSD. Dependent variables include PTSD, Intrusion, Avoidance and Hyperarousal, Intendent variables include physical condition during the pandemic, a cared one died of COVID-19 and living places during the pandemic. Although random sampling was used in this study, there were still two biases in the samples. On the one hand, since all the infected teachers were involved in the survey, they cannot be directly incorporated into the sample of noninfected teachers obtained through multistage random sampling. On the other hand, some colleges did not complete the planned sample size, which led to sample imbalance between colleges. Therefore, we used the population size and sample data to calculate a sampling weight to adjust for these sample imbalances and used them in the logistic regression models. Data were analysed using Stata14.

3 | RESULTS

3.1 | Sample characteristics

Table 1 presents the sociodemographic characteristic of college teachers in Wuhan, and the differences between noninfected and infected teachers using χ^2 tests. Among the 1650 teachers in this survey, 795 (47.54%) were male, average age 40.28 (SD = 8.30), 1252 (75.88%) were 30–39 years old, and 1233 (75%) were CCP members. In terms of highest education, 1202 (93.64%) graduated from domestic university, 635 (38.48%) obtained doctorate degrees and 875 (53.03%) obtained degrees in science and engineering. In terms of work, 561 (34.00%) were from state-affiliated university. In total, 590 and 605 had lecturer and associate professor titles, respectively (72.43% in total). A total of 375 (22.73%) held concurrent administrative positions, and 98 (5.94%) held a talent or expert title at provincial or ministerial level or above.

χ^2 Test results showed that there were significant differences between noninfected and infected teachers in terms of multiple characteristics. Compared with that among noninfected teachers, the infection rate of males was significantly higher among infected teachers (70.21 vs. 47.54%, χ^2 [1, N = 1650] = 9.40, p = 0.002). Teachers who were 50 years old or more were more likely to be infected (38.3 vs. 12.35%, χ^2 [3, N = 1650] = 28.80, $p < 0.001$). Non-CCP members had a higher infection rate (36.17 vs. 24.95%, χ^2 [1, N = 1650] = 3.04, p = 0.081). In terms of education and work, teachers with lower education, that is, those with a junior bachelor's degree, had a significantly higher infection rate (8.51 vs. 1.19%, χ^2 [3, N = 1650] = 19.21, $p < 0.001$). Compared to teachers from province or city-affiliated universities, teachers from state-affiliated universities had a significantly higher infection rate (76.60 vs. 32.75%, χ^2 [1, N = 1650] = 39.11, $p < 0.001$).

In terms of the type and severity of trauma exposure, the occurrence of symptoms similar to COVID-19 and the confirmation of COVID-19 during the pandemic were the primary manifestations of trauma exposure. In this survey, 47 (2.85%) teachers were diagnosed with COVID-19 infection. Among the non-infected teachers, 48 (2.91%) were diagnosed with severe symptoms such as common influenza and pneumonia, and 48 (2.91%) had mild symptoms such as itchy throat, dry cough, fatigue and joint pain. The second

TABLE 1 Sociodemographic characteristics of college teachers in Wuhan

	Total (n = 1650)	Noninfected teachers (n = 1603)	Infected teachers (n = 47)	χ^2 test (p)
Sociodemographic characteristics				
Gender				0.002
Male	795 (48.18)	762 (47.54)	33 (70.21)	
Female	855 (51.82)	841 (52.46)	14 (29.79)	
Age cohort				0.000
50 years old and above	216 (13.09)	198 (12.35)	18 (38.30)	
40–49 years old	497 (30.12)	487 (30.38)	10 (21.28)	
30–39 years old	755 (45.76)	737 (45.98)	18 (38.30)	
29 years old and below	182 (11.03)	181 (11.29)	1 (2.13)	
CCP membership				0.081
No	417 (25.27)	400 (24.95)	17 (36.17)	
Yes	1233 (74.73)	1203 (75.05)	30 (63.83)	
Graduation university				0.813
Domestic university	1202 (93.64)	1168 (93.7)	34 (91.49)	
Overseas university	448 (6.36)	435 (6.30)	13 (8.51)	
Highest degree				0.000
Junior bachelor	23 (1.39)	19 (1.19)	4 (8.51)	
Bachelor	221 (13.39)	213 (13.29)	8 (17.02)	
Master's	771 (46.73)	754 (47.04)	17 (36.17)	
Doctor	635 (38.48)	617 (38.49)	18 (38.30)	
Discipline of highest degree				0.982
Liberal arts	775 (46.97)	753 (46.97)	22 (46.81)	
Science and engineering	875 (53.03)	850 (53.03)	25 (53.19)	
University category				0.000
Province or city-affiliated university	1089 (66.00)	1078 (67.25)	11 (23.40)	
State-affiliated university	561 (34.00)	525 (32.75)	36 (76.60)	
Professional qualification title				0.254
Assistant lecturer	249 (15.09)	242 (15.1)	7 (14.89)	
Lecturer	590 (35.76)	573 (35.75)	17 (36.17)	
Associate professor	605 (36.67)	592 (36.93)	13 (27.66)	
Professor	206 (12.48)	196 (12.23)	10 (21.28)	
Concurrent administrative position				0.194
No	1275 (77.27)	1235 (77.04)	40 (85.11)	
Yes	375 (22.73)	368 (22.96)	7 (14.89)	
Province-level and above talent or expert title				0.449
No	1552 (94.06)	1509 (94.14)	43 (91.49)	
Yes	98 (5.94)	94 (5.86)	4 (8.51)	
Type and severity of trauma exposure				
Physical condition during the pandemic				–
No symptom	1507 (91.33)	1507 (94.01)	0 (0.00)	

TABLE 1 (Continued)

	Total (n = 1650)	Noninfected teachers (n = 1603)	Infected teachers (n = 47)	χ^2 test (p)
Mild symptom	48 (2.91)	48 (2.99)	0 (0.00)	
Confirmed common influenza	48 (2.91)	48 (2.99)	0 (0.00)	
Confirmed COVID-19	47 (2.85)	0 (0.00)	47 (100)	
A cared one died of COVID-19				0.184
None	1538 (93.2)	1496 (93.33)	42 (89.36)	
Friends or neighbours	73 (4.42)	71 (4.43)	2 (4.26)	
Family members or relatives	39 (2.36)	36 (2.25)	3 (6.38)	
Living places during the pandemic				0.049
Other provinces	330 (20.00)	325 (20.27)	5 (10.64)	
Other places in Hubei	342 (20.73)	336 (20.96)	6 (12.77)	
Wuhan	978 (59.27)	942 (58.76)	36 (76.60)	

Note: The results in the table are presented as n (%); the term 'infected college teachers' was defined as those who were diagnosed with COVID-19, and the term 'noninfected teachers' was defined as those who suffered home quarantine, social distancing, college closure, and anxiety during the COVID-19 outbreak.

Abbreviation: COVID-19, coronavirus disease 2019.

manifestation of trauma exposure was the death of a loved one from COVID-19. The survey revealed that 39 (2.36%) had family members or other relatives who died, and 73 (4.42%) had friends, colleagues, classmates or neighbours who died. The χ^2 test showed no significant difference between infected and noninfected teachers (χ^2 [2, N = 1650] = 3.39, p = 0.184). The third manifestation of trauma exposure was the risk of infection in different areas of the severity of the pandemic. Among all the teachers, 978 (59.27%) lived in Wuhan during the pandemic. Among all the infected teachers, 36 (76.60%) lived in Wuhan, the proportion of which was significantly higher than the proportion of those who lived in Wuhan among all the noninfected teachers (76.6 vs. 58.76%, χ^2 [2, N = 1650] = 6.05, p = 0.049).

3.2 | Trauma exposure and PTSD

Table 2 presents a descriptive analysis of PTSD and its three symptom categories, that is, intrusion, avoidance and hyperarousal. We calculated the proportion of participants with a PTSD score ≥1.5, that is, the incidence of PTSD (Creamer et al., 2003). The analysis showed that the overall incidence of PTSD among college teachers in Wuhan was high (24.55%), but the average level was low (M = 1.06, SD = 0.72). Among them, the level of intrusion symptom was slightly higher (M = 1.36, SD = 0.91), but the levels of avoidance symptom (M = 0.90, SD = 0.69) and hyperarousal symptom (M = 0.79, SD = 0.82) were lower. The results of ANOVA showed that there were significant differences in PTSD scores among college teachers in Wuhan in terms of their age cohort (F = 5.23, p = 0.001), highest degree (F = 4.94, p = 0.002), discipline of highest degree (F = 6.04, p = 0.014) and professional qualification title (F = 5.41, p = 0.001). The group differences in symptoms of intrusion, avoidance and hyperarousal were similar to those of PTSD.

The data analysis showed that the incidence of PTSD among college teachers infected with COVID-19 was as high as 46.81%; that is, nearly half of them had probable PTSD. Furthermore, even among people with a diagnosis of common influenza, or mild symptoms during the pandemic, the incidence of PTSD reached as high as 39.58%. The traumatic exposure caused by the death of a loved one from COVID-19 had a great impact. Among those who had family members or relatives who died of COVID-19, the incidence of PTSD reached as high as 48.72%, which was higher than among those who were infected with COVID-19 (46.81%). Similarly, the incidence of PTSD among those who had colleagues, friends, or neighbours who died of COVID-19 was as high as 45.21%. In contrast, the incidence among those who had no symptoms was 22.95% and no one died of COVID-19 was 22.73%. The living places during the pandemic had little effect on PTSD. Although Wuhan is a high-risk and severely affected area, the incidence of PTSD among teachers living in Wuhan during the pandemic was 26.28%, only slightly higher than the overall average.

ANOVA showed that a teacher's physical condition during the pandemic had a significant impact on their PTSD scores (F = 12.82, p < 0.001). Using Bonferroni correction, the PTSD scores of teachers infected with COVID-19 were significantly higher than those of teachers with no symptoms (M = 1.49, SD = 0.86 vs. M = 1.03, SD = 0.7, p < 0.001). In addition, the teachers infected with COVID-19 had higher intrusion (M = 1.91, SD = 1.1 vs. M = 1.31, SD = 0.89, p < 0.001), avoidance (M = 1.15, SD = 0.75 vs. M = 0.88, SD = 0.68, p = 0.049) and hyperarousal symptom scores (M = 1.23, SD = 1.01 vs. M = 0.76, SD = 0.8, p = 0.001) than did teachers with no symptoms. Among them, the intrusion symptom was the most significant, and its

TABLE 2 Psychological manifestations of college faculty

	PTSD score ≥1.5	PTSD		Intrusion		Avoidance		Hyperarousal	
		M ± *SD*	*p* Value	*M* ± *SD*	*p* Value	*M* ± *SD*	*p* Value	*M* ± *SD*	*p* Value
Total	24.55%	1.06 ± 0.72		1.36 ± 0.91		0.90 ± 0.69		0.79 ± 0.82	
Sociodemographic characteristics									
Gender			0.0553		0.0666		0.2795		0.0430
Male	23.77%	1.03 ± 0.72		1.31 ± 0.92		0.88 ± 0.70		0.75 ± 0.81	
Female	25.26%	1.10 ± 0.72		1.40 ± 0.91		0.92 ± 0.68		0.83 ± 0.84	
Age cohort			0.0014		0.0103		0.0004		0.0101
50 years old and above	27.31%	1.12 ± 0.78		1.37 ± 0.97		1.00 ± 0.74		0.86 ± 0.91	
40–49 years old	27.36%	1.13 ± 0.74		1.44 ± 0.95		0.96 ± 0.69		0.84 ± 0.87	
30–39 years old	23.97%	1.05 ± 0.71		1.34 ± 0.89		0.87 ± 0.68		0.79 ± 0.80	
29 years old and below	15.93%	0.90 ± 0.62		1.19 ± 0.81		0.76 ± 0.64		0.62 ± 0.64	
CCP membership			0.9029		0.7886		0.3440		0.3088
No	24.46%	1.07 ± 0.70		1.37 ± 0.91		0.93 ± 0.71		0.76 ± 0.78	
Yes	24.57%	1.06 ± 0.73		1.35 ± 0.92		0.89 ± 0.68		0.81 ± 0.84	
Graduation university			0.0020		0.0016		0.0104		0.0268
Domestic university	26.09%	1.11 ± 0.69		1.33 ± 0.96		1.04 ± 0.68		0.84 ± 0.77	
Overseas university	19.91%	0.92 ± 0.71		1.15 ± 0.90		0.82 ± 0.69		0.67 ± 0.81	
Highest degree	25.94%	1.12 ± 0.72		1.42 ± 0.91		0.95 ± 0.70		0.85 ± 0.83	
Junior bachelor	24.41%	1.04 ± 0.71		1.36 ± 0.92		0.85 ± 0.67		0.77 ± 0.82	
Bachelor			0.9762		0.7147		0.8942		0.3788
Master's	24.79%	1.06 ± 0.72		1.36 ± 0.92		0.90 ± 0.69		0.80 ± 0.83	
Doctor	20.95%	1.06 ± 0.68		1.39 ± 0.88		0.91 ± 0.69		0.73 ± 0.76	
Discipline of highest degree			0.0141		0.0229		0.0222		0.0689
Liberal arts	26.19%	1.11 ± 0.73		1.41 ± 0.93		0.94 ± 0.69		0.83 ± 0.84	
Science and engineering	23.09%	1.02 ± 0.71		1.31 ± 0.90		0.86 ± 0.68		0.76 ± 0.81	
University category			0.3207		0.1460		0.9496		0.4350
Province or city-affiliated university	23.69%	1.05 ± 0.72		1.33 ± 0.91		0.90 ± 0.68		0.78 ± 0.82	
State-affiliated university	26.20%	1.09 ± 0.73		1.40 ± 0.92		0.90 ± 0.70		0.82 ± 0.83	
Professional qualification title			0.0011		0.0028		0.0072		0.0065
Assistant lecturer	25.73%	1.06 ± 0.74		1.33 ± 0.98		0.93 ± 0.68		0.78 ± 0.84	
Lecturer	27.77%	1.15 ± 0.76		1.46 ± 0.95		0.95 ± 0.71		0.87 ± 0.90	
Associate professor	24.24%	1.03 ± 0.70		1.31 ± 0.88		0.88 ± 0.68		0.77 ± 0.80	
Professor	16.47%	0.95 ± 0.61		1.25 ± 0.82		0.78 ± 0.65		0.67 ± 0.64	
Concurrent administrative position			0.2753		0.1194		0.5732		0.7684
No	23.53%	1.05 ± 0.71		1.34 ± 0.89		0.89 ± 0.68		0.79 ± 0.81	
Yes	28.00%	1.10 ± 0.76		1.42 ± 0.98		0.92 ± 0.70		0.81 ± 0.87	
Province-level and above talent or expert title			0.6559		0.6228		0.9755		0.5651
No	24.16%	1.06 ± 0.72		1.35 ± 0.91		0.90 ± 0.69		0.79 ± 0.82	
Yes	30.61%	1.10 ± 0.74		1.40 ± 0.98		0.90 ± 0.69		0.84 ± 0.84	

TABLE 2 (Continued)

	PTSD score ≥1.5	PTSD		Intrusion		Avoidance		Hyperarousal	
		M ± *SD*	*p* Value	*M* ± *SD*	*p* Value	*M* ± *SD*	*p* Value	*M* ± *SD*	*p* Value
Type and severity of trauma exposure									
Physical condition during the pandemic			0.0000		0.0000		0.0132		0.0000
No symptom	22.89%	1.03 ± 0.70		1.31 ± 0.89		0.88 ± 0.68		0.76 ± 0.80	
Mild symptom	39.58%	1.41 ± 0.71		1.84 ± 0.91		1.01 ± 0.70		1.19 ± 0.96	
Confirmed common influenza	39.58%	1.34 ± 0.82		1.80 ± 1.13		1.05 ± 0.67		0.95 ± 0.97	
Confirmed COVID-19	46.81%	1.49 ± 0.86		1.91 ± 1.10		1.15 ± 0.75		1.23 ± 1.01	
A cared one died of COVID-19			0.0000		0.0000		0.0000		0.0000
None	22.95%	1.04 ± 0.70		1.32 ± 0.89		0.88 ± 0.67		0.76 ± 0.80	
Friends or neighbours	45.21%	1.51 ± 0.88		1.83 ± 1.09		1.26 ± 0.81		1.32 ± 1.01	
Family members or relatives	48.72%	1.35 ± 0.89		1.78 ± 1.09		1.04 ± 0.79		1.02 ± 1.08	
Living places during the pandemic			0.4114		0.4539		0.3715		0.2565
Other provinces	22.73%	1.06 ± 0.75		1.38 ± 0.95		0.86 ± 0.70		0.77 ± 0.87	
Other places in Hubei	21.35%	1.02 ± 0.67		1.30 ± 0.86		0.88 ± 0.69		0.74 ± 0.74	
Wuhan	26.28%	1.08 ± 0.73		1.37 ± 0.92		0.92 ± 0.68		0.82 ± 0.84	

Abbreviations: CCP, China Communist Party; COVID-19, coronavirus disease 2019; PTSD, posttraumatic stress disorder.

score was higher than 1.5, close to 2. There were also significant differences in PTSD incidence and its three symptom incidences between teachers with common influenza and mild symptoms and teachers without symptoms.

Whether a loved one died of COVID-19 had a significant impact on PTSD ($F = 18.82$, $p < 0.001$). Mean comparisons with Bonferroni correction showed that PTSD was significantly higher in those who had a family member or relative who died of COVID-19 than in those who had not ($M = 1.35$, $SD = 0.89$ vs. $M = 1.04$, $SD = 0.7$, $p = 0.022$). There were significant differences in intrusion symptoms ($M = 1.78$, $SD = 1.09$ vs. $M = 1.32$, $SD = 0.89$, $p = 0.006$), but no significant differences in avoidance symptoms ($M = 1.04$, $SD = 0.79$ vs. $M = 0.88$, $SD = 0.67$, $p = 0.446$) or hyperarousal symptoms ($M = 1.02$, $SD = 1.08$ vs. $M = 0.76$, $SD = 0.80$, $p = 0.158$) between these two groups. Those who had friends or neighbours who died of COVID-19 were significantly more likely to have PTSD ($M = 1.51$, $SD = 0.88$ vs. $M = 1.04$, $SD = 0.70$, $p < 0.001$) and its three symptoms, that is, intrusion ($M = 1.83$, $SD = 1.09$ vs. $M = 1.32$, $SD = 0.89$, $p < 0.001$), avoidance ($M = 1.26$, $SD = 0.81$ vs. $M = 0.88$, $SD = 0.67$, $p < 0.001$) and hyperarousal symptoms ($M = 1.32$, $SD = 1.01$ vs. $M = 0.76$, $SD = 0.80$, $p < 0.001$), than those who did not. In terms of the risk of infection, whether or not one was living in Wuhan during the pandemic had no significant impact on PTSD and its three symptoms.

3.3 | Prediction models

To further determine who is more likely to develop PTSD and the three groups of symptoms, samples with an average score of PTSD and the three groups of symptoms above 1.5 were assigned a value of 1, while the other samples were assigned a value of 0. Logistic regression model analysis was used. The results are shown in Table 3.

The regression results showed that traumatic exposure had a significant effect on PTSD. First, being ill during the pandemic can significantly increase the risk of PTSD. For those with mild symptoms, the ratio of PTSD was 1.993 (95% CI: [0.970, 4.094]); that is, compared with those without symptoms, the ratio of PTSD increased by 99%. The ratio for those with confirmed common influenza was 1.786 (95% CI: [0.921, 3.465]). For those with confirmed COVID-19, the ratio was much higher, up to 2.814 (95% CI: [1.542, 5.136]). Such results showed that the confirmation of COVID-19 infection increased the risk of PTSD by 181%, much higher than common influenza and no symptoms. The effect of the diagnosis of common influenza was not significant in the three specific symptoms. Mild symptoms increased the ratio of intrusion and hyperarousal symptoms by 150% and 130%, respectively. The conformation of COVID-19 infection increased the ratios of intrusion, avoidance and hyperarousal by 214%, 90%, and 269%, respectively.

Second, the death of a loved one from COVID-19 significantly increased the ratio of PTSD. The ratio of PTSD was 2.052 (95% CI: [0.992, 4.246]) for those who had friends, colleagues, classmates or neighbours died of COVID-19, 105% higher than those who had no one who died. For those who had family members or relatives who died of COVID-19, the ratio was 5.592 (95% CI: [2.271, 13.766]), 459% higher than those who had no one who died. Models 2, 3, and 4 showed that the death of friends or neighbours had a significant effect on intrusion, avoidance and alertness symptoms, with ratio increases of 151%, 170%, and 193%, respectively. However, the death

TABLE 3 .Logistic regression analysis

Dependent variables	Model 1 PTSD	Model 2 Intrusion	Model 3 Avoidance	Model 4 Hyperarousal
Type and severity of trauma exposure				
Physical condition during the pandemic (no symptoms = 0)				
Mild symptom = 1	1.993* [0.970, 4.094]	2.501** [1.215, 5.149]	1.017 [0.454, 2.281]	2.301** [1.071, 4.941]
Confirmed common influenza = 2	1.786* [0.921, 3.465]	1.580 [0.859, 2.906]	1.375 [0.645, 2.932]	1.449 [0.670, 3.134]
Confirmed COVID-19 = 3	2.814*** [1.542, 5.136]	3.138*** [1.677, 5.871]	1.914* [0.979, 3.742]	3.686*** [1.961 ,6.927]
A cared one died of COVID-19 (none = 0)				
Friends or neighbours = 1	2.052* [0.992, 4.246]	2.505*** [1.461, 4.296]	2.698*** [1.280, 5.686]	2.926*** [1.305, 6.561]
Family member or relatives = 2	5.592*** [2.271, 13.766]	4.536*** [1.868, 11.012]	1.262 [0.315, 5.052]	1.546 [0.535, 4.472]
Living places during the pandemic (other provinces = 0)				
Other places in Hubei = 1	0.695 [0.385, 1.257]	0.649* [0.397, 1.060]	1.078 [0.569, 2.040]	0.969 [0.492, 1.911]
Wuhan = 2	1.112 [0.732, 1.691]	0.862 [0.603, 1.232]	1.993** [1.175, 3.380]	1.195 [0.747, 1.914]
Sociodemographic characteristics				
Gender (male = 0)	1.402* [0.966, 2.034]	1.069 [0.769, 1.488]	1.590** [1.041, 2.427]	1.292 [0.861, 1.940]
Age cohort (50 years old or more = 0)				
40–59 years old = 1	0.620 [0.339, 1.133]	0.767 [0.444, 1.325]	0.844 [0.381, 1.873]	0.437** [0.230, 0.831]
30–39 years old = 2	0.453** [0.220, 0.930]	0.628 [0.331, 1.190]	0.578 [0.234, 1.428]	0.370*** [0.179, 0.767]
29 years old or less = 3	0.326** [0.123, 0.864]	0.663 [0.272, 1.617]	0.336* [0.110, 1.030]	0.282** [0.096, 0.827]
CCP membership (No = 0)	1.694** [1.080, 2.656]	1.448* [0.984, 2.131]	1.109 [0.670, 1.837]	2.124*** [1.205, 3.742]
Highest degree (junior bachelor = 0)				
Bachelor = 1	0.268 [0.040, 1.776]	0.300 [0.053, 1.707]	0.382 [0.056, 2.582]	0.0639** [0.007, 0.625]
Master's = 2	0.465 [0.076, 2.864]	0.653 [0.126, 3.376]	0.669 [0.107, 4.196]	0.390 [0.042, 3.608]
Doctor = 3	0.401 [0.063, 2.562]	0.664 [0.124, 3.538]	0.451 [0.068, 2.990]	0.276 [0.030, 2.536]
Graduation university (domestic university = 0)	0.863 [0.386, 1.925]	0.810 [0.381, 1.724]	1.032 [0.435, 2.446]	1.380 [0.554, 3.442]
Discipline of highest degree (science and engineering = 0)	1.378 [0.932, 2.039]	1.365* [0.985, 1.891]	1.131 [0.721, 1.775]	1.013 [0.649, 1.580]
University category (province or city-affiliated university = 0)	1.089 [0.694, 1.706]	0.925 [0.636, 1.347]	1.238 [0.745, 2.060]	0.822 [0.507, 1.331]
Professional qualification title (assistant lecturer = 0)				
Lecturer = 1	1.423 [0.688, 2.942]	1.413 [0.746, 2.678]	0.826 [0.351, 1.943]	1.973* [0.955, 4.077]
Associate professor = 2	1.512 [0.701, 3.262]	1.450 [0.738, 2.849]	0.733 [0.296, 1.817]	3.036*** [1.368, 6.738]
Professor = 3	1.159 [0.420, 3.196]	0.962 [0.401, 2.307]	0.712 [0.212, 2.388]	1.862 [0.654, 5.306]
Concurrent administrative position (No = 0)	1.000 [0.667, 1.498]	0.934 [0.639, 1.366]	1.008 [0.643, 1.581]	0.822 [0.514, 1.314]
Province-level and above talents or expert title (No = 0)	1.603 [0.653, 3.934]	1.244 [0.544, 2.845]	0.568 [0.190, 1.694]	1.547 [0.709, 3.376]
N	1650	1650	1650	1650
Pseudo R^2	0.113	0.082	0.075	0.151

Note: Odds ratio [95% confidence intervals].

Abbreviations: CCP, China Communist Party; COVID-19, coronavirus disease 2019; PTSD, posttraumatic stress disorder.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

of a family member or relative only had a significant impact on intrusion symptoms, with a 354% increase in ratio.

Finally, the regression analysis showed that the living places during the pandemic had no significant effect on PTSD. Living in severely affected Wuhan during the pandemic did not significantly increase the ratio of PTSD. Among the three specific symptoms, only the ratio of avoidance symptoms was 99% for those living in Wuhan compared with those living in other provinces. In contrast, the ratio of intrusion for those living in other places of Hubei was 65% higher than those living in other provinces.

Among the control variables, the ratio of PTSD showed significant differences in terms of gender, age cohort and CCP membership. Specifically, the ratio of PTSD in women was 40% higher than in men, and the ratio of avoidance symptom in women was nearly 60% higher than in men. Teachers who were born after 1980 had a 50% lower ratio of PTSD than did those who were born before 1980. In terms of specific symptoms, there was no significant age cohort difference in the ratio of intrusion symptom. The ratio of hyperarousal symptom was significantly higher in teachers who were born before 1970. Finally, notably, compared with non-CCP members, the ratio of PTSD in CCP members was 1.7 times higher, the ratio of intrusion was 1.4 times higher, and hyperarousal symptom was 2.1 times higher than in non-CCP members. This suggests that CCP members suffered more psychological stress, which resulted in higher PTSD during the pandemic.

4 | DISCUSSION

4.1 | The prevalence of PTSD

In this study, CIES-R was used to measure the PTSD of college teachers in Wuhan 1 month after the lockdown was lifted. The results showed that approximately 1/4 of college teachers in Wuhan developed PTSD, but the level of PTSD was low. Why the prevalence of PTSD is high while the level of PTSD is low? One possible reason is that although the COVID-19 pandemic deteriorated rapidly in mid to late January 2020, Wuhan was locked down before the large-scale spread happened and the first home quarantine order across the nation was implemented (from 23 January 2020 to the end of March); therefore, the infection rate was relatively low, and the pandemic had no direct impact on the vast majority of people indicated by infection diagnosis. In addition, this time period happened to coincide with the Chinese traditional Lunar New Year holidays (from 23 January 2020 to 30 January), and family reunion and companionship provided psychological support among family members. In addition, the support for Wuhan to fight the COVID-19 in various ways and forms across the nation enabled Wuhan citizens, including college teachers, to receive support including medical resources and services, living materials, and psychological and emotional supports. This conclusion was supported by the fact that the type of living places during a pandemic had no significant effect on PTSD.

4.2 | Trauma exposure and PTSD

The study found that confirmed COVID-19 and the death of a loved one from COVID-19, had direct and significant effects on PTSD. The incidence of PTSD in teachers who were diagnosed with COVID-19 was 2.8 times higher than in those without symptoms, and about twice higher than those with confirmed influenza and mild symptoms. At the same time, the incidences of intrusion, avoidance and hyperarousal symptoms in the teachers with confirmed COVID-19 were significantly higher than those in teachers with no symptoms. Thus, COVID-19 not only harmed patients physically but also had a significant negative impact on their mental health. From January to June 2020, the global COVID-19 confirmed population continued to grow rapidly, while the effective control of the pandemic remains elusive (Kissler et al., 2020). The large number of confirmed cases worldwide makes these conclusions of great practical significance. Public health should focus on not only COVID-19 infection and physical care but also psychological trauma and care.

It is important to note that the diagnosis of common influenza and mild symptoms were also associated with a high incidence of PTSD, and mild symptoms were even associated with a higher incidence of PTSD. Compared with those with confirmed common influenza, patients with mild symptoms during the pandemic not only had significantly higher incidence of PTSD, but they also had higher incidences of intrusion and hyperarousal symptoms. Why is this happening? We believe that the 'high degree of uncertainty' faced by people during the pandemic is an important reason. In the early stage of the COVID-19 pandemic in Wuhan, (1) the rapid deterioration and the widespread susceptibility to COVID-19 among people caught the public off-guard; (2) medical resources were seriously insufficient and the detection capacity was severely limited, which made it difficult for people with respiratory symptoms to be quickly diagnosed; (3) There is a lack of effective drugs, and the medical community does not understand the pathogenesis and disease transformation mechanism of COVID-19, such that confirmed patients are always at risk of death and (4) Because of the absence of effective isolation and protection, for undiagnosed patients with respiratory symptoms, there is always the possibility of transmitting virus to their family members and others, thereby causing greater social and psychological stress. Thus, the psychological stress of patients with undiagnosed mild symptoms is significantly much higher than that of patients with diagnosed common influenza, associated with a higher incidence of PTSD and higher incidence of intrusion and hyperarousal symptoms.

The death of a loved one from COVID-19 was also associated with higher levels of PTSD and three groups of symptoms. As of 20 June 2020, 460,545 people have died from COVID-19 globally, with a confirmed mortality rate of 5.3%; however, some countries have a confirmed mortality rate of more than 10%, and the mortality rates in Belgium and France were even higher (Johns Hopkins Coronavirus Resource Center, 2020). Since there is still a lack effective drugs for treatment, the mortality rate cannot be effectively reduced in the short term, which means that more people will die from COVID-19

worldwide, and more people will suffer psychological trauma due to the death of a loved one. Nevertheless, the impact of the death of a family member or relative was different from that of a friend or neighbour. The death of a family member or relative was associated with a higher incidence of PTSD and intrusion symptom, while the death of a friend or neighbour was associated with a lower incidence of PTSD, but with higher incidences of avoidance and hyperarousal symptoms. This may be because in the isolation situation during the pandemic, people can be informed of the diagnosis of a friend or neighbour but cannot provide direct help under the virus threat and the quarantine measures. People may therefore feel self-reproach or guilt, especially when a friend or neighbour dies. This kind of self-reproach and guilt may become more serious, leading to higher levels of avoidance symptoms. At the same time, when a friend or neighbour is diagnosed with COVID-19 and eventually dies, it may make people feel the threat of the spread of the virus more directly, which then brings greater psychological stress and produces a higher incidence of hyperarousal symptoms.

This study showed that whether or not one was living in a severely affected area as in Wuhan during the pandemic had no significant effect on PTSD. The reason may be that, shortly after the outbreak, China implemented home quarantine measures across the nation. At the same time, people mainly acquired pandemic information via the Internet instantly and transparently, and there was no significant difference for people living in or out of Wuhan; thus, there was no significant difference in incidence of PTSD.

4.3 | Other factors

The analysis showed that teachers who were CCP members had a higher incidence of PTSD than those who were not. This may be because they had a higher risk of virus infection. Between February and March 2020, when the pandemic was most severe, most CCP member teachers in Wuhan were required or mobilised to 'sink into urban communities'[2] to undertake pandemic prevention and control tasks or serve as volunteers for residents' lives, which increased their personal and family risk of infection. At the same time, teachers working in the community may experience tremendous psychological stress due to hearing and seeing more infected patients and other COVID-19-related events such as death. This was similar to the mechanism of PTSD produced by groups such as humanitarian rescuers and disaster relief workers (Connorton et al., 2012; Eriksson et al., 2001). In other words, being on the front line of pandemic prevention and control is a traumatic exposure that can easily lead to PTSD.

4.4 | Implications and limitations

As for how to reduce the negative impact of COVID-19 pandemic on people's mental health, this study had several important implications. First, during pandemic prevention and control, home quarantine should be encouraged and family reunion should be implemented to overcome difficulties together. Second, concentrated isolation should be implemented for suspected patients to alleviate the risk and psychological stress caused by internal infection among family members. Third, the ability of diagnosis and detection should be improved, and the uncertainty caused by the difficulty of diagnosis should be reduced. Fourth, necessary grief counselling and even grief treatment for those who lost family members, friends and neighbours to COVID-19 should be provided.

Some limitations of this study should be noted. First, this study adopted a cross-sectional design. It cannot clearly describe the time-varying trends of the relationship between variables, and it cannot confirm causal relationships across time. Therefore, it is difficult to effectively discuss the long-term mechanism of PTSD. Future studies should examine the relationships between the time-varying trends of the relationship of trauma exposure and PTSD over time and the long-term mechanisms of PTSD through the design of longitudinal studies. Second, due to the limitations of pandemic prevention and control, an online self-reported survey was adopted in this study; absence of on-site guidance from investigators may have affected the psychological assessment measurements.

5 | CONCLUSION

The COVID-19 pandemic resulted in a high incidence of PTSD (24.55%) among college teachers in Wuhan, but the average level was low ($M = 1.06$, $SD = 0.72$). There were significant differences in PTSD and three groups of symptoms in terms of age cohort, highest degree, discipline of highest degree, and professional qualification title. During the COVID-19 pandemic, two types of trauma exposure—confirmed COVID-19 of teachers and death of a loved one from COVID-19—had significant impact on PTSD. Those diagnosed with COVID-19 were 2.8 times more likely to develop PTSD than those without symptoms. Mild symptoms significantly increased the incidence of intrusion and hyperarousal symptoms. The death of a family member or relative was associated with a higher incidence of PTSD and intrusion symptoms, while the death of a friend or neighbour was associated with a lower incidence of PTSD but a higher incidence of avoidance and hyperarousal symptoms. The above results indicate that the prevalence of PTSD of college teachers is higher in the areas with more severe pandemic. Mental health services which integrate individual, close-relationship, and distant social factors to reduce PTSD should be provided. Teachers with confirmed COVID-19, mild symptoms or loss loved ones to COVID-19 should be given particular care.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

Ping Fu proposed the project, presided over the survey and data collection, proposed the research topic of the present study, had the full access to the data involved, and was responsible for the integrity of data. Changyu Fan designed the survey sampling, undertook the statistical analysis, wrote the draft of the manuscript, made revisions and answered all the questions of the anonymous reviewers. Xueyan Li managed the literature searches and analyses, participate in manuscript revision. Min Li and Miao Zhu answered all the questions of the anonymous reviewers. All authors took part in data collection, analysis and interpretation, contributed to and have approved the final manuscript. All authors have read and agreed to the published version of the manuscript.

DATA AVAILABILITY STATEMENT

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

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ENDNOTES

[1] State-affiliated university refers to higher education institution mainly funded by Chinese central government and administered directly by the Ministry of Education, while province or city-affiliated university funded by Chinese local governments and administered by local education departments.

[2] Sinking' is an image term. During the COVID-19 pandemic, the Chinese government requires party members and cadres of higher-level administrative units to participate in pandemic prevention and control and provide services to the grassroots communities.

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