BMJ Open

Prevalence and risk factors of worry among teachers during the COVID-19 epidemic in Henan, China: a cross-sectional survey

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ABSTRACT

Objective To evaluate the level of worry and its influencing factors during the COVID-19 epidemic among teachers in Henan Province in China.

Study design A cross-sectional study was conducted.

Methods We designed a cross-sectional survey that included 88 611 teachers from three cities in Henan Province, China between 4 February 2020 and 12 February 2020. Level of worry was measured using a five-item Likert scale, with 1 being 'not worried' and 5 being 'very worried'. The OR and 95% CI of potential influencing factors for level of worry among study participants were estimated using ordinal logistic regression models.

Results About 59% of teachers reported being 'very worried' about the COVID-19 epidemic. The proportion of female teachers was higher than of male teachers (60.33% vs 52.89%). In all age groups considered in this study, a 'very worried' condition accounted for the highest proportion. The age group 40–49 years had the lowest proportion of participants who were very worried, 52.34% of whom were men and 58.62% were women. After controlling for potential confounding factors, age, education level, type of teacher, school location, attention level, fear level, anxiety level and behaviour status were all related to level of worry (all p<0.05).

Conclusion During the COVID-19 epidemic, there was a high proportion of teachers who were 'very worried' about the situation in Henan Province, China. Our study may remind policymakers to consider factors including age, educational status, type of teacher, school location, source of information on COVID-19, attention level, anxiety level, fear level and behaviour status to alleviate worry.

INTRODUCTION

Since the first cluster of cases was identified in China in December 2019, COVID-19 has continued to pose public health attention around the country.[1–3] With its highly contagious characteristics, containment of COVID-19 requires joint and comprehensive measures, including city lockdowns, proper hygiene practices and social distancing. Since then, the Chinese government has been imposing strict health policies and strategies

Strengths and limitations of this study

► The study has a large sample size.
► The study was able to recruit a representative population of highly educated urban and rural teachers to ensure data quality to some degree.
► Ordinal logistic regression model was used to conduct a more effective statistical analysis of data.
► Due to the cross-sectional nature of the study, we were unable to determine trends in the level of 'worry' among teachers at different stages of the COVID-19 epidemic and to make any inferences about causality.

to mitigate the propagation of new infections.[4] However, it did not only incur substantial losses to the global economy and trade, but also posed great challenges to medical and health services supply.[5] Epidemics may induce panic to the general public.[6] In these times of uncertainty, people are worried not only about the epidemic, but also about income, employment and other factors that have direct effects on survival and life due to changes in the working environment during lockdowns.

Worry is a form of repetitive thinking that involves negative thoughts about future events and is regarded as a major source of anxiety.[7] A study investigating the sociocultural features of the influenza pandemic showed that worry towards influenza was the most commonly reported symptom across various sociocultural populations.[8] We think that the level of worry plays an important role in public health, especially when coupled with the epidemic situation of a fast-spreading infectious disease. Strengthening public awareness of the relationship between worry status and the ongoing epidemic may aid in the development of effective management and preventive measures.[9] Baiano *et*

al[10] proposed that mindfulness-based interventions that improve the ability to focus on the present moment could be a valuable approach to supporting individuals who experience worry and fear related to the COVID-19 outbreak. Based on a cross-sectional survey of 2007 participants, Ho et al[11] discovered that information explored from the academia may help facilitate public education and reduce public worry in cases of infectious disease outbreaks. In addition, Wahlund et al[12] introduced a brief digital and easily scalable self-guided psychological intervention that can significantly reduce dysfunctional worry and the associated behavioural symptoms related to the COVID-19 pandemic.

Henan Province, which borders Hubei Province, has a population of more than 100 million, with a high level of resident mobility. As of 17 June 2020, Henan Province has a total of 1273 confirmed cases, with a cumulative incidence rate of 1.32 per 100 000, which was higher than in other provinces and cities outside Hubei and closely related to the geographical location of Henan Province.[13 14] The COVID-19 epidemic has had a negative impact on the global educational system, particularly when school closure policies were implemented.[15] As soon as the epidemic broke out, all cities in Henan Province took emergency measures such as closing of schools.[14] In this scenario, teachers' health may be of concern due to the reported high incidence of occupational stress following the closure of schools in response to the epidemic.[16] There has not been a lot of research on teachers' worry status; however, many previous studies have focused on teachers' anxiety and its effects during COVID-19. According to Li et al,[17] improper wearing of mask is an important factor that contributes to an increase in anxiety during the epidemic. A recent study from Arab countries indicates that the epidemic has caused anxiety among teachers, restricting their ability to teach properly.[18] Moreover, it has been shown that indoor physical activity prevents anxiety and depression during lockdowns.[19] Worry, rather than anxiety, appears to be more prevalent in previous studies.[20] Teachers at all levels of education may be 'worried'about the ongoing COVID-19 epidemic. As a result, we believe that a timely understanding of worry status in this population is critical.

The current study aimed to assess teachers' level of worry and identify its potential risk factors in Henan, China during the COVID-19 epidemic. Moreover, since gender differences have been reported as among the predisposing factors of worry, anxiety and emotional distress, with women being more worried,[21] anxious[22] and at higher risk of emotional distress compared with men,[23] here we also looked at possible sex differences in the psychological response to quarantines.[10] Findings of this study may aid in informing and alerting government agencies and healthcare professionals on the general mental health status among populations and help plan ahead proper strategies to face future epidemics.

METHODS

Study design

We designed a cross-sectional survey using an online platform ('SurveyStar', Changsha RanXing Science and Technology, Shanghai, China) and developed an anonymous online questionnaire to assess demographic characteristics, knowledge, attention, behaviour, mental state and other factors related to COVID-19 among the participants.

Setting

To estimate level of worry during the COVID-19 epidemic, we implemented this study using a questionnaire link which was sent to the respondents through social media ('WeChat', Tencent, Shenzhen, China). We recruited teachers, including primary, junior, high school and university teachers, aged ≥18 years residing in Zhengzhou, Xinyang and Xinxiang City of Henan Province, China during 4 February 2020 and 12 February 2020.

Participants and sample size

Sample size was calculated using the formula $N = z^2 * p(1-p)/d^2$ in the epidemiological cross-sectional survey, where p=0.59, z=1.96 and d=0.05. A minimum sample of 372 teachers was required for this study. We eventually enrolled 88 611 teachers (including 243 retired teachers; the retirement age of teachers in China is over 60 years) from a total population of 93 518 after excluding participants who spent less than 100 s answering the questions completely and those younger than 18 years (n=4907).

Intraclass correlation coefficient for the test–retest reliability of the self-made questionnaire used was 0.81.[24] The weighted kappa that was conducted to assess agreement between test and retest showed a substantial agreement of 0.73 between the two occasions of answering the self-made questions.[25]

All participants consented for participation in this study.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

Data sources

Participants were asked to provide information about their age, sex, marital status, education level, knowledge about COVID-19, behaviour status, attention level, mental state including worry, fear and anxiety, and other factors including teachers' category and school location. Sources of information on COVID-19 were classified as independent learning (including tools such as WeChat/Weibo and television/radio), structured learning (including tools such as documents issued by the government or schools) and mixed learning (including independent and structured learning). Teachers' levels of attention, fear and anxiety towards the epidemic were classified into high, moderate and low. Parameters used to examine participants' behaviour included 'wearing a mask', 'frequency

of hand washing', 'frequency of going outdoor' and 'spring festival travel plans'. Participants' behaviour was classified as 'high' if they correctly answered all of the questions in this session and as 'moderate' if they only got a portion of the answers correct. If participants got all incorrect answers in this session, their behaviour status was considered 'low'.

The Generalized Anxiety Disorder (GAD-7) tool was used to assess anxiety. The tool has a sensitivity of 89% and a specificity of 82%. A score of 10 or higher was thought to be a reasonable cut point for identifying cases. Cut points of 5, 10 and 15 on GAD-7 may be interpreted as mild, moderate and severe level of anxiety, respectively.[26]

The level of worry of teachers during the COVID-19 epidemic in China was assessed by the question 'How worried are you on the novel coronavirus infection?' and their responses were scored on a 5-item Likert scale: 1=not worried, 2=not too worried, 3=generally worried, 4=more worried and 5=very worried.

Statistical methods

Pearson χ^2 test was used to test for differences among categorical variables, while analysis of variance was applied for continuous variables. We developed ordinal logistic regression models for risk factors. The adjusted model was controlled by age, educational status, type of teacher, school location, marital status, information source, attention level, anxiety level, fear level and behaviour status.

All analyses were performed using SAS V.9.4 and STATA V.14. All statistical tests were two-sided, with p<0.05 considered statistically significant.

RESULTS
Characteristics of the participants

Among the 88611 teachers, more than half (58.61%) expressed a 'very worried' condition during the outbreak of COVID-19 in China, 10881 (52.89%) of whom were male teachers and 41126 (60.33%) were female teachers. The mean age of the participants was 36 (SD=9) years, ranging from 18 to 79 years. The overall mean score for level of worry among the study participants was 4.47 (SD=0.74). We found different levels of worry by age, educational status, type of teacher, school location, marital status, attention level, information source, anxiety level, fear level and behaviour status (all p<0.0001). Details of the characteristics of the participants stratified by level of worry are shown in table 1.

Level of worry by age group

During the COVID-19 epidemic in China, teachers generally had a high level of worry, with 91.16% being either 'very worried' or 'more worried'. Figure 1 shows the different proportions of level of worry between male and female teachers by age and categories of worry. Gender and age group were found to be consistent in all levels of worry, showing that a 'very worried' status accounted for the highest proportion in all age groups, with 52.77%,

53.22%, 52.34% and 53.31% in the 18–29 years, 30–39 years, 40–49 years and ≥50 years among male age groups, respectively, and 60.70%, 61.04%, 58.62% and 59.54% in the 18–29 years, 30–39 years, 40–49 years and ≥50 years among female age groups, respectively. Furthermore, about 33% of male and 32% of female teachers were 'more worried'. We found a small proportion of teachers who were not worried (1.36% male vs 0.44% female) about the ongoing epidemic across all age groups. Teachers in the age group 40–49 years were shown to have the lowest proportion of 'very worried' condition, of whom 52.34% (SE 0.60%) were male and 58.62% (SE 0.41%) were female.

Risk factors of level of worry among male teachers

Adjusted analyses show that male teachers aged between 18 and 29 were more likely to have a higher level of worry compared with all other age groups. This study also found that teachers with college education were more likely to report having a higher level of worry compared with those of other educational status, such as bachelor's and master's degree. However, participants in the 'others' category (ie, no college, bachelor's or master's education) had higher odds of suffering from a higher level of worry (OR 1.33, 95% CI 1.11 to 1.59). Compared with primary school teachers, junior high school (OR 0.82, 95% CI 0.76 to 0.88) and senior high school (OR 0.85, 95% CI 0.79 to 0.92) teachers were less likely to suffer from a higher level of worry. Similarly, teachers from county-level urban and rural schools had 21% (OR 0.79, 95% CI 0.74 to 0.85) and 16% (OR 0.84, 95% CI 0.77 to 0.90) less odds of having a higher level of worry compared with those residing in urban areas. Teachers with a moderate level of attention towards the epidemic were 70% (OR 0.30, 95% CI 0.21 to 0.43) less likely to have a higher level of worry. Teachers with moderate level of fear (OR 0.05, 95% CI 0.05 to 0.07) and low level/no fear (OR 0.01, 95% CI 0.01 to 0.02) had a strong protective effect of keeping a lower level of worry than those with a high level of fear. Similarly, teachers with low level/no anxiety were also less likely (OR 0.46, 95% CI 0.37 to 0.58) to be very worried compared with those with a high level of anxiety. Teachers who did not execute proper behaviours were less likely (OR 0.92, 95% CI 0.85 to 0.99) to suffer from a higher level of worry about the epidemic situation compared with those who showed proper healthy behaviours. Detailed information is shown in table 2.

### Risk factors of level of worry among female teachers

Adjusted analyses show that female teachers aged between 30 and 39 years (OR 0.92, 95% CI 0.88 to 0.97) and between 40 and 49 years (OR 0.90, 95% CI 0.85 to 0.95) had lower odds and were less likely to suffer from a higher level of worry compared with the lowest age group (18–29 years). This study also found that teachers with college education were more likely to report having a higher level of worry compared with those of other educational status, such as bachelor's and master's degree. However,

Table 1 Characteristics of study participants by level of worry

Characteristics	Not worried n=578	Not too worried n=1253	Generally worried n=5999	More worried n=28844	Very worried n=51937	P value
Age (years)	40.30±9.57	40.08±9.21	37.08±9.02	36.20±9.03	36.00±8.97	<0.0001
Sex (%)						<0.0001
Male	277 (47.92)	528 (42.14)	1938 (32.31)	6888 (23.88)	10811 (20.82)	
Female	301 (52.08)	725 (57.86)	4061 (67.69)	21956 (76.12)	41126 (79.18)	
Educational status (%)						<0.0001
College	192 (33.22)	344 (27.45)	1392 (23.20)	5794 (20.09)	12747 (24.54)	
Bachelor's	317 (54.84)	792 (63.21)	3976 (66.28)	19853 (68.83)	32616 (62.80)	
Master's	32 (5.54)	52 (4.15)	380 (6.33)	2191 (7.60)	3241 (6.24)	
Others	37 (6.40)	65 (5.19)	251 (4.18)	1006 (3.49)	3333 (6.42)	
Type of teacher (%)						<0.0001
Primary school teacher	321 (55.54)	650 (51.88)	3155 (52.59)	15112 (52.39)	31213 (60.10)	
Junior school teacher	160 (27.68)	356 (28.41)	1713 (28.55)	8442 (29.27)	12952 (24.94)	
High school teacher	73 (12.63)	219 (17.48)	1022 (17.04)	4759 (16.50)	6932 (13.35)	
University teacher	24 (4.15)	28 (2.23)	109 (1.82)	531 (1.84)	840 (1.62)	
School location (%)						<0.0001
Urban	164 (28.37)	425 (33.92)	2004 (33.41)	11492 (39.84)	20962 (40.36)	
County-level urban	238 (41.18)	491 (39.19)	2284 (38.07)	9500 (32.94)	18120 (34.89)	
Rural	176 (30.45)	337 (26.90)	1711 (28.52)	7852 (27.22)	128559 (24.75)	
Marital status (%)						<0.0001
Married	66 (11.42)	140 (11.17)	1069 (17.82)	5909 (20.49)	9551 (18.39)	
Unmarried	485 (83.91)	1073 (85.63)	4802 (80.05)	22400 (77.66)	41396 (79.70)	
Widowed	8 (1.38)	5 (0.40)	25 (0.42)	88 (0.31)	178 (0.34)	
Divorced	19 (3.29)	35 (2.79)	103 (1.72)	447 (1.55)	812 (1.56)	
Information source (%)						<0.0001
Independent learning	19 (3.32)	57 (4.57)	355 (5.94)	1756 (6.11)	3396 (6.56)	
Structured learning	19 (3.32)	21 (1.68)	84 (1.41)	276 (0.96)	642 (1.24)	
Mixed learning	535 (93.37)	1169 (93.74)	5538 (92.66)	26725 (92.93)	47749 (92.20)	
Attention level (%)						<0.0001
High	561 (97.06)	1277 (97.92)	5842 (97.38)	28702 (99.51)	51814 (99.76)	
Moderate	6 (1.04)	18 (1.44)	149 (2.48)	128 (0.44)	93 (0.18)	
Low	11 (1.90)	8 (0.64)	8 (0.13)	14 (0.05)	30 (0.06)	
Fear level (%)						<0.0001
High	8 (2.60)	14 (1.22)	34 (0.58)	619 (2.16)	21597 (41.87)	
Moderate	21 (6.82)	32 (2.79)	289 (4.91)	15975 (55.69)	21869 (42.40)	
Low/none	279 (90.58)	1099 (95.98)	5562 (94.51)	12094 (42.16)	8110 (15.72)	
Anxiety level (%)						<0.0001
High	11 (1.90)	7 (0.56)	35 (0.58)	245 (0.85)	3555 (6.84)	
Moderate	9 (1.56)	16 (1.28)	73 (1.22)	1216 (4.22)	6943 (13.37)	
Low/none	558 (96.54)	1230 (98.16)	5891 (98.20)	27383 (94.93)	41439 (79.79)	
Behaviour status (%)						<0.0001
High	432 (75.13)	981 (78.29)	4692 (78.21)	23605 (81.84)	42558 (81.94)	
Moderate	139 (24.17)	271 (21.63)	1302 (21.70)	5232 (18.14)	9373 (18.05)	
Low	4 (0.70)	1 (0.08)	5 (0.08)	7 (0.02)	6 (0.01)	

Data are mean (SD) or number (percentage).
P value is from analysis of variance test or χ^2 test for continuous variables and categorical variables.
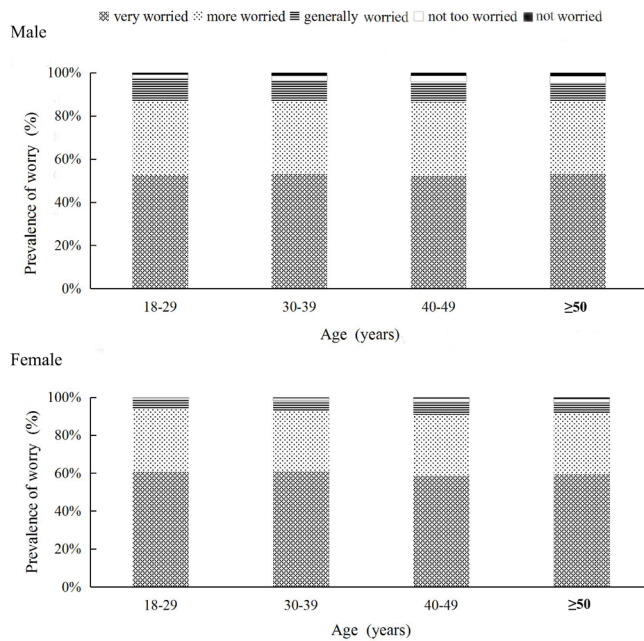
Figure 1 Proportion of level of worry among teachers stratified by sex during the COVID-19 epidemic in China based on age groups.

participants in the 'others' category (ie, no college, bachelor's or master's education) had higher odds of suffering from a higher level of worry (OR 1.11, 95% CI 1.02 to 1.22). Compared with primary school teachers, junior school (OR 0.85, 95% CI 0.81 to 0.88) and high school (OR 0.84, 95% CI 0.80 to 0.89) teachers had lower odds and were less likely to suffer from a higher level of worry. Similarly, teachers from county-level urban and rural schools had 9% (OR 0.91, 95% CI 0.87 to 0.95) and 14% (OR 0.86, 95% CI 0.83 to 0.90) less odds of suffering from a higher level of worry compared with those residing in urban areas. Teachers with a moderate level of attention (OR 0.20, 95% CI 0.16 to 0.25) and low level/no attention (OR 0.41, 95% CI 0.21 to 0.78) had about 80% and 60% less odds of suffering from a higher level of worry. Teachers with moderate level of anxiety (OR 0.64, 95% CI 0.53 to 0.76) and low level/no anxiety (OR 0.31, 95% CI 0.26 to 0.36) were also less likely to encounter a very worried condition compared with those with a high level of anxiety. Similarly, teachers with moderate level of fear (OR 0.05, 95% CI 0.05 to 0.06) and low level/no fear (OR 0.01, 95% CI 0.01 to 0.01) had a strong protective effect of keeping a lower level of worry than those with a high level of fear. Teachers who did not execute proper behaviours were less likely (OR 0.94, 95% CI 0.90 to 0.99) to be very worried about the epidemic situation compared with those who showed proper healthy behaviours. Detailed information is shown in table 3.

DISCUSSION

This study aimed to investigate the level of worry among teachers by gender during the COVID-19 epidemic and its influencing factors in Henan, China, and hence

provide reference for policymakers. In the context of the epidemic, we found that the level of worry among teachers was not encouraging, with only 0.65% of teachers reporting being not worried and 58.61% and 32.55% of teachers reporting being very worried and more worried about the epidemic, respectively, suggesting that the epidemic had imposed a significant amount of worry. Furthermore, age, educational status, type of teacher, school location, attention level, anxiety level, fear level and behaviour status were associated with worry.

The ongoing COVID-19 epidemic made everyone worried about becoming infected. This worried condition is also fuelled by fear of lack of sufficient medical resources and financial crisis.[11 17 27–29] Our findings are consistent with previous research showing that male participants reported less worry than female participants.[30] Caroppo et al[31] found gender differences in the response to lockdowns in a study published not long ago on the unequal effects of the national lockdown on mental and social health in Italy. In this study, female teachers are more likely to be worried, which may be related to their sensitivity to psychological stress and the higher perceived susceptibility, resulting in increased disease-related worries.[32 33] The older age is associated with lower level of worry, which is similar to previous studies showing that older adults exhibit less worry and fewer post-traumatic stress disorder symptoms following natural disasters and terrorist attacks.[34 35] This may be due to older adults possessing superior emotion regulation and coping strategies.[36]

We also found that educational status and type of teacher correlated with level of worry, which was similar to the results of a study showing that teachers of higher educational status experience less psychological problems than those of lower educational status.[37] University teachers also represent teachers of higher educational status to a large extent in China. School location was also a factor affecting teachers' levels of worry, which may be related to the regional differences in the number of confirmed COVID-19 cases, where there were more cases in urban than in rural areas.[38] In the survey area of this study, patients are immediately isolated in a special city hospital for isolation and treatment if confirmed positive. Urban school teachers seemed to be affected when there are cases in their area, and to some extent would worry and hesitate to seek medical attention.[39 40]

According to reports of the National Mental Health Development in China (2017–2018), the mental health of teachers is declining annually. Studies show that the mental health condition of Chinese teachers has become much worse than normal.[41–43] The COVID-19 epidemic has caused unprecedented damage to the educational system worldwide. In particular, teachers are intellectual resources and have to face various types of financial, physical and mental struggles due to COVID-19.[27 44] Previous experience suggests that the public is likely to experience anxiety, depression and panic attacks when faced with highly contagious diseases.[45] In our study, both male and

Table 2 Independent association between characteristics and level of worry among male teachers during the COVID-19 epidemic in China

Characteristics	OR (95% CI)*	OR (95% CI)†
Age (years)		
18–29	1.00 (ref)	1.00 (ref)
30–39	1.01 (0.92 to 1.10)	**0.83 (0.74 to 0.93)**
40–49	0.97 (0.89 to 1.06)	0.89 (0.80 to 1.00)
≥50	1.01 (0.92 to 1.11)	**0.87 (0.77 to 0.98)**
Educational status (%)		
College	1.00 (ref)	1.00 (ref)
Bachelor's	**0.85 (0.80 to 0.90)**	**0.91 (0.84 to 0.98)**
Master's	**0.84 (0.75 to 0.95)**	**0.85 (0.73 to 0.98)**
Others	**1.60 (1.38 to 1.86)**	**1.33 (1.11 to 1.59)**
Type of teacher (%)		
Primary school teacher	1.00 (ref)	1.00 (ref)
Junior school teacher	**0.81 (0.76 to 0.86)**	**0.82 (0.76 to 0.88)**
High school teacher	**0.80 (0.75 to 0.86)**	**0.85 (0.79 to 0.92)**
University teacher	**0.84 (0.72 to 0.99)**	0.89 (0.74 to 1.07)
School location (%)		
Urban	1.00 (ref)	1.00 (ref)
County-level urban	**0.92 (0.87 to 0.98)**	**0.79 (0.74 to 0.85)**
Rural	**0.85 (0.79 to 0.91)**	**0.84 (0.77 to 0.90)**
Marital status (%)		
Married	1.00 (ref)	1.00 (ref)
Unmarried	**1.13 (1.03 to 1.23)**	1.01 (0.90 to 1.13)
Widowed	1.48 (0.90 to 2.42)	1.20 (0.67 to 2.16)
Divorced	1.23 (0.99 to 1.53)	1.13 (0.88 to 1.47)
Information source (%)		
Independent learning	1.00 (ref)	1.00 (ref)
Structured learning	0.89 (0.70 to 1.14)	0.99 (0.75 to 1.31)
Mixed learning	0.93 (0.82 to 1.05)	1.06 (0.92 to 1.22)
Attention level (%)		
High	1.00 (ref)	1.00 (ref)
Moderate	**0.23 (0.16 to 0.32)**	**0.30 (0.21 to 0.43)**
Low	**0.08 (0.04 to 0.17)**	0.56 (0.19 to 1.70)
Fear level (%)		
High	1.00 (ref)	1.00 (ref)
Moderate	**0.05 (0.04 to 0.06)**	**0.05 (0.05 to 0.07)**
Low/none	**0.01 (0.01 to 0.02)**	**0.01 (0.01 to 0.02)**
Anxiety level (%)		
High	1.00 (ref)	1.00 (ref)
Moderate	**0.56 (0.45 to 0.70)**	0.90 (0.70 to 1.16)
Low/none	**0.14 (0.11 to 0.16)**	**0.46 (0.37 to 0.58)**
Behaviour status (%)		
All correct	1.00 (ref)	1.00 (ref)
Partially correct	**0.93 (0.87 to 0.99)**	**0.92 (0.85 to 0.99)**
All wrong	**0.11 (0.04 to 0.27)**	0.33 (0.09 to 1.21)

The bold type: P<0.05.
*Unadjusted.
†Adjusted for age, educational status, type of teacher, school location, married status, information source, attention level, fear level, anxiety level and behaviour status.
ref, reference.

Table 3 Independent association between characteristics and level of worry among female teachers during the COVID-19 epidemic in China

Characteristics	OR (95% CI)*	OR (95% CI)†
Age (years)		
18–29	1.00 (ref)	1.00 (ref)
30–39	0.99 (0.96 to 1.03)	**0.92 (0.88 to 0.97)**
40–49	**0.88 (0.85 to 0.92)**	**0.90 (0.85 to 0.95)**
≥50	**0.92 (0.86 to 0.98)**	0.97 (0.89 to 1.05)
Educational status (%)		
College	1.00 (ref)	1.00 (ref)
Bachelor's	**0.81 (0.78 to 0.84)**	**0.84 (0.80 to 0.88)**
Master's	**0.75 (0.71 to 0.80)**	**0.81 (0.74 to 0.88)**
Others	**1.40 (1.30 to 1.52)**	**1.11 (1.02 to 1.22)**
Type of teacher (%)		
Primary school teacher	1.00 (ref)	1.00 (ref)
Junior school teacher	**0.80 (0.77 to 0.82)**	**0.85 (0.81 to 0.88)**
High school teacher	**0.76 (0.72 to 0.80)**	**0.84 (0.80 to 0.89)**
University teacher	**0.78 (0.69 to 0.89)**	0.90 (0.77 to 1.04)
School location (%)		
Urban	1.00 (ref)	1.00 (ref)
County-level urban	0.97 (0.94 to 1.01)	**0.91 (0.87 to 0.95)**
Rural	**0.85 (0.81 to 0.88)**	**0.86 (0.83 to 0.90)**
Married status (%)		
Married	1.00 (ref)	1.00 (ref)
Unmarried	1.10 (1.06 to 1.14)	1.00 (0.95 to 1.05)
Widowed	0.89 (0.69 to 1.15)	0.86 (0.64 to 1.15)
Divorced	0.93 (0.82 to 1.05)	0.98 (0.85 to 1.13)
Information source (%)		
Independent learning	1.00 (ref)	1.00 (ref)
Structured learning	1.07 (0.90 to 1.25)	1.08 (0.89 to 1.30)
Mixed learning	**0.91 (0.86 to 0.97)**	1.07 (1.00 to 1.15)
Attention level (%)		
High	1.00 (ref)	1.00 (ref)
Moderate	**0.14 (0.12 to 0.18)**	**0.20 (0.16 to 0.25)**
Low	**0.27 (0.15 to 0.47)**	**0.41 (0.21 to 0.78)**
Fear level (%)		
High	1.00 (ref)	1.00 (ref)
Moderate	**0.05 (0.04 to 0.05)**	**0.05 (0.05 to 0.06)**
Low/none	**0.01 (0.01 to 0.01)**	**0.01 (0.01 to 0.01)**
Anxiety level (%)		
High	1.00 (ref)	1.00 (ref)
Moderate	**0.39 (0.33 to 0.46)**	**0.64 (0.53 to 0.76)**
Low/none	**0.08 (0.07 to 0.10)**	**0.31 (0.26 to 0.36)**
Behaviour status (%)		
All correct	1.00 (ref)	1.00 (ref)
Partially correct	**0.93 (0.90 to 0.97)**	**0.94 (0.90 to 0.99)**
All wrong	**0.10 (0.04 to 0.24)**	0.32 (0.10 to 1.05)

*Unadjusted.
†Adjusted for age, educational status, type of teacher, school location, married status, information source, attention level, fear level, anxiety level and behaviour status.

female teachers experienced a relatively complex mental state, and there was a positive correlation between their level of worry and attention level, fear level and anxiety status towards the epidemic. In particular, the level of fear among teachers had a strong influence on the level of worry. Fear may be a central construct in explaining these negative individual and societal consequences of the coronavirus epidemic.[20]

We also found that teachers whose behavior status was deemed inappropriate had relatively lower worry levels compared with ones that exhibited appropriate behavior. In other words, appropriate behaviors (such as: mask wearing, frequency of hand washing, frequency of going outdoor for dinner, and spring festival travel) may be a consequence of teachers' 'very worried' condition in our study, which confirmed the findings of earlier research indicating that certain risk perceptions would promote proper conduct or behaviour.[45 46] In addition, this study may also confirm that teachers were more worried about the epidemic due to the more information they perceived.[47] Further investigation into the relationship between information perception and risk of worry is required. However, the government and policymakers should pay attention to people's psychological well-being and raise awareness on the 'worry situation' with regard to the ongoing epidemic, which may aid in the development of effective management and preventive strategies.[9]

Our study had some limitations that must be taken into account when interpreting the results. First, this was an online and self-reported study conducted in the middle of an outbreak, a situation which might have introduced some amount of reporting bias. During this time, China had already implemented lockdown strategies as well as other strict policies such that we could not organise professionals to conduct mental state diagnostics for the study participants. Second, the study could only reflect the level of worry during the critical period of the outbreak and cannot reflect the level of worry at different stages of the epidemic. More studies are needed with longer-term monitoring of participants. In addition, we were unable to make inferences on causality due to the cross-sectional nature of the study. Therefore, more research with cohort study design is required to infer relationships and confirm the stability of our findings. Finally, our findings might be limited to teachers in Henan Province and may not be generalisable to the entire Chinese teaching population.

CONCLUSIONS
During the COVID-19 epidemic, the proportion of teachers who were very worried was particularly high in Henan Province, especially among female teachers. Factors including age, educational status, type of teacher, school location, information source, attention level, anxiety level, fear level and behaviour status can alert policymakers in Henan that the relative implications of these factors can be considered in order to alleviate worry.

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