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Psychological resilience, depression, anxiety, and somatization symptoms in response to COVID-19: A study of the general population in China at the peak of its epidemic

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ABSTRACT

Rationale: Psychological resilience is characterized as the ability to respond to extreme stress or trauma or adverse experience successfully. While the relation between public emergencies and psychological distress is well known, research on the relationship between psychological resilience and mental health is very limited during the outbreak of public health emergencies.

Objective: This research investigated the relationship between psychological resilience and mental health (depression, anxiety, somatization symptoms) among the general population in China.

Method: Psychological resilience, depression, anxiety, and somatization symptoms of 1770 Chinese citizens were investigated during the epidemic peak of coronavirus disease 2019 (COVID-19) (23rd February 2020 to 2nd March 2020). The analyses were done through the Connor-Davidson Resilience Scale (CD-RISC), the Patient Health Questionnaire-9 (PHQ-9), the Generalized Anxiety Disorder-7 (GAD-7) scale, and the Patient Health Questionnaire-15 (PHQ-15) scale.

Results: The prevalence of depression, anxiety, somatization symptoms was found to be 47.1%, 31.9%, 45.9%, respectively, among all participants. From them, 18.2% showed moderate to severe symptoms of depression, 8.8% showed moderate to severe symptoms of anxiety, and 16.6% showed moderate to severe symptoms of somatization. Psychological resilience was negatively correlated with depression (standardized $\beta = -0.490$, $P < 0.001$), anxiety (standardized $\beta = -0.443$, $P < 0.001$), and somatization symptom scores (standardized $\beta = -0.358$, $P < 0.001$), while controlling for confounding factors. Analysis of the three-factor resilience structure showed that strength and tenacity were correlated with depression (standardized $\beta = -0.256$, $P < 0.001$; standardized $\beta = -0.217$, $P < 0.001$), anxiety (standardized $\beta = -0.268$, $P < 0.001$; standardized $\beta = -0.147$, $P < 0.001$), and somatization symptoms (standardized $\beta = -0.236$, $P < 0.001$; standardized $\beta = -0.126$, $P < 0.01$).

Conclusions: Our results suggest that there is a high prevalence of psychological distresses among the general population at the peak of the COVID-19 epidemic in China, which is negatively correlated with resilience. Psychological resilience represents an essential target for psychological intervention in a public health emergency.

1. Introduction

The novel coronavirus (COVID-19) is a public health epidemic that has affected the physical and mental health of many individuals (Duan and Zhu, 2020). As COVID-19 progresses, daily life has been altered for people to a certain extent, resulting in different levels of adverse mental health conditions, such as depression, anxiety, fear, and insomnia (Liu

et al., 2020; Xiang et al., 2020). In public health emergencies, citizens' negative emotions often predominate and may not be favorable to prevent and control the epidemics. Hence, it is essential to handle emotional problems to control the epidemic.

Psychological resilience refers to the ability, outcome, or dynamic process of successfully adapting to adversity, trauma, or other major stressors (Norris et al., 2009; Olsson et al., 2003; Richardson, 2002).

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Resilience is the capacity to recover from adverse experiences rather than immunity from stress (Garmezy, 1991; Norris et al., 2009). Resilience can also be defined as a dynamic mechanism acting to mitigate the impact of an adverse event. It involves the interaction between internal and external protection and risk processes (Rutter, 1985, 2002). Previous studies have shown that psychological resilience represents an intermediate between stress and mental health status (Hao et al., 2015; Howell et al., 2017), and may mitigate the adverse effects of stress (Poole et al., 2017; Sheerin et al., 2018). Cross-sectional and longitudinal studies have confirmed that resilience has mediated the impact of personality traits and family dysfunction on depressive symptoms and sleep quality (Chang et al., 2019; Gong et al., 2020), and reduced the risk of depression in individuals with adverse childhood experiences (Poole et al., 2017; Schulz et al., 2014). Furthermore, low resilience to stress during adolescence was associated with an increased risk of lifelong use of antidepressant and anxiolytic drugs (Hiyoshi et al., 2015). Thus, resilience is an essential buffer for stress or a traumatic incident and could defend against psychological distress. As such, the assessment of individual psychological resilience could help to predict mental health status.

Although the correlation between public emergencies and mental health is well known (Cheng et al., 2004; Liu et al., 2020; Lowe et al., 2015; Zhu et al., 2012), most research focuses on evaluating the impact of resilience on physical health, psychological health, and quality of life following a major natural disaster or public event (Kukihara et al., 2014; Lee et al., 2018; Li and Dai, 2017; Zhu et al., 2012). Only a few researchers have examined the effect of resilience on mental health during public emergencies specifically (Osofsky et al., 2011). For instance, Osofsky et al. (2011) found that resilience was negatively correlated with both depression and anxiety among people exposed to both Hurricane Katrina and the Deepwater Horizon oil spill. Nevertheless, research into the relationship between psychological resilience and psychological concerns during the onset of public health emergencies is scarce. The prompt awareness and evaluation of psychological consequences during a crisis in public health will help to determine the course of the much-needed psychological services.

During the COVID-19 outbreak in China, online services became the mainstream mode of mental health work (Liu et al., 2020). The mental health status of the public is investigated in this study through online psychological assessments. The main purpose of this study is to explore the psychological resilience, depression, anxiety, and somatization symptoms of COVID-19 among the general population at the peak of the epidemic, and to provide a theoretical basis and future direction for both targeted crisis intervention and psychological trauma recovery plans.

2. Method

2.1. Subjects

Participants were citizens of the different provinces of China affected by COVID-19 from 23rd February 2020 to 2nd March 2020. Patients diagnosed with emotional or mental disorders, medical staff, COVID-19 staff, newly diagnosed COVID-19 patients, suspected COVID-19 patients, close contacts of COVID-19 patients, and family members affected by COVID-19 were all excluded from this analysis. Subjects were informed of the purpose and significance of this study before online psychological assessments. All participants have provided informed consent. For those ≤ 18 years of age, parents or legal guardians provided their consent of participation.

2.2. Data collection

The present research is a cross-sectional analysis that followed convenience sampling methods for distributing QR code and website links to the evaluation system. Online psychological assessments were composed of three parts: general information, psychological resilience

assessments, and psychiatric symptom assessments (depression, anxiety, somatization symptoms). Before assessing each scale, identified instructions were provided, while general data included demographic data and exposure to the epidemic. Demographic details covered age, gender, level of education, marital status, and current residence. Epidemic exposure included whether the participants were patients, suspected patients, medical and related personnel, close contacts, and participants in the prevention and treatment of COVID-19.

2.3. Psychological resilience, depression, anxiety, and somatization symptoms assessment

The Chinese version of the Connor Davidson Resilience Scale (CD-RISC) measured personal resilience over the past 30 days (Yu and Zhang, 2007). The CD-RISC evaluates 25 items using 5-point scoring methods (0 = never, 1 = seldom, 2 = sometimes, 3 = often, 4 = always). The scale consisted of three factors, which were optimism, strength, and tenacity. Higher scores indicated a greater degree of psychological resilience. The original Chinese version of the CD-RISC had excellent internal consistency (Cronbach's $\alpha = 0.91$) (Yu and Zhang, 2007); in this study, α was 0.93.

The severity of depression was assessed using the Patient Health Questionnaire-9 (PHQ-9). The score for PHQ-9 was split into normal (0–4), mild depression (5–9), moderate depression (10–14), moderate to severe depression (15–19), and severe depression (20–27) (Kroenke et al., 2001). For the PHQ-9, an ideal cut-off point is defined by a total score of 10 or higher (Kroenke et al., 2001; Manea et al., 2012). In China, this scale had strong reliability and validity: Internal consistency and two-week test-retest reliability of the PHQ-9 were 0.86 and 0.86, respectively (Wang et al., 2014). The PHQ-9 correlated 0.49 with the Chinese Health Questionnaire, -0.41 with the Happiness Scale, and -0.60 with the mental subscale of the Short-Form 12-Item Health Survey (Yu et al., 2012).

The severity of anxiety was assessed using the Generalized Anxiety Disorder-7 (GAD-7) scale, with the severity scored as no anxiety (0–4), mild anxiety (5–9), moderate anxiety (10–14), and severe anxiety (≥ 15) (Spitzer et al., 2006). A total GAD-7 score of 10 or higher represents an optimal cut-off point (Spitzer et al., 2006). The Cronbach's alpha coefficient of the Chinese version of the GAD-7 was 0.89, and the test-retest reliability was found to be 0.85. The GAD-7 correlated with the Hospital Anxiety and Depression Scale and the Hamilton Anxiety Scale, $r = 0.66$ and 0.84, respectively (He et al., 2010).

In our research, the Patient Health Questionnaire-15 (PHQ-15) was used for assessing somatization symptoms. The PHQ-15 is a self-administered screening tool suggested by the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) Workgroup. Severe somatization symptoms were divided into four types, which are no somatization symptoms (0–4), mild somatization symptoms (5–9), moderate somatization symptoms (10–14), and severe somatization symptoms (≥ 15) (Kroenke et al., 2002). A total PHQ-15 score of 10 or higher showed potential somatoform disorder, with the reasonable cut-off for sensitivity (80.2%) and specificity (58.5%) (Körber et al., 2011). The Chinese version of the PHQ-15 exhibited excellent internal consistency (Cronbach's $\alpha = 0.83$) (Zhang et al., 2016).

In the current analysis, α coefficients for the PHQ-9, GAD-7, and PHQ-15 were found as 0.86, 0.90, and 0.84, respectively.

2.4. Quality control

The same IP address could only provide a single answer, and all entries were set as required questions. Only after completing all items was the questionnaire submitted. Otherwise, the system would automatically record the outcome as incomplete. The test time was set by pretest results, and questionnaires with test times of less than 260 s were deleted.

2.5. Statistical analysis

SPSS 25.0 program was used for performing all of the statistical analyses. Measurement data were expressed as the mean \pm standard deviation (*SD*), while independent sample *t*-tests were used for group comparisons. In the multiple group comparisons, one-way analysis of variance was used. Pearson's correlation was used to examine the association between depression, anxiety, somatization symptoms, age, and resilience. Additionally, linear regressions were used to analyze the relationship between the severity of depression, anxiety, somatization symptoms, and resilience. Depression, anxiety, and somatization scores were used as dependent variables, while resilience was used as an independent variable. Variables were screened using the enter method, and factors affecting negative emotional symptoms, somatization symptoms, and psychological resilience were controlled as co-variables. Significance levels were set at 0.05 and all tests were two-sided.

3. Results

3.1. Subject characteristics

In our online assessment system, 2113 entries were registered, of which 273 were invalid (these participants only logged into our online psychological assessment system and no meaningful psychological measurement was recorded). Thus, 1840 ordinary citizens took part in the online psychological questionnaire survey; 1770 participants completed the tests, while the data were lost for 70 cases. Hence, the effective rate of valid data received for the present analysis was 96.19%. Missing data for 70 cases were not included in the follow-up analysis. Participants had an average age of 28.7 (*SD* = 10.64), and 66.9% of the valid participants were women. Approximately two-thirds of the participants were highly educated. The number of married and unmarried participants were comparable. The subjects originated from different Chinese provinces, mainly the Chongqing and Sichuan Provinces located in the Southwest of China. All provinces have been severely affected by COVID-19 (see [Table 1](#)).

3.2. Depression, anxiety, and somatization symptoms

[Table 2](#) shows that 47.1% of respondents had depression (18.2% with moderate or more severe symptoms, PHQ-9 score ≥ 10), 31.9% had anxiety (8.8% with moderate or more severe anxiety, GAD-7 score ≥ 10), and 45.9% had somatization (16.6% with moderate or more severe symptoms, PHQ-15 score ≥ 10).

Table 1
Characteristics of those in the sample.

Sociodemographic	Total (N = 1770)
Age (years), Mean (<i>SD</i>)	28.70 (10.64)
Sex, n (%)	
Female	1184 (66.9%)
Male	586 (33.1%)
Education level, n (%)	
Junior high school or lower	87 (4.9%)
High school	133 (7.5%)
College	1376 (77.7%)
Graduate and above	174 (9.8%)
Marital status, n (%)	
Unmarried	959 (54.2%)
Married	754 (42.6%)
Divorced	53 (3.0%)
Widowed	4 (0.2%)
Place of residence, n (%)	
Chongqing	1148 (64.9%)
Sichuan	186 (10.5%)
Other provinces	436 (24.6%)

Table 2

Depression, anxiety, and somatization among the general population [n (%)].

Symptoms	Asymptomatic	Mild	Moderate	Moderately severe	Severe
Depression	937 (52.9%)	512 (28.9%)	208 (11.8%)	82 (4.6%)	31 (1.8%)
Anxiety	1205 (68.1%)	409 (23.1%)	106 (6.0%)	–	50 (2.8%)
Somatization symptoms	958 (54.1%)	519 (29.3%)	220 (12.5%)	–	73 (4.1%)

3.3. Analysis of influencing factors of depression, anxiety, and somatization symptoms

Age, resilience, optimism, strength, and tenacity were negatively correlated with depression, anxiety, and somatization ($P < 0.001$) ([Table 3](#)). Significant differences in depression, anxiety, and somatization scores ($P < 0.001$) have been observed between men and women ([Table 3](#)).

[Table 3](#) presents significant differences in depression observed by education ($P < 0.001$), marital status ($P < 0.001$), and place of residence ($P < 0.001$). Significant differences in anxiety were noted by education ($P < 0.05$), marital status ($P < 0.05$), and area of residence ($P < 0.001$). Significant differences in somatization symptoms were observed according to education ($P < 0.001$) and city of residence ($P < 0.05$). No significant differences in somatization symptoms have been observed regardless of marital status ($P = 0.059$).

3.4. Relationship between psychological resilience and depression, anxiety, and somatization symptoms severity

Linear regression analysis showed the resilience of the ordinary population ($B = -0.173$, standardized $\beta = -0.490$, $P < 0.001$) while controlling for gender, age, education level, marital status, and area of residence, and all were associated with the depression scores. The three factors of resilience were optimism ($B = -0.124$, $\beta = -0.063$, $P < 0.05$), strength ($B = -0.261$, $\beta = -0.256$, $P < 0.001$) and tenacity ($B = -0.133$, $\beta = -0.217$, $P < 0.001$) ([Table 4](#)).

As shown in [Table 5](#), resilience ($B = -0.126$, $\beta = -0.443$, $P < 0.001$) was associated with anxiety. Optimism ($B = -0.117$, $\beta = -0.074$, $P < 0.01$), strength ($B = -0.222$, $\beta = -0.268$, $P < 0.001$) and tenacity ($B = -0.073$, $\beta = -0.147$, $P < 0.001$) were also associated with anxiety scores.

As shown in [Table 6](#), resilience ($B = -0.112$, $\beta = -0.358$, $P < 0.01$) was associated with somatization. Strength ($B = -0.215$, $\beta = -0.236$, $P < 0.001$) and tenacity ($B = -0.069$, $\beta = -0.126$, $P < 0.01$) were associated with somatization. However, optimism ($B = -0.044$, $\beta = -0.025$, $P = 0.36$) was not associated with somatization symptoms.

4. Discussion

Online psychological assessments were used in the present research study to investigate the mental health status of 1770 people in the general population in China during the peak of its COVID-19 epidemic. [Table 2](#) presents the prevalence of depression, anxiety, somatization symptoms, which were identified as 47.1%, 31.9%, and 45.9%, respectively. Results showed the scores for a different level of symptoms (e.g., moderate to severe depression (PHQ-9 score ≥ 10), anxiety (GAD-7 score ≥ 10)), and somatization symptoms (PHQ-15 score ≥ 10) were noted as 18.2%, 8.8%, and 16.6%, respectively. The proportions of subjects with moderate to severe depression or anxiety during the non-epidemic period were 7% ([Wang et al., 2011](#)) and 4.7%, respectively ([He et al., 2010](#)). Somatization was rated at 14.6% and was observed among the general population of Hong Kong ([Lee et al., 2011](#)). Depression and anxiety symptoms were more prevalent during the peak period of the COVID-19 pandemic, when compared to non-epidemic times. The

Table 3
Factors influencing depression, anxiety, and somatization symptoms (mean ± SD).

	Depression	r/t/F	P	Anxiety	r/t/F	P	Somatization	r/t/F	P
Age	–	–0.201 ^a	<0.001	–	–0.118	<0.001	–	–0.113	<0.001
Gender		–3.579 ^b	<0.001		–4.180	<0.001		–9.713	<0.001
Male	4.83 ± 4.90			3.13 ± 3.83			3.82 ± 3.91		
Female	5.75 ± 5.14			3.99 ± 4.21			5.87 ± 4.65		
Educational level		6.149 ^c	<0.001		3.630	<0.05		6.377	<0.001
Junior high school and below	5.16 ± 5.52			4.14 ± 4.82			5.28 ± 5.18		
High school	5.59 ± 5.30			3.75 ± 4.31			5.17 ± 4.51		
University	5.65 ± 5.11			3.79 ± 4.08			5.37 ± 4.54		
Graduate student	3.91 ± 4.21			2.76 ± 3.70			3.78 ± 3.78		
Marital status		16.431 ^c	<0.001		3.715	<0.05		2.491	0.059
Unmarried	6.22 ± 5.25			4.00 ± 4.17			5.45 ± 4.67		
Married	4.53 ± 4.66			3.34 ± 3.94			4.92 ± 4.43		
Divorce	4.62 ± 5.65			3.57 ± 5.02			4.43 ± 4.15		
Bereavement	4.50 ± 3.00			4.25 ± 3.59			4.00 ± 2.44		
Area of residence		14.988 ^c	<0.001		8.632	<0.001		4.062	<0.05
Chongqing	4.98 ± 4.84			3.42 ± 3.95			4.99 ± 4.48		
Sichuan	5.92 ± 5.35			3.92 ± 3.96			5.19 ± 4.07		
Other provinces	6.48 ± 5.42			4.36 ± 4.48			5.72 ± 4.78		
Resilience									
Total score		–0.511 ^a	<0.001		–0.447	<0.001		–0.386	<0.001
Optimism		–0.356 ^a	<0.001		–0.324	<0.001		–0.260	<0.001
Strength		–0.495 ^a	<0.001		–0.438	<0.001		–0.378	<0.001
Tenacity		–0.482 ^a	<0.001		–0.414	<0.001		–0.365	<0.001

Note: ^a r value; ^b t value; ^c F value.

Table 4
Linear regression between resilience and depression.

Independent variable ^a	B	Standardized β	t-value	P	95% CI
Total score	–0.173	–0.490	–22.752	<0.001	–0.188~–0.158
Optimism	–0.124	–0.063	–2.416	<0.05	–0.225~–0.023
Strength	–0.261	–0.256	–6.662	<0.001	–0.338~–0.184
Tenacity	–0.133	–0.217	–5.898	<0.001	–0.178~–0.089

^a Control gender, age, education, marital status, current place of residence.

Table 5
Linear regression between resilience and anxiety.

Independent variable ^a	B	Standardized β	t	P	95% CI
Total score	–0.126	–0.443	–19.717	<0.001	–0.139~–0.114
Optimism	–0.117	–0.074	–2.715	<0.01	–0.202~–0.033
Strength	–0.222	–0.268	–6.714	<0.001	–0.286~–0.157
Tenacity	–0.073	–0.147	–3.849	<0.001	–0.111~–0.036

^a Controlled for gender, age, education, marital status, and current place of residence.

Table 6
Linear regression between resilience and somatization.

Independent variable ^a	B	Standardized β	t	P	95% CI
Total score	–0.112	–0.358	–15.619	<0.001	–0.126~–0.098
Optimism	–0.044	–0.025	–0.916	0.36	–0.140~–0.051
Strength	–0.215	–0.236	–5.794	<0.001	–0.287~–0.142
Tenacity	–0.069	–0.126	–3.217	<0.01	–0.111~–0.027

^a Control gender, age, education, marital status, current place of residence.

present findings revealed that in the general population, public health emergencies could cause a poor mental health status.

Previous research showed that resilience score assessed using CD-RISC was negatively correlated with depression among Korean university students ($r = -0.500$) (Mak et al., 2018), and weakly associated with anxiety among Chinese migrant workers ($r = -0.179$) (Yang et al., 2020). In both studies, the PHQ-9 and GAD-7 scales have been used for assessing depression and anxiety. In the current study, Pearson’s correlation analysis showed that total CD-RISC was correlated with symptom scores for depression, anxiety, and somatization ($r = -0.511$, $r = -0.447$, and $r = -0.386$) in a different level, as presented in Table 3.

Table 4 through 6 summarize results related to the linear regression analysis, which found that psychological resilience was significantly and negatively associated with depression, anxiety, and somatization symptoms after controlling for confounding factors. Individuals with high resilience faced with a public health emergency were less likely to develop negative emotional symptoms. Psychological resilience has been found to protect a better state of mental health among refugees and natural disaster survivors (Kukihara et al., 2014; Poudel-Tandukar et al., 2019). In this context, Kukihara et al. (2014) found that higher rates of resilience predicted lower-level symptoms of post-traumatic stress disorder and depression among survivors from the earthquake, tsunami, and nuclear disasters in Japan. To evaluate the link between resilience and mental health among Bhutanese refugees, Poudel-Tandukar et al. (2019) conducted a cross-sectional study. They indicated that, due to poor adaptability to stressful life events, low resilience individuals tended to have worse mental health outcomes related to depression and anxiety. These observations are consistent with our present findings because they exemplify how psychological resilience, as a potential ability of individual self-protection, could help people cope with disasters and survive crises.

Studies were conducted six months after the Wenchuan earthquake; these showed post-earthquake negative events having an indirect effect on adolescent depressive symptoms by weakening resilience (partly mediating). In contrast, resilience could reduce the impact of negative events on depression (Zhu et al., 2012). Previous researchers have confirmed that resilience reduced the risk of depression in individuals exposed to childhood trauma (Poole et al., 2017; Schulz et al., 2014). A Swedish cohort study found that higher cognitive function during adolescence was associated with a reduced risk of antidepressant drugs, yet this negative association has been lowered or counteracted by low-stress resilience (Hiyoshi et al., 2015). Moreover, a genetic study showed that resilience mediated polygenic susceptibility to an alleviated risk of depression (Navrady et al., 2018). Therefore, the potential protective effects of resilience to mitigate and counteract the negative impact of adverse mental health risk factors are also considered.

A follow-up analysis two-and-a-half years after the Wenchuan earthquake showed that resilience played a significant role in the post-traumatic growth of individuals after the disaster (Li and Dai, 2017). After the floods in Mexico and the terrorist attacks in New York, longitudinal stress has indicated that reduced mass traumatic stress may be better achieved by interventions designed to improved resilience and avoid further adverse trajectories (Norris et al., 2009). Based on reports of stress related to healthcare staff during the epidemic of Severe Acute Respiratory Syndrome (SARS), however, it is proposed that improving the resilience of mentally stable individuals could be the best response to the pandemic stress relief (Maunder et al., 2008). Thus, psychological resilience is a major goal for psychological interventions in a public emergency. Also, a randomized controlled trial from rural China showed that resilience-based multi-level intervention improved the psychosocial health of children exposed to parental HIV/AIDS (Li et al., 2017).

The results obtained from the three-factor structural analysis of psychological resilience suggested that strength and tenacity were correlated with depression, anxiety, and somatization symptoms (see Tables 4–6) in which mental strength has the highest impact. Yu and Zhang (2007) divided the factor structure of CD-RISC into three dimensions: tenacity, strength, and optimism. The strength factor focuses on the ability of an individual to recover after a setback and become stronger. Tenacity reflects calmness, agility, perseverance, and a sense of control in difficult times and when facing challenges. The final factor is optimism, which primarily reflects the tendency of an individual to see the positive side of events and measures their confidence in avoiding negative events, though the influence of this factor is relatively small.

There have been many types of online mental health services carried out in China. Comprehensive implementation of online psychological tests, mental health education, and a psychological crisis intervention provide new ideas for handling emergencies in public health. Like SARS, COVID-19 can be spread by contact and air droplets. Hence, online mental health services are able not only to prevent the spread of the virus but also to boost lifelines (Liu et al., 2020). The results of this study provide a theoretical framework for potential crisis approaches and can guide future strategies for restoring psychological traumas. Psychological immunity may delay the psychological injuries incurred by public health emergencies from the perspective of psychological resilience, thereby promoting social stability.

4.1. Limitations

Some limitations of this study should be noted. First, it was difficult to control the quality of the online psychological tests, which may have affected the accuracy of the data. Secondly, the assessment of individual experience of stress has been neglected. Hence, it was difficult to determine if psychological resilience had an intermediary or regulatory effect on stress. Finally, the assessment was primarily done based on the individuals residing in Southwest China (Chongqing, Sichuan Province), with very few participants from other provinces. Notably, the rates of depression, anxiety, and somatization may differ by region. In essence,

studies are now required to examine factors that enhance resilience and further follow-up of the research is expected.

5. Conclusions

During the peak of the COVID-19 epidemic in China, the mental health of the general population was significantly affected. The percentages of moderate-to-severe depression, anxiety, and somatization symptoms in the general population were 18.2%, 8.8%, and 16.6%, respectively. Furthermore, the present findings suggest that psychological resilience was correlated negatively with symptoms of depression, anxiety, and somatization. As such, people with high resilience are less likely to show emotional symptoms, while those with low resilience are more likely to exhibit emotional symptoms. Psychological resilience may be an essential target for psychological interventions aimed at improving mental health. Future research is required to examine the precise mechanism of psychological resilience in these associations.

Declaration of competing interest

All authors declare that they have no conflicts of interest.

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Abbreviations

COVID-19	Coronavirus disease 2019
CD-RISC	Connor-Davidson Resilience Scale
PHQ-9	Patient Health Questionnaire-9
GAD-7	Generalized Anxiety Disorder-7
PHQ-15	Patient Health Questionnaire-15
SD	Standard Deviation
SARS	Severe Acute Respiratory Syndrome

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2020.113261>.

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