

Resilience and Depressive Symptoms Mediated Pathways from Social Support to Suicidal Ideation Among Undergraduates During the COVID-19 Campus Lockdown in China

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Purpose: The COVID-19 pandemic has greatly affected people's mental health. The direct and indirect pathways between social support and suicidal ideation in the period are still unclear. This study explores the pathways from social support to suicidal ideation through resilience and depressive symptoms among undergraduates during the COVID-19 campus lockdown.

Methods: During two weeks of the COVID-19 campus lockdown, a total of 12,945 undergraduates at a university in eastern China completed the questionnaire including sociodemographic characteristics, suicidal ideation, social support, resilience, and depressive symptoms. A structural equation modeling (SEM) approach was used to analyze the direct and indirect pathways from social support to suicidal ideation via the mediators of resilience and depressive symptoms.

Results: Of the 12,917 undergraduates included in this study, 7.4% ($n = 955$) reported they sometimes had suicidal ideation, 0.8% ($n = 109$) reported they often had suicidal ideation, 0.9% ($n = 122$) reported they always had suicidal ideation, and 13.2% ($n = 1704$) reported they had depressive symptoms. Social support exerted significant direct ($\beta = -0.058$), indirect ($\beta = -0.225$), and total ($\beta = -0.283$) effects on suicidal ideation; 20.5% of the total effect was direct, and 79.5% was indirect. Social support predicted suicidal ideation through resilience ($\beta = -0.038$), and depressive symptoms ($\beta = -0.087$), explaining 13.4%, and 30.7% of the total effect, respectively. Social support predicted suicidal ideation through the sequential mediation of resilience and depressive symptoms ($\beta = -0.099$), explaining 35.0% of the total effect.

Conclusion: This is the first study to provide the evidence of pathways from social support to suicidal ideation through resilience and depressive symptoms during the COVID-19 campus lockdown among undergraduates in China. Both direct and indirect pathways from social support to suicidal ideation were identified as intervention targets to reduce suicidal ideation.

Keywords: depressive symptoms, resilience, social support, suicidal ideation, COVID-19, campus lockdown

Introduction

Despite efforts to understand and prevent suicide and its underlying causes, increasing suicide rates continues to be a major public health problem.¹ There is a range of suicidal thoughts and behaviors, including suicidal ideation, attempts, and completions.² The integrated motivational-volitional (IMV) model of suicidal behavior, is a diathesis-stress framework that explains the transition from suicidal ideation to behavioral enactment.³ Suicidal ideation may predict suicide attempts in adolescents⁴ and is strongly associated with completed suicides.⁵ Suicidal ideation should be the focus of continued research. Suicidal ideation is not the same as self-harm behavior or a completed suicide. Rather, it can be defined as thinking about, considering, or planning suicide.¹ It accounts for 15% of the global suicide death toll in China,

but research efforts of suicidal ideation are not well documented.⁶ One study found that the prevalence of suicidal ideation during the COVID-19 lockdown was higher in a sample of Chinese children and adolescents in Shandong.⁷

The omicron variant spread globally during early 2022, and its highly infectious nature and effects on individuals caused some universities in China to transition partially or fully to online learning and implemented full or partial campus lockdowns in an effort to reduce the transmission of the virus. The lockdown policies intended to prevent the spread of the virus may influence mental health, and the mental health outcomes of these measures remain inconclusive.⁸ Of 22.6% of students in Wuhan, China, who experienced lockdown reported having depressive symptoms—a higher rate than in other cities.⁹ In a systematic review undertaken during the COVID-19 pandemic, short-term school closures as part of lockdown measures were associated with adverse mental health outcomes among adolescents, with 18% to 60% of them scoring above risk thresholds.¹⁰ Also, restrictions such as lockdown were associated with poorer mental health in a nationwide sample from Germany.¹¹ A study in Spain showed that the COVID-19 pandemic had a negative impact on mental health for younger population and depressive symptoms significantly increased during confinement.¹² A review and meta-analysis of 72,004 participants found that the mental health impact of the COVID-19 lockdown is small in magnitude and highly heterogeneous, suggesting that lockdowns do not have uniformly detrimental effects on mental health and that a majority people are psychologically resilient to these effects.¹³

A UK study found a deterioration in mental health occurred due to the COVID-19 pandemic,¹⁴ and rates of depressive symptoms have been found to range from 9% to 46% in Spain.⁸ A longitudinal study revealed that the COVID-19 lockdown is linked to changes in mental health, with the prevalence of depressive symptoms increasing 5.5-fold in the Czech Republic.¹⁵ The COVID-19 pandemic has increased the risk of depressive symptoms,¹⁶ with one study of 1210 respondents from 194 cities in China finding that 16.5% of participants reported moderate to severe depressive symptoms.¹⁷ In a sample in England, child suicide deaths increased during the COVID-19 lockdown.¹⁸ The occurrence of suicidal ideation was associated with increased levels of psychosocial adversity during the COVID-19 pandemic,¹⁹ and the rates of suicidal ideation increased in the UK.²⁰ The adolescent transition period increases risk of mental illnesses, and the estimated prevalence of depressive symptoms during the time is 13%.¹⁹ A sample in Hubei showed that 22.28% of children and adolescents were suffering from depressive symptoms during the pandemic.²¹ In Japan, suicide rates increased by 16% during the pandemic, with a larger increase (49%) among children and adolescents.²²

In Italy, a third of participants reported moderate to extremely severe depressive symptoms, and resilience was found to be inversely associated with depressive symptoms during the COVID-19 pandemic.²³ An Irish study showed that depressive symptoms were a common experience during the pandemic and were associated with younger age.²⁴ Younger age was related to higher rates of depressive symptoms during the pandemic, and resilience was negatively associated with depressive symptoms in low- and middle-income countries (LMICs).²⁵ Psychological distress increased during the COVID-19 lockdown, particularly among young adults from an Asian background with college degrees.²⁶ Medical students may have higher resilience in coping with mental illnesses, with the prevalence of depressive symptoms in Malaya at 17%.²⁷ A Chinese study showed that the prevalence of depressive symptoms was 47.1%, and resilience was negatively correlated with depressive symptoms, suggesting that resilience may be an essential target for mental health interventions during the pandemic.²⁸

Social support has been hypothesized to be a protective factor against suicidal ideation,²⁹ which is well-documented to positively influence suicide rates. A previous study has shown a negative association between social support and suicidal ideation during the COVID-19 pandemic.³⁰ A study of 11,806 undergraduates in China indicated that the suicide attempters had higher rates of suicidal ideation and lower levels of social support, and undergraduates with higher depressive symptoms had a higher risk of suicide attempts.³¹ The depressive symptoms did not increase and lack of emotional support did not found during the pandemic.³²

Suicidal ideation is complex, and the pathways for prevention have multiple challenges. A lower level of social support may be linked to suicidal ideation, and while the direct and indirect pathways between social support and suicidal ideation are not known,³³ yet they thrive. This study provides a conceptual framework (Figure 1), and proposes the following hypotheses: 1) a direct pathway may exist from social support to suicidal ideation; 2) resilience may mediate the pathways from social support to suicidal ideation; 3) depressive symptoms may mediate the pathways from social

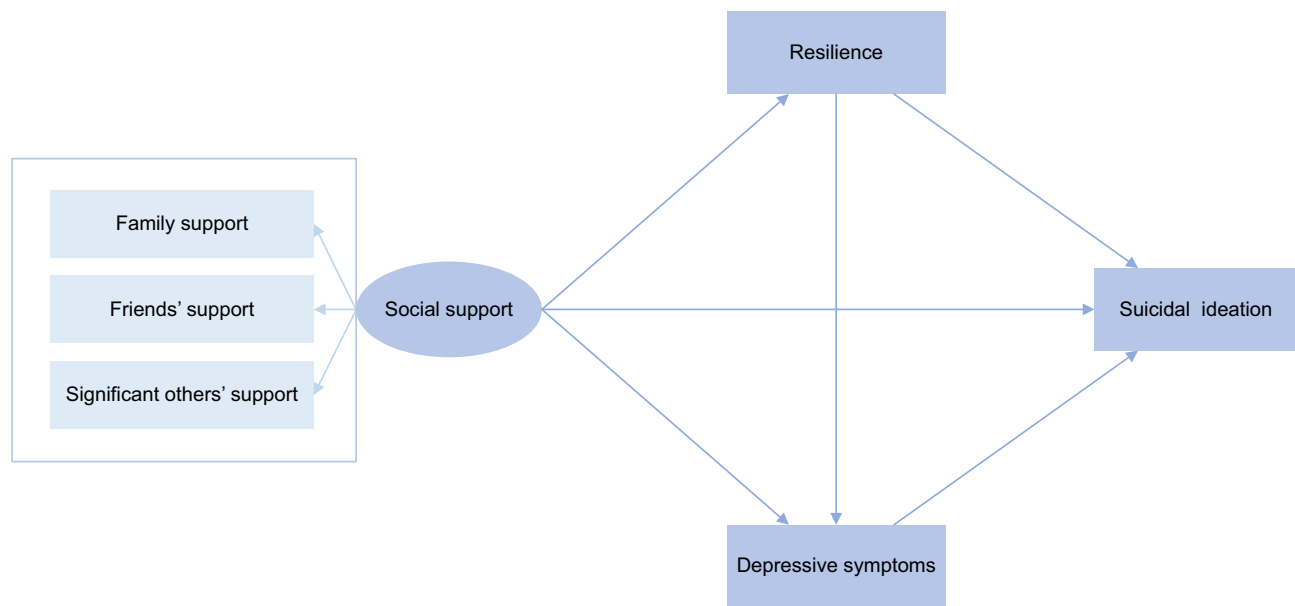


Figure 1 Hypothesized pathways from social support to suicidal ideation in the conceptual model.

support to suicidal ideation; 4) social support may indirectly influence suicidal ideation through the sequential mediation of resilience and depressive symptoms. This study explores the pathways from social support to suicidal ideation through resilience and depressive symptoms during the COVID-19 campus lockdown among undergraduates using structural equation modeling (SEM) in order to improve mental health policy and practice.

Methods

Participants and Procedure

The data used in this study were obtained from the Mental Health Center for undergraduates at a university in eastern China after two weeks of COVID-19 campus lockdown (April 10–19, 2022). A total of 12,945 undergraduates were included in this study, and there were no exclusion criteria. Through a social media platform (WeChat), undergraduates completed the questionnaires consisting information on sociodemographic characteristics, suicidal ideation, social support, resilience, and depressive symptom.

Measures

Sociodemographic Characteristics

Data on sociodemographic characteristics were collected including sex (male, female), age (years), and family residence (rural, urban).

Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS) is a 12-item instrument to measure perceived social support of family (eg, “My family is willing to help me make decisions”), friends (eg, “I can count on my friends when things go wrong”), and significant others, (eg, “There is a special person with whom I can share my joys and sorrows”).³⁴ Each item is rated on a 7-point Likert scale ranging from 1 = very strongly disagree to 7 = very strongly agree; scores range from 12 to 84, with higher scores indicating higher perceived social support. The reliability and validity of the Chinese version of the MSPSS for the undergraduates were acceptable,³⁵ and Cronbach’s alpha was 0.956 in this study.

Resilience

Resilience was assessed using the Psychological Capital Questionnaire (PCQ) which contains 24 items for evaluating hope, self-efficacy, resilience, and optimism.³⁶ Six items were used to measure resilience in this study (eg, “I can recover

quickly when I encounter setbacks”).³⁷ Each item is rated on a 6-point Likert scale from 1 = strongly disagree to 6 = strongly agree; scores range from 6 to 36, with higher total scores indicating higher resilience. Reliability and validity of the Chinese version of the PCQ were acceptable among students,³⁸ and Cronbach’s alpha of the resilience level was 0.823 in this study.

Depressive Symptoms

The Patient Health Questionnaire (PHQ-9) is a 9-item screening tool of depressive symptoms over the previous two weeks (eg, “Over the last two weeks, how often have you been bothered by feeling down, depressed, or hopeless”). Each item is rated on a 4-point Likert scale from 0 = not at all to 3 = nearly every day, scores range from 0 to 27, with a score of 10 or higher used to determine the presence of a depressive disorder.³⁹ The reliability and validity of the Chinese version of PHQ-9 among undergraduates were acceptable,⁴⁰ and Cronbach’s alpha was 0.911 in this study.

Suicidal Ideation

Suicidal ideation was measured using item 9 of the PHQ-9, which asks: “Over the last two weeks, how often have you thought that you would be better off dead or of hurting yourself in some way?”.⁴¹ Participants responded with 0 = never, 1 = sometimes, 2 = often, or 3 = always, with higher scores indicating higher levels of suicidal ideation.

Statistical Analysis

Statistical analysis was performed using STATA 16.0 (Stata Corporation, College Station, TX, USA) and AMOS 23.0 (IBM Corporation, Armonk, NY, USA) software. Descriptive analysis was performed to summarize the categorical variables (frequencies and percentages) and the continuous variables (mean and standard deviation). The differences in suicidal ideation according to sociodemographic characteristics were analyzed using Fisher’s exact and chi-squared tests. The correlations between social support, resilience, depressive symptoms, and suicidal ideation were conducted using Spearman correlation analysis.

An SEM approach was used to analyze the direct and indirect pathways from social support to suicidal ideation via the mediators of resilience and depressive symptoms according to the conceptual framework, with robust maximum likelihood estimation for continuous variables. Confirmatory factor analysis (CFA) was conducted to examine the interrelationships and covariation among observed variables and factor loadings, and the model fit indices were calculated. CFA was used to construct the latent variable of “social support”. Bias-corrected 95% confidence intervals (BC 95% CIs) were estimated using bootstrap sampling procedures with 2000 samples to examine the significance of the indirect effects of each pathway from social support to suicidal ideation.⁴² The total effects were accounted for with the sum of the direct and indirect effects, mathematically expressed as $c = c' + ab$, where c = total effect, c' = direct effect, and ab = indirect effect.⁴³ Multiple modification indices were conducted to achieve acceptable model fit, including the root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) ≤ 0.06 , comparative fit index (CFI), goodness of fit index (GFI), adjusted goodness-of-fit index (AGFI) and Tucker-Lewis index (TLI) values ≥ 0.90 .⁴⁴ The χ^2 value should be reported as one of the fit indices, but it was highly sensitive to the large sample size and was therefore excluded from this study.⁴⁵ A p -value < 0.05 indicated statistical significance.

Ethical Approval and Data Collection

This study was approved by the Xuzhou Medical University Ethics Committee (ID number: XMUs 22/0406). All procedures were carried out in accordance with relevant guidelines and regulations. Before data collection, a pilot study was conducted on 300 undergraduates to determine the consistency, validity, and clarity of the questionnaires. The questionnaires were not modified after analysis of the pilot study data, and pilot data was merged into the final sample. Participants completed the questionnaires via scanning a QR code on a mobile phone. Participants’ IP addresses were used to identify and eliminate duplicate responses. The online social media platform (WeChat) did not allow participants

to move on from a question unless an answer was given. As such, there was no missing data in this study. The online questionnaire took approximately 20 minutes to complete.

Results

Sociodemographic Characteristics and the Distribution of Suicidal Ideation and Depressive Symptoms

Tables 1 and 2 present the descriptive analysis and distribution of suicidal ideation and depressive symptoms according to sociodemographic characteristics. Undergraduates' sex, age, and residence were included as covariates in the SEM approach.

Correlation of Social Support, Resilience, Depressive Symptoms, Suicidal Ideation and Covariates

Figure 2 presents the correlations among social support, resilience, depressive symptoms, suicidal ideation, and covariates. Suicidal ideation was negatively correlated with family support ($r = -0.25$), friends' support ($r = -0.24$), significant others ($r = -0.25$), resilience ($r = -0.25$) and was positively correlated with depressive symptoms ($r = 0.41$). Undergraduates' sex was positively correlated with family support ($r = 0.05$), friends' support ($r = 0.09$), significant others ($r = 0.12$), depressive symptoms ($r = 0.03$) and was negatively correlated with resilience ($r = -0.03$), and suicidal ideation ($r = 0.07$). Undergraduates' age was negatively correlated with significant others ($r = -0.02$) and depressive symptoms ($r = -0.05$). Undergraduates' residence was positively correlated with family support ($r = 0.08$), friends' support ($r = 0.04$), significant others ($r = 0.05$) and resilience ($r = 0.05$).

Table 1 Sociodemographic Characteristics Among the Distribution of Suicidal Ideation

Variable	n (%)	Never (n = 11,731)	Sometimes (n = 955)	Often (n = 109)	Always (n = 122)	χ^2	p
Sex						80.630	< 0.001
Male	5512 (42.7)	4874 (88.4)	488 (8.9)	70 (1.3)	80 (1.5)		
Female	7405 (57.3)	6857 (92.6)	467 (6.3)	39 (0.5)	42 (0.6)		
Age						1.027	0.795
17–20	5293 (41.0)	4791 (90.5)	404 (7.6)	47 (0.9)	51 (1.0)		
21–26	7624 (59.0)	6940 (91.0)	551 (7.2)	62 (0.8)	71 (0.9)		
Residence						1.647	0.651
Rural	5628 (43.6)	5126 (91.1)	402 (7.1)	44 (0.8)	56 (1.0)		
Urban	7289 (56.4)	6605 (90.6)	553 (7.6)	65 (0.9)	66 (0.9)		

Table 2 Sociodemographic Characteristics Among the Distribution of Depressive Symptoms

Variable	n (%)	Yes (n = 1704)	No (n = 11,213)	χ^2	p
Sex				16.326	< 0.001
Male	5512 (42.7)	804 (14.6)	4708 (85.4)		
Female	7405 (57.3)	900 (12.2)	6505 (87.8)		
Age				2.998	0.086
17–20	5293 (41.0)	731 (13.8)	4652 (86.2)		
21–26	7624 (59.0)	973 (12.8)	6651 (87.2)		
Residence				1.039	0.319
Rural	5628 (43.6)	723 (12.8)	4905 (87.2)		
Urban	7289 (56.4)	981 (13.5)	6308 (86.5)		

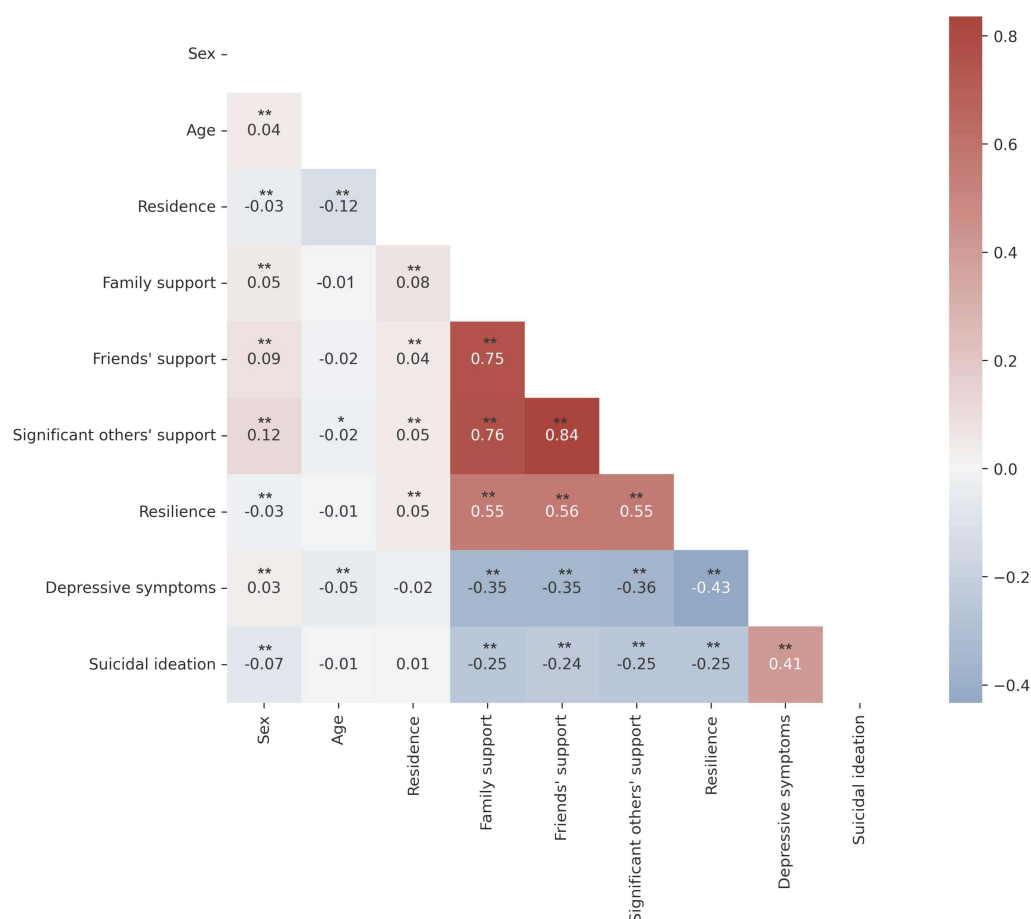


Figure 2 Bivariate Spearman correlations among study variables.

Note: * $p < 0.05$, ** $p < 0.01$.

Pathways from Social Support to Suicidal Ideation

The model fit of the CFA was acceptable, indicating that social support was a latent variable (Table 3). The standardized direct, indirect, and total effects of estimates of the pathways from social support to suicidal ideation through resilience and depressive symptoms are presented in Figure 3 and Table 4. Social support exerted significant direct ($\beta = -0.058$), indirect ($\beta = -0.225$), and total ($\beta = -0.283$) effects on suicidal ideation; 20.5% of the total effect was direct and 79.5% was indirect. Social support predicted suicidal ideation through resilience ($\beta = -0.038$), and depressive symptoms ($\beta = -0.087$), explaining 13.4%, and 30.7% of the total effect, respectively. Social support predicted suicidal ideation through the sequential mediation of resilience and depressive symptoms ($\beta = -0.099$), explaining 35.0% of the total effect. The SEM approach indicated an acceptable model fit, with RMSEA = 0.030, SRMR = 0.009, CFI = 0.996, GFI = 0.997, AGFI = 0.991, and TLI = 0.990.

Table 3 Standardized Loadings Based on Confirmatory Factor Analysis for Social Support

Factors	Factor loading	Mean	SD
Family support	0.85	22.50	4.52
Friends' support	0.79	22.22	4.48
Significant others' support	0.82	21.73	4.67

Notes: CFA model fit indices: RMSEA = 0.056; SRMR = 0.020; CFI = 0.988; GFI = 0.983.

Abbreviation: SD, standard deviation.

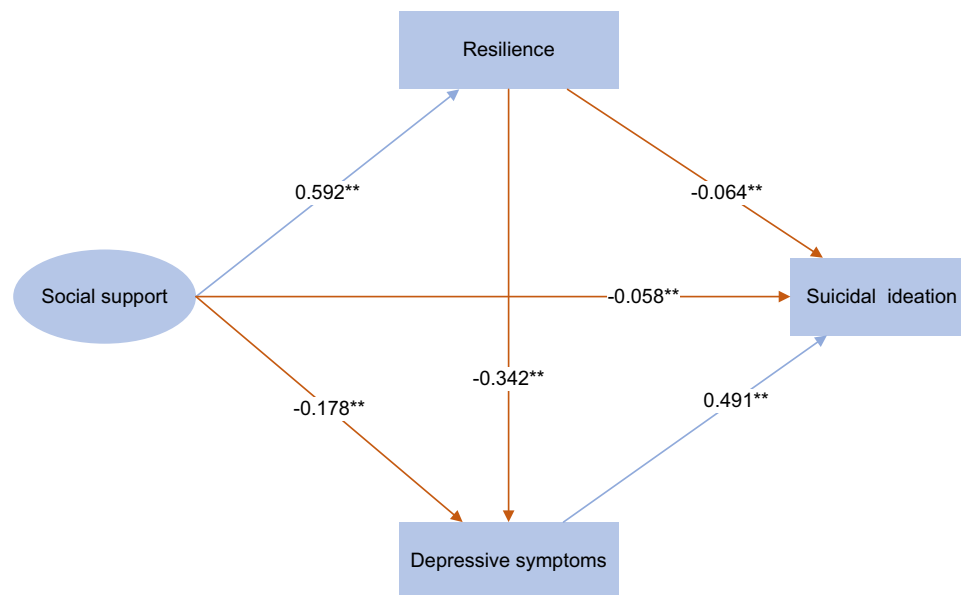


Figure 3 Standardized estimates of the pathways from social support to suicidal ideation in the model.

Note: ** $p < 0.01$. Fitting of the model: RMSEA = 0.030; SRMR = 0.009; CFI = 0.996; GFI = 0.997; AGFI = 0.991; TLI = 0.990.

Discussion

To the best of our knowledge, this is the first study to analyze the potential pathways from social support to suicidal ideation using the SEM approach during the COVID-19 campus lockdown among undergraduates in China. Consistent with the conceptual framework, this study found that social support mainly had an indirect effect on suicidal ideation through the sequential mediation of resilience and depressive symptoms. Social support had a significant effect on suicidal ideation through resilience and depressive symptoms, respectively. Both direct and indirect pathways from social support to suicidal ideation may be identified as intervention targets to reduce suicidal ideation during the COVID-19 campus lockdown; such interventions could reduce mental health inequities in this vulnerable group.

This study indicates that lower social support is directly associated with a higher risk of suicidal ideation. Previous research has shown that social factors are strongly associated with mental health, and lower social support may represent a higher risk pathway to suicidal ideation.⁸ This study shows the sequential mediating effects of resilience and depressive symptoms in indirect pathways from social support to suicidal ideation. Study has shown the protective effect of resilience on depressive symptoms and suicidal ideation during the COVID-19 lockdown.⁴⁶ A study in Greece indicated that the risk of suicidal ideation was significantly elevated during the COVID-19 lockdown, which was

Table 4 Standardized Direct, Indirect, and Total Path Effects from Social Support to Suicidal Ideation

Effects	Pathways	β	S.E.	p	BC 95% CI
Direct effects	Social support $\rightarrow$ Resilience	0.592	0.009	< 0.001	0.575 to 0.610
	Social support $\rightarrow$ Depression	-0.178	0.014	< 0.001	-0.204 to -0.151
	Social support $\rightarrow$ Suicidal ideation	-0.058	0.016	0.001	-0.090 to -0.028
	Resilience $\rightarrow$ Depression	-0.342	0.013	< 0.001	-0.368 to -0.315
	Resilience $\rightarrow$ Suicidal ideation	-0.064	0.015	< 0.001	-0.094 to -0.036
	Depression $\rightarrow$ Suicidal ideation	0.491	0.013	< 0.001	0.465 to 0.516
Indirect effects	Social support $\rightarrow$ Resilience $\rightarrow$ Suicidal ideation	-0.038	0.009	< 0.001	-0.055 to -0.022
	Social support $\rightarrow$ Depression $\rightarrow$ Suicidal ideation	-0.087	0.007	< 0.001	-0.100 to -0.074
	Social support $\rightarrow$ Resilience $\rightarrow$ Depression $\rightarrow$ Suicidal ideation	-0.099	0.005	< 0.001	-0.110 to -0.090
Total effects	Social support $\rightarrow$ Suicidal ideation	-0.283	0.013	< 0.001	-0.309 to -0.257

Abbreviations: S.E., standard error; BC 95% CI, bias-corrected 95% confidence intervals.

independently associated with greater depressive symptoms and lower resilience.⁴⁷ Resilience has been shown to have a protective effect against depressive symptoms and suicidal ideation, whereas higher perceived social support indicates a lower risk of developing suicidal ideation.⁸ Higher social support produces protective effects on mental health and promotes adaptive coping strategies, which has been associated with psychological resilience, while poor social support has been associated with psychiatric conditions, including depressive symptoms.⁴⁸ Especially in the context of low psychology capital, freshmen with high levels of family support exhibit less depression than those with low family support.⁴⁹

This study shows that lower social support is indirectly associated with a higher risk of suicidal ideation via depressive symptoms. In two longitudinal population cohorts in the UK, depressive symptoms during the COVID-19 pandemic were greater among younger ages,⁵⁰ which was associated with mental illnesses.⁸ Social support negatively affects depressive symptoms,⁵¹ and during the COVID-19 lockdown in the UK, a study found that individuals with higher levels of perceived social support had lower level of depressive symptoms.⁵² Coping through engagement with social support, such as support from family and friends in managing negative emotions and stress, is associated with lower level of depressive symptoms and suicide among African American adolescents.⁵³

This study indicates that the pathways from social support to suicidal ideation mediated by resilience. Resilience is mediated by perceived social support in substance use disorders,⁵⁴ and social support contributes to resilience, thus influencing suicidal behaviors.⁴⁸ Resilience is the process of effectively coping with uncertainty during the COVID-19 pandemic, and the enhancement of resilience may reduce the risk of suicide.⁴⁸ There are gender differences in suicide and resilience among adolescents,³³ as girls are twice as likely as boys to be diagnosed with depressive symptoms that may be life-threatening.¹⁹ This study found that male undergraduates had a higher risk of suicidal ideation, though another study found that female adolescents had a higher risk of suicidal ideation among 5,175 Chinese adolescents.⁷ Higher suicidal ideation rates among male adolescents may be linked to depressive symptoms.⁴⁸

Implications for practice, research and policy

This study provides a conceptual framework and supports the existing literature that is important for understanding the pathways from social support to suicidal ideation, including mediators of resilience and depressive symptoms among Chinese undergraduates during the COVID-19 campus lockdown. The SEM approach not only explicates the complex pathways to suicidal ideation but also points to current perspectives and intervention strategies. The conventional pathways to suicidal ideation may not be operative, this study recommends expanding theoretical models and intervention strategies to build upon cultural strengths while improving mental health during and after the COVID-19 pandemic.

The uncertainty of academic progression during the COVID-19 pandemic may have a negative effect on the mental health of students.¹⁷ It is the responsibility of healthcare workers and academics to enhance mental health,⁵⁵ and universities should commit to improving mental health and preventing suicide among undergraduates.⁷ Given the effect of social isolation during the COVID-19 pandemic on the mental health of undergraduates, there should be widespread concern over the increased practical implications of social support and resilience interventions.⁵⁶ The undergraduate learning model should be adjusted to mitigate the adverse mental health effects of the COVID-19 pandemic, and policymakers should apply a digital learning model when in-person courses are limited.

This study provides relevant evidence about the mental health of undergraduates in order to guide intervention strategies that are beneficial to alleviate suicidal ideation. The promotion of social support and resilience may show promise in suicidal ideation prevention. Since the adverse mental health impacts of the COVID-19 pandemic may remain in the long term, effective suicide prevention, particularly among vulnerable populations, should be an important mental health consideration.²² The continuous reinforcement of mental health policies during and after the COVID-19 pandemic is of global importance. High-quality global data on mental health for vulnerable populations during and after the COVID-19 pandemic is needed.⁵⁶ Psychosocial measures of population should be priority for mental health services,⁵⁷ mental health interventions during and after the COVID-19 pandemic should be highlighted on international and national public health agendas to improve overall wellbeing.⁵⁸

Limitations

Prominent contemporary theories of suicidal ideation have limited validity for Chinese adolescents, and current assessment tools for suicidal ideation do not adequately reflect the differences in the etiology and manifestation of suicidal thoughts and behaviors. Researchers measuring suicidal ideation, depressive symptoms, social support, and resilience need to consider socioecological and cultural differences that are unique to Chinese adolescents compared to those of other racial and ethnic backgrounds.³³ This sample of undergraduates is not nationally representative. The data was made available through the Mental Health Center assessing the mental health of undergraduates during the COVID-19 epidemic at a university. For instance, medical history of mental health was not collected, which may limit the findings on pathways from social support to suicidal ideation. All variables were self-reported; the findings may be affected by reporting bias. This study highlights that the presence of suicidal ideation in a few undergraduates may be hidden by adaptive behaviors. Future research should strive to evaluate the long-lasting effects of the COVID-19 pandemic on mental health. Further work should utilize prospective longitudinal studies to deeply understand the pathways between social support and suicidal ideation for designing mitigation intervention strategies that will be beneficial for undergraduates' mental health during and after the COVID-19 pandemic.

Conclusion

This is the first study to clarify the direct and indirect pathways from social support to suicidal ideation through resilience and depressive symptoms among Chinese undergraduates during the COVID-19 campus lockdown. This study strongly recommends mental health policy provide social support and resilience interventions to mitigate the massive mental health impact of the COVID-19 pandemic, especially for undergraduates. Action is needed to improve social support and resilience throughout this and future pandemics to reduce the potential of suicidal ideation.

Abbreviations

AGFI, adjusted goodness-of-fit index; CFA, Confirmatory factor analysis; CFI, comparative fit index; COVID-19, 2019 coronavirus disease; GFI, goodness of fit index; IMV, integrated motivational-volitional; LMICs, low- and middle-income countries; RMSEA, the root-mean-square error of approximation; SEM, structural equation modeling; SRMR, standardized root mean square residual; TLI, Tucker-Lewis index; MSPSS, Multidimensional Scale of Perceived Social Support; PCQ, Psychological Capital Questionnaire; PHQ-9, Patient Health Questionnaire; WHO, World Health Organization.

Data Sharing Statement

The datasets generated and analyzed during the current study are not publicly available due to original consent, but are available from the corresponding author upon reasonable request.

Ethical Approval

This study was approved by the Xuzhou Medical University Ethics Committee (ID number: XMUs 22/0406). All procedures were carried out in accordance with relevant guidelines and regulations.

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Disclosure

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this manuscript.

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