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Abstract

Background There is substantial evidence linking bullying victimization to suicidal ideation, but the mechanism behind this link is not well understood. This study investigates whether depressive symptoms mediate the relationship between bullying victimization and suicidal ideation, and whether perceived family economic strain moderates this mediation.

Methods Data were collected from 7,702 adolescents (mean age = 14.74 ± 1.69 years, 52% girls) using a self-report questionnaire that assessed bullying victimization, depressive symptoms, suicidal ideation and perceived family economic strain. Mediation and moderated mediation analyses were conducted using the PROCESS macro in SPSS.

Results Suicidal ideation was significantly associated with both bullying victimization and depressive symptoms, as determined by linear regression analysis (both p

[†]Xiaoyu Jiang and Qiaoyue Wei contributed to the work equally and should be regarded as co-first authors.

*Correspondence:
Xiujin Lin
13790329518@163.com
Junduan Wu
wujunduan@gxmu.edu.cn

Full list of author information is available at the end of the article

Introduction

Suicide results in the loss of over 700,000 lives worldwide each year, ranking as the third leading cause of death among individuals aged 15 to 19 [1]. It is a complex phenomenon that unfolds in three stages: suicidal ideation, suicide attempts, and completed suicide, progressing from contemplation to actual action. Suicidal ideation, which includes thoughts, considerations, or preparations for suicide, has consistently been identified as a strong predictor of actual suicidal behavior [2]. Recent research, including a meta-analysis of 103,309 adolescents, revealed that 15.4% of Chinese adolescents experience suicidal ideation [3], surpassing the global prevalence of 14% reported by Biswas [

each grade (7–12) in each school. With written informed agreement from students and guardians, a self-report questionnaire was distributed to all students in the chosen courses. The survey was conducted voluntarily and anonymously, and all information was kept strictly confidential. Guangxi Medical University's Ethics Committee gave its approval to the project (Approval number:

depression-related symptoms experienced in the past week, with responses scored on a four-point Likert scale ranging from 0 (not at all) to 3 (most days). The total score ranges from 0 to 60, with higher scores indicating more severe depressive symptoms, and a commonly used cut-off score of 16 or above suggests a propensity for depressive symptoms. Previous studies have validated the scale's high suitability for Chinese adolescents, showing its efficacy in measuring the intended constructs within this population [61, 62]. The CES-DC exhibited excellent internal consistency and reliability among the sample, with a Cronbach's coefficient of 0.942.

Suicidal ideation

The Positive and Negative Suicide Ideation (PANSI) Inventory, developed by Osman to assess positive and negative suicidal ideation across two dimensions among adolescents [63], and later translated and adapted by Chen for use in China [64]. The 14-item scale assesses suicidal ideation in adolescents, with responses rated on a 5-point Likert scale, ranging from 0 (none at all) to 3 (most of the time). The overall score ranges from 14 to 70, with higher scores indicating more severe suicidal ideation. Prior research has confirmed the inventory's high suitability for Chinese adolescents, demonstrating its efficacy in measuring the relevant constructs within this demographic [65–67]. In our study, the Cronbach's coefficient for the PANSI was 0.879.

Perceived family economic strain

The Perceived Family Economic Strain scale is utilized to assess the perceived economic strain within families of Chinese school students [

Correlations among bullying victimization, depressive symptoms, perceived family economic strain, and suicidal ideation

Table 2 displayed the Pearson correlations along with the means and standard deviations of the variables. Findings revealed that bullying victimization showed positive associations with suicidal ideation ($r=0.355$, $p<0.001$), depressive symptoms ($r=0.476$, $p<0.001$), and perceived family economic strain ($r=0.262$, $p<0.001$). Additionally, suicidal ideation exhibited a positive correlation with depressive symptoms ($r=0.652$, $p<0.001$) and perceived family economic strain ($r=0.208$, $p<0.001$). Moreover, perceived family economic strain was positive associa-

victimization on depressive symptoms decreased from $\beta = 1.076$ to $\beta = 0.926$ (Supplementary Table 3)). However, perceived family economic strain did not act as a moderating factor in the mediation model among Han, rural, town, and city adolescents. In the supplementary material we provide more information on the results of the subgroups.

Discussion

In the midst of the escalating issue of bullying victimization among Chinese adolescents, this study sought to investigate how bullying victimization impacts suicidal ideation among this population. While the significant influence of bullying victimization on suicidal ideation has been broadly acknowledged [72, 73], the precise roles of perceived family economic strain in this context within China's evolving economic and cultural landscape remained uncertain. This research sought to clarify how family economic strain influences this relationship, explore ethnic differences in this effect, and analyze depressive symptoms' potential mediation, as well as perceived family economic strain's moderation of this process.

Bullying victimization and suicidal ideation

Bullying victimization is strongly linked to suicidal ideation among adolescents, as supported by prior research and this study's findings [7, 74, 75]. Bullying victimization often suffers from negative impacts on their physical and mental health, including anxiety, depression, and low self-esteem, which can diminish their sense of belonging and self-worth. According to the Interpersonal Suicide Theory (ITS) [76], suicide is more likely when individuals have both the desire and the ability to act on it, which includes a frustrated sense of belonging and a perceived burden. Bullying can exacerbate these feelings, leading to social alienation and, in vulnerable individuals, suicidal

ideation. Therefore, preventing bullying is crucial for reducing the risk of suicidal ideation in adolescents.

The mediating role of depressive symptoms

In this study, we tested the second hypothesis that depressive symptoms serve as a mediator in the relationship between bullying victimization and suicidal ideation, aligning with previous research [37, 77]. According to the General Stress Theory, adolescents who endure bullying or maintain poor peer relationships may experience heightened stress [78]. This stress can initiate a series of adverse emotional responses, such as fear, anxiety, anger, and sadness, which may subsequently lead to maladaptive behaviors or thought patterns [79]. When considered alongside ITS [76], bullying victimization may cause adolescents to negatively evaluate themselves and their environment, leading to internalizing problems like depression. Under depression, adolescents may be more prone to feelings of being overwhelmed and a loss of belonging, fulfilling the initial components of the ITS and paving the way for suicidal ideation. Additionally, research indicates that individuals exposed to bullying may experience dysfunction in the hypothalamic-pituitary-adrenal (HPA) axis and increased sensitivity in the bilateral frontal lobes to perceived threats, leading to difficulties in emotional regulation, potential depression, and ultimately heightened suicidal ideation [80–82]. These findings underscore the urgent need for targeted interventions for bullying and emphasize the critical importance of promoting positive mental health development among adolescents.

The moderating role of perceived family economic strain

The moderated mediation model employed in this study reveals that perceived family economic strain significantly moderates the indirect relationship between bullying victimization and depressive symptoms among both the general and minority adolescent populations. However, it fails to demonstrate a significant moderating influence of perceived family economic strain on either the direct path from bullying victimization to suicidal ideation or the indirect path from depressive symptoms to suicidal ideation. These findings suggest that the impact of bullying victimization on depressive symptoms may be mitigated by high levels of perceived family economic strain. Our findings contradict the prevalent notion that persistent financial stress within families

Conclusions

This study examined the role of depressive symptoms in mediating bullying victimization and suicidal ideation, as well as the moderating role of perceived family economic strain. Our findings confirm the hypotheses that bullying victimization may be positively associated with suicidal ideation. Furthermore, bullying victimization may indirectly influence suicidal ideation through the mediating role of depressive symptoms, and perceived family economic strain moderates the relationship between bullying victimization and depressive symptoms. These findings highlight the critical need to consider both depressive symptoms and broader socioeconomic contexts when addressing the impact of bullying on mental health.

Supplementary Information



