

Study on the Relationship between Family Intimacy, Psychological Resilience, Coping Strategies, and Non-Suicidal Self-Injury among Middle School Students in Sanming City

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Abstract

Purpose: To explore the underlying interactive constraints and mechanisms among family intimacy, non-suicidal self-injury behavior, psychological resilience, and coping strategies among middle school students in Sanming City. This study aims to provide a systematic and scientifically sound theoretical basis for the prevention and intervention mechanisms of non-suicidal self-injury behavior among junior high school students. **Method:** Using convenience sampling, 388 students from the first year of high school at a school in Ninghua County, Sanming City, Fujian Province, were selected. Assessment tools such as the Adolescent Self-Harm Behavior Questionnaire, the Connor-Davidson Resilience Scale (CD-RISC), the Family Intimacy Scale, and a simplified coping methods questionnaire were employed for data collection. **Results:** 1) The overall reporting rate of non-suicidal self-injury behavior among the surveyed students is 31.7%. There is a significant difference in the reporting rate of non-suicidal self-injury behavior based on family economic status ($p < 0.01$). 2) Students with and without left-behind experiences show a significant difference in strength scores ($t = 2.19, p < 0.05$). 3) Students with and without non-suicidal self-injury behavior exhibit significant differences in family intimacy ($t = 5.58, p < 0.01$), psychological resilience ($t = 4.16, p < 0.01$), resilience ($t = 3.50, p < 0.01$), strength ($t = 4.02, p < 0.01$), optimism ($t = 4.03, p < 0.01$), and negative coping strategies ($t = -1.97, p < 0.05$). 4) Correlation analysis results show that non-suicidal self-injury behavior is positively correlated with negative coping strategies ($r = 0.17, p < 0.01$) and with total psychological resilience ($r = 0.20, p < 0.01$), resilience ($r = 0.19, p < 0.01$), strength ($r = 0.21, p < 0.01$), optimism ($r = 0.20, p < 0.01$), family intimacy ($r = 0.21, p < 0.01$), and positive coping strategies ($r = 0.10, p < 0.05$). Family intimacy is positively correlated with total psychological resilience ($r = 0.41, p < 0.01$), resilience ($r = 0.38, p < 0.01$), strength ($r = 0.37, p < 0.01$), optimism ($r = 0.32, p < 0.01$), and positive coping strategies ($r = 0.36, p < 0.01$). Positive coping strategies are positively correlated with total psychological resilience ($r = 0.47, p < 0.01$), resilience ($r = 0.44, p < 0.01$), strength ($r = 0.45, p < 0.01$), and optimism ($r = 0.36, p < 0.01$). 5) The mediating effect of coping strategies between family intimacy and non-suicidal self-injury behavior is not significant. 6) Psychological resilience has a mediating effect on the relationship between family intimacy and non-suicidal self-injury behavior, with a mediating effect of -0.08 . This accounts for 30.18% of the total effect of family intimacy (-0.26). **Conclusion:** These results indicate a relatively high detection rate of non-suicidal self-injury behavior and a significant mediating effect of psychological resilience. This suggests that school interventions may benefit from focusing on providing additional support at the family level to enhance individual levels of psychological resilience, ultimately reducing the occurrence of non-suicidal self-injury behavior among middle school students.

Keywords

family intimacy; non-suicidal self-injury; positive coping strategies; psychological resilience; mediating effect

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1. Introduction

The high school stage is an important turning point for students' future development directions. The huge talent competition in today's society and the high-intensity learning tasks often multiply the pressure on students at this stage. When students face challenges from their academic and personal lives without having the correct scientific coping mechanisms and timely help from their surroundings, the accumulation of pressure can often lead to serious consequences. This article will start from the relatively serious issue of non-suicidal self-injury behavior, explore the level of this indicator and related factors among first-year high school students in Ninghua County, Sanming City, Fujian Province, and provide corresponding intervention and prevention measures.

Non-suicidal self-injury behavior refers to various behaviors that individuals adopt due to a lack of appropriate coping mechanisms, which are not accepted and recognized by today's social culture. However, these behaviors occur without clear behavioral motives. These behaviors, due to repeated and intentionally targeted at body tissues, can cause mild to moderate damage^[1]. The detection rate of non-suicidal self-injury behavior depends on the definition of related concepts, specific measurement methods, sample representativeness, etc. In Lang Junjie's meta-analysis of non-suicidal self-injury behavior in China, the overall prevalence rate among middle school students was 22.37%, with 20.6% for males and 21.9% for females^[2]. Similarly, in Zheng Ziwei's study, 29.75% of middle school students had engaged in non-suicidal self-injury behavior, with females (32.03%) higher than males (27.89%) ($p=0.032$), and junior high school students (33.05%) higher than high school students (26.99%)^[3]. Regarding the different results shown by non-suicidal self-injury behavior in terms of the demographic variable of gender, Fang Xiaojia summarized from previous research progress on risk factors for non-suicidal self-injury behavior that most studies indicate that females show a slightly higher number of non-suicidal self-injury behaviors in terms of gender, which may be related to females experiencing more negative events in life than males. Furthermore, Fang Xiaojia discussed the impact of biological factors and individual factors on non-suicidal self-injury behavior from a medical perspective. Firstly, the author discussed the influence of three biological

factors, genetics, neuroendocrinology, and neuroimaging, on non-suicidal self-injury behavior, and then explained individual factors such as age, gender, etc., which also have varying degrees of influence^[4].

Of course, we cannot ignore the individual's family environmental factors, which are also very important risk factors. As Li Yun's study showed, the more intimate the emotional relationship between family members, the stronger the family's ability to cope with changes, but the poorer the parent-child relationship, the greater the probability of dangerous behaviors such as self-harm. In addition, research also suggests that adolescents growing up in incomplete family structures such as divorced families are more likely to engage in non-suicidal self-injury behaviors^[5]. Foreign studies also indicate that the quality of social support and emotional connection from other family members in the family environment is closely related to non-suicidal self-injury. Another study showed that family intimacy is an important protective factor for non-suicidal self-injury behavior^[6]. By implementing appropriate psychological intervention measures and assistance, effectively addressing issues such as family rules and family adaptive development can make family members closer to each other, thus reducing the recurrence of self-harm behaviors^[7]. Psychological resilience refers to an individual's ability to withstand setbacks or adversity and successfully cope with adversity and trauma. When individuals take spontaneous behavioral actions in response to stressful events from their life environment, these behaviors are called coping mechanisms^[8]. These mechanisms often demonstrate the social adaptability developed by individuals and judge whether an individual's social skill development meets societal standards^[9]. Both are psychological abilities reflected by individuals in adverse situations. Previous literature has indicated a significant correlation between family intimacy and coping mechanisms, which can significantly positively predict coping mechanisms^[10]. Research also suggests that coping mechanisms may impact an individual's non-suicidal self-injury behavior, as some self-harm behaviors exhibited by adolescents can be seen as resulting from a lack of positive and correct coping mechanisms^[11-12]. Intimate family relationships and a good environment can protect children, enabling them to exhibit higher levels of psychological resilience^[13].

Additionally, the research results of Ma Yuqiao's article indicate that students with different types of self-harming behaviors show significant differences in their levels of psychological resilience^[14]. Therefore, this article proposes the following hypotheses:

Hypothesis 1: Coping mechanisms play a mediating role between family intimacy and non-suicidal self-injury behavior. Hypothesis 2: Psychological resilience plays a mediating role between family intimacy and non-suicidal self-injury behavior. In conclusion, this study will examine the relationship between family intimacy, psychological resilience, coping mechanisms, and non-suicidal self-injury behavior. Theoretically, it aims to further clarify the underlying psychological mechanisms and hopes to apply the results to practical teaching activities, promote attention to students' psychological health status at the societal, school, and family levels, and provide timely prevention and intervention strategies.

2. Materials and Methods

2.1. Participants

A questionnaire survey was conducted on first-year high school students at a certain high school in Ninghua County, Sanming City, Fujian Province, using convenience sampling. A total of 441 questionnaires were distributed, and 388 valid questionnaires were collected based on the lie detection questions and answer conditions set, with an effective questionnaire recovery rate of 87.89%. The

distribution of various demographic statistical indicators is shown in Table 1.

2.2. Questionnaire

Adolescent Self-Harm Behavior Questionnaire

This scale is divided into self-harm frequency and severity. Self-harm frequency is categorized into 4 levels, scored from 1 to 4; severity ranges from "none" to "extreme" scored from 1 to 5. Self-harm behavior is calculated as the product of self-harm frequency and severity, with higher scores indicating more severe behavior. In this study, the Cronbach's alpha coefficient for this scale was 0.90.

Connor-Davidson Resilience Scale (CD-RISC)

This scale includes the dimensions of resilience, strength, and optimism. It uses a five-level rating, with higher scores indicating higher levels of psychological resilience. In this study, the Cronbach's alpha coefficients for the full scale and the three sub-scales were 0.92, 0.88, 0.80, and 0.60, respectively.

Family Intimacy Scale The study utilized the family intimacy sub-scale from the Chinese version of the Family Intimacy and Adaptability Scale to assess the actual level of family intimacy among research subjects. It employs a five-level scoring system, with higher scores indicating higher levels of family intimacy. The Cronbach's alpha coefficient for this scale in the study was 0.86.

Simple Coping Style Questionnaire

This scale is divided into two dimensions: positive coping

Table 1. Population distribution of each demographic statistical index

Gender		Whether serving as a class cadre		Family location		Whether an only child		Family economic situation				
Male	Female	Yes	No	Rural	Urban or town	Yes	No	Very poor	Lower-middle	Medium	Upper-middle	Very good
193	195	159	229	134	254	66	322	17	64	270	33	4
Parents' work situation				whether there is a left-behind experience.								
Both parents work locally	Both work outside	Only mother works outside	Only father works outside	Yes	No							
213	58	18	99	175	213							

style and negative coping style. It uses a 0-3 (“never used” to “frequently used”) 4-level rating system. In this study, the Cronbach’s alpha coefficients for the full scale and the positive and negative coping style sub-scales were 0.80, 0.82, and 0.74, respectively.

2.3. Data analysis

Data analysis was conducted using SPSS 25.0 software, including descriptive statistical analysis, correlation analysis, independent sample t-tests, stepwise multiple regression, and other analytical methods.

3. Results

3.1. Common Method Bias Test

Psychological characteristics of the participants were measured using self-report scales in this study. To test for the presence of common method bias, a Harman single-factor test was conducted^[15]. The results showed that there were 31 factor eigenvalues greater than 1 in the unrotated factor solution, and the first common factor explained variance was 14.666% (<40%), indicating that the common method bias effect was not severe in this study.

3.1.1. Reporting Rates of Non-Suicidal Self-Injury Behavior Across Different Student Categories

In this study, the reporting rate of non-suicidal self-injury behavior was 31.7%. There was a significant difference in the reporting rates of non-suicidal self-injury behavior based on the demographic variable of family economic situation, with $p < 0.01$, as shown in **Table 2**.

3.1.2. Students’ Non-Suicidal Self-Injury Behavior, Psychological Resilience, Family Intimacy, and Coping Strategies Scores Comparison Based on Left-Behind Experience

There were no significant differences ($p > 0.05$) in non-suicidal self-injury behavior, coping strategies, psychological resilience, resilience, and optimism scores between students with and without left-behind experiences. However, there was a significant difference ($p < 0.05$) in strength scores. Refer to **Table 3** for details.

3.2. Students with and without Non-Suicidal Self-Injury Behavior: Comparison of Psychological Resilience, Family Intimacy, and Coping Strategies Scores

The research results indicate that significant differences ($p < 0.01$) exist in the scores of psychological resilience and its three sub-dimensions, as well as family intimacy, between students with and without non-suicidal self-injury behavior. There is also a significant difference ($p < 0.05$) in scores related to negative coping strategies. However, there is no significant difference ($p > 0.05$) in scores related to positive coping strategies. Refer to **Table 4** for details.

3.3. The Relationship between Non-Suicidal Self-Injury Behavior and Family Intimacy, Psychological Resilience, Coping Strategies

Pearson correlation analysis results indicate that non-suicidal self-injury behavior is positively correlated with negative coping strategies ($r = 0.17$, $p < 0.01$), as well as with total psychological resilience score ($r = 0.20$, $p < 0.01$), resilience ($r = 0.19$, $p < 0.01$), strength ($r = 0.21$, $p < 0.01$), optimism ($r = 0.20$, $p < 0.01$), family intimacy ($r = 0.21$, $p < 0.01$), and positive coping strategies ($r = 0.10$, $p < 0.05$); family intimacy is positively correlated with total psychological resilience score ($r = 0.41$, $p < 0.01$), resilience ($r = 0.38$, $p < 0.01$), strength ($r = 0.37$, $p < 0.01$), optimism ($r = 0.32$, $p < 0.01$), and positive coping strategies ($r = 0.36$, $p < 0.01$); positive coping strategies are positively correlated with total psychological resilience score ($r = 0.47$, $p < 0.01$), resilience ($r = 0.44$, $p < 0.01$), strength ($r = 0.45$, $p < 0.01$), and optimism ($r = 0.36$, $p < 0.01$). Refer to **Table 5** for details.

3.4. The Mediating Effect of Coping Strategies between Family Intimacy and Non-Suicidal Self-Injury Behavior

The correlation analysis results between coping strategies and family intimacy indicate that there is no correlation between negative coping strategies and family intimacy, whereas positive coping strategies show a significant correlation with family intimacy ($r = 0.36$, $p < 0.01$). Based on this result, the subsequent discussion specifically focuses on the mediating role of positive

Table 2. Comparison of Reporting Rates of Non-Suicidal Self-Injury Behavior Among Students Based on Different Demographic Characteristics

Demographic index		Number	Non-Suicidal Self-Injury Behavior		χ^2 values	p values
Gender	Male	193	55	28.50%	1.82	>0.05
	Female	195	68	34.87%		
Whether serving as a class cadre	Yes	159	54	33.96%	0.64	>0.05
	No	229	69	30.13%		
Family location	Rural	134	44	32.84%	0.12	>0.05
	Urban or town	254	79	31.10%		
Whether an only child	Yes	66	20	30.30%	0.07	>0.05
	No	322	103	31.99%		
Family economic situation	Very poor	17	5	29.41%	22.58	<0.01
	Lower-middle	64	35	54.69%		
	Medium	270	70	25.93%		
	Upper-middle	33	13	39.40%		
whether there is a left-behind experience	Very good	4	0	0.00%	0.98	>0.05
	Yes	213	63	29.58%		
	No	175	60	34.29%		

Table 3. Comparison of Non-Suicidal Self-Injury Behavior, Psychological Resilience and its Factors, Family Intimacy, and Coping Strategies Scores among Students with and without Left-Behind Experience ($x \pm s$)

Whether there is a left-behind experience	No	Yes	T values	P values
Non-Suicidal Self-Injury Behavior	22.92±11.28	23.66±13.00	-0.61	0.55
Psychological Resilience	3.19±0.61	3.08±0.58	1.75	0.08
Toughness	3.10±0.67	3.03±0.65	1.13	0.26
Strength	3.30±0.67	3.15±0.64	2.19	0.03*
Optimism	3.26±0.70	3.13±0.66	1.85	0.07
Family Intimacy	66.28±10.26	64.87±9.73	1.38	0.17
Positive Coping Strategies	77.46±14.02	75.42±12.34	1.51	0.13
Negative Coping Strategies	18.09±4.95	18.46±4.81	-0.74	0.46

Note: * $p < 0.05$, ** $p < 0.01$ **Table 4.** Comparison of Psychological Resilience, Family Intimacy, and Coping Strategies Scores among Students with and without Non-Suicidal Self-Injury Behavior ($x \pm s$)

Non-Suicidal Self-Injury Behavior	Number	Psychological Resilience	Toughness	Strength	Optimism	Family Intimacy	Positive Coping Strategies	Negative Coping Strategies
No	265	3.23±0.6	3.15±0.66	3.32±0.64	3.29±0.68	67.51±9.55	35.22±7.44	17.92±4.81
Yes	123	2.96±0.57	2.9±0.62	3.04±0.66	3.00±0.65	61.63±9.92	34.34±6.66	18.97±4.97
t values		4.16	3.5	4.02	4.03	5.58	1.12	-1.97
p values		<0.01	<0.01	<0.01	<0.01	<0.01	>0.05	<0.05

Table 5. Correlation Coefficients between Non-Suicidal Self-Injury Behavior and Psychological Resilience, Coping Strategies, Family Intimacy (N=388)

	Non-SuicidalSelf-InjuryBehavior	Psychological Resilience	Toughness	Strength	Optimism	Family Intimacy
Psychological Resilience	-0.22**	1				
Toughness	-0.19**	0.95**	1			
Strength	-0.21**	0.91**	0.77**	1		
Optimism	-0.20**	0.75**	0.60**	0.66**	1	
Family Intimacy	-0.21**	0.41**	0.38**	0.37**	0.32**	1
Positive Coping Strategies	-0.10*	0.47**	0.44**	0.45**	0.36**	0.36**
Negative Coping Strategies	0.17**	-0.05	-0.05	-0.1	0.02	-0.01

Note: ** $p < 0.01$ (two-tailed) ; * $p < 0.05$ (two-tailed)

coping strategies. As shown in **Table 3**, there is a close relationship between positive coping strategies and non-suicidal self-injury behavior. Hence, it can be inferred that positive coping strategies may act as a mediating variable in the relationship between family intimacy and non-suicidal self-injury behavior.

The process of testing the mediating effect is as follows: First, family intimacy total score is set as the independent variable, non-suicidal self-injury behavior as the dependent variable for regression analysis. Second, family intimacy total score is set as the independent variable, and positive coping strategies as the dependent variable for regression analysis. Third, using positive coping strategies and family intimacy total score as independent variables, and non-suicidal self-injury behavior as the dependent variable, conduct a stepwise multiple regression analysis. The mediating effect test can be conducted using the Bootstrap method with bias correction, with a sample size of 5000. If the confidence interval of the bias-corrected probability is above 95%, and the result does not include zero, the mediating effect is established.

The results indicate that under the conditions of a bias-corrected confidence interval probability of over 95%, the mediating effect result contains zero (LLCI=-0.199, ULCI=0.002). This suggests that there is no mediating effect of positive coping strategies in the relationship between family intimacy and non-suicidal self-injury behavior, as shown in **Table 6**.

3.5. The Mediating Effect of Psychological Resilience between Family Intimacy and Non-Suicidal Self-Injury Behavior

The correlation analysis results show that the total score and dimensions of psychological resilience are significantly correlated with family intimacy. Based on this result, the subsequent discussion focuses on the mediating role of psychological resilience. As shown in **Table 3**, psychological resilience is also significantly correlated with non-suicidal self-injury behavior. Therefore, it can be inferred that psychological resilience may act as a mediating variable in the relationship between family intimacy and non-suicidal self-injury behavior.

The process of testing the mediating effect is similar to the steps outlined in section 2.6, with positive coping strategies replaced by psychological resilience. Using the Bootstrap method with bias correction and a sample size of 5000, under the condition of a bias-corrected probability of over 95% for the confidence interval, the mediating effect result does not contain zero (LLCI=-0.120, ULCI=-0.010). This indicates that psychological resilience has a mediating effect in the relationship between family intimacy and non-suicidal self-injury behavior. Furthermore, according to Figure 6, the effect size is -0.08, accounting for 30.18% of the total effect of family intimacy on self-injury behavior (-0.26). Refer to **Table 7** for details.

Table 6. Testing the Mediating Effect of Positive Coping Strategies between Family Intimacy and Non-Suicidal Self-Injury Behavior (N=388)

Step	DependentVariable	IndependentVariable	R ² values	Fvalues	Bvalues	StandardError	tvalues
First	Non-Suicidal Self-Injury Behavior	Family Intimacy	0.05	18.40**	-0.26	0.06	-4.29**
Second	Positive Coping Strategies	Family Intimacy	0.59	512.25**	1	0.04	22.63**
Third	Non-Suicidal Self-Injury Behavior	Family Intimacy	0.05	10.78**	-0.14	0.09	-0.11**
		Positive Coping Strategies			-0.12	0.07	-0.13

Table 7. Testing the Mediating Effect of Psychological Resilience between Family Intimacy and Non-Suicidal Self-Injury Behavior (N=388)

Step	DependentVariable	IndependentVariable	R ² values	Fvalues	Bvalues	StandardError	tvalues
First	Non-Suicidal Self-Injury Behavior	Family Intimacy	0.05	18.40**	-0.26	0.06	-4.29**
Second	Psychological Resilience	Family Intimacy	0.17	76.19**	0.02	0.01	8.73**
Third	Non-Suicidal Self-Injury Behavior	Family Intimacy	0.06	13.72**	-0.18	0.07	-2.76**
					-3.19	1.09	-2.94**

4. Discussion

4.1. Reporting Rates of Non-Suicidal Self-Injury Behavior among Students of Different Categories

The overall reporting rate of non-suicidal self-injury behavior among the survey participants is 31.7%, which is higher than the detection rates reported by Zheng Ziwei et al. (29.75%)^[3] among 2040 middle school students, Wang Xiaoyan et al. (9.5%)^[16], Chen Yunli et al. (21.9%)^[17], and lower than the rate reported by Lin Lihua et al. (40.34%). Furthermore, demographic indicators such as gender, class cadre status, family location, being an only child, and experiencing left-behind situations did not show significant differences in the presence of non-suicidal self-injury behavior. However, non-only children (31.99%) reported higher rates than only children (30.30%), and rural areas (32.84%) reported higher rates than urban areas (31.10%). This aligns with the results of Lang Junjie et al.'s meta-analysis, where non-only children and rural students in mainland China had higher reporting rates than their counterparts. Interestingly, students with left-behind experiences showed a lower

detection rate of self-injury behavior (29.58%) compared to those without such experiences (34.29%), contrary to previous studies^[17]. This discrepancy could be attributed to the boarding school setting of the surveyed students, where the provision of a supportive environment and strict dormitory management may reduce the occurrence of non-suicidal self-injury behavior. However, students with left-behind experiences scored slightly higher on the item of self-injury behavior compared to students without such experiences, albeit with a lower detection rate^[20]. This suggests that this group may exhibit more extreme self-injurious behaviors. Notably, the consideration of boarding school life dimensions in the criteria reveals that whether female students board at school has been identified as a factor influencing their non-suicidal self-injury behavior.

Regarding family economic status as a demographic indicator, students from different economic backgrounds showed significant differences in reporting rates of non-suicidal self-injury behavior. Research has indicated that family environment plays a dominant role in human development, with familial support being a

crucial protective factor against individual self-injurious behaviors. Additionally, studies have shown that left-behind children in middle school tend to exhibit more emotional and behavioral problems within the lower to middle economic range^[21].

Overall, the study demonstrates a relatively high reporting rate of non-suicidal self-injury behavior. Several reasons may account for this finding: the survey was conducted in Ninghua, a poverty-stricken county in Fujian province experiencing a significant outflow of migrant workers, resulting in a higher prevalence of left-behind students. Moreover, the unpredictable and uncontrollable nature of the COVID-19 pandemic has impacted individuals' mental health, particularly adolescents who may lack coping strategies compared to other age groups, making them more vulnerable to severe mental health issues^[22]. Additionally, first-year high school students are in the adolescence period^[23], which is a high-risk group for non-suicidal self-injury behavior. The survey was conducted around January 20, 2022, a time when students were preparing for year-end exams, potentially heightening academic stress and leading to negative emotions such as anxiety and depression, which could trigger self-harming behaviors.

4.2. Comparison of Non-Suicidal Self-Injury Behavior, Psychological Resilience, Family Intimacy, and Coping Strategies between Students with and without Left-Behind Experiences

From **Table 3**, it is evident that students with left-behind experiences scored slightly lower than students without such experiences in total psychological resilience, resilience, strength, optimism, family intimacy, and positive coping strategies. However, they showed the opposite results in negative coping strategies. Notably, there was a significant difference in scores between the two groups in the strength dimension.

In terms of psychological resilience, the study results align with those of Jin Yinghua et al^[24]. However, differences in research tools and sample sizes may yield varying results among scholars^[25].

Regarding family intimacy, students with left-behind experiences scored slightly lower than those without such experiences, consistent with previous research indicating

that left-behind students, due to parents' long absences for work and limited time spent with parents, may experience a sense of detachment and a decrease in family intimacy due to the lack of effective communication and support caused by distance^[26].

When it comes to coping strategies, students with left-behind experiences scored slightly lower in positive coping strategies compared to those without such experiences, while displaying opposite results in negative coping strategies. Previous studies, such as Zhu Yan's research, have shown insignificant differences in coping strategies between the two groups of students^[27].

4.3. Comparison of Psychological Resilience, Family Intimacy, and Coping Strategies between Students with and without Non-Suicidal Self-Injury Behavior

Table 4 indicates significant differences in scores of psychological resilience and its three sub-dimensions, family intimacy, and negative coping strategies between students with and without non-suicidal self-injury behavior, with the latter group scoring higher. Studies have suggested that students engaging in different types of self-injurious behaviors demonstrate varying levels of psychological resilience. Furthermore, as the frequency of self-injury behaviors increases, individuals may exhibit lower levels of psychological resilience. Family intimacy serves as an indicator of close family relationships and atmosphere, which can decrease the likelihood of engaging in maladaptive behaviors^[28]. Guerreiro et al. mentioned in their review that adolescents engaging in self-injurious behaviors tend to adopt relatively passive coping strategies^[29].

4.4. Relationship between Non-Suicidal Self-Injury Behavior, Family Intimacy, Psychological Resilience, and Coping Strategies

The results reveal a negative correlation between non-suicidal self-injury behavior and family intimacy, psychological resilience, its sub-dimensions, and positive coping strategies. In contrast, positive correlations are observed between psychological resilience, family intimacy, positive coping strategies, indicating that these factors are important influencing factors for non-suicidal self-injury behavior. Jiang Guangrong et al.

mention in their self-harm behavior study that traumatic childhood experiences hinder individuals' development of motivation, attitudes, tools, emotions, and interpersonal abilities required for positive adaptation, leading them to adopt harmful coping mechanisms when lacking necessary resources and adaptive skills^[30].

4.5. Mediating Effect of Coping Strategies between Family Intimacy and Non-Suicidal Self-Injury Behavior

Research suggests that adolescents who have experienced adverse events during childhood may exhibit a direct relationship between their coping strategies for handling sudden major life events and current self-injurious behaviors^[31]. Surprisingly, the present study did not find a mediating effect of coping strategies between family intimacy and non-suicidal self-injury behavior, which contradicts previous research. By comparing this study with the research of Ma Shuangshuang and Ren Y, we can explore why there is no mediating effect of positive coping strategies in the present study.

Ma Shuangshuang et al. similarly used a questionnaire on adolescent self-harm behavior and a trait coping style questionnaire with the same dimensional division as this study. The consistency in the process of testing for mediating effects was evident. However, a detailed comparison between Ma Shuangshuang et al.'s research and the present study reveals some inconsistencies. Firstly, Ma Shuangshuang et al. employed a stratified cluster sampling method, which allowed for the investigation of different levels of objects. In contrast, this study focused solely on first-year high school students, showcasing strong homogeneity and weak representativeness due to this single-level survey. Additionally, in terms of sample size, Ma Shuangshuang et al. studied 9704 urban and rural middle and high school students in Zhengzhou and Guiyang, demonstrating a significant difference in sample size compared to the present study^[32].

Ren Y, using Nock's comprehensive theoretical model, conducted a representative sampling of 1989 Taiwanese high school students (stratified sampling based on school type and class) and employed the Brief Family Functioning Scale (BFF), Stress Coping Scale (SCC), and Deliberate Self-Harm Inventory (DSHI) to collect data

on family functioning, coping strategies, and non-suicidal self-injury behavior. The study explored the predictive roles of distal risk factors (i.e., family functioning) and general susceptibility factors (i.e., coping strategies) in non-suicidal self-injury behavior, as well as the mediating effect of coping strategies in the relationship between family functioning and non-suicidal self-injury behavior^[13]. The results indicated that avoidance/emotion-focused coping strategies mediated the relationship between family functioning and non-suicidal self-injury behavior. By comparing this study with Ren Y et al.'s research, several reasons for discrepancies can be considered: the disagreement in research subjects, consistent with Ma Shuangshuang et al., and in terms of research tools, this study utilized a simplified coping strategy questionnaire that categorized coping strategies into positive and negative aspects. Ren Y's study included more detailed coping strategies, such as avoidance and seeking social support, which might explain the lack of significant mediating effects of positive coping strategies in this study.

4.6. The Mediating Effect of Psychological Resilience between Family Intimacy and Non-Suicidal Self-Injury Behavior

In the previous studies mentioned, such as Ma Shuangshuang et al., it was noted that emotional symptoms and maladaptive psychological symptoms during childhood abuse have a partial mediating effect on non-suicidal self-injury. The trait of psychological resilience in this study is closely related to these emotional and maladaptive symptoms, indicating that psychological resilience could also play a mediating role in the relationship between family intimacy and non-suicidal self-injury behavior.

Looking back at previous research, we understand that when children receive timely warmth and care from family members during their growth, as well as having their needs for care and attention met, their development of psychological resilience improves. Conversely, hindered development of psychological resilience may lead to psychological or behavioral risks, such as self-harm or suicide, especially when family intimacy is weak among family members^[33]. This insight provides valuable lessons for the psychological development of adolescents:

on one hand, schools and families should actively create platforms to showcase students' abilities, helping them enhance positive psychological qualities such as self-esteem and optimism. On the other hand, efforts should be made to facilitate students in improving their personal qualities while learning how to utilize external resources effectively. This can be achieved through regular mental health workshops conducted by the school or through close and supportive relationships with peers. Combining these approaches can promote the development of psychological resilience, thereby enhancing the mental health levels of individuals.

5. Conclusion

The overall reporting rate of non-suicidal self-injury behavior among the surveyed students is relatively high at 31.7%, with variations in reporting rates based on different family economic situations.

Students with left-behind experiences scored lower in strength compared to students without such experiences.

Students engaging in non-suicidal self-injury behavior demonstrated lower scores in family intimacy, psychological resilience, and its three sub-dimensions, while showing opposite results in negative coping strategies.

Non-suicidal self-injury behavior showed a negative correlation with the total score and three sub-dimensions of psychological resilience, family intimacy, and positive coping strategies, and a positive correlation with negative coping strategies. Family intimacy exhibited a positive correlation with the total score and three sub-dimensions of psychological resilience and positive coping strategies. The total score and three sub-dimensions of psychological resilience were positively correlated with positive coping strategies.

Coping strategies did not exhibit a mediating effect in the relationship between family intimacy and non-suicidal self-injury behavior.

Psychological resilience was found to have a mediating effect in the relationship between family intimacy and non-suicidal self-injury behavior.

Disclosure statement

The author declares no conflict of interest.

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