



Relationship among Aggression, Non-Suicidal Self-Injury, and Depression in Youths

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Abstract

Background: Competition among countries becomes fiercer with progress in globalization. As the future and hope of national development, the youth are undertaking intensifying competitive pressures. More youths suffer psychological health issues, such as non-suicidal self-injury (NSSI), depression, and aggressive behaviors. What are the relationships among suicidal self-injury, aggression, and depression? There's few systematic study on these two aspects yet. Thus, we examined the relationship between aggression and NSSI in youths, as well as the mediating effects of depression in such a relationship.

Methods: A total of 770 youths (comprising university students, community youths and rural migrant workers) in Zhejiang, Anhui and Henan in China were investigated from August to December 2022 by using the aggression scale, NSSI scale, and depression scale. The relationship among aggression, NSSI and depression in youths was discussed through a t-test, correlation analysis, and multivariate regression analysis.

Results: With respect to abuse experiences during childhood, parental emotional status and family conditions, the total scores in aggression, NSSI, and depression of youths differed significantly ($P<0.05$). A significantly positive correlation existed between aggression and NSSI of youths ($r=0.41$, $P<0.01$), a significantly positive correlation existed between aggression and depression ($r=0.42$, $P<0.01$), and a significantly positive correlation exists between NSSI and depression ($r=0.42$, $P<0.01$). Aggression of youths had not only direct and positive prediction effects on NSSI ($B=0.41$, $P<0.001$) but also indirect effects on NSSI through depression.

Conclusion: Aggression, NSSI and depression of youths were influenced significantly by abuse experiences during childhood, parental emotional status and family conditions. Depression has partial mediating effects between aggression and NSSI in youths.

Keywords: Abuse; Childhood; Parental emotional status; Aggression; Depression; Injury

Introduction

Competition among countries has become fiercer with progress in globalization. As the future and hope of national development, the youth are undertaking intensifying competitive pressure, thus increasing psychological problems such as depression, anxiety, self-injury, suicide, and violent

behaviors to an extent. The psychological health of youths is attracting great attention worldwide. The global morbidity of depression increased by approximately 20% from 2008 to 2018 and it kept increasing year by year (1). Non-suicidal self-injury (NSSI) behaviors mainly start from early adolescence and increase obviously during ado-



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lescence. Meanwhile, people with NSSI are easy to suffer from various forms of emotional disorder, which comprises depression and anxiety (2). Aggression is viewed as a potential expression of self-injury and phenotype of suicidal behaviors, which highly concerned scholars.

Patients with depression often present several inward and outward attacking forms, such as self-injury, suicide, impulsion, agitation, and so on. These not only may hurt their bodies and even may threaten their life, but may bring threats to others (3). These studies have proven that aggression, NSSI, and depression may have the mental mechanism of high generality, which further proves the high correlation and mutual interaction among these three factors.

NSSI usually refers to a type of behavior that individuals hurt their body tissues directly and deliberately without the intention of suicide. Common behaviors comprise hitting with heat, cutting, burning, skin wearing, and so on. It has been reported that more than 20% of teenagers might make self-injury. They hurt themselves to relieve the impacts of pain rather than an intention of suicide. They apply self-punishment and/or send signals of individual pain to important people (4). NSSI is deliberate and excludes the desire of death. Hence, the pathogenesis of NSSI might be at least partially different from suicidal behaviors. NSSI behaviors may not only cause damage to body tissues but are also closely related to multiple psychological problems, such as sexual abuse in the past, previous suicidal attempt, drug use and existence of anxiety (5). Factors that influence NSSI of individuals comprise personality characteristics, sleep disorders, and emotional management (6). Changes in living environment are closely related with occurrence of NSSI, which determined that people with NSSI behaviors may easily suffer from various forms of emotional disorders, such as depression and anxiety (7). In respondents with auditory hallucinations, respondents who heard "something bad" or made comments to their ideas and behaviors are the most likely to have NSSI at the same time, whereas positive or praiseful sounds can protect them. Negative sounds can

continue to cause NSSI two years later, even though self-injuries have been treated (8). Therefore, discussing NSSI characteristics of Chinese youths and influencing factors have important theoretical and practical significance.

Aggression refers to behaviors in all forms to hurt individuals who want to avoid such injuries and it refers to any behaviors that hurt others deliberately. The attacker believes that his or her behaviors may hurt the other party who wants to avoid such hurts. Patients with obvious emotional expressions may increase the risk of attacking, especially opposite-sex attacks (9). Ages ranging between 19 and 78 and aggression was evaluated through self-reports, and found that increasing anger was the risk factor of physical and language attacks (10). Aggression (particularly lack of thinking and planning) may be a factor to predict NSSI. Trait aggression is related with tendency of NSSI. In clinics, aggression is a component of intermittent explosive disease and it is related with increasing morbidity of NSSI (11). Aggression is discovered as a far-end predictive factor of NSSI in teenagers. According to the motivation and will model of suicidal behaviors, individuals with high impulsion are highly likely to change NSSI ideas into NSSI behaviors without thinking and plans. It has been demonstrated that emotional adjustment, self-punishment, interpersonal communication and feeling seeking are motivations for individuals to make NSSI behaviors (12). Individuals with high impulsion might consider functions of NSSI behaviors rather than the consequence of behaviors. Most youth patients with metal disorders are reported to have NSSI and aggression behaviors (13). Thus, aggression might be highly related and may interact with NSSI. On this basis, Hypothesis 1 was proposed: Youth aggression can be used to predict NSSI.

Depression is the primary cause of disability in the world. More than 800,000 people die for suicide every year in average, in which about 50% are related with depression and other emotional disorders (14). On the one hand, patients with depression often may experience relapse, recurrence or both, and have many expressions (15). On the other hand, they usually show various

inward and outward attacking forms, such as self-injury, suicide, impulsion, agitation, and so on. Depression is likely to be a predictive factor of NSSI behaviors because not only can it hurt their bodies and threaten their lives, but may also bring threats to others (16). Depression symptoms are closely related to aggressive behaviors and boys with depression have more serious and diversified criminal behaviors (17). NSSI is significantly correlated with aggression, impulsion, self-esteem, negative temperament, depression symptoms and borderline personality disorder (BPD). The morbidity of depression symptoms and NSSI not only increases during adolescence, but may also occur at the same time. Compared with teenagers of other states, teenagers who suffer relational aggression, negative experiences in alcohol drinking and self-abasement are more likely to develop from moderate to high depression or keep high depression symptoms and self-injuries (18). A total of 384 high-risk teenagers (58.8% are women) aged from 12 to 18 have been examined and found that teenagers with self-injury and crime of intentional arson are an obvious high-risk group with low morbidity. They were characterized by difficulties in interpersonal relationships, increasing psychological health issues and material utilization as well as more serious self-injuries and suicidal behaviors (19). Negative self-dialogue, negative cognitive styles and low family support are important intermediary agents between aggression and frequent NSSI behaviors (20). Thus, these studies have proven that aggression, NSSI, and depression may be highly correlated. Therefore, Hypothesis 2 was proposed: Depression symptoms of youths can be used to predict NSSI behaviors. Hypothesis 3: Depression provides mediating effects between aggression and NSSI.

Materials and Methods

Aggression questionnaire

The aggression questionnaire compiled by Buss et al. and revised by Li et al. was applied (21). It comprises 14 items and uses the five-point Likert

scale. A higher score indicates a higher aggression level. 1: non-conformance; 5: complete conformance. In this study, Cronbach's α of the questionnaire was 0.84.

NSSI questionnaire

The NSSI behavior assessment questionnaire for youths compiled by Wan et al. was applied (22). This questionnaire comprises 12 items and uses the Likert 5-scale. The higher score indicates a higher frequency of self-injury. "Have you hurt yourself by following ways in the recent 1 year?" 0: Never; 1: one time; 2: 2~4 times; 3: 5 times or more. In this study, it was judged that there were NSSI behaviors if there was one self-injury behavior. The Cronbach's α of the questionnaire was 0.95.

Depression syndrome scale (PHQ-9)

The PHQ-9 scale was compiled according to depression standards recommended in the 5th edition of *Diagnostic and Statistical Manual of Mental Disorders* published by American Psychiatric Association (23). It has nine symptom items for a retrospective investigation of the respondents' situations two weeks before. Each item has 0-3 scores, which are divided into four levels: <5: no depression; 5-9: mild depression; 10-14 obvious depression; ≥ 15 severe depression. The depression degree was judged according to the respondents' total scores. The higher score indicates further severity of depression. In this study, Cronbach's α of the questionnaire was 0.88.

Data collection

The research team investigated university students, community youths and migrant workers in Zhejiang, Anhui and Henan in China from August to December 2022. In the investigation procedures, 800 questionnaires were set online and offline according to intentions of respondents. This study was approved by the Ethics Committee of Shaoxing University (No.54212562/2021-52 and dated 30.12.2021).

Statistical analysis

Data was collected, analyzed and processed by SPSS 21.0 (IBM Corp., Armonk, NY, USA). Results on the aggression questionnaires, NSSI questionnaires and depression scale were analyzed. The status of aggression, NSSI and depression in youth and influencing factors were discussed through the *t*-test, correlation analysis and multivariate regression analysis.

Results

Common method variance

The Harman single-factor test method was used and all test variables were included in exploratory factor analysis. Results showed that seven factors with characteristic factor roots larger than one

was gained without rotation. The amount of variability interpreted by the first factor was 30.82%.

Demographics differences

A total of 770 valid questionnaires were collected, exhibiting an effective recovery rate of 96.3%. With respect to gender, there were 200 male respondents (26.0%) and 570 female respondents (74.0%). For ages, there were 319 respondents (41.4%) aged 19 or younger, 369 respondents (47.9%) aged 20 to 20, 66 respondents (8.6%) aged 30 to 39, and 16 respondents (2.1%) aged 40 to 44. An independent sample *t*-test and one-way analysis of variance (ANOVA) were conducted to demographic differences of total scores of aggression, NSSI and depression of youths (Table 1).

Table 1: Demographic differences of questionnaire scores in aggression, NSSI and depression of youths

Variables	Aggression (t/F)	NSSI (t/F)	Depression (t/F)
Gender	2.56*	0.91	-1.54
Males	28.03(8.84)	1.19(3.39)	6.64(4.61)
Females	26.30(7.76)	0.94(4.02)	7.19(4.44)
Age	9.27***	9.94***	1.32
19 or younger	25.90(7.83)	0.99(3.27)	6.88(4.20)
20-29	26.82(7.60)	0.83(3.15)	7.36(4.43)
30-39	29.38(8.47)	0.79(2.79)	6.38(5.16)
40-44	34.69(14.93)	6.13(16.35)	6.75(8.41)
Abuse experiences during childhood or not	4.20***	2.37*	3.33**
Yes	36.12(13.28)	6.48(13.83)	11.61(8.11)
No	26.36(7.57)	0.79(2.66)	6.88(4.19)
Parental emotional status	7.41***	11.46***	13.10***
Relative good	26.33(7.78)	26.74(7.79)	30.61(10.80)
Moderate	0.88(3.43)	0.74(2.34)	3.33(9.23)
Relatively poor	6.62(4.52)	7.44(3.80)	9.60(5.88)
Family conditions	11.96***	24.84***	12.02***
Divorced	32.56(12.70)	5.05(12.51)	10.37(6.45)
Single-parent	27.59(9.55)	0.97(3.84)	6.87(4.23)
Two-parents	26.38(7.57)	0.79(2.65)	6.89(4.31)
Marriage conditions	5.10***	2.22*	-1.19
Married	30.83(10.03)	1.88(7.43)	6.54(5.87)
Unmarried	26.31(7.76)	0.89(3.33)	7.14(4.36)
Family location	0.52	-1.60	-0.77
Urban	27.01(8.07)	0.79(2.30)	6.94(4.46)
Rural	26.70(8.34)	1.25(5.34)	7.20(4.69)
Single-child or not	-0.79	-0.69	0.06
Yes	26.55(7.89)	0.88(3.04)	7.08(4.44)
No	27.03(8.37)	1.09(4.54)	7.06(4.65)

Note: data are expressed in mean (standard deviation). * $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$

There was significant gender difference in term of total score of aggression. The total score of aggression in male youths was significantly higher than that in female youths ($P<0.01$). There were extremely significant differences among various age groups in term of aggression and NSSI ($P<0.001$). The total score of aggression was positively related with age. For NSSI, the total scores of NSSI of youths over 40 years old were significantly higher than those of other age groups, but there's insignificant difference among other age groups.

The youths with abuse experiences during childhood presented significantly higher total scores of aggression, NSSI and depression than the youths without ($P<0.001$). For parental emotional status, total scores of aggression, NSSI, and depression differed significantly ($P<0.001$). Total scores of aggression, NSSI, and depression of youths with poor parental emotional status were significantly higher compared with those of youths with good parental emotional status. For family conditions, the total scores of aggression, NSSI, and depression presented extremely significant differences ($P<0.001$). Specifically, total scores of aggression, NSSI and depression of youths from divorced families were significantly higher than those of youths from single-parent families and two-parent families ($P<0.001$).

Marriage conditions had significant differences on total scores of aggressions and NSSI ($P<0.05$). The total scores of aggressions and NSSI of mar-

ried youths were significantly higher than those of unmarried ones. The total scores of aggression of married youths were extremely significantly higher compared to those of unmarried ones ($P<0.001$). However, no significant difference exists between married and unmarried youths in term of depression. The total scores of aggression, NSSI and depression varied slightly among different family locations ($P>0.05$). The total scores of depression and NSSI of rural youths were higher than those of urban youths, but the differences were insignificant ($P>0.05$). The total scores of aggression of urban youths were higher than those of rural youths, but the difference was insignificant ($P>0.05$). The total scores of aggression, NSSI, and depression exhibited no significant differences among youths whether they were single child in a family or not ($P>0.05$).

Descriptive statistics and correlation analysis

A total of 770 youths were invited to the baseline survey in this study. Among them, 169 youths had been reported with NSSI behaviors, reporting a detection rate of 21.10%. Another 287 youths had been reported with depression tendency, reporting a detection rate of 37.27%. A correlation analysis was conducted after gender, age, and other demographic variables were controlled. Results showed positive correlations between any two of total scores of aggression, NSSI and depression ($P<0.01$) (Table 2).

Table 2: Correlations among aggression, NSSI, and depression of youths

<i>Variable</i>	$\bar{x} \pm s$	<i>Aggression</i>	<i>NSSI</i>	<i>Depression</i>
Aggression	26.73±8.07	-		
NSSI	1.00±3.87	0.41**	-	
Depression	7.05±4.49	0.42**	0.42**	-

* $P<0.05$ and ** $P<0.01$

Regression analysis of depression with aggression and NSSI

According to correlation analyses among aggression, NSSI and depression of youths, aggression and NSSI had significantly positive correlations

with depression ($P<0.01$), which provided a possibility to test mediating effects of depression (Table 3). Thus, the mediating effects of depression between aggression and NSSI were analyzed through regression analysis, aiming to determine

relations among variables. An OLS multivariate regression analysis was applied, in which aggression was used as the independent variable, depression as the mediating variable and NSSI as

the dependent variable. The percentile Bootstrap method of offset correction was applied to test the mediating effects of depression between aggression and NSSI (Table 4).

Table 3: Regression analysis depression with aggression and NSSI

<i>Variables</i>	<i>Depression</i>		<i>NSSI</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 2</i>	<i>Model 3</i>
Aggression	0.418***	0.411***		0.285***
Depression				0.302***
R ²	0.175	0.169		0.244
Adjusted R ²	0.174	0.168		0.242
F-value	185.277***	177.669***		140.840***

* $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$

Table 4: Mediating effect test

<i>Path</i>	<i>Mediating effect</i>	<i>95% confidence interval</i>	
		<i>Lower limit</i>	<i>Upper limit</i>
Aggression – depression – NSSI	0.13	0.07	0.23

The multilayer regression analysis method was applied for regression analysis (Table 3). Aggression of youths ($\beta=0.411$, $P < 0.001$) had significantly positive predictive effects on NSSI, while aggression of youths ($\beta=0.418$, $P < 0.001$) had significantly positive predictive effects on depression. After depression was added in, aggression ($\beta=0.285$, $P < 0.001$) and depression ($\beta=0.302$, $P < 0.001$) had significantly positive predictive effects on NSSI. The mediating effects of depression were further tested by the Bootstrap method. The mediating effects of depression between aggression and NSSI were 0.285 and the Boot standard error of indirect effects was 0.017. The Bootstrap 95% confidence interval was [0.07, 0.23], excluding 0 (Table 4), indicating that depression had significant mediating effects between aggression and NSSI. The regression coefficient of aggression behaviors ($\beta=0.285$, $P < 0.001$) showed that depression provided partial mediating effects between aggression and NSSI of youths. The ratio between mediating effects and overall effects was 30.7%. The mediating effects of depression were 0.31.

Discussion

A total of 770 youths were invited to a baseline survey. Among them, 169 youths had been reported with NSSI behaviors, showing a detection rate of 21.10%. Another 287 youths had been reported with depression tendency, showing a detection rate of 37.27%. Such detection rates were slightly higher than those in a previous study (24). This may be because the COVID-19 pandemic has been developing since January 2020, which has caused great influences on family, school and the society. It increased psychological health risks of the public, such as depression, NSSI, and aggression. Family location and single-child condition had insignificant influences on aggression, NSSI and depression of youths. This reflected that aggression, NSSI, and depression were common psychological health problems of the youth.

Aggression, NSSI and depression of youths are significantly related with abuse experiences during childhood. This reflected that abuse experiences during childhood had considerable effects on growth of youths. Youths with abuse experi-

ences often lack security and trust, while their cognition and social communication ability are easily damaged, thus influencing their psychological health and behaviors in adulthood. This study has demonstrated that abuse experiences during childhood had positive predictive effects on depression behaviors of university students and they could be used to predict aggression behaviors of youths (25). Parental emotional status and family conditions are also important aspects that influence psychological health in the youth. Aggression, NSSI and depression of youths had significant differences under different parental emotional status and family conditions. Youths from families with poor parental emotional status and divorced families had significantly more serious aggression, NSSI, and depression symptoms than youths from families with good parental emotional status and two-parent families. This demonstrated that youths from families with poor parental emotional status and divorced families would easily have conflicts with others, suffered depression, NSSI and aggression behaviors (26). This study has demonstrated that compared with non-depression patients, depression patients had higher genetic risks (27). The depression symptoms of the mother and father had two-way correlations with the internalization of anxiety and depression from early childhood to middle adolescence (28).

Significantly positive correlations exist among NSSI, aggression, and depression of youths. This finding proved that aggression and NSSI were major expressions of depression. The emotional disorder theory believes that aggression and anti-social behaviors of youths are attributed to anomalies in the loop of central nervous system which is responsible for adjusting negative emotions and processing environmental clues. This may weaken their ability in emotional adjustment and control. They cannot control emotional expression effectively and may simulate or maintain some pathological symptoms. This proves the effects of aggression behaviors of youths on NSSI and it supports Hypotheses 1 and 2. Therefore, the higher frequency of NSSI and aggression behaviors indicates the serious depression

tendency of youths; otherwise, youths have depression symptoms, accompanied with aggression and NSSI behaviors. This further proves the results from a previous study (29). The results in Tables 3 and 4 show that depression of youths has not only significant effects on aggression directly but also provides partial mediating effects between aggression and NSSI. This is consistent with the findings of Szewczuk-Boguslawska et al (30), and it further supports Hypothesis 3. Consequently, conclusions are conducive to understand how aggression influences NSSI of youths theoretically. Thus, paying attention to home education, establishing good family relationships, and decreasing abusive behaviors during childhood is beneficial to physical and mental health during adulthood. Government sectors, schools, enterprises, and communities shall pay attention to the psychological health of the youth group, decrease frequency of occurrence of NSSI, aggression, and depression, and thereby improve their psychological health.

Conclusion

Aggression, NSSI, and depression of youths are common psychological health problems. Aggression, NSSI and depression of youths are influenced significantly by abuse experiences in the past, parental emotional status and family conditions. The depression tendency of youths had not only significant influences on aggression directly but also had partial mediating effects between aggression and NSSI behaviors.

Journalism Ethics considerations

Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, and so on) have been completely observed by the authors.

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Conflict of Interest

The authors declare that there is no conflict of interests.

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