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Prediction of Non-suicidal self-Injury Behaviors in Adolescents based on Psychological Stress Response with the Mediation of Coping Styles and the Moderating Role of Sleep Sisorders

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ABSTRACT

Objective: This study aims to anticipate such behavior in adolescents by examining the influence of psychological stress responses, coping styles, and sleep disorders.

Methods and Materials: This research employed descriptive-correlational methods and cross-sectional research design, utilizing structural equation modeling (SEM). The statistical population consisted of all adolescents in Gachsaran who engaged in non-suicidal self-injury behaviors from July to November 2023. The sample size comprised 192 adolescents with non-suicidal self-injury behaviors, chosen through purposive sampling. Assessment tools included the Behavior Problems Inventory-01 (BPI-01), Mini Sleep Questionnaire (MSQ), coping strategies questionnaire (CSQ), and self-reporting questionnaire 20 (SRQ-20). The research utilized SPSS version 27 for conducting descriptive statistics and SmartPLS version 4 for path analysis. Sobel's test was used to assess the significance of the mediator variable, with the significance level set at 0.05.

Findings: The current study revealed that sleep disorders like Hypersomnia and Insomnia have a notable and beneficial influence on self-injury actions, according to the study results ($P<0.05$). Only Physical restraint among coping styles had a significant and negative effect on self-injury behaviors ($\beta=-0.257$, $P<0.001$). Additionally, the psychological stress response was negatively related to coping styles ($p< 0.001$) and had a positive and significant effect on self-injury behaviors ($\beta=0.264$, $P<0.001$). The variable dimensions of sleep disorders, including Hypersomnia and Insomnia, did not act as a significant moderator in the relationships between the variables examined in the study.

Conclusion: According to the results of the present study, it can be said that increasing physical restraint can reduce self-harm behaviors in adolescents, and sleep disorders and psychological stress response can predict the increase in self-harm behaviors. Also, psychological stress can lead to a decrease in coping styles.

Keywords: Non-suicidal self-injury, stress, coping styles, sleep disorders, adolescents.

Introduction

Non-suicidal self-injury is the act of intentionally harming one's body tissue without the intention of committing suicide and is not socially accepted, including behaviors like cutting, burning, biting, and scratching the skin. The prevalence of non-suicidal self-injury is estimated to be 17% among Adolescents, 13.4% among young people, and 5.5% among adults(Guerrero et al.). Engaging in non-suicidal self-injury is connected to significant emotional and psychological distress, leading to negative consequences on a person's health and functioning, such as increased psychological distress, poor emotion regulation, and higher interpersonal stress(Tan et al.). Non-suicidal self-injury can also escalate to suicidal attempts or completed suicide, making it the fourth leading cause of death among individuals aged 15 to 29 according to the World Health Organization(Chen et al., 2024). Research findings indicate that non-suicidal self-injury is carried out for various reasons, including 80% to cope with anger, 78% to manage uncomfortable emotions, and 72% to alleviate stress(Abdou et al.).

Non-suicidal self-injury behaviors are commonly observed in individuals experiencing symptoms of depression and anxiety, serving as a method to regulate intense negative emotions during times of extreme stress(Carosella et al.). Psychological stress, as stated by the International Standard Organization, refers to the combined effect of various external factors that impact an individual's mental well-being(Ernst et al.). Stressful life events can impair an individual's ability to adaptively regulate their emotions, potentially leading to non-suicidal self-injury as a means to lessen or alter internal states(Robillard et al., 2021). A study revealed that a supportive family environment, emotion-focused coping styles, and stressful life events play a significant role in influencing non-suicidal self-injury among adolescents(Yudiyasiwi & Anganthi, 2024). Additionally, research suggests that symptoms of stress, isolation, and financial difficulties are connected to suicidal ideation and self-injury(Elbogen et al., 2021).

Stressors can heighten the likelihood of mental health issues like anxiety, depression, post-traumatic stress, and intentional self-injury in adolescents by depleting their coping resources(Robillard et al., 2021). When faced with a stressor, it serves as a triggering event that prompts the individual to develop adaptive coping styles(Zhang et al.). Coping involves a conscious effort to alleviate stress and requires various techniques to withstand, lessen, or mitigate stressful events; coping style encompasses the cognitive and behavioral actions individuals take in response to stress, including active and passive behaviors(Okechukwu et al.). Research has suggested that having a diverse array of coping strategies to choose from in unstable situations can assist in managing stress and overall well-being(Rogowska et al., 2021). Additionally, another study noted that by employing appropriate coping styles and acquiring the necessary skills to cope with and handle stress, high levels of perceived stress and anxiety can be reduced(Garbóczy et al., 2021).

A negative coping style can heighten the risk of having suicidal thoughts when faced with difficult situations. Conversely, a positive coping style can alleviate feelings of depression. Engaging in activities like hobbies and maintaining an optimistic mindset to manage stress is connected to a lower likelihood of experiencing sleep disorders(Li et al.). Sleep disorders encompass difficulties in falling asleep, disorders during sleep, unusual movements while asleep, insufficient sleep, and excessive sleep. Some of the most common sleep disorders are rapid eye movement behavior disorder, difficulty falling asleep or staying asleep, feeling very tired during the day, Restless Leg Syndrome, problems with breathing during sleep, and disruptions in the body's natural sleep-wake cycle(Thangaleela et al.). Sleep disorders like insomnia are frequently seen in young individuals, particularly those with psychiatric conditions, and can greatly affect their daily activities, health, and growth. In addition, lack of sleep can result in detrimental effects on cognitive abilities, emotional control, and treatment outcomes(Leone et al.). Research findings have shown that inadequate sleep is a contributing factor to self-injury behaviors, with a strong association between sleep deprivation and self-injury, especially when coupled with depression(Hua et al., 2023). Another study has found a correlation between insomnia and the rise in non-suicidal self-injury incidents(Latina et al.).

Non-suicidal self-injury is a significant concern for adolescent health, especially in clinical settings, with stress being a common trigger for such behaviors(Abdou et al.). Understanding and predicting non-suicidal self-

injury in adolescents based on their response to psychological stress is crucial. Despite the importance of this issue, there is a lack of research that examines the prediction of non-suicidal self-injury in adolescents using psychological stress response, considering coping styles and the influence of sleep disorders. Therefore, there is a research gap in this field. Considering the important role of non-suicidal self-injurious behaviors in adolescents, this research seeks to answer the question whether non-suicidal self-injurious behaviors in adolescents can be predicted through psychological stress response variables and coping styles with the moderation of sleep disorders?

Methods and Materials

Study Design and Participants

This research employed a descriptive-correlational approach, utilizing a cross-sectional research method and structural equation modeling (SEM). The statistical population of this study focused on all adolescents in Gachsaran who had engaged in non-suicidal self-injury behaviors between July and November 2023.

The sample consisted of 192 adolescents with confirmed non-suicidal self-injury behaviors, identified by psychologists using DSM-5 criteria, and selected through purposive sampling. Initially, the researcher obtained the required permits from the university where they were studying to conduct the research. The researchers were connected to three psychology and counseling clinics in Gachsaran with the help of university professors. The identities of these clinics were undisclosed. These clinics were selected because of their convenient location and their potential for cooperation to engage with adolescents exhibiting non-suicidal self-injury behaviors. Subsequently, the researcher visited the clinics to arrange and organize the research activities. "In the subsequent stage, families with a child exhibiting non-suicidal self-injury behaviors and receiving counseling and treatment from research clinics were contacted by psychological clinics to participate in the study. Detailed information about the research, including its goals, ethical considerations, and assurance of confidentiality, was disseminated to them through social media platforms.

The sample size was determined using Cohen's formula from 2013(Cohen), taking into account the number of observed and latent variables, the expected effect size, and the desired probability and statistical power levels. This calculation helped determine the appropriate sample size for the SEM analysis.

Anticipated effect size: 0.3

Desired statistical power level: 0.8

Number of latent variables: 4

Number of observed variables: 110

Probability level: 0.01

Based on the values mentioned above, the researcher determined 137 individuals for the study. To account for potential attrition in the sample group, the researcher increased the number to 200 to ensure sample size retention. To participate in the study, individuals had to meet specific criteria such as having a history of non-suicidal self-injury behaviors, providing informed consent as adolescents, obtaining parental consent, and demonstrating sufficient literacy to answer questions. Conversely, individuals were excluded from the study if they were older than 19, had physical or mental conditions preventing participation, failed to answer specific questionnaire items, took psychiatric medication, or withdrew from the study.

The study made clear that the research forms did not include any personal information and that adolescents had the option to withdraw from the study if they wanted. Because of difficulties in involving all parents, the research and completion of online questionnaires took place over a period of 4 months. The analysis included 192 out of 200 questionnaires after excluding eight incomplete or intentionally erroneous ones. Participants filled out self-report measures on non-suicidal self-injury behaviors, psychological stress response, coping styles, and sleep disorders. The operational definition of the variables includes the non-suicidal self-injury behaviors variable, which is the subject's score in Behavior Problems Inventory-01 (BPI-01), and the psychological stress response variable, which is the subject's score in the Self-reporting questionnaire 20 (SRQ-20) was obtained, similarly, the variable of coping styles was obtained based on the score of Coping strategies questionnaire (CSQ) and the variable of sleep disorders was obtained based on the score of Mini Sleep Questionnaire (MSQ). The research followed ethical guidelines, and participants were able to withdraw at any time.

Data Collection Tools

Behavior Problems Inventory-01 (BPI-01): The questionnaire developed by Rojahn et al. in 2001 aimed to assess self-injury behaviors(Baraldi et al., 2013). It consists of 52 items where respondents rate their behavior on a 4-point Likert scale (1=never, 2=rarely, 3=sometimes, 4=always). Scores on this scale range from 52 to 208, with higher scores indicating more self-injury tendencies. The reliability of the questionnaire in Iran was determined to be 0.83 and 0.94 using Cronbach's alpha(Gashool et al.). The researcher in this study also found a Cronbach's alpha value of 0.73.

Mini Sleep Questionnaire (MSQ): The Sleep Disorders Questionnaire was established in 1985 by Zomer and his colleagues to assess the prevalence of sleep disorders(Zomer). It consists of 6 items, with participants rating their responses on a 7-point Likert scale ranging from 1 to 7. The questionnaire evaluates two main dimensions: sleepiness (questions 4, 8, and 9) and insomnia (questions 1, 2, and 7). Higher scores indicate a higher prevalence of sleep disorders. In Iran, the reliability of this questionnaire was examined, with Cronbach's alpha coefficient reported as 0.79(Manavipour). In this study, the researcher obtained a Cronbach's alpha of 0.82 for the Hypersomnia dimension and 0.71 for the Insomnia dimension.

Coping strategies questionnaire (CSQ): In 1981, Billings and Moss created a questionnaire to assess individuals' coping strategies when faced with challenges(Billings & Moos, 1984). This questionnaire consists of 32 questions, divided into five categories of coping strategies: problem-solving (3 items), emotional restraint (11 items), cognitive evaluation (5 items), physical restraint (9 items), and attracting social support (4 items). Respondents rate each question on a four-point Likert scale ranging from never to always. A study in Iran found the retest reliability coefficient of this questionnaire to be 0.79(Soltani et al.). The Cronbach alpha coefficient for the Problem-Solving component was 0.70, Emotional restraint was 0.88, Cognitive assessment was 0.954, Physical restraint was 0.893, and Attracting social support was 0.963.

Self-reporting questionnaire 20 (SRQ-20): "The survey was created in 1994 by Beusenberg et al. based on guidelines from the World Health Organization to assess psychological stress and anxiety in individuals(Beusenberg et al.). It consists of 20 questions using a binary scale (0=no, 1=yes). A higher total score suggests a stronger psychological stress reaction. A study in Iran found the test-retest reliability of the questionnaire to be above 0.7(Abdollahzadehrad). The researcher also calculated a Cronbach's alpha value of 0.80 for the questionnaire components."

Data analysis

Descriptive statistics were conducted using SPSS version 27 software, while data trends and standard coefficients were analyzed using SmartPLS version 4 software. Sobel's test was employed to determine the significance of the mediator variable. The normality of the distribution of research variables was checked using the Kolmogorov-Smirnov test, which revealed that the research variables did not have a normal distribution, thus necessitating the use of SmartPLS. The sample size for implementing the structural equation model using the partial least squares method consisted of 192 individuals. The analysis utilized a significance level of 0.05.

Findings and Results

Initially, the researcher analyzed the descriptive statistics of the variables in the study. The adolescents were categorized into three age brackets: 15 to 16 years old (56.3%), 16 to 17 years old (25.5%), and 18 to 19 years old (18.2%). Similarly, the adolescents were divided into two groups based on gender, with boys accounting for 60.4% and girls for 39.6%.

Table 1

Description of the demographic variables

Variables	Groups	Frequency	Percent	Sample size	Median
Gender	Boy	116	60.4	192	1
	Girl	76	39.6		
Age	15 to 16	108	56.3	192	1

16 to 17	49	25.5
18 to 19	35	18.2

Table 2 shows the mean and standard deviation of the research variables.

Table 2

Description of the main research variables

Variables	Mean± SD	Max	Min	N	Skewness	Kurtosis
Self-injury behaviors	127.0208±24.163	178	7	192	-0.078	-0.201
Hypersomnia	10.7656±3.895	19	4	192	0.323	-0.872
Insomnia	10.4792±4.029	19	4	192	0.645	-0.616
Psychological stress response	10.8646±2.769	16	4	192	-0.695	-0.142
Problem-Solving	5.4115±1.834	8	1	192	-0.495	-0.529
Emotional restraint	13.6198±8.311	26	1	192	-0.165	-1.457
Cognitive assessment	6.4948±3.733	14	1	192	0.334	-1.059
Physical restraint	18.6354±4.434	24	7	192	-1.236	0.566
Attracting social support	6.8385±3.590	11	1	192	-0.31	-1.463

Table 3 shows the correlation between research variables based on Pearson's correlation coefficient.

Table 3

Pearson's correlation coefficient

Variables	1	2	3	4	5	6	7	8	9	P-value
Self-injury behaviors	-									p <0.001
Hypersomnia	٠.777	-								p <0.001
Insomnia	٠.727	٠.794	-							p <0.001
Psychological stress response	٠.701	٠.602	٠.544	-						p <0.001
Problem-Solving	-٠.684	-٠.717	-٠.645	-٠.557	-					p <0.001
Emotional restraint	-٠.608	-٠.648	-٠.478	-٠.577	٠.761	-				p <0.001
Cognitive assessment	-٠.491	-٠.601	-٠.467	-٠.520	٠.705	٠.873	-			p <0.001
Physical restraint	-٠.668	-٠.586	-٠.521	-٠.519	٠.690	٠.594	٠.524	-		p <0.001
Attracting social support	-٠.536	-٠.587	-٠.426	-٠.392	٠.669	٠.774	٠.712	٠.546	-	p <0.001

Based on Table 3, the various aspects of sleep disorders like Hypersomnia and Insomnia showed a strong and positive connection with Self-injury behaviors ($p < 0.001$). Similarly, there was a significant and positive link between psychological stress response and self-injury behaviors ($p < 0.001$). On the other hand, coping styles showed a negative and significant association with self-injury behaviors. After running the model, the researcher analyzed the path coefficients and significance levels between the variables listed in Table 4. In this study, the researcher established the bootstrap value at 5000.

Table 4

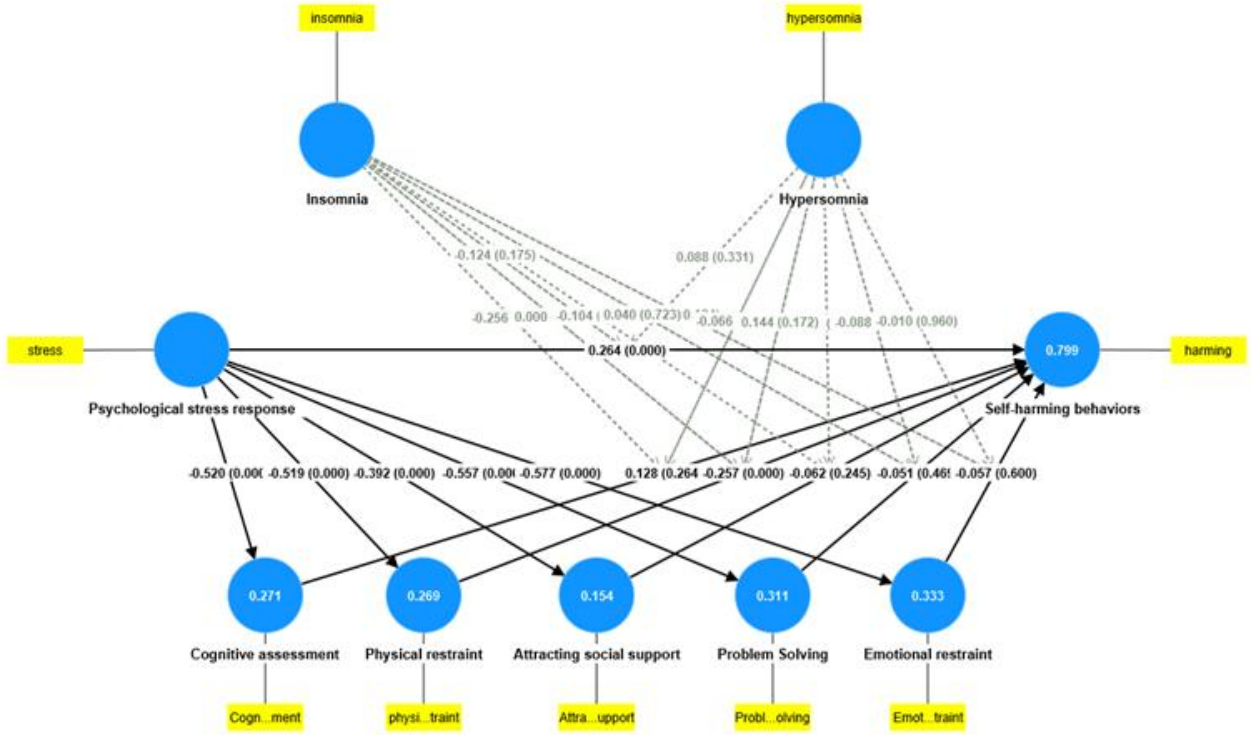
Standard research coefficients in general

Result of the hypothesis	Path	STDEV	P-value	T-value	Result
Attracting social support -> Self-injury behaviors	-0.062	0.053	0.245	1.164	rejection
Cognitive assessment -> Self-injury behaviors	0.128	0.115	0.264	1.118	rejection
Emotional restraint -> Self-injury behaviors	-0.057	0.109	0.6	0.525	rejection
Hypersomnia -> Self-injury behaviors	0.191	0.077	0.013	2.473	confirmation
Insomnia -> Self-injury behaviors	0.317	0.068	p <0.001	4.692	confirmation
Physical restraint -> Self-injury behaviors	-0.257	0.057	p <0.001	4.546	confirmation
Problem Solving -> Self-injury behaviors	-0.051	0.071	0.469	0.724	rejection
Psychological stress response -> Attracting social support	-0.392	0.058	p <0.001	6.821	confirmation

Psychological stress response -> Cognitive assessment	-0.52	0.049	p <0.001	10.529	confirmation
Psychological stress response -> Emotional restraint	-0.577	0.037	p <0.001	15.614	confirmation
Psychological stress response -> Physical restraint	-0.519	0.039	p <0.001	13.281	confirmation
Psychological stress response -> Problem Solving	-0.557	0.041	p <0.001	13.556	confirmation
Psychological stress response -> Self-injury behaviors	0.264	0.047	p <0.001	5.589	confirmation
Insomnia x Cognitive assessment -> Self-injury behaviors	-0.256	0.224	0.252	1.146	rejection
Insomnia x Problem-Solving -> Self-injury behaviors	0.04	0.114	0.723	0.355	rejection
Insomnia x Emotional restraint -> Self-injury behaviors	0.334	0.217	0.124	1.54	rejection
Hypersomnia x Psychological stress response -> Self-injury behaviors	0.088	0.091	0.331	0.972	rejection
Hypersomnia x Cognitive assessment -> Self-injury behaviors	-0.066	0.211	0.755	0.313	rejection
Hypersomnia x Physical restraint -> Self-injury behaviors	0.144	0.106	0.172	1.366	rejection
Insomnia x Attracting social support -> Self-injury behaviors	-0.104	0.119	0.383	0.873	rejection
Hypersomnia x Attracting social support -> Self-injury behaviors	-0.068	0.103	0.512	0.656	rejection
Hypersomnia x Emotional restraint -> Self-injury behaviors	-0.01	0.196	0.96	0.051	rejection
Insomnia x Psychological stress response -> Self-injury behaviors	-0.124	0.092	0.175	1.356	rejection
Hypersomnia x Problem Solving -> Self-injury behaviors	-0.088	0.121	0.47	0.722	rejection
Insomnia x Physical restraint -> Self-injury behaviors	0	0.099	0.999	0.001	rejection

Figure 1

Path coefficients between variables and significance level



The results presented in Table 4 and Figure 1 indicate that the variable dimensions of sleep disorders, such as Hypersomnia and Insomnia, had a significant and positive impact on Self-injury behaviors (P<0.05). Furthermore, Physical restraint was the only component of coping styles that had a noticeable negative influence on Self-injury behaviors (β=-0.257, P<0.001) as a mediator. Additionally, the psychological stress response variable had a significance negative effect on the various components of coping styles (p<0.001). Additionally, the variable measuring psychological stress response had a notable and beneficial impact on self-injury behaviors. However, the variable dimensions of sleep disorders, like Hypersomnia and Insomnia, did not have a noteworthy impact as a moderator on the relationships between the research variables. The researcher utilized Sobel's test to ascertain the significance of the mediating variables in

the study. The calculation was conducted using the provided formula.

$$Z - value = \frac{a * b}{\sqrt{(b^2 * s_a^2) + (a^2 * s_b^2) + (s_a^2 * s_b^2)}}$$

In the Sobel test, if the Z value exceeds 1.96, it indicates that the mediating effect of a variable is statistically significant at the 95% confidence level. The Z score was computed as 4.27032 for the role of Physical restraint in mediating the relationship between Psychological stress response and Self-injury behaviors. Based on the results of the Sobel test, it can be inferred that the mediating variable in the study holds significance. The author assessed the reliability and validity of the research model in Table 5.

Table 5

Reliability and validity of the model

AVE	Composite Reliability	Cronbach's Alpha	Variables
0.66	0.74	0.73	Self-injury behaviors
0.53	0.83	0.82	Hypersomnia
0.56	0.76	0.71	Insomnia
0.54	0.84	0.80	Psychological stress response
0.51	0.73	0.70	Problem-Solving
0.55	0.901	0.88	Emotional restraint
0.749	0.954	0.954	Cognitive assessment
0.685	0.9·	0.893	Physical restraint
0.869	0.964	0.963	Attracting social support

Table 5 clearly shows that the model has been validated and deemed reliable. The variables have a Cronbach's alpha reliability above 0.7, indicating strong reliability. The combined reliability of these variables also exceeds 0.7. Additionally, the model's validity was assessed using the Average variance extracted index, which showed values above 0.5 for the research variables, confirming validity. The fit of the model was also examined, with all fit indices confirmed. The SRMR, which measures the difference between observed and structural model correlations, had a value of 0.188, while the NFI value was 0.688.

Discussion and Conclusion

The current study aimed to predict non-suicidal self-injury behaviors in adolescents through the influence of psychological stress response, with coping styles as a mediator and sleep disorders as a moderator. The study found that dimensions of sleep disorders such as hypersomnia and insomnia were positively related to self-injury behaviors, but as moderator, they did not significantly impact the relationships between variables. Only physical restraint had a detrimental effect on self-injury behaviors out of all coping styles. Additionally, psychological stress response negatively affected coping styles and positively affected self-injury behaviors. The results of the study also confirmed the significance of the mediating variable.

The results of the current study indicated that sleep disturbances, such as insomnia and hypersomnia, can contribute to self-injury behaviors, but as a moderating factor, they do not significantly impact the relationships between the variables under investigation. This discovery is consistent with previous research studies(Hua et al., 2023; Sweetman & Adams; Tang et al.). One study revealed that both sleep deprivation and excessive sleep are connected to a higher likelihood of engaging in non-suicidal self-injury(Tang et al.). Another study suggested that sleep disorders are correlated with an increased risk of suicide, even after controlling for previous mental health conditions, emphasizing the importance of addressing suicide risk in individuals with sleep disorders(Kjær Høier et al.). The finding of Hua et al. (2023) further supported the idea that inadequate sleep is a risk factor for self-injury, especially when combined with depression in young individuals(Hua et al., 2023). Additionally, a study highlighted insomnia and sleep disturbances as potential predictors of suicide and self-injury(Sweetman & Adams).

The reason for this discovery can be explained by the fact that sleep disorders in adolescents are often caused by changes in biology, like delays in the production of hormones that induce sleep, as well as changes in their

social environment, like the workload they face in school. This combination often leads to symptoms of insomnia in many adolescents. Unfortunately, this lack of sleep due to insomnia can impair their ability to control their impulses. Consequently, symptoms of insomnia act as a stressor, increasing the likelihood of adolescents experiencing depressive symptoms and engaging in impulsive behaviors, such as using non-suicidal self-injury as a way to cope. In situations where stressful events trigger overwhelming negative emotions, adolescents might turn to non-suicidal self-injury as a coping style to alleviate or remove such intense feelings(Latina et al.). During adolescence, the sleep patterns shift, leading more adolescents to stay up late and get less sleep due to social influences. This altered sleep duration can disturb the body's internal clock and result in higher levels of inflammatory markers linked to non-suicidal self-injury(Tang et al.).

The results of the current study demonstrated that the use of physical restraint, a coping style, can decrease self-injury behaviors in adolescents. This finding aligns with previous research(Cheng et al.; Wan et al.). Another study suggested that addressing negative coping styles and enhancing positive coping styles in girls with traumatic backgrounds can reduce non-suicidal self-injury among adolescents(Wan et al.). Research by Cheng et al. (2022) also found that women tend to use emotion-focused negative coping styles when faced with challenges, making them more susceptible to non-suicidal self-injury(Cheng et al.).

The coping style refers to the cognitive and behavioral actions taken by a person to meet both internal and external needs that are not just necessities. Coping styles are typically classified into problem orientation and emotional orientation, with the former having a positive impact and involving problem-solving and seeking social support, while the latter has a negative impact and includes avoidance and denial. Problem-solving and seeking help are protective factors against non-suicidal self-injury, whereas avoidance and denial are risk factors. Self-injury is often used as a means to manage emotional pain, indicating a lack of effective coping styles among adolescents exhibiting self-injury behaviors(Zhou et al., 2022). Building resilience and reducing mental symptoms in childhood and adolescence is essential through adopting a positive coping style that involves effectively managing stress and emotions. Conversely, negative coping styles like avoidance, self-blame, venting, waiting, disengagement, and fantasizing can raise the chances of self-injury not related to suicide. Individuals who engage in non-suicidal self-injury tend to avoid confronting personal and external stressors, resulting in the buildup of negative emotions that can have detrimental outcomes(Cheng et al.).

The results of the current study also indicate that experiencing psychological stress can lead to a decline in coping styles and an increase in self-injury behaviors. This conclusion aligns with previous research studies(Elbogen et al., 2021; Masiran et al.; Yudiyasiwi & Anganthi, 2024). One study suggested that managing stress is crucial for enhancing coping styles, reducing stress levels, and promoting overall well-being(Masiran et al.). Additionally, the findings of the study highlight the significance of a supportive family environment, emotion-focused coping, and exposure to stressful life events in influencing non-suicidal self-injury among adolescents(Yudiyasiwi & Anganthi, 2024). Another study found a connection between stress symptoms, feelings of isolation, financial stress, and thoughts of self-injury or suicide(Elbogen et al., 2021).Coping style pertains to the mental and behavioral tactics people employ when faced with stress, including both proactive and reactive actions. It includes both active and passive behaviors. When individuals appraise stressors, they experience emotional distress if they feel they lack the necessary control or resources to face the challenge. Research shows that when people face similar levels of psychological stress, those who predominantly use positive coping styles tend to experience lower levels of emotional distress, indicating that positive coping may act as a factor of resilience. On the other hand, those who rely more on negative coping styles are more likely to experience higher levels of emotional distress, making them a high-risk population for developing mental illness under stress(Yan et al.). Stress plays a significant role in influencing how individuals cope with various situations, with stressful factors potentially depleting adolescents' coping resources and increasing the likelihood of experiencing mental health issues like anxiety, depression, post-traumatic stress, and intentional self-injury(Robillard et al., 2021). Stress is widely recognized as a major trigger for self-injury, with individuals often resorting to behaviors like "self-

soothing," seeking relief from anxiety, or avoiding dealing with emotional pain as reasons for self-injury. Non-suicidal self-injury is often used as a coping style, commonly serving to manage anger, handle distressing emotions, and alleviate stress(Abdou et al.).

The findings of the current study indicated that physical restraint was a significant mediator between psychological stress responses and non-suicidal self-injury behaviors. This result aligns with previous research(Cheng et al.; Garbóczy et al., 2021; Rogowska et al., 2021). Previous studies have also highlighted the strong connection between non-suicidal self-injury behaviors and environmental variables, individual characteristics, and coping styles, particularly among adolescents(Cheng et al.). Research has shown that having a variety of coping styles to choose from in challenging situations can help individuals effectively manage stress and well-being(Rogowska et al., 2021). Additionally, studies have suggested that adopting suitable coping styles and acquiring the necessary skills to handle stress can decrease levels of perceived stress and anxiety(Garbóczy et al., 2021).

Coping styles are enduring strategies, whether positive or negative, that individuals use to overcome challenges they face, both external and internal. A positive coping style involves approaching problems directly and logically, leading to a decrease in feelings of depression. On the other hand, a negative coping style involves ignoring, avoiding, or denying problems, which can contribute to an increased risk of suicidal ideation in response to stressful situations(Li et al.).

"Higher levels of stress are connected to higher rates of suicidal thoughts and self-injury, but utilizing effective coping styles can decrease these thoughts and behaviors in adolescents. Coping styles have the potential to moderate the connection between stress and self-injury ideation. Research into the impact of stressful life events on suicidal thoughts, attempts, and actions is a key focus in the study of mental health disorders, as individuals strive to manage stress through deliberate efforts and various methods. Stressful events may also lower the occurrence of non-suicidal self-injury behaviors(Okechukwu et al.)."

The current study also had some limitations. For instance, it was challenging to investigate self-injury behaviors in countries like Iran due to cultural taboos and reluctance among people to discuss such issues in an Islamic society. Another limitation was the absence of information on mental health conditions among the participants, as the adolescents were not questioned about their mental well-being or the support they may have received. The research focused on individuals with non-suicidal self-injury behaviors without confirming a mental health diagnosis. Additionally, the study did not control for demographic factors like socio-economic status and did not explore potential influences such as childhood physical or sexual abuse on self-injury behaviors.

One of the main drawbacks of this study is the reliance on self-report scales to gather information. This method can lead to distortions due to unconscious defenses, response bias, personal biases, and social desirability. To mitigate this issue, researchers can use a combination of self-report measures with observations and interviews. It is recommended to incorporate interviews and observations alongside questionnaires in future research to address these limitations. Additionally, it is recommended that future research includes an exploration of the impact of moral perfectionism, psychological resilience, and attachment styles in conjunction with variables like loneliness, happiness, mental health, personality characteristics, aggression, criminal behavior, and adolescent disorders such as Antisocial Personality disorder. The adolescence stage, particularly conduct disorders, should be a focus of investigation to gain a comprehensive understanding of these variables and their interconnections with other behaviors and non-suicidal self-injury behaviors.

According to the results of the present study, it can be said that increasing physical restraint can reduce self-harm behaviors in adolescents, and sleep disorders and psychological stress response can predict the increase in self-harm behaviors. Also, psychological stress can lead to a decrease in coping styles. The results suggest that it is important to monitor distress levels and non-suicidal self-injury thoughts in adolescents with sleep disorders, and clinicians should be alert to early warning signs of such behaviors. It is crucial to recognize that sleep disorders may be symptomatic of underlying sleep disorders, which could be correlated to non-suicidal self-injury behaviors. Additionally, the results of this research indicate that either too much or too little sleep can lead to a higher likelihood of non-suicidal self-injury among adolescents. It is recommended that parents,

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educators, and healthcare professionals pay close attention to sleep disorders in adolescents and take steps to address them. Providing educational programs, workshops, and specialized training sessions could also prove helpful in decreasing instances of self-injury in this age group.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this study.

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