

The Model for Predicting Self-Harming Behaviors Based on Cognitive Emotion Regulation Strategies and Emotional Distress Tolerance in Adolescents Visiting Harm Reduction Centers in Tehran: The Mediating Role of Internalized Shame

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ABSTRACT

Objective: This study aimed to predict self-harming behaviors based on cognitive emotion regulation strategies and emotional distress tolerance, with the mediating role of internalized shame in adolescents visiting harm reduction centers in Tehran.

Methods: The research employed a descriptive correlational design. The statistical population included adolescents aged 14 to 18 who attended drop-in harm reduction centers in District 12 of Tehran (Shush-Harandi neighborhood) during the first four months of 2022. A total of 300 participants were selected using purposive sampling. The research tools included the Self-Injury Questionnaire (Sansone et al., 1998), the Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2001), the Distress Tolerance Scale (Simons & Gaher, 2005), and the Internalized Shame Scale (Cook, 1993). Data were analyzed using structural equation modeling and AMOS24 software.

Findings: The results indicated a relationship between cognitive emotion regulation strategies (-0.39), emotional distress tolerance (-0.41), internalized shame (0.36), and self-harming behaviors ($P < 0.01$). Furthermore, internalized shame mediated the relationship between cognitive emotion regulation strategies ($B = 0.52$) and emotional distress tolerance ($B = 0.45$) with self-harming behaviors in adolescents ($P < 0.01$).

Conclusion: Based on these findings, it can be concluded that since internalized shame mediates the relationship between cognitive emotion regulation strategies and emotional distress tolerance with self-harming behaviors, focusing on factors influencing these behaviors can help reduce the risks associated with this developmental period.

Keywords: Emotional distress tolerance, cognitive emotion regulation strategies, self-harming behaviors, internalized shame, adolescents.

1. Introduction

Adolescence, as a transitional period from childhood to maturity and integration into larger and more complex societies, can be considered a critical stage in life. During adolescence, individuals experience significant physical and hormonal changes, which can greatly impact their identity and future decision-making (Liu & Vazsonyi, 2024). Additionally, adolescents face psychological transformations, such as changes in thinking, emotions, and self-awareness, which can profoundly affect their future lives. In this phase, adolescents shape their identities and values, making critical decisions about their lives and futures. Considering these aspects, adolescence is a period full of changes and challenges. Awareness during this stage can provide opportunities for growth and turn challenges into optimal development opportunities (Aizpitarte et al., 2019).

One of the harms adolescents face is engaging in high-risk behaviors, such as self-harm, which are more prevalent during adolescence than at other stages of life (Daly et al., 2020; Faura-Garcia et al., 2021). Self-harm occurs across various societies and cultures, regardless of economic and social contexts (De Oliveira Costa et al., 2020). In Iran, the prevalence of self-harming behaviors has been reported to range between 6.2% and 12.3% (Mozaffari et al., 2021). Self-harm refers to behaviors in which an individual directly inflicts damage to different parts of their body without suicidal intent (Glenn & Klonsky, 2013). These behaviors can be seen as a form of self-directed violence (Duarte et al., 2020; Lee, 2016).

Factors such as psychological problems (depression, personality, and behavioral disorders), social pressures (peer and academic pressures), family and cultural pressures, substance abuse experiences, and family communication deficiencies influence self-harming behaviors in adolescents (Wang et al., 2024). Previous studies have identified psychological issues, including deficits in cognitive emotion regulation strategies (Asarnow et al., 2021), emotional distress tolerance (Erol & Inozu, 2023), and internalized shame (Weatherford et al., 2024), as contributing factors in hospitalized adolescents presenting with self-harming behaviors.

Emotions play a significant role in self-harming behaviors because many of these behaviors are used to manage negative and unpleasant emotions (Chen et al., 2021). Self-harming behaviors are associated with deficits in emotional regulation. Some individuals may attempt to

relieve emotional pain and alleviate psychological stress through self-harm, such as cutting or substance use (Asarnow et al., 2021). Cognitive emotion regulation refers to managing and manipulating emotionally evocative information (Hatkevich et al., 2019). It involves how individuals think after experiencing a negative or traumatic event (Neacsiu et al., 2018).

According to the Gross and Thompson model (2007), emotion regulation includes adaptive strategies (positive reappraisal, positive refocusing, planning, and perspective-taking) and maladaptive strategies (self-blame, blaming others, acceptance, catastrophizing, and rumination), which are used to increase, maintain, or decrease emotional, behavioral, and cognitive components of emotional responses (Gross & Thompson, 2007). Various studies have demonstrated a relationship between cognitive emotion regulation strategies and self-harming behaviors (Abbasi Aberzgeh et al., 2022; Ahmadimorvili et al., 2019; Asarnow et al., 2021; Erol & Inozu, 2023; Khedmati, 2019; Rashidi-Asl et al., 2020; Zanus et al., 2021).

In addition to cognitive emotion regulation, emotional distress tolerance is another factor related to self-harming behaviors. Many individuals who engage in self-harming behaviors may struggle to cope with emotional distress effectively and fail to use healthy methods for managing it (Zanus et al., 2021). Low emotional distress tolerance can lead to heightened negative emotions, which in turn may result in self-harming behaviors (Erol & Inozu, 2023). Emotional distress tolerance refers to the capacity to observe and become aware of current emotional states and attitudes without attempting to change or control environmental factors causing the distress (Hancock & Bryant, 2018).

Distress tolerance is increasingly recognized as an important construct for understanding the onset and maintenance of psychological harm and for the prevention and treatment of such harm (Billingsley & Steinman, 2021). Individuals with low distress tolerance may engage in destructive behaviors, such as high-risk and self-harming activities, to relieve emotional distress (Abbasi Aberzgeh et al., 2022; Bryan et al., 2014; Ellis et al., 2018; Erol & Inozu, 2023; Zanjani et al., 2018; Zanus et al., 2021).

Individuals experiencing internalized shame may feel unworthy, making shame a significant factor in self-harming behaviors (Cameron et al., 2021). Shame, as a negative emotion, can adversely affect mental health. Individuals experiencing shame may face emotional problems, such as anxiety, depression, and stress (Zhang et al., 2023). Shame is linked to emotions and deficiencies in emotional

tolerance. These individuals may attempt to reduce their shame and related emotions through self-harming behaviors (Weatherford et al., 2024).

Shame, as one of the most significant self-conscious emotions, is associated with an individual's sense of self, well-being, and vulnerability to psychological and personality disorders. Two components of shame are identified. The first, internalized shame, involves self-focused attention, where individuals perceive themselves as inadequate, defective, or bad (Rajabi & Abbasi, 2011). The second, external shame, relates to thoughts and feelings about how one is perceived in the minds of others (Fathollahzadeh et al., 2017). This study focuses on internalized shame.

Various studies have shown a relationship between internalized shame and self-harming behaviors (Abbasi Aberzgeh et al., 2022; Bryan et al., 2014; Rajabi & Abbasi, 2011; Weatherford et al., 2024; Zhang et al., 2023).

Given that adolescence is a period with high risks for self-harming behaviors (Hashemi et al., 2011), longitudinal studies have identified prior psychological and emotional issues as the most significant predictors of self-harming behaviors (Plener et al., 2018). However, research has not adequately addressed the simultaneous examination of primary factors predicting self-harming behaviors. Despite existing theories and studies on risk factors for self-harming behaviors, the influential aspects of these risk factors remain unclear.

Considering the lack of prior research on vulnerable populations, such as adolescents attending harm reduction centers who often engage in self-harming and suicidal behaviors, this study aims to fill the gap. By addressing emotional and psychological challenges in these adolescents, we aim to develop a conceptual model to examine the relationship between self-harming behaviors, cognitive emotion regulation strategies, and emotional distress tolerance. This study seeks to answer the question: Can internalized shame act as a mediator in the relationship between self-harming behaviors, cognitive emotion regulation strategies, and emotional distress tolerance in adolescents attending harm reduction centers in Tehran?

2. Methods

2.1. Study Design and Participants

This study is applied in its aim and utilizes a descriptive-correlational approach for data collection, employing structural equation modeling.

The statistical population consisted of adolescents (both male and female) aged 14 to 18 years who attended drop-in harm reduction centers in District 12 of Tehran (Shush-Harandi neighborhood) during the first four months of 2022. A total of 300 participants were selected through purposive sampling from among the adolescents attending these centers. The inclusion criteria for participation in the study were: being between 14 and 18 years old, not having psychotic disorders based on available social work files and psychologist interviews, providing consent to participate in the research, and having a clearly defined gender and sexual identity as male or female (excluding transgender adolescents). Exclusion criteria included failure to complete the study questionnaires.

2.2. Measures

2.2.1. Self-Harming

The Self-Injury Questionnaire, developed by Sansone et al. (1998), was one of the tools used in the study. This questionnaire comprises 22 items scored dichotomously (No = 0, Yes = 1), with a score range of 0 to 22. Higher scores indicate greater severity and frequency of self-injurious behaviors. The reliability of this instrument, as measured by Cronbach's alpha, was reported to be 0.84 by Sansone et al. (1998), and the convergent validity with Kernberg's Personality Disorder Inventory (1967) was 0.70. In previous studies, Mikaeili et al. (2019) reported Cronbach's alpha reliability as 0.74, and Rashidi Asl et al. (2020) reported it as 0.76 (Mikaeili et al., 2019; Rashidi-Asl et al., 2020). In this study, Cronbach's alpha reliability was calculated as 0.76.

2.2.2. Cognitive Emotion Regulation

The Cognitive Emotion Regulation Questionnaire (CERQ), developed by Garnefski et al. (2001), was also utilized. This questionnaire contains 36 items across nine subscales: self-blame, acceptance, rumination, positive refocusing, refocusing on planning, positive reappraisal, putting into perspective, catastrophizing, and blaming others. The items are scored on a four-point Likert scale (Almost Never = 1 to Almost Always = 5), with subscale scores ranging from 4 to 20. Basharat and Bazzazian (2011) reported Kendall's coefficient of agreement for subscales to be between 0.81 and 0.92. Hasani (2010) found that Cronbach's alpha ranged from 0.76 to 0.92 across subscales

(Hasani, 2010). In the current study, Cronbach’s alpha reliability was calculated as 0.75.

2.2.3. *Distress Tolerance*

The Distress Tolerance Scale, developed by Simons and Gaher (2005), was employed to measure participants’ ability to tolerate emotional distress. This scale consists of 15 items covering four components: tolerance, absorption, appraisal, and regulation. It uses a five-point Likert scale (Strongly Agree = 1 to Strongly Disagree = 5), with item 6 being reverse-scored. Higher scores indicate greater distress tolerance. Simons and Gaher (2005) reported Cronbach’s alpha reliability for the tolerance, absorption, appraisal, and regulation components as 0.72, 0.82, 0.78, and 0.70, respectively, and 0.82 for the entire scale. Similarly, Jangi et al. (2018) found Cronbach’s alpha reliability for the components to be 0.81, 0.75, 0.72, and 0.79, respectively (Jangi et al., 2018). In this study, Cronbach’s alpha reliability for the scale was calculated as 0.77.

2.2.4. *Internalized Shame*

The Internalized Shame Scale (ISS), designed by Cook (1993), was used to assess feelings of shame. This scale comprises 30 items and includes two components: shyness

and self-esteem. Responses are based on a five-point Likert scale (Never = 0 to Always = 4). Higher scores indicate feelings of worthlessness, inadequacy, inferiority, emptiness, and loneliness, while lower scores reflect higher self-confidence. Cook (1993) reported Cronbach’s alpha reliability for the shyness and self-esteem subscales as 0.94 and 0.90, respectively. Rajabi and Abbasi (2011) found Cronbach’s alpha reliability for the overall scale to be 0.90 (0.89 for males and 0.91 for females) (Rajabi & Abbasi, 2011). In this study, Cronbach’s alpha reliability was calculated as 0.79.

2.3. *Data Analysis*

To test the research hypotheses, structural equation modeling was employed as the primary method of analysis.

3. **Findings and Results**

The average age of the participants was 16.49 years, with a standard deviation of 1.42. Among the 300 adolescents, 190 were female (63.3%) and 110 were male (36.7%).

Table 1 presents descriptive data for the study variables and indices related to the assumption of non-collinearity for the predictor variables.

Table 1

Means, Standard Deviations, Skewness, Kurtosis, Tolerance Coefficient, and Variance Inflation Factor (VIF) of Study Variables

Variable	Component	Mean	SD	Skewness	Kurtosis	Tolerance	VIF
Self-Harming Behaviors	-	13.89	6.96	0.144	-0.748	-	-
Cognitive Emotion Regulation	Acceptance	10.49	3.24	-0.291	-0.535	0.156	1.961
	Rumination	12.75	3.43	0.129	-0.815	0.177	1.941
	Positive Refocusing	14.41	4.33	-0.226	-0.595	0.142	1.666
	Refocusing on Planning	9.56	3.25	-0.244	-0.536	0.152	1.466
	Positive Reappraisal	9.44	3.28	-0.227	-0.620	0.150	1.884
	Perspective-Taking	9.38	3.37	-0.203	-0.497	0.194	1.586
	Catastrophizing	11.86	3.07	0.156	-0.570	0.182	1.122
	Blaming Others	13.11	3.42	0.145	-0.781	0.185	1.121
	Self-Blame	16.90	2.25	0.078	-0.443	0.177	1.645
Emotional Distress Tolerance	Overall Score	107.90	7.60	-0.059	-0.852	0.121	1.341
	Tolerance	9.17	3.08	-0.054	-0.397	0.178	1.145
	Appraisal	18.20	5.04	-0.108	-0.261	0.171	1.164
	Absorption	9.28	2.97	-0.085	-0.161	0.209	1.741
	Regulation	9.21	3.13	-0.158	-0.180	0.208	1.413
Internalized Shame	Overall Score	45.73	12.52	-0.155	-0.659	0.122	1.197
	-	59.55	36.50	0.148	-0.896	0.144	1.741

The mean self-harming behavior score was 13.89 with a standard deviation of 6.96. Cognitive emotion regulation strategies, measured across components such as acceptance, rumination, positive refocusing, and others, displayed

acceptable skewness and kurtosis values within the range of -2 to 2. The overall cognitive emotion regulation strategy score averaged 107.90 (SD = 7.60). Emotional distress tolerance components such as tolerance, appraisal,

absorption, and regulation also showed acceptable skewness and kurtosis values, with an overall emotional distress tolerance score of 45.73 (SD = 12.52). Internalized shame had a mean score of 59.55 with a standard deviation of 36.50.

The indices for skewness and kurtosis indicate that the univariate distribution of the data is normal, as none of the

values exceed the range of -2 to 2. Furthermore, the Variance Inflation Factor (VIF) and tolerance coefficients confirm that the assumption of non-collinearity among predictor variables is met.

Table 2

Correlation Matrix of Variables

Variable	Self-Harming Behaviors	Cognitive Emotion Regulation Strategies	Emotional Distress Tolerance	Internalized Shame
Self-Harming Behaviors	1.00			
Cognitive Emotion Regulation	.45*	1.00		
Emotional Distress Tolerance	.30*	.50**	1.00	
Internalized Shame	.60**	.40*	.25	1.00

**p<.01; *p<0.05

The correlation matrix (Table 2) demonstrates significant positive and negative relationships among the study variables.

Table 3

Path Coefficients for Total, Direct, and Indirect Effects

Path	b	B	t	Sig.
Cognitive Emotion Regulation → Self-Harm	-0.72	-0.436	-2.86	0.001
Emotional Distress Tolerance → Self-Harm	-0.504	-0.488	-2.82	0.001
Cognitive Emotion Regulation → Shame	-2.944	-0.496	-2.568	0.001
Emotional Distress Tolerance → Shame	-2.71	-0.536	-2.803	0.001
Shame → Self-Harm	0.182	0.510	2.082	0.001

Path analysis results in Table 3 revealed significant negative direct effects of cognitive emotion regulation strategies ($\beta = -0.436, p < 0.001$) and emotional distress tolerance ($\beta = -0.488, p < 0.001$) on self-harming behaviors. Internalized shame mediated the relationship between

cognitive emotion regulation strategies and self-harming behaviors (indirect effect $\beta = 0.522, p < 0.001$) as well as between emotional distress tolerance and self-harming behaviors (indirect effect $\beta = 0.456, p < 0.001$).

Table 4

Fit Indices for the Final Structural Model

Fit Index	χ^2	df	χ^2/df	P-Value	Cmin/df	GFI	AGFI	IFI	NFI	TLI	CFI	RMSEA
Ideal Threshold	-	-	1 to 5	> 0.05	< 3	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	< 0.08
Final Model	0.09	83	3.34	0.057	1.37	0.94	0.93	0.99	0.98	0.99	0.99	0.038

The final model's fit indices (Table 4) showed adequate fit: $\chi^2/df = 3.34, GFI = 0.94, AGFI = 0.93, CFI = 0.99,$ and $RMSEA = 0.038$. These indices fall within acceptable thresholds, indicating that the structural model aligns well with the collected data.

The findings suggest that internalized shame mediates the relationship between cognitive emotion regulation strategies, emotional distress tolerance, and self-harming behaviors. Additionally, modifying the structural model by adding covariances between emotional distress tolerance

and cognitive emotion regulation strategies, as well as creating connections between regulation and absorption, resulted in improved model fit.

4. Discussion and Conclusion

The objective of this study was to determine the mediating role of internalized shame in the relationship between self-harming behaviors and cognitive emotion regulation strategies as well as emotional distress tolerance in adolescents visiting harm reduction centers in Tehran. The results indicated that internalized shame significantly mediates the relationship between self-harming behaviors, cognitive emotion regulation strategies, and emotional distress tolerance.

The findings revealed a relationship between cognitive emotion regulation strategies and self-harming behaviors, aligning with prior research (Abbasi Aberzgeh et al., 2022; Ahmadimorvili et al., 2019; Asarnow et al., 2021; Erol & Inozu, 2023; Khedmati, 2019; Rashidi-Asl et al., 2020; Zanus et al., 2021).

To explain these findings, it can be stated that as individuals increasingly use these strategies, their correlation with self-harming behaviors also increases. However, as individuals' awareness and understanding of using these strategies for managing emotions improve, the correlation decreases. When individuals employ positive strategies with full awareness of their thoughts and emotional states, they are more likely to replace self-harming ideation with positive thoughts. Conversely, individuals who predominantly use maladaptive strategies (e.g., self-blame, rumination, catastrophizing, and blaming others) without emotional awareness are more prone to self-harming behaviors (Hatkevich et al., 2019). The negative relationship between positive strategies and self-harming behaviors stems from the fact that individuals using positive strategies view negative events in a more constructive light, considering their potential short- and long-term benefits. As a result, they experience less depression and hopelessness, reducing their susceptibility to self-harming ideation.

Additionally, adolescents who lack the ability to plan for their future or goals and tend to make impulsive decisions are more likely to act irrationally when faced with stress, increasing their risk. This risk factor reflects the use of maladaptive cognitive-emotional strategies, where individuals lose emotional control, leading to anxiety and impulsive reactions due to an inability to recognize

emotional and stressful characteristics (Quintana-Orts et al., 2020).

The results also indicated a relationship between emotional distress tolerance and self-harming behaviors, consistent with previous findings (Abbasi Aberzgeh et al., 2022; Erol & Inozu, 2023; Jangi et al., 2018; Simons & Gaher, 2005).

Explaining this finding, it can be stated that individuals who engage in self-harming behaviors often struggle with emotional distress tolerance and face challenges in managing their emotions due to heightened emotional sensitivity. Consequently, they respond with inappropriate emotional reactions, such as self-harm, as a means of controlling their emotions (Heidarinejad et al., 2020). Moreover, negative emotional states associated with low self-esteem and defective self-perceptions exacerbate emotional reactivity and lead to maladaptive emotional expressions. Individuals with emotional difficulties are less capable of tolerating and appraising situations, perceiving problems as enduring and unchangeable. This perspective makes emotional regulation difficult, prompting them to engage in behaviors such as self-harm to escape or discharge unpleasant emotions. Conversely, individuals with high self-esteem and confidence in their positive attributes understand that they can resolve problems with wisdom, resulting in fewer emotional difficulties (Erol & Inozu, 2023).

The study also found that internalized shame mediates the relationship between cognitive emotion regulation strategies, emotional distress tolerance, and self-harming behaviors. These results align with prior research (Bryan et al., 2014; Rajabi & Abbasi, 2011; Weatherford et al., 2024; Zhang et al., 2023), which demonstrated a relationship between internalized shame, emotional problems, and self-harming behaviors.

In interpreting this finding, it can be said that individuals facing problems tend to rely on specific strategies to manage their emotions. Emotion regulation may involve adaptive or maladaptive strategies. Individuals with lower cognitive abilities to address problems are more likely to use maladaptive strategies (Quintana-Orts et al., 2020). Internalized shame, accompanied by psychological challenges and reduced self-esteem, causes individuals to underestimate their ability to use adaptive strategies. Consequently, in stressful situations, they rely on maladaptive strategies, such as rumination, which involves repetitive thinking about problems (Bryan et al., 2014). These individuals often anticipate catastrophic outcomes, which significantly hinders successful problem-solving.

Reduced cognitive abilities and the belief that they lack the skills to cope cognitively diminish their capacity for acceptance and positive attention, focusing instead on their perceived inadequacies. This pattern leads to emotional outbursts and behaviors such as self-harm as a way to escape or release these emotions (Hatkevich et al., 2019). Thus, self-harming behaviors are linked to maladaptive emotional strategies and emotional distress tolerance, with internalized shame acting as a mediating variable (Ahmadimorvili et al., 2019).

The findings of this study showed a significant negative relationship between cognitive emotion regulation strategies and emotional distress tolerance with self-harming behaviors and a significant positive relationship between internalized shame and self-harming behaviors. Additionally, internalized shame mediated the relationship between cognitive emotion regulation strategies, emotional distress tolerance, and self-harming behaviors in adolescents. The results indicate that the model predicting self-harming behaviors based on cognitive emotion regulation strategies and emotional distress tolerance, with the mediating role of internalized shame, shows good fit for adolescents visiting harm reduction centers in Tehran.

5. Suggestions and Limitations

This study has several limitations that should be considered when interpreting and generalizing the results to other groups. These include the unavailability of accurate data on the frequency and severity of self-harming behaviors due to potential dishonesty in responses. Additionally, the inability to classify participants based on the type of self-harming behavior presents another limitation. Since most participants were runaway adolescents or from disadvantaged families, accessing parents and assessing high-risk behaviors in other family members were not feasible. Caution should therefore be exercised in generalizing these findings.

Based on the results, it is recommended that future studies include adolescents from typical families who live with their parents and have a history of self-harming behaviors. Future research should also use additional tools, such as self-report questionnaires, to assess behavioral problems among family members and first-degree relatives, as well as demographic factors. Additionally, the type and severity of self-harming behaviors should be examined in subsequent studies.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

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

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