



Research Paper

Self-harming Behaviors and Suicide Probability in Delinquent Adolescent Girls: The Role of Emotion Dysregulation and Modeling the Self-harming of Peers



Maryam Akbari-Motlaq¹ , Saied Teymuri^{1*} , Mohammadjavad Asghari-Ebrahimabad^{1,2} , Behrouz Mahram^{1,2} 

1. Department of psychology, Torbat-e Jam Branch, Islamic Azad University, Torbat-e Jam, Iran.

2. Department of Psychology, School of Psychology, Ferdowsi University of Mashhad, Mashhad, Iran.



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ABSTRACT

Background: Adolescents may be exposed to several mental health related difficulties due to lack of complete cognitive maturity.

Objectives: This study investigated the mediation of emotion dysregulation and modeling of peers in relation between self-harming behaviors and suicide probability in adolescent.

Materials & Methods: In a descriptive study, we investigated juvenile delinquents of Correction and Rehabilitation Center of Mashhad during 2021. A total of 148 individuals were selected and evaluated using the self-harm motivation scale, Ottawa self-harming inventory, regulation problems scale and peer self-harm modeling scale. Data were analyzed using structural equation modeling in SmartPLS-3 software.

Results: The Mean±SD age of participants was 16.21±2.42. There was significant direct effect of self-harming behaviors on suicide probability ($\beta=0.86$, $P=0.001$). The significant indirect effect of self-harming behaviors on suicide probability through emotional dysregulation ($\beta=0.36$, $P=0.001$) was stronger than indirect effect mediated by peers modeling ($\beta=0.17$, $P=0.04$). The model account for 87% of total variance of suicide probability.

Conclusion: Based on the findings of the study, it can be concluded that emotion dysregulation and peers modeling play a role in increasing suicide probability and should be considered in preventing harmful behaviors in adolescents.

Keywords: Self-injury, Suicide, Emotion regulation

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* Corresponding Author:

Saied Teymuri, PhD.

Address: Department of Psychology, School of Psychology, Torbat-e-Jam Branch, Islamic Azad University, Torbat-e-Jam, Iran.

Tel: +98 (915) 5221420

E-mail: steimory28@yahoo.com

1. Introduction

The frequency of self-harming behaviors in adolescence is increasing. One study demonstrated that the level of non-suicidal self-harming behaviors raised from 4% in 2002 to nearly 16% in 2017 [1]. Self-harming rate in Iranian adolescents was estimated between 13% to 22% [2]. It may result in several psychological and social outcomes. In most cases, it is difficult to recognize the main reason of this behavior [3]. Self-harming may contrive committing suicide or self-murder [4]. Therefore, studying the risk factors of self-harming is critically important. Although self-harming behavior is in contrast with life motive, but various motives are attributed to it. Yet there is no consistent and comprehensive information about the process of forming, continuity, and repetition of this behavior [5]. The contributing factors in self-harming could be generally considered as internal and external.

Nock et al. categorize self-harming motives in four-function model (FFM) as positive attention attracting from others, creating positive emotional moods, release of negative emotions, and avoiding irritating people [6]. Although the impulsive behavior contribute to predicting harming behavior, Lockwood et al. [7] in a review article concluded that several cognitive and emotional variables can play role in explaining and retaining this behavior. Among cognitive variables, emotion dysregulation is the most accepted etiologies of self-harming behaviors in teenagers [8].

On the other hand, the role of peers in adolescence behaviors is considerable. The peers' factors in adolescence especially modeling of them, copying them, the tendency to be accepted by them and the experience of being victim or bullying among them correspond with self-harming and committing suicide. Previous studies indicated that self-harming behaviors correspond with the motivations of group acceptance, agitation tool, anti-suicide, self-proving, self-distinguishing from others, anti-resolution and revenge ties with the motives of non-suicidal self-harming [9]. Emotion dysregulation contribute to a wide range of strategies which people use in different stressful situations. Individuals who experience emotion dysregulation have difficulty accepting their emotional response which can lead to behavioral dysregulation including excessive substance use, impulsivity or self-harming [10]. It should be noted that self-harming includes two groups of direct behaviors such as non-suicidal self-harming and indirect behavior like drug abuse and risk-taking behaviors. In direct behaviors, a person

hurt his peripheral tissues consciously and deliberately but does not intend to suicide and the behavior is not socially accepted by culture and in indirect self-harming a person behaves voluntarily which in long term would harm, but there is no intention of self-harming at the time of doing behavior [11].

The role of emotion regulation defects in self-harming has been reported [12]. There is dispersed information about the factors and processes which may build links between self-harming and defects of emotion regulation. The present research could be novel and innovative with the aim of studying emotion regulation and modeling the self-harming of peers in predicting self-harming behaviors in teenage girls.

2. Materials and Method

Study type and population

The current descriptive-cross sectional study was conducted on delinquent teenage girls in Correction and Rehabilitation Center of Mashhad from January to April 2021. The participants were selected voluntarily and the eligibility criteria were: 16-18 age range; the ability to read and write and the consent for participating in research. Moreover, we obtained the informed consent of their legal guardians. The sample size was estimated 150 out of the total of 242 teenage girls in Correction and Rehabilitation Center of Mashhad, using Cochran formula. The estimation was based on maximum prevalence of 0.5, precision and significance level of 0.05 and considering finite population correction for calculation.

Data collection and measures

The required data was collected using four questionnaires that were given to the psychologist and the consultant of the center in order to distribute between participants. They also received the instructions on how to fill them.

Self-harming behaviors was assessed using Self-harm Inventory of Sanson et al. (1994) containing 22 items scored as yes (1) or no (0). The range of score was 0-22. High score indicates the high rates of self-harming behavior. Several studies have supported the validity and reliability of the tool. In the first study of Soanson et al. [13] the reliability of questionnaires according to Alfa Cronbach was 0.83. Tahbaz et al. [14] translated the scale into Persian. They reported adequate content validity and reliability coefficient was 0.76.

Emotion Dysregulation Scale questionnaire by Garenfsky et al. consists of 36 items rated on a 5-point Likert scale (ranging from 0=almost never to 5=almost always). The range of score was 0-180. The questions measure 6 dimensions; Non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. The six-factor structure of scale confirmed through exploratory factor analysis, and the validity coefficient was 0.93 [15]. The factor structure of the questionnaires has been confirmed in Iran. The internal consistency was 0.92 and test-re-test correlation during two weeks for sub-scales was estimated between 0.86 to 0.88 [16].

The questionnaire of modeling peer's self-harming by Clitor and Nixon is a part of Ottawa self-harming inventory. This sub-scale contains 6 items with three types of questions; yes/no (0/1) questions and multiple-choice questions (little (1), sometimes (2), a lot (3) and one question scored 1-5). Higher scores indicate more modeling of peers and scores ranged between 4-14. In Nixon et al. [17] reliability coefficient was reported 0.82. In Iran, Khanipour [18] internal consistency of the questionnaire according to Cronbach's Alfa was 0.73.

Suicide Probability Scale by Cull and Gill comprise of 36 questions and 4 subscales of disappointment, suicide thoughts, hostility-aggression and negative self-evaluation. The questions are scored according to a four-rated scale. The scores are categorized to high risk (75-100), average risk (50-74), and low risk (25-49) of suicide. The scores ranged from 25 to 100. In Cull and Gill study the Cronbach's Alfa of the total score for scale was reported 0.93 and for subscales ranged from 0.62 to 0.89 [19]. The scale was applied to adolescents and the four-factor structure was confirmed, also the validity was reported 0.91 for all questions using Cronbach's Alfa [20]. The convergent validity of the scale according to the correlation between test score and symptoms was verified in a study on teenagers in Iran [21].

Statistical analysis

Research data were described through the Mean±SD. According to the research aims, a model was developed and the model parameters were estimated by the method of partial least squares. Suicide probability was exogenous variable, self-harming behavior was endogenous, and emotion dysregulation and peer modeling were the mediating variable of the model, which were defined as a latent variable. To measure the fit of the

research conceptual model, structural equation modeling (SEM) was used, which is a kind of latent variable analysis, which allows sets of multiple regression equations to be tested simultaneously to test the relationships between variables [22]. After specifying the model, an estimation of overall goodness of fit of the model with the observed data was performed. For this purpose, Chi-square/df index of fit, the comparative fit index (CFI), and Standardized root mean square residual (SRMR) were used [23]. The R^2 evaluates the portion of the variance of the endogenous variables, which is explained by the structural model. It indicates the quality of the adjusted model. For the area of the social and behavioral sciences, Cohen suggests that $R^2=2\%$ as classified as having a small effect, $R^2=13\%$ as a medium effect, and $R^2=26\%$ as having a large effect. The Cohen's Indicator (f^2) is obtained by the inclusion and exclusion of model constructs (one by one). The values of 0.02, 0.15, and 0.35 considered as small, medium and large effect [24]. The significance level was considered 0.05. Correlation matrix was reported using Pearson correlation coefficient. Data analysis was conducted in SPSS software, version 22 and SEM was performed using SmartPLS-3 software.

The reliability of the variables was evaluated using composite reliability (CR), which is a measure of the internal fit of the model, in the SmartPLS-3 software. Convergent validity of latent variables was tested with the average variance extracted (AVE). Convergent validity was defined as AVE greater than or equal to 0.50. The AVE values should be above the 0.50. The traditional indicator Cronbach's Alpha (CA), is based on the variables inter-correlations. CA values above 0.60 and 0.70 are considered fitting in exploratory studies and composite reliability (CR) values of 0.70 and 0.90 are considered satisfactory [22].

3. Results

The mean age of participants was 16.21 ± 2.42 . All of participants were female. The majority of them were student of high school (94.9%). The education level of the majority of parents of participants (69.1%) were elementary, 18.4 % were illiterate, and the rest educated up to high school. According to the classification of suicide probability, 91 individuals (60.7%) was at low-risk category, 57 individuals (38%) at average risk, and 2 (1.3%) at high risk.

Table 1 represents the results of descriptive statistics bivariate correlation analysis between self-harming behavior with psychological and peers' related fac-

tors. There was significant strong and direct correlation between self-harming with emotion dysregulation ($r=0.85$), peers modeling ($r=0.77$), and suicide probability ($r=0.87$) ($P<0.001$).

The reliability of the variables was assessed by composite reliability. The results showed that the minimum and maximum composite reliability values were related to emotion dysregulation (0.75) and self-harm (0.90), respectively, indicating the acceptable reliability of latent variables. The convergent validity of latent variables was tested with AVE. The lowest AVE (0.52) was related to emotion dysregulation and the highest AVE (0.67) belonged to “self-harming”. Since the mean AVE was greater than 0.5, the convergent validity of latent variables was confirmed. Also, due to the larger CR values than AVE, there was a convergent validity condition.

Figure 1 shows the structural equation model of research variables. The results showed that all direct and indirect relationships are significant at the 0.05 level. The strongest relationship was observed between self-

harming behaviors ($\beta=0.86$, $P=0.001$) and emotion dysregulation ($\beta=0.34$, $P=0.001$) and weakest relationship was between peers modeling and suicide probability ($\beta=0.25$, $P=0.04$). The model account for 87 % of total variance of suicide probability.

The results represented in Table 2 shows significant indirect effect of self-harming behaviors to suicide probability through emotion dysregulation ($\beta=0.37$) and peers modeling ($\beta=0.17$).

4. Discussion

High prevalence of self-harming behavior in adolescence lead to permanent outcomes in their future life. On the other hand, these behaviors are increasing in girls. Hence, the study was conducted in order to analyze the effect of behavioral (self-harming), cognitive (emotion dysregulation), and environmental (peers) factors in suicide probability. The results indicated the indirect and direct relation between self-harming and suicide probability with emotion dysregulation. These findings were in consistent with findings of Hasanvand et al., Peh et al.,

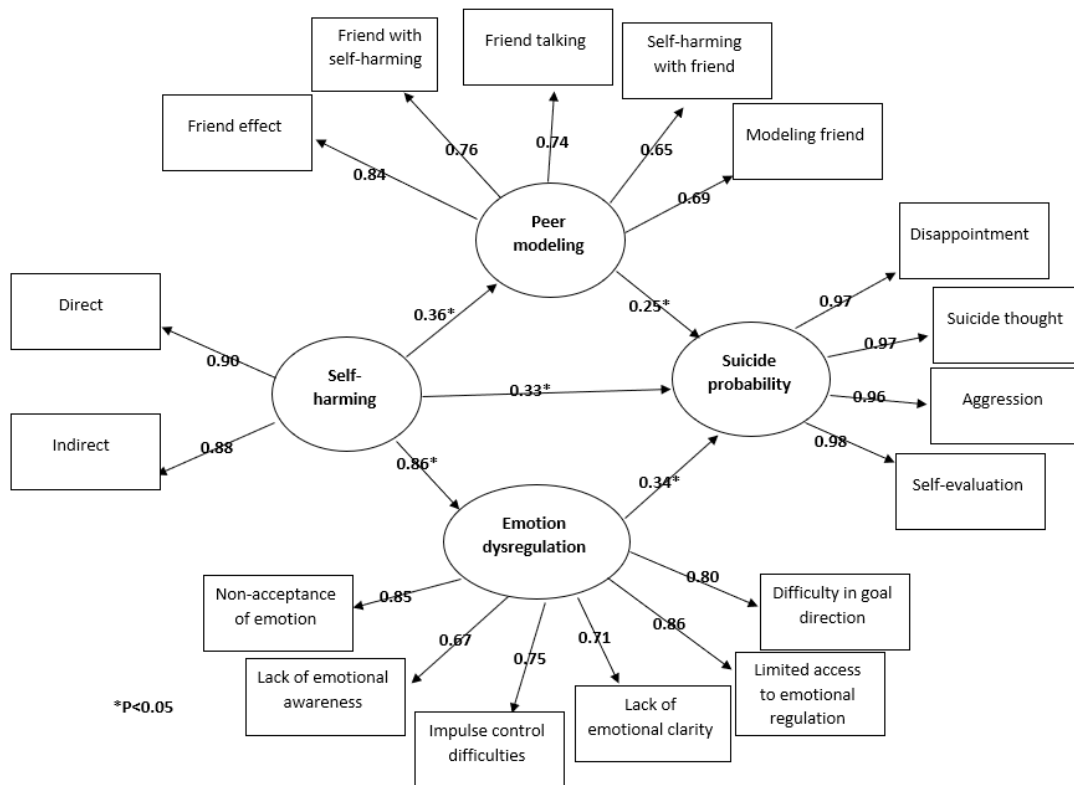


Figure 1. Path diagram from the final model from self-harming to suicide probability with mediation of emotion dysregulation and peers modeling

Values on line represent standardized loading factor or regression coefficients. Circle indicate latent variables. Boxed denote observed variables ($\chi^2=360.34$, $NFI=0.86$, $SRMR=0.082$).



Table 1. Descriptive statistics and correlation of variables

Scale	Subscale	Mean±SD	Min-Max	(1)	(2)	(3)	(4)
Self-harming (1)	-	13.98±3.74	6-20	1		-	-
Emotion dysregulation (2)	-	111.98±22.33	63-134	0.85*	1	-	-
	Impulse control difficulties	19.49±4.11	-	-	-	-	-
	Lack of emotional awareness	18.36±3.99	-	-	-	-	-
	Limited access to emotion regulation strategies	15.44±2.84	-	-	-	-	-
	Lack of emotional clarity	21.16±5.01	-	-	-	-	-
	Non-acceptance of emotional responses	16.34±3.19	-	-	-	-	-
	Difficulty engaging in goal-directed behavior	20.11±5.23	-	-	-	-	-
Peers modeling (3)	-	4.54±2.18	4-14	0.77*	0.68*	1	
Suicide probability (4)	-	39.33±8.49	31-73	0.87*	0.73*	0.78*	1
	Disappointment	6.70±2.01	-	-	-	-	-
	Suicide thoughts	15.28±4.15	-	-	-	-	-
	Hostility-aggression	7.46±1.99	-	-	-	-	-
	Negative self-evaluation	8.71±2.15	-	-	-	-	-

*P<0.001



Table 2. Path coefficients of self-harming and suicide probability with mediation role of peers modeling and emotion dysregulation

Path	Standardized Coefficient	SE	t	P
Indirect path				
Self-harming behaviors>Emotion dysregulation>Suicide probability	0.37	0.06	5.79	0.001
Self-harming behaviors>Peers modeling>Suicide probability	0.17	0.02	1.99	0.04
Total effect				
Self-harming behaviors>Emotion dysregulation	0.84	0.01	45.49	0.001
Self-harming behaviors>Suicide probability	0.86	0.02	43.91	0.001
Emotion dysregulation>Suicide probability	0.34	0.35	4.30	0.001
Self-harming behaviors>Peers modeling	0.36	0.01	8.15	0.001
Peers modeling>Suicide probability	0.25	0.08	4.03	0.001



and Breton and Macglinchi [25-27]. Kedmati [16] concluded that difficulty in emotion regulation could predict the suicide probability and self-harming.

To explain this finding, inability in accepting emotional strategies may cause to negative emotions. People with low emotional regulation ability show more irritabilities in response to negative emotions. Since adolescent with suicide thoughts cannot avoid negative emotions, they cannot recognize appropriate strategy to face stressful situations. They do not have enough access to emotional strategies and this leads to choose maladaptive strategies. Because of higher impulsive behaviors related to emotional dysregulation the probability of risky behaviors such as drug abuse and self-harming is prevalent among them [28]. According to emotion-regulation model the adolescents with more emotional dysregulation who have problems in accepting, evaluating and controlling emotional responses have more potential for self-harming suicide behaviors [27].

The results also indicated the indirect and direct relation between self-harming and suicide probability with peers' roles. In line with the findings in the study by Khanipour [9]; Prinstein et al. [29] highlighted the role of peers in self-harming. In a model presented by Nouk, one of the main reasons for teenagers with self-harming is delivering social messages. This leads to social responses as it is a high risk behavior and impose cost on family and social systems. The second motive for non-suicidal inter-personal injury is self-affirmation. It is more in delinquent adolescents to demonstrate their abilities to others. This was more evident in our study because the group were delinquent. They believed they are identified as a popular and powerful individual among peers. Self-other distinction is another interpersonal non-suicidal self-harming motive. The teenagers who have difficulty in understanding, accepting and extending compassion to themselves might display self-injurious behavior to be distinguished from others and achieve a feeling of self-consistency.

In general, the findings regarding the indirect and direct relationship between emotional regulation and peer modeling with self-harm and the possibility of suicide can be explained by several models. According to the four-function model [6], self-harm is a maladaptive emotional strategy that is used by people with emotional regulation deficits in stressful situations. Also, based on the experiential avoidance model, self-harm behavior is considered as an avoidance behavior in distress conditions to avoid distress conditions. This theory highlights the role of emotional skills. Also, Bandura's social cognitive model

can be helpful in explaining this finding because it justifies the peer modeling of teenagers. It is possible that one of the peers achieves their desires with self-harming behaviors and pretending to commit suicide, and this makes others eager to copy their behavior for self-harming or tendency to suicide.

5. Conclusion

The results of the study showed was self-harming was strongest predictor of emotion dysregulation, thus it is suggested to pay more attention on self-harming behaviors in rehabilitation centers. As the emotion dysregulation could predict the suicide probability, it is recommended to give necessary information about relation between variables and consider them in creating mediators and consultation to correct and improve the emotion dysregulations of cases with self-harming.

The study had limitations as it was confined to delinquent teenagers of rehabilitation center of Mashhad and it is not definite whether the research variables have the same share in predicting other populations. The research was done on a limited number of people; thus generalizing the results to other studies should be done carefully. It studied the relation between self-harming behaviors with limited variables, while other variables including emotional intelligence, personality and gender can contribute.

Ethical Considerations

Compliance with ethical guidelines

The study protocol was approved by [Islamic Azad University, Torbat Jam Branch](#) (Code: IR.TRJUMS.REC.1398.011).

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Authors' contributions

All authors equally contributed to preparing this article

Conflict of interest

There is no conflict of interest in this study

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