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Predicting self-harming behaviors based on attachment styles and early maladaptive schemas among adolescents; mediating roles of trauma, emotion dysregulation, impulsivity and self-criticism

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ABSTRACT

Introduction: Self-harming behavior is a major clinical issue in adolescence. In this study, we aimed to clarify the pathway from attachment styles and early maladaptive schemas to self-harming behavior through the mediating roles of trauma, emotion dysregulation, impulsivity, and self-criticism among adolescents in Iran. *Methods*: A sample of 558 (263 girls and 295 boys) middle school-aged adolescents (aged 13–17) were recruited. Participants had at least one self-harming behavior in their clinical records. Self-report questionnaires in this research were completed online. *Results:* The Sobel Test revealed that attachment styles and early maladaptive schemas had significant indirect effects on self-harming behavior. More specifically, attachment styles had indirect effect on self-harming behavior with mediating roles of trauma, emotion dysregulation, and self-criticism except impulsivity. Early maladaptive schemas had an indirect effect on self-harming behavior with mediating roles of emotion dysregulation, impulsivity, and self-criticism except trauma. *Conclusions:* Our findings, which were based on the assessment of the model, provided new insight to the relationship of attachment styles and early maladaptive schemas with self-harming behavior.

Keywords: Self-harming behavior, Attachment styles, early maladaptive schemas, Trauma, Emotion dysregulation, Impulsivity, Self-criticism

1. INTRODUCTION

Self-harm among the young is globally focused as a growing public health issue (Hawton et al., 2012). Those who commit this behavior is a deliberate

self-inflicted harm, are at high risk of suicide regardless their intention for dying (Pilkington et al., 2020). Self-harm starts during adolescence and has been related with late or completed stages of puberty more than chronological age (Hawton et al., 2012; Patton et al., 2007). The average prevalence of self-harming behaviors among adolescents is about 13-23% (Muehlenkamp et al., 2012) and 30-82% in the clinical sample (Hooley & Franklin, 2018).

Attachment styles and early maladaptive schems in the relationship of self-harm

Bowl by believed that insensitive and unresponsive caregiving results in declined child's ability for making strong affectional bonds to others which in turn shapes different types of psychological disorders (Bowlby, 1973). Numerous studies have shown, there is a relationship between self-harming behaviors and insecure attachment styles (Falgares et al., 2017; Glazebrook et al., 2015). Young considers early maladaptive schemas as pervasive cognitive themes that shape through childhood, affect self-perception, and have major effect on personal relationship. He suggests that schemas are extended patterns composed of memories, emotions, cognitions, and somatic sensations of a person and his or her relationship with others (Young et al., 2003). Results of related researches showed that early maladaptive schemas plays an important role in self-harm (Lewis et al., 2015; Saldias et al., 2013).

Self-harm, emotion dysregulation and impulsivity

Numerous studies indicated that self-harming behaviors can be explained in the framework of emotion dysregulation model and impulsivity (Chamberlain et al., 2017; Lockwood et al., 2020; Wolff et al., 2019). Emotion regulation can be described as a mechanism that individual purposefully or non-purposefully modify their emotional experiences to achieve their desires (Aldao et al., 2010) and impulsivity is often a general tendency to act rashly (Whiteside et al., 2005).

Self-harm and trauma (child maltreatment)

Child maltreatment is mainly categorized into four various types: emotional, physical, sexual abuse and neglect. One study revealed that the relationship between childhood maltreatment (includes emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect) and non-suicidal self-injury. In this longitudinal study, it is reported that non-suicidal self-injury behavior was associated with childhood maltreatment (Kaplan et al., 2016).

Self-harm and self-criticism

Self-criticism can be defined as people's tendency to have high expectations of themselves and to criticize their own performance (James et al., 2015). Self-criticism is divided into two types; Comparative self-criticism and internalized self-criticism. In comparative self-criticism, individuals compare themselves with others, and in internalized self-criticism compare with high-level and unattainable internal expectations. Finally, both types of self-criticism are associated with low self-esteem and psychological disturbances (Thompson & Zuroff, 2004).

The mediating roles of Trauma, emotion dysregulation, impulsivity, and self-criticism

By searching the following sites (e.g.; Electronic databases Scopus (Elsevier), CINAHL, Psych INFO (EBSCO) and Medline) until June 17, 2021, it was found that, there was no similar research that investigated the role of Trauma, emotion dysregulation, impulsivity, and self-criticism as mediators in the relationship ofattachment styles and early maladaptive schemas with self-harming behaviors. Therefore, according to the researches on self-harming behaviors, it remains unclear what model can provide a better explanation for self-harm. For the reason we examined the role of trauma, emotion dysregulation, impulsivity and self-criticism as mediators in the relationship of attachment styles and early maladaptive schemas with self-harming behaviors.

2. METHODS

Participants and procedure

The study period of this research was from October 2020 to July 2021. Participants were selected from 900 individuals who had a clinical record at the Counseling Center that located in Karaj, Iran. At least, one self-harming behavior was reported in their records. Sampling firstly was done with simple randomized sampling and from 4 counseling centers, one center was selected. In the second stage, the participants were selected by purposefully sampling. Participants expressed their consent to collaborate on this research by selecting the relevant online option. Out of 900 subjects who were invited to participate in the research, 631 subjects completed the research questionnaires online. The data of 558 subjects (263 girls and 295 boys) middle school-aged adolescents (aged 13–17), were analyzed and 73 subjects did not meet the research conditions and their data put away from this research.

Measures

Self-Harm Inventory (SHI)

Self-Harm Inventory (SHI) is a 22-item questionnaire which measures the history of deliberate self-harm and includes a wide range of physical and nonphysical, direct and indirect behaviors. Self-harm behaviors which are scored above five are considered as an indication for psychopathology and the SHI is scored by summing the number of this behaviors (Sansone et al., 1998). The SHI has good internal consistency in both clinical and nonclinical populations (Sansone et al., 2007). Cronbach's alpha in the present study is 0.87.

Attachment Styles Questionnaire (ASQ)

The definition of Hazan and Shaver's about how people usually feel in their close-knit relationships has shaped a base for the attachment styles questionnaire (Hazan & Shaver, 1987). It was used in this research to test adolescents' attachment styles. This questionnaire has 21 statements which is scored on a five-point scale ranging from not at all (1) to very much (5) with three subscales: secure, avoidant style, and ambivalent style. Cronbach's alpha in the present study is 0.78.

The Young Schema Questionnaire – Short Form (YSQ-S2)

The YSQ is a 75-item scale used for assessment 15 maladaptive schemas on a six-point Likert-type rating scale (responses range from 1 = completely untrue of me; 6 = describes me perfectly). The Cronbach's alphas for the YSQ-SF subscales were reported to be between 0.76 and 0.93 (Welburn et al., 2002). The discriminant and predictive validity of the scale were permissible (Oei & Baranoff, 2007). Cronbach's alpha in the present study for Isolation/alienation and insufficient self-control/self-discipline schema is respectively 0.73 and 0.71.

The Difficulties in Emotion Regulation Scale (DERS)

The DERS has 36 items as a self-report questionnaire which is developed to assess clinically associated emotion dysregulation, and normal development. DERS evaluates emotion dysregulation through six subscales; Non-acceptance of negative emotions, difficulties engaging in goal-directed behaviors, difficulties controlling impulsive behaviors, lack of emotional awareness, limited access to effective emotion regulation, and lack of emotional clarity. The measure has showed acceptable reliability and validity with adolescent samples (Neumann et al., 2010). Cronbach's alpha in the present study is 0.91.

Trauma was assessed using the Childhood Trauma Questionnaire (CTQ-SF)

The intensity of physical, sexual, and emotional abuse and physical and emotional neglect are assessed by CTQ-SF as a 28-item self-report questionnaire. Items were rated from 1 (never true) to 5 (very often). The CTQ-SF has been reported to be valid and reliable (Spinhoven et al., 2014). Cronbach's alpha in the present study is 0.88.

Barratt Impulsiveness Scale (BIS)

The scale measures impulsivity as a trait measure with 30 items, scored on a four-point scale. BIS provides a total impulsivity score and the score for three subscales (attentional impulsivity, motor impulsivity, and non-planning impulsivity). The scale is extensively used and showed a good test re-test reliability (Spearman's P=0.83), internal consistency (α=0.83), and the factor structure (Stanford et al., 2009). Cronbach's alpha in the present study is 0.84.

Levels of Self-Criticism Scale (LOSC)

LOSC is a 22-item scale that assess the Levels of Self-Criticism (Thompson & Zuroff, 2004). A five-point scale ranging from 'it does not apply to me at all' to 'absolutely true of me' is used to score this scale. Two subscales of the LOSC are Comparative Self-Criticism (CSC) and Internalized Self-Criticism (ISC). The scale has good validity and Cronbach's alpha is calculated to be 0.90 for this scale (Yamaguchi & Kim, 2013). Cronbach's alpha in the present study is 0.72.

Data analysis

To examine fit of the model, structural equation modeling (SEM) techniques were used by Amos software (version 24). Mardia multivariate skewness and kurtosis coefficient (Mardia, 1970) was used and it was 2.17, which indicates that the condition of multivariate normality is met. Also, the variance inflation factor (VIF) revealed that there was not any strong collinearity between the predictive variables. To check the fit of the model, Root Mean Square Error Approximation (RMSEA), Comparative Fit Index (CFI), Normed Fit Index (NFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) have been used.

3. RESULTS

Demographic data showed that 52.9% of the sample group were boys and 47.1% were girls aged 13-17 (M=15.06, SD= .73). Descriptive findings of research subscales are shown in Table 1.

Table 1 Descriptive of Subscales

variables	Mean	Standard Deviation	Normal Distribution	
			Kurtosis	Skewness
Avoidant attachment Styles	24.65	3.52	.44	-.12
Secure attachment Styles	24.16	3.49	.44	-.40
Ambivalent attachment Styles	24.73	3.88	.31	-.10
Social Isolation Schema	14.73	2.11	.88	-.41
Insufficient Self-control/Self-discipline Schema	17.90	4.15	-.12	-.31
Emotional Abuse	22.73	3.05	2.79	-1.33
Physical Abuse	23.79	3.01	1.38	-1.28
Sexual Abuse	24.12	2.62	1.82	-1.88
Emotional Neglect	22.00	4.03	1.84	-1.50
Physical Neglect	20.39	1.94	1.52	-1.75
Non-acceptance of negative emotions	23.52	5.21	-.06	-.72
Difficulties engaging in goal-directed behaviors	17.76	4.73	-.40	-.46
Difficulties controlling impulsive behaviors	23.22	5.50	-.13	-.78
Lack of emotional awareness	20.57	4.64	-.08	-.23
Limited access to effective emotion regulation	31.76	6.80	.84	-1.07
Lack of emotional clarity	18.82	3.55	.16	-.87
Attentional Impulsivity	23.61	4.26	-.44	-.33
Motor Impulsivity	34.60	5.33	.05	-.64
Non-planning Impulsivity	33.33	5.35	-.43	-.25
Internalized Self-Criticism	40.88	11.52	.55	-.87
Comparative Self-Criticism	45.65	9.66	.01	-.08
Self-harm Behaviors	13.36	4.46	1.40	-1.60

It is clear that based on the data in Table 1, the skewness and kurtosis of the indicators are not out of the range (3, -3), therefore, it might be considered normal. Fig 1 shows the mean and standard deviation of subscales as Bar chart. As shown in Table 2 the non-collinearity conditions are met.

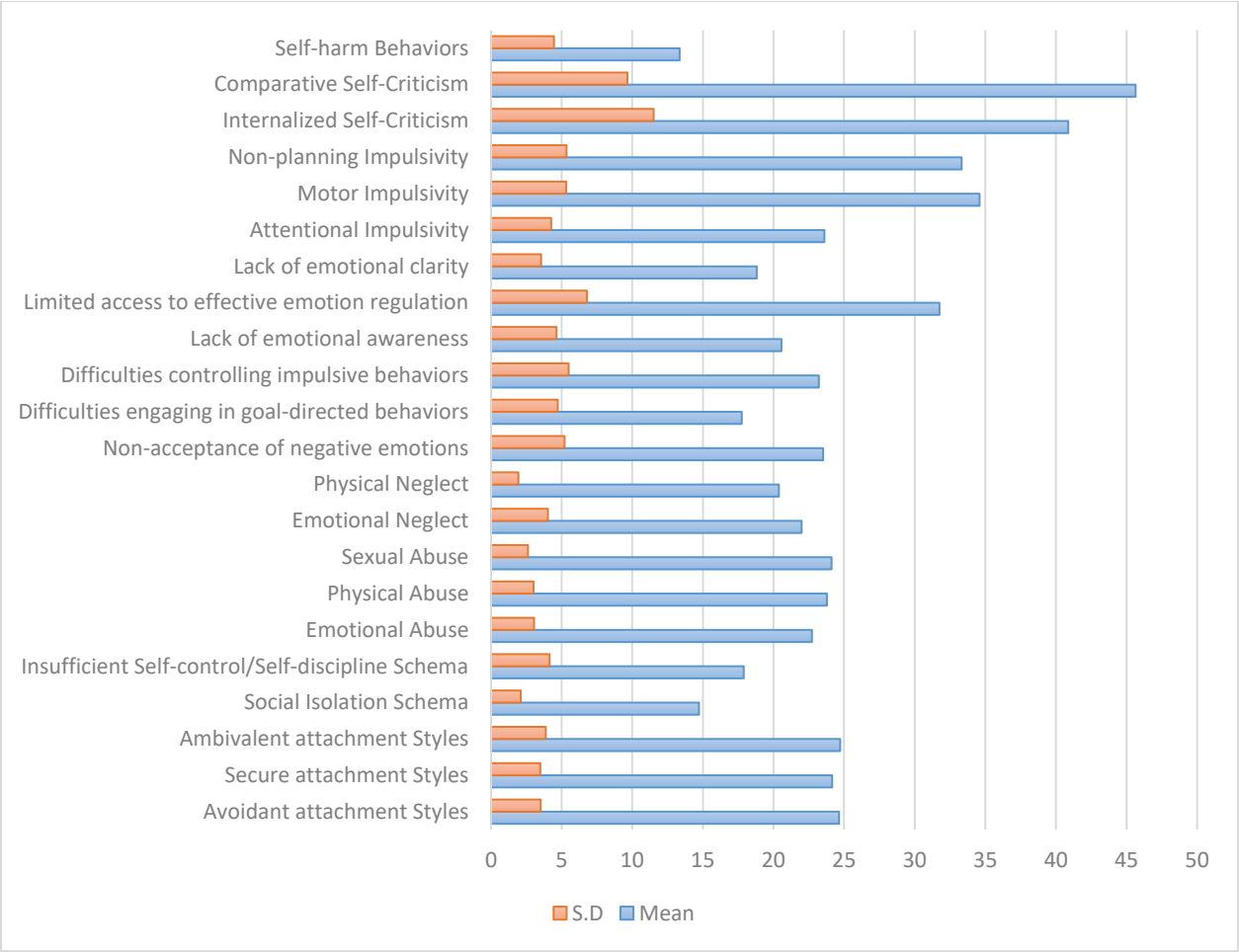

Figure 1 Bar chart of subscales

Table 2 Collinearity of Predictive Variables

Predictive Variables	collinearity	
	Tolerance	VIF
Avoidant attachment Styles	.79	1.26
Secure attachment Styles	.70	1.43
Ambivalent attachment Styles	.71	1.40
Social Isolation Schema	.99	1.01
Insufficient Self-control/Self-discipline Schema	.91	1.10

Checking fit of the model

In general, in the Amos software, to check the fit of the model, Root Mean Square Error Approximation (RMSEA), Comparative Fit Index (CFI), Normed Fit Index (NFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) are used. The indexes in Table 3, lonely are not the reason for the suitability or inadequacy of the model, and these indexes must be interpreted together. Based on the results of the Table 3, it might be concluded that the model has a good fit. Figure 2 shows the model with standardized coefficients.

Table 3 Fitness of the model

Indexes	Model Fit Goodness	
	Value	Permissible limit
($\chi 2$) / df	1.76	Less than 3
Root Mean Square Error Approximation (RMSEA)	.05	Less than .1
Comparative Fit Index (CFI)	.97	more than .9

Normed Fit Index (NFI)	.94	more than .9
Goodness of Fit Index (GFI)	.95	more than .9
Adjusted Goodness of Fit Index (AGFI)	.93	more than .9

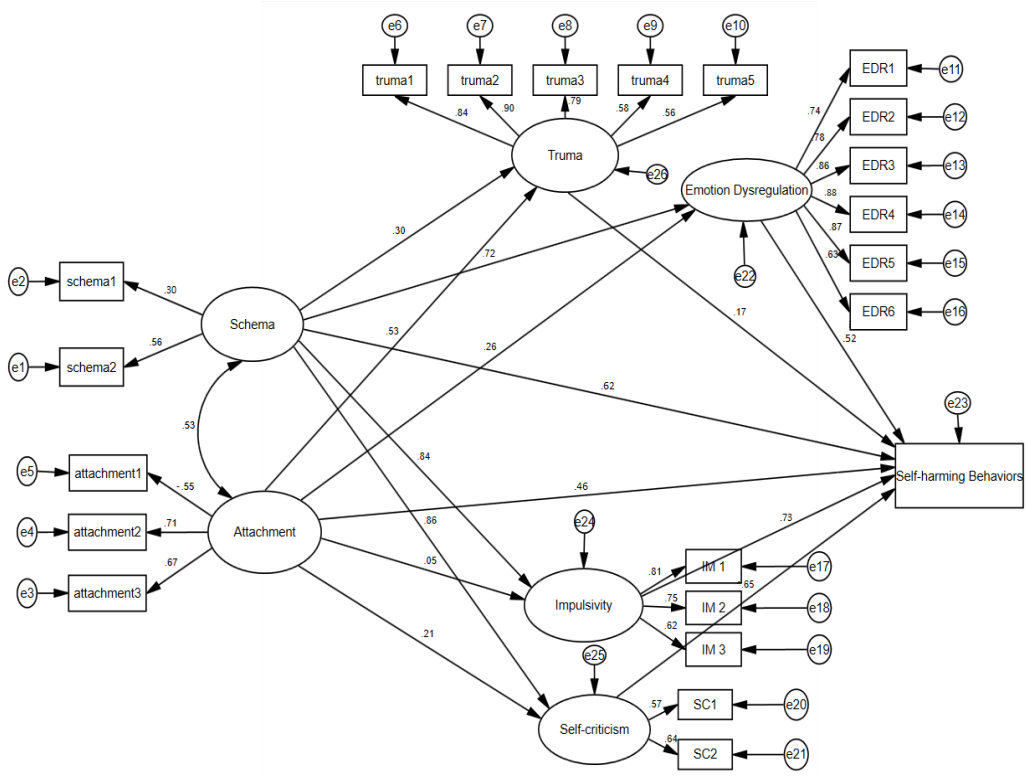

Figure 2 Standardized coefficients of model paths

Direct and indirect paths analyses

Data of the table 4 shows the relational paths in two ways. First, direct path shows the effect of both independent variables and mediating variables on self-harm. The second, indirect path shows the roles of the mediators in the relation of attachment styles and early maladaptive schemas with self-harm.

Table 4 Direct and indirect paths

Criterion Variable	Predictor Variable	Effect Type	Unstandardized Coefficient	Standardized Coefficient	t	Sig
			B	(β)		
Self-harming Behaviors	Attachment Styles	Direct	.88	.46	4.89	.001
Self-harming Behaviors	Early Maladaptive Schemas	Direct	2.02	.62	6.32	.001
Self-harming Behaviors	trauma	Direct	.27	.17	2.39	.019
Self-harming Behaviors	Emotion Dysregulation	Direct	.55	.52	5.71	.001
Self-harming Behaviors	Impulsivity	Direct	.75	.73	7.62	.001
Self-harming Behaviors	Self-Criticism	Direct	.98	.65	6.79	.001

Self-harming Behaviors	Attachment Styles	Indirect via Trauma	.16	.10	2.06	.03
Self-harming Behaviors	Early Maladaptive Schemas		.10	.05	1.27	.18
Self-harming Behaviors	Attachment Styles	Indirect via Emotion Dysregulation	.21	.14	2.30	.02
Self-harming Behaviors	Early Maladaptive Schemas		.68	.37	4.18	.001
Self-harming Behaviors	Attachment Styles	Indirect via Impulsivity	.06	.04	.98	.29
Self-harming Behaviors	Early Maladaptive Schemas		.93	.61	6.33	.001
Self-harming Behaviors	Attachment Styles	Indirect via Self-Criticism	.53	.14	2.32	.02
Self-harming Behaviors	Early Maladaptive Schemas		2.37	.56	5.97	.001

Based on the results of the table 4; attachment styles, early maladaptive schemas, trauma, emotion dysregulation, impulsivity, and self-criticism have a direct effect ($p < 0.05$) on self-harm. To examine the influence of the mediating variables in the model, Sobel test was used. The results of the Sobel test in the table 4 show that, the attachment styles have an indirect effect on self-harm through trauma, emotion dysregulation and self-criticism except impulsivity ($p < 0.05$). Also, the early maladaptive schemas have an indirect effect on the self-harm through emotion dysregulation, impulsivity and self-criticism except trauma ($p <0.05$).

4. DISCUSSION

The current study investigates the relationship of attachment styles and early maladaptive schemas with self-harming behaviors through mediating roles of trauma, emotion dysregulation, impulsivity, and self-criticism among adolescents. The current results showed that there is a significant relationship between attachment styles and early maladaptive schemas with self-harming behaviors, and it can be explained through two indirect paths.

Indirect path in the relationship between attachment styles and self-harming behaviors

Based on the results of the current study, there is a significant indirectly correlation across attachment styles and self-harming behaviors through mediating role of trauma, emotion dysregulation, and self-criticism except impulsivity. In the other words, trauma, emotion dysregulation, and self-criticism are the mediators of the relationship across attachment styles and self-harming behaviors but not impulsivity. With regard trauma, results was consistent with both developmental model of self-harm and studies that showed the correlation across trauma and self-harm (Kaplan et al., 2016; Peh et al., 2017). Based on the developmental model, childhood physical and sexual abuse affects the adolescent's attachment and reduce ability to regulate emotions, communicate with the environment, differentiate between themselves and others, and thus, self-harm as a compensatory strategy occur to cope with this disability (Yates, 2004).

The mediating role of emotion dysregulation can be explained based on the emotion regulation model (Gratz, 2003) and It explains that environmental risk factors such as strict, discredited parenting, and victimization in the peer group affect self-harming behaviors through emotional regulation deficits. Also, this finding was consistent with the following studies (Kimball & Diddams, 2007; Rogier et al., 2017). Another result of the current research was the significant mediating role of self-criticism in the relationship between attachment styles and self-harming behaviors, that it was consistent with a study that showed that self-criticism plays a mediating role in the correlation across attachment styles and suicide related behaviors (Falgares et al., 2017). This finding also was in line with the Integrated Theoretical Model (Nock, 2010) and findings of studies that showed the role of self-criticism as a factor related to self-harm (Daly & Willoughby, 2019; Thompson & Zuroff, 2004).

According to the Integrated Theoretical Model, disgusting cognitions (eg; self-critical thoughts) are the cause of intrapersonal vulnerability to the emergence of self-harming behaviors and other destructive behaviors. Finally, the mediating role of impulsivity in the correlation across attachment styles and self-harming behaviors was not significant. This finding contradicts the findings of three researches showing that impulsivity is a predictor for self-harm (Chamberlain et al., 2017; Lockwood et al., 2020). To explain

this finding, it can be argued that people with insecure attachments are more likely to turn their anger from their parents to themselves through avoidant coping style (Young et al., 2003), but when we include impulsivity in this equation, self-directed anger is extruded to the others this time and this reduces the significance of the relationship between attachment styles and self-harming behaviors.

Indirect path in the correlation across early maladaptive schemas and self-harming behaviors

Based on the results of the current study, there is a significant indirect correlation across early maladaptive schemas and self-harming behaviors through mediating roles of emotion dysregulation, impulsivity, and self-criticism except trauma. Regarding emotion dysregulation and impulsivity, the results are consistent with Experiential Avoidance Model (Howe-Martin et al., 2012) and the researches that showed emotion dysregulation (Peh et al., 2017; Wolff et al., 2019) and impulsivity (Chamberlain et al., 2017; Lockwood et al., 2020) as predictors of self-harm related behaviors. Based on the Experiential Avoidance Model, self-harmers experience high emotional responsiveness due to high impulsivity and novelty seeking. Therefore, experiencing self-centered emotions such as shame, guilt, tolerance for low turmoil, and poor regulation of emotional arousal increases the tendency to self-harm.

Another finding was that, self-criticism mediated the relationship between early maladaptive schemas and self-harming behaviors. This finding is allied with Self-Punishment Model (Nock, 2010) and the results of previous research which showed that self-criticism is the risk factor for self-harm behaviors without suicidal ideation (Daly & Willoughby, 2019). Based on the Self-Punishment Model, when someone commits a self-harming behavior, he or she might consider him or herself as guilty and tries to confirm his or her negative self-concept which is resulted from the dissonance between the self-image and the wrong behavior.

Finally, we found that trauma could not significantly mediate the relationship between early maladaptive schemas and self-harming behaviors. This finding was inconsistent with the result of the prior studies which showed that trauma is an important risk factor for adolescent self-harm behaviors (Kaplan et al., 2016; Peh et al., 2017). Although both early maladaptive schemas and trauma are significantly correlated with self-harming behavior (r= 0.62 and r=0.17 respectively) but the stronger relationship between early maladaptive schemas and self-harming behaviors defines non-significant mediating role of trauma.

Limitations

This study had some limitations. First, it was conducted as cross-sectional design and it is better to use longitudinal designs in the future to explain more precisely the relationship between variables. Second, due to COVID-19, Questionnaires were completed online, that increases the likelihood of random responses. Third, the clinical interview was not administered because of prevalence COVID-19.

5. CONCLUSION

Overall, the following results from the present study are as below: first, attachment styles and early maladaptive schemas directly positively influence self-harm behavior of middle school-aged adolescents. Second, trauma, emotion dysregulation, impulsivity, and self-criticism directly correlated self-harm behavior. Third, attachment styles indirectly influence self-harm behavior through mediating roles of trauma, emotion dysregulation, and self-criticism except impulsivity. Fourth, early maladaptive schemas indirectly influence self-harm behavior through mediating roles of emotion dysregulation, impulsivity, and self-criticism except trauma.

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Author Contributions

Conceptualization:	H Shahmoradi; A Msjedi-Arani; M Bakhtiyari; I Abasi
Data collection:	H Shahmoradi
Formal analysis:	H Shahmoradi; I Abasi
Investigation:	H Shahmoradi and A Msjedi-Arani
Methodology:	H Shahmoradi; A Msjedi-Arani; M Bakhtiyari; I Abasi
Writing – original draft:	H Shahmoradi
Writing – review & editing:	H Shahmoradi; A Msjedi-Arani; M Bakhtiyari; I Abasi

Ethical approval

The study was approved by the Medical Ethics Committee of Shahid Beheshti University of Medical Sciences (ethical code: IR.SBMU.MSP.REC.1399.525).

Conflicts of interest

The authors declare that they have no conflict of interest.

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Data and materials availability

All data associated with this study are present in the paper.

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