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The mediating role of parenting stress, psychosocial stress and attention deficit hyperactivity disorder in explaining the relationship between borderline personality traits and childhood trauma

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ABSTRACT

Introduction: The aim of this study was to provide a model to explain the relationship between borderline personality traits and childhood trauma using the mediating role of parenting stress, psychosocial stress and ADHD in students. *Materials and Methods:* The present study was a descriptive correlational study. 342 male and female students from Kermanshah University of Medical Sciences were selected using cluster sampling method. They were asked to fill out the questionnaires of childhood trauma, borderline personality traits, parenting stress and ADHD and participate in the psychosocial stress test. The collected data was evaluated via LISREL-8.7 software, structural equation method, AMOS-23, and path analysis. *Results:* The final results of the evaluation of the proposed model indicated a good fit of the model. Therefore, the proposed model can provide a good explanation for mediating role of parenting stress, psychosocial stress and ADHD in predicting relationship between borderline personality traits and childhood trauma. *Conclusion:* In addition to proposed model, this study can provide researchers and experts with important clues about the role of family as well as social and psychological factors in predicting borderline personality traits.

Keywords: Borderline personality, Childhood trauma, Parenting stress, psychosocial stress, ADHD

1. INTRODUCTION

Borderline Personality Disorder (BPD) is a long-standing disorder that accounts for about 20 to 40 percent of psychiatric admissions. It is also a

severe, debilitating disorder affecting 1 to 2% of general population. Moreover, women suffer from BPD twice as much as men. People with BPD experience a complex range of symptoms such as impulsivity, emotional dysregulation, and disrupted interpersonal relationships (Kaplan, 2016). It is estimated that about 84% of these patients have behaviors such as self-harm and suicide, and about 10% of them die as result of suicide attempt (Pompili et al., 2005).

The distinguishing feature of this personality disorder is a pattern of instability in individual's relationships characterized by fluctuations between the two poles of idealization and devaluation. Other diagnostic features include instability, persistent devaluation of self-image, impulsive behavior, suicide threats or repeated self-harm, emotional instability, and inability to control anger (Apfelbaum et al., 2013). In addition to BPD, borderline personality traits (BPT) in the nonclinical population are also characterized by characteristics such as academic problems, mood problems, and communication disorders and other subclinical symptoms of BPD (Xie et al., 2021). In the field of etiology, BPD and the characteristics associated with this disorder, there are several theories and models, all of which emphasize the combination and interaction of environmental and biological factors. One of the well-known models is Linhan's biosocial model, in which the emergence of BPD results from combination of biological contexts, emotion regulation problems, and disturbed parenting styles (Kuo et al., 2015).

The model of Zannarini et al., (2002) has investigated the etiology of this disorder. According to this model, the first factor in causing the disorder is the presence of traumatic atmosphere in the house. With a new conceptualization based on the schema model, Yang explains BPD based on schemas of deprivation, insecurity, and instability in the home. Young's schema theory about etiology of BPD is based on two main factors: the first is the biological factor and the second is the childhood and family conditions. The pattern of harassment and insecurity is highly evident in people with BPD (Buchman-Wildbaum et al., 2021). The need to study and pay attention to childhood schemas becomes clearer when a significant percentage of people with BPD have history of child-abuse in childhood. Various type of child abuse includes physical abuse, sexual abuse, and neglect. Zanarini believes that among people with BPD, a history of child abuse is more reported and has a higher proportion of unpleasant childhood experiences than non-patients (Zanarini et al., 2002). Parenting stress has also been identified as a family factor associated with BPD or traits. Parenting combined with force and difficult parent-child interactions are parameters studied in recent studies.

Parents with BPD or BPT use methods that develop emotional harassment schemes in children compared to the nonclinical population. Researchers believe that increased personal stress, emotional dysregulation, and mood swings in parents with BPT are related to development of adult disorders in children and possibly BPT (Buchman-Wildbaum et al., 2021; Kellogg et al., 2006). Another factor associated with BPT and symptoms is psychological social stress. This variable has been studied directly and indirectly in various studies and the results have showed that parameters such as emotional dysregulation, lack of emotion control and lack of self-awareness as mediating variables are good predictors of BPT. In this regard, many studies and meta-analyses indicate that people with high levels of psychosocial stress are not able to regulate their emotions in stressful situations and their cortisol levels and physiological responses are higher than normal people (Thomas et al., 2019).

In addition to the above-mentioned factors, a history of Attention Deficit Hyperactivity Disorder (ADHD) has been observed in people with BPD. ADHD is differentiated from other similar disorders with symptoms such as hyperactivity impulsivity and attention deficit disorder (Storebø et al., 2014). These traits, along with the lack of emotional regulation, are traits that somewhat overlap with symptoms and signs of BPD. Thus, researchers have concluded that there may be related underlying mechanisms between BPT and ADHD (Storebø et al., 2014). Longitudinal studies also suggest that ADHD in childhood is associated with diagnosis and subclinical symptoms of BPD (Ditrich et al., 2021). In addition, adults with ADHD have concurrent disorders such as personality disorders, particularly disorders such as narcissism, paranoid, antisocial, and BPD (Matthies et al., 2016).

The study of research literature indicates significant relationships between variables of this study. The problem becomes more apparent when the vast majorities of people with diagnosis and symptoms of BPD have a background of childhood trauma and have never been clinically evaluated. Childhood trauma with emotional spread can have major effects on personality and emotional disorders. Therefore, it is necessary to examine childhood trauma and role of influential mediating variables such as parenting stress, psychosocial stress and ADHD. Considering the present research literature and the hypothetical relationship between the mentioned variables, the present study was aimed at investigating relationship between childhood trauma and BPT by evaluating mediating role of parenting stress, psychosocial stress and ADHD.

2. METHOD

This research was a descriptive-correlational study. In addition, to analyze data, structural equation modeling and path analysis methods were used. Moreover, SPSS statistical software version 24, LISREL software version 8.7 and AMOS software were used to apply statistical commands including bootstrap.

Sampling

The statistical population of this study was all undergraduate, graduate; doctoral students in Kermanshah University of Medical Sciences during April 2021 to December 2021. Moreover, the participants included both males and females. To determine the sample size based on Klein research, the sample size ratio for each parameter was estimated to be at least 5 people and at the highest level 20 people (Kline, 2015). In the proposed model, 17 variables or parameters were measured. For this purpose, the Klein sample size determination rule was used. 340 people were required to be evaluated according to Klein's principle in this study. However, due to possible out-of-control factors such as unsuccessful completion of questionnaires and low cooperation of participants in the laboratory test, 370 people were considered. Sampling method in present study was cluster sampling. Thus, first, 2 faculties selected from among the faculties of medicine, pharmacy, nursing and midwifery; randomly, and 2 classes were selected from the existing classes in the faculty. At the beginning, explanations were provided regarding the research objectives and the general purpose, and after receiving informed consent from the students, questionnaires were distributed among them. Besides, laboratory test of psychosocial stress was performed by two PhD students in clinical psychology. 28 questionnaires were excluded from study and in the analysis process, 342 questionnaires were finally analyzed due to defects and random answers. Also, due to the high number of questionnaires; five interested Ph.D. students in clinical psychology were assisted who had received the necessary specialized training (under the supervision of a research supervisor) on how to conduct the questionnaire.

Criteria for inclusion and exclusion

Inclusion criteria involved being a student of Kermanshah University of Medical Sciences, completing the questionnaires and participating in laboratory tests of psychosocial stress. On the other hand, exclusion criteria were unsuccessful completion of questionnaires, any diagnosis of psychiatric comorbidity, drug use, random response to questions and failure to perform the laboratory tests of psychosocial stress.

Research tools

Childhood trauma questionnaire

This questionnaire first developed by Bernstein et al., (1998) and it is now standardized for many languages and cultures around the world. Besides, this questionnaire has been standardized for first time in Iran by Mikaeli et al., (2012). The four main components of this questionnaire include physical harassment, emotional harassment, emotional neglect and physical neglect. The total number in the questionnaire is 43 items. The reliability coefficient of this scale for the whole questionnaire and its subscales has been calculated from 0.65 to 0.91. In order to validate this scale, factor analysis method was used in which the reliability coefficient of the obtained factors with the subscales of this scale was 0.81 (Mikaeili et al., 2012). The reliability of components of this questionnaire including emotional harassment, emotional neglect and physical negligence and emotional negligence, in the present study, were 0.86, 0.89, 0.98 and 0.88, respectively.

Borderline Personality Inventory

This scale was designed to measure BPT in non-clinical and clinical samples besides; it is answered as yes or no. The scale contains 53 items based on the criteria of the fourth edition of DSM-IV. The construct validity of this scale has been reported as appropriate. Moreover, the reliability of whole scale and subscales including identity disorder, primary pathological defense mechanisms, distorted reality testing and fear of intimacy have been reported as 0.80, 0.63, 0.74, 0.66, and 0.62, respectively (Leichsenring, 1999). In this study, the reliability of 0.84 was obtained using Cronbach's alpha method.

Parenting Stress Index

Parenting stress is assessed using the Parenting Stress Index 4th Edition Short Form (PSI-4-SF) (Abidin, 1990). The short form of this scale has 36 items and has a Likert scale from completely agree to strongly disagree. The short form has three subscales including Parental Distress (PD), Difficult Child (DC) and Parent-Child Dysfunctional Interaction (P-CDI). Total score of this questionnaire is the sum scores of the subscales. Scores obtained in the 16th to 84th percentiles are considered normal, and the 85th to 60th percentiles are close to the clinical status. Also, scores above the 90th percentile are completely clinical. The short form has a high internal stability and is calculated between 0.88 and 0.95 for all subscales. Moreover, test-retest reliability was calculated between 0.88 and 00.95 (Abidin, 1990). The reliability of the test in this study was calculated by Cronbach's alpha coefficient and the alpha coefficient for P-CDI was 0.91 and the overall stress score was 0.95. Furthermore, a reliability score for PD and DC were .98 and 0.89, respectively.

Trier social stress test

Trier social stress test is a standardized test that is used to assess the amount of social psychological pressure. To retest, the test is usually repeated one week after the initial run (Kirschbaum et al., 1993). This lab test consists of three steps: preparation, talking to two experts, and an arithmetic task (5 minutes each). The content of the test is about a job interview: the participants should imagine that they are being interviewed in a position for a job. They must convince the expert committee that they are the best option for the job. The two-member committee also takes notes on the applicant's behavior, and a camera and microphone are used to examine the applicant's facial expressions. The arithmetic task also requires that the four-digit number be returned quickly and correctly in 13 steps. In contrast, the P-TSST (Placebo-TSST) is performed in an empty room without stressful space and the participant is asked to speak aloud in an empty room (Het et al., 2009). This section is performed 30 minutes after the first test.

Conners' Adult ADHD Rating Scales – Self-Report short form

Conners' Adult ADHD Rating Scales – Self-Report Short form (CAARS-S: S) is a good tool for measuring ADHD symptoms in adults. In Arabgol et al., (2004) study, this scale was performed on 20 people and its reliability was obtained using Cronbach's alpha method as 0.81. This scale has 26 items that are scored from 0 to 3 based on the Likert scale. Five subscales of this tool include A: Attention Deficit / Memory Problem, B: Restlessness / Hyperactivity Disorder, C: Impulsivity, D: Difficulties in self-concept, E: Hyperactivity / Attention Deficit Index. The first four subscales have 5 items, and the Attention Deficit / Hyperactivity Disorder Index is result of an individual's responses to all items. Sub-scale A includes items 3-5-17-18-21, subscale B includes items 4-6-10-11-23, subscale C includes items 1-7-8-13-20, subscale D includes items 9-15-16-25-26, and finally subscale E is the overall outcome and complementary index associated with ADHD symptoms (Conners et al., 2002).

3. FINDINGS

The demographic information of the present research sample is listed in Table 1. Besides, Table 2 shows the statistical properties of the studied variables and Table 3 indicates the correlation coefficients of the studied variables including the correlation between Child Trauma and Parent-Child Dysfunctional Interaction (P-CDI) (r= 0.65). There is a relationship between psychosocial stress (r = 0.59) and ADHD (r = 0.54). In contrast, there is no significant relationship between BPT and child trauma.

In the second phase, the analysis of the model was performed. The initial assumptions for path analysis including multivariate normality and non-multicollinearity were examined. The kurtosis multivariate relative index was used to confirm the hypothesis of normality of multivariate and its value was 2.034. According to Chou and Bentler (1991), values less than 3 indicate the normality of multivariate (Conners et al., 2002). Correlation matrix was also used to confirm the non-multicollinearity hypothesis. Multicollinearity means high correlation between variables, and values above 0.85 make it difficult to accurately estimate the model (Hu et al., 1999).

Table 1 Demographic characteristics of the sample of study

Gender	Number	Average age (SD)
Female	179	24.78 (4.1)
Man	153	27.7(5.7)
Total	342	26.24 (4.9)

Table 2 Central and dispersion indicators of studied variables

variables	Mean (SD)	Kalmogov-Smirnov test	Min	Max
Borderline personality traits	16.67 (5.76)	1.67	2	38
Childhood trauma	9.45 (1.56)	1.69	3	25
Parenting distress	6.56 (1.09)	0.76	1	8
Parent-Child Dysfunctional Interaction (P-CDI)	7.56 (1.56)	0.98	1	8
difficult child	6.55 (1.34)	0.29	1	8
Psychosocial stress	23.6(2.6)	1.56	0	32

Attention Deficit / Memory Problem (A)	6.78 (0.89)	1.56	1	6
Hyperactivity / Attention Deficit Index (B)	9.8 (098)	1.78	1	6
Impulsivity (C)	7.8.(1.09)	1.98	1	6
Problem with self-concept (D)	6.8 (0.78)	1.01	1	6
Hyperactivity Index (E)	34 (3.6)	1.33	1	24

As shown in Table 3, all values are less than 0.85, and this assumption is also met. In the next step, the relationship between observed and latent variables in the proposed model was evaluated. Therefore, the fit model indexes were evaluated. In Table 4 the fit model indexes shows the appropriate acceptable fit of the proposed model. Also, the effect size of the variables is shown in Table 5, and the Parent-Child Dysfunctional Interaction path has the most effect size border characteristics with a size of 0.26. Also, the second and third paths with sizes 0.32 and 0.22 show the size of significant effect. Considering the appropriate fit indexes in proposed model, the model can be presented as an acceptable model for fitting data and thus based on this; the relationships between variables can be shown. The final model of the research along with the path coefficients are shown in Figure 1.

Table 3 Pearson correlation coefficient of the studied variables

variables	Mean (SD)	Kalmogov-Smirnov test	Min	Max
Borderline personality traits	16.67 (5.76)	1.67	2	38
Childhood trauma	9.45 (1.56)	1.69	3	25
Parenting distress	6.56 (1.09)	0.76	1	8
Parent-Child Dysfunctional Interaction (P-CDI)	7.56 (1.56)	0.98	1	8
difficult child	6.55 (1.34)	0.29	1	8
Psychosocial stress	23.6(2.6)	1.56	0	32
Attention Deficit / Memory Problem (A)	6.78 (0.89)	1.56	1	6
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Impulsivity (C)	7.8.(1.09)	1.98	1	6
Problem with self-concept (D)	6.8 (0.78)	1.01	1	6
Hyperactivity Index (E)	34 (3.6)	1.33	1	24

Note: * Significance in P≤0.01 / ** Significance in P≤0.05

Table 4 Model fit indicators

Indice	X^2/df	RMSEA	GFI	AGFI	NFI	CFI	RFI
Optimal Value	less than 3	Less than 0.08	More than 0.08	More than 0.08	More than 0.09	More than 0.09	More than 0.09
Obtained value	1.798	0.087	0.987	0.902	1.4	1.42	1.34

Table 5 Bootstrap test results for intermediate relationships

Path	Bootstrap Bound		Effect Size	P
	Lower Bound	Upper Bound		
CT P-CDI	0.345	0.367	0.26	0.005
CT BPT	0.234	0.287	0.32	0.005
CT ADHD BPT	0.312	0.325	0.22	0.005

Abbreviation: P-CDI:Parent-Child Dysfunctional Interaction; CT:Childhood trauma; BPT:Borderline personality traits

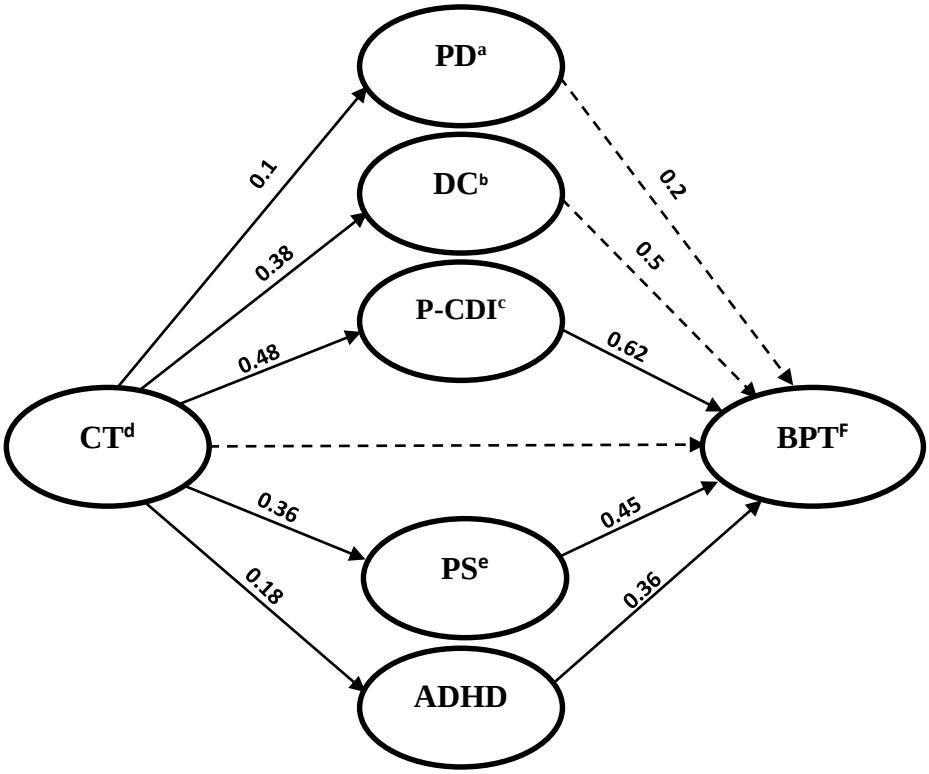

Figure 1 Fitted model of relationship between BPT and childhood trauma

Note: Straight lines indicate a significant and direct relationship and dashed lines indicate deleted paths in Modified models

Abbreviation: a: Parenting distress; b: difficult child; c: Parent-Child Dysfunctional Interaction; d: Childhood trauma; e: Psychosocial stress; f: BPT

4. DISCUSSION

The aim of this study was to predict BPT based on childhood trauma with mediating role of psychosocial stress, parenting stress, and ADHD. Findings from path analysis suggest that childhood trauma does not play a direct role in predicting BPT. This finding is consistent with the studies done by Cattane et al., (2017) and Mainali et al., (2020) and is inconsistent with the study of Kuo et al., (2015). There are several reasons for the inconsistency of the studies that exist in the research body in field of borderline personality and childhood trauma including the difference in historical-cultural conditions that explain these differences in depth. In some cultures, childhood emotional abuse has different explanations, and child abuse has different meanings in parenting styles. For instance, in some cultures, child abuse is considered equivalent to authoritarian parenting, while in other cultures the method of authoritarian parenting is fully accepted. Therefore, the child's perception of parenting models and educational methods has an

important effect in explaining the true nature of child abuse, and thus this issue is considered as a completely cultural matter (Iwaniec, 2006).

No mistake should be made in explaining the findings and eliminating some direct paths between variables, such as the direct path of childhood trauma in predicting BPT. As it is clear, deleting the paths of some variables does not mean the inability of these paths to predict, but indirect paths play a higher predictive power than direct paths. It should be noted that in proposed model (Figure 1), like other models, less effective paths were removed to make the model brighter and clearer. The concepts of relative mediation and complete mediation refer to the significance of direct paths - indirect paths and the significance of indirect paths, respectively. This study indicates a clear mediation between BPT and childhood trauma with mediating role of parenting stress, psychological and social stress, and ADHD. In this regard, the results of many studies suggest that the experience of child trauma in about half of people does not lead to BPD or at least the development of BPT. This finding clarifies the difference between childhood trauma and its long-term impact with respect to the role of numerous other variables (Lieb et al., 2004).

In recent years, research on relationship between BPT and even pure BPD with childhood trauma has shifted its focus to many related variables in an attempt to increase the power of predictive explanation and analysis. In particular, some studies have examined the role of attachment styles, theory of mind (Ghiasi et al., 2016), and emotional regulation (Pourshahriar et al., 2018) in predicting BPT. In this study, as shown in the results section, variables such as parenting stress, psychosocial stress and ADHD were capable of playing a mediating role in predicting the relationship between BPT and childhood trauma. Indeed, indirect childhood trauma can be a suitable predictor of the emergence of BPT in adulthood.

In general explanation of this finding, according to previous studies (Winsper et al., 2017), childhood trauma can lead to the formation and expansion of schemas such as emotional abuse in children, and this schema can strongly affect all psychological dimensions of the individual in adulthood. Therefore, the child's development is strongly affected by the trauma. Different dimensions of parenting can lead to personality abnormalities or traits that are close to the borderline spectrum by putting pressure on children and reinforcing structural abnormalities (Winsper et al., 2017). Also, the type of parent-child interactions leads to the activation of schemas such as emotional harassment in children. These schemas in the long run develop long-term instability emotional styles (Winsper et al., 2017).

Psychosocial stress in childhood causes major physiological changes that lead to instability and lack of emotional regulation, which are main symptoms of mood instability in people with clinical and non-clinical features of BPD. Emotional instability can be caused by authoritarian parenting styles and parental pressure to complete child rearing (extreme perfectionism) (Chamberlain et al., 2019). Childhood psychological harassment and trauma are also effective in the formation of BPD by stimulating and activating early maladaptive schemas. In order to explain the results, it should be noted that interaction of family-social variables and psychological ones are effective in development of personality disorders, particularly in the range of disorders in which childhood and emotional distress play a major role (Steele et al., 2019). Increased psychological social stress from a biological point of view leads to increased secretion of testosterone. Studies have shown that increased testosterone secretion is associated with mood disorders and lack of emotion regulation.

The functional significance of this finding becomes clearer when these stresses and their consequences can lead to parental reactions, and in the long run these reactions may be close to the abnormal limit and have a more negative effect on the child (Chamberlain et al., 2019). The present study due to the long implementation of research tools and, thus, affecting the quality of students' responses as well as the lack of a pure sample of BPD should be cautious in generalizing its results. These limitations can provide research suggestions for future investigations including the use of short and valid tools as well as the study of pure clinical examples of BPD.

5. CONCLUSION

Based on the results of the present study on prediction of borderline personality based on childhood trauma with the mediating role of parenting stress, psychosocial stress and ADHD, it is possible to gain a better understanding of how borderline personality development occurs and based on these findings, existing treatments can be modified and programs developed to prevent it.

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Authors' contributions

Hamed Ghiasi: wrote the manuscript with input from all authors; performed the measurements.

Maryam Bakhtiari: supervised the project and contributed to designing and directing the project; contributed to the writing of the manuscript.
Fatemeh Askarirostami: contributed collecting the data; contributed to the writing of the manuscript
Sajjad, Reisi: contributed analyzing the data; contributed to the writing of the manuscript

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Ethical approval
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Conflicts of interest
The authors declare that there are no conflicts of interests.

Data and materials availability
All data associated with this study are present in the paper.

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