



Prediction of Self-Injury Behavior in Men with Borderline Personality Disorder Based on Their Symptoms of Borderline Personality and Alexithymia

Azizollah Mojahed¹, Moslem Rajabi², Sajjad Khanjani^{3,*} and Sajjad Basharpour⁴

¹Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, IR Iran

²Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, IR Iran

³Developmental Center for Student Research and Technology Talent, School of Behavioral Sciences and Mental Health (Institute of Tehran Psychiatry), Iran University of Medical Sciences, Tehran, IR Iran

⁴Department of Psychology, Faculty of Educational Science and Psychology University of Mohaghegh Ardabili, Ardabil, IR Iran

*Corresponding author: Sajjad Khanjani, Developmental Center for Student Research and Technology Talent, School of Behavioral Sciences and Mental Health (Institute of Tehran Psychiatry), Iran University of Medical Sciences, Tehran, IR Iran. E-mail: kxanjanis23@yahoo.com

Received 2016 April 24; Revised 2017 March 13; Accepted 2017 June 20.

Abstract

Background: Understanding psychological factors related to self-injury behaviors in people with borderline personality disorder can be an important step towards identifying the causes and preventing it.

Objectives: The current study was conducted to determine the role of symptoms of borderline personality and alexithymia in predicting self-injury behaviors in people with borderline personality disorder.

Patients and Methods: The statistical population of the study includes all men with borderline personality disorder, referring to the psychiatric section of Imam Sajjad (AS) hospital of Tehran. A total of 94 people were selected by non-probable sampling and were asked to complete Deliberate Self-Harm, Symptoms of Borderline Personality, and Alexithymia questionnaires. Data was analyzed using the Pearson correlation coefficient and multiple regression analysis by the SPSS-18 software.

Results: The results showed that self-injury behaviors have a positive correlation with the total score of Symptoms of Borderline Personality, and hopelessness, impulsivity, stress related dissociative as well as paranoid symptoms, and total score of Alexithymia, difficulty in identifying, difficulty in describing feeling, and external orient thinking style. Also the results of the regression analysis showed that 15% of variance of self-harming behaviors was explained by Symptoms of Borderline Personality and 21% variance of it was explained by Alexithymia.

Conclusion: The results showed that Symptoms of Borderline Personality and Alexithymia can play a role in self-harming behaviors of people with borderline personality disorder.

Keywords: Self-Injurious Behavior, Borderline Personality Disorder, Affective Symptoms

1. Background

Borderline personality disorder is characterized by a comprehensive pattern of instability in interpersonal relationship, self-concept, feelings, and impulsivity (1). This disorder is associated with an increased self-harm risk, and the probability of committing suicide and non-suicidal self-injury is high in people suffering from this disorder. The rate of death resulted from suicide in people with borderline personality disorder and mood disorders has been reported identical (2). However, therapists believe that patients with mood disorders are treatable, whereas they believe that patients with borderline personality disorder are more problematic and responsible for controlling suicide

behaviors (3). About 10% to 26% of patients with borderline personality disorder have a history of committing suicide (4, 5).

Nonsuicidal self-injury behaviors refer to a class of direct and intentional damage to a part of body tissue, causing bleeding, bruising or pain without the purpose of suicide, and are not socially acceptable (1). Nonsuicidal self-injury is done through the methods such as burning, pricking, tapping, scrapping, or tattooing. However skin incision has been reported as the most common method in self-injury (6, 7). The prevalence of nonsuicidal self-injury behaviors considerably varies in different studies as in juveniles and adults samples of the population; prevalence range has been reported 13% - 45% (8-10). The prevalence

of these self-injury behaviors in the clinical population has been reported 38%-67% (11) and prevalence of these behaviors is specifically high in patients with borderline personality disorder (12-15).

Recent studies showed that nonsuicidal self-injury behavior is a predictor of committing suicide in the future (16, 17). Along with the comorbidity of committing suicide and nonsuicidal self-injury, in many studies there is considered a different phenomenology for these behaviors and committing methods and rate of death differ in these 2 cases (15, 16). The motivation of nonsuicidal self-injury behaviors is associated with emotion regulation while the motivation of people who are committing suicide is to end their lives or to change other behaviors (17). Suicide occurs with little frequency but nonsuicidal self-injury occurs chronically with high frequency and it causes relief when it occurs completely (18). The Diagnostic and Statistical Manual of Mental Disorders-5th Edition has introduced the nonsuicidal self-injury phenomenon as a syndrome that requires further study to distinguish between these 2 behaviors (1). Nonsuicidal self-injury is a serious warning due to the fact that it is associated with many psychiatric disorders and increases the risk of committing suicide (19, 20).

Generally, the reasons of committing non-suicidal self-injury vary from person to person and at the same time there may be several incentives. However, it often seems that self-injury occurs because of the need to regulate negative emotional states, self-punishment, and influencing others or communicating with them (21). These incentives must be considered in working with people committing self-injury.

Distinctive symptoms of borderline personality disorders include dysfunction in a wide range of neurobehavioral systems, emotional expression (such as reaction), behavioral inhibition (such as impulsivity), cognitions (such as paranoia or disruption during serious distress), interpersonal functions (such as fear of rejection), and disturbed interpersonal relationships, which is considered as the main diagnostic core of this disorder (22). Hopelessness and depression had a positive relation with nonsuicidal self-injury in several studies (23, 24). Nonsuicidal self-injury is used as an ineffective emotion regulation strategy in dealing with hopelessness, depression, loneliness, and feeling of guilt (24). Hopelessness is emphasized as an important risk factor in relation with suicide ideation and behavior (25). Hopelessness has been associated with self-injury behaviors in various studies (26, 27). Dissociation is another sign showed in studies to be associated with nonsuicidal self-injury and is considered as emotion regulation strategy where someone reacts automatically in this way in dealing with stressful situation (28, 29).

The high dissociation alongside the low cognitive reassessing scores is associated with increasing of non-suicidal self-injury behaviors. However, the low score in diagnostic reevaluation alongside the high score in dissociation is associated with reducing nonsuicidal self-injury behaviors (30). The frequency and severity of self-injury behaviors in patients with self-induced dermatoses have direct relationship with emotion regulation and dissociation (31).

Impulsivity is another sign that is associated with self-injury behaviors (32, 33). In one study, nonsuicidal self-injury mediated between impulsivity and non-suicidal self-injury behaviors (34). Studies show that people who commit self-injury behaviors are more impulsive compared with others (12, 35, 36). Impulsivity is associated with nonsuicidal self-injury behaviors of people with Bulimia nervosa binge/purging (37). People who commit nonsuicidal self-injury behaviors have problem with emotion regulation, distress tolerance, indenting, and expressing their emotions (38). Therefore, Alexithymia is another variable that is associated with nonsuicidal self-injury behavior (39).

Alexithymia is a clinical syndrome that is characterized by difficulty in describing feelings to others, difficulty in differentiating and distinguishing between feelings and physical sensations, when emotional arousal occurring, and external circuit thinking focusing on objective events (40). Affective (impaired consciousness emotional expression) and cognitive (externally oriented thinking) factors of Alexithymia are obstacle to understanding and expressing feelings and mental states of the affected person and others, thus, creating of successful mentality will be disrupted (41, 42). About 1/10 of the general population are suffering from Alexithymia (43). Its absolute and relative stability in long-term follow-up (up to 11 years) has been reported high (44). Alexithymia is associated with different personality disorders (45, 46), particularly with cluster B (47, 48). In one study, just its affective aspect (41), and in the others, both of its affective and cognitive aspects are associated with personality disorders (47). Alexithymia is considered as a vulnerable factor to various types of physical and psychosomatic disorders (49-51). In a study, Alexithymia also was associated with cyber bullying (52). People with Alexithymia in comparison with others are more likely to engage in self-destructive behaviors (53). In another study, Alexithymia was also associated with self-destructive behaviors in admitted women (54). In another, study Alexithymia also acted as mediator between self-injury behaviors and childhood trauma (55).

Although many studies have investigated the relationship between symptoms associated with borderline personality disorder and Alexithymia with self-destructive behavior and suicide, the role of these variables in nonsuici-

dal self-injury behavior in patients with borderline personality disorder is less studied. Given the fact that self-injury behavior are one of the most traumatic symptoms of borderline personality disorder, determining its predictor factors can be an important step in intervening the factors.

2. Objectives

This study was conducted in order to predict self-injury in men with borderline personality disorder based on borderline personality symptoms and Alexithymia.

3. Patients and Methods

This study was conducted by using the description method and the correlation type. The population of this study included all men aged 18 - 30 with borderline personality disorder who were referred to the psychiatric section of Imam Sajjad hospital of Naja. In this study, 100 people were selected by using the non-probability available method. However, given to the inaccuracy of 6 participants in completing the questionnaire and low prevalence of this disorder, the scores of 94 participants were analyzed.

3.1. Tools of Study

1. Structured Clinical Interview: A structured clinical interview was performed by the psychiatrist based on the 5th edition of diagnostic and statistical manual of mental disorders for borderline personality disorder to confirm the diagnosis (1).
2. The Deliberate Self-harm Inventory: This is a 17-item self-reported questionnaire that evaluates the history of self-harm behaviors and includes frequency, duration and type of self-harm (such as cutting, burning, tattooing, breaking bones, etc). In this tool, subjects are asked to answer a series of questions about types of self-harm behaviors in form of yes or no. The test-retest reliability and Cronbach's alpha coefficient were reported 0.92 and 0.82, respectively and it is significantly correlated with other self-harm tools. Test-retest reliability, construct validity, convergence, and divergence of the questionnaire have been appropriately reported in the sample of undergraduate students and patients (56, 57). This questionnaire was widely used in the past studies (56, 58). Cronbach's alpha coefficient was 0.67 in participants of this study.
3. Borderline Personality Scale (STB): This scale, containing 24 items, is made to measure patterns of borderline personality, that is answered by yes/no form. A total of 3 subscales of hopelessness, impulsivity, and dissociative as well as paranoid symptoms have stress-dependence. Jackson and colleagues reported its test-retest reliability coefficient, 0.61 (59). Ralings and colleagues have reported an alpha coefficient of 0.80 (60). In a study conducted by clinical samples of patients with borderline personality, the differential validity and STB construct have been approved (61). In Iran, Mohammad Zadeh and colleagues have reported tool's Test-retest reliability 0.84 within 4 weeks, Cronbach's alpha coefficient for the total scale 0.77 and for subscales of hopelessness 0.64, impulsivity 0.58, paranoid, and dissociative symptoms of stress dependence 0.57. STB also has a desirable validity (factor and differential) in Iran (62).
4. Toronto Alexithymia Scale: This 20-item scale was made by Bagby and colleagues and evaluates Alexithymia in 3 subscales of difficulty in identifying feelings (item 7), difficulty in describing feelings (item 5), and thinking of external experiences (item 8). In this scale, the higher score is the sign of high severity of Alexithymia. Questions are scored based on five-pointed Likert scale from strongly agree (1) to strongly disagree (5) (63). In the Iranian version of Alexithymia, Cronbach's alpha coefficient for total scale was 0.85 and for its subscales of difficulty in identifying feelings, difficulty in describing feelings, and focusing on external experience was 0.82, 0.75, and 0.72, respectively (64).

The method of collecting data in this study was so that at first patients complaining from frequent self-injury behaviors referred to psychiatric section of Naja Imam Sajjad hospital in Tehran completed structured clinical interview by psychiatrists that have worked at least several years in this section to confirm the diagnosis of borderline personality disorder. After confirming the diagnosis, structured clinical interview was conducted by the researcher. Participants were asked to complete the questionnaire of deliberate self-harm, scales stress tolerance, and self-compassion. Diagnosis of borderline personality disorder was conducted based on psychiatrist and psychologist opinion, structured clinical interview, prior history of committing self-injury behaviors, and having a minimum education of 3rd grade of guidance school, were the qualifications for people to participate in this study.

Exclusion criteria included the following: failure to cooperate in this study, suffering from schizophrenia and other psychotic disorders, bipolar disorder, and intellectual disability. In addition, clinical disorders especially comorbidity of drug abuse disorder, has been considered in this study and its results will be published in another study. In this study, all subjects were completely free to participate in the test and because of moral consideration the

goals of the study was explained to them before completing the questionnaire. They were assured that the collected data will be analyzed as a group. The collected data was analyzed using the Pearson correlation and multiple regression analysis, input method, and SPSS software, version 18.

4. Results

In this study, the age range of all 94 subjects was 18-30, and standard deviation of their average age was 22.77 ± 2.83. Table 1 shows the frequency and the percentage of subjects participating in the study based on educational level and employment status.

Table 1. The Frequency Distribution and the Percentage of Subjects Based on Demographic Variables, Educational Level and Employment Status

		Frequency	Percent
Educational level	Guidance	53	56.37
	High school	38	40.42
	BA	3	3.1
Employment status	Free job	16	17.03
	Retired	7	7.44
	Unemployment	71	75.53

Table 2. Frequency Distribution and Percentage of Subjects Based on Committed Self-Injury Behaviors

Self-Injury Behavior	Frequency	Percent
cutting	92	97.8
Burning the skin with cigarettes	45	47.8
Burning the skin with lighters or matches	19	20
Tattooing words on the skin	53	56
Tattooing designs or marks on the skin	53	56
Scratching	89	94.6
Skin tear	73	77.6
Rubbing sandpaper on the skin	11	11.7
Throwing acid on the skin	3	3.1
The use of harmful chemicals to clean the skin	13	13.8
Pricking the skin	27	28.7
Dipping the glass in the skin	58	61.7
Breaking bones	18	19.1
Hammering the head to something	78	82.9
Punching yourself or other subjects	74	78.7
Hindering to heal your own wound	47	50
Other methods	31	32.9

Table 4 shows that self-injury behaviors have positive correlation with total score of Symptoms of Borderline Personality ($r = -0.39$; $P < 0.001$), and hopelessness ($r = -0.25$; $P < 0.016$), impulsivity ($r = -0.30$; $P < 0.004$), Stress related dissociative and paranoid symptoms ($r = 0.24$; $P < 0.021$) and total score of Alexithymia ($r = -0.46$; $P < 0.001$), difficulty in identifying feeling ($r = -0.42$; $P < 0.001$), difficulty in describing feeling ($r = -0.45$; $P < 0.001$), external orient thinking style ($r = -0.41$; $P < 0.001$).

Table 4 shows that 15% of the total variance in self-injury behaviors is characterized by symptoms of borderline personality. F ratio suggests that the regression model of self-injury behaviors based on symptoms of borderline personality are meaningful ($f = 5.03$; $P > 0.003$). This means that regression model is statistically significant. The results of regression coefficients also show that among symptoms of borderline personality, the obtained t from hopelessness ($t = 2.09$; $P < 0.039$) and impulsivity ($t = 2.27$; $P < 0.026$) is meaningful. This means that only two of these symptoms significantly predict self-injury behaviors.

Table 5 shows that 21% of the total variance in self-injury behaviors is characterized by Alexithymia. F ratio suggests that the regression model of self-injury behaviors based on Alexithymia are meaningful ($f = 7.99$; $P > 0.001$). This means that regression model is statistically significant. The results of regression coefficients also show that among factors of Alexithymia, the obtained t from difficulty in identifying feelings ($t = 1.98$; $P < 0.042$) and difficulty in describing feelings ($t = 2.60$; $P < 0.009$) is meaningful. This means that only 2 these factors significantly predict self-injury behaviors.

5. Discussion

This study was conducted to predict committing of self-injury behaviors based on symptoms of borderline personality and Alexithymia. The results of correlation coefficients showed that total score of symptoms of borderline personality, hopelessness and impulsivity and dissociation (stress-related paranoia) are significantly associated with self-injury behaviors. The results of regression analysis also revealed that 15% of the total variance of self-injury behaviors are predicted by symptoms of borderline personality. These results are consistent with the results of the previous studies (Klonsky (23), Bresin (24), O'Connor and Nock (25), Milnes, Owens and Blenkiron (26), McMillan et al. (27), Zweig-Frank, Paris and Guzder (28), Paris (29), Navarro-Haro et al. (30), Gupta (31), Chesin, Jeglic and Stanley (32), Anestis et al. (33), Anestis et al. (34), Claes et al. (35), Hamza, Willoughby and Heffer (36), and Gratz Roemer (37), showing that the symptoms, in association with borderline personality disorders plays an important

Table 3. Mean, Standard Deviation and Correlation Coefficient Scores in Variables Symptoms of Borderline Personality, Alexithymia and Self-Injury

Variables	Mean ± SD	1	2	3	4	5	6	7	8	9
1. Hopelessness	5.75 ± 1.15		0.21 ^a	0.25 ^a	0.42 ^b	0.28 ^b	0.30 ^b	0.23 ^a	0.28 ^b	0.25 ^a
2. Impulsivity	8.79 ± 1.39			0.45 ^b	0.72 ^b	0.27 ^b	0.29 ^b	0.31 ^b	0.31 ^b	0.30 ^b
3. Dissociation	4.12 ± 1.26				0.83 ^b	0.30 ^b	0.37 ^b	0.37 ^b	0.37 ^{**}	0.24 ^a
4. Borderline personality	17.31 ± 2.68					0.39 ^b	0.45 ^b	0.41 ^b	0.44 ^{**}	0.39 ^{**}
5. Difficulty in identifying feelings	18.28 ± 8.97						0.72 ^b	0.82 ^b	0.83 ^b	0.42 ^b
6. Difficulty in describing feelings	13.87 ± 5.78							0.82 ^b	0.87 ^{**}	0.45 ^b
7. Thinking of external experiences	24.73 ± 8.56								0.89 ^b	0.41 ^b
8. Alexithymia	56.88 ± 21.76									0.46 ^b
9. Self-injury	8.38 ± 2.70									

^a P > 0.05
^b P > 0.01

Table 4. Regression Analysis of Self-Injury Behaviors Based on Symptoms of Borderline Personality

Predictor Variables	R	R ²	F	Sig of F	B	SE.B	β	t	P	Collinearity Statistics	
										Tolerance	VIF
	0.38	0.15	5.03	0.003							
Constant					0.60	2.08		0.29	0.773		
Hopelessness					0.50	0.24	0.21	2.09	0.039 ^a	0.93	1.06
Impulsivity					0.48	0.21	0.25	2.27	0.026 ^b	0.79	1.26
Dissociation					0.15	0.24	0.07	0.64	0.525	0.75	1.34

^a P > 0.05
^b P > 0.01

Table 5. Regression Analysis of Self-Injury Behaviors Based on Alexithymia

Predictor Variables	R	R ²	F	Sig of F	B	SE.B	β	t	P	Collinearity Statistics	
										Tolerance	VIF
	0.46	0.21	7.99	0.001							
Constant					5.09	0.78		6.56	0.001		
Difficulty in identifying feelings					0.29	0.13	0.17	1.98	0.042 ^a	0.74	1.35
Difficulty in describing feelings					0.36	0.28	0.26	2.60	0.009 ^b	0.84	1.22
Thinking of external experiences					0.32	0.22	0.25	1.45	0.124	0.78	1.30

^a P > 0.05
^b P > 0.01

role in self-injury behaviors, ideation, and committing suicide. According to the results of this study it can be said that nonsuicidal self-injury behaviors are used as an ineffective strategy to deal with different symptoms of borderline personality (hopelessness, impulsivity, dissociation) that people with borderline personality disorder experience (24, 28, 29). Therefore, when people experience negative emotions such as stress, anxiety, blaming themselves or solving interpersonal problems, the probability of committing self-injury behaviors among these people is very high, due to the fact that the relative calm after committing self-injury behavior acts as a reinforcing factor in this process that in turn, increases the probability of committing self-injury behavior in the future and can be one of the causes where these behaviors are chronic. In association with Alexithymia and self-injury behaviors, correlation coefficients showed that self-injury behaviors have a positive

relationship with the total score of Alexithymia and factors of difficulty in identifying feelings, difficulty in describing feelings, and focusing on external experiences.

The results of regression analysis showed that 21% of variance of self-injury behaviors was explained by Alexithymia. These results are consistent with the results of the studies (Swannell et al. (38), Cerutti, Calabrese, and Valastro (39), Aricak and Ozbay (52), Norman and Borrill (53), Zlotnick et al. (54), as well as Paivio and McCulloch (55), showing that Alexithymia plays an important role in self-injury behaviors, ideation and suicide attempts. According to the results of this study and given the fact that many people with borderline personality disorder experience Alexithymia (46-48), self-injury behaviors can be considered as a strategy by which these people express and regulate their negative emotions (38). In addition, the limited understanding and tolerance of feelings may decrease the

ability of people to use the most effective coping strategy, when controlling the negative intensive feelings. Generally, non-suicidal self-injury behaviors are one of the main concerns of mental health that is associated with severe consequences. Therefore, it is considered as a syndrome that requires further studies, in the diagnostic and statistical classification of mental disorders-fifth edition. The results of this study showed that the people with borderline personality disorders as well as having higher score in symptoms of borderline personality and Alexithymia, more likely commit to non-suicidal self-injury behaviors. Thus, appropriate intervention is necessary to emphasize the skills emotion regulation, recognition, and adapting with emotional reactions. Improving the emotion regulation is one of the basic features of dialectical behavior therapy. The focused training of emotion regulation may be a reason for effectiveness of dialectical behavior therapy in reduction self-injury behavior in these people. In generalization the results, the method of sampling exclusive to outpatient and men subjects, available sampling method, and using the design of correlation research should be considered.

Acknowledgments

We would like to thank the manager of Naja Imam Sajjad hospital of Tehran and Personnel of psychiatric section for their valuable cooperation in conducting this study.

References

1. Psychiatric Association A. *Diagnostic and Statistical Manual of Mental Disorders. fifthed*, editor. Arlington, VA: American Psychiatric Publishing; 2013.
2. Chesney E, Goodwin GM, Fazel S. Risks of all-cause and suicide mortality in mental disorders: a meta-review. *World Psychiatry*. 2014;**13**(2):153-60. doi: [10.1002/wps.20128](https://doi.org/10.1002/wps.20128). [PubMed: [24890068](https://pubmed.ncbi.nlm.nih.gov/24890068/)].
3. Bodner E, Cohen-Fridel S, Mashiah M, Segal M, Grinshpoon A, Fischel T, et al. The attitudes of psychiatric hospital staff toward hospitalization and treatment of patients with borderline personality disorder. *BMC Psychiatry*. 2015;**15**:2. doi: [10.1186/s12888-014-0380-y](https://doi.org/10.1186/s12888-014-0380-y). [PubMed: [25609479](https://pubmed.ncbi.nlm.nih.gov/25609479/)].
4. Oldham JM. Borderline personality disorder and suicidality. *Am J Psychiatry*. 2006;**163**(1):20-6. doi: [10.1176/appi.ajp.163.1.20](https://doi.org/10.1176/appi.ajp.163.1.20). [PubMed: [16390884](https://pubmed.ncbi.nlm.nih.gov/16390884/)].
5. Schneider B, Wetterling T, Sargk D, Schneider F, Schnabel A, Maurer K, et al. Axis I disorders and personality disorders as risk factors for suicide. *Eur Arch Psychiatry Clin Neurosci*. 2006;**256**(1):17-27. doi: [10.1007/s00406-005-0593-7](https://doi.org/10.1007/s00406-005-0593-7). [PubMed: [16133739](https://pubmed.ncbi.nlm.nih.gov/16133739/)].
6. Klonsky ED. Non-suicidal self-injury in United States adults: prevalence, sociodemographics, topography and functions. *Psychol Med*. 2011;**41**(9):1981-6. doi: [10.1017/S0033291710002497](https://doi.org/10.1017/S0033291710002497). [PubMed: [21208494](https://pubmed.ncbi.nlm.nih.gov/21208494/)].
7. Nock MK. Self-injury. *Annu Rev Clin Psychol*. 2010;**6**:339-63. doi: [10.1146/annurev.clinpsy.121208.131258](https://doi.org/10.1146/annurev.clinpsy.121208.131258). [PubMed: [20192787](https://pubmed.ncbi.nlm.nih.gov/20192787/)].
8. Hankin BL, Abela JR. Nonsuicidal self-injury in adolescence: prospective rates and risk factors in a 2(1/2) year longitudinal study. *Psychiatry* Res. 2011;**186**(1):65-70. doi: [10.1016/j.psychres.2010.07.056](https://doi.org/10.1016/j.psychres.2010.07.056). [PubMed: [20807667](https://pubmed.ncbi.nlm.nih.gov/20807667/)].
9. Zetterqvist M, Lundh LG, Dahlstrom O, Svedin CG. Prevalence and function of non-suicidal self-injury (NSSI) in a community sample of adolescents, using suggested DSM-5 criteria for a potential NSSI disorder. *J Abnorm Child Psychol*. 2013;**41**(5):759-73. doi: [10.1007/s10802-013-9712-5](https://doi.org/10.1007/s10802-013-9712-5). [PubMed: [23344701](https://pubmed.ncbi.nlm.nih.gov/23344701/)].
10. Swannell SV, Martin GE, Page A, Hasking P, St John NJ. Prevalence of nonsuicidal self-injury in nonclinical samples: systematic review, meta-analysis and meta-regression. *Suicide Life Threat Behav*. 2014;**44**(3):273-303. doi: [10.1111/sltb.12070](https://doi.org/10.1111/sltb.12070). [PubMed: [24422986](https://pubmed.ncbi.nlm.nih.gov/24422986/)].
11. Nixon MK, Heath NL. *Self-injury in youth: The essential guide to assessment and intervention*. Taylor & Francis; 2008.
12. Glenn CR, Klonsky ED. A multimethod analysis of impulsivity in nonsuicidal self-injury. *Personal Disord*. 2010;**1**(1):67-75. doi: [10.1037/a0017427](https://doi.org/10.1037/a0017427). [PubMed: [22448604](https://pubmed.ncbi.nlm.nih.gov/22448604/)].
13. Guerry JD, Prinstein MJ. Longitudinal prediction of adolescent nonsuicidal self-injury: examination of a cognitive vulnerability-stress model. *J Clin Child Adolesc Psychol*. 2010;**39**(1):77-89. doi: [10.1080/15374410903401195](https://doi.org/10.1080/15374410903401195). [PubMed: [20390800](https://pubmed.ncbi.nlm.nih.gov/20390800/)].
14. Muehlenkamp JJ, Ertelt TW, Miller AL, Claes L. Borderline personality symptoms differentiate non-suicidal and suicidal self-injury in ethnically diverse adolescent outpatients. *J Child Psychol Psychiatry*. 2011;**52**(2):148-55. doi: [10.1111/j.1469-7610.2010.02305.x](https://doi.org/10.1111/j.1469-7610.2010.02305.x). [PubMed: [20735511](https://pubmed.ncbi.nlm.nih.gov/20735511/)].
15. Selby EA, Bender TW, Gordon KH, Nock MK, Joiner TJ. Non-suicidal self-injury (NSSI) disorder: a preliminary study. *Personal Disord*. 2012;**3**(2):167-75. doi: [10.1037/a0024405](https://doi.org/10.1037/a0024405). [PubMed: [22452757](https://pubmed.ncbi.nlm.nih.gov/22452757/)].
16. Bryan CJ, Bryan AO, Ray-Sannerud BN, Etienne N, Morrow CE. Suicide attempts before joining the military increase risk for suicide attempts and severity of suicidal ideation among military personnel and veterans. *Compr Psychiatry*. 2014;**55**(3):534-41. doi: [10.1016/j.comppsy.2013.10.006](https://doi.org/10.1016/j.comppsy.2013.10.006). [PubMed: [24246604](https://pubmed.ncbi.nlm.nih.gov/24246604/)].
17. Klonsky ED, May AM, Glenn CR. The relationship between nonsuicidal self-injury and attempted suicide: converging evidence from four samples. *J Abnorm Psychol*. 2013;**122**(1):231-7. doi: [10.1037/a0030278](https://doi.org/10.1037/a0030278). [PubMed: [23067259](https://pubmed.ncbi.nlm.nih.gov/23067259/)].
18. Andover MS, Morris BW, Wren A, Bruzese ME. The co-occurrence of non-suicidal self-injury and attempted suicide among adolescents: distinguishing risk factors and psychosocial correlates. *Child Adolesc Psychiatry Ment Health*. 2012;**6**:11. doi: [10.1186/1753-2000-6-11](https://doi.org/10.1186/1753-2000-6-11). [PubMed: [22463065](https://pubmed.ncbi.nlm.nih.gov/22463065/)].
19. Andover MS, Pepper CM, Ryabchenko KA, Orrico EG, Gibb BE. Self-mutilation and symptoms of depression, anxiety, and borderline personality disorder. *Suicide Life Threat Behav*. 2005;**35**(5):581-91. doi: [10.1521/suli.2005.35.5.581](https://doi.org/10.1521/suli.2005.35.5.581). [PubMed: [16268774](https://pubmed.ncbi.nlm.nih.gov/16268774/)].
20. Nock MK, Joiner TJ, Gordon KH, Lloyd-Richardson E, Prinstein MJ. Non-suicidal self-injury among adolescents: diagnostic correlates and relation to suicide attempts. *Psychiatry Res*. 2006;**144**(1):65-72. doi: [10.1016/j.psychres.2006.05.010](https://doi.org/10.1016/j.psychres.2006.05.010). [PubMed: [16887199](https://pubmed.ncbi.nlm.nih.gov/16887199/)].
21. Klonsky ED, Muehlenkamp JJ. Self-injury: a research review for the practitioner. *J Clin Psychol*. 2007;**63**(11):1045-56. doi: [10.1002/jclp.20412](https://doi.org/10.1002/jclp.20412). [PubMed: [17932985](https://pubmed.ncbi.nlm.nih.gov/17932985/)].
22. Lazarus SA, Cheavens JS, Festa F, Zachary Rosenthal M. Interpersonal functioning in borderline personality disorder: a systematic review of behavioral and laboratory-based assessments. *Clin Psychol Rev*. 2014;**34**(3):193-205. doi: [10.1016/j.cpr.2014.01.007](https://doi.org/10.1016/j.cpr.2014.01.007). [PubMed: [24534643](https://pubmed.ncbi.nlm.nih.gov/24534643/)].
23. Klonsky ED. The functions of self-injury in young adults who cut themselves: clarifying the evidence for affect-regulation. *Psychiatry Res*. 2009;**166**(2-3):260-8. doi: [10.1016/j.psychres.2008.02.008](https://doi.org/10.1016/j.psychres.2008.02.008). [PubMed: [19275962](https://pubmed.ncbi.nlm.nih.gov/19275962/)].
24. Breslin K. Five indices of emotion regulation in participants with a history of nonsuicidal self-injury: a daily diary study. *Behav Ther*. 2014;**45**(1):56-66. doi: [10.1016/j.beth.2013.09.005](https://doi.org/10.1016/j.beth.2013.09.005). [PubMed: [24411115](https://pubmed.ncbi.nlm.nih.gov/24411115/)].

25. O'Connor RC, Nock MK. The psychology of suicidal behaviour. *Lancet Psychiat*. 2014;**1**(1):73-85.
26. Milnes D, Owens D, Blenkiron P. Problems reported by self-harm patients: perception, hopelessness, and suicidal intent. *J Psychosomat Res*. 2002;**53**(3):819-22.
27. McMillan D, Gilbody S, Beresford E, Neilly L. Can we predict suicide and non-fatal self-harm with the Beck Hopelessness Scale? A meta-analysis. *Psychol Med*. 2007;**37**(6):769-78. doi: [10.1017/S0033291706009664](https://doi.org/10.1017/S0033291706009664). [PubMed: [17202001](https://pubmed.ncbi.nlm.nih.gov/17202001/)].
28. Zweig-Frank H, Paris J, Guzder J. Psychological risk factors for dissociation and self-mutilation in female patients with borderline personality disorder. *Canadian J Psychiat/La Revue canadienne de psychiatrie*. 1994.
29. Paris J. Understanding self-mutilation in borderline personality disorder. *Harv Rev Psychiatry*. 2005;**13**(3):179-85. doi: [10.1080/10673220591003614](https://doi.org/10.1080/10673220591003614). [PubMed: [16020029](https://pubmed.ncbi.nlm.nih.gov/16020029/)].
30. Navarro-Haro MV, Wessman I, Botella C, Garcia-Palacios A. The role of emotion regulation strategies and dissociation in non-suicidal self-injury for women with borderline personality disorder and comorbid eating disorder. *Compr Psychiatry*. 2015;**63**:123-30. doi: [10.1016/j.comppsy.2015.09.001](https://doi.org/10.1016/j.comppsy.2015.09.001). [PubMed: [26555500](https://pubmed.ncbi.nlm.nih.gov/26555500/)].
31. Gupta MA. Emotional regulation, dissociation, and the self-induced dermatoses: clinical features and implications for treatment with mood stabilizers. *Clin Dermatol*. 2013;**31**(1):110-7. doi: [10.1016/j.clindermatol.2011.11.015](https://doi.org/10.1016/j.clindermatol.2011.11.015). [PubMed: [23245982](https://pubmed.ncbi.nlm.nih.gov/23245982/)].
32. Chesin MS, Jeglic EL, Stanley B. Pathways to high-lethality suicide attempts in individuals with borderline personality disorder. *Arch Suicide Res*. 2010;**14**(4):342-62. doi: [10.1080/1381118.2010.524054](https://doi.org/10.1080/1381118.2010.524054). [PubMed: [21082450](https://pubmed.ncbi.nlm.nih.gov/21082450/)].
33. Anestis MD, Soberay KA, Gutierrez PM, Hernandez TD, Joiner TE. Reconsidering the link between impulsivity and suicidal behavior. *Pers Soc Psychol Rev*. 2014;**18**(4):366-86. doi: [10.1177/1088868314535988](https://doi.org/10.1177/1088868314535988). [PubMed: [24969696](https://pubmed.ncbi.nlm.nih.gov/24969696/)].
34. Anestis MD, Tull MT, Lavender JM, Gratz KL. The mediating role of non-suicidal self-injury in the relationship between impulsivity and suicidal behavior among inpatients receiving treatment for substance use disorders. *Psychiatry Res*. 2014;**218**(1-2):166-73. doi: [10.1016/j.psychres.2014.03.031](https://doi.org/10.1016/j.psychres.2014.03.031). [PubMed: [24768248](https://pubmed.ncbi.nlm.nih.gov/24768248/)].
35. Claes L, Fernandez-Aranda F, Jimenez-Murcia S, Botella C, Casanueva FF, de la Torre R. Co-occurrence of non-suicidal self-injury and impulsivity in extreme weight conditions. *Personalit Individual Differ*. 2013;**54**(1):137-40.
36. Hamza CA, Willoughby T, Heffer T. Impulsivity and nonsuicidal self-injury: A review and meta-analysis. *Clin Psychol Rev*. 2015;**38**:13-24. doi: [10.1016/j.cpr.2015.02.010](https://doi.org/10.1016/j.cpr.2015.02.010). [PubMed: [25779460](https://pubmed.ncbi.nlm.nih.gov/25779460/)].
37. Gratz KL, Roemer L. The relationship between emotion dysregulation and deliberate self-harm among female undergraduate students at an urban commuter university. *Cogn Behav Ther*. 2008;**37**(1):14-25. doi: [10.1080/16506070701819524](https://doi.org/10.1080/16506070701819524). [PubMed: [18365795](https://pubmed.ncbi.nlm.nih.gov/18365795/)].
38. Swannell S, Martin G, Page A, Hasking P, Hazell P, Taylor A, et al. Child maltreatment, subsequent non-suicidal self-injury and the mediating roles of dissociation, alexithymia and self-blame. *Child Abuse Negl*. 2012;**36**(7-8):572-84. doi: [10.1016/j.chiabu.2012.05.005](https://doi.org/10.1016/j.chiabu.2012.05.005). [PubMed: [22858062](https://pubmed.ncbi.nlm.nih.gov/22858062/)].
39. Cerutti R, Calabrese M, Valastro C. Alexithymia and personality disorders in the adolescent non-suicidal self injury: Preliminary results. *Procedia-Social Behavior Sci*. 2014;**114**:372-6.
40. Dimaggio G, Carcione A, Nicolo G, Lysaker PH, d'Angerio S, Conti ML, et al. Differences between axes depend on where you set the bar: associations among symptoms, interpersonal relationship and alexithymia with number of personality disorder criteria. *J Pers Disord*. 2013;**27**(3):371-82. doi: [10.1521/pedi_2012_26_043](https://doi.org/10.1521/pedi_2012_26_043). [PubMed: [23130814](https://pubmed.ncbi.nlm.nih.gov/23130814/)].
41. Grynberg D, Luminet O, Corneille O, Grezes J, Berthoz S. Alexithymia in the interpersonal domain: A general deficit of empathy? *Personalit Individual Differ*. 2010;**49**(8):845-50.
42. Mattila AK, Salminen JK, Nummi T, Joukamaa M. Age is strongly associated with alexithymia in the general population. *J Psychosom Res*. 2006;**61**(5):629-35. doi: [10.1016/j.jpsychores.2006.04.013](https://doi.org/10.1016/j.jpsychores.2006.04.013). [PubMed: [17084140](https://pubmed.ncbi.nlm.nih.gov/17084140/)].
43. Franz M, Popp K, Schaefer R, Sitte W, Schneider C, Hardt J, et al. Alexithymia in the German general population. *Soc Psychiatry Psychiatr Epidemiol*. 2008;**43**(1):54-62. doi: [10.1007/s00127-007-0265-1](https://doi.org/10.1007/s00127-007-0265-1). [PubMed: [17934682](https://pubmed.ncbi.nlm.nih.gov/17934682/)].
44. Tolmunen T, Heliste M, Lehto SM, Hintikka J, Honkalampi K, Kauhanen J. Stability of alexithymia in the general population: an 11-year follow-up. *Compr Psychiatry*. 2011;**52**(5):536-41. doi: [10.1016/j.comppsy.2010.09.007](https://doi.org/10.1016/j.comppsy.2010.09.007). [PubMed: [21081227](https://pubmed.ncbi.nlm.nih.gov/21081227/)].
45. Grabe HJ, Spitzer C, Freyberger HJ. Alexithymia and the temperament and character model of personality. *Psychother Psychosom*. 2001;**70**(5):261-7. doi: [10.1159/000056264](https://doi.org/10.1159/000056264). [PubMed: [11509896](https://pubmed.ncbi.nlm.nih.gov/11509896/)].
46. Domes G, Grabe HJ, Czeschnek D, Heinrichs M, Herpertz SC. Alexithymic traits and facial emotion recognition in borderline personality disorder. *Psychother Psychosom*. 2011;**80**(6):383-5. doi: [10.1159/000325828](https://doi.org/10.1159/000325828). [PubMed: [21968640](https://pubmed.ncbi.nlm.nih.gov/21968640/)].
47. Joyce AS, Fujiwara E, Cristall M, Ruddy C, Ogrodniczuk JS. Clinical correlates of alexithymia among patients with personality disorder. *Psychother Res*. 2013;**23**(6):690-704. doi: [10.1080/10503307.2013.803628](https://doi.org/10.1080/10503307.2013.803628). [PubMed: [23731378](https://pubmed.ncbi.nlm.nih.gov/23731378/)].
48. New AS, aan het Rot M, Ripoll LH, Perez-Rodriguez MM, Lazarus S, Zipursky E, et al. Empathy and alexithymia in borderline personality disorder: clinical and laboratory measures. *J Pers Disord*. 2012;**26**(5):660-75. doi: [10.1521/pedi.2012.26.5.660](https://doi.org/10.1521/pedi.2012.26.5.660). [PubMed: [23013336](https://pubmed.ncbi.nlm.nih.gov/23013336/)].
49. Rufer M, Albrecht R, Zaum J, Schnyder U, Mueller-Pfeiffer C, Hand I, et al. Impact of alexithymia on treatment outcome: a naturalistic study of short-term cognitive-behavioral group therapy for panic disorder. *Psychopathology*. 2010;**43**(3):170-9. doi: [10.1159/000288639](https://doi.org/10.1159/000288639). [PubMed: [20197710](https://pubmed.ncbi.nlm.nih.gov/20197710/)].
50. Steinweg DL, Dallas AP, Rea WS. Fibromyalgia: unspeakable suffering, a prevalence study of alexithymia. *Psychosomatics*. 2011;**52**(3):255-62. doi: [10.1016/j.psym.2010.12.022](https://doi.org/10.1016/j.psym.2010.12.022). [PubMed: [21565597](https://pubmed.ncbi.nlm.nih.gov/21565597/)].
51. Nowakowski ME, McFarlane T, Cassin S. Alexithymia and eating disorders: a critical review of the literature. *J Eat Disord*. 2013;**1**:21. doi: [10.1186/2050-2974-1-21](https://doi.org/10.1186/2050-2974-1-21). [PubMed: [24999402](https://pubmed.ncbi.nlm.nih.gov/24999402/)].
52. Aricak OT, Ozbay A. Investigation of the relationship between cyberbullying, cybervictimization, alexithymia and anger expression styles among adolescents. *Computer Human Behavior*. 2016;**55**:278-85.
53. Norman H, Borrill J. The relationship between self-harm and alexithymia. *Scand J Psychol*. 2015;**56**(4):405-19. doi: [10.1111/sjop.12217](https://doi.org/10.1111/sjop.12217). [PubMed: [26011069](https://pubmed.ncbi.nlm.nih.gov/26011069/)].
54. Zlotnick C, Shea MT, Pearlstein T, Simpson E, Costello E, Begin A. The relationship between dissociative symptoms, alexithymia, impulsivity, sexual abuse, and self-mutilation. *Comprehensiv Psychiat*. 1996;**37**(1):12-6.
55. Paivio SC, McCulloch CR. Alexithymia as a mediator between childhood trauma and self-injurious behaviors. *Child Abuse Negl*. 2004;**28**(3):339-54. doi: [10.1016/j.chiabu.2003.11.018](https://doi.org/10.1016/j.chiabu.2003.11.018). [PubMed: [15066350](https://pubmed.ncbi.nlm.nih.gov/15066350/)].
56. Gratz KL. Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *J Psychopathol Behavior Assess*. 2001;**23**(4):253-63.
57. Fliège H, Kocalevent RD, Walter OB, Beck S, Gratz KL, Gutierrez PM, et al. Three assessment tools for deliberate self-harm and suicide behavior: evaluation and psychopathological correlates. *J Psychosom Res*. 2006;**61**(1):113-21. doi: [10.1016/j.jpsychores.2005.10.006](https://doi.org/10.1016/j.jpsychores.2005.10.006). [PubMed: [16813853](https://pubmed.ncbi.nlm.nih.gov/16813853/)].
58. Cerutti R, Manca M, Presaghi F, Gratz KL. Prevalence and clinical correlates of deliberate self-harm among a community sample of Italian adolescents. *J Adolesc*. 2011;**34**(2):337-47. doi: [10.1016/j.adolescence.2010.04.004](https://doi.org/10.1016/j.adolescence.2010.04.004). [PubMed: [20471075](https://pubmed.ncbi.nlm.nih.gov/20471075/)].
59. Jackson M, Claridge G. Reliability and validity of a psychotic traits

- questionnaire (STQ). *Br J Clin Psychol.* 1991;**30** (Pt 4):311-23. [PubMed: [1777753](#)].
60. Rawlings D, Claridge G, Freeman JL. Principal components analysis of the schizotypal personality scale (STA) and the borderline personality scale (STB). *Personalit Individual Differ.* 2001;**31**(3):409-19.
61. Shankar R. *Borderline personality disorder and the psychosis spectrum: a personality and divided visual field study*. University of Oxford; 1998.
62. Mohammadzadeh A, Goodarzi M, Taghavi M, Mollazadeh M. The Study of Factor structure, Validity, reliability and Standardization of borderline personality scale in Shiraz university students. *J Fund Ment Heal.* 2005:27-8.
63. Bagby RM, Taylor GJ, Parker JD. The twenty-item Toronto Alexithymia Scale—II. Convergent, discriminant, and concurrent validity. *J Psychosomat Res.* 1994;**38**(1):33-40.
64. Besharat MA. Reliability and factorial validity of a Farsi version of the 20-item Toronto Alexithymia Scale with a sample of Iranian students. *Psychol Rep.* 2007;**101**(1):209-20. doi: [10.2466/pr0.101.1.209-220](#). [PubMed: [17958129](#)].