Research Paper

Comparing Theory of Mind, Emotion Recognition, and Suicidal Ideation Among Adolescents With and Without Self-harm

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ABSTRACT

Background: Self-harm is a significant indicator of suicide attempts, with the likelihood of suicide increasing among adolescents who engage in frequent self-harming behaviors. Addressing this issue is crucial. This study aimed to compare the theory of mind (ToM), emotion recognition, and suicidal ideation among adolescents with and without self-harm.

Methods: The present study followed a causal-comparative design. The statistical population comprised all high school-educated boys and girls in the second half of the 2022 academic year in Guilan. A total of 55 high school students were selected using a multi-stage cluster approach and purposive sampling methods. Data collection instruments included the Ekman 60-faces test (EK-60F), the ToM scale, and the Beck scale for suicidal ideation (BSSI). Eventually, the data collected from 55 individuals were analyzed through a one-way analysis of variance and Tukey's post hoc test by SPSS software, version 27.

Results: The group of boys with self-harm significantly differed from the group of girls without self-harm regarding the introductory ToM variable using the ToM ($P<0.001$). Considering the variable emotion recognition, the group of boys with self-harm exhibited a significant difference compared to both the boys without self-harm and the girls without self-harm groups ($P<0.001$). For the suicide ideation variable, the boys with self-harm group demonstrated a significant difference when compared to the boys without self-harm and girls without self-harm groups ($P<0.001$).

Conclusion: The research discovered variations in ToM, emotion recognition, and suicidal thoughts between teenagers who engage in self-harm and those who do not.

Keywords: Theory of mind (ToM), Emotion recognition, Suicidal ideation, Adolescents, Self-harm

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Introduction

Adolescence is a crucial stage of human growth, during which young individuals encounter various sources of stress [1]. Self-harm behavior is a common problem among teenagers today, observed across various cultures. It involves intentionally inflicting harm or damage to oneself [2]. This includes acts, such as cutting and burning body parts, inflicting forceful blows to the head, ingesting toxic substances, and swallowing objects, or interfering with the natural wound-healing process [3]. Non-suicidal self-injury (NSSI) usually begins in early adolescence, commonly between the ages of 12 and 15, and can last for different lengths of time, ranging from weeks to months or even spanning several years [4]. Studies indicate that getting involved with self-harm behaviors throughout adolescence raises the probability of experiencing suicidal ideation, attempting suicide, and developing other mental disorders [2-5]. NSSI is highly prevalent among adolescents in Iran, with an annual rate exceeding 40%. The global incidence of NSSI is considerably lower in comparison to the previously indicated percentage [6]. Individuals who engage in NSSI have elevated levels of self-criticism in comparison to the general population [7]. Nevertheless, it is essential to acknowledge that girls demonstrate an increased tendency to engage in NSSI in comparison to boys. Recurrent NSSI is associated with various concerns, including depressive symptoms, low self-esteem, substance addiction, impaired social interactions, poor academic performance, and behavioral problems [8]. A thorough analysis of pain threshold and tolerance levels in individuals who engage in self-harm behaviors, compared to those who do not, found that individuals who self-harm as a form of self-punishment have higher pain tolerance and threshold levels [9]. Additionally, they exhibit a stronger implicit association with thoughts of self-harm compared to individuals who do not engage in such behaviors [10].

Theory of mind (ToM) pertains to the distinctive cognitive capacity of individuals to attribute mental states, including intentions, emotions, desires, and beliefs, to themselves and others to comprehend and predict behavior [11]. The ToM involves a framework that consists of two main dimensions, including the ability to recognize and differentiate cues in one's immediate social environment, particularly the ability to understand the mental state of others and draw inferences about these indicators, namely the ability to participate in cognitive processes associated with comprehending the thoughts and emotions of others [12, 13]. Empirical evidence indicates that the correlation between ToM and mental functions continues to develop until late adolescence [14]. Royka and Santos identified two separate elements within the ToM. The components can be classified as cognitive (cold) and emotional (warm). The cognitive components refer to the ability to understand the intentions and beliefs of others, whereas the emotional elements involve processing individuals' emotions and feelings [15, 16]. A study conducted by Laghi et al. revealed that individuals who engaged in NSSI exhibited lower levels of performance in all elements of ToM in comparison to the control group. Additionally, a negative correlation was observed between ToM performance and suicidal tendencies, while a positive correlation was found between ToM performance and a life-oriented outlook, in relation to the type and frequency of self-harm behaviors [17].

An essential and influential factor in those who engage in self-harm is their ability to recognize their emotions. Emotions play a crucial role in social interactions, as they are conveyed through facial expressions, allowing individuals to communicate without explicitly discussing the other individual's circumstances, desires, worries, and intentions [18]. Emotions are vital for rational decision-making, perception, interaction, and human cognition. They serve essential monitoring and beneficial functions within the human body and brain and contribute to rational decision-making and imagination [19]. Emotions interact with our intentions and motivations and drive our creative and social behavior [20]. Recognizing facial emotions and mirroring facial expressions can be difficult in social interactions, as difficulties may arise from not being able to identify emotions in facial expressions and not imitating facial expressions accurately [21]. Taajobi et al. found differences in emotion management and metacognitive views between typical adolescents and smokers. They also found variations in positive worry beliefs, negative metacognitive beliefs, cognitive efficiency, and cognitive self-awareness [22]. Bahreini and Aghaei found that delinquent adolescents may lack emotional regulation and possess limited self-awareness abilities [23].

Self-harming adolescents have high levels of negative thoughts and self-images that are triggered automatically in specific situations [24]. These thoughts dominate emotions and behaviors, leading to rapid transit through the mind [25]. Depression is characterized by spontaneous negative thoughts, which are linked to dysfunctional attitudes and a higher risk of depression [26]. Psychological and emotional traumas can lead individuals to have persistent negative thoughts, resulting in further harm [27]. Adolescents experience frequent unpleasant thoughts,

including negative, self-referential, and past-focused thoughts [28]. Training in negative mood regulation can reduce suicidal ideations, anxiety, and depression [29]. Peer victimization is linked to an increase in suicidal thoughts, while affiliation with school is associated with a decrease in suicidal ideations [30]. Self-injury has detrimental consequences for young people in the Iranian community. Support and guidance are crucial during this pivotal stage of development. The ability to understand others' thoughts and emotions, as well as negative thinking patterns, has a significant influence on individuals. Engaging in self-harm is closely associated with the risk of attempting suicide. This research is pioneering in examining all relevant factors. The objective was to assess ToM, emotion recognition, and suicidal thoughts in adolescents who engage in self-harming behavior.

Methods

Research design

This study was conducted as part of a causal-comparative research design. The study's statistical population comprised boys and girls with a high school education residing in Guilan who were enrolled in the 10th, 11th, and 12th grades during the latter half of the academic year 2023.

Subjects

The sampling was done using a multi-stage cluster approach. The sampling procedure involved several steps. Initially, a comprehensive list of all schools located in Guilan was compiled. Subsequently, urban districts inside Guilan were identified. Finally, a random selection process was employed to choose five schools from these three districts. The authors employed a randomized technique to choose schools, utilizing a random number. Of the five initially selected schools, three were for boys and two were for girls. The researcher interviewed individuals to select the participants of the study. The goals of the research and qualitative questions related to self-harm among adolescents were explained during the interviews.

The sample size was determined using G*Power software, version 3.1.9.7 through the analysis of variance. The computation included a mean effect size of 0.50, a significance level of 5% for type 1 errors, and a power level of 80% for type 2 errors [31]. The study's sample size consisted of 60 individuals, with a uniform distribution of 15 participants in each group. The study employed the purposive sampling method, which involved meticulous selection. Purposive sampling is a non-probability sampling method and is implemented when the elements selected for the sample are selected by the researcher's judgment. Based on this, the researcher selected teenagers who met the inclusion criteria. The sampling process continued until 15 girls with self-harm, 15 girls without self-harm, 15 boys with self-harm, and 15 boys without self-harm were identified, as determined by the initial research interview.

The research population was selected based on the study's predetermined inclusion and exclusion criteria. The study focused on adolescents attending the selected schools while intentionally excluding adolescents from other schools. Likewise, any adolescents who were unwilling to participate in the study were also omitted from the research. The sampling process was carried out concerning the academic protocols. Initially, the researchers obtained the necessary approvals from the university to conduct the investigation.

Subsequently, they collaborated with the educational organization to proceed with the sampling process. After obtaining the necessary permissions, the researcher continued to visit the specified schools during the sampling phase. The research initially included 60 individuals; however, due to voluntary withdrawals, the final dataset for analysis comprised data from 55 participants. The study evaluated three aspects associated with the ToM, which included three separate components, along with the recognition of emotions and suicidal ideation in each individual within the sample. The research was conducted over three months. To conform to the ethical norms, before administering the questionnaires, participants in the study were asked to provide their consent to collaborate. Participants were informed that their participation in the study was completely voluntary and that they had the right to withdraw from the study at any time. Moreover, they were clarified that the research procedure did not require any personally identifiable information. In general, in order to comply with the ethical principles, before conducting the tests, the teenagers participating in the research were asked whether they would like to cooperate, and they were informed that there was no obligation to participate or continue in the research.

Measures

ToM scale: This scale was created by Muris et al. in 1999 to assess ToM in children and adolescents. It measures social understanding and the ability to understand the thoughts and feelings of others. The questionnaire has 78 questions divided into three subtests. This scale is

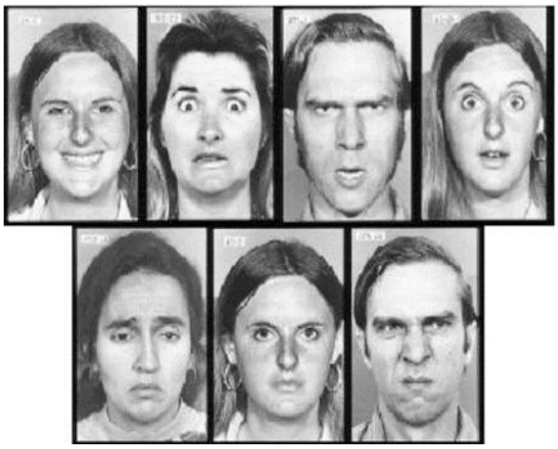

Figure 1. Sample images of the facial emotion recognition test

administered as an interview; a correct answer receives 1 point, while a wrong answer receives 0 points. The range of scores for individuals on the subscales is 0 to 29 (first test), 0 to 33 (second test), and 0 to 16 (third test). The reliability coefficient of the questionnaire is 0.72, and the concurrent validity is 0.89 [32]. The internal consistency, calculated using Cronbach's α coefficient, was found to be 0.86 for the whole scale and specific subtests [33]. In the current study, the scale's Cronbach's α coefficient was found to be 0.871.

Ekman 60-faces test (EK-60F): This test assesses emotional recognition ability and is commonly used in psychiatry and neurology research [34]. Participants identified emotions, like fear and happiness through oral illustrations. Wrong answers resulted in exclusion from the study. The test includes 60 facial expression photos with assigned weights. The images depict the faces of ten actors (6 girls and 4 boys) displaying six basic emotions: Happiness, sadness, anger, fear, surprise, and disgust. Respondents were required to label the emotions shown by the actors. Ekman and Friesen's method was used, with images displayed for 5 seconds each [35]. Scores ranged from 0 to 60, with each emotion getting a sub-score of zero to ten. Test reliability was assessed by retesting 15 children with Down syndrome, resulting in a coefficient of 0.79 [36]. The Cronbach's α coefficient for the scale used was 0.81 (Figure 1).

Beck scale for suicidal ideation (BSSI): The scale presented in this study serves as a valuable instrument for quantifying suicidal ideation. It comprises a total of 19 items that effectively evaluate both the existence and intensity of suicidal thoughts [37]. Beck et al. introduced a self-report version of the suicidality measure. In 1988, an ordinal scale ranging from zero to two was utilized to assign scores to individual items. The cumulative score, which could range from 0 to 38, was then determined. According to Beck et al., the Cronbach's α coefficient of this questionnaire was reported to be 0.96, indicating a significant degree of reliability. The investigation of this questionnaire has also been conducted in Iran. The questionnaire was assessed by Esfahani et al., who reported a Cronbach's α score of 0.82 [38, 39]. The researcher discovered a Cronbach's α coefficient of 0.77 for the scale in this study.

Statistical analysis

The linearity of relationships between variables was confirmed. Outliers were examined and only a few outliers were identified. Box plots were utilized to detect outlier data and standard tests were performed to obtain standard scores. Items with standardized residual column values above 3 or below -3 were eliminated. The Kolmogorov-Smirnov test indicated a normal distribution of scores. The homogeneity of variance among groups was validated using Levene's test. Data analysis was conducted using one-way ANOVA with Tukey's post hoc test. The ANOVA was employed to identify significant differences between the means of independent groups, while Tukey's test facilitated pairwise comparisons of group means. Descriptive statistics were computed using SPSS software, version 27, with a significance level of 0.05.

Results

This study sample included 55 adolescents, consisting of 13 girls with self-harm, 15 girls without self-harm, 14 boys with self-harm, and 13 boys without self-harm. At first, the researcher analyzed the descriptive statistics

Figure 2. Differences between variables in the research groups

Table 1. Descriptive statistics of the variables and ANOVA results

Variables	Groups	Number	Mean±SD	Min	Max	Mean Square	F	P	η_p^2
Introductory ToM	Boys with self-harm	14	12.21±2.044	10	26	213.046	14.75	<0.001	0.465
	Boys without self-harm	13	20.23±4.065						
	Girls with self-harm	13	16.76±4.361						
	Girls without self-harm	15	20.6±4.272						
	Total	55	17.47±5.047						
The real ToM	Boys with self-harm	14	13.64±1.905	10	30	544.811	28.73	<0.001	0.628
	Boys without self-harm	13	24.61±6.21						
	Girls with self-harm	13	14.92±3.546						
	Girls without self-harm	15	25.53±4.67						
	Total	55	19.781±6.94						
Advanced aspects of ToM	Boys with self-harm	14	9.571±2.651	6	15	36.008	8.811	<0.001	0.341
	Boys without self-harm	13	12.84±1.86						
	Girls with self-harm	13	10.15±1.06						
	Girls without self-harm	15	12.4±2.097						
	Total	55	11.25±2.42						
Emotion recognition	Boys with self-harm	14	31.57±6.71	25	90	7970.157	87.70	<0.001	0.838
	Boys without self-harm	13	72.92±8.957						
	Girls with self-harm	13	38.076±11.75						
	Girls without self-harm	15	78.6±10.09						
	Total	55	55.7±22.99						
Social cognition	Boys with self-harm	14	31.14±3.84	10	37	1101.112	34.42	<0.001	0.669
	Boys without self-harm	13	12.84±3.387						
	Girls with self-harm	13	25.84±10.23						
	Girls without self-harm	15	14.2±1.78						
	Total	55	20.94±9.559						

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pertinent to the variables under investigation. The participants in the study were classified into three discrete age groups: 15-16 years, 16-17 years, and 17-18 years. In addition, the participants were divided into two separate groups based on gender, consisting of boys and girls accordingly. Likewise, the participants were classified into three groups according to their academic fields: Mathematics, empirical sciences, and humanities. The researcher conducted a comparative analysis of the demographic variables of two unique groups: One with

Table 2. Tukey's post hoc test results to compare the means of two groups

Variables	Group 1	Group 2	Mean Difference	Std. Error	P
Introductory ToM	Girls with self-harm	Girls without self-harm	-3.831	1.44	0.062
	Girls with self-harm	Boys with self-harm	4.555*	1.464	0.018
	Girls with self-harm	Boys without self-harm	-3.462	1.491	0.146
	Girls with self-harm	Boys with self-harm	8.386*	1.412	<0.001
	Girls without self-harm	Boys without self-harm	0.369	1.44	1.000
	Boys with self-harm	Boys without self-harm	-8.016*	1.464	<0.001
The 1st statement of the real ToM	Girls with self-harm	Girls without self-harm	-10.973*	1.677	<0.001
	Girls with self-harm	Boys with self-harm	-1.28	1.677	1.000
	Girls with self-harm	Boys without self-harm	-11.89*	1.618	<0.001
	Girls with self-harm	Boys with self-harm	-9.692*	1.708	<0.001
	Girls without self-harm	Boys without self-harm	-10.61*	1.65	<0.001
	Boys with self-harm	Boys without self-harm	0.918	1.65	1.000
Advanced aspects of ToM	Girls with self-harm	Girls without self-harm	-3.275*	0.779	0.001
	Girls with self-harm	Boys with self-harm	-0.582	0.779	1.000
	Girls with self-harm	Boys without self-harm	-2.829*	0.751	0.003
	Girls with self-harm	Boys with self-harm	-2.692*	0.793	0.008
	Girls without self-harm	Boys without self-harm	-2.246*	0.766	0.030
	Boys with self-harm	Boys without self-harm	-0.446	0.766	1.000
Emotion recognition	Girls with self-harm	Girls without self-harm	-41.352*	3.672	<0.001
	Girls with self-harm	Boys with self-harm	-6.505	3.672	0.494
	Girls with self-harm	Boys without self-harm	-47.029*	3.543	<0.001
	Girls with self-harm	Boys with self-harm	-34.846*	3.739	<0.001
	Girls without self-harm	Boys without self-harm	-40.523*	3.612	<0.001
	Boys with self-harm	Boys without self-harm	5.677	3.612	0.733
Suicide ideation	Girls with self-harm	Girls without self-harm	18.297*	2.178	<0.001
	Girls with self-harm	Boys with self-harm	5.297	2.178	0.112
	Girls with self-harm	Boys without self-harm	16.943*	2.102	<0.001
	Girls with self-harm	Boys with self-harm	13*	2.218	<0.001
	Girls without self-harm	Boys without self-harm	11.646*	2.143	<0.001
	Boys with self-harm	Boys without self-harm	1.354	2.143	1.000

*P<0.05.

self-harm and the other group without self-harm tendencies. The chi-square test results indicated no statistically significant difference between the variables in the two groups (P>0.05). Likewise, in Figure 2, the researcher examined the differences between the variables in the research groups.

Table 1 demonstrates that there was a significant difference in the mean values of all variables among the four groups (P<0.001). A significant difference was found between the groups of boys and girls with self-harm and boys and girls without self-harm in the Introductory ToM variable (P<0.001, F=14.751). Also, a significant difference was found between the groups of boys and girls with self-harm and boys and girls without self-harm in the real ToM variable (P<0.001, F=28.735). At the same time, a significant difference was found between the groups of boys and girls with self-harm and boys and girls without self-harm in the advanced aspects of the ToM variable (P<0.001, F=8.811). Also, a significant difference was found between the groups of boys and girls with self-harm and boys and girls without self-harm, in the emotion recognition variable (P<0.001, F=87.700). In the end, a significant difference was found between the groups of boys and girls with self-harm and boys and girls without self-harm in the social cognition variable (P<0.001, F=34.420).

According to Table 2, the pairwise comparison of the groups demonstrated a significant difference between the group of girls without self-harm and the group of boys with self-harm in the introductory ToM component (P<0.001). Similarly, the group of boys with self-harm was significantly different from the group of boys without self-harm (P<0.001). Furthermore, there was a significant difference between the group of girls with self-harm and the group of boys with self-harm (P=0.018). Also, a significant difference was observed between the group of boys with self-harm and the groups of boys and girls without self-harm in the component of "the first statement of the real ToM" (P<0.001). Additionally, there was a significant difference between the group of girls with self-harm and the groups of boys without self-harm and girls without self-harm (P<0.001).

Furthermore, a significant difference was observed between groups with boys with self-harm group, boys without self-harm group (P=0.001), and girls without self-harm in the advanced aspects of the ToM component (P=0.003). Also, there was a significant difference between the group of girls with self-harm and the group of boys without self-harm (P=0.008), as well as the group of girls without self-harm (P=0.030). Moreover, there was a significant difference between the boys with self-harm group and the boys without self-harm and girls without self-harm groups in the emotion recognition variable (P<0.001). In addition, there was a significant difference between the group of girls with self-harm and the groups of boys without self-harm and girls without self-harm in emotion recognition (P<0.001). Furthermore, there was a significant difference between the group of boys with self-harm and the groups of boys and girls without self-harm in suicide ideation (P<0.001). Likewise, a significant difference was observed between the group of girls with self-harm and the groups of boys without self-harm and girls without self-harm in suicide ideation (P<0.001).

Discussion

The current study conducted a comparative analysis of the ToM, emotion recognition, and suicidal ideation among adolescents with and without self-harm.

The research revealed variances in ToM between girls who do not self-harm and boys who do self-harm. Additionally, differences were observed between individuals with and without self-harm, regardless of gender. Both boys and girls with self-harm displayed a notable contrast in ToM compared to those without self-harm. Boys with self-harm displayed noticeable differences from those without. The same distinction was observed among girls with self-harm compared to those without. Boys who self-harm also showed unique patterns in emotion recognition compared to both boys and girls who do not self-harm. Girls who engage in self-harm exhibited unique characteristics compared to both boys and girls who do not self-harm. Similarly, boys with self-harm displayed distinct differences from both boys and girls without, particularly in terms of suicidal ideation. Girls who engage in self-harm demonstrated differences from both boys and girls who do not self-harm.

The study findings are supported by previous research, confirming a difference in the ToM variable between two groups: Girls and boys without self-harm and girls and boys with self-harm [39-41]. The results of the present study suggest that adolescents with NSSI demonstrate lower performance levels in all aspects of ToM compared to the control group [39]. In addition, Hatkevich et al. demonstrated a strong correlation between an excessive tendency toward ToM, which involves attributing excessive mental and emotional states to others, and the occurrence of suicidal ideation and behavior among adolescents who receive support [40]. The research findings

also revealed a significant association between a deficit in the ToM and suicide [41].

The current study suggests that ToM plays a vital role in the context of NSSI. Recent empirical investigations provide compelling evidence that individuals who engage in NSSI experience significant difficulties in self-regulation compared to those who do not have such tendencies [1, 2, 5, 8, 9]. Different cognitive states encompass a variety of mental phenomena, which may include emotions, among other factors. Heightened emotional arousal can lead to temporary suppression of cognitive processes [8, 9]. Adolescents who engage in self-harm may be employing a dysfunctional approach to cope with their emotions [1, 2]. This behavior is intended to regulate and control their feelings, with the aim of decreasing negative emotions [1, 2, 5, 8, 9]. Enhanced awareness could potentially reduce the likelihood of engaging in self-harm. The concept of ToM is essential for the development of social and emotional abilities [39]. It aids teenagers in understanding the thoughts and emotions of others, resulting in improved social and emotional skills. Grasping others' viewpoints fosters the establishment of trust in relationships [36]. Individuals who have a limited understanding of ToM may find it challenging to grasp and analyze the thoughts, emotions, actions, and intentions of others, which can result in difficulties in cognitive, emotional, and social interactions. Conditions associated with ToM have been linked to suicidal ideation and behaviors [40].

Another remarkable finding of this study is the variation in emotional recognition between girls and boys with self-harm, as opposed to girls and boys without self-harm. This conclusion is in line with previous studies [42-44]. The use of emotion dysregulation strategies can be a predictive factor for the development of emotional disorders in soldiers with a history of self-harm behaviors [42]. Ahmadi et al. conducted a study demonstrating how cognitive emotion regulation approaches, attachment style, and personality organization can operate as mediation factors in predicting self-harm behaviors and suicidal tendencies in adolescents [43]. Furthermore, another investigation revealed a correlation between borderline personality disorder and NSSI, specifically regarding disturbances in stress control and detecting emotions [44]. Boys and girls may experience low self-esteem and hold themselves responsible as a result of psychological and social influences. Experiencing stress could result in self-blame and engaging in self-harming activities [42]. Individuals with a history of suicide attempts often struggle with managing their emotions effectively. Negative feelings, such as anger, anxiety, and sorrow can contribute to depression. Some individuals find it challenging to identify and control their negative emotions. Teenagers frequently resort to unhealthy methods of coping with stress due to their limited understanding and negative perceptions [23].

The research supports previous studies regarding a connection between suicidal thoughts and self-harm in both genders, in comparison to individuals who do not engage in self-harm [45-47]. People who commit suicide often utilize NSSI techniques and participate in risky behaviors [45]. Studies indicate a significant correlation between NSSI and suicidal actions among young people [46, 47]. Suicide attempts and NSSI are indicators of the likelihood of death by suicide [47]. t is important to recognize the link between NSSI and suicide attempts, particularly in adolescents with multiple self-harm behaviors. Various psychosocial factors contribute to self-harm and suicide attempts, such as mental illness, family background, life stressors, and disorders, like depression and borderline personality disorder. People with these factors are at higher risk for self-harm and suicidal behaviors [47]. Factors, like impulsivity, anger, and internalizing and externalizing problems interact with stress to increase the likelihood of engaging in such behaviors. Adolescents exposed to these factors are especially vulnerable. NSSI can escalate to more severe forms of self-harm and suicidal thoughts. Focusing on self-harm could lead to more fear and ultimately result in suicide [46].

Conclusion

The research discovered variations in ToM, emotion recognition, and suicidal thoughts between teenagers who engage in self-harm and those who do not. Early intervention is crucial in preventing self-harm among vulnerable adolescents by pinpointing factors that contribute to it and implementing appropriate treatments. Initiatives in education and therapeutic interventions can be beneficial in tackling challenges related to emotional regulation. Professionals in mental health who work with at-risk youth should focus on effective interventions and social support to ward off self-harm.

The present investigation has several limitations. It was conducted on a distinct group of adolescents, encompassing both girls and boys, studying in a high school in Guilan. It is essential to employ caution when applying the findings to different groups and clinical populations. Therefore, future research should enjoy a larger sample size and a wider range of age groups. Additionally, one of the primary limitations is the insufficient testing of adolescents on intervening variables, including parents'

social, economic, educational, and marital conditions. The impact of cultural contexts on adolescent behavior is diverse, underscoring the significance of integrating cultural elements in future research attempts.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the Ethical Committee of Payame-Noor University, Tehran, Iran (Code: IR.PNU.REC.1402.153).

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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References

[1] Yasfard G, Abaspour Azar Z, Hosseini Almadani SA. [Comparing the effectiveness of group dialectical behavior therapy and solution-focused brief therapy on self-esteem, cognitive-emotional regulation and non-suicidal self-injury in daughters (Persian)]. Iranian Journal of Health Education and Health Promotion. 2019; 7(4):343-58. [DOI:10.29252/ijhehp.7.4.343]

[2] Firouzeh M, Ehsani S, Barzegar M, Moradi Doliskani M. Effectiveness of dialectical behavior therapy on difficulty coefficient, life expectancy and emotional processing of adolescents with self-injury background. Psychological Achievements. 2023; [Unpublished]. [DOI:10.22055/psy.2023.43712.3027]

[3] Gharadaghi A, Hamrang Gabalo I, Rahimi S. [The qualitative study of transmitted shame and guilt feeling from parents in male adolescents with history of Self-injury (Persian)]. Knowledge & Research in Applied Psychology. 2021; 22(2):101-14. [DOI:10.30486/jsrp.2019.1875873.1991]

[4] Lawrence HR, Balkind EG, Ji JL, Burke TA, Liu RT. Mental imagery of suicide and non-suicidal self-injury: A meta-analysis and systematic review. Clinical Psychology Review. 2023; 103:102302. [DOI:10.1016/j.cpr.2023.102302] [PMID] [PMCID]

[5] Karimi S, Pirmoradi MR, Ashouri A, Aghebati A. [Relationship of Temperament and Character Traits, Emotional Regulation and Perceived Parenting With Self-harming Behaviors in Adolescents (Persian)]. Iranian Journal of Psychiatry and Clinical Psychology. 2021; 26(4):448-63. [DOI:10.32598/ijpcp.26.4.2955.2.1]

[6] Khashanian F, Khodabakhshi-Koolaee A, Taghvaei D, Ahghar G. [Comparing the effectiveness of two group therapies compassion-focused therapy and positive-oriented Therapy on empathy and feelings of happiness in adolescent girls with a background of self-injury (Persian)]. Journal of Pediatric Nursing. 2023; 9(3):40-51. [DOI:10.22034/JPEN.9.3.40]

[7] Hosseini Fathabadi HS, Ruhani A, Naderi Nobandegani Z. [The social construction of self-harm in the changing context of educational system: A qualitative study of female students in the city of Yazd, Iran (Persian)]. Journal of Social Continuity and Change. 2022; 1(2):311-30. [DOI:10.22034/jscc.2022.2712]

[8] Thomas D, Bonnaire C. Non-suicidal self-injury and emotional dysregulation in male and female young adults: A qualitative study. Soa Chongsonyon Chongsin Uihak. 2023; 34(3):159-68. [DOI:10.5765/jkacap.230033] [PMID] [PMCID]

[9] Shahnazdoust F, Mikaeili N, Aghajani S. [The mediating role of emotion regulation strategies in the relationship between emotional abuse and self-harm behaviors in adolescents: A cross-sectional study (Persian)]. Journal of Guilan University of Medical Sciences. 2022; 31(2):124-35 [DOI:10.32598/JGUMS.31.2.1892.1]

[10] Ghamari Givi H, Azimi D, Mastanabadi S. [Comparison of Communication patterns, self-efficacy and assertiveness at teenage girls with self-mutilation and normal group (Persian)]. Women's Studies Sociological and Psychological. 2021; 19(3):185-212. [DOI:10.22051/jwsps.2021.34078.2334]

[11] Moon H, Nam G, Hur JW. Neural correlates of affective theory of mind in medication-free nonsuicidal self-injury: An fMRI study. Frontiers in Psychiatry. 2022; 13:850794. [DOI:10.3389/fpsyt.2022.850794] [PMID] [PMCID]

[12] Fateminia M, Hasani F, Borjali A, Golshani F. [The mediating role of emotional intelligence in explaining the causal relations between theory of mind and cognitive flexibility with borderline personality disorder traits in adolescents (Persian)]. Quarterly Journal of Psychological Methods and Models Winter. 2023; 13(50):135-50. [DOI:10.30495/jpmm.2023.31089.3719]

[13] Dehqan A, Salehi M. [Differences of the theory of mind (TOM) in children who stutter (Persian)]. Jundishapur Scientific Medical Journal. 2019; 18(1):31-9. [DOI:10.22118/jsmj.2019.174614.1613]

[14] Alkire D, McNaughton KA, Yarger HA, Shariq D, Redcay E. Theory of mind in naturalistic conversations between autistic and typically developing children and adolescents. Autism. 2023; 27(2):472-88. [DOI:10.1177/13623613221103699] [PMID] [PMCID]

[15] Royka A, Santos LR. Theory of mind in the wild. Current Opinion in Behavioral Sciences. 2022; 45:101137. [DOI:10.1016/j.cobeha.2022.101137]

[16] Shareh H, Hashemi T. [Comparing theory of mind and emotion recognition in children and adolescents with autism spectrum disorder and attention deficit hyperactivity disorder (Persian)]. Journal of Fundamentals of Mental Health. 2020; 22(2):129-38. [DOI:10.22038/jfmh.2020.16159]

[17] Laghi F, Terrinoni A, Cerutti R, Fantini F, Galosi S, Ferrara M, et al. Theory of mind in non-suicidal self-injury (NSSI) adolescents. Consciousness and Cognition. 2016; 43:38-47. [DOI:10.1016/j.concog.2016.05.004] [PMID]

[18] Maneshi Azghandi A, Pashang S, Khodaverdian S. Predicting perceived social support based on perceived stress and cognitive emotion regulation in patients with ulcerative colitis. Iranian Journal of Health Psychology. 2022; 5(1):39-48 [DOI:10.30473/ijohp.2022.55667.1138]

[19] Yari S, Noruzi A. [Emotions and emotion theories in information retrieval: Roles and applications (Persian)]. Library and Information Science Research Journal. 2021; 10(2):297-320. [DOI:10.22067/infosci.2021.23913.0]

[20] Behzadi H, Sanatjoo A, Fattahi R, Salehi Fadardi J. [Survey the role of emotions in information retrieval (Persian)]. Journal of Information Processing and Management. 2016; 31(2):531. [DOI:10.35050/JIPM010.2016.045]

[21] In-Albon T, Bürli M, Ruf C, Schmid M. Non-suicidal self-injury and emotion regulation: A review on facial emotion recognition and facial mimicry. Child and Adolescent Psychiatry and Mental Health. 2013; 7(1):5. [DOI:10.1186/1753-2000-7-5] [PMID] [PMCID]

[22] Taajobi M, Moradi O. [Comparing metacognition beliefs and emotional regulation and Smoking among adolescents ordinary in City of Sanandaj (Persian)]. Shenakht Journal of Psychology and Psychiatry. 2016; 3(3):40-8. [Link]

[23] Bahreini N, Aghaei A. [Comparison of emotional regulation and self-awareness between normal and delinquent adolescents (Persian)]. Thoughts and Behavior in Clinical Psychology. 2019; 14(52):57-66. [Link]

[24] Alijani F, Ranjbarkohan Z. [The effectiveness of compassion focused therapy on negative automatic thoughts and dysfunctional attitudes of patients with major depression disorder (Persian)]. Clinical Psychology Studies. 2022; 13(47):1-36. [DOI:10.22054/jcps.2022.64972.2674]

[25] Okhovati F, Shokri O, Khodaei A. [The effect of psychological resilience education program on negative automatic thoughts and cognitive coping strategies (Persian)]. Clinical Psychology & Personality. 2023; 20(2):121-33. [DOI:10.22070/cpap.2022.16373.1239]

[26] Javadian Qomi N, Sharifi T, Mashhadi Zadeh S, Ahmadi R. [Effectiveness of mindfulness-based stress reduction on negative automatic thoughts of female students with difficulty in emotional regulation (Persian)]. Empowering Exceptional Children. 2022;13(2):106-96. [DOI:10.22034/ceciranj.2022.342967.1662]

[27] Flouri E, Panourgia C. Negative automatic thoughts and emotional and behavioural problems in adolescence. Child and Adolescent Mental Health. 2014; 19(1):46-51. [DOI:10.1111/camh.12004] [PMID]

[28] Webb CA, Tierney AO, Brown HA, Forbes EE, Pizzagalli DA, Ren B. Spontaneous thought characteristics are differentially related to heightened negative affect vs. blunted positive affect in adolescents: An experience sampling study. JCPP Advances. 2022; 2(4):e12110. [DOI:10.1002/jcv2.12110] [PMID] [PMCID]

[29] Amirinejad A, Ghodsi M, Jamshidzadeh F, Mohammadian F. [The effect of negative mood control skill training on suicidal thoughts, anxiety and depression in female students of the first secondary school in Ilam city (Persian)]. Journal of Ilam University of Medical Sciences. 2019; 6(27):88-95. [DOI:10.29252/sjimu.27.6.88]

[30] Mohammadhossein Hajivar A, Shiralinia K, Abbaspour Z. [The role of victimization by peers and School connectedness in predicting suicidal thoughts of Adolescent girls (Persian)]. Iranian Journal of Psychiatric Nursing. 2023; 11(2):64-73. [DOI:10.22034/IJPN.11.2.64]

[31] Kang H. Sample size determination and power analysis using the G*Power software. Journal of Educational Evaluation for Health Professions. 2021; 18:17. [DOI:10.3352/jeehp.2021.18.17] [PMID] [PMCID]

[32] Muris P, Steerneman P, Meesters C, Merckelbach H, Horselenberg R, van den Hogen T, et al. The TOM test: A new instrument for assessing theory of mind in normal children and children with pervasive developmental disorders. Journal of Autism and Developmental Disorders. 1999; 29(1):67-80. [DOI:10.1023/A:1025922717020] [PMID]

[33] Aliakbari M, Kakojuibari AA, Amirabadi F, Shaghaghi F, Zare N, Khaleghi F. [The role of theory of mind and executive function in predicting empathy (Persian)]. Advances in Cognitive Science. 2013; 15(2):1-10. [Link]

[34] Ghamarani A, Alborzi SH, Khayer M. [Validity and reliability of the theory of mind test (TOM test) for use in Iran (Persian)]. Journal of Psychology. 2006; 10(2):181-99. [Link]

[35] O'Sullivan M, Ekman P, Geher G. Facial expression recognition and emotional intelligence. Face Recognition. 2008; 25-40. [Link]

[36] Dodich A, Cerami C, Canessa N, Crespi C, Marcone A, Arpone M, et al. Emotion recognition from facial expressions: A normative study of the Ekman 60-Faces Test in the Italian population. Neurological Sciences. 2014; 35(7):1015-21. [DOI:10.1007/s10072-014-1631-x] [PMID]

[37] Malmir M, Seifenaraghi M, Farhud DD, Afrooz GA, Khanahmadi M. Mother's happiness with cognitive-executive functions and facial emotional recognition in school children with down syndrome. Iranian Journal of Public Health. 2015; 44(5):646. [Link]

[38] Beck AT, Kovacs M, Weissman A. Assessment of suicidal intention: The scale for suicide ideation. Journal of Consulting and Clinical Psychology. 1979; 47(2):343-52. [DOI:10.1037/0022-006X.47.2.343] [PMID]

[39] Esfahani M, Hashemi Y, Alavi K. Psychometric assessment of beck scale for suicidal ideation (BSSI) in general population in Tehran. Medical Journal of the Islamic Republic of Iran. 2015; 29:268. [PMID]

[40] Hatkevich C, Venta A, Sharp C. Theory of mind and suicide ideation and attempt in adolescent inpatients.Journal of Affective Disorders. 2019; 256:17-25. [DOI:10.1016/j.jad.2019.05.051] [PMID]

[41] Nestor BA, Sutherland S. Theory of mind and suicidality: A meta-analysis. Archives of Suicide Research. 2022; 26(4):1666-87. [DOI:10.1080/13811118.2021.1939209] [PMID] [PMCID]

[42] Saadat SH, Mousavi SE, Ahmadi G, Ebrahimi LS, Siahi A, Zandifar H. [The role of emotion regulation strategies in emotional disorders of soldiers with history of self-harm attempts (suicidal and non-suicidal) (Persian)]. Journal of Military Medicine. 2020; 22(1):64-73. [DOI: 10.30491/JMM.22.1.54]

[43] Ahmadi Marvili N, Mirzahoseini H, Monirpoor N. [The prediction model of self-harm behaviors and tendency to suicide in adolescence based on attachment styles and personality organization: Mediating role of cognitive emotion regulation strategies (Persian)]. Journal of Applied Psychological Research. 2019; 10(3):101-17. [DOI:10.22059/japr.2019.274866.643162]

[44] Koenig J, Lischke A, Bardtke K, Heinze AL, Kröller F, Pahnke R, Kaess M. Altered psychobiological reactivity but no impairment of emotion recognition following stress in adolescents with non-suicidal self-injury. European archives of psychiatry and clinical neuroscience. 2023;273(2):379-95. [DOI:10.1007/s00406-022-01496-4] [PMID] [PMCID]

[45] Stewart JG, Esposito EC, Glenn CR, Gilman SE, Pridgen B, Gold J, et al. Adolescent self-injurers: Comparing non-ideators, suicide ideators, and suicide attempters. Journal of Psychiatric Research. 2017; 84:105-12. [DOI:10.1016/j.jpsychires.2016.09.031] [PMID] [PMCID]

[46] Horváth LO, Győri D, Komáromy D, Mészáros G, Szentiványi D, Balázs J. Nonsuicidal self-injury and suicide: The role of life events in clinical and non-clinical populations of adolescents. Frontiers in Psychiatry. 2020; 11:370. [DOI:10.3389/fpsyt.2020.00370] [PMID] [PMCID]

[47] Sohn MN, Dimitropoulos G, Ramirez A, McPherson C, Anderson A, Munir A, et al. Non-suicidal self-injury, suicidal thoughts and behaviors in individuals with an eating disorder relative to healthy and psychiatric controls: A systematic review and meta-analysis. The International Journal of Eating Disorders. 2023; 56(3):501-15. [DOI:10.1002/eat.23880] [PMID]