



Assessment of suicide probability and related factors in male incarcerated adolescents; a sample of reformatory center in Turkey

Serdar Karatoprak^{a,*}, Nusret Ayaz^b, Yunus Emre Dönmez^c, Mustafa Dogan^d

^a Department of Child and Adolescent Psychiatry, Konya City Hospital, Konya, Turkey

^b Department of Forensic Medicine, Niğde Training and Research Hospital, Niğde, Turkey

^c Department of Child and Adolescent Psychiatry, School of Medicine, Inonu University, Malatya, Turkey

^d Omer Halisdemir University Faculty of Medicine, Department of Forensic Medicine, Niğde, Turkey

ARTICLE INFO

Keywords:

Suicidal behaviors
Risk factors
Incarcerated
Juvenile detention
Adolescents

ABSTRACT

Objective: Suicidal behavior in adolescents is an important public health problem, and it ranks first among the causes of prison deaths in incarcerated adolescents(IAs). The aim of this study is to determine the probability of suicide and associated risk factors in IAs.

Method: Seventy-one male adolescents in a reformatory center were contrasted with a matched group of 71 male adolescent with no psychiatric disorder and no criminal record. Suicidal probability and psychiatric symptomatology were assessed with the Suicide Probability Scale, SA-45 Questionnaire, respectively.

Results: It was determined that the probability of suicide was higher in IAs, and depression and hostility symptoms, the presence of another individual involved in delinquency in family had predictive effects. It was also found that there was a positive correlation between the probability of suicide and the number of delinquencies, the number of incarceration, and a negative correlation between attending to school or work while in reformatory and being visited by relatives while in reformatory.

Conclusions: The results suggest that when assessing suicide risk for IAs, it may be useful to pay attention to those with symptoms of depression or hostility, those with multiple delinquencies or entrance to reformatory, and those who have family members involved in delinquency.

1. Introduction

Suicide is a self-injurious behavior in order to take one's own life and is a serious public health problem (Stone et al., 2017). Center for Disease Control and Prevention reported that suicide rate among persons aged 10–24 was statistically increased 57.4% between 2007 and 2018 (Sally C. Curtin, 2020), with the death rate for suicide between the ages of 10 and 19 increasing 56% between 2007 and 2016 (Curtin, Heron, Miniño, & Warner, 2018). Suicide was the second leading cause of death in girls aged 15–19 and the third leading cause of death in boys (World Health Organization, 2019). Suicide is also an important problem among incarcerated adolescents. It has been reported that the rates of suicide among incarcerated adolescents are 2 to 4 times higher than the general adolescent population rates (Abram et al., 2008). Also, mortality rates due to suicide, and use of violent methods are higher in incarcerated adolescents (Penn, Esposito, Schaeffer, Fritz, & Spirito, 2003). Completed suicide rates in detained adolescents were reported to be 4.6

times higher than the general adolescent population (Sanislow, Grilo, Fehon, Axelrod, & McGlashan, 2003). In another study conducted by Fazel, Benning, and Danesh (2005), suicide-related mortality rates were found 5 times higher in adult male prisoners than in the general population, while this rate was 18 times higher in male prisoners aged 15–17 years.

In studies, several heritable, psychosocial, demographic and biological factors have been identified for suicidal behavior (Turecki & Brent, 2016). Heritability is estimated to be about 17.4% for suicidal attempt and about 36% for suicidal ideation (Fu et al., 2002). This result shows that other factors are more prominent than hereditary factors in suicidal behavior. One of the most important predictors of suicidal behavior is having attempted suicide in the past, and another is the presence of psychopathology in individual (Arsenault-Lapierre, Kim, & Turecki, 2004; Hoertel et al., 2015). It is the depressive episodes, associated with either major depressive disorder or bipolar disorder, that has the strongest relationship with suicidal behavior among psychiatric

* Corresponding author at: Department of Child and Adolescent Psychiatry, Konya City Hospital, Konya /Turkey, Akabe, 42020 Karatay, Konya, Turkey.
E-mail address: srdkrtrprk@hotmail.com (S. Karatoprak).

<https://doi.org/10.1016/j.ijlp.2021.101731>

Received 28 February 2021; Received in revised form 24 June 2021; Accepted 27 July 2021

Available online 1 September 2021

0160-2527/© 2021 Elsevier Ltd. All rights reserved.

disorders (Holma et al., 2014). Other disorders associated with suicidal behavior include psychotic disorders, alcohol and substance abuse, personality disorders, particularly cluster B personality disorders, conduct disorders and eating disorders (Turecki & Brent, 2016). Impulsive aggression, behavioral disorder, antisocial behavior, and alcohol and substance abuse are important risk factors for suicidal behavior in adolescents (Brent, Baugher, Bridge, Chen, & Chiappetta, 1999).

The final result of any psychiatric disorder does not result in suicidal behavior, and certain demographic characteristics are also associated with suicide. A well-defined another risk factor is exposure to negative life events such as parental neglect and childhood physical, sexual, or emotional abuse (Turecki & Brent, 2016). In addition, important social and economic factors associated with suicide include job loss, economic turmoil, having a low income, being in debt, being bullied, having poor family connectedness, being single, and stringent sociocultural norms (Turecki et al., 2019). The vast majority of adolescent suicide and suicide attempts in the world occur in low and middle income countries (World Health Organization, 2019). Exposure to sexual abuse in childhood, depression, social impairment, impulsivity, instability, trauma and not residing with at least one biological parent were identified as risk factors for suicidal behavior in prisoners (Sanislow et al., 2003; Stokes, McCoy, Abram, Byck, & Teplin, 2015).

Suicidal attempts and behaviors are of great concern for clinicians dealing with patients with mental health problems (Carballo et al., 2020). The perpetuation of these behaviors by juvenile detainees is a major concern for both clinicians and prison staff, as suicide has been shown to be the leading cause of adolescent deaths in juvenile detention centers (Gallagher & Dobrin, 2006a, 2006b). Therefore, determining suicide risk factors is of great importance, and more studies are needed to develop specific procedures and methods to prevent suicide in the incarcerated adolescent population. The vast majority of previous studies on adolescents were conducted with only incarcerated participants, and the number of studies involving non-delinquent control group is limited (Matsumoto et al., 2009; Sanislow et al., 2003). This study was conducted with incarcerated adolescents, and controls consisted of adolescents with no previous psychiatric disorder and no criminal record. In this study, we aimed to investigate the probability of suicide and the factors affecting the probability of suicide in incarcerated male adolescents (IAs).

2. Method

2.1. Participants

This study was conducted with 71 incarcerated male adolescents aged 12–18 in a juvenile reformatory center and 71 healthy male adolescents who do not have any psychiatric disorder and criminal record in the same age range. Seventy-one subjects, who were sentenced as a result of the trial between the ages of 12 and 18 and whose sentences were approved, were evaluated in the juvenile reformatory center where they were staying. Adolescents were incarcerated in the reformatory centers for a variety of delinquencies including theft, illegal drug sale, extortion, offenses against sexual immunity, murder, wounding. The data of the research were collected between November 2019–February 2020 in accordance with the written permission of the Ministry of Justice General Directorate of Prisons and Detention Houses. The study, approved by the Nigde Omer Halisdemir University Clinical Researches Ethics Committee (Date and report number: 2019/35–19), conducted its research following the principles of the Helsinki Declaration.

An informed consent form was given to the participants prior to the study. All participants who volunteered to participate in the study answered the sociodemographic data form, the suicide probability scale, and the symptom assessment-45 questionnaire scale. Time required to complete the scales was 20 to 30 min. Participants filled out these forms under the supervision of a researcher. The scales used in the study were

filled in by the detainees themselves, but the scales of those who had reading and vision difficulties or wanted help, and the prisoner's answers were recorded by the researcher. The researcher verbally stated to the participants that a diagnosis and a prescription must be made by the physician in order to answer "yes" to the questions in the Sociodemographic Form whether they have psychological and physical problems and whether they use drugs regularly.

In Turkey, juvenile offenders for whom a court order has been issued for detention, but whose trial has not yet been completed, are first placed in closed prisons. Juvenile offenders whose trial process is completed and punished are transferred from closed prisons to reformatory centers for the execution of their sentences. There are no obstacles to escape in these institutions. Adolescents staying in these centers can go to school or work during the day if they continue their education or attend vocational courses. Adolescents who receive disciplinary punishment in the reformatory center and escape from the reformatory center are transferred to closed penal institutions. This study was conducted with adolescents staying in a reformatory center.

2.2. Sociodemographic form

Two separate sociodemographic forms were designed by the authors for the control group and the incarcerated adolescents. Both forms included questions regarding age, family structure, family income, psychiatric disorder in parents, educational status of parents, and whether there are other convicts in the family. In addition, the form prepared for IAs included questions regarding the type of the delinquency, the age at delinquency date, the number of delinquencies, the number of entrance to reformatory center, the time spent in reformatory, the remaining duration of sentence, whether he participated in activities in reformatory, whether he went to school or to work during in reformatory. Family income status was evaluated at three levels. The income level below the gross minimum wage was defined as low, between the gross minimum wage and twice the gross minimum wage was defined as medium, and over twice the gross minimum wage was defined as high. When this form was prepared for the first time, the participants were asked questions about whether they had attempted suicide before, if so, how many times they attempted suicide, and what methods were used. Facility concerns prevented asking these questions.

2.3. Suicide Probability Scale (SPS)

Suicide Probability Scale (SOS) is a 36-item likert-type self-report scale developed by Cull and Gill to assess suicide risk in adolescents and adults (Cull & Gill, 1989). The scale consists of four subscales: hopelessness, suicidal ideation, negative self-assessment, and hostility. The highest score that can be obtained from the scale is 144 and the lowest score is 36. Suicide probability is considered to be high in individuals who score high on the scale. The internal consistency coefficient of SPS, whose reliability and validity study was carried out by Tugcu, was 0.87, and the test-retest reliability was determined as 0.98 (Batigun & Sahin, 2018).

2.4. Symptom Assessment-45 Questionnaire (SA-45)

It is a scale consisting of 45 questions and 9 subscales developed to meet the need for a brief but comprehensive general psychiatric symptomatology screening. The Turkish adaptation and standardization studies of the test, which was originally SCL-90 (Symptom Check List), were carried out by Epözdemir in 2009 (Epözdemir, 2009). 9 subscales are Anxiety, Hostility, Obsessive-Compulsive behavior, Phobic Anxiety, Somatization, Depression, Interpersonal Sensitivity, Paranoia, and Psychoticism. The validity and reliability of the scale in adolescents was conducted by Avcu, and internal consistency was found as 0.92 for the total scale and a range of 0.55 to 0.78 for the subscale (Avcu, 2006).

2.5. Statistical analysis

The statistical analyses were conducted using the SPSS version 22.0 for Windows software package. The categorical variables of the participants and numerical data were presented using number and percentage values. Chi-square test was used to compare categorical variables, and the Kolmogorov–Smirnov test was used to evaluate the normality of the data distributions. Independent sample *t*-test was used for comparisons between two groups for variables with normal distribution among continuous variables. To determine the independent contribution of sociodemographic characteristics and psychiatric symptomatology to SPS total score, we performed linear regression analyses to predict the probability of suicide. Pearson's correlation analysis was performed to investigate the relationship between SPS total score and facility conditions and criminological factors in IAs. A value of $p < 0.05$ (two-tailed) was considered to indicate significance.

3. Results

The mean age of the IAs was 17.14 ± 0.85 years and of the control group was 17.04 ± 0.69 years ($Z = -1.277$, $p = 0.445$). It was determined that 62% (n:44) of the mothers of the IAs and 43% (n:31) of their fathers were illiterate, while in the control group, these rates were 14% (n:10) and 0% (n:0), respectively. The family structure in which 83% (n:59) of the IAs and 89% (n:63) of the control group lived was in the form of nuclear families. The families of the majority of the IAs (n:57) had a low socioeconomic level, and the families of the majority of the control group (n: 59) had a medium-high socioeconomic level. In addition, 22% (n:16) of the IAs were found to have another member of the family who involved in a delinquency. The demographic variable of participants were given in Table 1.

It was determined that 56% of the IAs (n:40) had more than one

Table 1
Demographic characteristics incarcerated adolescents vs. control group.

Demographic characteristics		IAs (n = 71)	Control (n = 71)	p
Age: mean (sd)		17.14 (0.85)	17.04 (0.69)	0.075
		n(%)	n(%)	
Living area	Rural	29 (40.8)	34 (47.9)	0.398
	Urban	42 (59.2)	37 (52.1)	
Literacy of the mother	Illiterate	44 (62.0)	10 (14.1)	≤ 0.001
	primary school	19 (26.8)	17 (23.9)	
	middle school	8 (11.3)	18 (25.4)	
	high school	0 (0)	12 (16.9)	
Literacy of the father	University	0 (0)	14 (19.7)	≤ 0.001
	Illiterate	31 (43.7)	0 (0)	
	primary school	18 (29.6)	21 (25.4)	
	middle school	9 (12.7)	7 (9.9)	
Psychiatric disorder in parents	high school	9 (12.7)	32 (45.1)	0.079
	University	1 (1.4)	14 (19.7)	
	Yes	10 (85.9)	4 (5.6)	
	No	61 (14.1)	67 (94.4)	
Partnership status of parents	Parents together	50 (70.4)	57 (80.3)	0.338
	Divorced	14 (19.7)	8 (11.3)	
	One of the parents dead	7 (9.9)	6 (8.5)	
Family type	Nuclear	59 (83.1)	63 (88.7)	0.335
	Extended	12 (16.9)	8 (11.3)	
Socioeconomic status	Low	57 (82.6)	12 (16.9)	≤ 0.001
	Middle	12 (16.9)	32 (45.1)	
	High	2 (2.8)	27 (38.0)	
Delinquency committed by another family member	Yes	16 (22)	2 (2.8)	≤ 0.001
	No	55 (78)	69 (97.2)	

criminal record. Sixty-three (88%) of the IAs were found to be in detention centers for three years or less. In addition, 43 (60%) of the IAs were determined that the remaining sentence period was less than 3 years. While 38 (53.5%) adolescents entered prison for the first time, 33 (46.5%) adolescents were incarcerated more than once. It was determined that 67.6% (n:48) of the IAs attended the activities held in reformatory, and 35.2% (n:25) went to school or work. In addition, it was found that 34 (83%) IAs were visited by their relatives while they were in reformatory. The criminological characteristics of IAs were showed in Table 2.

Table 3 showed the mean scores and standard deviations of the total scores and subscales of the SA-45 and SPS of the incarcerated adolescents and the control group. SA-45 global symptom index and all scores of subscales of SA-45 were found to be higher in IAs compared to the control group. These differences between the groups were found to be statistically significant except Obsessive-Compulsive behavior subscale. Similarly, the mean scores of the total score and subscales of the SPS were also found to be higher in IAs. These differences between the groups were found to be statistically significant except negative self-evaluation subscale score.

To determine whether potential predictors of suicide probability risk were for IAs, separate linear regression analysis was carried out. The total score of SPS was the dependent variable, and the primary independent variables were sociodemographic characteristics including parents' education status, socioeconomic level, having another member of the family who committed a delinquency. Among sociodemographic characteristics, the presence of another individuals involved in delinquency in the family was determined as potential predictor for the probability of suicide in IAs (95.0% CI: 0.40–14.72, $p = 0.039$) (Table 4). Then, a separate linear regression analysis was performed, to determine the psychological symptoms predicting the probability of suicide. Depression (95.0% CI: 0.52–1.58, $p < 0.001$) and hostility (95.0% CI: 0.46–1.31, $p < 0.001$) was determined as potential predictors for the probability of suicide in IAs (Table 5).

In order to examine the relationship between the SPS total score and facility conditions (participation in activities organized in reformatory, attending to school or work and being visited by their relatives) and criminological factors (age at the time of the delinquency, the time spent in reformatory, the remaining period of sentence, number of delinquencies, the number of entrance to reformatory), the correlation analysis performed only with IAs group revealed that there was a positive correlation with the number of delinquencies ($r:0.34$, $p = 0.004$), the number of entrance to reformatory ($r:0.32$, $p = 0.006$), and a

Table 2
Criminological characteristics of incarcerated adolescents.

Criminological characteristics		IAs (n = 71)	
Age at the time of the delinquency: mean (sd)		14.10 (1.38)	
		n	(%)
Number of delinquency	One time	30	42.3
	More than once	40	56.3
Time spent in reformatory	<12 months	32	45.1
	1–3 years	31	43.7
	3–5 years	7	9.9
Sentence time remaining	≥ 5 years	1	1.4
	<12 months	27	38.0
	1–3 years	16	22.5
	3–5 years	12	16.9
Number of entrances to facility	≥ 5 years	12	16.9
	One	38	53.5
	More than once	33	46.5
Participation in activities	Yes	48	67.6
	No	21	29.6
Visited by relatives	Yes	34	83.1
	No	37	16.9
Attending to school or work	Yes	25	35.2
	No	46	64.8

Table 3
Differences in scales and subscales of SPS and Symptom Assessment-45 Questionnaire in incarcerated adolescents group vs. control group.

Scales		IAs	Control	F	p
		Mean (SD)	Mean (SD)		
Suicide Probability Scale	Hostility	14.60 (4.74)	12.46 (3.95)	2.549	0.004
	Negative self-assessment	19.52 (5.15)	17.97 (4.75)	0.629	0.065
	Suicidal ideation	18.56 (4.65)	14.98 (4.12)	0.769	0.000
	Hopelessness	29.08 (6.00)	26.73 (5.30)	0.393	0.015
	Total	81.77 (14.20)	72.07 (13.13)	0.443	0.000
Symptom Assessment-45 Questionnaire	Somatization	11.92 (5.22)	8.94 (4.57)	2.362	0.005
	Obsessive-Compulsive behavior	13.45 (4.56)	12.01 (4.32)	0.381	0.056
	Interpersonal Sensitivity	12.91 (4.78)	9.84 (4.37)	0.415	0.000
	Depression	13.88 (4.80)	11.57 (4.82)	0.272	0.005
	Anxiety	11.92 (5.35)	8.91 (4.13)	8.382	0.000
	Hostility	12.40 (5.62)	9.77 (4.90)	3.976	0.003
	Phobic Anxiety	9.47 (4.45)	6.40 (2.15)	34.442	0.000
	Paranoia	13.30 (4.59)	11.05 (4.40)	0.013	0.003
	Psychoticism	11.30 (4.45)	8.29 (3.31)	6.852	0.000
	General Symptom Index	110.6 (35.48)	86.83 (28.66)	6.039	0.000

Table 4
Linear regression model predicting suicidal probability by sociodemographic characteristics.

Variable	B	95.0% CI	p
Groups 0: control, 1: incarcerated adolescents	6424	0.25–12.59	0.041
Mothers' education status →0:illiterate 4:university	0.953	−0.77 - 2.67	0.276
Fathers' education status →0:illiterate 4:university	−1.089	−2.56–0.39	0.148
Family income →0:low 2: high	−0.789	−3.54–1.96	0.572
Have another member of the family who committed a delinquency 0: no, 1: yes	7.564	0.40–14.72	0.039

95.0% CI: 95.0% confidence interval (lower - upper).

Bold indicate p<0.05.

Table 5
Linear regression model predicting suicidal probability by Symptom Assessment-45 Questionnaire subscales.

Variables	B	95.0% CI	P
Depression	1.11	0.52–1.58	≤0.001
Anxiety	0.86	−1.01 - 0.33	0.317
Psychoticism	0.65	−0.65 - 0.54	0.858
Phobic Anxiety	0.17	−0.48–0.79	0.630
Hostility	0.99	0.46–1.31	≤0.001
Somatization	3.52	−0.69–0.42	0.627
Paranoia	−0.66	−0.3–1.19	0.063
Interpersonal Sensitivity	1.01	−0.31–1.03	0.289

95.0% CI: 95.0% confidence interval (lower - upper).

Bold indicate p<0.05.

negative correlation with attending to school or work ($r:-0.27, p = 0.021$) and being visited by their relatives ($r:-0.26, p = 0.027$). No correlation could be found between the age at the time of the delinquency, the time spent in reformatory, the remaining period of sentence, participation in the activities organized in prison, and the probability of suicide.

4. Discussion

The aim of this study was to evaluate the probability of suicide, and to determine potential predictors of suicide probability among socio-demographic factors, conditions of the recovery center, and psychiatric symptoms in incarcerated male adolescents. The results showed that the probability of suicide was higher in IAs than control group. The risk factors that increase the probability of suicide in IAs were the presence of another individuals involved in delinquency in the family, the high number of entrances to reformatory center, the high number of delinquencies, have high level of depression, hostility symptoms. In addition, it was determined that attending to work or school while stay in reformatory center and being visited by relatives while in reformatory center were the factors that decrease the probability of suicide.

Suicide behaviors have been found to be an increasing problem in adolescent population (Sally C. Curtin, 2020, curtin2018). Similarly, these behaviors are also important for prisoner population in custody, and there is even more risk in the prisoner population, especially incarcerated adolescent, than general population (Fazel et al., 2005; Sanislow et al., 2003). In their study conducted with 1801 adolescents in 39 detention facilities, Morris et al. determined that 22% of adolescents seriously thought about committing suicide, 20% planned to commit suicide, 16% attempted suicide, and 8% were injured during suicide attempts (Morris et al., 1995). Esposito et al.'s study conducted with 200 incarcerated adolescents showed that 52% of incarcerated adolescents had suicidal ideas in the last one month and 54% of them had moderate to severe suicidal ideas (Esposito & Clum, 2002). In two separate studies evaluating suicide ideas in incarcerated adolescents in the last 6 months, suicidal ideas were found in 25% and 36% of the incarcerated adolescents, respectively (Goldstein et al., 2003; Sedlak & McPherson, 2010). In current study, it could not questioned whether the participants had suicidal ideas and attempts, but as a result of the evaluation made with the SPS, it was found that the probability of suicide in IAs was higher than control group in accordance with the literature.

Studies investigating the relationship between psychiatric disorders and suicide have shown that psychiatric disorders, especially depression, have a predictive effect on suicidal behavior. (Arsenault-Lapierre et al., 2004; Hoertel et al., 2015). In a meta-analysis study conducted by Arsenault-Lapierre et al. (2004), it was determined that 87.3% of the subjects who died as a result of suicide attempt had a mental disorder, and most of those had affective, substance-related, personality and psychotic disorders. Similarly, previous studies have shown that psychiatric disorders, especially depression, have a predictive effect on suicide ideas and attempts in incarcerated adolescents (Stokes et al., 2015). In current study, the probability of suicide was evaluated with SPS, which was found to significantly predict suicidal behavior in previous studies with adolescents (Huth-Bocks, Kerr, Ivey, Kramer, & King, 2007; Larzelere, Smith, Batenhorst, & Kelly, 1996). In accordance with the literature, one of the results obtained from this study was that SPS scores were higher in IAs with depressive symptoms. This result supports the evidence that depression has a predictive effect on suicide in IAs. Other psychiatric symptom found in relation to suicide probability in IAs in this study was hostility. In previous studies in the literature, it has been shown that hostility is related to suicidal thoughts and attempts (Miotto et al., 2003; Simonds, McMahon, & Armstrong, 1991). Simonds et al. (1991), in their study with 518 adolescents and young adults with serious suicide attempts, found that these individuals showed higher hostility. Similarly, in a study with 61 self-harmed patients, it was found that the hostility scores of the patients who harmed themselves were

significantly higher (Brittlebank et al., 1990). It is believed that people with intense feelings of hostility direct their aggressiveness and anger towards their-selves by causing physical harm to themselves (Görgülü & Tutarel-Kişlak, 2014). These results show that it is important to refer IAs with depressive symptoms and hostility to the child psychiatry clinic in order to prevent possible suicide attempts.

Another factor affecting suicidal behavior is demographic characteristics. In many studies conducted both in the general population and in adolescents and young people living in correctional institutions, it has been determined that there is a gender difference in the frequency of suicidal behavior, and the frequency of current and lifetime suicidal behavior is higher in girls (Stokes et al., 2015). However, the effect of gender on the probability of suicide could not be evaluated, as only incarcerated male adolescents were included in this study. In this study, statistically significant difference was found between the groups in terms of sociodemographic characteristics such as parental education status, family income, and having another individual involved in delinquency in the family, and as a result of the linear regression analysis, it was found that the presence of another individual involved in delinquency in the family of IAs was a potential predictor for suicide probability. There are several common factors in the etiology of both delinquency and suicidal behavior, including psychiatric disorders, personality traits (i.e. impulsivity), having poor coping strategies, and the presence of other individuals who commit these behaviors in the individual's environment (Bobbio, Arbach, & Redondo Illescas, 2020; Hasking, 2007; Kim & Kim, 2008; Thompson, Ho, & Kingree, 2007). The presence of other individuals involved in delinquencies in the families of IAs may be an indication of the familial loading in terms of these negative factors leading to delinquency and suicide. In addition, within the framework of social learning theory, if family members use suicidal behavior as a coping strategy to problems, children and adolescents may learn to use this method against problems. For this reason, it is important to find out whether there is another individual with suicidal behavior or involved in delinquency in the family of IAs.

Stressful life events are another important factor in suicidal behaviors (Kim & Kim, 2008). Undoubtedly, prison life is one of the most stressful experiences, and some prison conditions can also be a risk factor for suicide attempt (Görgülü & Tutarel-Kişlak, 2014). Leese et al., stated that overcrowding and assaults from other prisoners were risk factors for suicidal death in prison, while having purposeful work and activity was a protective factor (Leese, Thomas, & Snow, 2006). Other criminological factors determined in terms of suicidal ideation and attempted suicide in detainees were including the time spent in prison, the remaining period of sentence, isolation, receiving disciplinary punishment, the type of delinquency, the first time entering to prison (Rabe, 2012). In this study, it was found that there was a positive correlation between the probability of suicide and committing more than one delinquency and repeated incarceration. Wasserman et al. found in their study that repetitive delinquencies were a risk factor in terms of suicidal ideation and attempts (Wasserman, McReynolds, Schwalbe, Keating, & Jones, 2010). In prospective studies, suicide was found to be more in individuals with delinquent behavior (Björkenstam, Björkenstam, Vinnerljung, Hallqvist, & Ljung, 2011; Thompson et al., 2007). It is not unexpected that the risk of suicide is higher in those with repetitive criminal behavior. In terms of both criminal behavior and suicidal behavior, the presence of individuals who do these behaviors in the person's environment is a risk factor (Bobbio et al., 2020; Kim & Kim, 2008). The incarceration of an individual more than once and committing delinquency more than once increases the likelihood of the individual being with the criminals. This research was carried out with adolescents staying in a reformatory center where juvenile delinquents can go to school or work, which is not possible in a closed prison. Closed prison conditions could not be evaluated in this study. The conditions of closed prisons are more difficult and have more limitations compared to reformatory centers. In these prisons, there are juvenile delinquents who receive disciplinary punishment in reformatory centers, and juvenile

delinquents whose first arrest decision is made by the court but whose trial process is not completed. It has been determined that the risk of suicide is higher in the first 24–48 h of arrest. However, this condition could not be evaluated in this study. Behavioral disorders and impulsivity may be more common in adolescents who receive disciplinary punishment, and the risk of suicide may be higher in these adolescents. The risk of suicide may be higher in juvenile delinquents who remain in closed prisons due to the high number of individuals with negative characteristics around the adolescent. It was found that there was a negative correlation between attending to work or school while in the reformatory and being visited by relatives while in the reformatory. In their study, Stokes et al. (2015) found that suicidal ideas and behaviors were higher in prisoners who had less social support and were less close to their relatives. Therefore, it is important to follow adolescents who have committed delinquencies more than once and who have been entered to prison more than once in terms of suicide. In addition, it seems that increasing purposeful actions such as school or work (or other purposeful actions more suitable for closed prisons), and opportunities for visiting by relatives in detention centers will contribute to the decrease of suicidal ideas and attempts in IAs.

4.1. Limitations

Although current study is one of a limited number of studies investigating the possibility of suicide in IAs, it has some limitations. Firstly, the study was conducted in a single reformatory center consisting of only male participants, and due to the relatively small sample size of the research population, its generalizability to other juvenile correctional facilities was limited. Secondly, this study limited our ability to predict future suicidal behavior because of its cross-sectional design. Moreover, this cross-sectional design also prevented determining causal relationships. Another limitation was that scale was used to detect psychiatric symptoms. Another limitation was the inability to determine whether or not the incarcerated adolescents had past suicidal ideas and behaviors.

5. Conclusion

In conclusion, this study showed that suicide probability and psychiatric symptoms were statistically significantly higher in IAs compared to healthy adolescents. In addition, depressive symptoms and hostility, committing delinquencies more than once, repeated entrances to the correctional facilities, and the presence of another individuals involved in delinquency in the family were found to be potential risk factors that increase the probability of suicide. In addition, attendance to work or school while staying in the reformatory and being visited by relatives while in the reformatory were found to be factors that reduce the probability of suicide. It is important to carefully monitor all incarcerated adolescents in terms of suicide behaviors. The results of this study have shown that it is more important to monitor adolescents who have psychiatric symptoms, have repetitive delinquencies and prison entrances, and have other family members involved in delinquency in terms of suicidal behaviors. In addition, providing extra psychosocial support to adolescents in reformatory centers who have the risk factors identified in this study may be more beneficial in preventing suicidal behavior. Further prospective studies with larger samples including male and female subjects are needed to elucidate the association between suicide probability and associated risk factors.

Declarations of interest

None.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

- Abram, K. M., Choe, J. Y., Washburn, J. J., Teplin, L. A., King, D. C., & Dulcan, M. K. (2008). Suicidal ideation and behaviors among youths in juvenile detention. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47(3), 291–300. <https://doi.org/10.1097/CHI.0b013e318160b3ce>.
- Arsenault-Lapierre, G., Kim, C., & Turecki, G. (2004). Psychiatric diagnoses in 3275 suicides: A meta-analysis. *BMC Psychiatry*, 4(1), 1–11.
- Avcu, G. (2006). Sorun Tarama Ölçeği'nin Türkiye Koşullarına Uygun Dilsel Eşdeğerlilik, Geçerlik, Güvenirlilik ve Norm Çalışması master thesis. İstanbul: Marmara University.
- Batigun, A. D., & Sahin, N. H. (2018). Suicide probability scale: Revision, validity and reliability. *Klinik Psikoloji Dergisi*, 2(2), 52–64.
- Björkenstam, E., Björkenstam, C., Vinnerljung, B., Hallqvist, J., & Ljung, R. (2011). Juvenile delinquency, social background and suicide—a Swedish national cohort study of 992 881 young adults. *International Journal of Epidemiology*, 40(6), 1585–1592. <https://doi.org/10.1093/ije/dyr127>.
- Bobbio, A., Arbach, K., & Redondo Illescas, S. (2020). Juvenile delinquency risk factors: Individual, social, opportunity or all of these together? *International Journal of Law, Crime and Justice*, 62(February), 100388. <https://doi.org/10.1016/j.ijlcrj.2020.100388>.
- Brent, D. A., Baugher, M., Bridge, J., Chen, T., & Chiapetta, L. (1999). Age- and sex-related risk factors for adolescent suicide. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38(12), 1497–1505. <https://doi.org/10.1097/00004583-199912000-00010>.
- Brittlebank, A. D., Cole, A., Hassanyeh, F., Kenny, M., Simpson, D., & Scott, J. (1990). Hostility, hopelessness and deliberate self-harm: A prospective follow-up study. *Acta Psychiatrica Scandinavica*, 81(3), 280–283. <https://doi.org/10.1111/j.1600-0447.1990.tb06497.x>.
- Carballo, J. J., Llorente, C., Kehrmann, L., Flamarique, I., Zuddas, A., Purper-Ouakil, D., Hoekstra, P. J., Coghill, D., Schulze, U. M. E., Dittmann, R. W., Buitelaar, J. K., Castro-Fornieles, J., Lievesley, K., Santosh, P., Arango, C., Sutcliffe, A., Curran, S., Selema, L., Flanagan, R., ... Aitchison, K. (2020). Psychosocial risk factors for suicidality in children and adolescents. *European Child and Adolescent Psychiatry*, 29(6), 759–776. <https://doi.org/10.1007/s00787-018-01270-9>.
- Cull, J. G., & Gill, W. S. (1989). *Suicide probability scale (SPS)*. Los Angeles: Western Psychological Services.
- Curtin, S. C., Heron, M., Miniño, A. M., & Warner, M. (2018). Recent increases in injury mortality among children and adolescents aged 10–19 years in the United States: 1999–2016. *National Vital Statistics Reports*, 67(4).
- Curtin, S. C. (2020). State suicide rates among adolescents and young adults aged 10–24. *National Vital Statistics Reports*, 69(11), 1–10.
- Epözdemir, H. (2009). *Turkish standardization of the symptom assessment-54 questionnaire (SA-45) doctoral dissertation*. İstanbul: İstanbul Bilgi University.
- Esposito, C. L., & Clum, G. A. (2002). Social support and problem-solving as moderators of the relationship between childhood abuse and suicidality: Applications to a delinquent population. *Journal of Traumatic Stress*, 15(2), 137–146. <https://doi.org/10.1023/A:1014860024980>.
- Fazel, S., Benning, R., & Danesh, J. (2005). Suicides in male prisoners in England and Wales, 1978–2003. *Lancet*, 366(9493), 1301–1302. [https://doi.org/10.1016/S0140-6736\(05\)67325-4](https://doi.org/10.1016/S0140-6736(05)67325-4).
- Fu, Q., Heath, A. C., Bucholz, K. K., Nelson, E. C., Glowinski, A. L., Goldberg, J., Lyons, M. J., Tsuang, M. T., Jacob, T., True, M. R., & Eisen, S. A. (2002). A twin study of genetic and environmental influences on suicidality in men. *Psychological Medicine*, 32(1), 11–24. <https://doi.org/10.1017/s0033291701004846>.
- Gallagher, C. A., & Dobrin, A. (2006a). Deaths in juvenile justice residential facilities. *Journal of Adolescent Health*, 38(6), 662–668. <https://doi.org/10.1016/j.jadohealth.2005.01.002>.
- Gallagher, C. A., & Dobrin, A. (2006b). Facility-level characteristics associated with serious suicide attempts and deaths from suicide in juvenile justice residential facilities. *Suicide and Life-Threatening Behavior*, 36(3), 363–375. <https://doi.org/10.1521/suli.2006.36.3.363>.
- Goldstein, N. E., Arnold, D. H., Weil, J., Mesiarik, C. M., Peuschold, D., Grisso, T., & Osman, D. (2003). Comorbid symptom patterns in female juvenile offenders. *International Journal of Law and Psychiatry*, 26, 565–582.
- Görgülü, T., & Tutarel-Kişlak, Ş. (2014). Erkek hükümlü ve tutukluları'nın boyundurucu davranışları, depresyon ve intihar olasıları. *Noropsikiyatri Arşivi*, 51(1), 40–45. <https://doi.org/10.4274/npa.y6563>.
- Hasking, P. A. (2007). Reinforcement sensitivity, coping, and delinquent behaviour in adolescents. *Journal of Adolescence*, 30(5), 739–749. <https://doi.org/10.1016/j.adolescence.2006.11.006>.
- Hoertel, N., Franco, S., Wall, M. M., Oquendo, M. A., Kerridge, B. T., Limosin, F., & Blanco, C. (2015). Mental disorders and risk of suicide attempt: A national prospective study. *Molecular Psychiatry*, 20(6), 718–726.
- Holma, K. M., Haukka, J., Suominen, K., Valtonen, H. M., Mantere, O., Melartin, T. K., ... Isometsä, E. T. (2014). Differences in incidence of suicide attempts between bipolar I and II disorders and major depressive disorder. *Bipolar Disorders*, 16(6), 652–661.
- Huth-Bocks, A. C., Kerr, D. C. R., Ivey, A. Z., Kramer, A. C., & King, C. A. (2007). Assessment of psychiatrically hospitalized suicidal adolescents: Self-report instruments as predictors of suicidal thoughts and behavior. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46(3), 387–395. <https://doi.org/10.1097/chi.0b013e31802b9535>.
- Kim, H. S., & Kim, H. S. (2008). Risk factors for suicide attempts among Korean adolescents. *Child Psychiatry and Human Development*, 39(3), 221–235. <https://doi.org/10.1007/s10578-007-0083-4>.
- Larzelere, R. E., Smith, G. L., Batenhorst, L. M., & Kelly, D. B. (1996). Predictive validity of the suicide probability scale among adolescents in group home treatment. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35(2), 166–172. <https://doi.org/10.1097/00004583-199602000-00009>.
- Leese, M., Thomas, S., & Snow, L. (2006). An ecological study of factors associated with rates of self-inflicted death in prisons in England and Wales. *International Journal of Law and Psychiatry*, 29(5), 355–360. <https://doi.org/10.1016/j.ijlpl.2005.10.004>.
- Matsumoto, T., Tsutsumi, A., Izutsu, T., Imamura, F., Chiba, Y., & Takeshima, T. (2009). Comparative study of the prevalence of suicidal behavior and sexual abuse history in delinquent and non-delinquent adolescents. *Psychiatry and Clinical Neurosciences*, 63(2), 238–240. <https://doi.org/10.1111/j.1440-1819.2009.01929.x>.
- Miotto, P., De Coppi, M., Frezza, M., Petretto, D., Masala, C., & Preti, A. (2003). Suicidal ideation and aggressiveness in school-aged youths. *Psychiatry Research*, 120(3), 247–255. [https://doi.org/10.1016/S0165-1781\(03\)00193-8](https://doi.org/10.1016/S0165-1781(03)00193-8).
- Morris, R. E., Harrison, E. A., Knox, G. W., Tromanhauser, E., Marquis, D. K., & Watts, L. L. (1995). Health risk behavioral survey from 39 juvenile correctional facilities in the United States. *Journal of Adolescent Health*, 17(6), 334–344. [https://doi.org/10.1016/1054-139X\(95\)00098-D](https://doi.org/10.1016/1054-139X(95)00098-D).
- Penn, J. V., Esposito, C. L., Schaeffer, L. E., Fritz, G. K., & Spirito, A. (2003). Suicide attempts and self-mutilative behavior in a juvenile correctional facility. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42(7), 762–769. <https://doi.org/10.1097/01.CHI.0000046869.56865.46>.
- Rabe, K. (2012). Prison structure, inmate mortality and suicide risk in Europe. *International Journal of Law and Psychiatry*, 35(3), 222–230. <https://doi.org/10.1016/j.ijlpl.2012.02.012>.
- Sanislow, C. A., Grilo, C. M., Fehon, D. C., Axelrod, S. R., & McGlashan, T. H. (2003). Correlates of suicide risk in juvenile detainees and adolescent inpatients. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42(2), 234–240. <https://doi.org/10.1097/00004583-200302000-00018>.
- Sedlak, A., & McPherson, K. S. (2010). *Survey of youth in residential placement: Youth's needs and services*.
- Simonds, J. F., McMahon, T., & Armstrong, D. (1991). Young suicide attempters compared with a control group: Psychological, affective, and attitudinal variables. *Suicide and Life-Threatening Behavior*, 21(2), 134–151. <https://doi.org/10.1111/j.1943-278X.1991.tb00461.x>.
- Stokes, M. L., McCoy, K. P., Abram, K. M., Byck, G. R., & Teplin, L. A. (2015). Suicidal ideation and behavior in youth in the juvenile justice system: A review of the literature. *Journal of Correctional Health Care*, 21(3), 222–242. <https://doi.org/10.1177/1078345815587001>.
- Stone, D. M., Holland, K. M., Bartholow, B., Crosby, A. E., Davis, S., & Wilkins, N. (2017). *Preventing suicide: A technical package of policy*.
- Thompson, M. P., Ho, C. H., & Kingree, J. B. (2007). Prospective associations between delinquency and suicidal behaviors in a nationally representative sample. *Journal of Adolescent Health*, 40(3), 232–237. <https://doi.org/10.1016/j.jadohealth.2006.10.016>.
- Turecki, G., & Brent, D. (2016). Turecki G, Brent DA. Suicide and suicidal behaviour. *The Lancet*. 2016;387(10024):1227–1239. *Lancet*, 387(10024), 1227–1239. [https://doi.org/10.1016/S0140-6736\(15\)00234-2](https://doi.org/10.1016/S0140-6736(15)00234-2). Suicide.
- Turecki, G., Brent, D. A., Gunnell, D., O'Connor, R. C., Oquendo, M. A., Pirkis, J., & Stanley, B. H. (2019). Suicide and suicide risk. *Nature Reviews. Disease Primers*, 5(1). <https://doi.org/10.1038/s41572-019-0121-0>.
- Wasserman, G. A., McReynolds, L. S., Schwalbe, C. S., Keating, J. M., & Jones, S. A. (2010). Psychiatric disorder, comorbidity, and suicidal behavior in juvenile justice youth. *Criminal Justice and Behavior*, 37(12), 1361–1376. <https://doi.org/10.1177/0093854810382751>.
- World Health Organization. (2019). *Suicide in the world: Global health estimates*. 32. Geneva: World Health Organization.