ARAŞTIRMA / RESEARCH ARTICLE

The Effects of Personality, Family Functioning and Perceived Social Support on Suicide: Suicide Risk Among Individuals in Turkish Probation System

Kişilik, Aile İşlevselliği ve Algılanan Sosyal Desteğin İntihar Davranışına Etkisi: Türkiye Denetimli Serbestlik Sistemindeki Bireylerde İntihar Riski

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Abstract

Objective: Each year, an average of one million people end their lives by suicide. This rate is higher for disadvantaged groups such as the criminal population and substance users. Psychiatric problems and certain social factors increase suicide risk. Although the criminal involved and substance users have been studied in Turkey, research on suicide risk factors are limited. Therefore, the aim of this study is to examine the effects of personality traits, and psychosocial variables such as family functioning, and perceived social support on suicide risk in individuals directed to Turkish probation services.

Materials and Methods: Participants were 403 males, of which 183 were substance users and 220 were criminals.

Results: Results revealed a significant relationship between being single, low income, criminal behavior at an early age, substance use behavior, multiple drug use, and suicide risk. Additionally, personality traits of neuroticism and psychoticism, as well as family members' interest in each other were found to be best predictive variables of suicide risk $R^2 = 0.551$, F (12, 389) = 39.79, $p < .001$; Adjusted $R^2 = .537$, and the explained variance ratio was 55%.

Conclusion: These results indicate that inclusion of social support factors such as family support, in suicide prevention programs may decrease suicide risk.

Keywords: Suicide Risk; Crime; Substance Use; Personality, Family Functioning; Perceived Social Support.

Öz

Amaç: Her yıl dünyada ortalama bir milyon birey intihar ederek hayatına son vermektedir. Bu oran madde kullanan ve suç popülasyonu gibi dezavantajlı gruplarda çok daha yüksektir. Bu gruplarda psikiyatrik bazı sorunların yanı sıra, sosyal sorunların katkısı intihar riskini yükseltmektedir. Ülkemizde bu bireylere yönelik psikososyal çalışmalar yapılıyor olsa da, intiharı önleme ve intihar risk faktörlerine yönelik çalışmalar henüz beklenen düzeyde değildir. Bu nedenle bu çalışmanın amacı, denetimli serbestlik tedbiri almış suçlu ve madde kullanımı olan bireylerde aile işlevselliği ve sosyal destek algısı gibi çeşitli psikososyal değişkenler ile kişilik faktörünün intihar riski üzerindeki etkisini incelemektir.

Gereç ve Yöntem: Bu amaç doğrultusunda bu çalışma 183 madde kullanıcısı ve 220 suç işlemiş birey olmak üzere 403 erkek katılımcıyla yapılmıştır.

Bulgular: Çalışmanın sonuçlarına göre bekar olmak, düşük geliri olmak, erken yaşta suç işlemek, madde kullanım davranışı ve birden fazla madde kullanım davranışı ile intihar riski arasında önemli bir ilişki olduğu görülmüştür. Ayrıca, intihar riskinin en iyi yordayıcı değişkenlerinin kişilik özelliklerinden nörotisizm, psikotisizm ve aile üyelerinin birbirlerine yönelik zayıf ilgileri olduğu bulunmuş, $R^2 = 0.551$, F (12, 389) = 39.79, $p < .001$; Adjusted $R^2 = .537$, açıklanan varyans oranının %55 olduğu görülmüştür.

Sonuç: Bu sonuçlar doğrultusunda, intiharı önleme çalışmalarında aile gibi sosyal destek faktörlerinin de çalışmalara dahil edilmesi intihar riskini düşüreceği öngörülmektedir.

Anahtar Kelimeler: İntihar Riski; Suçluluk; Madde Kullanımı; Kişilik; Aile İşlevselliği; Algılanan Sosyal Destek.

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1. Introduction

Suicidal behavior, which is an important public health problem, is defined as an individual's tendency to intentionally and willingly end their own life. An average of one million individuals end their lives by suicide each year (1). Studies demonstrate that a complex phenomenon such as suicidal behavior cannot be explained by a single factor, but rather a combination of multiple variables are involved (2). The most relevant risk factors for suicidal behavior include age and marital status (3), trauma, physical and sexual abuse, suicidal ideation and past suicide attempts, crime, substance use and abuse, hopelessness, and mood disorders such as depression or bipolar disorders (4-8). Although psychiatric patterns have a significant effect on suicidal behavior, studies reveal that innate personality traits are also related to suicide. Specifically, evidence points to personality traits that a risk factor for suicidal behavior such as being negative, introverted, addictive, neurotic, antisocial or impulsive (9).

Family problems represent another important variable, in which family system dysfunctions are almost as important as some psychiatric problems in relation to suicidal behavior (10). Problems of family functioning are not only cited as reasons for various psychological problems, but also contribute to suicidal behavior (11). However, the direction of the relationship between suicide and family functionality is unclear. Problems in the family may cause suicidality due to psychological problems, or a suicidal family member may contribute to problematic family coping. Nevertheless, studies show that family issues to include conflicts, communication problems, poor problem-solving skills, or members' negative behavior patterns leads the individual's coping strategies to weaken, resulting in negative behavioral consequences such as self-harm or suicide (12).

While family problems can increase suicide risk, social support, to include that from family, is an important preventive factor. Moreover, evidence indicates that not only instrumental social support, but perceived social support alone reduces suicide risk (13). Perception of social support, proven to be an important protective mechanism by increasing the individual's positive psychological state, is just as important as family functioning, and lack of perceived support is an important risk factor for suicidal behavior (14). This may also be applicable to perceived social support from family (15).

Although various psychosocial factors are associated with suicide, some groups are at a particularly high risk; as criminals and substance users. The risk of suicide in the criminal population, especially among violent criminals, is estimated 20 times higher than the general population (16). Suicide rates are especially high in prisons, with 37% of prisoner deaths explained by suicidal behaviors (17). The causes of suicide in criminals include familial problems, personality, social isolation, and the presence of a psychiatric disorder (18,19). In recent years, crime has increased at an alarming rate throughout Turkey, creating an important obstacle to reducing suicidal behavior in the criminal population. The other high-risk group is substance users, especially given that it's not necessary them to have suicidal thoughts or plans, but rather choose suicidal behavior impulsively (20). Considering that substance use behavior continues to increase in Turkey, suicidal behavior in this group is also expected to increase.

Since the literature clearly demonstrates an increase in suicide risk for prisoners and individuals with substance use, it is critical to determine suicide risk factors in these populations. Furthermore, suicide risk continues even after offenders are released from prison. In Turkey, rehabilitation of individuals released from prison, as well as substance users, is carried out by probation services. However, existing studies on populations using these services are outdated since these probation services were established around the year 2005. Therefore, the purpose of this study was to provide current data on the effects of psychosocial characteristics as family functioning, and perceived social support levels, and personality traits on the risk of suicide in criminals and substance users directed to Ankara Probation Service.

Although efforts to prevent suicide in these two groups are almost negligible in Turkey, post-release rehabilitation and psychosocial treatment studies for individuals with substance use are carried out in probation services. Therefore, it is useful to describe the Turkish probation system.

1.1. Turkey's Probation System Status

In Turkey, the probation system is not just a punitive system that uses risk analyses to reduce recidivism, but is also a system of psycho-social interventions and studies for the treatment and rehabilitation of substance users (21).

While Turkey's probation system was established in 2005, probation systems have a 100-year history worldwide. In Turkey, two types of studies are typically conducted in the system. One involves collaborative work between the Ministry of Health-related services and probation services for the rehabilitation of substance users and abusers (i.e., have substance use behavior convictions). The other entails the rehabilitation of individuals convicted for a short time or released from prison.

According to the Turkish Criminal Code, the use of narcotic drugs and stimulants is a crime. Individuals con-

victed of such crimes are given penalties ranging from two to five years, but the initiation of a public case is usually postponed for five years. During this time, individuals are sent to probation services, are not subject to criminal proceedings, and biopsychosocial treatment is imperative. In this process, the individual is directed to the institutions affiliated with the Ministry of Health during the user-controlled probation services. A urine screen is performed at least three times spaced every two weeks. Additionally, a psychiatrist assesses for the presence of a diagnosable substance use disorder, and a corresponding report is sent to the probation officer. If this report indicates a substance use diagnosis, psychiatric care is more intense, and substance use behavior is expressed as a criminal behavior according to the Turkish Criminal Code. This system makes it obligatory for the state to treat individuals who have a substance use problem in a certain way.

2. Materials and Methods

2.1. Sample

This study was carried out with 183 substance users and 220 criminals, for a total of 403 male participants between 18 and 65 years-of-age in Ankara Probation Service. The sampling was applied based on simple random sampling method. Individuals referred to probation service due to substance use behavior were required to meet the diagnostic criteria for substance use disorder as defined in the DSM-5 and to determine the presence of illicit substance metabolites in urine samples by the Ministry of Health drug addiction treatment centers.

Before administration of the scales, the purpose of the study was explained to potential participants. For any who agreed to participate, informed consent was provided, stating that if participants disturbed by the scales could discontinue participation and/or request psychological support from researchers. The scales were given in a different order to each participant so that fatigue would not be a confounding variable. Necessary approvals were obtained from the Ministry of Justice and ethical approval was obtained from the Institutional Review Board of Hacettepe University in Turkey.

2.2. Instruments

Personal Information Form: The personal information form, developed by the researchers consists of 37 questions on characteristics and psychosocial information such as age, gender, marital status, crime, substance use and suicide risk factors. Suicide risk factor questions include suicidal thoughts, past suicide attempts, suicide attempts in family members and social environment,

presence of suicidal behavior in family members and social environment, substance abuse behaviors, and type of substances used. (Self-cutting behavior was considered as a suicide attempt if the resultant injuries could have resulted in death.) Participants were also asked if they have ever been diagnosed by a psychiatrist with a psychiatric disorder. .

Suicide Probability Scale (SPS): SPS was developed by Cull and Gill (22) and it is a 36 item 4-point Likert-type scale that can be applied to individuals over 14 years of age. SPS has four subscales: Hopelessness, Suicide Ideation, Negative Self-Evaluation, and Hostility. The minimum score that can be obtained from the scale is 30, while the maximum is 146. It is assumed that suicide probability increases with increasing scale score. The psychometric study of the SPS was conducted with 1100 adults, according to the results internal consistency coefficient of .98 for the total score, and the following for each subscale: .85 for Hopelessness, .88 for Suicide Ideation, .58 for Negative-Self Evaluation, and .58 for Hostility. The test-retest reliability of the scale was calculated as .92. According to a validity study using the MMPI Threat Suicide Scale, the similar scale's coefficient was calculated as .70. A Turkish adaptation study was conducted by Tuğcu (23) and the internal consistency coefficient of the scale was calculated as .87. In a validity study conducted with the Beck Hopelessness Scale, the scale's corresponding coefficient was calculated as .81.

Eysenck Personality Questionnaire Revised-Abbreviated Form (EPQR-A): EPQR-A is the shortened version of the Eysenck Personality Questionnaire Short Form (EPQR-S) originally developed by Eysenck. The scale was reduced to 24 items by Francis, Brown (24), and measures three dimensions of personality: Neuroticism (N), Extraversion (E), and Psychoticism (P). A Lie (L) subscale is used to check the validity of the whole scale. Each subscale consists of 6 items with a minimum possible score of 0 and maximum possible score of 24. The psychometric study of the scale was conducted with 685 students in United Kingdom, Canada, America, and Australia. It was found that the scale had a sufficiently high coefficient. According to the results of a concurrent validity study with EPQR-S, the correlation of Neuroticism changed between .92 and .94, the coefficient of Extraversion changed in the range of .93-.95, the coefficient of Psychoticism changed in the range of .80-.87, and finally, the coefficient Lie changed between .89 and .92. Validity and reliability studies were conducted with 756 university students by Karancı and Dirik (25) in Turkey. The internal consistency coefficient of the scale was calculated as .65 for Neuroticism, .78 for Extroversion, .42

for Psychoticism and .64 for Lie. The test-retest reliability of the scale was calculated as .82 for Neuroticism, .84 for Extroversion, .69 for Psychoticism, and .69 for Lie.

Family Assessment Device (FAD): FAD was developed collaboratively by Brown University and Butler Hospital to assess family functioning in individuals 12 years and older. It is a 4-point Likert-type scale with 60 items and six basic sub-dimensions: Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, and Behavior Control. The scale is scored between 1 and 4 points per item, and the final scale score is obtained by dividing the total score by the number of questions. As the scores get closer to 4, the family is assumed to be unhealthy. The internal consistency coefficient for the original form of the scale ranged from .72 to .92, and its test-retest reliability ranged from .66 to .76 (26). Adaptation to Turkish was made by Bulut (1990), and the test-retest reliability coefficient of the scale ranged from .78 to .90. The validity of the scale was calculated by the Marriage Life Scale and the correlation coefficient between the two scales was calculated as .66 (27).

Multidimensional Perceived Social Support Scale (MSPSS): MSPSS was developed by Zimet and Dahlem (28). The scale is a 7-point Likert type scale that consists of 12 items and are three subscales related to perceived social support from family, friends, and the significant other. The scale is scored between 1 and 7 points per item. The highest score that can be taken from the scale is 84, while the lowest score is 12. In the validity and reliability study of the scale, the internal consistency coefficient for the total score was calculated as .88. The subscales' coefficients were .87 for family, .85 for friends, and .91 for significant other. The validity and reliability study of MSPSS in Turkey was conducted by Eker and Arkar (29) with university students and a hospital sample. According to the results of the study, the internal consistency coefficient ranged from .77 to .82 for the total score, .82 to .92 for family, .78 to .90 for friend and .79 to .91 for the significant other.

2.3. Statistical Analysis

Total scores of the scales were converted to "z" scores to determine if the data showed normal distribution. Data exceeding +3.29 standard deviation were excluded from the analysis. Accordingly, one of the participant's data was excluded from the analysis. In addition, there was no statistically significant difference between the substance users and the criminals in terms of the total score suicide probability ($t = .58; = .09$). Therefore, the data of the two groups were combined and the analyses were performed on the total score mean of 402 participants.

For bivariate and multivariate analyses, independent-samples t test and one-way analysis of variance (ANOVA) were performed, while Tukey test was used as the intergroup comparison test. Additionally, multiple hierarchical regression analysis was performed to find the predictive variables of SPS. Prior to performing the multiple hierarchical regression analysis, Pearson-Moments Correlation Coefficient test was performed to determine if there was multicollinearity between variables. All statistical analyses were performed with the IBM SPSS 20 package software. A significance level of .05 was chosen in the analysis of the data.

3. Results

This section first provides socio-demographic characteristics of participants. Second, it presents the analysis of differences in terms of various psychosocial characteristics and the total scores of the scales. Finally, findings on the hierarchical multiple regression analysis are included.

3.1. Socio-demographic characteristics of the sample

The mean age of participants was 30 years, of which 45.4% were directed to probation services due to substance use and 54.6% were criminals released from prison. Of all participants, 33.6% were middle school graduates, 45.3% were single, 67.3% were employed (50.3% worked for the same employer for less than one year), 29.9% earned 1001-2000 TL ($ 287-572) per month, 17.9% had no income, 64.2% had past criminal behavior with the following charges: 37% of the participants were charged with violent crime, 3.4% with sexual crime, 26.8% with substance use, and 18% with burglary. As for past juvenile behavior, 39.3% of them committed their first crime before 18 years of age in the following categories for first criminal behavior: 36.9% committed violent crime, 3.4% sex offenses, 25.48% drug use or drug trade, 16.22 % burglary. Additionally, 26.9% of participants had suicidal thoughts, 20.5% had past suicide attempts, and 40.8% of the suicide attempters used the self-cutting method. When substance use history was examined, it was found that 43.6% used more than one substance, 94.3% used cannabis, and 29.8% used the substance for the first time before 18 years of age.

3.2. The bivariate and multivariate results of suicide probability

As seen in Table 1, ANOVA was used to determine the difference in the total score of suicide probability in terms of marital status. There was a significant difference between the groups ($F(3-97) = 3.74, p \leq .001$). According to results of the comparison between the groups using the

Tukey test, the mean total score of single individuals was higher than that of married individuals, with a statically significant increase of 4.51 (p = .02).

SPS differed significantly in terms of income status (F (5-384) = 7.84, $p \leq$ .001). According to results of the comparison between the groups using the Tukey test, participants with a monthly income of 100-1000 TL ($19-188) had significantly higher (p = .013) SPS scores at 11.49 than those earning 4001 TL ($755) per month. The most dramatic results were seen in participants with

no monthly income. The mean total score of these participants was significantly ($p \leq$ .001) lower at 8.63 than those with a monthly income of 1001-2000 TL ($189-377). Also, the mean total score of participants who had no monthly income was significantly ($p \leq$ .001) lower at 11.19 than those with a monthly income of 2001-3000 TL ($378-566), lower at 3.16 than those with a monthly income of 3001-4000 TL ($365-754.), and lastly, lower at 16.33 than those with a monthly income of 4001 TL ($755) and over.

Table 1. Bivariate and multivariate results

Psychosocial Variables	*n (%)*	*M/SD*	*F/t*	*Post-hoc*
Marital status				
Single[a]	182 (45.3)	64.66/ 14.62	3.75**	a> b
Married[b]	168 (41.8)	60.15/ 15.96		
Divorced[c]	45 (11.2)	65.73/ 14.74		
Widow[d]	7 (1.7)	69.14/ 13.60		
Income				
No income[a]	70 (17.9)	70.02/ 16.43	7.84***	a> c,d,e,f/
100-1000 TL ($ 29-286)[b]	110 (28.1)	65.19/ 13.94		b>e/
1001-2000 TL ($ 287-572)[c]	117 (29.9)	61.39/ 12.81		
2001-3000 TL ($ 573-858)[d]	48 (12.3)	58.54/ 14.52		
3001-4000 TL ($ 859-1144)[e]	26 (6.6)	56.76/ 17.58		
4001 TL and over ($ 1145)[f]	20 (5.1)	53.70/ 9.75		
Age of first criminal behavior				
12-17[a]	130 (39.3)	67.59/ 14.72	6.82***	a> c,d,e
18-23[b]	85 (25.7)	64.81/ 14.88		
24-29[c]	58 (17.5)	58.52/ 15.21		
30-35[d]	29 (8.8)	59.10/ 13.90		
36 and over[e]	29 (8.8)	57.21/ 10.50		
Criminal behavior in environment				
Yes	224 (55.7)	65.11/ 15.92	3.13**	
No	177 (44.3)	60.45/ 13.79		
Past substance use behavior				
Yes	226 (66.0)	64.0/ 15.45	3.42**	
No	137 (34.0)	59.49/ 14.30		
Substance use in past year				
Yes	224 (55.6)	64.74 (15.28)	2.63**	
No	179 (44.4)	60.82 (14.27)		
Number of substances				
One substance	150 (56.4)	63.03/ 14.52	-2.17*	
More than one substance	116 (43.6)	67.16/ 16.38		
Age of onset of substance use				
12-17[a]	145 (57.3)	67.37/ 14.95	3.16**	
18-23[b]	64 (25.3)	63.23/ 15.79		a>d
24-29[c]	24 (9.5)	59.83/ 14.78		
30-35[d]	15 (5.9)	59.73/ 13.30		
36 and over[e]	5 (2.0)	58.20/ 18.93		

*p< .05, **p< .01, ***p< .001

Another important risk factor for suicide is the age of first crime. Suicide probability of individuals committing crimes before they are 18 years old was significantly higher than other age groups, and the difference was statically significant (F (4-326) =6.819, $p \leq .001$). In addition, only 5.4% of these individuals have more than one criminal behavior before the age of 18 years. According to the results of the Tukey test, the total SPS of the individuals who committed a crime for the first time in the age range of 12-17 years were significantly ($p \leq .001$) higher than those who committed crime for the first time in the age ranges of 24-29 years ($p = .023$), 30-35 years ($p = .037$), and those at age of 36 years or older ($p = .005$).

There was also a difference between the mean SPS total scores of participants based on past substance use behavior. Suicide probability among individuals who had substance abuse for the past year was higher than those who did not. The difference between the two groups was statistically significant (95% CI (.99, 6.85), t (264) = .631, $p = .009$). This reveals that even for individual with past substance use behavior, it is still an important risk factor for current suicide potential.

The number of substances used is also important. Suicide probability was found to be significantly different between individuals who used one substance and those who used multiple substance (95% CI (-7.86, -.38), t (264) = -2.171, $p = .031$). As shown in Table 1, suicide probability for individuals who used more than one substance was higher than those who did not.

Finally, the age of onset of substance use was a critical variable in suicide probability and the difference was significant (F (4-248) = 3.156, $p = .015$). Suicide probability of individuals who started substance use before the age of 18 was found to be significantly higher (7.64) than those who started substance use in the age range of 30-35 years ($p \leq .001$). This result indicates that the risk of suicide increases with the drop in the age of first substance use.

The results for variables that are predictive for suicide probability

Hierarchical multiple regression analysis was performed to find the variables predictive for suicide probability (Table 2). The subscales of EPQR-A were added to the first model. The subscales of the FAD were added

Table 2. Results of Hierarchical Multiple Regression Analysis of the Suicide Probability Scale

Suicide Probability						
	Model 1		Model 2		Model 3	
Predictors [a]	B	ß	B	ß	B	ß
	46.50***		30.3***		48.2***	
N	4.81**	.60	3.84***	.48	3.58***	.45
E	-.44	-.05	-.6	-.01	.30	.02
P	2.23**	.17	14.46**	.11	1.42**	.11
Ps			1.59	.71	1.32	.06
Com			4.03**	.14	2.70	.09
Rol			.80	.03	.28	.01
Ar			.66	.30	.52	.02
Ai			.44*	.96	2.33*	.09
Bc			2.00	.60	1.89	.06
Family					.00	.00
Friend					-.12	-.06
Significant Other					-.48	-.20
R²	.429		.505		.551	
F	99.83**		44.39***		39.79***	
ΔR²	.429		.75		.46	
ΔF	99.83***		9.95***		13.37***	

N = 402, *p < .05, **p < .01, ***p < .001

[a] N= Neuroticism, E= Extraversion, P=Psychoticism, Ps=Problem solving, Com=Communication, Rol=Roles, Ar= Affective Responsiveness, Ai= Affective Involvement, Bc= Behavior control.
Model 1: N+E+P
Model 2: N+E+P+Ps+Com+Rol+Ar+Ai+Bc
Model 3: N+E+P+Ps+Com+Rol+Ar+Ai+Bc+Family+Friends+Significant Other

to the second model. Finally, the subscales of the MPSS were added to the third model. According to the results, Model 3 revealed statistically significant effects, with values of R^2= 0.551, F (12, 389) = 39.79, p < .001; Adjusted R^2= .537, and the explained variance ratio was 55.1%. The most important predictives of suicide probability were lack of affective involvement in family system, as well as neuroticism and psychoticism as personality traits. These findings indicate that, if the individual is depressed, hopeless, aggressive, angry, and has additional vulnerability due to family functioning, there is a 55% risk for suicide probability.

4. Discussion

This study aimed to explore the relationship between psychosocial characteristics such as family functionality, social support and personality traits on suicide risk of criminal individuals and substance users who were directed to Ankara Probation Service. In this section, study findings are discussed considering the existing suicidality literature.

Suicide risk of single individuals was found to be higher than that of married individuals. This result supports previous research, in which several studies show that married individuals have lower suicide risks than people who are single, divorced, or widowed (30). This finding does not imply that marital status is an important risk factor for suicidal behavior; however, it suggests that being married can be a protective factor against suicide risk due to the enhancement of perceived social support and a strengthened social support system.

Another difference in suicide risk was related to participants' income level. Accordingly, suicide probability of individuals with low or no income was higher than other income levels. This result was most dramatic for those with no income. According to some studies, economic status alone is not a sufficient cause for suicidal behavior, but it is an important risk factor (31). It is known that disadvantaged groups such as criminals and drug users face social exclusion (32), which can decrease their employment options and lead to an increase in suicide risk. Additionally, the government's social expenditure budget may contribute to is the population's suicide risk. Suicide rates are lower in countries that allocate social spending budgets (33), revealing that macroeconomic policies are important in preventing suicidal behavior.

It was found that individuals who committed crimes before the age of 18 had a higher suicide risk. Age of onset also important in regards to substance use. Specifically, suicide probability of individuals who began using substances before the age of 18 was higher than other age groups. This finding indicates that substance use and criminal behavior at an early age are still risk factors for current suicidal behavior. Other studies have revealed similar findings. In a longitudinal study with young people who used drugs in the 15-16 age group, participants were followed up to the age of 25 to reveal that substance use at a young age was an important predictor of substance use in following years, and also predicted later suicidal tendencies and aggressive behavior (34). In the light of these results, it is believed that individuals who cannot cope with problems at early ages, or use substances to cope with negative events, continue to have problems in future years. However, other risk factors may impact the relationship between early criminal behavior and suicide risk. For example, some psychosocial problems or multiple criminal behavior at young ages may increase later suicide risk. Besides, in this study it was found that 5.4% of individuals had more than one criminal behavior before the age of 18, but multiple criminal behavior before age of 18 which effect the suicidal behavior could not be determined. For this reason, it is recommended that future studies, assess early criminal behavior as well as risk factors associated with suicidal behavior

It was also found that individuals who had been using substances for the past year had a higher suicide risk than those who had not. This corresponds with studies demonstrating that substance abuse behavior is an important risk factor for suicidal behavior (35) and have even suggested that substance abuse alone induces impulsive behaviors that directs the individual to commit suicide (20). Another important finding of this study was that even prior use of substances increase current suicide risk. This result suggests that not only current substance use behavior, but past substance use still effects suicide risk. According to statistics, substance use behavior is increasing in Turkey in recent years. Cannabis use increased by 118% in 2013 in comparison to the previous year, and by 102% in 2014, whereas a similar dramatic increase was observed in morphine use. Additionally, the number of patients treated for substance use increased by 123% (36). Considering these numbers, risk for an increase in suicidal behavior is evident. In this study it was found that the best predictors of suicide probability are the personality traits of neuroticism and psychoticism, as well as weak affective involvement in the family system. According to these results, individuals who have anxious, depressive, hopeless, and aggressive personality traits might be more susceptible to suicide. Prior studies have also shown that hopeless and depressed individuals have a tendency for suicidal behavior, and aggressive individuals direct their anger towards themselves (37,38). Considering this, psycho-

social prevention studies should include anger management therapy for individuals who tend to be violent, and individual therapy for depressive and hopeless individuals to improve their coping skills. Results also indicate that the addition of family problems to the neurotic and psychotic personality traits increases the risk of suicide. Previous studies also reveal that problems in the family system increase suicide risk, and positive interest of family members towards each other is an important social support mechanism to prevent suicide (14). Considering that high-risk individuals, especially the criminal population and substance users, likely have substance users or criminals in their family that may exasperate family problems and hence increase the risk of suicide. For this reason, it is suggested that the support of family members should be considered in suicide prevention studies, and it is important to conduct individual or group interventions for family members to prevent suicide.

5. Conclusion

This study revealed some important suicide risk-factors in the criminal and substance use populations. For one, individuals with low incomes have a higher risk of suicide. Risk is particularly higher in criminals due to unemployment problems. For this reason, employment options are important when working with released prisoners. To this end, laws on obligation to employ ex-convicts, which have been abandoned in Turkey, should be reintroduced. Moreover, the issue could be further addressed if the Republic of Turkey would increase its current low social spending rate.

Individuals who started to use substances or commit crimes before the age of 18 also have high suicide risk. Therefore, psychosocial studies in schools are important to better understand children and adolescents at risk for criminality or substance use. For this reason, it is necessary for professionals to identify children and adolescents exhibiting criminal behavior or using substances in schools. Additionally, psychosocial and family intervention studies should be carried out on this population to prevent existing and future suicide risks.

In this study, it was observed that the personality traits of neuroticism and psychoticism, as well as social factors such as poor family functioning, increased suicide probability. This makes it clear that it is especially critical for family members to care for each other to prevent suicide. Thus, it is suggested that psychosocial studies should be conducted to change negative feelings, thoughts, and behaviors of individuals who are identified as hopeless, depressed and aggressive. At the same time, consider-ing that suicidal behavior is aggressive behavior towards the self, it is important for professionals to also work on issues such as anger management, communication, and stress coping strategies. Finally, it is also clear that a weak family system is a significant risk factor for suicidal behavior, in which family members' weak attention to each other may trigger suicide. Therefore, it is important to work with families to enhance the perceived social support from family to decrease suicide probability.

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