Correlates, Predictors, and Protectors of Suicidal Ideation in Depression

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ABSTRACT

Objective: Aim of the study was identifying correlates, protectors and predictors of suicidal ideation among 26 variables in a Turkish outpatient population.

Method: A retrospective and naturalistic study was designed and it was set in a private psychiatry clinic in Istanbul between 2011 and 2017 years. 1902 drug-free depressed patients were participated. Turkish versions of the Hamilton Depression Scale (HAMD), Hamilton Anxiety Rating Scale (HARS), Insight Evaluation Scale, and Quality of Life Scale (WHOQOL-BREF) were used. Each participant also was asked about suicidal ideation. Univariate analysis and predictive modeling were used to identify significant factors affecting suicidal ideation.

Results: 1082 women and 820 men were included; 999 (52.4%) reported suicidal ideation. Of the 26 factors associated with a high rate of suicidal ideation, high severity of depression, low severity of anxiety, low quality of life, and low insight were predictive. Receiver operating characteristic curve analysis showed that HAMD >21 for men was associated with a quality of life <76; in addition, HAMD >14, HARS <24, and WHOQOL-BREF <75 can be used as follow-up tools in suicidal ideation.

Conclusion: Contributing factors to increased suicidal ideation include decreased libido or appetite, high severity in depression, low quality of life, low anxiety and insight, family history of psychiatric disorder, and conversive seizures. Provocation of anxiety may be helpful in reducing suicidal ideation to some extent. In addition, protective actions may include increasing insight about depression, early intervention to lower depression severity, and increasing quality of life, educating the person's social support system via proper psychotherapeutic approaches.

Keywords: Suicidal Ideation, Depression, Anxiety, Insight, Quality of Life

ÖZET

Depresyonda İntihar Düşüncesi ile İlişkili, Koruyucu ve Yordayıcı Faktörler

Amaç: Çalışmanın amacı, tedaviye başvuran bir grup depresyon hastasının intihar düşüncesi ile 26 değişken arasındaki korelasyonu, koruyucu ve yordayıcı faktörleri tespit etmek.

Yöntem: Geriye dönük ve natüralist bir çalışma dizayn edilmiş ve 2011 ile 2017 yılları arasında İstanbul'da özel bir psikiyatri kliniğinde yapılmıştır. Çalışmaya ilaç kullanmayan 1902 depresyon hastası katılmıştır. Ayrıca, Hamilton Depresyon Ölçeği, Hamilton Anksiyete Ölçeği, İçgörü Değerlendirme Ölçeği ve Yaşam Kalitesi Ölçeği kullanılmıştır. Her katılımcıya intihar düşüncesi sorulmuştur. İntihar düşüncesini etkileyen anlamlı faktörleri saptamak için tek değişkenli analiz ve öngörücü modelleme kullanılmıştır.

Bulgular: 1082 kadın ve 820 erkeğin katıldığı çalışmada, 999 (%52.4) katılımcı intihar düşüncesini rapor etmiştir. Yüksek oranda intihar düşüncesi ile ilişkili olan 26 faktörden, yüksek yoğunluktaki depresyon, düşük yoğunluktaki anksiyete, düşük yaşam kalitesi ve düşük içgörü yordayıcı olarak tespit edilmiştir. Alıcı işletim karakteristik eğrisi analizi, 21'den yüksek olan Hamilton Depresyon Ölçeği puanlarının 76'dan düşük Yaşam Kalitesi Ölçeği puanları ile ilişkili olduğunu göstermiştir. Ayrıca, 14'ten yüksek Hamilton Depresyon Ölçeği Puanları, 24'ten düşük Hamilton Anksiyete Ölçeği Puanları ve 75'ten düşük Yaşam Kalitesi Ölçeği puanları intihar düşüncesini takip etme aracı olarak kullanılabilir.

Sonuç: Yüksek yoğunluktaki depresyon, düşük anksiyete, yaşam kalitesi ve içgörü, düşen libido veya iştah, ailede psikiyatrik hastalık geçmişi ve konversiyon intihar düşüncesinin artmasında etkili olan faktörlerdir. Anksiyeteyi provake etmek bir dereceye kadar intihar düşüncesinin azalmasına yardımcı olabilir. Ayrıca, depresyon hakkındaki içgörüyü artırmak, daha düşük yoğunluktaki depresyona erken müdahale etmek ve yaşam kalitesini yükseltmek, uygun psikoterapötik yaklaşımlar yolu ile kişinin sosyal destek ağını eğitmek koruyucu adımlar olabilir.

Anahtar Sözcükler: İntihar düşüncesi, Depresyon, Anksiyete, İçgörü, Yaşam kalitesi

INTRODUCTION

Depression affects approximately 350 million people worldwide.[1] Suicide attempts are relatively common among depressed patients with suicidal ideation, which is a highly predictive factor.[2] Thus, early detection of suicidal ideation is crucial for preventing such attempts. Suicidal ideation has been proposed to be associated with social, psychological, and biological variables.[3] To determine the correlates and predictors of suicidal ideation, we investigated 26 variables as possible predictive factors of suicidal ideation in a large outpatient Turkish sample. Factors were selected based on the literature and included quality of life, age, gender, anxiety, severity of depression, family history of psychiatric disease, and conversive seizures.

Regarding gender and age, girls and women tend to report a higher frequency of suicidal ideation than males, and the highest rates of suicidal ideation have been reported in adults aged 18—29 years.[4,5] Individuals over age 30 years report significantly less suicidal ideation,[4] although, some studies contradict these findings, suggesting that older depressed adults (≥65 years old) are a high-risk group for both suicidal ideation and attempted suicide.[6] A positive association was found between delusions and hallucinations, and impulsive suicidality in individuals who also have depression.[7,8]

A link was found between being single and suicidality, with single people having higher rates of suicide than their married peers.[9] In addition, numerous studies point to a significant association between poor social support and increased suicidal ideation.[10-12] It was also suggested an inverse relationship between time spent on hobbies and suicidal ideation.[13]

Although there are some contradictory findings on the links between anxiety and suicidal ideation, the majority of studies show that increased anxiety is associated with higher suicidal ideation.[14] One study reported that severe depression is highly associated with suicidality,[15] and hopelessness has been claimed as the strongest variable contributing to both depression and suicidal ideation.[11] Sleep disturbance additionally has emerged as strongly associated with high suicidal risk in depressive patients, and poor sleep quality has been linked to a higher frequency of suicidal ideation. A neurobiological explanation has been proposed for this particular relationship, with serotonergic dysfunction as the culprit.[3]

Deficits in working memory also have been associated with suicidality in patients with mood disorders because of the negative impact that memory impairments have on problem-solving skills.[16] However, few studies have investigated the possible links among insight, mood disorders, and suicidal ideation, and the limited research on the subject has failed to show a correlation between insight and suicidal risk in patients with depression.[17]

Recent studies on attention and suicidal ideation emphasize attention deficit/hyperactivity disorder as a factor that strongly contributes to suicidality in all age groups for both genders.[18] Generally speaking, it has been proposed that the presence of previous psychiatric disorders increases the risk of suicidal ideation,[19] and a positive correlation between previous psychiatric hospitalization and suicidal ideation has been reported.[20]

Numerous cross-sectional studies have revealed that substance abuse is positively correlated with suicidality.[21] Smoking has also been reported as a contributing factor for suicidality,[22,23] as have childhood sexual, physical, and emotional abuses.[24]

A family history of depression and parent psychiatric disorder is also a risk factor for suicidal ideation in young children.[25] Similarly, a family history of suicidal behavior was reported to be a risk factor for suicidal ideation.[26] Regarding family relationships, good communication with parents decreases suicidal ideation in all age groups,[27] and a negative relationship with family correlates with an increased suicide risk in depressed adolescents.[28] Adolescents are less likely to have suicidal ideation when they perceive their fathers as supportive and their parents as caring. Maternal warmth has been found to have an indirect effect, whereas paternal warmth directly affects suicidal ideation, mediated by depression.[29]

Finally, patients with severe head and extracranial injuries carry a high risk of suicidal ideation even many years after the injury.[30] Given the well-established previous research on all of the above factors associated with increases or decreases in suicidal ideation, we aimed to (1) further elucidate the relationship between some of these well-known factors, such as depression and family relationships and (2) investigate other possible variables that may significantly affect suicidal ideation. The new variables that we evaluated are quality of life, libido, appetite, and conversive seizures. We hypothesized that high quality of life and efficient social support would alleviate suicidal ideation and that sleep disturbances, decreased appetite, decreased libido, difficulty with memory and attention, and comorbid physical and psychiatric illnesses may increase the rate of suicidal ideation.

METHODS

Study design and setting

A psychiatrist gathered demographic and clinical data from all participants. Data were collected between March 1, 2011, and May 1, 2017. Each session, a semi-structured interview was conducted in which each participant was asked if they have suicidal ideation and responses to the 532 items of the interview were coded in an SPSS file. The change in the suicidal ideation was examined based on the first session. Afterwards, the Turkish versions of the Hamilton Depression Scale (HAMD),[31] Hamilton Anxiety Rating Scale (HARS),[32] Insight Evaluation Scale (INSIGHT),[33] and the Quality of Life Scale (WHOQOL-BREF),[34] were begun to apply in each sessions between April 2016 and April 2017; a sub-group was created. Only the WHOQOL-BREF was self-rated by the participants, and the rest were filled out by the psychiatrist conducting the interview. HAMD, HARS and INSIGHT examine the current situation of the participant; whereas WHOQOL-BREF examines the previous two weeks.

All participants included in study were drug-free in the first session.

Since it was a naturalistic study, ethics committee approval and informed consent were not needed.

Participants

Clinical data were collected in a private psychiatry clinic in Istanbul, Turkey, over 6 years. A total of 1902 drug-free depressed patients (56.9% female, 43.1% male) with a mean age of 37.79 (standard deviation 12.4 years) were enrolled for this analysis. Depression was indicated according to DSM IV-R criteria. Participants who had additional diagnosis were not included to the study.

Outcomes

Outcomes were assessed by the psychiatrist and from the results from the HAMD, HARS, INSIGHT, and WHOQOL-BREF. The association between suicidal ideation and the following variables was assessed: gender, age, marital status, quality of life, social relationships, time spent on hobbies, severity of depression, severity of anxiety, sleep disturbances, decreased appetite, decreased libido, difficulty with memory and attention, delusions and hallucinations, decreased insight, history of psychiatric disorder, family history of psychiatric disorder, family history of suicide, history of hospitalization, smoking, and other drugs, childhood trauma, relationships with mother and/or father, history of head trauma, and conversive seizures.

Sample size and statistical analysis

Of the 1902 participants, 52.4% declared suicidal ideation. Chi-squared analysis was applied for categorical data. Independent samples t tests were used to analyze the age differences. The variables were also used for binary logistic analysis with a backward (Likelihood Ratio) LR stepwise elimination method. Using the 'Enter' method, p and odds ratio (OR) values for each variable obtained at the final step of the elimination were generated.

The necessary subject size was calculated based on standard deviations of HAMD and WHOQOL-BREF results. We found that n=37 for each group was sufficient for a 95% confidence level and 80% power, with 10 points of difference and standard deviation of 15. In addition, because we were planning a multivariate analysis, a 10% increase in sample size was needed for each variable of 12. Thus, 120 participants for each group were enough for the multivariate analysis.

For further analyses, we used data for 317 patients and their scores for HAMD, HARS, WHOQOL-BREF, and INSIGHT collected within the last year (April 2016 to April 2017). Of this group, 41.3% declared suicidal ideation. The same univariate analysis as above was applied for this particular group. The variables that reached the cut-off of p <0.10 were retained. In addition to those variables, age, gender, and family history of suicide were included. This group of variables was used for the binary logistic regression with the 'enter' method for multivariate analysis. With this analysis, the effects of all variables ex-cept gender and the scale scores disappeared; thus, if area under the curve scores were significant, further analysis was done by using the Youden Index to identify the discriminative power of each scale in terms of suicidal ideation. In this way, a cut-off for specificity and sensitivity of the scales was calculated. All of the analyses were performed using SPSS version 20, and significance was set at p<0.05.

RESULTS

Participant characteristics

During the 6-year evaluation, 1082 women (mean age 36.46, standard deviation 12.60) and 820 men (mean age 34.94, standard deviation 12.20) and 6 with missing data were enrolled in the study. A total of 999 participants (52.4%) reported suicidal ideation.

Analysis of the overall dataset

Univariate analysis (Table 1) of the total data for which scale scores were not included showed that suicidal ideation correlated with all variables except gender. Using the same variables, we conducted multivariate analyses, namely binary logistic regression, on data from a total of 1902 participants to better understand which of the variables had predictive value for suicidal ideation. The results showed that gender, age, family history of suicide, relationship with father, conversive seizures, illicit drug use, impaired attention, hospitalization, decreased appetite, decreased libido, and insufficient social relationships were predictive (Table 1).

Table 1. Predictors of suicidal ideation in large dataset without psychiatric diagnostic scales

	Univariate tests (suicidal ideation=999/1902)				Binary logistic regression with the 'enter' method for the variables, which has efficient on last step of backward LR (n=1149)				
	Existence of suicidal ideation	Non-existence of suicidal ideation	Test value	p	beta	p	OR		95% CI of OR
Gender (male)	413/999 (41.3%)	407/903 (45.1%)	X^2=2.691	0.101	-0.119	0.067	0.887	0.781	1.008
Age (mean±SD (n))	34.23±11.83 (999)	37.53±12.95 (902)	t=5.796	p<0.0001	-0.014	0.012	0.986	0.976	0.997
Family history of suicide	133/998 (13.3%)	65/843 (7.7%)	X^2=15.017	0.0001	0.153	0.157	1.166	0.943	1.442
Mother, relationship	188/990 (19%)	116/836 (13.9%)	X^2=8.543	0.003					
Father, relationship	335/987 (33.9%)	186/829 (22.4%)	X^2=29.149	<0.0001	0.252	0.001	1.287	1.109	1.494
Conversive seizures	182/998 (18.2%)	87/842 (10.3%)	X^2=22.857	<0.0001	0.425	<0.0001	1.529	1.268	1.843
Memory	669/994 (67.3%)	487/857 (56.8%)	X^2=21.546	<0.0001	0.105	0.107	1.111	0.978	1.263
Childhood conditions	235/998 (23.5%)	160/846 (18.9%)	X^2=5.843	0.016	0.056	0.484	1.058	0.904	1.238
Use of illicit drugs	138/999 (13.8%)	73/843 (8.7%)	X^2=11.975	0.001	0.237	0.044	1.267	1.007	1.595
Attention	688/995 (69.1%)	452/856 (52.8%)	X^2=51.944	<0.0001					
Hallucinations or delusions	197/993 (19.8%)	106/837 (12.7%)	X^2=16.920	<0.0001					
Hospitalization	106/999 (10.6%)	34/843 (4%)	X^2=28.165	<0.0001	0.561	<0.0001	1.752	1.318	2.329
Time spent for hobbies	247/517 (47.8%)	242/431 (56.1%)	X^2=6.598	0.010					
Decreased appetite	624/996 (62.7%)	414/855 (48.4%)	X^2=37.820	<0.0001	0.336	<0.0001	1.400	1.235	1.586
Head trauma	63/997 (6.3%)	29/842 (3.4%)	X^2=7.938	0.005					
Decreased libido	531/988 (53.7%)	368/844 (43.6%)	X^2=18.738	<0.0001					
Personal psychiatric disorder	584/998 (58.5%)	437/844 (51.8%)	X^2=8.408	0.004	0.045	0.484	1.046	0.923	1.185
Smoking	545/999 (54.6%)	397/843 (47.1%)	X^2=10.185	0.001					
Social relationships	524/983 (53.3%)	310/834 (37.2%)	X^2=47.309	<0.0001	0.220	0.001	1.246	1.098	1.414
Family psychiatric disorder	524/998 (52.5%)	398/843 (47.2%)	X^2=5.121	0.024					
Insomnia	769/997 (77.1%)	542/857 (63.2%)	X^2=42.917	<0.0001					
Marital status	422/623 (67.7%)	420/574 (73.2%)	X^2=18.726	<0.0001	-0.003	0.971	0.997	0.866	1.148

Model, chi square=154, p<0.0001; Hosmer–Lemeshow goodness of fit, p=0.11; overall correct classification, 65.4%

Analysis of the data subsets

When we conducted univariate analysis on the data collected from the subjects to whom the scales were applied, we found that based on WHOQOL-BREF, HAMD, and HARS, attention, hallucination and/or delusions, hospitalization, decreased appetite, and poor social relationships were significant correlates of suicidal ideation. We then used all of these significant variables plus the variables with p values <0.10 (conversive seizure, illicit drug use, insomnia) and clinically indispensable variables (gender, age, family history of suicide) for the multivariate analysis. Logistic regression with the 'enter' method for this data subset showed that gender and the WHOQOL-BREF, HAMD, HARS, and INSIGHT scores predicted suicidal ideation. Specifically, suicidal ideation correlated positively with HAMD scores and negatively with WHOQOL-BREF, HARS, and INSIGHT scores (Table 2).

Receiver operating characteristic curve analysis was also conducted for each gender separately. The cut-off score for WHOQOL-BREF was 75 for each gender. HAMD cut-off scores were 14 for women and 21 for men. Thus, even lower scores in the HAMD scale were found to be predictive among women. In contrast, HARS scores had to reach at least 24 points to be predictive for women. HARS scores were not predictive at all for the male participants. INSIGHT scores were not significant for either men or women (Table 3).

DISCUSSION

Many of the correlations that we found in the overall dataset are supported by previous studies, such as the rate of suicidal ideation increases as age decreasese.[4] In addition, our findings regarding the association between suicidal ideation and female gender, memory and attention impairments, and psychosis (i.e., hallucinations and/or delusions) are also supported by previous research,[4,5,7,8,11,19] as is the association we found between insomnia and suicidal ideation.[16] Having any kind of previous psychiatric disorders, family history of suicide, cigarette smoking or use of illicit drugs, childhood trauma, head trauma, any kind of family history of psychiatric illness, problems with social, maternal, or paternal relationships, being alone, conversive seizures, reduced time spent for hobbies, history of hospitalization, decrease in appetite, and decreased libido all tended to increase suicidal ideation, in line with the literature[20,22,25, 27,31]

When we looked at the associations of the participants for whom scales results were available, we found that low WHOQOL-BREF, high HAMD, low HARS, problems with attention, psychotic experiences like hallucinations, a hospitalization history, decreased appetite, and problems with social relations were associated with suicidal ideation. All of these associations have previously been described,[2,7,8,11,12,15,18,20] with only a low anxiety level being contrary to the previous findings.

Table 2. Role of HAMD, HARS, WHOQOL-BREF, and INSIGHT in suicidal ideation

	Univariate tests (suicidal ideation=131/311)				Logistic regression with 'enter' method (suicidal ideation=103/234)				
	Existence of suicidal ideation	Non-existence of suicidal ideation	Test values	p	beta	p	OR	95% CI of OR	
Gender (male)	61/131 (46.6%)	88/180 (48.9%)	X2=0.164	0.685	-0.333	**0.047**	0.717	0.516	0.99
Age (mean±SD (n))	35.08±12.52 (131)	36.04±12.79 (181)	t=0.665	0.506	-0.006	0.687	0.994	0.966	1.02
WHOQOL-BREF (mean±SD (n))	72.1±16.56 (125)	82.02±15.28 (162)	t=5.257	**<0.0001**	-0.048	**0.00001**	0.953	0.930	0.97
HAMD (mean±SD (n))	22.29±10.6 (130)	16.74±9.57 (181)	t=4.823	**<0.0001**	0.061	**0.012**	1.063	1.014	1.11
HARS (mean±SD (n))	25.1±11.47 (129)	21.56±11.33 (177)	t=2.682	**0.008**	-0.047	**0.026**	0.954	0.915	0.99
INSIGHT (mean±SD (n))	12.81±2.46 (114)	13.08±2.43 (168)	t=0.931	0.353	-0.185	**0.006**	0.831	0.728	0.94
Family history of suicide	18/130 (13.8%)	19/176 (10.8%)	X2=0.655	0.418	-0.013	0.956	0.987	0.624	1.56
Mother, relationship	23/129 (17.8%)	26/176 (14.8%)	X2=0.516	0.473					
Father, relationship	39/129 (30.2%)	47/175 (26.9%)	X2=0.417	0.518					
Conversive seizures	23/131 (17.6%)	18/176 (10.2%)	X2=3.487	0.062	0.328	0.148	1.389	0.890	2.16
Memory	83/130 (63.8%)	109/176 (61.9%)	X2=0.117	0.732					
Childhood conditions	39/130 (30%)	46/178 (25.8%)	X2=0.650	0.420					
Use of illicit drugs	22/131 (16.8%)	17/176 (9.7%)	X2=3.447	0.063	0.159	0.488	1.172	0.748	1.83
Attention	99/130 (76.2%)	107/176 (60.8%)	X2=8.017	**0.005**	0.232	0.189	1.261	0.892	1.78
Hallucinations or delusions	37/129 (28.7%)	34/176 (19.3%)	X2=3.635	**0.056**	0.039	0.837	1.039	0.720	1.50
Hospitalization	16/131 (12.2%)	9/176 (5.1%)	X2=5.061	**0.024**	0.447	0.168	1.563	0.828	2.94
Time spent for hobbies	45/92 (48.9%)	62/123 (50.4%)	X2=0.047	0.828					
Decreased appetite	80/131 (61.1%)	87/176 (49.4%)	X2=4.100	**0.043**	-0.048	0.786	0.953	0.676	1.34
Head trauma	8/131 (6.1%)	7/176 (4%)	X2=0.733	0.392					
Libido	72/131 (55%)	89/176 (50.6%)	X2=0.581	0.446					
Personal psychiatric disorder	36/131 (27%)	57/177 (32%)	X2=0.797	0.372					
Smoking	73/131 (55.7%)	91/176 (51.7%)	X2=0.488	0.485					
Social relationships	74/128 (57.8%)	79/177 (44.6%)	X2=5.161	**0.023**	0.096	0.553	1.101	0.801	1.51
Family psychiatric disorder	63/130 (48.5%)	89/176 (50.6%)	X2=0.133	0.716					
Insomnia	103/131 (78.6%)	121/176 (68.8%)	X2=3.713	0.054	0.022	0.913	1.022	0.688	1.51
Marital status	60/79 (75.9%)	78/105 (74.3%)	X2=0.751	0.386					

Model chi-square=57.72, p<0.0001; Hosmer–Leme
show goodness of fit, p=0.11; overall correct classifi
cation, 71.8%

WHOQOL-BREF, Quality of Life Scale; HARS, Hamilton Anxiety Scale; HAMD, Hamilton Depression Scale; INSIGHT, Insight Evaluation Scale.

For the larger population, we used a backward elimination model with binary regression. At the final step of the model, being female, younger age, a family history of suicide, poor social and paternal relationships, conversive seizures, use of illicit drugs, impaired attention, history of hospitalization, decreased appetite, and reduced libido were predictive. For this second analysis, we found that being female and having high HAMD scores were predictive. At the same time, low HARS, low INSIGHT, and low WHOQOL-BREF scores were also predictive for suicidal ideation. Regardless of the statistical approach used in each of these analyses, the findings were almost the same, so that the results of the analyses were consistent with each other.

conversive seizures, little time for hobbies, history of hospitalization, decreased appetite, and low libido are all correlates of suicidal ideation identified here. Being female, having a low quality of life, severe depression, or low insight, and a lack of anxiety about the situation are the most powerful predictors of progressing suicidal ideation. Finally, the HAMD, HARS, and WHOQOL-BREF scales all look promising as follow-up tools in these patients.

Given our finding that as anxiety increased, rates of suicidal ideation might tend to decrease; anxiety may serve as both a protective and predictive factor in suicidal ideation. Thus, with the elimination of the additional diagnosis; provocation of anxiety may be helpful in

Table 3. ROC curves for scales

	Male (suicidal ideation=88/149 (59.1%))						Female (suicidal ideation=92/162 (56.8%))					
	AUC	95% CI	p	Cut-off	Sp (%)	Sn (%)	AUC	95% CI	p	Cut-off	Sp (%)	Sn (%)
HAMD	0.65	0.55 to 0.73	0.0004	>21	59	66.3	0.68	0.59 to 0.76	0.0016	>14	76.8	52.7
HARS	0.56	0.47 to 0.65	0.11	NS			0.61	0.52 to 0.69	0.036	>24	62.3	59.8
INSIGHT	0.57	0.48 to 0.66	0.06	NS			0.53	0.44 to 0.62	0.54	NS		
WHOQOL-BREF	0.66	0.57 to 0.75	0.0016	<76	61.4	67.5	0.74	0.65 to 0.81	<0.0001	<75	64.7	65.8

AUC, area under the curve; WHOQOL-BREF, Quality of Life Scale; HARS, Hamilton Anxiety Scale; HAMD, Hamilton Depression Scale; INSIGHT, Insight Evaluation Scale; Sp, specificity; Sn, sensitivity.

We also conducted receiver operating characteristic curve analysis for each gender separately and found that excluding the INSIGHT scale, the scales each have gender-specific value for monitoring for the presence of suicidal ideation. The implication is that they reliably can be used as follow-up tools.

Although previous studies support the finding that as insight increases, suicidal ideation decreases, there are some discrepancies regarding the relationship between anxiety and suicidal ideation in the literature.[14,15,18] Interestingly, we found that as anxiety increased, the rates of suicidal ideation tended to decrease; therefore, anxiety may serve as both a predictor and protective factor against suicidal ideation. This knowledge may be helpful for creating psychotherapeutic approaches for patients with suicidal ideation whether they declare or not.

To the best of our knowledge, this study is the first to find somatic symptoms of depression, such as decreased libido and decreased appetite, low quality of life, family history of psychiatric disorder, and conversive seizures as factors that contribute to increased suicidal ideation.

Limitations

A major limitation of this study is that the data were collected in a private psychiatric center. A multi-center analysis involving populations with different cultural characteristics is needed, as are prospective studies to confirm the clinical validity of these findings.

For future studies, the comorbid diagnosis of the patients may be a included to the evaluation.

Conclusions

This study identifies correlates, predictors, preventive measures, and follow-up tools related to suicidal ideation. Younger age, memory and attention impairments, psychosis (i.e., hallucinations and/or delusions), insomnia, any kind of previous psychiatric disorders, family history of suicide, cigarette smoking or illicit drug use, childhood trauma, head trauma, any kind of family history of psychiatric illness, problems with social, maternal, or paternal relationships, being alone, having

resolving suicidal ideation to some extent. In addition, the presence of insight regarding depression and a low level of depression severity and an increase in the WHOQOL-BREF parameters of spending enough time on hobbies and having enough social support (i.e., maternal, paternal, and social relations) also seem protective against suicidal ideation.

REFERENCES

1. WHO. The Global Burden of Disease: 2004 Update. Geneva: WHO Press; 2008: 59.

2. Nugent WR, Williams M. The Relationship between the comorbidity of depression with problems in psychosocial functioning and the severity of suicidal ideation. Soc Serv Rev, 2001; 7(4):581-604.

3. Bernert RA, Joiner TE. Sleep disturbances and suicide risk: A review of the literature. Neuropsychiatr Dis Treat, 2007; 3(6):735–743.

4. Crosby AE, Han B, Ortega LAG, Parks SE, Gfroerer J. Suicidal thoughts and behaviors among adults aged ≥18 years ——United States, 2008–2009. MMWR Morb Mortal Wkly Rep, 2011; 60(3):1-22.

5. Yoshimasu K, Sugahara H, Tokunaga S, Akamine M, Kondo T, Fujisawa K, et al. Gender differences in psychiatric symptoms related to suicidal ideation in Japanese patients with depression. Psychiatry Clin Neurosci, 2006; 60(5):563–569.

6. Bruine de Bruin W, Dombrovski AY, Parker AM, Szanto K. Late-life Depression, suicidal ideation, and attempted suicide: The role of individual differences in maximizing, regret, and negative decision outcomes. J Behav Decis Mak, 2016; 29(4):363-372.

7. Koyanagi A, Stickley A, Haro JM. Subclinical psychosis and suicidal behavior in England: Findings from the 2007 Adult Psychiatric Morbidity Survey. Schizophr Res, 2016; 168(1-2):62-67.

8. Fredriksen KJ, Schoeyen HK, Johannessen JO, Walby FA, Davidson L, Schaufel M. A. Psychotic depression and suicidal behavior. Psychiatry, 2017; 80(1):17-29.

9. Kposowa AJ. Marital status and suicide in the national longitudinal mortality study. J Epidemiol Community Health, 2000; 54(4):254–261.

10. Almeida OP, Draper B, Snowdon J, Lautenschlager NT, Pirkis J, Byrne G, et al. Factors associated with suicidal thoughts in a large community study of older adults. Br J Psychiatry, 2012; 201(6):466–472.

11. Iliceto P, D'Antuono L, Cassara L, Giacolini T, Sabatello U, Candilera G. Obsessive-compulsive tendencies, self/other perception, personality, and suicidal ideation in a non-clinical sample. Psychiatr Q, 2017; 88(2):411-422.

12. VanDerHorst RK, McLaren S. Social relationships as predictors of depression and suicidal ideation in older adults. Aging Ment Health, 2005; 9(6):517–525.

13. Ra CK, Cho Y. Differentiated effects of social participation components on suicidal ideation across age groups in South Korea. BMC Public Health, 2013; 13(1):1.

14. Bentley KH, Franklin JC, Ribeiro JD, Kleiman EM, Fox K, Nock MK. Anxiety and its disorders as risk factors for suicidal thoughts and behaviors: A meta-analytic review. Clin Psychol Rev, 2016; 43:30-46.

15. Findlay L. Depression and suicidal ideation among Canadians aged 15 to 24. Health Rep, 2017; 28(1):3-11.

16. Giner L, Blasco-Fontecilla H, La Vega DD, Courtet P. Cognitive, emotional, temperament, and personality trait correlates of suicidal behavior. Curr Psychiatry Rep, 2016; 18(11):102.

17. Silva RA, Mograbi DC, Bifano J, Santana CM, Cheniaux, E. Correlation between insight level and suicidal behavior/ideation in bipolar depression. Psychiatr Q, 2017; 88(1): 47-53.

18. Balazs J, Kereszteny A. Attention-deficit/hyperactivity disorder and suicide: A systematic review. World J Psychiatry, 2017; 7(1):44-59.

19. Assari S. Ethnic and gender differences in additive effects of socio-economics, psychiatric disorders, and subjective religiosity on suicidal ideation among blacks. Int J Prev Med, 2015; 6(53):1-8.

20. Wolff JC, Davis S, Liu RT, Cha CB, Cheek SM, Nestor BA, et al. Trajectories of suicidal ideation among adolescents following psychiatric hospitalization. J Abnorm Child Psychol, 2018; 46(2):355-363.

21. Rivers I. Suicidal ideation and alcohol use: Understanding developmental trajectories. J Adolesc Health, 2017; 60(4):357.

22. Poorolajal J, Darvishi N. Smoking and suicide: A meta-analysis. PLoS ONE, 2016; 11(7):1-18.

23. Sankaranarayanan A, Clark V, Baker A, Palazzi K, Lewin TJ, Richmond R, et al. Reducing smoking reduces suicidality among individuals with psychosis: Complementary outcomes from a Healthy Lifestyles intervention study. Psychiatry Res, 2016; 243:407-412.

24. Bahk YC, Jang SK, Choi KH, Lee SH. The relationship between childhood trauma and suicidal ideation: Role of maltreatment and potential mediators. Psychiatry Invest, 2017; 14(1):37-43.

25. Martin SE, Liu RT, Mernick LR, DeMarco M, Cheek SM, Spirito A, et al. Suicidal thoughts and behaviors in psychiatrically referred young children. Psychiatry Res, 2016; 246:308–313.

26. Lopez-Castroman J, Guillaume S, Olie´ E, Jaussent I, Baca-Garcia E, Courtet P. The additive effect on suicidality of family history of suicidal behavior and early traumatic experiences. Arch Suicide Res, 2015; 19:275–283.

27. Samm A, Tooding LM, Sisask M, Kõlves K, Aasvee K, Värnik A. Suicidal thoughts and depressive feelings amongst Estonian schoolchildren: effect of family relationship and family structure. Eur Child Adolesc Psychiatry, 2010; 19(5):457-468.

28. Consoli A, Peyre H, Speranza M, Hassler C, Falissard B, Touchette E, et al. Suicidal behaviors in depressed adolescents: Role of perceived relationships in the family. Child Adolesc Psychiatry Ment Health, 2013; 7(1):8.

29. Vega D. The relationship between familism and suicide attempts among Latina adolescents: Prevention and intervention efforts. J Res Women Gender, 2015; 5:62-70.

30. Kesinger MR, Juengst SB, Bertish H, Niemeir JP, Krellman JW, Pugh MJ, et al. Acute trauma factor associations with suicidality across the first 5 years after traumatic brain injury. Arch Phys Med Rehabil, 2016; 97(8):1301-1308.

31. Akdemir A, Orsel AD, Dag I, Turkcapar MH, Iscan N, Ozbay H. Hamilton depresyon derecelendirme ölçeği (HDDÖ) geçerliliği-güvenilirliği ve klinikte kullanımı. 3P Dergisi, 1996; 4(4):251-259.

32. Yazıcı MK, Demir B, Tanrıverdi N, Karaagaoğlu E, Yolaç P. Hamilton Anksiyete Değerlendirme Ölçeği, değerlendiriciler arası güvenirlik ve geçerlik çalışması. Turk J Psychiatry, 1998; 9(2):114-117.

33. Aslan S, Günay Kılıç B, Karakılıç H, Coşar B, Işıklı S, Işık E. İçgörünün üç bileşenini değerlendirme ölçeği: güvenilirlik ve geçerlik çalışması. Türkiye'de Psikiyatri, 2001; 3:17-24.

34. Fidaner H, Elbi H., Fidaner C, Eser SY, Eser E, Göker E. Psychometric properties of WHOQOL-100 and WHOQOL-BREF. 3P Dergisi, 1999; 7(2):23-40.