



GAMBLING INVOLVEMENT, HOPELESSNESS, AND SUICIDE-RELATED INDICATORS IN TÜRKİYE: A CROSS-SECTIONAL ONLINE SURVEY

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Abstract

Objective: We aimed to estimate gambling participation and positive screening for probable gambling disorder and to examine their associations with hopelessness and suicide-related outcomes in an online sample of adults in Türkiye.

Methods: In this cross-sectional web-based survey, 1,057 adults recruited online through non-probability convenience and snowball sampling completed the South Oaks Gambling Screen (SOGS), Beck Hopelessness Scale (BHS), and Suicide Probability Scale (SPS). Group differences were examined using non-parametric tests, followed by multivariable regression analyses.

Results: Gambling participation was reported by 30.7% (95% CI 28.0–33.6) of participants; 4.9% (95% CI 3.8–6.4) screened positive for probable gambling disorder using the Turkish SOGS cut-off of ≥ 8 . Participants reporting gambling had higher BHS and SPS scores, and differences were more pronounced among those screening positive for probable gambling disorder. The between-group difference in SPS scores among participants reporting gambling corresponded to a moderate-to-large effect ($r=0.497$, 95% CI 0.335–0.649). After covariate adjustment, gambling participation was associated with a 1.46-point higher BHS (95% CI 0.79–2.13) and 5.26-point higher SPS scores (95% CI 3.15–7.36). Among participants reporting gambling, positive screening was associated with 2.60-point higher BHS (95% CI 0.88–4.32) and 12.59-point higher SPS scores (95% CI 7.21–17.96). Gambling participation was also associated with histories of suicidal ideation (OR=1.71, 95% CI 1.17–2.50) and suicide attempt (OR=2.54, 95% CI 1.32–4.88).

Conclusion: Gambling involvement, particularly positive SOGS screening, was associated with greater hopelessness and suicide-related symptom burden. The cross-sectional design and non-probability sampling preclude causal interpretation and population-level prevalence estimates.

Keywords: *Gambling, Suicidal ideation, Hope, Behavior, Addictive.*

Introduction

Gambling is a common activity worldwide; however, for a minority of individuals, it may develop into a persistent pattern associated with clinically significant distress or functional impairment. Gambling disorder (GD) is classified within the substance-related and addictive disorders in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision.¹ A recent systematic review and meta-analysis of 366 studies from 68 countries estimated that 46.2% of adults had participated in gambling during the previous 12 months, while 8.7% engaged in some form of risky gambling and 1.41% met criteria for problem gambling.² Data from Türkiye are limited. In the only nationwide epidemiological study to date, conducted with 5,008 individuals aged 15 years and above across 12 provinces using stratified random sampling and computer-assisted face-to-face interviews, 6.81% reported having gambled at least once in their lifetime, of whom 29.33% were gambling regularly at the time of data collection; sports betting (55.4%) and the national lottery (42.2%) were the most commonly reported forms.³ Estimates from samples in Türkiye using self-administered instruments have been considerably higher⁴, and no study conducted in Türkiye has examined gambling, hopelessness, and suicide-related outcomes together. Although only a minority of individuals who gamble develop severe problems, gambling-related financial, psychological, interpersonal, and social harms have led GD to be recognized as an important public health concern.⁵

Suicidality is among the most serious clinical outcomes associated with GD. A meta-analysis of 39 studies reported that 31% of individuals with GD had experienced suicidal ideation, 17% had made a suicide plan, and 16% had attempted suicide.⁶ A broader meta-analysis of 107 studies similarly found that individuals with gambling problems had higher odds of both suicidal ideation and suicide attempts than those without gambling problems, although the available evidence was insufficient to establish the direction or causality of this association.⁷ More recently, a Norwegian registry-based cohort study found that patients diagnosed with GD had an elevated risk of suicide mortality compared with the general population.⁸ Gambling-related losses may contribute to suicidal symptoms through financial stress, interpersonal conflict, shame, and psychiatric comorbidity; conversely, individuals experiencing pre-existing psychological distress may engage in gambling as an avoidant or escape-oriented coping strategy. These possibilities suggest that the relationship between gambling and suicidality may be complex and potentially bidirectional.

Hopelessness, defined as a pattern of negative expectations about the future and the perception that adverse circumstances are unlikely to improve, is strongly associated with suicidal thoughts and behaviors.^{9,10} Emerging evidence suggests that hopelessness may also be relevant to gambling-related problems. In a study examining personality-based vulnerability to problematic gambling, hopelessness was associated with concurrent gambling problems and predicted escalation in gambling problems over six months.¹¹ Nevertheless, evidence regarding the extent to which hopelessness contributes to the statistical association between gambling involvement and suicide-related symptoms remains limited, particularly in non-treatment-seeking samples from Türkiye.

The present study aimed to (1) estimate the proportions of participants reporting gambling participation and screening

positive for probable gambling disorder, (2) compare hopelessness and suicide-related outcomes according to gambling participation and screening status, and (3) examine whether these associations persisted after adjustment for sociodemographic and clinical covariates. We hypothesized that participants reporting gambling, particularly those screening positive for probable gambling disorder, would have higher BHS and SPS scores and more frequent histories of suicidal ideation and suicide attempts. Indirect-effect and interaction analyses were conducted as secondary exploratory analyses because of the cross-sectional design.

Methods

Sample and Procedure

This study is a cross-sectional study conducted between January 2, 2025, and February 2, 2025. All participants were reached via a questionnaire created through Google Forms. The questionnaire included the South Oaks Gambling Screen (SOGS)¹², the Beck Hopelessness Scale (BHS)⁹, the Suicide Probability Scale (SPS)¹³, and a socio-demographic data form. An introductory note explaining the purpose of the study in detail and a confidentiality statement assuring the protection of the participants' data were provided. A consent section stating that participation in the survey was voluntary was added, and online informed consent was obtained from those who agreed to participate voluntarily. After the informed consent was obtained, participants who agreed to take part in the study proceeded to complete the questionnaires. The survey link was distributed through the researchers' personal and professional networks on WhatsApp using convenience and snowball sampling. Inclusion criteria for the study were being over the age of 18 and having at least a primary school education (to ensure sufficient comprehension of the scales). Exclusion criteria included a self-reported diagnosis of schizophrenia-spectrum disorder, bipolar disorder, intellectual disability, alcohol use disorder, or substance use disorder. Ethical approval for the study was obtained from the Akdeniz University Medical Scientific Research Ethics Committee, decision number TBAEK-42, on January 2, 2025. All phases of the study were conducted in accordance with the principles of the Declaration of Helsinki.

South Oaks Gambling Screen Turkish Version: The SOGS contains 26 questions, of which 20 scored items contribute to a total score ranging from 0 to 20. In the Turkish validation study, a score of ≥ 8 was proposed to identify probable pathological gambling; in the present study, this threshold was interpreted as positive screening for probable gambling disorder.¹⁴

Beck Hopelessness Scale: This is a self-report scale consisting of 20 items. Items are scored between 0 and 1. The items are answered in a yes/no format. The score ranges from 0 to 20. There is no cut-off point; however, higher scores are interpreted as indicating higher levels of hopelessness.¹⁵

Suicide Probability Scale: This scale consists of 36 items and is a Likert scale. It is a self-report scale. The possible total score ranges from 36 to 144. There is no cut-off point. Higher scores indicate a greater risk (probability) of suicide.¹⁶

Statistical Analysis

Statistical analyses were performed using SPSS version 23.0, jamovi version 2.4, and Python version 3.13.5 with the statsmodels 0.14.6 and SciPy 1.17.0 packages. All tests were two-sided, and $p < 0.05$ was considered statistically significant. Continuous variables are presented as

mean±standard deviation and median with interquartile range, and categorical variables as counts and percentages. Distributional assumptions were evaluated using histograms, Q–Q plots, skewness, and kurtosis. Because SOGS, BHS, and SPS scores showed substantial departures from normality, particularly the zero-heavy and overdispersed SOGS distribution, non-parametric and count-based methods were used where appropriate. Sample proportions were reported with Wilson 95% confidence intervals. Continuous and categorical variables were compared using the Mann–Whitney U test and appropriate chi-square or exact tests, respectively. Effect sizes were expressed as rank-biserial correlations or Cramér's V. P-values for the original 17 comparisons within each panel of Table 2 were adjusted using the Benjamini–Hochberg false discovery rate procedure. Associations between continuous variables were assessed using Spearman's rho with bootstrap 95% confidence intervals. Table 2 reports effect sizes with 95% confidence intervals from 5,000 stratified bootstrap resamples (percentile method; resampling within groups).

Primary multivariable analyses treated BHS and SPS scores as continuous outcomes. Gambling participation in the full sample, positive SOGS screening among participants reporting gambling, and continuous SOGS scores were examined in separate linear-regression models using heteroskedasticity-consistent HC3 standard errors. BHS and SPS were analyzed in separate models because of their conceptual and statistical overlap. Separate logistic-regression models examined histories of suicidal ideation and suicide attempt. Because only 44 participants reported a previous suicide attempt, the suicide-attempt model used a restricted covariate set to reduce overfitting. Covariates were entered simultaneously without stepwise selection.

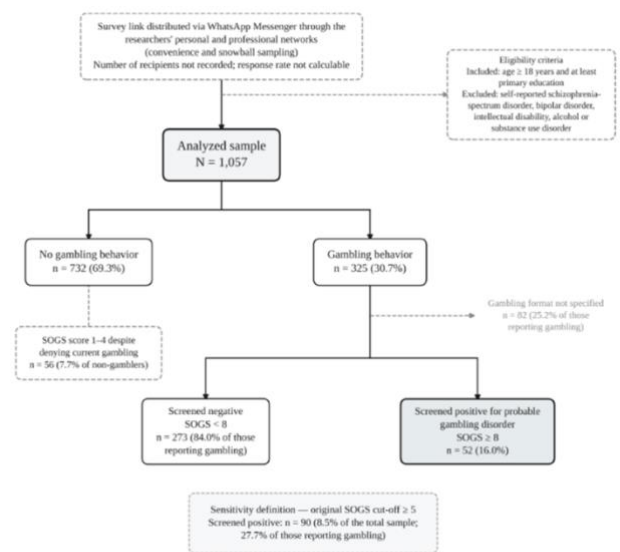
Secondary exploratory analyses examined factors associated with gambling participation and positive SOGS screening using logistic regression and factors associated with SOGS scores using negative binomial regression. In the secondary logistic- and negative binomial regression models, BHS and SPS scores were entered separately in parallel models with otherwise identical covariate sets. Multicollinearity was assessed using variance inflation factors, and logistic-model calibration and discrimination were evaluated using the Hosmer–Lemeshow goodness-of-fit test and the area under the receiver operating characteristic curve, with Hosmer–Lemeshow statistics reported in Table 5. Exploratory indirect-effect models evaluated the indirect statistical association between gambling indicators and SPS scores through BHS scores using 5,000 bootstrap resamples. Effect modification by screening status was examined using interaction terms and comparisons of Spearman correlations. In Table 5, estimates are presented with 95% confidence intervals; coefficients whose confidence interval excluded the null value of 1 are marked with an asterisk. Sensitivity analyses used the original SOGS cut-off of ≥ 5 , median regression, and alternative model specifications.

Results

Sample characteristics and observed gambling proportions

A total of 1,057 adults participated in the study (Figure 1). The mean age was 37.45 ± 11.34 years, and 507 participants (48.0%) were women. Most participants were university graduates (88.3%), employed (78.5%), and married (57.8%). Overall, 25.3% reported a previous psychiatric diagnosis. The

median BHS score was 3.00 (Q1–Q3: 1.00–7.00), and the median SPS score was 61.00 (Q1–Q3: 53.00–73.00). Table 1 presents the sociodemographic and clinical characteristics of the sample.



Dashed boxes denote information that was not quantified at the time of data collection. Because the number of individuals who received the survey link was not recorded, view, participation, and completion rates could not be calculated. Percentages for screening status are calculated within participants reporting gambling behavior (n = 325). SOGS = South Oaks Gambling Screen.

Figure 1. Participant flow. Dashed boxes denote information that was not quantified at the time of data collection. Because the number of individuals who received the survey link was not recorded, view, participation, and completion rates could not be calculated. Percentages for screening status are calculated within participants reporting gambling behavior (n = 325). SOGS = South Oaks Gambling Screen.

Gambling participation was reported by 325 participants (30.7%, 95% CI 28.0–33.6). Among the 243 participants who specified gambling type, multi-format gambling was most common (42.8%), followed by sports betting (16.5%) and casino games (13.6%). Using the Turkish SOGS cut-off of ≥ 8 , 52 participants screened positive for probable gambling disorder, representing 4.9% (95% CI 3.8–6.4) of the total sample and 16.0% (95% CI 12.4–20.4) of participants reporting gambling.

Unadjusted comparisons according to gambling participation and screening status

Participants reporting gambling were more frequently male and current smokers and more often reported family gambling and histories of suicidal ideation and suicide attempt than participants not reporting gambling. They also had higher BHS and SPS scores, although the corresponding effect sizes were small ($r=0.184$ and $r=0.235$, respectively; Table 2).

Among participants reporting gambling, those screening positive for probable gambling disorder had lower educational attainment and more frequently reported current smoking, family gambling, suicidal ideation, and suicide attempt. They also had substantially higher BHS scores ($r=0.322$) and SPS scores ($r=0.497$) than screen-negative participants. The difference in SPS scores corresponded to a moderate-to-large effect and represented the strongest group difference observed in the study (Table 2).

Table 1. Sociodemographic and clinical characteristics of the participants (n=1,057).

Characteristic	n (%)		
Gender	Female	507 (48.0)	
	Male	550 (52.0)	
Marital status	Single	372 (35.2)	
	Married	611 (57.8)	
	Divorced	74 (7.0)	
Educational level	Primary/secondary	22 (2.1)	
	High school	102 (9.6)	
	University	933 (88.3)	
Employment status	Employed	830 (78.5)	
	Not employed	227 (21.5)	
History of legal issues	Yes	71 (6.7)	
	No	986 (93.3)	
History of psychiatric diagnosis	Yes	267 (25.3)	
	No	790 (74.7)	
Current smoking	Yes	399 (37.7)	
	No	658 (62.3)	
Family member who gambles	Yes	190 (18.0)	
	No	867 (82.0)	
History of suicidal ideation	Yes	173 (16.4)	
	No	884 (83.6)	
History of suicide attempt	Yes	44 (4.2)	
	No	1013 (95.8)	
Gambling participation	Yes	325 (30.7)	
	No	732 (69.3)	
Positive screening for probable gambling disorder, SOGS ≥8	Yes	52 (4.9)	
	No	1005 (95.1)	
Continuous variables	Mean±SD	Median (Q1–Q3)	Min–Max
Age (years)	37.45±11.34	37.00 (28.00–45.00)	18–71
Monthly income (TRY)	—	45000 (12000–80000)	0–2500000
Beck Hopelessness Scale	4.85±4.91	3.00 (1.00–7.00)	0–20
Suicide Probability Scale	64.65±15.74	61.00 (53.00–73.00)	36–130
SOGS total score	1.18±2.58	0.00 (0.00–1.00)	0–18
Number of ideation episodes (n=96)	—	2.00 (1.00–3.00)	1–15
Number of suicide attempts (n=39)	—	1.00 (1.00–2.00)	1–6

SOGS = South Oaks Gambling Screen; TRY = Turkish lira; SD = standard deviation; Q1–Q3 = interquartile range. Percentages are calculated over the total sample (n=1,057) unless otherwise stated. Data were complete for all variables entered into multivariable models; missing values were confined to conditional follow-up items, for which the valid n is reported in the row label.

Table 2. Comparisons according to gambling participation and probable gambling-disorder screening status.**Panel A.** Participants reporting gambling versus participants not reporting gambling

Variable	Category/statistic	Participants reporting gambling (n=325)	Participants not reporting gambling (n=732)	q ^a	ES ^b	95% CI ^c
Gender	Male	229 (70.5)	321 (43.9)	<0.001	0.246	0.188–0.301
	Female	96 (29.5)	411 (56.1)			
Educational level	Primary/secondary	10 (3.1)	12 (1.6)	0.064	0.078	0.028–0.149
	High school	40 (12.3)	62 (8.5)			
	University	275 (84.6)	658 (89.9)			
Employment status	Employed	248 (76.3)	582 (79.5)	0.311	0.036	0.002–0.097
	Not employed	77 (23.7)	150 (20.5)			
Current smoking	Yes	147 (45.2)	252 (34.4)	0.003	0.103	0.042–0.164
	No	178 (54.8)	480 (65.6)			
Family member who gambles	Yes	77 (23.7)	113 (15.4)	0.004	0.099	0.036–0.161
	No	248 (76.3)	619 (84.6)			
Previous psychiatric diagnosis	Yes	78 (24.0)	189 (25.8)	0.613	0.019	0.001–0.077
	No	247 (76.0)	543 (74.2)			
History of suicidal ideation	Yes	73 (22.5)	100 (13.7)	0.002	0.110	0.045–0.173
	No	252 (77.5)	632 (86.3)			
History of suicide attempt	Yes	22 (6.8)	22 (3.0)	0.012	0.087	0.020–0.155
	No	303 (93.2)	710 (97.0)			
Age (years)	Median (Q1–Q3)	35.00 (28.00–44.00)	37.00 (29.00–45.00)	0.099	–0.070	–0.146 to 0.007
Monthly income (TRY)	Median (Q1–Q3)	45 000 (15 000–70 000)	50 000 (10 000–80 000)	0.919	0.004	–0.070 to 0.080
Beck Hopelessness Scale	Median (Q1–Q3)	4.00 (2.00–10.00)	3.00 (1.00–6.00)	<0.001	0.184	0.109–0.258
Suicide Probability Scale	Median (Q1–Q3)	67.00 (57.00–79.00)	60.00 (52.00–70.00)	<0.001	0.235	0.161–0.307

Panel B. Screen-positive versus screen-negative participants among those reporting gambling

Variable	Category/statistic	Screen-positive (n=52)	Screen-negative (n=273)	q ^a	ES ^b	95% CI ^c
Gender	Male	43 (82.7)	186 (68.1)	0.086	0.117	0.021–0.207
	Female	9 (17.3)	87 (31.9)			
Educational level	Primary/secondary	2 (3.8)	8 (2.9)	0.002	0.222	0.099–0.366
	High school	15 (28.8)	25 (9.2)			
	University	35 (67.3)	240 (87.9)			
Employment status	Employed	41 (78.8)	207 (75.8)	0.724	0.026	0.002–0.129
	Not employed	11 (21.2)	66 (24.2)			
Current smoking	Yes	35 (67.3)	112 (41.0)	0.002	0.194	0.085–0.297
	No	17 (32.7)	161 (59.0)			
Family member who gambles	Yes	19 (36.5)	58 (21.2)	0.045	0.132	0.019–0.253
	No	33 (63.5)	215 (78.8)			
Previous psychiatric diagnosis	Yes	18 (34.6)	60 (22.0)	0.127	0.108	0.011–0.231
	No	34 (65.4)	213 (78.0)			
History of suicidal ideation	Yes	23 (44.2)	50 (18.3)	<0.001	0.228	0.106–0.350
	No	29 (55.8)	223 (81.7)			
History of suicide attempt	Yes	8 (15.4)	14 (5.1)	0.032	0.150	0.017–0.294
	No	44 (84.6)	259 (94.9)			
Age (years)	Median (Q1–Q3)	34.00 (27.00–40.50)	35.00 (28.00–45.00)	0.351	–0.093	–0.242 to 0.064
Monthly income (TRY)	Median (Q1–Q3)	34 500 (3 765–50 000)	50 000 (15 000–80 000)	0.131	–0.150	–0.317 to 0.012
Beck Hopelessness Scale	Median (Q1–Q3)	9.00 (3.00–14.00)	4.00 (1.00–8.00)	0.001	0.322	0.149–0.493
Suicide Probability Scale	Median (Q1–Q3)	85.50 (68.00–99.00)	64.00 (55.00–75.00)	<0.001	0.497	0.335–0.649

Positive screening for probable gambling disorder was defined as a SOGS score ≥ 8 . Categorical variables are presented as n (%) and continuous variables as median (Q1–Q3). Categorical variables were compared using Fisher's exact test (2×2 tables) or the Pearson chi-square test (larger tables); continuous variables were compared using the Mann–Whitney U test. ^a q = Benjamini–Hochberg false discovery rate–adjusted p-value across the original 17 comparisons in each panel. ^b ES = effect size: Cramér's V for categorical variables and rank-biserial correlation r for continuous variables. ^c 95% confidence intervals for effect sizes were obtained from 5,000 stratified bootstrap resamples (percentile method, resampling within groups). For educational level in Panel B, the Fisher–Freeman–Halton exact test was used because the minimum expected cell count was 1.60. SOGS = South Oaks Gambling Screen; TRY = Turkish lira; Q1–Q3 = interquartile range.

Adjusted associations with hopelessness and SPS scores

After adjustment for the prespecified covariates listed in Table 3, gambling participation was associated with a 1.46-point higher BHS score ($B=1.46$, 95% CI 0.79–2.13, $p<0.001$) and a 5.26-point higher SPS score ($B=5.26$, 95% CI 3.15–7.36, $p<0.001$). Among participants reporting gambling, positive screening for probable gambling disorder was associated with a 2.60-point higher BHS score ($B=2.60$, 95% CI 0.88–4.32, $p=0.003$) and a 12.59-point higher SPS score ($B=12.59$, 95% CI 7.21–17.96, $p<0.001$).

When SOGS score was analyzed continuously, each five-point increase was associated with a 2.01-point increase in BHS score (95% CI 1.33–2.68, $p<0.001$) and an 8.58-point increase in SPS score (95% CI 6.67–10.48, $p<0.001$) in the full sample. Among participants reporting gambling, the corresponding increases were 1.84 BHS points (95% CI 0.90–2.78, $p<0.001$) and 8.40 SPS points (95% CI 5.76–11.03, $p<0.001$; Table 3).

Table 3. Adjusted associations of gambling indicators with hopelessness and Suicide Probability Scale scores.

Gambling indicator	Analysis sample	BHS, adjusted B (95% CI)	P	SPS, adjusted B (95% CI)	P
Gambling participation (yes vs no)	Full sample (N=1,057) ^a	1.46 (0.79–2.13)	<0.001	5.26 (3.15–7.36)	<0.001
Positive screening for probable gambling disorder (SOGS ≥ 8; yes vs no)	Participants reporting gambling (n=325) ^b	2.60 (0.88–4.32)	0.003	12.59 (7.21–17.96)	<0.001
SOGS total score (per 5-point increase)	Full sample (N=1,057) ^a	2.01 (1.33–2.68)	<0.001	8.58 (6.67–10.48)	<0.001
SOGS total score (per 5-point increase)	Participants reporting gambling (n=325) ^b	1.84 (0.90–2.78)	<0.001	8.40 (5.76–11.03)	<0.001

B = unstandardized regression coefficient expressed in scale points; BHS = Beck Hopelessness Scale; SPS = Suicide Probability Scale; SOGS = South Oaks Gambling Screen; CI = confidence interval. Estimates were obtained from multivariable linear regression with heteroskedasticity-consistent HC3 standard errors. ^a Adjusted for age, sex, university education, employment status, current smoking, family gambling, history of legal issues, previous psychiatric diagnosis, and $\ln(\text{monthly income} + 1)$. ^b Models restricted to participants reporting gambling were adjusted for the same covariate set as the full-sample models.

Adjusted associations with suicidal ideation and suicide attempt

After covariate adjustment, gambling participation was associated with higher odds of a history of suicidal ideation (OR=1.71, 95% CI 1.17–2.50, $p=0.006$) and suicide attempt (OR=2.54, 95% CI 1.32–4.88, $p=0.005$). Among participants reporting gambling, positive screening for probable gambling disorder was associated with higher odds of suicidal ideation

(OR=2.96, 95% CI 1.44–6.07, $p=0.003$). The association with suicide attempt was in the same direction but was not statistically significant (OR=1.96, 95% CI 0.68–5.67, $p=0.212$). The precision of this estimate was limited because only 22 participants in the gambling subgroup reported a previous suicide attempt (Table 4).

Table 4. Adjusted associations of gambling indicators with histories of suicidal ideation and suicide attempt.

Gambling indicator	Analysis sample	Suicidal ideation, adjusted OR (95% CI)	P	Suicide attempt, adjusted OR (95% CI)	P
Gambling participation (yes vs no)	Full sample (N=1,057)	1.71 (1.17–2.50) ^a	0.006	2.54 (1.32–4.88) ^b	0.005
Positive screening for probable gambling disorder (SOGS ≥8; yes vs no)	Participants reporting gambling (n=325)	2.96 (1.44–6.07) ^c	0.003	1.96 (0.68–5.67) ^{c, d}	0.212

OR = odds ratio; CI = confidence interval; SOGS = South Oaks Gambling Screen. In the full sample, 173 participants reported a history of suicidal ideation, and 44 reported a history of suicide attempt. Among participants reporting gambling, the corresponding numbers were 73 and 22. ^a Adjusted for age, sex, university education, employment status, current smoking, family gambling, history of legal issues, previous psychiatric diagnosis, and $\ln(\text{monthly income} + 1)$. ^b Adjusted for age, sex, current smoking, and previous psychiatric diagnosis. ^c Adjusted for age, sex, current smoking, family gambling, and previous psychiatric diagnosis. ^d Exploratory estimate because only 22 participants in the gambling subgroup reported a previous suicide attempt; the confidence interval should be interpreted cautiously.

Secondary exploratory analyses

Factors associated with gambling outcomes

In multivariable models, male sex and family gambling were consistently and independently associated with gambling participation, positive screening for probable gambling disorder, and higher SOGS scores, whereas current smoking was more specifically associated with positive screening and with gambling severity. Higher BHS and SPS scores were

independently associated with all three gambling outcomes. Because the SPS contains a hopelessness subscale and the two instruments were strongly correlated in the full sample ($\rho=0.633$, 95% CI 0.589–0.671, $p<0.001$), each outcome was modeled twice with parallel specifications; the pattern of results was consistent across model pairs. Detailed estimates are presented in Table 5.

Table 5. Factors independently associated with gambling participation, positive screening for probable gambling disorder, and South Oaks Gambling Screen score.

Variable	Gambling participation (N=1,057) — logistic regression, OR (95% CI)		Positive screening for probable gambling disorder (n=325) — logistic regression, OR (95% CI)		SOGS score (N=1,057) — negative binomial regression, IRR (95% CI)	
	Model 1a (BHS)	Model 1b (SPS)	Model 2a (BHS)	Model 2b (SPS)	Model 3a (BHS)	Model 3b (SPS)
Male sex	3.26 (2.40–4.42)*	3.08 (2.27–4.18)*	2.58 (1.14–5.83)*	2.95 (1.26–6.94)*	3.49 (2.70–4.50)*	3.27 (2.55–4.20)*
Age (per year)	0.99 (0.98–1.00)	0.99 (0.98–1.00)	0.98 (0.95–1.01)	0.99 (0.96–1.02)	0.983 (0.973–0.994)*	0.990 (0.979–1.001)
University education	0.81 (0.53–1.24)	0.84 (0.54–1.29)	—	—	0.79 (0.54–1.14)	0.96 (0.66–1.39)
Not employed	1.32 (0.93–1.88)	1.29 (0.90–1.84)	—	—	1.18 (0.87–1.60)	1.19 (0.88–1.60)
Current smoking	1.32 (0.99–1.76)	1.28 (0.96–1.71)	2.59 (1.33–5.02)*	1.98 (0.99–3.95)	1.57 (1.23–2.01)*	1.44 (1.13–1.84)*
Family member who gambles	1.85 (1.30–2.63)*	1.83 (1.28–2.61)*	2.46 (1.23–4.93)*	2.34 (1.13–4.84)*	1.88 (1.39–2.55)*	1.90 (1.41–2.55)*
History of legal issues	1.65 (0.98–2.79)	1.58 (0.93–2.67)	—	—	1.51 (0.97–2.36)	1.31 (0.85–2.03)
Previous psychiatric diagnosis	0.92 (0.66–1.29)	0.89 (0.64–1.24)	—	—	1.06 (0.80–1.40)	0.92 (0.70–1.22)
Log monthly income	1.01 (0.98–1.05)	1.02 (0.98–1.05)	—	—	1.01 (0.98–1.05)	1.02 (0.99–1.05)
BHS (per point)	1.06 (1.03–1.09)*	—	1.11 (1.05–1.17)*	—	1.078 (1.052–1.105)*	—
SPS (per point)	—	1.02 (1.01–1.03)*	—	1.05 (1.03–1.07)*	—	1.034 (1.026–1.043)*
Model fit	R ² N=0.152; AUC=0.701; HL $\chi^2(8)=9.52$, $p=0.300$	R ² N=0.160; AUC=0.707; HL $\chi^2(8)=4.23$, $p=0.836$	R ² N=0.189; AUC=0.746; HL $\chi^2(8)=7.00$, $p=0.537$	R ² N=0.258; AUC=0.794; HL $\chi^2(8)=5.75$, $p=0.675$	AIC=2 708	AIC=2 673

OR = odds ratio; IRR = incidence rate ratio; CI = confidence interval; AUC = area under the receiver operating characteristic curve; R²N = Nagelkerke R²; AIC = Akaike information criterion; BHS = Beck Hopelessness Scale; SPS = Suicide Probability Scale; SOGS = South Oaks Gambling Screen. * Confidence interval excludes the null value of 1. HL = Hosmer–Lemeshow goodness-of-fit test (8 degrees of freedom); a non-significant result indicates no evidence of poor calibration. All covariates were entered simultaneously (enter method). Because the SPS contains a hopelessness subscale and correlates strongly with the BHS ($\rho=0.633$), two parallel models with an otherwise identical covariate set are presented for each outcome. Models 2a and 2b were restricted to participants reporting gambling (52 events) and were deliberately parsimonious to maintain an events-per-variable ratio of 10.4; variance inflation factors were <2.2 in all models. Negative binomial regression with a log link was selected for the SOGS score because the distribution was right-skewed with 64.0% zero values and marked overdispersion (variance-to-mean ratio 5.64); an ordinary least-squares model of the same data yielded an AIC of 4 791 ($R^2=0.199$).

Exploratory indirect-effect analyses

Exploratory models adjusted for age and sex identified statistically significant indirect associations between gambling indicators and SPS scores through BHS scores (Table 6). For gambling participation, the indirect association was 3.58 SPS points (bootstrap 95% CI 2.11–5.05). Because

all variables were measured concurrently and the BHS and SPS overlap conceptually, these findings represent statistical decompositions of covariance and should not be interpreted as evidence of causal mediation.

Table 6. Exploratory indirect-effect analyses involving hopelessness.

Predictor (X)	n	a (X → BHS)	b (BHS → SPS)	Total effect (c)	Direct effect (c')	Indirect effect (95% CI)
Gambling participation (yes vs no)	1 057	1.69***	2.12***	6.25***	2.67***	3.58 (2.11–5.05)
SOGS total score (per point)	1 057	0.46***	2.04***	1.96***	1.03***	0.94 (0.64–1.20)
Positive screening for probable gambling disorder (SOGS ≥8) ^a	325	3.23***	2.17***	16.15***	9.14***	7.01 (3.17–10.96)

BHS = Beck Hopelessness Scale; SPS = Suicide Probability Scale; CI = confidence interval. All models were adjusted for age and sex; coefficients are unstandardized and expressed in SPS points. Indirect effects and percentile confidence intervals were obtained from 5,000 bootstrap resamples. *** $p < 0.001$. ^a Restricted to participants reporting gambling. Given the cross-sectional design, these models represent a statistical decomposition of covariance and do not establish temporal or causal ordering.

Exploratory effect-modification analyses

Among participants reporting gambling, the correlation between BHS and SPS scores was numerically higher in participants screening positive for probable gambling disorder than in those screening negative ($\rho = 0.762$ vs $\rho = 0.665$). The difference between the two Spearman correlations was 0.097, with a bootstrap 95% confidence interval ranging from -0.058 to 0.218 , and a permutation test provided no statistically significant evidence that the correlations differed between the two groups ($p = 0.235$). Consistent with this, the BHS $\times$ screening-status interaction was not statistically significant in the full sample ($B = 0.49$, 95% CI -0.05 to 1.03 , $p = 0.074$) or among participants reporting gambling ($B = 0.40$, 95% CI -0.23 to 1.03 , $p = 0.213$). No statistically significant evidence of effect modification by screening status was therefore identified; however, the relatively small screen-positive subgroup ($n = 52$) limited the precision of the interaction estimates (Figure 2).

1.05–1.16, $p < 0.001$) remained independently associated with positive screening, whereas the association with current smoking was attenuated ($OR = 1.66$, $p = 0.073$). Median regression analyses produced results consistent with the robust linear regression models: gambling participation was associated with adjusted increases of 1.39 points in median BHS score (95% CI 0.82 – 1.95 , $p < 0.001$) and 5.81 points in median SPS score (95% CI 3.48 – 8.14 , $p < 0.001$), and among participants reporting gambling, positive screening was associated with adjusted increases of 3.82 BHS points (95% CI 2.14 – 5.51 , $p < 0.001$) and 13.58 SPS points (95% CI 7.90 – 19.26 , $p < 0.001$). Excluding log-transformed income from the multivariable models did not materially change the principal coefficients. Ordinary least-squares models of SOGS scores identified the same principal predictors as the negative binomial models, except that the association with suicide-attempt history was not robust across modeling approaches.

Discussion

In this online cross-sectional survey of 1,057 adults in Türkiye, 30.7% of participants reported gambling participation and 4.9% screened positive for probable gambling disorder using the Turkish SOGS cut-off of ≥ 8 . Participants reporting gambling had higher hopelessness and SPS scores than those not reporting gambling, and these differences were more pronounced among screen-positive participants. In particular, the difference in SPS scores between screen-positive and screen-negative participants corresponded to a moderate-to-large effect. Gambling participation was also independently associated with histories of suicidal ideation and suicide attempt.

Male sex and having a family member who gambled were consistently associated with gambling-related outcomes. Current smoking was more specifically associated with positive screening and greater SOGS scores than with gambling participation in general, suggesting that smoking may be more closely related to gambling severity than to gambling involvement itself.

Compared with the nationwide study from Türkiye, gambling patterns differed: sports betting predominated in the nationwide sample (55.4%), whereas involvement in more than one gambling format was the most common pattern in the present study (42.8% of participants who specified a gambling format). Multi-format involvement may indicate greater gambling intensity and may partly explain the relatively high proportion of screen-positive participants in the current sample.

The observed proportions should be interpreted as characteristics of this sample rather than as national prevalence estimates: the sample was recruited through non-probability online snowball distribution, was predominantly composed of university graduates and employed participants, and online surveys may over-represent individuals who

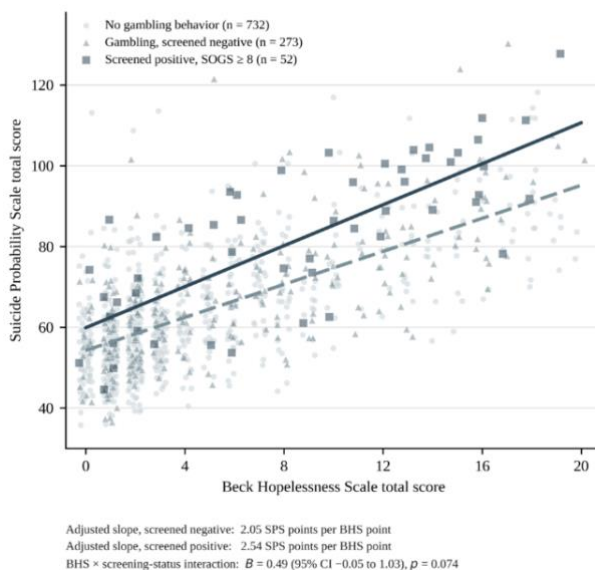


Figure 2. Association between hopelessness and Suicide Probability Scale scores according to gambling and screening status. Points are jittered to reduce overplotting. Regression lines are derived from a linear model including a BHS $\times$ screening-status interaction term, adjusted for age and sex and evaluated at sample mean values of those covariates. The interaction was not statistically significant, and participants screening positive occupied a higher position on both distributions rather than showing a steeper association. BHS = Beck Hopelessness Scale; SPS = Suicide Probability Scale; SOGS = South Oaks Gambling Screen.

Sensitivity analyses

Repeating the analyses using the original SOGS cut-off of ≥ 5 produced results consistent with those obtained using the Turkish cut-off of ≥ 8 . Male sex ($OR = 3.18$, 95% CI 1.61 – 6.25 , $p < 0.001$), family gambling ($OR = 2.37$, 95% CI 1.28 – 4.40 , $p = 0.006$), SPS score ($OR = 1.04$ per point, 95% CI 1.03 – 1.06 , $p < 0.001$), and BHS score ($OR = 1.10$ per point, 95% CI

gamble frequently or experience gambling-related problems.¹⁷ The screening instrument may also have contributed, because the SOGS assesses gambling-related problems over a broad, predominantly lifetime-oriented period and may yield relatively high estimates at lower cut-off values.¹⁸ The primary threshold of ≥ 8 followed the Turkish validation study and is compatible with recent clinical psychometric findings.^{14,19}

Gambling and suicide-related outcomes

The present findings are consistent with previous studies demonstrating an association between gambling problems and suicidal ideation, suicide attempts, and suicide mortality. Meta-analytic studies indicate that approximately one third of individuals with gambling problems report suicidal ideation and that a clinically important minority report previous suicide attempts.^{6,7} Register-based studies have also shown elevated suicide mortality among patients diagnosed with gambling disorder.^{8,20}

In the current sample, 44.2% of participants who screened positive at SOGS ≥ 8 reported previous suicidal ideation and 15.4% reported a previous suicide attempt. Their median SPS score was also substantially higher than that of participants who gambled but did not screen positive. Higher SPS scores remained associated with gambling participation, positive screening for probable gambling disorder, and greater SOGS scores after adjustment for relevant covariates.

The associations were also observed for directly reported suicide-related histories. After covariate adjustment, gambling participation was associated with higher odds of both suicidal ideation and suicide attempt. Among participants reporting gambling, positive screening for probable gambling disorder was associated with suicidal ideation, whereas the association with suicide-attempt history was imprecise and did not reach statistical significance. The latter finding should be interpreted cautiously because of the small number of suicide attempts in the gambling subgroup. These findings indicate a clinically important association but do not establish its direction. Gambling-related financial, interpersonal, and occupational difficulties may contribute to psychological distress and suicidality. Conversely, individuals experiencing pre-existing distress may use gambling as an avoidant or escape-oriented coping strategy. Gambling and suicidality may also share underlying factors such as depression, impulsivity, substance use, and socioeconomic adversity.

The SPS was analyzed as a continuous self-report measure and should not be considered equivalent to a structured clinical assessment of current suicidal intent or imminent suicide risk. Therefore, the findings support careful clinical assessment of suicidality among individuals with more severe gambling problems but should not be interpreted as direct estimates of future suicide events.

Hopelessness and gambling-related outcomes

Hopelessness is characterized by negative expectations about the future and the belief that adverse circumstances cannot be changed.⁹ It is a well-established correlate and predictor of suicidal thoughts and behaviors.¹⁰ Previous research has also linked hopelessness with gambling problems and gambling-related psychological vulnerability.¹¹

In this study, BHS scores were higher among participants who reported gambling and were substantially higher among participants who screened positive at SOGS ≥ 8 . Hopelessness was also independently associated with gambling participation, positive screening for probable gambling disorder, and greater SOGS scores. These findings suggest that hopelessness may be an important clinical characteristic

among individuals experiencing more severe gambling problems.

Exploratory analyses suggested an indirect statistical association between gambling indicators and SPS scores through hopelessness; because all measures were obtained concurrently and the SPS contains hopelessness-related content, these results are hypothesis-generating rather than evidence of causal mediation. Interaction analyses did not provide significant evidence that the association between BHS and SPS differed by screening status, although the small screen-positive subgroup limited precision.

Other correlates of gambling

Male sex and family gambling were consistently associated with gambling participation, positive screening, and greater gambling severity. The association with family gambling is consistent with evidence of familial clustering and intergenerational transmission of gambling behavior^{20,21}, although the present study cannot distinguish between genetic vulnerability, behavioral modeling, normalization of gambling within the family, and shared environmental influences. Current smoking was associated mainly with positive screening and greater SOGS scores, suggesting a closer relationship with gambling severity than with participation itself. A similar association between gambling and tobacco use was reported in the nationwide sample from Türkiye.³ Associations with gambling severity were generally robust across alternative model specifications.

Clinical and Public Health Implications

The findings support considering gambling involvement during routine psychiatric assessment, particularly among individuals presenting with hopelessness, suicidal symptoms, other addictive behaviors, or financial difficulties. Individuals reporting more severe gambling problems should receive a clinical assessment of suicidal ideation, previous attempts, current intent, and other relevant risk factors rather than being evaluated solely through self-report scale scores. Hopelessness may also be relevant to the clinical formulation of individuals with gambling problems. However, the present study does not establish that reducing hopelessness would reduce gambling severity or suicide risk. Prospective and intervention studies are needed to determine whether hopelessness-focused treatments are beneficial for this population.

Family gambling history may represent a simple and clinically useful screening question because it was associated with all major gambling outcomes. At the public health level, the findings add to evidence that gambling-related harms deserve attention beyond specialist addiction services. Nevertheless, policy recommendations concerning gambling availability, advertising, and regulation should be based primarily on representative population studies and policy-specific research.

Limitations

The strengths of this study include its relatively large sample, the use of validated Turkish versions of established instruments, correction for multiple comparisons, reporting of effect sizes and confidence intervals, and sensitivity analyses using different SOGS thresholds and regression approaches.

Several limitations should be considered. First, the cross-sectional design precludes conclusions regarding temporal order or causality. In particular, the indirect-effect analyses represent statistical associations and cannot demonstrate that hopelessness temporally or causally links gambling involvement with suicide-related outcomes.

Second, participants were recruited through non-probability online convenience and snowball sampling. The sample included disproportionately high numbers of university graduates and employed participants, and the number of individuals who received the survey link was unknown. Consequently, a response rate could not be calculated, and the observed proportions should not be interpreted as national prevalence estimates or generalized to the adult population of Türkiye.

Third, gambling participation and SOGS scores may have referred to different time periods. The SOGS predominantly assesses lifetime gambling-related problems, whereas the gambling-participation question may have reflected more recent behavior. In addition, probable gambling disorder was identified using a screening threshold rather than a structured diagnostic interview, and classification varied according to the cut-off used. The findings therefore reflect positive screening for probable gambling disorder rather than confirmed diagnostic prevalence.

Fourth, the BHS and SPS overlap conceptually because the SPS contains hopelessness-related content. All measures were also completed through self-report during the same online session, which may have increased common-method variance, recall bias, and social-desirability bias. Psychiatric diagnoses, exclusion criteria, suicidal ideation, and suicide attempts could not be clinically verified. Internal consistency coefficients could not be computed for the present sample, because only composite scale scores were retained in the analysis dataset and item-level responses were not available. Reliability is a property of scores in a given sample rather than of an instrument, and the psychometric properties reported in the validation studies of the Turkish versions of these instruments cannot substitute for it.

Fifth, participants reporting a diagnosis of alcohol or substance use disorder, bipolar disorder, schizophrenia-spectrum disorder, or intellectual disability were excluded in order to limit heterogeneity in self-reported psychiatric history. These conditions are among those that most frequently co-occur with gambling disorder and are themselves associated with elevated hopelessness and suicide risk, so the excluded individuals would be expected to show both more severe gambling involvement and greater suicide-related symptom burden. Their exclusion therefore restricts generalizability to the clinical populations in which gambling disorder is most commonly encountered, and would be expected to attenuate rather than inflate the associations reported here; the present estimates may accordingly be regarded as conservative. Because these exclusions relied on self-report and could not be clinically verified, however, residual confounding by undetected substance use or mood pathology cannot be ruled out, and the direction of this bias cannot be established with certainty.

Finally, several potentially relevant factors were not measured, including current depression and anxiety severity, impulsivity, gambling expenditure, indebtedness, financial harm, gambling motives, and validated gambling-related cognitions. In addition, only 52 participants screened positive at the SOGS ≥ 8 threshold, 44 participants in the full sample reported a previous suicide attempt, and only 22 participants reporting gambling had an attempt history. These small event numbers limited the precision and statistical power of subgroup, interaction, and suicide-attempt analyses.

Conclusion

In this online convenience sample, gambling participation and positive screening for probable gambling disorder were associated with higher hopelessness and suicide-related symptom scores. Gambling participation was also associated with histories of suicidal ideation and suicide attempt after covariate adjustment. These findings support assessment of gambling involvement and suicidality in relevant clinical settings. However, the cross-sectional design and non-probability sampling preclude causal interpretation and population-level prevalence estimates. Longitudinal studies using structured diagnostic interviews are needed to clarify the direction of these associations.

Conflict of Interest

The authors have no conflicts of interest to disclose.

Ethical approval

Written ethics committee approval was obtained for the study from the Akdeniz Medical Scientific Research Ethics Committee (Date: 02.01.2025, Decision number: TBAEK-42).

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Author Contributions

B.B.Ö., Ü.N.K.T.: Conceptualization; B.B.Ö., Ü.N.K.T., S.K.: Methodology; A.E., M.T.: Formal Analysis; Writing – Original Draft Preparation; Ü.N.K.T., S.K.: Investigation; S.K., B.B.Ö.: Data Curation; A.E., M.T., B.C.: Writing – Review and Editing. All authors have read and approved the final version of the manuscript.

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