

ORIGINAL ARTICLE

Gambling Addiction and Suicide: A 10-Year Autopsy-Based Retrospective Analysis

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Main Points

- This study represents one of the first autopsy-based series in Türkiye to investigate gambling-related suicides over a 10-year period.
- Male sex, young age (particularly 18 – 30 years), indebtedness, bipolar disorder, and online gambling behaviors emerged as key risk factors.
- Debt, especially unsecured debt, appears to play an important triggering role in gambling-related suicides.
- The findings highlight the need for multidisciplinary risk assessments that include economic and social dimensions, stronger regulatory frameworks, and targeted prevention strategies.

Abstract

This study retrospectively examined suicides associated with gambling disorder through a multidimensional evaluation of sociodemographic features, psychiatric comorbidities, suicide methods, and toxicological findings. Case files from Council of Forensic Medicine between September 2015 and September 2025 were reviewed. All autopsy cases classified as suicide or suspected suicide with documented gambling history or gambling-related debt were included. A total of 24 cases were identified, of whom 87.5% were male and one-third aged 18 – 30. Almost all cases (91.7%) had documented debts, usually bank loans or unspecified debts, and over half (54.2%) had intrafamilial problems. Bipolar disorder was the most frequent psychiatric diagnosis (66.7%), while 29.2% had prior suicide attempts. Online gambling was present in one-third of cases, associated with younger age, male sex, and a higher likelihood of hanging. Drug intoxication (37.5%) and hanging (25.0%) were the main methods, while alcohol and substance positivity were detected in 33.3% and 29.2% of cases. Findings highlight the convergence of financial strain, psychiatric disorders, and gambling behaviors, with young men emerging as a vulnerable group. These results underscore the urgency of multidisciplinary assessments and stronger regulatory frameworks. Prospective large-scale studies are also needed to refine risk profiles and guide effective prevention strategies.

Keywords: Autopsy, gambling addiction, online gambling, psychiatric comorbidity, suicide

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Introduction

Gambling disorder has increasingly been recognized as a significant and escalating public health concern with profound individual and societal implications. Its impact extends beyond financial devastation

and social marginalization, as it frequently coexists with emotional dysregulation and psychiatric comorbidities, thereby creating a critical pathway toward fatal outcomes (Kristensen et al., 2025; Oruç et al., 2022). Over the past decade, a growing body of research has underscored the heightened risk of

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suicide among individuals with gambling disorder (Kidane et al., 2025; van der Maas et al., 2024). Epidemiological studies consistently demonstrate that the prevalence of suicidal ideation and attempts is markedly elevated in this population compared with the general population (Marionneau & Nikkinen, 2022; Wong et al., 2010).

In particular, the rapid expansion of online gambling has created even higher risk profiles, especially among young men, due to its easy accessibility, anonymity, and the potential for rapid indebtedness. These features differentiate online gambling from traditional forms and may intensify vulnerability to suicidal behavior in this subgroup (Vijayakumar & Vijayakumar, 2023). The strong association between gambling-related suicides and psychiatric comorbidities has been frequently emphasized in the literature. Depression, anxiety disorders, and substance use disorders are among the most commonly observed psychiatric conditions in this population (Reynolds et al., 2025). In a retrospective psychological autopsy study conducted in Hong Kong, it was reported that all suicide victims with pathological gambling had unpayable debts, and 82.4% of them presented with either depression or a substance use disorder (Wong et al., 2010). Furthermore, socioeconomic adversity, psychiatric illness, and interpersonal conflicts have been identified as key determinants of gambling-related suicides. A large-scale national case-control study from Sweden analyzed suicide and mortality rates among individuals diagnosed with gambling disorder in relation to socioeconomic factors and comorbid conditions. The findings demonstrated that gambling disorder itself constituted a significant independent risk factor; however, the presence of psychiatric comorbidities and socioeconomic disadvantages markedly amplified this risk (Blaszczynski & Marfels, 2003; Karlsson & Håkansson, 2018). Evidence from Australia and the United Kingdom further suggests that a substantial proportion of gambling-related deaths remains insufficiently addressed in forensic investigations, highlighting the need for a stronger legal framework to clarify the role of betting companies and financial debts in fatal outcomes (Blaszczynski & Marfels, 2003; Rintoul et al., 2023).

This study aims to retrospectively examine suicide cases associated with gambling disorder by conducting a multidimensional evaluation of their sociodemographic characteristics, suicide methods, toxicological findings, and psychiatric histories. A systematic analysis of forensic medicine – based data provides a unique opportunity not only to delineate clinical risk factors but also to elucidate how financial, psychiatric, and social dynamics converge to produce fatal outcomes. In doing so, the study is expected to address important gaps in the literature regarding the link between gambling disorder and suicide, thereby contributing to the development of multidimensional risk assessment models and targeted prevention strategies. Such an approach holds the potential to offer valuable insights for clinicians, as well as for forensic and social policymakers, enabling more effective interventions against this increasingly critical public health challenge.

Material and Methods

Study Design and Setting

This study was designed as a retrospective, descriptive analysis and was conducted at the Council of Forensic Medicine. The study covered the period between September 1, 2015, and September 1, 2025,

and included all autopsy cases with evidence of gambling history or gambling-related debt that were investigated under suspicion of suicide. The main objective was to describe sociodemographic, clinical, and forensic-toxicological characteristics of these cases.

Case Selection and Sampling

A universal sampling strategy was adopted, and all cases meeting the eligibility criteria during the study period were included. Case identification proceeded in two steps: first, screening of all autopsies performed within the defined time frame; and second, verification of inclusion criteria based on the manner of death and gambling history.

The inclusion criteria required that cases had been reviewed by the Council of Forensic Medicine between September 1, 2015, and September 1, 2025, and that a forensic autopsy had been performed. In addition, the manner of death had to be classified as “suicide” or “suspected suicide” based on a comprehensive evaluation of autopsy findings together with investigation and scene reports, and there had to be at least one documented piece of evidence indicating gambling behavior or gambling-related debt (e.g., witness statements, digital data, financial, or legal records).

The exclusion criteria comprised cases with insufficient data preventing the extraction of key variables (e.g., gambling-related factors, psychiatric comorbidities, suicide method, and toxicological findings), cases in which the manner of death remained “undetermined” due to a lack of sufficient evidence, duplicate records, and cases classified as having a “natural” manner of death.

Data Collection and Variables

Data were systematically extracted from the electronic archive and case files available in the National Judiciary Informatics System of Türkiye (UYAP), which is an official digital platform used by all institutions of the Ministry of Justice. For each case, a comprehensive set of variables was collected. Sociodemographic data included age, sex, marital status, educational attainment, employment status, place of residence (urban or rural), and living arrangement. Economic and family-related factors such as the presence of debt, unemployment, and intrafamilial problems were also recorded. Gambling-related information encompassed gambling history, online gambling status, sources of debt, and any documented evidence of intense gambling behavior immediately prior to death. Clinical variables consisted of previous suicide attempts, psychiatric diagnoses, history of treatment applications, types of medication used, and recent changes in medication, including initiation or dose increase. Finally, forensic and toxicological characteristics were gathered, including the method of suicide, the presence of a suicide note, and postmortem toxicological findings for alcohol and psychoactive substances.

Operational Definitions

“Gambling history” was defined as any documented record or witness statement explicitly reporting gambling or gambling-related debts. “Online gambling” was coded as present only when explicitly documented in the case file or witness statements; vague or suspected accounts were not classified as such. “Intense gambling prior to death” referred to a marked increase in gambling activity immediately before the fatal incident, as explicitly stated in records. Psychiatric diagnoses and medication use were recorded as reported in the files, without additional clinical verification.

Suicide methods and toxicological results were classified based on official forensic reports.

Ethical Considerations

The study was conducted in compliance with national regulations on the use of forensic data. All identifying information was removed prior to analysis. As the research was based exclusively on deceased individuals and retrospective anonymized data, informed consent was not required. Institutional and legal approvals were obtained in accordance with local regulations. This study was approved by the Training and Scientific Research Commission of the Council of Forensic Medicine, Istanbul, Türkiye (Approval Date: 02.09.2025; Approval Number: 21589509/2025/1132). All data were anonymized to protect the privacy and confidentiality of the subjects. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical Analysis

Data were anonymized prior to analysis. A case-available approach was adopted, and denominators for percentages varied according to the number of cases with available data for each variable. No imputation was performed for missing values. Statistical analyses were performed using SPSS (IBM SPSS Corp.; Armonk, NY, USA) software. Given the descriptive nature of the study and the sample size, only descriptive statistics were used: categorical variables were expressed as frequency (*n*) and percentage (%), while continuous variables were reported as mean ± standard deviation. Cases were also stratified according to the presence of online gambling and compared descriptively across sociodemographic, clinical, and forensic variables. No inferential statistical tests were applied.

Results

A total of 24 cases were included in the study, of which 87.5% were male and 12.5% female. The age distribution showed that 33.3% were between 18 and 30 years, 37.5% were between 31 and 45 years, 25.0% were between 46 and 60 years, and 4.2% were ≥61 years. Regarding marital status, half of the individuals (50.0%) were married, 37.5% were single, and 12.5% were divorced. In terms of educational level, 29.2% had a primary school education, 25.0% were high school graduates, and 45.8% had completed university. Employment status revealed that 66.7% were employed, 20.8% unemployed, 8.3% retired, and 4.2% students. The majority of cases (83.3%) lived in urban areas. While 45.8% were living alone, 54.2% resided with family members. Economic difficulties were prominent, with debt reported in 91.7% of cases, whereas unemployment was present in 8.3%. Intrafamilial problems were documented in 54.2% of cases (Table 1).

All cases (100.0%) had a history of gambling. Previous suicide attempts were reported in 29.2% of the cases. Among those with psychiatric diagnoses, bipolar disorder was the most common (66.7%), followed by depression (16.7%) and attention-deficit/hyperactivity disorder (16.7%). One-quarter of the cases (25.0%) had previously sought treatment. Antipsychotics were the most frequently reported medication (66.7%), followed by antidepressants (16.7%) and psychostimulants (16.7%). Only 4.2% had requested treatment specifically for gambling addiction. A suicide note was present in 29.2% of cases, and online gambling was

Table 1.
Sociodemographic Characteristics of the Cases

	<i>n</i>	%
Sex		
Female	3	12.5
Male	21	87.5
Age group (years)		
18 – 30	8	33.3
31 – 45	9	37.5
46 – 60	6	25.0
≥61	1	4.2
Marital status		
Single	9	37.5
Married	12	50.0
Divorced	3	12.5
Education level		
Primary school	7	29.2
High school	6	25.0
University	11	45.8
Employment status		
Unemployed	5	20.8
Employed	16	66.7
Student	1	4.2
Retired	2	8.3
Place of residence		
Rural	4	16.7
Urban	20	83.3
Living arrangement		
Alone	11	45.8
With family	13	54.2
Economic problems		
Debt	22	91.7
Unemployment	2	8.3
Intrafamilial problems		
Yes	13	54.2
No	11	45.8

identified in 33.3%. Regarding the source of debt, bank loans (36.4%) and unknown sources (36.4%) were the most common, followed by debts to family/friends (22.7%) and loan sharks (4.5%). Intense gambling behavior immediately before suicide was reported in 16.7% of cases (Table 2).

Drug intoxication was the most frequent suicide method (37.5%), followed by hanging (25.0%), gas inhalation/asphyxia (12.5%), jumping from height (8.3%), firearm use (8.3%), and other methods such as sharp force injury or drowning (8.3%). Postmortem toxicological analysis revealed that 33.3% of cases were positive for alcohol and 29.2% tested positive for psychoactive substances (Table 3).

Table 2.
Clinical Characteristics of the Cases

	<i>n</i>	%
Gambling history	24	100.0
Previous suicide attempt	7	29.2
Psychiatric diagnosis		
Depression	1	16.7
Bipolar disorder	4	66.7
ADHD	1	16.7
Treatment application	6	25.0
Medication type		
Antidepressant	1	16.7
Antipsychotic	4	66.7
Psychostimulant	1	16.7
Medication changes		
Newly initiated	4	66.7
Dose increased	2	33.3
Addiction treatment request	1	4.2
Suicide note present	7	29.2
Online gambling	8	33.3
Debt source		
Bank loan	8	36.4
Family/friends	5	22.7
Loan shark	1	4.5
Unknown	8	36.4
Intense gambling immediately before suicide	4	16.7

Data are presented as frequencies (*n*) and column percentages (%).

When comparing the eight cases with online gambling to the 16 without, notable differences emerged. All cases in the online gambling group were male, and 75.0% were between 18 and 30 years of age. Being single was more common in the online gambling

Table 3.
Suicide Methods and Toxicological Findings of the Cases

	<i>n</i>	%
Suicide methods		
Drug intoxication	9	37.5
Hanging	6	25.0
Gas inhalation/asphyxia	3	12.5
Jumping from height	2	8.3
Firearm	2	8.3
Others (sharp force, drowning)	2	8.3
Postmortem toxicological findings		
Alcohol positive	8	33.3
Substance positive	7	29.2

Data are presented as frequencies (*n*) and column percentages (%).

group (62.5%) compared to the non-online group (25.0%). The annual distribution of cases also demonstrated temporal variation, with a noticeable increase in online gambling-related suicides after 2022 (Figure 1). Educational attainment differed, with a lower rate of primary school education (12.5% vs. 37.5%) among online gamblers. Most online gamblers lived with their families (75.0%), whereas the majority of non-online gamblers lived alone (56.3%). A previous suicide attempt was reported in 12.5% of online gamblers compared to 37.5% in the non-online group. Regarding suicide methods, hanging (50.0%) and sharp force injury (12.5%) were more common among online gamblers, while drug intoxication was predominant in the non-online group (50.0%). Toxicological findings showed that alcohol positivity was lower in the online gambling group (12.5%) compared to the non-online group (43.8%) (Table 4).

Discussion

This study represents one of the first autopsy-based series to examine suicides associated with gambling disorder in a comprehensive and multidimensional manner. The 10-year data

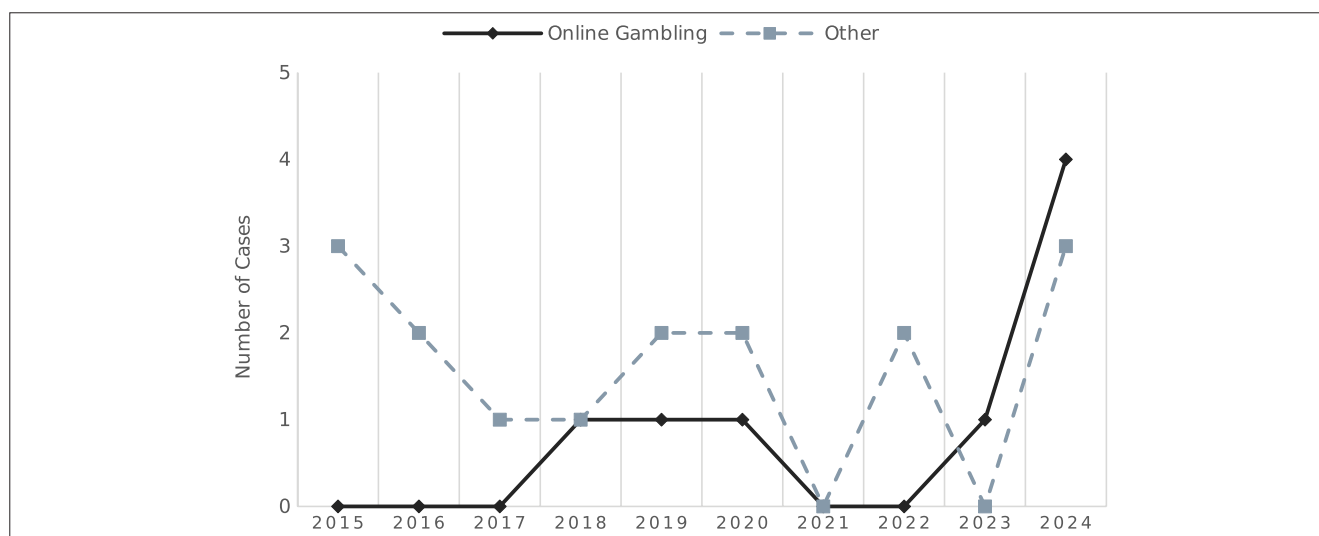


Figure 1. Annual Distribution of Suicide Cases by Gambling Type (2015 – 2024).

Table 4.
Comparison of Case Characteristics by Online Gambling Status

	With Online Gambling (n = 8)	Without Online Gambling (n = 16)
Sex		
Male	8 (100.0%)	13 (81.3%)
Female	0 (0.0%)	3 (18.8%)
Age group (years)		
18 – 30	6 (75.0%)	2 (12.5%)
31 – 45	2 (25.0%)	7 (43.8%)
46 – 60	0 (0.0%)	6 (37.5%)
≥61	0 (0.0%)	1 (6.3%)
Marital status		
Single	5 (62.5%)	4 (25.0%)
Married	3 (37.5%)	9 (56.3%)
Divorced	0 (0.0%)	3 (18.8%)
Education level		
Primary school	1 (12.5%)	6 (37.5%)
High school	4 (50.0%)	2 (12.5%)
University	3 (37.5%)	8 (50.0%)
Place of residence		
Rural	2 (25.0%)	2 (12.5%)
Urban	6 (75.0%)	14 (87.5%)
Living arrangement		
Alone	2 (25.0%)	9 (56.3%)
With family	6 (75.0%)	7 (43.8%)
Previous suicide attempt		
Yes	1 (12.5%)	6 (37.5%)
Suicide method		
Hanging	4 (50.0%)	2 (12.5%)
Firearm	1 (12.5%)	1 (6.3%)
Sharp force injury	1 (12.5%)	0 (0.0%)
Drug intoxication	1 (12.5%)	8 (50.0%)
Gas inhalation/asphyxia	1 (12.5%)	2 (12.5%)
Jumping from height	0 (0.0%)	2 (12.5%)
Drowning	0 (0.0%)	1 (6.3%)
Suicide note	2 (25.0%)	5 (31.3%)
Toxicology		
Alcohol positive	1 (12.5%)	7 (43.8%)
Substance positive	2 (25.0%)	5 (31.3%)

Data are presented as frequencies (n) and column percentages (%).

highlight that gambling disorder constitutes not only an individual but also a societal public health concern capable of leading to fatal outcomes. The predominance of male cases, the overrepresentation of younger individuals, the high prevalence of debt,

the concentration of online gambling among young single men, and the frequent use of drug intoxication and hanging as suicide methods are among the most notable findings. Taken together, these results underscore the need to approach gambling disorder from clinical, forensic, and social perspectives simultaneously.

The overwhelming predominance of male cases in this series is consistent with previous evidence demonstrating higher prevalence rates of both gambling disorder and suicidal behavior among men (Armoon et al., 2023; Husky et al., 2015; Sher, 2022; Ukhova et al., 2024). The finding that the majority of online gambling cases were in the 18 – 30 age group emphasizes the intersection of technological accessibility and impulsive behaviors, suggesting that young adult males represent a particularly vulnerable group for gambling-related suicide risk (Riley et al., 2021). This is in line with studies showing elevated suicidal ideation and attempts in younger cohorts among individuals with gambling problems. For example, in a Swedish nationwide case – control study, nearly 17.7% of individuals with gambling disorder exhibited suicidal behavior compared with 1.6% in matched controls. Psychiatric comorbidity, including anxiety, depression, and substance use disorders, was significantly associated with increased risk (Kidane et al., 2025).

Psychiatric comorbidities were also noteworthy. Bipolar disorder emerged as the most common diagnosis in the present sample, followed by depression and attention-deficit/hyperactivity disorder in smaller proportions (Tamam et al., 2008). This finding highlights the critical role of mood disorders in the pathway linking gambling disorder to suicide. Furthermore, approximately one-third of individuals had a history of prior suicide attempts, reinforcing the importance of systematically assessing past suicidal behavior in clinical risk evaluations of gambling populations (Wardle & McManus, 2021). Such associations between comorbidity and suicide risk have also been reported in other settings: for instance, in the Swedish register - based studies where substance use disorders, depressive disorders, and anxiety disorders increased suicide risk markedly among people with gambling disorder (Karlsson & Håkansson, 2018; Karlsson et al., 2025).

Economic adversity appeared as a nearly universal feature among the cases. Almost all individuals had documented debt, most derived from bank loans or unspecified sources. The presence of intense gambling immediately before death in a subset of cases suggests that sudden escalation in financial and emotional stressors may act as acute precipitants of suicidal behavior (Andreeva et al., 2022). Literature supports this: studies have found that problem gambling correlates strongly with indebtedness, financial hardship, and economic vulnerabilities, which in turn are associated with suicidal ideation and attempts (Karlsson & Håkansson, 2018; Wong et al., 2010).

Analysis of suicide methods revealed drug intoxication as the most common means, followed by hanging. These findings align with previously reported patterns in forensic series. Toxicological analyses demonstrated alcohol and substance positivity in approximately one-third of cases, underlining the contribution of substance use as an additional risk factor in gambling-related suicides. This is corroborated by meta-analytic reviews showing elevated substance use among gambling disorder patients with

suicidal behaviors (Armoon et al., 2023; Marionneau & Nikkinen, 2022).

When comparing cases by online gambling status, several distinct patterns emerged. Individuals who engaged in online gambling were younger, exclusively male, and more likely to live with their families, in contrast to the higher proportion of solitary living among those without online gambling. In this study, suicides associated with online gambling were found to be on an increasing trend over the years. This finding is consistent with the literature and may be related to technological advances and increased accessibility to online gambling (Challet-Bouju et al., 2024; Jones et al., 2025). Method of suicide also differed: hanging was more common among online gamblers, whereas drug intoxication predominated in the non-online group. The preference for more lethal and less reversible methods among online gamblers may suggest a distinct risk profile in this subgroup (Redondo, 2015). Interestingly, alcohol positivity was lower in online gambling cases, further indicating possible differences in underlying behavioral and psychosocial characteristics. Although few studies so far have separated online vs. offline gambling in autopsy or forensic samples, broader literature suggests that online gambling tends to have higher impulsivity, accessibility, and possibly more severe outcomes (Vijayakumar & Vijayakumar, 2023).

An important dimension corroborated by international literature is the strong mediating effect of debt stress in the gambling – suicidality link (Oksanen et al., 2018). A study on over-indebted individuals found that financial debts drove psychological distress and were independently associated with suicidal thoughts and behaviors—even when controlling for gambling disorder (Barone & Graffigna, 2025). Additionally, problem gamblers in population surveys have shown significantly elevated rates of suicidal ideation and attempts, with severity of gambling behavior correlating with higher suicidality (Thon et al., 2014). These findings support the observation that almost all the cases had documented debt, pointing to debt not just as a consequence of gambling but as a potential trigger for acute suicidal crises.

The magnitude of suicide mortality associated with gambling disorder has also been quantified recently: a 2025 study demonstrated that individuals diagnosed with gambling disorder have significantly increased suicide mortality compared with both the general population and other patient groups (Kristensen et al., 2025). Such data provide external validity to the present results, especially concerning method lethality and demographic risk patterns. Moreover, studies of indebtedness among gamblers show that unsecured debt in particular tends to exacerbate gambling-related harm and increase mental health risks (Marionneau & Nikkinen, 2022; Muggleton et al., 2021). This underscores the need for assessment of not only the presence of debt but also its type, magnitude, and the debtor's perceived ability to repay, as potential stratifiers of suicide risk.

Beyond the forensic and clinical dimensions, these findings also carry important implications for primary care and public health practice. Gambling disorder and its associated suicide risks are often overlooked in family medicine, yet they represent issues that may be detectable and preventable if recognized early. Family physicians may identify risk patterns through indirect cues such as debt history, sleep disturbances, depressive symptoms, or

family conflicts, and can provide timely referrals to specialized services. From a public health perspective, community-based awareness campaigns targeting young men, improving accessibility of addiction treatment centers, and regulating online gambling environments could play a critical role in suicide prevention. These considerations reinforce the notion that gambling-related suicides should be addressed not only as an individual problem but also as a societal challenge, requiring integrated policies that combine clinical, forensic, and social interventions.

Limitations

This study should be interpreted considering several limitations. First, the retrospective design inherently restricted data collection to information available in official case files and witness statements. Consequently, important variables such as the exact duration and severity of gambling behavior, the amount and structure of debt, and detailed psychiatric histories could not be comprehensively assessed. Psychiatric diagnoses recorded in the files were based on prior documentation rather than standardized clinical evaluations, and thus their validity may be limited. Similarly, the timing and accuracy of reported treatment histories, medication use, and changes in prescriptions could not be independently verified. Second, the study relied exclusively on forensic autopsy cases evaluated by the XXX, which may not represent all gambling-related suicides in the general population. Deaths classified without autopsy, suicides not referred to forensic investigation, or cases in which gambling history was not documented would not have been captured in this dataset. As such, there is a risk of selection bias, and the findings cannot be generalized to all individuals with gambling disorder. Third, the reliance on witness statements and secondary reports introduces the possibility of reporting bias. Families and acquaintances may underreport or fail to recognize gambling behaviors, psychiatric symptoms, or substance use, leading to potential underestimation of these variables. Likewise, online gambling may be underdetected when explicit documentation was lacking, possibly resulting in misclassification bias. Fourth, the relatively small sample size limits the statistical power of subgroup analyses, particularly when comparing online versus offline gambling groups. The descriptive nature of the study precluded inferential statistical testing, and observed differences should therefore be interpreted with caution. Finally, the study did not account for potentially relevant contextual factors such as cultural attitudes toward gambling, availability of gambling platforms, or broader socioeconomic influences, which may also shape the relationship between gambling disorder and suicide. Future research incorporating prospective designs, larger and more representative samples, and standardized psychiatric assessments would be essential to overcome these limitations and provide more definitive conclusions.

In conclusion, this study provides original autopsy-based evidence on the sociodemographic, clinical, and toxicological features of gambling-related suicides, underscoring the complex interplay of financial debt, psychiatric comorbidity, online gambling behaviors, and social context in shaping fatal outcomes. The predominance of young men, the frequent presence of mood disorders, and the use of highly lethal methods highlight the need for multidisciplinary risk assessment that extends beyond clinical symptoms to include economic and social dimensions. From

both clinical and forensic perspectives, systematic screening for gambling behaviors and debt, improved documentation in suicide investigations, and stronger regulatory frameworks addressing gambling practices are essential. Future prospective and larger-scale studies are warranted to refine risk profiles and inform the development of targeted, effective prevention strategies.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from the Training and Scientific Research Commission of the Council of Forensic Medicine, Istanbul, Türkiye (Approval No.:21589509/2025/1132; Date: September 2, 2025). All data were anonymized to protect the privacy and confidentiality of the subjects. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Informed Consent: As the research was based exclusively on deceased individuals and retrospective anonymized data, informed consent was not required. Institutional and legal approvals were obtained in accordance with local regulations.

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