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Original Article

Evaluation of Suicide Risk Among Patients With Tramadol Toxicity: A Cross-Sectional Study in an Emergency Department

Saba Aghajani[1], Amir Ghaffarzad[2], Mohammad Safari Asl[2], Yasamin Ostadi[3], Minoo Javadi[4], Samad Shams Vahdati[2*], Paria Habibollahi[5]

[1]Department of Medicine, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[2]Emergency and Trauma Care Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
[3]Department of Pharmacology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[4]Department of Medicine, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[5]Department of toxicology, Faculty of Pharmacy, Tabriz University of medical sciences, Tabriz, Iran

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***Corresponding Author:**
Samad Shams Vahdati,
Email: sshamsv@gmail.com

Abstract

Background: Tramadol misuse and poisoning are serious health concerns in regions with limited prescription regulation, including Iran. Beyond its toxicologic effects, the pharmacologic properties of tramadol and associated psychosocial factors may contribute to elevated suicide risk. Accordingly, this study aimed to assess suicide risk using the SAD PERSONS scale among patients presenting with acute tramadol poisoning to the emergency department.

Methods: This descriptive cross-sectional study evaluated 80 patients with confirmed tramadol poisoning presenting to Sina Hospital during 2021–2022. Demographic data, motives for tramadol use, adverse effects, and SAD PERSONS scores were collected, and suicide risk was categorized as low (0–4), moderate (5–6), or high (7–10). The obtained data were analyzed using descriptive and inferential statistical tests.

Results: The mean age of participants was 36.25 ± 6.81 years. Overall, 66.25% and 61.25% were male and single, respectively. The average daily tramadol dose was 912.96 ± 245.16 mg. The mean SAD PERSONS score was 6.85 ± 2.37, with 43.75%, 28.75%, and 27.5% categorized as high, moderate, and low risk, respectively. Moreover, pleasure-seeking (40%), depressive symptoms (33.75%), and sexual performance enhancement (27.5%) were the most frequently cited motives for use. Eventually, dizziness (60%), nausea (55%), and seizures (31.25%) were the most commonly reported adverse effects.

Conclusion: A substantial proportion of tramadol-poisoned patients demonstrated moderate-to-high suicide risk, highlighting tramadol poisoning as a toxicologic emergency and a psychiatric crisis. Integrating structured suicide screening and timely psychiatric evaluation into emergency care is essential for early detection and prevention of recurrent self-harm.

Keywords: Tramadol poisoning, Suicide risk, SAD PERSONS scale, Intentional overdose, Substance misuse, Emergency department

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Introduction

Tramadol, a centrally acting synthetic opioid introduced in the 1970s, is frequently prescribed in the management of moderate-to-severe pain. Its analgesic effect results from the mild activation of μ-opioid receptors and the inhibition of serotonin and norepinephrine reuptake.[1] In addition, abuse of prescription opioids has emerged as a public health issue, with regional differences in prevalence and opioid type. Initially perceived as a safer alternative to stronger opioids, tramadol was considered to carry a low risk of dependence and misuse.[2] Therefore, its use in clinical settings has increased, and in certain regions, it remains highly accessible due to inadequate regulatory control.

Despite early assumptions, tramadol has shown serious abuse potential, especially in areas with poor prescription regulation. Global non-medical consumption is rising, particularly among adolescents and young adults drawn to its anxiolytic and euphoric effects.[3] In recent years, several countries, especially in parts of Africa and Asia, including Iran, have experienced increased tramadol abuse, leading to higher rates of overdose, poisoning, and

emergency hospital admissions. Epidemiological data from Iran indicate a considerable burden of tramadol misuse, with prevalence rates of almost 5% and 1% in males and females, respectively, contributing to 13% of total admissions related to drug poisoning.[4] Moreover, it is estimated that more than 200,000 people in urban areas misuse tramadol, demonstrating widespread access and persistent gaps in control policies.[5]

Tramadol poisoning typically presents with a number of symptoms, such as nausea, vomiting, dizziness, agitation, and seizures, even at therapeutic doses.[6,7] Likewise, severe cases may involve central nervous system depression, respiratory compromise, and serotonin syndrome, especially when combined with other serotonergic agents. Beyond its physical symptoms, tramadol's modulation of serotonin and norepinephrine can trigger psychiatric effects, including mood instability, anxiety, hallucinations, and suicidal ideation, particularly in individuals with preexisting mental health conditions or substance use disorders [8]. Self-medication with tramadol to manage emotional distress is observed in many cases, increasing the risk of intentional overdose [3]. Similarly, studies have shown that tramadol overdose cases are commonly associated with suicidal attempts, highlighting its dual role in triggering and marking psychological instability. This complex interaction of tramadol toxicity and psychological vulnerability underlines the importance of the medical and psychiatric evaluation of tramadol poisoning cases presenting to the emergency settings.

The pharmacologic profile of tramadol may contribute to its potential for severe toxicity and suicidal behavior. Acting as a weak μ-opioid receptor agonist and an inhibitor of serotonin and norepinephrine reuptake, tramadol produces complex central nervous system effects that can trigger seizures and mood disturbances.[9] Seizures occur more frequently after tramadol overdose than with other opioids, thereby worsening outcomes in intentional ingestions.[9] Additionally, co-use with alcohol, benzodiazepines, or other sedatives increases the risk of respiratory depression and fatal outcomes.[7,10] These biological and contextual factors likely interact with psychological vulnerabilities to heighten both suicidal ideation and lethality.

Suicide is a serious global public health concern, with an estimated 720,000 deaths annually. It ranks as the third leading cause of mortality among 15–29-year-old individuals.[11] Further, substance use disorders are strongly associated with an increased risk of suicide.[12,13] Multiple studies indicate a greater likelihood of suicidal thoughts, attempts, and completed suicides among opioid misusers.[14-18] It should be noted that tramadol misuse, as an opioid, is becoming increasingly widespread, especially in Africa and Asia. Although small-scale studies and case reports suggest an elevated suicide risk and attempts among tramadol users,[7,19-22] there is a lack of systematically structured research investigating this association. This gap emphasizes the need for focused studies to enhance our understanding and early identification of high-risk patients for suicidal behavior, particularly in emergency care units.

Thus, this study seeks to investigate the suicide risk in tramadol poisoning patients presenting to the emergency unit, aiming to enhance understanding and improve risk assessment and early intervention strategies.

Methods

This descriptive-analytical cross-sectional study was conducted to evaluate the underlying causes and suicide risk in tramadol-poisoned patients presenting to Sina Hospital, Tabriz University of Medical Sciences, Iran, during 2021–2022. The study protocol was approved by the Ethics Committee of Tabriz University of Medical Sciences (approval code IR.TBZMED.REC.1400).

Data Collection

Patients who presented to the emergency department of Sina Hospital (2021–2022) with complaints related solely to tramadol use were considered for inclusion. Then, informed consent was obtained from all these participants. Tramadol poisoning was diagnosed based on clinical presentation and patient-reported history of tramadol ingestion, supported by the emergency physician and toxicology consultation. The laboratory confirmation of tramadol levels was not routinely available. It should be noted that patients with reported ingestion of substances other than tramadol were excluded from the study when such information was clearly documented. The intentionality of ingestion was assessed based on patient self-report and emergency department psychiatric evaluation when available. In addition, information regarding prior psychiatric diagnoses was obtained from patient history and medical records when documented; however, systematic psychiatric diagnostic interviews were not performed.

The sample size was determined by the total number of eligible patients with tramadol poisoning who presented to the emergency department during the study period.

Variable Assessment

For each participant, several variables were recorded, including age, gender, reason for tramadol use, dosage and time of consumption, reported adverse effects, and suicide risk assessment using the SAD PERSONS Scale. This scale was employed as a standardized screening tool for evaluating suicide risk among participants. It consists of ten clinically recognized risk factors, each represented by a letter in the acronym "SAD PERSONS." The factors include male gender, age (< 19 or > 45 years), depression, previous suicide attempt, ethanol (alcohol) abuse, rational thinking loss, lack of social support, organized suicide plan, lack of a spouse, and sickness. Each item is dichotomously scored, with 1 or 0 points for the presence or absence of the risk factor, yielding a total score ranging from 0 to 10.

Participants were assessed individually, and scores were interpreted according to established thresholds:

- 0–4 points: Low suicide risk, typically managed by outpatient follow-ups
- 5–6 points: Moderate risk, warranting further psychiatric evaluation
- 7–10 points: High risk, probably requiring immediate intervention or hospitalization

This scale was selected for its clinical utility, ease of administration, and ability to provide a rapid, structured assessment of suicide risk in diverse settings. Furthermore, its integration into the study protocol ensured consistent evaluation across participants and facilitated appropriate triage and referral when necessary.

Statistical Analysis

The obtained data were entered and analyzed using SPSS software, version 15.0. Descriptive statistics were used to summarize the data. Continuous and categorical variables are presented as means ± standard deviations (SD), as well as frequencies and percentages, respectively. Given the descriptive nature of the study and the absence of comparison groups, no hypothesis-testing analyses or causal inferences were performed.

Results

A total of 80 patients were enrolled in the study, with a mean age of 36.25 ± 6.81 years. Overall, 49 participants (61.25%) were single, while 31 (38.75%) of them were married. Further, the sample comprised 53 males (66.25%) and 27 females (33.75%). The average daily dose of tramadol consumption was 912.96 ± 245.16 mg.

Assessment using the SAD PERSONS Scale yielded a mean score of 6.85 ± 2.37. Based on established cutoffs, 35 (43.75%), 23 (28.75%), and 22 (27.5%) patients were categorized as high, moderate, and low suicide risk, respectively, indicating that more than two-thirds of the cohort required at least further psychiatric evaluation.

Motivations for tramadol use were predominantly emotional and behavioral in nature. In this regard, the most frequently reported reasons included pleasure-seeking (40%), depressive symptoms (33.75%), enhancement of sexual performance (27.5%), and relief from physical pain (23.75%). Moreover, reported adverse effects varied in prevalence, with dizziness (60%) and nausea (55%) being the most common. Notably, seizures were observed in nearly one-third of patients (31.25%), while drowsiness was reported by 5%.

Discussion

This study provided data regarding the motivations for tramadol use and the distribution of suicide risk among patients presenting with tramadol toxicity to an emergency department. The cohort was predominantly composed of young to middle-aged men, and the most regularly reported motives for use were pleasure-seeking, depressive symptoms, and sexual performance enhancement. Based on SAD PERSONS scoring, a substantial proportion of patients were classified as having moderate-to-high suicide risk, representing the need for further psychiatric evaluations in a large segment of this population.

The distribution of age and gender observed in this study is consistent with previous reports from Iran and neighboring regions, where tramadol misuse is more prevalent among young and middle-aged men.[4,6] Similar demographic patterns have been found in studies from Egypt and other parts of Africa, suggesting that tramadol misuse in emergency settings commonly involves this population.[19]

Depressive symptoms were repeatedly reported as a motive for tramadol use in the present cohort, aligning with the findings of prior research describing frequent co-occurrence of tramadol misuse and mood-related complaints.[19] Another study confirmed elevated rates of suicidal ideation and attempts among individuals using tramadol compared with the general population.[20] However, differences in study design, populations, and assessment tools limit direct comparisons across substances and settings.

According to prior literature, the pharmacological properties of tramadol are associated with neurological adverse effects and psychiatric symptoms.[21] In clinical practices, these effects may complicate the presentation of tramadol-poisoned patients in emergency settings, underscoring the importance of comprehensive medical and psychiatric assessment.[1,8,22] Nonetheless, the present study was not designed to examine mechanistic pathways.

Additionally, physiological toxicity intensifies the psychiatric risk related to tramadol use. Seizures and other neurological complications were frequently observed in this cohort, which is in line with previous reports describing tramadol toxicity in emergency settings,[7] often leading to more severe complications in intentional ingestions. Fatal cases often involve concurrent use of central nervous system depressants (e.g., benzodiazepines or alcohol), amplifying respiratory suppression and lethality.[23] Moreover, even single-substance tramadol overdoses have been documented to cause coma, multiorgan failure, and death.[24] It is noteworthy that the presence of such complications may increase clinical complexity, indicating the need for careful monitoring and multidisciplinary management during acute care.

Dependence and withdrawal are considered major contributors to the connection between chronic tramadol use and suicide risk. Reports demonstrate severe psychological distress and suicide attempts following abrupt withdrawal.[25] In our cohort, individuals who used tramadol for pleasure or sexual enhancement may have been especially prone to this cycle of transient relief followed by withdrawal-related distress. Based on evidence from the broader opioid field, prolonged or increasing doses are associated with higher rates of suicide mortality, suggesting that elevated opioid exposure can reflect and intensify psychological dysregulation.[14,15]

Likewise, social and cultural factors exacerbate the risk. In Iran and several neighboring regions, tramadol remains widely available because of insufficient regulatory oversight [4]. Misconceptions about the ability of this drug to improve sexual performance encourage unsupervised use among men.[5] These cultural beliefs, along with some stressors, such as family conflict and unemployment, create conditions in which tramadol becomes a coping tool and a potential route toward self-harm.[4,19]

The mean SAD PERSON score observed in our sample underscores the clinical relevance of these pathways. Almost half of the patients required psychiatric evaluation, consistent with international evidence demonstrating that opioid use disorders substantially elevate the risk of suicidal ideation, attempts, and death.[16,18] Overall, the neurobiological effects of tramadol, the dynamics of dependence, and the influence of psychosocial adversity point toward an integrated model in which tramadol becomes a biological stressor and a marker of deep psychological vulnerability.

From a public health and clinical perspective, the findings support the incorporation of structured suicide risk screening into the routine evaluation of patients presenting with tramadol poisoning in emergency departments. The use of brief tools, such as the SAD PERSONS scale, may facilitate early identification of individuals requiring psychiatric assessment and follow-ups.

Considering that dependence and withdrawal markedly heighten suicide risk, tramadol discontinuation should be cautiously managed through slow tapering and appropriate psychological support. Closer coordination between addiction treatment, psychiatric care, and emergency toxicology services could noticeably reduce the likelihood of repeated overdoses and support better long-term recovery.

Study Limitations

This study had several important limitations. Its cross-sectional and single-center design precluded causal inference and limited generalizability. In addition, suicide risk was assessed using a screening instrument rather than a diagnostic psychiatric evaluation. Moreover, information on intentionality and psychiatric history relied on patient self-reports and available medical records; therefore, it might be subject to reporting bias. Additionally, the absence of a comparison group prevented the assessment of whether observed suicide risk was specific to tramadol poisoning or reflected broader characteristics of emergency department populations.

Conclusion

In general, tramadol misuse poses a complex clinical challenge, combining toxicologic effects with psychiatric vulnerability and social influences. The elevated SAD PERSONS scores observed in this cohort indicated that tramadol poisoning presentations frequently warrant concurrent psychiatric evaluation in addition to toxicological management. Accordingly, assessing suicide risk in these patients must be incorporated into immediate care and ongoing prevention strategies.

Ethics statement

This study was approved by regional ethic committee of Tabriz University of medical science with no.:IR.TBZMED.REC.1400.1239.

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Conflict of interests declaration

The authors declare they have no conflict of interests.

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Data availability statement

The authors confirm that the data supporting the findings of this study are available.

Author contributions

Conceptualization: Samad Shams Vahdati
Data curation: Mohammad Safari Asl
Formal analysis: Saba Aghajani
Investigation: Amir Ghaffarzad
Methodology: Samad Shams Vahdati
Project administration: Amir Ghaffarzad
Software: Yasamin Ostadi,Minoo Javadi
Supervision: Samad Shams Vahdati, Paria Habibollahi
Validation: Amir Ghaffarzad, Paria Habibollahi
Visualization: Saba Aghajani
Writing–original draft: Yasamin Ostadi, Minoo Javadi
Writing–review & editing: Saba Aghajani

Consent for publication

Not applicable.

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