The Hidden Danger on Social Media: A Case Series of Methanol Intoxication

Received: 15/06/2025 **Published:** 30/06/2025 Doi: **10.71051/jnlm.1720210**

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ABSTRACT

This case series highlights the public health risks posed by the unregulated sale of methanol via social media platforms, where it is often misrepresented as ethanol. We present four patients admitted to our tertiary emergency department in Türkiye following methanol intoxication from alcohol purchased online. The patients, ranging in age from 17 to 43, experienced symptoms such as vision loss, metabolic acidosis, and altered consciousness. In three cases, timely diagnosis and treatment—including intravenous ethanol administration and hemodialysis—resulted in full recovery without long-term complications. However, one patient succumbed to fatal outcomes due to delayed admission to the emergency department. This series underscores the growing threat of methanol poisoning, exacerbated by the widespread availability of illicit alcohol products through social media. The findings emphasize the need for stringent regulatory controls, public awareness campaigns, and more effective preventive measures to reduce the incidence of such preventable intoxications. Methanol intoxication is a critical yet preventable condition requiring a coordinated response from healthcare professionals, toxicologists, legal authorities, and social media regulators. Further research into the regulation of online alcohol sales and early intervention protocols for methanol intoxication is urgently needed to safeguard public health.

Keywords: ***Methanol, ethanol, social media, case report, emergency department***

ÖZET

Bu olgu serisi, metanolün sosyal medya platformları aracılığıyla düzensiz satışının yol açtığı ve sıklıkla etanol olarak yanlış tanıtıldığı halk sağlığı risklerini vurgulamaktadır. Çalışmamızda, çevrimiçi satın alınan alkol sonrası metanol zehirlenmesiyle Türkiye'deki 3. basamak acil servisimize başvuran dört hasta sunulmaktadır. Yaşları 17 ila 43 arasında değişen hastalar, görme kaybı, metabolik asidoz ve bilinç değişikliği gibi semptomlar yaşamıştır. Üç vaka, intravenöz etanol uygulaması ve hemodiyaliz dahil olmak üzere zamanında tanı ve tedavi ile uzun vadeli komplikasyonlar olmaksızın tam iyileşme ile sonuçlanmıştır. Ancak, bir hasta acil servise geç başvuru nedeniyle ölümcül sonuçla karşılaşmıştır. Bu seri, yasa dışı alkol ürünlerinin sosyal medyada yaygın olarak bulunabilirliği ile şiddetlenen metanol zehirlenmesi tehdidinin arttığını vurgulamaktadır. Bulgular, bu tür önlenebilir zehirlenmelerin sıklığını azaltmak için sıkı düzenleyici kontrollere, halkı bilinçlendirme kampanyalarına ve daha etkili önleyici tedbirlere ihtiyaç duyulduğunu vurgulamaktadır. Metanol zehirlenmesi, sağlık profesyonelleri, toksikologlar, yasal otoriteler ve sosyal medya düzenleyicilerinden koordineli bir yanıt gerektiren kritik, ancak önlenebilir bir durumdur. Halk sağlığını korumak için çevrimiçi alkol satışlarının düzenlenmesi ve metanol zehirlenmesi için erken müdahale protokolleri üzerine daha fazla araştırmaya acil ihtiyaç duyulmaktadır.

Anahtar kelimeler: ***Metanol, etanol, sosyal medya, olgu sunumu, acil servis***

INTRODUCTION

The rise of social media has revolutionized access to goods and services, but it has also introduced significant risks by providing a platform for the unregulated sale of dangerous substances. In recent years, the availability of illicit alcohol through these channels has become a growing public health concern. Although reports of alcohol sales via social media have emerged, documented cases of methanol intoxication resulting from these purchases remain rare in medical literature (Kuntsche et al., 2020). This highlights a critical gap in our understanding of the risks associated with social media-facilitated alcohol distribution.

Methanol poisoning can occur due to accidental or intentional ingestion, inhalation, dermal exposure, or through self-preparation via home-distillation, as methanol, also referred to as methyl alcohol, is a volatile and colorless substance (Güler and Üçöz Kocaşaban, 2024). Methanol itself is not inherently toxic, but it becomes highly dangerous when metabolized by the enzyme alcohol dehydrogenase into formaldehyde and formic acid, which are responsible for the severe toxic effects. These metabolites can cause life-threatening complications, such as high anion gap metabolic acidosis, basal ganglia damage, optic neuropathy, and irreversible retinal injury. The accumulation of formic acid, in particular, disrupts mitochondrial function by inhibiting cytochrome c oxidase, leading to cellular hypoxia and potentially permanent vision loss (Ross et al., 2022; Sadeghi et al., 2023). Diagnosing methanol intoxication can be challenging, as decreased consciousness may be the initial symptom, hindering the patient's ability to provide a comprehensive medical history (Tabatabaei et al., 2023).

Methanol toxicity outbreaks often occur when methanol is illicitly added to alcoholic beverages as a cost-effective substitute for ethanol (Room and O'Brien, 2021). Given the increasing prevalence of methanol intoxication through alcohol purchased on unregulated online platforms, there is an urgent need for heightened awareness and regulatory measures. In this case series, we present four patients admitted to our tertiary emergency department with methanol intoxication after consuming alcohol bought via social media. These cases not only illustrate the potentially fatal consequences of methanol poisoning but also emphasize the need for stricter oversight and intervention strategies to prevent similar incidents in the future. Our findings aim to shed light on this emerging public health threat and advocate for multidisciplinary efforts to mitigate the dangers posed by unregulated alcohol sales through social media channels.

Case Reports

Case 1: In December 2024, a 17-year-old female presented to the emergency department with complaints of fatigue, weakness, and vision loss. Her vital signs were stable, with a blood pressure (BP) of 110/70 mmHg, heart rate (HR) of 89 bpm, temperature of 36.6°C, and respiratory rate (RR) of 16 breaths/min. A detailed history revealed that she had consumed three glasses of whisky purchased via a social media network 48 hours prior. The patient had no significant medical history or medication use. Laboratory tests showed a pH of 7.07, PCO2 of 21.4 mmHg, PO2 of 32.6 mmHg, and HCO3 of 6.4 mmol/L. Her blood ethanol level was 0, while the blood methanol level was 85 mg/dL. Given the sudden vision loss, history of alcohol consumption from an unreliable source, metabolic acidosis with an increased anion gap (26.6 mmol/L), and elevated methanol levels, a diagnosis of methanol intoxication was made. Treatment was initiated with a loading dose of 10 ml/kg of 10% ethanol intravenously (IV) followed by an infusion at 1.5 ml/kg/hour, and hemodialysis was performed. Her blood gas parameters improved, and she was admitted to the ICU, subsequently being discharged in good health after 5 days. Since the patient was conscious, her statement was taken by law enforcement while still in the emergency department. The case was reported to the judicial authorities through law enforcement as a legal obligation.

Case 2: In December 2024, an 18-year-old male presented to the emergency department with agitation, vision loss, and

restlessness. Initial vital signs included a BP of 100/60 mmHg, HR of 110 bpm, temperature of 36.8°C, and RR of 18 breaths/min. He had a Glasgow Coma Scale (GCS) score of 8 and required elective intubation. The patient had consumed an unspecified amount of whisky purchased via a social media network the previous day. Laboratory findings indicated a pH of 7.20, PCO2 of 21.4 mmHg, PO2 of 89 mmHg, and HCO3 of 18.5 mmol/L, with blood methanol levels reaching 150 mg/dL. The patient received IV ethanol therapy and underwent hemodialysis. His condition improved, and he was admitted to the ICU, later being discharged in good health after a 9-day stay. The case was referred to the judicial authorities via law enforcement in accordance with legal obligations.

Case 3: In January 2025, a 43-year-old male arrived at the emergency department in an agitated state, with a BP of 90/60 mmHg, HR of 115 bpm, temperature of 36.8°C, and RR of 19 breaths/min. He was intubated with a GCS score of 7. His relative (Case 4) reported consuming alcohol together, purchased from social media, over the past 2-3 days. Laboratory tests revealed a pH of 6.88, PCO2 of 75 mmHg, PO2 of 90 mmHg, and HCO3 of 9.3 mmol/L, indicating severe metabolic acidosis with an increased anion gap (32 mmol/L). IV ethanol therapy was administered along with hemodialysis; however, the patient suffered cardiac arrest twice and, despite resuscitation efforts, passed away 16 hours after ICU admission. The case was reported to the judicial authorities through law enforcement as a legal obligation, and notification was made for an autopsy.

Case 4: In January 2025, a 38-year-old male presented with vision loss. His vital signs were BP 110/60 mmHg, HR 110 bpm, temperature 36.8°C, and RR 17 breaths/min. He had consumed 200 cc of rakı purchased via a social media network 12 hours earlier. Laboratory results showed pH 7.30, PCO2 21.4 mmHg, PO2 89 mmHg, HCO3 20 mmol/L, with a blood methanol level of 55 mg/dL. The diagnosis of methanol intoxication was confirmed. Treatment involved IV ethanol administration and hemodialysis. He was admitted to the ICU and discharged in good health after 6 days. Since the patient was conscious, law enforcement obtained his statement while he was still in the emergency department. In compliance with legal obligations, the case was reported to the judicial authorities through law enforcement.

DISCUSSION

In these case series (Table 1), we highlight the growing public health threat posed by the unregulated sale of methanol through social media platforms.

Table 1. Clinical Characteristics and Outcomes of Methanol Intoxication Cases

Characteristic	Case 1 (17Y, F)	Case 2 (18Y, M)	Case 3 (43Y, M)	Case 4 (38Y, M)
Admission Date	Dec 2024	Dec 2024	January 2025	January 2025
Complaints	Fatigue, weakness, vision loss	Agitation, vision loss, restlessness	Agitation	Vision loss
Consumed Product & Source	Whisky (3 glasses) via social media	Whisky (unspecified amount) via social media	Alcohol (shared with Case 4) via social media	Rakı (200 cc) via social media
Time Since Ingestion	48 hours prior	Previous day	Past 2-3 days	12 hours earlier
GCS	15	8	7 (intubated)	15
pH (Arterial Blood Gas)	7.07	7.20	6.88	7.30
HCO3 (mmol/L)	6.4	18.5	9.3	20
Anion Gap (mmol/L)	26.6	-	32	-
Blood Methanol	85	150	-	55

Level (mg/dL)				
Treatment	IV Ethanol, Hemodialysis	IV Ethanol, Hemodialysis	IV Ethanol, Hemodialysis	IV Ethanol, Hemodialysis
Outcome	Full recovery; discharged after 5 days	Full recovery; discharged after 9 days	Fatal; succumbed 16 hours after ICU admission	Full recovery; discharged after 6 days

Sellers increasingly prefer social media due to cost advantages and the ability to reach a broad audience (Jormand et al., 2020). Despite legal restrictions on alcohol sales via the internet in Türkiye, social media has facilitated access to methanol, which, although cheaper, is significantly more toxic than ethanol (Gulen et al., 2020). Economic factors further drive individuals with alcohol dependence to seek out tax-free and low-cost methanol (Room and O'Brien, 2021). Addressing this issue requires enhancing social media literacy, implementing stricter sales controls, strengthening counseling services for those struggling with addiction, and enforcing severe penalties for illegal methanol production.

During the COVID-19 pandemic, as people were confined to their homes, social mobility decreased, and curfews were enforced, increased alcohol consumption driven by anxiety and fear, combined with misleading messages on social media, led to a mass methanol poisoning outbreak (Güler and Üçöz Kocaşaban, 2024; Soltaninejad, 2020). Alcohol consumption tends to increase during holidays and the New Year, amplifying the risk of intentional or unintentional methanol ingestion (Barták et al., 2023). As observed in our cases, methanol obtained from unregulated platforms poses a serious health risk during these periods. Therefore, intensifying monitoring efforts, especially during peak consumption times, and adopting regulatory measures similar to those implemented in other countries may effectively reduce such poisoning incidents.

The broad accessibility of social media not only facilitates the sale of methanol but also enables the distribution of counterfeit and other toxic substances. In all cases we presented, patients had obtained alcohol through social media networks, underscoring the urgency for immediate action. In these cases, the victims unknowingly purchased alcohol adulterated with methanol, believing it to be ethanol-based beverages. The sellers falsely advertised the products as safe for consumption, emphasizing authenticity through social media marketing tactics.

Rapid identification and prompt treatment—such as intravenous ethanol administration and hemodialysis—are crucial for patient survival in emergency departments. However, due to the unavailability of methanol level testing in many hospitals, thorough history-taking and blood gas analysis are essential for timely diagnosis. Early intervention is key to reducing mortality and morbidity rates.

Methanol poisoning can lead to severe complications, including permanent vision loss and neurological deficits, significantly impacting survivors' quality of life. As an antidote treatment, patients were administered either fomepizole or intravenous (IV) ethanol (10%). In cases where fomepizole could not be provided, IV ethanol was used to maintain blood ethanol levels within the range of 100 to 150 mg/dL (Güler and Üçöz Kocaşaban, 2024). In this case series, while three patients recovered without sequelae, one unfortunately did not survive, underscoring the life-threatening nature of methanol intoxication.

The uncontrolled widespread use of social media for selling toxic substances poses a significant public health challenge. Preventive strategies should encompass public awareness campaigns, educational initiatives, and informative publications by healthcare institutions to educate the public about the dangers of methanol. Additionally, monitoring social media can help identify sources of illicit sales, thereby preventing further poisoning cases. A multidisciplinary approach involving emergency medicine specialists, toxicologists, public health experts, legal authorities, and law

enforcement agencies is crucial to effectively combat this emerging threat. Policymakers must re-evaluate existing regulations on the sale of toxic substances like methanol and enforce stringent controls to safeguard public health.

Abbreviations

- ED: Emergency Department
- ICU: Intensive Care Unit
- IV: Intravenous
- GCS: Glasgow Coma Scale
- BE: Base Excess

Conflict of Interest

The authors declare that they have no conflict of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethics Approval

Given the nature of this submission as a case report, formal ethical approval was not required. However, all procedures involving human participants were conducted in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards regarding patient care and confidentiality.

Informed Consent

Consent for publication was obtained from all patients or their legal guardians.

Author Contributions

MÇ conceptualized the study and led the data collection and analysis process. MÇ, AEG, MG contributed to drafting the manuscript and interpreting the data. All authors critically revised the manuscript for important intellectual content. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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