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Personality and Background Characteristics in Patients with Methamphetamine-Induced Psychosis

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ABSTRACT

Purpose: This study aimed to examine the association between personality traits and the occurrence of psychosis among methamphetamine users.

Methods and Materials: A descriptive, cross-sectional study was conducted among 200 adults with confirmed methamphetamine dependence recruited from addiction treatment centers in North Khorasan Province, Iran. Methamphetamine-induced psychosis was diagnosed using structured clinical interviews based on DSM-5 criteria, initially by a clinical psychologist and then confirmed by a psychiatrist. Personality characteristics were assessed with the Millon Clinical Multiaxial Inventory-III (MCMI-III), adapted and validated for the Iranian population. Demographic and background data—including age, gender, education, marital and employment status, housing, and concurrent substance use—were collected via structured questionnaires. Statistical analyses were performed using independent-samples t-test, Mann-Whitney U test, and chi-square test at a significance level of $p < 0.05$.

Findings: Significant differences were observed between psychotic and non-psychotic methamphetamine users across several personality domains. Psychotic individuals scored higher on schizoid, schizotypal, paranoid, avoidant, dependent, depressive, sadistic, negativistic, masochistic, and borderline traits ($p < 0.05$), while histrionic traits were significantly lower in the psychotic group ($p = 0.016$). Demographically, psychotic users were more likely to have lower education ($p = 0.043$) and to be unmarried or divorced ($p = 0.048$). Polysubstance use was common, with concurrent use of methamphetamine with opium (55.5%) and heroin (55%) being most frequent.

Conclusion: Specific personality patterns, particularly within Clusters A and B, are strongly associated with methamphetamine-induced psychosis. Incorporating personality assessment into addiction treatment may improve risk detection and enable personalized interventions to prevent or mitigate psychotic outcomes among methamphetamine users.

Keywords: Personality traits, Psychotic, Substance use, Methamphetamine.

1. Introduction

Methamphetamine (MA), a potent synthetic derivative of amphetamine, has emerged as one of the most widely abused psychostimulants worldwide, exerting profound effects on the central nervous system (CNS) and causing extensive individual and social harm (Barr et al., 2006; Degenhardt et al., 2014). The addition of a methyl group to the amphetamine molecule enhances lipophilicity, allowing methamphetamine to cross the blood–brain barrier rapidly and trigger intense psychoactive effects (Rathitharan et al., 2020; Unadkat et al., 2018). Over the past two decades, methamphetamine misuse has increased across diverse contexts—from North America to East Asia and the Middle East—posing a major global health and social policy challenge (Kwon & Han, 2018). In the United States alone, the National Survey on Drug Use and Health reported that approximately 1.6 million people (0.6% of the population) used methamphetamine in the past year and about 774,000 (0.3%) reported monthly use (SaaMhs, 2017). While prevalence rates in Iran remain officially lower, methamphetamine users account for a large proportion of those entering addiction treatment, underscoring its growing public health burden (Alammehrjerdi et al., 2019; Noori et al., 2016).

Methamphetamine use is associated with a range of acute and chronic adverse consequences, including irritability, hyperarousal, aggression, and severe neuropsychiatric outcomes such as substance-induced psychosis (Darke et al., 2008). Methamphetamine-induced psychosis (MIP) typically manifests with hallucinations, delusions, and thought disturbances and is clinically similar to schizophrenia-spectrum disorders (Hides et al., 2014; McKetin et al., 2006). Meta-analytic estimates suggest that nearly 43% of chronic methamphetamine users experience psychotic episodes (Arunogiri et al., 2018). Although the acute psychotic state may remit with abstinence, a subset of users develop persistent or recurrent psychosis, significantly complicating treatment and prognosis (Arunogiri et al., 2017). Neurobiological findings implicate dopaminergic dysregulation, oxidative stress, and microglial activation as contributors to this vulnerability (Rathitharan et al., 2020). Structural and functional brain changes—including alterations in the striatum and prefrontal cortex—have also been identified, linking neurotoxicity to the emergence of psychotic features (Barr et al., 2006).

The risk of psychosis among methamphetamine users is shaped by a constellation of factors. High cumulative dose

and duration of use, intravenous administration, and polysubstance use—particularly cannabis and opioids—have been consistently associated with elevated risk (Chen et al., 2005; McKetin et al., 2013). In Iran, polysubstance use is frequent; methamphetamine is often combined with opium and heroin, potentially potentiating its neurotoxic and psychotic effects (Nazari et al., 2023). Clinical observations also highlight that psychosocial instability—including unemployment, low educational attainment, and poor social support—is prevalent among methamphetamine-dependent populations (Kaviyani et al., 2023; Noori et al., 2016). Recent qualitative work has shown that lapses and relapses are influenced by complex interpersonal, emotional, and contextual triggers, underscoring the heterogeneity of this population (Kaviyani et al., 2023; Shoa Kazemi et al., 2025).

Beyond environmental and neurotoxic influences, personality has long been hypothesized to play a pivotal role in vulnerability to substance use disorders and their psychiatric sequelae. Personality pathology is highly prevalent among individuals with substance use disorders (Rounsaville et al., 1998; Sansone & Sansone, 2011; Verheul, 2001). Traits such as impulsivity, emotional dysregulation, interpersonal instability, and suspiciousness may predispose individuals to both methamphetamine misuse and psychotic reactions (Horan et al., 2008; Shi et al., 2018). In the Big Five model, neuroticism is strongly associated with increased risk of psychotic-like experiences and emotional dyscontrol (Shi et al., 2018), while schizoid and schizotypal tendencies reflect underlying social withdrawal and cognitive-perceptual distortions that may progress to frank psychosis under stimulant stress (Horan et al., 2008). Borderline personality features—marked affective lability, identity disturbance, and paranoia under stress—are also frequently observed in methamphetamine users (Anderson et al., 2024; Sansone & Sansone, 2011). Emerging data suggest that distress intolerance, a key facet of borderline and related pathology, may amplify substance use motives and worsen psychiatric outcomes (Anderson et al., 2024).

Cluster-based models of personality (Clusters A, B, and C) offer additional insight into the pathways linking personality structure and psychotic vulnerability. Cluster A traits (schizoid, paranoid, schizotypal) are closely aligned with psychosis proneness, including suspiciousness and odd beliefs (Horan et al., 2008; Verheul, 2001). Cluster B features (borderline, antisocial, narcissistic, histrionic) are associated with impulsivity, emotional dysregulation, and

unstable self-image, which may exacerbate substance-related psychopathology (Rounsaville et al., 1998; Sansone & Sansone, 2011). Meanwhile, Cluster C traits (avoidant, dependent, obsessive-compulsive) reflect anxious and socially inhibited patterns that may emerge as maladaptive coping or risk enhancers in chronic substance use (Pourmohseni & Niksarsh, 2022; Verheul, 2001). Indeed, aggressive and psychopathic tendencies have been identified as drivers of substance misuse in vulnerable youth populations (Pourmohseni & Niksarsh, 2022). Furthermore, clinical case reports illustrate the diagnostic complexity when severe personality pathology co-occurs with polysubstance use, leading to frequent misclassification and treatment delay (Tsyingauz, 2023).

Despite this knowledge, research explicitly linking specific personality profiles to methamphetamine-induced psychosis remains limited and fragmented. Much of the available work has examined either general psychiatric comorbidity or broad neurobiological correlates without parsing distinct personality clusters (Barr et al., 2006; McKetin et al., 2013). While there is evidence that methamphetamine users show higher schizoid and borderline features compared to non-users (Rounsaville et al., 1998), it is unclear whether these traits meaningfully distinguish those who develop psychosis from those who do not. Few studies have examined this within Middle Eastern populations, where sociocultural and substance-use patterns differ markedly from Western contexts (Nazari et al., 2023; Noori et al., 2016). Given the regional increase in methamphetamine availability and the unique demographic and psychosocial profile of Iranian users, this gap represents a crucial limitation in tailoring prevention and treatment strategies.

Personality assessment may also hold practical value for early intervention. Identifying high-risk personality constellations could help clinicians anticipate psychotic decompensation, inform psychoeducation, and design targeted therapies. For example, patients with schizotypal or borderline traits might benefit from enhanced monitoring during withdrawal, while those with avoidant or dependent tendencies may require supportive and relationally attuned treatment to maintain abstinence. Integrating personality profiling into addiction services could complement pharmacological and cognitive-behavioral approaches already in use (Alammehrjerdi et al., 2019).

Furthermore, the interplay between polysubstance use and personality vulnerabilities complicates clinical prediction. Individuals with strong borderline or

psychopathic features may seek multiple drugs to regulate affect or assert control, amplifying neurotoxicity and psychosis risk (Pourmohseni & Niksarsh, 2022; Sansone & Sansone, 2011). Concurrent opioid use, common among Iranian methamphetamine users (Nazari et al., 2023; Noori et al., 2016), may not directly cause psychosis but can worsen health instability and obscure clinical presentation. Understanding these complex interactions requires culturally sensitive research capable of disentangling predisposing traits from the effects of chronic intoxication.

Another critical consideration is the temporal and diagnostic challenge: distinguishing pre-existing personality pathology from substance-induced changes is notoriously difficult (Tsyingauz, 2023). Longitudinal designs are rare, yet needed to clarify whether certain personality structures predict psychotic conversion or whether repeated psychotic episodes reshape personality functioning. Moreover, female users—an underrepresented subgroup in research—may show different vulnerability patterns, including higher emotional dysregulation and self-harming behaviors that complicate psychosis risk (Shoaa Kazemi et al., 2025). Capturing these nuances could significantly improve prevention and intervention strategies.

Neuroimaging advances reinforce the theoretical basis for personality-driven risk. Methamphetamine-associated microglial activation and neuroinflammation (Rathitharan et al., 2020) may interact with trait-level vulnerability, including threat sensitivity and impaired emotional regulation (Shi et al., 2018). These biological and psychological factors converge to heighten psychotic liability, suggesting a biopsychosocial model of MIP rather than a purely substance-driven phenomenon. From a clinical standpoint, this underscores the importance of moving beyond a “one-size-fits-all” conceptualization of stimulant-induced psychosis.

Collectively, the literature reveals an urgent need for culturally grounded, empirically robust studies investigating how specific personality dimensions relate to methamphetamine-induced psychosis. Current evidence is scattered across neurobiological, epidemiological, and psychopathological domains but lacks integrative models applicable to Iranian and similar populations (Alammehrjerdi et al., 2019; Kaviyani et al., 2023; Nazari et al., 2023). A systematic exploration of personality patterns may improve diagnostic accuracy, reduce misclassification with primary psychotic disorders, and guide individualized treatment planning.

Accordingly, the present study aimed to investigate the personality and background characteristics associated with methamphetamine-induced psychosis, with the goal of identifying specific personality traits that differentiate psychotic from non-psychotic methamphetamine users and informing prevention and treatment strategies tailored to high-risk groups.

2. Methods and Materials

2.1. Study Design and Participants

This study was a descriptive, cross-sectional research conducted in addiction treatment centers of Bojnourd and Shirvan (North Khorasan Province, Iran) in 2023.

A total of 200 individuals (men and women) with positive methamphetamine test results were recruited. Participants were referred to addiction treatment centers either voluntarily, through family complaints, or by judicial order. Sampling was performed using a consecutive (available) sampling method until the required sample size was reached.

Inclusion criteria:

- Age between 18–60 years.
- Confirmed methamphetamine use (positive urine test).
- Undergoing methadone maintenance therapy at the time of recruitment.
- Ability and willingness to provide informed consent.

Exclusion criteria:

- Severe psychiatric disorders (such as schizophrenia, bipolar disorder, or severe cognitive impairment) that impaired the ability to participate.
- Inability to complete questionnaires or clinical interviews.

2.2. Diagnostic Procedure

Within the first 48 hours of admission, structured clinical interviews were conducted by clinical psychologists to assess methamphetamine-induced psychosis based on DSM-5 criteria. Interviews with family members were also performed to obtain collateral information. Diagnoses were subsequently confirmed by a board-certified psychiatrist. Based on these assessments, participants were categorized into two groups: psychotic and non-psychotic.

2.3. Data Collection Tool

Demographic Checklist: Information regarding age, gender, education, marital status, housing, employment, and concurrent substance use (e.g., opium, heroin) was collected.

Millon Clinical Multiaxial Inventory-III (MCMI-III): This scale, originally developed by Theodore Millon and colleagues in 1994, is a standardized self-report instrument with 175 true–false items designed to assess enduring personality traits and clinical syndromes. It includes 24 clinical scales organized into three major groups: 11 Personality Pattern scales (Schizoid, Avoidant, Depressive, Dependent, Histrionic, Narcissistic, Antisocial, Sadistic/Aggressive, Compulsive/Obsessive, Negativistic/Passive–Aggressive, and Masochistic/Self-Defeating), 3 Severe Personality Pathology scales (Schizotypal, Borderline, and Paranoid), and 10 Clinical Syndrome and Severe Clinical Syndrome scales (Anxiety, Somatoform, Bipolar: Manic, Dysthymia, Alcohol Dependence, Drug Dependence, Post-Traumatic Stress Disorder, Thought Disorder, Major Depression, and Delusional Disorder). Responses are scored using Base Rate (BR) scores that adjust for disorder prevalence in clinical populations, with scores of 75 or higher indicating the presence of significant traits or syndromes and 85 or higher reflecting prominent or pervasive features. The Persian version of the MCMI-III, previously validated for Iranian populations, was used in this study and demonstrated strong internal consistency. To ensure content and face validity for the present sample, the questionnaire was reviewed by three clinical psychology experts and minor cultural and linguistic adaptations were made.

2.4. Procedure

Before completing the questionnaire, participants were informed about the purpose of the study, assured of confidentiality, and signed a written informed consent form. To reduce social desirability bias, participants were reminded that there were no right or wrong answers, and some items were reverse-coded. Questionnaires were completed in a private room within the treatment center under the supervision of a trained researcher, who provided clarifications if needed. Completion took approximately 25 minutes per participant. In total, 7 incomplete questionnaires were excluded, and 193 complete responses were analyzed.

2.5. Data Analysis

Data were analyzed using **SPSS version 26**. Independent samples t-tests, chi-square tests, and Mann–Whitney U tests were used to compare demographic and personality characteristics between psychotic and non-psychotic groups. Statistical significance was set at $p < 0.05$. Potential confounding factors such as concurrent substance use (opium, heroin) and methadone treatment were considered in subgroup analyses.

Table 1

Demographic characteristics of participants

Demographic characteristics		Number (percentage)
Gender	Male	144 (72 %)
	Female	56 (28 %)
Residential area	Urban	143 (71.5 %)
	Rural	57 (28.5 %)
Education	Illiterate	27 (13.5 %)
	Elementary	49 (24.5 %)
	Secondary	69 (34.5 %)
	High school	12 (6 %)
	Diploma	29 (14.5 %)
	Higher education	14 (7 %)
Marital status	Married	96 (48 %)
	Single	51 (25.5 %)
	Divorced	40 (20 %)
	Widow	6 (3 %)
	Divorced /Married	7 (3.5 %)
Housing Status	Renting	64 (32.32 %)
	Owner	75 (37.88 %)
	Homeless	11 (5.56 %)
	With parents	44 (22.22 %)
	Other	4 (2.02 %)
Employment status	Employed	52 (26 %)
	Unemployed	148 (74 %)

Table 2 shows the demographic status of psychotic and non-psychotic methamphetamine users. From the table, significant differences may be found between the psychotic

3. Findings and Results

Table 1 shows the demographic characteristics of the participants. The study group consisted of male (72%) and female (28%) methamphetamine users. Also, 72% of methamphetamine users were living in urban areas. It was also found that 48% of the study group are married and 74% were unemployed.

and non-psychotic individuals in terms of age, gender, location of residence, education status, marital status, housing status, and job status.

Table 2

Demographic characteristics of patients using methamphetamine by their psychosis status

		Psychosis		P-Value
		Yes	No	
		Mean (SD) or Count (%)	Mean (SD) or Count (%)	
Age		36.59 (8.29)	36.05 (8.52)	0.647
Gender	Male	66 (72.53 %)	78 (71.56 %)	0.879
	Female	25 (27.47 %)	31 (28.44 %)	
Residency	Urban	63 (69.23 %)	80 (73.39 %)	0.516
	Rural	28 (30.77 %)	29 (26.61 %)	
Education	Illiterate	9 (9.89 %)	18 (16.51 %)	0.043*

Marital Status	Elementary	23 (25.27 %)	26 (23.85 %)	0.048*
	Secondary	35 (38.46 %)	34 (31.19 %)	
	High school	3 (3.30 %)	9 (8.26 %)	
	Diploma	18 (19.78 %)	11 (10.09 %)	
	Higher education	3 (3.30 %)	11 (10.09 %)	
	Married	34 (37.36 %)	62 (56.88 %)	
	Single	27 (29.67 %)	24 (22.02 %)	
	Divorced	23 (25.27 %)	17 (15.60 %)	
	Widow	3 (3.30 %)	3 (2.75 %)	
	Divorced /Married	4 (4.40 %)	3 (2.75 %)	
Housing Status	Renting	22 (24.18 %)	42 (39.25 %)	0.16
	Owner	36 (39.56 %)	39 (36.45 %)	
	Homeless	6 (6.59 %)	5 (4.67 %)	
	With parents	24 (26.37 %)	20 (18.69 %)	
	Other	3 (3.30 %)	1 (0.93 %)	
Job Status	Employed	24 (26.37 %)	28 (25.69 %)	0.912
	Unemployed	67 (73.63 %)	81 (74.31 %)	

Table 3 shows the status of the simultaneous use of methamphetamine and other types of drugs (i.e. opium, heroin, cannabis, alcohol, cigarettes, and other opiates). The

details show that the use of methamphetamine & opium, and methamphetamine & heroin are the most frequent concurrent uses.

Table 3

Simultaneous use of methamphetamine and other drugs

Type of drug	N (%)
Opium	111 (55.5 %)
Heroin	110 (55 %)
Cannabis	21 (10.5 %)
Nicotine	62 (31 %)
Alcohol	29 (14.5 %)
Other opiates	12 (6 %)

Table 4 shows the personality traits of methamphetamine users by their psychotic status. As observed 4, mean scores of psychotic methamphetamine users in schizoid, avoidant, Depressive, dependent, histrionic, sadistic, negativism, masochistic, schizotypal, borderline, and paranoid

personality traits are significantly higher than the non-psychotic methamphetamine users. In other personality traits (i.e. narcissism, antisocial, obsessive, and substance dependence) no significant differences were found between the psychotic and non-psychotic methamphetamine users.

Table 4

Personality traits of methamphetamine addicts based on psychiatric status

	Mean (SD)	psychosis		P-Value
		No	Yes	
Schizoid	14 (4)	13 (4)	15 (4)	0.001*
Avoidant	13 (6)	12 (5)	15 (5)	<0.001*
Depressive	15 (6)	14 (6)	17 (5)	0.002*
Dependent	15 (5)	14 (5)	16 (5)	0.015*
Histrionic	13 (5)	14 (5)	12 (5)	0.016*
Narcissistic	15 (5)	15 (5)	15 (5)	0.9
Antisocial	15 (4)	15 (4)	16 (4)	0.091
Sadistic	15 (6)	14 (5)	17 (6)	0.014*

Obsessive-compulsive	14 (3)	14 (3)	14 (3)	0.465
Negativism	16 (5)	15 (6)	17 (5)	0.012*
Masochistic	13 (4)	12 (4)	14 (4)	<0.001*
Schizotypal	14 (6)	12 (6)	16 (6)	<0.001*
Borderline	14 (6)	12 (6)	16 (6)	<0.001*
Paranoid	15 (6)	14 (6)	16 (6)	0.049*

*P-Values less than 0.05 are considered statistically significant

4. Discussion and Conclusion

The present study investigated the demographic, social, and personality correlates of methamphetamine dependence and examined how these characteristics differentiate methamphetamine users who develop psychosis from those who do not. Our findings revealed significant differences between psychotic and non-psychotic users in several background factors, including education, marital status, and patterns of concurrent substance use. Importantly, the study demonstrated that specific personality traits—particularly schizoid, schizotypal, paranoid, avoidant, dependent, depressive, sadistic, negativistic, masochistic, and borderline—were elevated among methamphetamine users experiencing psychosis, while histrionic traits were comparatively lower. These results provide new evidence for the role of enduring personality features in shaping vulnerability to methamphetamine-induced psychosis (MIP), offering both theoretical and clinical implications.

Consistent with prior epidemiological work, our sample was predominantly male and urban-dwelling, with a high proportion of participants reporting low educational attainment and unemployment (Kaviyani et al., 2023; Noori et al., 2016). Similar demographic trends have been reported in other Iranian studies and global assessments, which have shown that methamphetamine misuse is closely linked with socioeconomic disadvantage and limited access to educational and employment opportunities (Alammehrjerdi et al., 2019; SaaMhs, 2017). The association between lower education and psychotic outcomes may be partially explained by reduced awareness of the risks associated with stimulant use, limited access to prevention programs, and increased exposure to high-risk social networks. Unemployment, likewise, may intensify psychosocial stress, reduce social integration, and create unstructured time that facilitates substance use and relapse (Kaviyani et al., 2023).

Our findings also showed that a considerable proportion of methamphetamine users were married, a pattern that contrasts with some Western and regional studies where single and divorced individuals are at higher risk (Arunogiri et al., 2017). Cultural and family dynamics may help explain

this discrepancy; in Iranian settings, marriage does not necessarily serve as a protective factor against drug use, especially in contexts of interpersonal conflict or financial hardship. Qualitative research suggests that relational stress and lack of spousal support can contribute to continued stimulant use and psychological distress (Shoaa Kazemi et al., 2025). Moreover, the presence of family responsibilities without adequate coping resources may intensify vulnerability to psychiatric complications.

The widespread polysubstance use observed—especially the concurrent use of methamphetamine with opium and heroin—replicates earlier Iranian findings (Nazari et al., 2023; Noori et al., 2016). Such patterns complicate both the clinical course and the neurobiological effects of methamphetamine. Co-use of opioids can modulate dopaminergic and glutamatergic systems, potentially exacerbating psychotic vulnerability (Barr et al., 2006). Cannabis and alcohol, though less prevalent in this sample, also pose independent risks for psychosis (McKetin et al., 2013). These findings underline the necessity of integrated treatment strategies addressing multi-drug use rather than single-substance frameworks.

A central contribution of this study is its detailed analysis of personality structures associated with psychosis in methamphetamine users. Psychotic participants exhibited markedly higher scores across Cluster A traits—schizoid, schizotypal, and paranoid—compared with non-psychotic users. These results strongly align with existing evidence linking Cluster A pathology to psychosis-proneness and cognitive-perceptual distortions (Horan et al., 2008; Verheul, 2001). Schizoid withdrawal and schizotypal eccentricity may reflect baseline neurocognitive vulnerabilities that, when combined with the neurotoxic effects of methamphetamine, accelerate psychotic decompensation (Rathitharan et al., 2020). The elevated paranoid traits in psychotic users correspond with clinical observations that stimulant-induced paranoia is a hallmark of MIP (Darke et al., 2008; McKetin et al., 2006).

Within Cluster B, borderline and sadistic features were significantly more pronounced in the psychotic group. Borderline personality organization—characterized by

affective instability, transient paranoia, and stress-induced dissociation—may magnify susceptibility to psychotic reactions under stimulant use (Anderson et al., 2024; Sansone & Sansone, 2011). Distress intolerance, a key mechanism in borderline pathology, has been shown to drive substance use motives and aggravate psychiatric complications (Anderson et al., 2024). Sadistic tendencies, though less frequently studied in the context of addiction, may reflect hostile and aggressive interpersonal schemas that heighten vulnerability to persecutory delusions and violent reactions during intoxication (Rounsaville et al., 1998). Interestingly, narcissistic and antisocial traits did not differ significantly between groups. While antisocial behavior and impulsivity are well-documented risk factors for stimulant misuse (Sansone & Sansone, 2011), our data suggest they may not independently predict psychotic transition among users.

The Cluster C profile was also notable: psychotic users scored higher on avoidant and dependent traits. These patterns may represent maladaptive coping strategies in individuals with fragile self-esteem and social inhibition who use stimulants to compensate for interpersonal deficits. Alternatively, heightened social anxiety and dependency could be reactive to repeated psychotic episodes, representing a consequence rather than a cause of MIP (Pourmohseni & Niksarsh, 2022). Nonetheless, the presence of these traits points to an important subgroup that may require supportive, relationship-centered interventions to reduce risk.

An unexpected but robust finding was the lower prevalence of histrionic traits among psychotic users. Histrionic personality is associated with emotional expressiveness and social engagement, which may facilitate help-seeking and connection to care networks (Sansone & Sansone, 2011). Users with higher histrionic tendencies may also maintain protective social relationships that buffer against isolation and paranoid ideation. This inverse association warrants further exploration, as it suggests that some socially oriented personality features could mitigate psychosis risk in stimulant-using populations.

Our personality findings dovetail with current neurobiological models of MIP. Methamphetamine-induced neuroinflammation and microglial activation (Rathitharan et al., 2020) likely interact with psychological vulnerability factors such as threat sensitivity and poor emotional regulation (Shi et al., 2018). Individuals with high neuroticism and schizotypy may be especially susceptible to dopaminergic sensitization, a key driver of stimulant

psychosis (Barr et al., 2006). These data support a biopsychosocial model in which stable personality configurations act as moderators of the neurotoxic effects of methamphetamine, shaping clinical trajectories and chronicity of psychosis.

From a service-delivery perspective, our findings echo international concerns regarding the complex comorbidity among methamphetamine users (Arunogiri et al., 2018; Unadkat et al., 2018). Diagnostic confusion between primary psychotic disorders and MIP is well-documented, particularly when personality disorders and polysubstance use overlap (Tsyngauz, 2023). This underscores the need for structured, longitudinal assessments that can differentiate pre-existing traits from drug-induced states. The integration of standardized personality assessment tools, such as the MCMI-III, into addiction treatment settings could help clinicians anticipate psychiatric instability and adapt therapeutic strategies accordingly.

Additionally, our data resonate with recent qualitative work highlighting the subjective complexity of relapse cycles among methamphetamine users (Kaviyani et al., 2023). Personality-driven coping mechanisms, unresolved trauma, and relational difficulties all contribute to ongoing use and psychiatric deterioration. Similarly, the lived experiences of women overcoming addiction suggest that gender-specific factors—self-harm, affective instability, interpersonal vulnerability—must be addressed in prevention of MIP (Shoaa Kazemi et al., 2025). Culturally sensitive interventions that integrate these psychosocial dynamics with personality-based risk screening may enhance outcomes.

This study, while advancing the understanding of personality correlates of MIP, has several important limitations. First, the cross-sectional design prevents firm conclusions regarding causality. It remains unclear whether certain personality traits existed prior to methamphetamine use and predisposed individuals to psychosis, or whether repeated psychotic episodes and chronic drug exposure modified personality functioning over time. Longitudinal research is needed to disentangle these temporal dynamics. Second, our sample was drawn from treatment-seeking individuals in North Khorasan Province, including many admitted through compulsory programs. This limits generalizability to community samples and individuals who avoid or lack access to formal treatment. Third, polysubstance use was highly prevalent; although analyses considered concurrent drug use, isolating the effects of methamphetamine from opioids, cannabis, or other

substances remains challenging. Fourth, self-report measures of personality, while clinically valuable, may be influenced by acute psychiatric states, denial, or social desirability bias. Finally, cultural factors unique to Iran, including stigma, gender roles, and social norms, may have shaped reporting patterns and limit direct comparison with Western studies.

Future research should employ longitudinal and prospective cohort designs to clarify the directionality of the relationship between personality and MIP. Tracking stimulant users over time, from early experimentation to potential psychotic conversion, would help determine whether schizoid, borderline, or avoidant traits predict later psychiatric deterioration or emerge as a consequence. Integrating multimodal neuroimaging could also illuminate how neuroinflammatory and dopaminergic changes interact with personality-based vulnerability. Expanding research to include female and rural populations will improve representativeness and clarify gender- and culture-specific risk factors. Additionally, future studies should examine protective personality features—such as social expressiveness or emotional openness—that might buffer against psychotic outcomes, an area neglected in current work. Finally, testing personality-informed intervention models, such as integrating dialectical behavior therapy skills for borderline features or social skills training for schizotypal traits, could translate personality research into practical, preventive strategies.

Clinicians working with methamphetamine users should consider routine personality assessment as part of comprehensive intake and risk evaluation. Identifying high-risk configurations—especially Cluster A, borderline, and sadistic features—may help flag individuals prone to psychotic deterioration and inform the intensity of monitoring and follow-up. Psychosocial interventions should be tailored to personality patterns; for example, users with borderline traits may benefit from emotion regulation and distress tolerance training, while those with avoidant or dependent traits might require strong therapeutic alliances and gradual exposure to interpersonal contexts. Culturally adapted family interventions could address relational dynamics that perpetuate substance use and psychological distress, particularly in settings where family systems strongly influence recovery. Lastly, treatment programs should integrate harm reduction and relapse prevention frameworks that acknowledge the impact of polysubstance use and psychosocial adversity on psychosis risk.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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