



Iranian Psychiatrists' Attitudes toward Methamphetamine Use Disorder and Prescribing Patterns: A Cross-Sectional Survey

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Abstract

Background: Methamphetamine Use Disorder (MUD) has emerged as a major public health concern in Iran, driven by a shift in substance use patterns from opioids to methamphetamine. Despite its rising prevalence, there is scarce data on Iranian psychiatrists' therapeutic approaches. This study evaluated their prescribing practices and attitudes toward managing MUD.

Methods: This cross-sectional study was conducted in 2024 among 150 practicing Iranian psychiatrists, recruited *via* convenience sampling through social media platforms until the target sample size was reached. The participants completed a researcher-made, structured questionnaire featuring four clinical scenarios representing MUD cases (methamphetamine-induced psychosis, intoxication, craving, and recurrent psychosis). Scenarios were developed by a panel of four psychiatrist faculty members with ≥ 3 yr. of experience, based on DSM-IV-TR and DSM-5 criteria, and refined by a separate panel of five experts for clarity and relevance. Responses, collected *via* Google Forms, were analyzed using SPSS v26.

Results: For methamphetamine-induced psychosis, 88% prescribed medications, primarily atypical antipsychotics (55.3%). For aggression, 50% prescribed adjunctive medications, predominantly sedatives (28%) and mood stabilizers (20%). Craving management involved pharmacotherapy in 66.7% of the cases, with bupropion (50%) and pregabalin/gabapentin (27.9%) most frequently prescribed. Half prescribed medication for intoxication, primarily benzodiazepines (28%). For recurrent psychosis, 80% recommended combining psychotherapy with pharmacotherapy, while 35.3% prescribed long-acting antipsychotics.

Conclusion: While prescription of atypical antipsychotics (for psychosis) and bupropion (for craving) align with partial evidence, underutilization of medications like mirtazapine and buprenorphine highlights knowledge-practice gaps. Findings emphasize the need for regional treatment guidelines, targeted educational interventions addressing evidence-practice discrepancies, and further research to optimize therapeutic strategies.

Keywords: Benzodiazepines, Buprenorphine, Methamphetamine, Prescriptions, Psychiatrists, Psychotherapy, Substance-related disorders

Introduction

Methamphetamine is a potent central nervous system stimulant with high abuse potential. Its history dates back to 1893, when Japanese chemist Nagayoshi Nagai first synthesized it from ephedrine. Subsequently, in 1919, Akira Ogata developed its crystalline form, which, due to its lipophilic nature, rapidly crosses the blood-brain barrier and contributes to its pronounced addictive potential. This pharmacokinetic profile often leads users to require repeated dosing to sustain its effects (1,2).

Globally, an estimated 36 million people used amphetamines in 2021, accounting for approximately 0.7% of the world's population. While North America reports the highest prevalence, East and Southeast Asia comprise the largest number of users (3).

Methamphetamine, specifically, was positioned as the second most prevalent illicit drug globally after opium in 2017 (4). Its use has become markedly prevalent among youth populations, with studies suggesting this may be associated with inaccurate perceptions of the drug's safety (5). An increasing trend in methamphetamine consumption is also documented among polydrug users in Asian nations, notably within Southeast Asia. Illustratively, research in Vietnam reported concurrent methamphetamine use among 24% of the heroin injectors (6).

In line with this worldwide pattern, in Iran, methamphetamine-known as "Shisheh" (meaning "glass")- has become a significant public health concern, emerging as the second most commonly used illicit drug in the country, excluding alcohol (7-10). National population estimates underscore the high prevalence of both opium and methamphetamine, with the latter affecting approximately 590 per 100,000 individuals in the general population (5). Over recent years, a notable shift in substance abuse patterns has been observed, moving away from traditional opioids toward newer substances such as methamphetamine. This transition is largely driven by the drug's accessibility and affordability, which have facilitated its recreational use, particularly among younger demographics thereby posing unique challenges for the healthcare system (11-14).

Structurally similar to epinephrine and dopamine, methamphetamine exerts a wide range of neuropsychiatric effects. At lower doses, it increases alertness and

irritability, while higher doses may induce fear, anxiety, and psychotic symptoms (1). A study of hospitalized Iranian patients with methamphetamine-induced psychosis reported high rates of persecutory delusions (85.5%), violent behavior (75.6%), and auditory hallucinations (51.3%) (13).

Despite limited consensus regarding the prevalence of methamphetamine-induced psychotic disorder among users, a meta-analysis by Lecomte *et al* reported a composite event rate of 36.5%. This prevalence increased to 42.7% when considering lifetime occurrence and rose further to over 43.5% among individuals specifically diagnosed with methamphetamine use disorders. These findings underscore the substantial societal prevalence of this disorder, necessitating focused attention from health systems on prevention and treatment strategies (15).

Treatment of Methamphetamine Use Disorder (MUD) remains challenging, primarily due to the lack of approved pharmacological interventions (10). While psychological interventions, particularly cognitive-behavioral therapy, are the mainstay of treatment, a variety of medications-including antipsychotics, antidepressants, and mood stabilizers-are frequently prescribed in clinical practice (16,17). Some pharmacological agents have shown promise in clinical trials, such as risperidone for positive psychotic symptoms, aripiprazole for negative symptoms, bupropion for craving reduction, and naltrexone for severe MUD (8,18).

Despite the rising prevalence of methamphetamine use in Iran, there is a notable paucity of data regarding Iranian psychiatrists' attitudes and prescribing patterns. Previous research, such as a 2012 study by Abe *et al* in Japan, has demonstrated that psychiatrist characteristics-including gender and yr. of practice-can influence treatment outcomes in patients with schizophrenia spectrum and mood disorders (19). More recently, an internet-based survey by Örum *et al* in Turkey identified factors affecting psychiatrists' approaches to treating methamphetamine-associated psychotic disorders (20).

However, to date, no study has specifically explored these factors in the context of MUD in Iran. This study seeks to address this gap by systematically assessing Iranian psychiatrists' attitudes toward MUD and identifying their common prescribing

patterns. By elucidating current clinical practices and perspectives, findings of the current study aim to inform the development of targeted educational initiatives and evidence-based guidelines, enhancing the management of this growing public health challenge in Iran.

Materials and Methods

Study design and population

This cross-sectional study utilized clinical vignettes and structured questionnaires to assess the attitudes and prescribing practices of Iranian psychiatrists regarding methamphetamine use disorder. The study population comprised practicing psychiatrists who provide psychiatric care across Iran, with data collection conducted in 2024. The participants were recruited through convenience sampling, predominantly *via* social media platforms, by inviting accessible psychiatrists to participate in the survey. Inclusion was limited to those who voluntarily completed and returned the questionnaire, and recruitment ceased upon reaching a sample size of 150 respondents. This sample size was determined with reference to the guidelines proposed by Krejcie and Morgan in 1970, which provided a practical framework for sample selection. However, it is important to note that the non-probabilistic nature of the sampling approach restricts the generalizability of the findings to the estimated population of approximately 2,000 active psychiatrists in Iran. This method was chosen primarily due to its practicality in accessing a geographically dispersed professional cohort, notwithstanding inherent limitations such as potential self-selection bias.

Scenario development and validation

A panel of four psychiatrist faculty members, each with a minimum of three *yr.* of specialized clinical experience, developed four clinical scenarios representing patients with methamphetamine use disorder. These scenarios were designed to present clear diagnoses based on DSM-IV-TR and DSM-5 criteria, explicitly excluding confounding comorbidities such as mood, other psychotic, or anxiety disorders. Each scenario emphasized key disorder characteristics relevant to clinical decision-making, while maintaining a manageable number of scenarios

to facilitate participant completion and minimize analytical confounders. The scenarios incorporated diverse factors influencing pharmacological treatment choices, with a deliberate focus on medication-based interventions. Subsequently, a separate panel of five psychiatrist faculty members reviewed and refined the scenarios to ensure clarity and clinical relevance.

Data collection and analysis

The scenarios and accompanying questionnaires were distributed electronically *via* email and virtual platforms. The questionnaire collected demographic data (gender, age, faculty membership status, and workplace) and presented four scenarios, comprising a total of 20 questions. For each scenario, the participants were asked to provide a single prescription, specifying the medication, dosage form, dosing instructions, and number of medications. Following the data collection, the responses were extracted and organized using Microsoft Excel, then imported into IBM SPSS Statistics version 26 for analysis. Descriptive statistics, including frequencies and percentages, were used to summarize the data. Additionally, inferential statistics such as chi-square tests (or Fisher's exact test for small cell counts) were applied post-hoc to assess associations between the demographic variables and prescribing patterns, with *p*-values reported for significant findings ($p < 0.05$) in relevant tables.

Results

Demographic characteristics of the participants

A total of 150 psychiatrists participated in this study, with their demographic characteristics presented in table 1. The mean age was 40.77 ± 8.75 *yr.*, with 66% being under 40 *yr.* of age. The sample comprised 58.7% female psychiatrists, while 24% of the participants were faculty members, and 71 participants (47.3%) worked in Tehran.

Methamphetamine-induced psychosis

"A young man was judicially referred for psychiatric hospitalization following neighbor complaints of aggressive behavior. History indicates several months of daily methamphetamine use preceded the onset of paranoia toward neighbors, culminating

Table 1. Demographic characteristics of the participating psychiatrists

Characteristic	Category	n(%)
Gender	Male	62(41.3%)
	Female	88(58.7%)
Age	<40 yr	99(66.0%)
	40-60 yr	34(22.7%)
	>60 yr	17(11.3%)
Faculty member	Yes	36(24.0%)
	No	114(76.0%)
Practice location	Tehran	71(47.3%)
	Outside tehran	79(52.7%)

in him breaking a neighbor's window with a brick. During this period, he exhibited reduced sleep and irritability. The thought form was intact, with no significant prior psychiatric history, diagnosed with Methamphetamine-Induced Psychotic Disorder.” In the first scenario involving a young male with methamphetamine-induced psychosis exhibiting

aggressive behavior, 88% of the psychiatrists chose to prescribe medication. Male psychiatrists (90.3%) were slightly more likely than female psychiatrists (86.4%) to prescribe medication for this condition ($p>0.05$). Atypical antipsychotics were the most frequently prescribed medications across all the demographic categories (55.3%), while benzodiazepines were the least prescribed (1.5%).

Psychiatrists in the 40-60 age group demonstrated the highest rate of atypical antipsychotic prescription ($p<0.001$). For psychosis control, 48 psychiatrists (32%) recommended injectable antipsychotics in non-depot formulations. Among these, 33 (68.8%) prescribed oral medications concurrently with the injection. Gender analysis revealed that female psychiatrists more commonly prescribed injectable formulations alone, whereas male psychiatrists more frequently combined injectable and oral medications ($p>0.05$).

For cases where psychosis persisted beyond one month, 107 psychiatrists (71.3%) recommended continuing antipsychotics for six months, with the highest rates observed among psychiatrists above 60

Table 2. Prescription patterns for psychosis control in case of methamphetamine induced psychosis

Variable % [†]	Male	Female	<40 yr	40-60 yr	>60 yr	Tehran	Other cities	Faculty	Non-faculty	Total
Prescription for psychosis	90.3	86.4	88.9	82.4	94.1	85.9	89.9	88.9	87.7	88.0
Specific medications										
Atypical antipsychotic	53.6	56.6	60.2**	64.3**	12.5**	57.4	53.5	50.0	57.0	55.3
Atypical+benzodiazepine	12.5	6.6	4.5**	28.6**	0	6.6	11.3	12.5	8.0	9.1
Atypical+BZDs+other sedatives	3.6	6.6	4.5	7.1	6.3	6.6	4.2	3.1	6.0	5.3
Atypical+other sedatives	14.3	7.9	12.5	0	18.8	8.2	12.7	3.1	13.0	10.6
Typical antipsychotic	5.4	6.6	5.7*	0	18.8*	6.6	5.6	6.3	6.0	6.1
Typical+atypical+BZDs	5.4	7.9	6.8*	0	18.8*	8.2	5.6	15.6	4.0	6.8
Typical+benzodiazepine	0	1.3	0	0	6.3*	0	1.4	0	1.0	0.8
Typical+other sedatives	1.8	1.3	1.1	0	6.3	1.6	1.4	3.1	1.0	1.5
Benzodiazepine	3.6	0	2.3	0	0	0	2.8	3.1	1.0	1.5
Injectable antipsychotics (non-depot)	29.0	34.1	30.3	32.4	41.2	29.6	34.2	44.4	28.1	32.0
Concomitant oral antipsychotics	83.3	60.0	73.3	72.7	42.9	61.9	74.1	62.5	71.9	68.8
Anti-psychotic use for persistent psychosis>1m										

Contd. table 2.

Discontinue after symptom resolution	21.0	29.5	27.3	26.5	17.6	29.6	22.8	19.4	28.1	26.0
Long-term use (≥6 months)	75.8	68.2	69.7	70.6	82.4	67.6	74.7	80.6	68.4	71.3
Lifelong use	3.2	2.3	3.0	2.9	0	2.8	2.5	0	3.5	2.7

Atypical: Atypical antipsychotics, BZDs: Benzodiazepines, Typical: Typical antipsychotics.

† All values shown in the table are expressed as percentages (%).

* $p < 0.05$, ** $p < 0.01$ (only significant values shown. All others $p \geq 0.05$).

yr. old and those with faculty experience. However, only 4 participants (2.7%) recommended indefinite antipsychotic treatment. Table 2 demonstrates the detailed prescription patterns for psychosis control. For aggression management, 75 psychiatrists (50%) prescribed additional medications beyond the primary treatment. Male psychiatrists and those working in Tehran exhibited a higher likelihood of prescribing such medications compared to female psychiatrists and those in other cities ($p > 0.05$).

Among these prescribers, sedatives, and mood stabilizers (particularly valproate) were the most frequently prescribed agents (28% and 20%, respectively).

Clinicians over 60 yr. old demonstrated unique prescribing patterns, favoring combinations such as atypical plus typical antipsychotics (22.2%, $p = 0.002$) and sedatives plus mood stabilizers (11.1%, $p > 0.05$). Table 3 presents the detailed breakdown of these prescription patterns.

When addressing methamphetamine craving, 68 psychiatrists (45.3%) prescribed specific medications, with bupropion and pregabalin/gabapentin being the most commonly chosen agents. Prescription of pregabalin/gabapentin differed by age group ($p = 0.033$), with higher use among older psychiatrists. However, the majority of psychiatrists (87.3%) did not recommend long-acting antipsychotics for these

Table 3. Prescription patterns for aggression control in case of methamphetamine induced psychosis

Variable % [†]	Male	Female	<40 yr	40–60 yr	>60 yr	Tehran	Other cities	Faculty	Non-faculty	Total
Additional medication for aggression	54.8	46.6	49.5	50.0	52.9	53.5	46.8	47.2	50.9	50.0
Specific medications										
Atypical antipsychotic	8.8	14.6	10.2	35.5	0	18.4	5.4	11.8	12.1	12.0
Atypical+typical antipsychotic	0	4.9	0	0	22.2**	6.2	2.7	5.9	1.7	2.7
Atypical+mood regulators	2.9	4.9	6.1	0	0	6.2	5.4	0	5.2	4.0
Atypical+sedatives	5.9	14.6	14.3	5.9	0	13.2	8.1	5.9	12.1	10.7
Typical antipsychotic	8.8	4.9	6.1	5.9	11.1	2.6	10.8	11.8	5.2	6.7
Typical+mood regulators	14.7	4.9	8.2*	11.8*	11.1*	15.8	2.7	0	12.1*	9.3
Typical+sedatives	0	7.3	2.0	5.9	11.1	0	8.1	5.9	3.4	4.0
Mood regulators (e.g., valproate)	26.5	19.5	22.4	11.8	22.2	21.1	18.9	23.5	19.0	20.0
Sedatives (e.g., benzodiazepines)	35.3	22.0	28.6	35.3	11.1	21.1	35.1	29.4	27.6	28.0
Sedatives+mood regulators	2.9	2.4	2.0	0	11.1	2.6	2.7	5.9	1.7	2.7

Atypical: Atypical antipsychotics, typical: typical antipsychotics.

† All values shown in the table are expressed as percentages (%).

* $p < 0.05$, ** $p < 0.01$ (only significant values shown. all others $p \geq 0.05$).

Table 4. Prescription patterns for craving control in case of methamphetamine induced psychosis

Variable %†	Male	Female	<40 yr	40–60 yr	>60 yr	Tehran	Other cities	Faculty	Non-faculty	Total
Additional medication for cravings	50.0	42.0	45.5	44.1	47.1	45.1	45.6	44.4	45.6	45.3
Specific medications										
Opioid agonists	3.2	8.1	4.4	6.7	12.5	6.3	5.6	6.3	5.8	5.9
Opioid agonists+Bupropion	3.2	2.7	2.2	6.7	0	3.1	2.8	6.3	1.9	2.9
Opioid agonists+methylphenidate	3.2	0	0	6.7	0	3.1	0	6.3	0	1.5
Bupropion	22.6	27.0	28.9	13.3	25.0	31.3	19.4	37.5	21.2	25.0
Bupropion+pregabalin/Gabapentin	3.2	2.7	4.4	0	0	0	5.6	0	3.8	2.9
Bupropion+methylphenidate or similar	0	2.7	2.2	0	0	3.1	0	0	1.9	1.5
Bupropion+modafinil	3.2	2.7	2.2	0	12.5	3.1	2.8	6.3	1.9	2.9
Bupropion+modafinil+pregabalin/gabapentin	6.5	8.1	8.9	6.7	0	6.3	8.3	6.3	7.7	7.4
Bupropion+modafinil+methylphenidate/similar	16.1	5.4	11.1	13.3	0	9.4	11.1	0	13.5*	10.3
Pregabalin/gabapentin	32.3	24.3	22.2*	33.3*	50.0*	28.1	27.8	25.0	28.8	27.9
Long-acting antipsychotic	37.1	34.1	34.3	32.4	47.1	29.6*	40.5*	38.9	34.2	35.3

† All values shown in the table are expressed as percentages (%).

*p<0.05, **p<0.01 (only significant values shown. all others p≥0.05).

patients. Table 4 presents the detailed medication choices for methamphetamine craving management.

Methamphetamine intoxication

“A young woman developed talkativeness, irritability, and non-delusional suspiciousness toward family members shortly after methamphetamine use. She was observed at approximately 12 hrs. post-onset with resolving symptoms. She has no history of methamphetamine use or prior psychiatric diagnoses. She was diagnosed with Methamphetamine Intoxication.”

For the second scenario involving a young woman with mild, resolving methamphetamine intoxication, only 24.7% of the psychiatrists recommended hospitalization, with female psychiatrists and those over 60 yr. old showing the highest rates (p>0.05). Half

of the psychiatrists chose to prescribe medication, with male psychiatrists (54.8%) more likely to prescribe than female psychiatrists (46.6%) (p>0.05). Sedatives-particularly benzodiazepines (28%)-were the most frequently prescribed agents, followed by atypical antipsychotics (26.7%).

A significant age difference was observed in sedative prescribing (p=0.021), with higher use among younger psychiatrists. Table 5 presents the detailed prescription patterns for this scenario.

Methamphetamine cessation with craving

“A young man with a several-month history of methamphetamine use presented for treatment seeking cessation. He exhibited no significant symptoms of acute intoxication or associated psychiatric disorders but reported recurrent cravings.”

Table 5. Prescription patterns in case of resolving methamphetamine intoxication

Variable % [†]	Male	Female	<40 yr	40–60 yr	>60 yr	Tehran	Other cities	Faculty	Non-faculty	Total
Hospitalized patient	19.4	28.4	28.3	11.8	29.4	23.9	25.3	16.7	27.2	24.7
Any medication prescribed	54.8	46.6	48.5	47.1	64.7	47.9	51.9	52.8	49.1	50.0
Specific medications										
Atypical antipsychotic	29.4	24.4	27.1	31.3	18.2	17.6	34.1	26.3	26.8	26.7
Atypical+typical antipsychotic	2.9	2.4	0	0	18.2*	5.9	0	5.3	1.8	2.7
Atypical+typical+mood regulators	0	2.4	0	0	9.1	0	2.4	5.3	0	1.3
Atypical+mood regulators	5.9	4.9	6.3	6.3	0	2.9	7.3	5.3	5.4	5.3
Atypical+sedatives	2.9	12.2	8.3	6.3	9.1	5.9	9.8	5.3	8.9	8.0
Typical antipsychotic	17.6	17.1	20.8	6.3	18.2	23.5*	12.2*	10.5	19.6	17.3
Typical+mood regulators	2.9	0	0	0	9.1	2.9	0	5.3	0	1.3
Typical+sedatives	2.9	4.9	6.3	0	0	2.9	4.9	5.3	3.6	4.0
Mood regulators (e.g., valproate)	8.8	2.4	4.2	6.3	9.1	2.9	7.3	10.5	3.6	5.3
Sedatives (e.g., benzodiazepines)	26.5	29.3	27.1*	6.3*	9.1*	35.3*	22.0*	21.1	30.4	28.0

Atypical: atypical antipsychotics, typical: typical antipsychotics.

[†] All values shown in the table are expressed as percentages (%).* $p < 0.05$, ** $p < 0.01$ (only significant values shown. all others $p \geq 0.05$).

In the third scenario involving a young man seeking help for cessation while experiencing cravings, 66.7% of the psychiatrists chose to prescribe medication for craving reduction, with female psychiatrists (69.3%) being more likely than their male counterparts (62.9%) to do so ($p > 0.05$). Bupropion was the most frequently prescribed medication (33.3%), whereas methadone

was prescribed by only 4%, and buprenorphine had the lowest prescription rate. Regarding hospitalization, 48% of the psychiatrists stated they would admit the patient if requested, yet only 31 participants (20.7%) believed that addiction rehabilitation camps would be beneficial for such cases.

When asked about preferred medications for

Table 6. Prescription patterns in case of methamphetamine cessation with craving

Variable % [†]	Male	Female	<40 yr	40–60 yr	>60 yr	Tehran	Other cities	Faculty	Non-faculty	Total
Prescription for craving	62.9	69.3	66.7	70.6	58.8	59.2*	73.4 *	75.0	64.0	66.7
Craving specific medications										
Bupropion	59.0	44.3	51.5	50.0	40.0	47.6	51.7	48.1	50.7	50.0
Opioid agonists	2.6	3.3	1.5	8.3	0	0	5.2	3.7	2.7	3.0
Bupropion+buprenorphine	2.6	2.7	1.5	0	0	0	1.7	0	1.4	1.0
Bupropion+methylphenidate	12.8	18.0	15.2*	12.5*	30.0*	19.0	13.8	11.1	17.8	16.0
Bupropion+modafinil	5.1	6.6%	6.1	8.3	0	9.5	3.4	7.4	5.5	6.0

Contd. table 6.

Bupropion+modafinil+ methylphenidate	2.6	3.3	1.5	4.2	10.0	7.1	0	7.4	1.4	3.0
Methylphenidate	5.1	6.6	6.1	8.3	0	7.1	5.2	7.4	5.5	6.0
Methylphenidate+ methadone	5.1	4.9	4.5	8.3	0	4.8	5.2	3.7	5.5	5.0
Modafinil	2.6	4.9	6.1	0	0	7.1	1.7	3.7	4.1	4.0
Hospitalization approaches										
Hospitalization if requested	46.8	48.9	47.5	52.9	41.2	53.5	43.0	50.0	47.4	48.0
Rehabilitation approaches										
Camps recommended	16.1	23.9	22.2	14.7	23.5	19.7	21.5	13.9	22.8	20.7
Prescribing for depressed/dysphoric mood										
SNRIs	8.1	10.2	9.1	11.8	5.9	14.1*	5.1*	8.3	9.6	9.3
SSRIs	27.4	19.3	24.2	20.6	17.6	15.5	29.1	13.9	25.4	22.7
Bupropion	46.8	42.0	43.4	47.1	41.2	50.7	38.0	44.4	43.9	44.0
Trazodone	0	1.1	0	2.9	0	0	1.3	0	0.9	0.7
Mirtazapine	0	4.5	0	0	0	1.4	3.8	5.6	1.8	2.7
No prescription	11.3	4.5	19.2*	8.8*	23.5*	15.5**	0	19.4*	3.5*	17.3

Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin–Norepinephrine Reuptake Inhibitors (SNRIs)

† All values shown in the table are expressed as percentages (%).

* $p < 0.05$, ** $p < 0.01$ (only significant values shown. All others $p \geq 0.05$).

managing depressed or dysphoric mood in these patients, 44% selected bupropion, 22.7% chose Selective Serotonin Reuptake Inhibitors (SSRIs), and 9.3% opted for Serotonin–Norepinephrine Reuptake Inhibitors (SNRIs). Trazodone and mirtazapine were the least commonly prescribed medications for this purpose. Rates of non-prescription for depressed/dysphoric mood were significantly higher among psychiatrists above 60 yr of age ($p = 0.033$), those practicing in Tehran ($p < 0.001$), and faculty members ($p < 0.05$). Table 6 presents the detailed distribution of these treatment preferences.

Recurrent methamphetamine-induced psychosis

“A middle-aged male patient using methamphetamine manifests psychotic symptoms with each administration; symptoms resolve upon cessation. However, due to persistent use, he rarely experiences asymptomatic periods.” In the final scenario involving a middle-aged man with recurrent psychotic symptoms

upon methamphetamine use, 80% of the psychiatrists recommended combining psychotherapy with pharmacotherapy, with male psychiatrists (82.3%) being slightly more likely than female psychiatrists (78.4%) to recommend this approach ($p > 0.05$).

Psychiatrists aged over 60 yr old reported the highest rate (88.2%) for this combined treatment approach ($p > 0.05$). Regarding long-acting antipsychotics, 35.3% of the psychiatrists would prescribe depot formulations, with the over-60 age group also demonstrating the strongest preference for prescribing these depot antipsychotics ($p > 0.05$). Table 7 presents the detailed treatment recommendations for this scenario.

Discussion

Summary of main findings

This cross-sectional study examined the attitudes and prescribing patterns of Iranian psychiatrists regarding the management of methamphetamine use disorder in 2024. The data revealed substantial heterogeneity in treatment strategies, influenced by practitioner

Table 7. Prescription patterns in case of recurrent methamphetamine-induced psychosis

Variable % [†]	Male	Female	<40 yr	40–60 yr	>60 yr	Tehran	Other cities	Faculty	Non-faculty	Total
Medication only during relapse	3.2	8.0	9.1*	0	0	4.2	7.6	2.8	7.0	6.0
Long-term medication without psychotherapy	9.7*	0	5.1	2.9	0	4.2	3.8	0	5.3*	4.0
Only psychotherapy	4.8*	13.6*	8.1	14.7	11.8	14.1	6.3	11.1	9.6	10.0
Psychotherapy+ pharmacotherapy	82.3	78.4	77.8	82.4	88.2	77.5	82.3	86.1	78.1	80.0
Depot antipsychotics prescription	37.1	34.1	34.3	32.4	47.1	29.6*	40.5*	38.9	34.2	35.3

[†] All values shown in the table are expressed as percentages (%).

* $p < 0.05$, ** $p < 0.01$ (only significant values shown. all others $p \geq 0.05$).

demographics and practice environments. Atypical antipsychotics represent the most frequently prescribed agents for methamphetamine-induced psychosis. For craving management, bupropion and gabapentin/pregabalin emerged as the preferred pharmacological choices, while benzodiazepines were predominantly utilized for acute intoxication symptoms. Notably, 80% of the participants endorsed a multimodal treatment approach combining psychotherapy with pharmacotherapy for recurrent methamphetamine-induced psychosis, demonstrating adherence to contemporary integrated treatment paradigms.

Influence of psychiatrist demographics on treatment decision-making

Age

Advanced age emerged as a significant determinant of therapeutic preferences among practitioners. Psychiatrists aged over 60 yr. demonstrated a stronger preference for combined injectable and oral formulations in the management of *methamphetamine*-induced psychosis.

Significant age-related differences were observed in the utilization of atypical antipsychotics (with higher rates among younger psychiatrists), typical antipsychotics (with higher rates among senior practitioners), and regimens combining typical and atypical antipsychotics with benzodiazepines (with higher rates among senior practitioners).

Furthermore, senior practitioners exhibited greater advocacy for sustained therapeutic relationships and more conservative treatment

modalities, which may account for their increased endorsement of integrated psychotherapeutic and pharmacological interventions. However, rates of non-prescription for depressed or dysphoric mood were significantly higher among senior psychiatrists. These age-stratified variations likely reflect differential clinical experience, educational backgrounds, and familiarity with contemporary treatment guidelines. Senior psychiatrists may demonstrate preference for therapeutic modalities proven effective throughout their clinical careers, while younger practitioners may exhibit greater responsiveness to recent educational updates and emerging research findings.

Gender

Gender exerted a modest influence on clinical decision-making, with significant differences noted in long-term medication prescriptions without psychotherapy (higher among male psychiatrists) and psychotherapy-only approaches (higher among female psychiatrists) for recurrent methamphetamine-induced psychosis. Male psychiatrists also displayed marginally higher overall medication prescription rates across scenarios, a slight preference for combined injectable and oral formulations in managing methamphetamine-induced psychosis, and greater propensity for prescribing adjunctive medications in aggression management, whereas female psychiatrists tended to favor exclusive use of injectable formulations. However, these latter differences were not statistically significant.

These findings partially align with prior research indicating that female physicians may demonstrate

stronger adherence to clinical guidelines and more patient-centered care (21,22). Moreover, they are consistent with Helen *et al*'s study, which found no significant gender-related differences in treatment patterns overall (23), though the identification of specific significant variations may reflect cultural influences in Iranian healthcare, including traditional gender roles and professional socialization.

Faculty status and practice location

Faculty affiliation and practice location were associated with variations in therapeutic approaches. Significant faculty-related differences were observed in prescribing patterns, including combinations of typical antipsychotics with mood regulators for aggression management, bupropion with modafinil and methylphenidate for craving, and long-term medication without psychotherapy for recurrent methamphetamine-induced psychosis—all of which were exclusive to non-faculty participants—as well as no prescription for mood symptoms that was higher among faculty members. Similarly, Tehran-based practitioners exhibited distinct preferences compared to those outside the capital, with significant differences in long-acting antipsychotics prescription for craving control (lower in Tehran), overall prescriptions for craving (lower in Tehran), SNRI use for depressed mood (higher in Tehran), and no prescription for mood symptoms (higher in Tehran).

These variations likely arise from differential access to current research, continuing education, and complex clinical cases. The concentration of academic resources and specialized training in Tehran may foster unique practice patterns among capital-based practitioners, highlighting the need for equitable distribution of continuing education and updated clinical guidelines across Iran's healthcare system.

Medication preferences: patterns and evidence **Antipsychotic medication utilization**

Atypical antipsychotics emerged as the predominant therapeutic choice for methamphetamine-induced psychosis across all the demographic categories, aligning with existing literature on their efficacy in managing psychotic symptoms, although significant age-related differences were noted (with higher

utilization among younger psychiatrists).

Risperidone, an atypical antipsychotic, has shown established efficacy in alleviating positive psychotic symptoms in methamphetamine users (24). Zarrabi *et al* reported that 46.1% of the hospitalized patients with methamphetamine psychosis in Iran received risperidone, while 37.5% were prescribed olanzapine (13). Additionally, Solhi *et al* demonstrated risperidone's superiority over methylphenidate in reducing craving and psychiatric symptoms among methamphetamine-dependent patients (25).

Management of craving **Bupropion**

Bupropion consistently represented the most frequently prescribed medication for methamphetamine craving across all the clinical scenarios, with no significant differences observed across demographic variables. This antidepressant, functioning through norepinephrine-dopamine reuptake inhibition and nicotinic acetylcholine receptor antagonism (26), was preferred by 44% of the psychiatrists for craving management, substantially exceeding prescription rates of alternative medications. The evidence supporting bupropion's efficacy remains equivocal, with Elkashef *et al* finding that while overall effects were not statistically significant, bupropion reduced methamphetamine use in participants with low-to-moderate baseline usage (27). This qualified efficacy may explain why bupropion remains the preferred option despite inconsistent evidence—it may demonstrate effectiveness for specific patient subgroups.

SSRIs

SSRIs were prescribed less frequently than bupropion for craving management, with only 22.7% of the psychiatrists selecting these agents. This conservative approach aligns with findings from Siefried *et al*, who reported SSRIs' ineffectiveness in reducing methamphetamine use (24). The limited SSRI prescription suggests that Iranian psychiatrists' practices conform to current evidence regarding their limited efficacy.

Pregabalin/gabapentin

Pregabalin and gabapentin were among the preferred

choices for managing methamphetamine cravings, prescribed by 12% of the psychiatrists, with significant age-related differences (higher in senior psychiatrist). However, the evidence supporting gabapentin/pregabalin remains inconsistent (17,26), with systematic reviews reporting contradictory findings regarding gabapentin's efficacy in reducing methamphetamine use or cravings. This discrepancy between clinical practice and research evidence highlights the need for more definitive studies examining gabapentin's role in methamphetamine treatment.

Underutilized therapeutic options

Buprenorphine was rarely prescribed for methamphetamine craving control despite Salehi *et al*'s clinical trial demonstrating its superiority over placebo in reducing methamphetamine cravings (28). The limited buprenorphine utilization may reflect concerns regarding potential misuse or limited familiarity with its application beyond opioid dependence treatment. Similarly, mirtazapine, a noradrenergic and specific serotonergic antidepressant, was rarely prescribed despite supportive evidence. Nicole *et al*'s systematic review indicated that mirtazapine significantly reduced methamphetamine use (26). This evidence-practice discrepancy suggests potential opportunities for expanding treatment options through enhanced education regarding alternative medications with demonstrated efficacy.

Cultural and systemic considerations

The treatment patterns observed in this study may reflect broader cultural and healthcare system characteristics within Iran, with significant demographic influences (*e.g.*, location-based differences) highlighting potential disparities in access to resources. The preference for combined therapeutic approaches may align with traditional Iranian healthcare values emphasizing holistic treatment modalities. It is essential, however, to avoid overgeneralization; prescribing practices are shaped by a complex interplay of systemic constraints (such as medication availability), resource disparities, and individual clinical experience.

These observations align with the literature on methamphetamine use disorder management in

Iran. For example, Mehrjerdi *et al* highlighted intervention challenges, including the lack of established pharmacological options, and advocated for educational and supportive programs to improve outcomes. Their findings indicated that non-pharmacological strategies may prove especially effective in this regional context, thereby complementing our integrated approaches (9).

Additionally, familial support-embedded in Iran's traditional social framework-significantly influences substance users' mental health and treatment adherence (29). Incorporating these cultural factors into clinical protocols could bolster intervention efficacy by addressing both individual and familial care dimensions.

Clinical implications and recommendations

The findings underscore the necessity for standardized, evidence-based clinical guidelines in the pharmacological management of methamphetamine use disorder in Iran, with particular attention to demographic variations (*e.g.*, age and location) that may compromise generalizability. Targeted education addressing the efficacy and safety profiles of less familiar therapeutic options, as well as ensuring equal access to ongoing training irrespective of age, gender, or practice location, is warranted. Culturally sensitive implementation of these recommendations will require ongoing attention to the unique systemic and societal factors influencing psychiatric practice in the region.

Limitations

This study has limitations that should be acknowledged. The scenario-based approach, while established in similar investigations, may not perfectly reflect actual clinical practice. The limited number of scenarios cannot capture all forms of methamphetamine use disorder or all potential confounding factors that might influence treatment decisions. Additionally, the reliance on self-reported prescribing preferences rather than objective prescribing data may introduce reporting bias.

Furthermore, the use of convenience sampling *via* social media platforms introduces potential self-selection bias, as participation was voluntary and limited to accessible, digitally active psychiatrists

who chose to respond. This method may overrepresent certain subgroups, such as younger or urban practitioners, while underrepresenting others (*e.g.*, those in rural areas or less engaged with social media), thereby limiting the generalizability of findings to the estimated population of approximately 2,000 active psychiatrists in Iran. Future studies could mitigate these issues by employing probability-based sampling techniques, such as stratified random sampling, to enhance representativeness and reduce bias.

Conclusion

This cross-sectional study provided a comprehensive assessment of Iranian psychiatrists' attitudes and prescribing patterns toward methamphetamine use disorder, revealing substantial variations influenced by demographic factors including age, gender, academic affiliation, and practice location. Older psychiatrists demonstrated distinct preferences for combined injectable and oral formulations in psychosis management, while male practitioners showed higher rates of overall medication prescription across scenarios. Integrated approaches combining psychotherapy and pharmacotherapy were widely endorsed, particularly among senior clinicians, with consistent patterns observed in psychosis control and craving management. Although atypical antipsychotics (for psychosis) and bupropion (for craving) are prescribed based on partial evidence, underused treatments like mirtazapine and buprenorphine reveal knowledge-practice gaps.

These results carry important practical implications for clinical care in Iran, where methamphetamine use disorder represents a growing public health challenge. To promote more uniform and effective treatment, healthcare providers could benefit from targeted training programs that address demographic-specific variations in practice, thereby improving patient safety and outcomes in diverse settings.

For guideline development, the findings underscore the urgency of establishing evidence-based, nationally standardized protocols tailored to Iran's cultural and resource context. Such guidelines could reduce practice variability, facilitate better symptom control, and support long-term recovery by incorporating multimodal strategies and accounting for regional disparities.

Future investigations should employ larger, probability-based samples to confirm these patterns and explore underlying factors, including training disparities and socioeconomic influences, ultimately advancing optimized management of methamphetamine use disorder.

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Ethical approval

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Conflict of Interest

There was no conflict of interest in this manuscript.

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