BMC Health Services Research

RESEARCH

Open Access

Practices and attitudes of adult psychiatrists regarding methamphetamine-associated psychotic disorder: an internet based survey conducted in Turkey

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Abstract

Background Many variables may affect approaches of psychiatrists to methamphetamine-associated psychotic disorder (MAP) treatment. This study was aimed to reach adult psychiatrists actively practicing in Turkey through an internet-based survey and to determine their practices and attitudes to MAP treatment.

Methods In this internet-based study, participants were divided into three groups based on their answers: Those who do not follow-up any MAP patient were group 1 ($n=78$), partially involved in the treatment process of at least one patient diagnosed with MAP were group 2 ($n=128$), completely involved in the treatment process of at least one patient diagnosed with MAP were group 3 ($n=202$).

Results Psychotropic preferences in insomnia ($p<0.001$), typical oral antipsychotic choice ($p<0.001$), preferred doses of olanzapine/risperidone/aripiprazole/amisulpride for maintenance treatment ($p<0.001$), long-acting injectable antipsychotic use practices ($p<0.001$), non-antipsychotic psychotropic use characteristics ($p<0.001$), extrapyramidal system side effect experiences ($p<0.001$), delirium and life-threatening situations encounter rates ($p<0.001$) were significantly different between group 2 and group 3. While the duration of maintenance with antipsychotics in the first MAP episode was similar between group 2 and group 3 ($p=0.254$), it was different in the second and subsequent MAP episodes ($p<0.05$). A binary logistic regression model containing the experiences of long-acting injectable antipsychotic use, extrapyramidal system side effect, and delirium was created (overall $p<0.001$, Nagelkerke $R^2=0.435$; Hosmer and Lemeshow test $p=0.203$).

Conclusions This first study in the field, which examines the current issue in detail, reveals that there are many factors that seriously affect psychiatrists' approaches to MAP treatment in Turkey.

Trial registration This study was approved by the Ethics Committee of the Fırat University (Date: 14/09/2023; Number: 2023/12–12).

Keywords Prescription practice, Psychotropic selection, Psychotropic preferences, Methamphetamine, Psychosis

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Background

According to United Nations Office on Drugs and Crime (UNODC) World Drug Report published in 2023, an estimated 36 million people used amphetamines in 2021, representing 0.7 per cent of the global population. While the prevalence of use is highest in North America, the largest number of users of amphetamines are found in East and South-East Asia. Record-high quantities of amphetamine-type stimulants were seized in 2021, dominated by methamphetamine at the global level [1]. The most often used form of methamphetamine is crystal, which has strong addictive effects and is typically smoked, injected, or inhaled. Due to the lipophilic nature of methamphetamine, when it is administered, it quickly crosses the blood–brain barrier and enters the bloodstream before penetrating the brain. Methamphetamine's half-life varies depending on how it is absorbed, however it typically lasts five to thirty hours. Due to the rapid onset and termination of its effects, methamphetamine users may need repeated doses [2]. Repeated use of methamphetamine, which also has a place in the second-line treatment of attention-deficit/hyperactivity disorder, severe obesity and narcolepsy, under uncontrolled conditions can lead to methamphetamine use disorder (MUD) [3].

Methamphetamine use has various neuropsychiatric complications. Increased alertness, irritability, loss of appetite, and overconfidence are psychiatric symptoms that are more common, especially at low doses. When used in high doses, it can cause fear, restlessness, anxiety, panic attack, psychomotor agitation, and various psychotic symptoms. Prominent psychotic symptoms in methamphetamine-associated psychotic disorder (MAP) include ideas of reference, tactile and auditory hallucinations, increased activity, odd speech, and paranoid delusions [3]. The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, Text Revision (DSM-5-TR) defines a substance-induced psychotic disorder as the presence of hallucinations and delusions developed during, or soon after, intoxication or withdrawal from a substance or medication known to cause psychotic symptoms, such as methamphetamines, and the presence of psychotic symptoms not mediated by another nonsubstance-induced psychotic disorder that persists longer than one month after substance intoxication or withdrawal [4]. Many psychiatric symptoms are similar in paranoid schizophrenia and MAP [5]. However, MAP has aspects that differentiate it from primary psychotic disorder and other drug-associated psychotic disorders. When methamphetamine usage persists, psychotic symptoms usually get worse over time [6]. It was once believed that methamphetamine withdrawal symptoms would dissipate in a week. Studies have revealed that while most MAP patients have symptom resolution within a month, 30% of MAP patients experienced symptom persistence up to six months, and 10–28% reported symptom persistence longer than six months. Symptoms of MAP have been shown to relapse after long periods of abstinence [7]. According to the DSM-5-TR, a persistent psychosis that persists six months after quitting methamphetamine may be diagnosed as schizophrenia [4]. Methamphetamine use is associated with a prevalence of psychotic symptoms ranging from 10 to 60%, indicating the possibility of unique neurobiological dysregulations in MAP patients. According to literature, the disorder can appear anywhere from 1.7 and 5.2 years after methamphetamine usage begins [8]. Studies reporting that even a single use of methamphetamine may cause psychotic symptoms indicate that this period should continue to be investigated in future studies [9].

Methamphetamine seems to mainly impact the mesocortical, mesolimbic, and nigrostriatal dopaminergic pathways. Methamphetamine metabolism inhibits both the vesicular monoamine transporter and the dopamine transporter, which affects dopamine transmission in the central nervous system. Dopamine concentrations rise and may even become neurotoxic when these proteins are inhibited. Glutamate and dopamine signalling are subsequently elevated as a result of altered polysynaptic connections between various dopaminergic systems brought on by elevated dopamine concentrations. After long-term usage, dopaminergic receptor density and function are altered, particularly in the striatum and mesolimbic system. This interferes with feed-forward processes and causes sensitization and addiction [8]. The mechanism by which methamphetamine causes psychosis has not yet been clearly elucidated. There have been discussions about the validity of a number of methamphetamine-associated animal models for psychosis, including the behavioral sensitization model, the neurotoxicity model, and the escalating dose-binge model [7]. Studies reveal that gamma-aminobutyric acidergic interneurons may be overloaded by excessive dopamine signalling, which could cause dopamine systems to become dysregulated and perhaps result in psychotic symptoms. This glutamate dysregulation may be brought on by increased neurotoxicity and damage to cortical interneurons, which can degrade N-methyl-D-aspartate receptors and cause damage to the cortex. This damage to the brain can then result in MAP-related symptoms [8].

Worldwide, seizures of methamphetamine have increased five-fold over the previous decade, while seizures of cocaine, cannabis, opioids, and opiates have not changed significantly. UNODC highlights the geographical spread of methamphetamine trafficking. Methamphetamine use and manufacture continues to expand

from traditional markets such as South-East Asia to new markets such as Western Europe. The recent increase in methamphetamine use and production in Afghanistan causes increasing concerns in Turkey, which serves as a geographical bridge between Asia and Europe [1]. For these reasons, methamphetamine use and MAP are increasingly problematic for Turkey and require urgent intervention approaches. Psychiatrists play a major role in the management of MAP-related psychiatric problems.

As mentioned above, methamphetamine use characteristics have changed over the years and the number of users has increased [1]. Therefore, it is possible that current psychiatrists have not encountered MAP cases during their specialty training. Additionally, some educational institutions have an inpatient unit, while others do not. Because some inpatient units do not provide adequate conditions, patients with psychotic features cannot be hospitalized. In mental health and disease hospitals, MAP hospitalizations are frequently performed in the form of voluntary and involuntary hospitalizations. In other words, there may be significant differences between treatment approaches acquired in educational institutions with different characteristics at different times. In this case, it is inevitable to experience events in which differences in treatment approaches can be described as inadequacy rather than wealth. It is almost impossible to reach psychiatrists face to face, working anywhere in Turkey to gather their opinions on the current issue and create a road map for MAP management. In addition, people may avoid participating in scientific research during the day or during working hours, or even if they participate, they may be careless in complying with research instructions. Internet offers various tools that we can use to overcome these difficulties that may be encountered in scientific data collection processes. Internet-based survey tools such as Google Forms make it much easier to reach target groups in research. These forms can be created and applied free of charge. In this study, it was aimed to reach psychiatrists actively working in Turkey through an internet-based survey form created using Google Forms and to determine their approaches to MAP treatment. Our hypothesis is that psychiatrists' psychiatry training characteristics and current working conditions affect their approaches to MAP treatment. Based on the results of this study, it will pave the way for organizing in-service training related to MAP management for psychiatrists.

Methods

This was an internet-based, quantitative, cross-sectional, psychiatrist approach-based observational survey. The current survey was conducted by randomly distributing an internet questionnaire to psychiatrists included in Yahoo and WhatsApp groups.

Sampling frame

Medical education in Turkey lasts six years and those who complete the process receive the title of general practitioner. Until 1973, there was no distinction between adult and child and adolescent psychiatry in Turkey. In 1973, child and adolescent psychiatry specialization was first organized in Turkey as a two-year subspecialty after psychiatry specialization. After 1990, child and adolescent psychiatry was transformed into a four-year major specialization, and thus adult and child and adolescent psychiatry were transformed into separate specialization areas. As a result, in Turkey, the branch of medicine that deals with the mental health and disorders of individuals aged 18 and under is called child and adolescent psychiatry, while the branch of medicine that deals with all individuals over the age of 18 is called adult psychiatry [10]. Psychiatry specialization training can be provided by mental health and disease hospital, university hospital, city hospital, and training and research hospital. Following the medical specialization exam, a four-year adult psychiatry residency process is followed and the title of adult psychiatry specialist is obtained after the publication of the medical specialization thesis. In Turkey, specialists (medical doctor) are required to work anywhere in the country for periods ranging from 300 to 600 days. After this period is completed, psychiatrists have the right to continue working for the government or to transfer to the private clinic. The population of this study included all psychiatrists working actively in Turkey. All psychiatrists included in this study were medical doctors, specialized in psychiatry, and clinicians actively following-up and treating patients diagnosed psychiatric disorders.

Concepts and institutional processes

The most prominent centres in the treatment of substance use disorders in our country are the Alcohol and Drug Addiction Research, Treatment, and Training Centre (AMATEM) and they have been serving since the 1980s in Turkey. MAP follow-up and treatment is carried out in outpatient or inpatient AMATEM clinics or closed psychiatric wards. Hospitalization in the treatment of MAP can be performed voluntarily or involuntarily based on articles 432–437 of the Turkish Civil Code (TCC) obtained from local courts.

In this study, the concept of partial or complete involvement of the participants in the treatment of any MAP case is frequently mentioned. By the concept of complete involvement, it is meant situations in which psychotic symptoms are completely eliminated and the patient achieves remission, starting from the first admission of a MAP episode. There is no requirement for the

participant to carry out this described treatment process alone. The treatment processes in which he was involved as part of a team consisting of more than one psychiatrists were accepted as his own experience. This information is explained in detail in the introduction to the internet survey.

The concept of "working duration in psychiatry" indicates the participant's year in psychiatry. For example, a 2-month psychiatric resident is considered to be in the 1st year. In Turkey, psychiatrists can work in university hospitals, training and research hospitals, city hospitals, provincial state hospitals, district state hospitals, mental health and disease hospitals, community mental health centres, private clinics, and private hospitals. Inpatient treatment units are mostly located in university hospitals, training and research hospitals and mental health and disease hospitals. In city hospitals, there are mostly inmate forensic psychiatry inpatient units and high security forensic psychiatry inpatient units. Community mental health centres are day care centres. In provincial and district state hospitals, there is usually no inpatient treatment unit and it functions as an outpatient clinic. Closed psychiatric wards are only available in mental health and disease hospitals, and with the decision of TCC 432–437, involuntary hospitalizations are only carried out in these hospitals. The number of mental health and disease hospitals in Turkey is 11.

All of the institutions mentioned in this study, except the private clinic and private hospital, are managed by the state.

Long-acting injectable (LAI) antipsychotics can be used in the treatment of MAP. In this study, LAI antipsychotics available in Turkey were questioned. These are once-monthly paliperidone palmitate (PP1M), zuclopenthixol decanoate depot, risperidone consta, haloperidol decanoate, aripiprazole maintena.

Sample size calculation

When the literature was examined, it was seen that there was no study examining psychiatrists' approaches to MAP in the world or in Turkey. It is estimated that the number of actively working psychiatrists in Turkey is approximately 6000 [11, 12]. In order to determine the rate of psychiatrists participating in the treatment process of at least one MAP case, data from the city where the first author was located (Elazığ) were taken into account. Almost all psychiatrists ($n=45$) working in Elazığ province were contacted and asked whether they had ever followed-up a MAP case. The rate of those who said yes was determined as 78%. Using a population size of 6000 and 78% as the population proportion of MAP follow-up at 5% margin of error and 95% confidence level, a sample of 253 participants would achieve adequate power for this study.

Development of questionnaire

The survey draft was developed in collaboration with all authors, who have academic and clinical experience in the field of MAP, and was finalized by the first author. The survey was developed using the literature, clinical experiences, psychiatric training in Turkey, and regional substance use patterns were taken into consideration. While creating sociodemographic data, literature was used. While creating the items questioning MAP-related situations and clinicians' approaches to MAP treatment processes, clinical experience was used. In addition to clinical experience, literature data was used in the creation of items for the treatment of MAP symptoms. The main justification for using clinical experience was the lack of sufficient information on the relevant subject in the literature. Leading questions were avoided, and all of the questions had a neutral content. Turkish was the language used for the survey. In the first section of the survey (landing page), informed consent was obtained. Those who wanted to participate in the survey were directed to the second section regarding group selection (group 1, 2, 3). Participants included in the group referred to as group 1 in the text were directed to the last section including questions about sociodemographic and training variables (10 items). Participants referred to as group 2 and group 3 were directed to the last section where their approaches to MAP treatment were questioned in addition to sociodemographic and training variables (59 items). We piloted the survey and made additional revisions in response to input from eighteen psychiatrists. Participants working in Turkey received the Google Form-created survey over Yahoo and WhatsApp groups. The survey used in this study was developed solely for this study and has not been previously published elsewhere (Appendix 1).

Recruitment procedure, inclusion and exclusion criteria

While carrying out the recruitment procedure and sample selection, the directives explained in detail in Örüm [13]'s study were applied. Study title, purpose, scope, definition and diagnostic criteria of MAP, ethics committee approval, and form filling time were some of the information included in the landing page. The explanations on the landing page can be accessed via Appendix 1. Three groups were formed based on the answers obtained (group 1, group 2, group 3). Estimated mean completion time for option 1 survey was approximately 1–2 min, for option 2 and 3 was 6–8 min. The survey was open from October 8, 2023 – November 6, 2023. Each

researcher assessed the survey responses independently and collectively.

Only adult psychiatrists were included in the study, and the word psychiatrist used anywhere in the text refers to adult psychiatrists.

Data extraction, data security, statistical analysis

The internet-based survey was hosted on the Google Forms platform, a secure end-to-end encrypted form builder for free to create online forms that capture classified data. Data was downloaded and stored on Microsoft Excel, an application for managing online surveys and databases. The data was shared only with the authors of the study for analysis and interpretation purposes. It was not possible to access the data except through the authors. It was impossible to access the identity of any participant based on the study findings. All analyses were performed using IBM SPSS Statistics version 22.0. Descriptive statistics and continuous variables were given as mean ± standard deviation, and categorical variables were given as frequency and percentage. The Chi-square test was used to compare the categorical data between the groups and genders. Binary logistic regression analysis was used in group prediction. In regression analysis, the grouping variable (group 2 and group 3) was accepted as the dependent variable, sociodemographic and clinical parameters as the independent variable. The suitability of the independent variable to the model was checked through the Hosmer and Lemeshov test. A p value of less than 0.05 was set as statistical significance.

Results

Sociodemographic and psychiatric training characteristics of participants

Four hundred and eight participants (216 females, 192 males) were included in the study. In total ($n=408$), the mean age was 33.86 ± 6.61 years (minimum 25.00 years, maximum 59 years, and median 32.00 years). In total, the working duration in psychiatry was 7.09 ± 5.79 years (min 1 year, max 30 years, and median 6.00 years). Data from 78 participants (40 females, 38 males) in group 1 were examined. While the mean age was 30.48 ± 6.13 years (min 25 years, max 52 years), the working duration in psychiatry was 3.71 ± 5.56 years (min 1 year, max 25 years). Data from 128 participants (70 females, 58 males) in group 2 were examined. While the mean age was 32.43 ± 4.06 years (min 25 years, max 43 years), the working duration in psychiatry was 5.95 ± 3.59 years (min 1 year, max 16 years). Data from 202 participants (106 females, 96 males) in group 3 were examined. While the mean age was 36.06 ± 7.28 years (min 26 years, max 59 years), the working duration in psychiatry was 9.12 ± 6.21 years (min 1 year, max 30 years). There was a significant difference between the three groups in terms of age ($p<0.001$) and working duration in psychiatry ($p<0.001$). All three groups were significantly different from each other in terms of both age and working duration in psychiatry. Sociodemographic and clinic characteristics of groups 1, 2, and, 3 were shown in Table 1.

Clinical approaches and experiences of group 2 and group 3

The experiences and clinical approaches to MAP of group 2 and group 3, which represent participants who were involved in the treatment process of at least one MAP case, are shown in Table 2.

MAP treatment has its own challenges. The approaches of group 2 and group 3 to possible situations that may be encountered during the MAP treatment process are shown in Table 3.

Psychotropic use characteristics of group 2 and group 3

Oral antipsychotic use characteristics of group 2 and group 3 are shown in Table 4. LAI antipsychotic use characteristics of group 2 and group 3 are shown in Table 5. Non-antipsychotic psychotropic use characteristics of group 2 and group 3 are shown in Table 6.

Comparison of sociodemographic and clinical variables of group 2 and group 3 in terms of gender

Participants in group 2 and group 3 ($n=330$) were compared in terms of some variables according to their gender. No significant difference was detected between genders in terms of residency institution, current institution, experience of working in a psychiatric ward, AMATEM experience, and number of MAP cases followed-up ($p>0.05$). Female and male participants' attitudes were similar on issues such as the necessity of inpatient treatment, the need for a closed ward, and involuntary hospitalization; psychotropic preference in insomnia, LAI antipsychotic preference, typical oral antipsychotic preference, atypical oral antipsychotic preference, atypical oral antipsychotic maintenance doses, duration of antipsychotic use in maintenance treatment according to the number of episodes, intramuscular use of haloperidol/chlorpromazine/zuclopenthixol decanoate acuphase; antidepressant, mood stabilizer, benzodiazepine, modafinil, psychostimulant, intravenous diazepam, routine intravenous fluid replacement preferences; psychotropic preferences in antisocial personality pattern/suicide/homicide; encountering conditions such as delirium, neuroleptic malignant syndrome, extrapyramidal system side effects ($p>0.05$).

Table 1 Sociodemographic and psychiatric training data of participants

Variables		Group 1 (*n*=78) *n* (%) or mean±SD	Group 2 (*n*=128) *n* (%) or mean±SD	Group 3 (*n*=202) *n* (%) or mean±SD	*p* value
Age (years)		30.48±6.13	32.43±4.06	36.06±7.28	<0.001*
Gender	**Female**	40 (51.28%)	70 (54.68%)	106 (52.47%)	0.878
	Male	38 (48.72%)	58 (45.22%)	96 (47.53%)	
Working duration in psychiatry (years)		3.71±5.56	5.95±3.59	9.12±6.21	<0.001*
Residency training from	**University hospital**	42 (53.84%)	82 (64.06%)	108 (53.46%)	<0.001*
	Training and research hospital	26 (33.33%)	36 (28.12%)	38 (18.81%)	
	City Hospital	6 (7.69%)	0 (0.00%)	2 (1.00%)	
	Mental health and diseases hospital	4 (5.12%)	10 (7.84%)	54 (26.73%)	
Current institution	**University hospital**	32 (41.02%)	30 (23.43%)	20 (9.90%)	<0.001*
	Training and research hospital	24 (30.76%)	32 (25.00%)	44 (21.78%)	
	City Hospital	6 (7.69%)	16 (12.5%)	14 (6.93%)	
	Mental health and diseases hospital	0 (0.00%)	10 (7.83%)	64 (31.68%)	
	Private clinic	10 (12.82%)	0 (0.00%)	16 (7.92%)	
	Private hospital	2 (2.56%)	2 (1.56%)	16 (7.92%)	
	Provincial state hospital	4 (5.12%)	16 (12.5%)	18 (8.91%)	
	District state hospital	0 (0.00%)	18 (14.06%)	10 (4.96%)	
	Community mental health centre	0 (0.00%)	4 (3.12%)	0 (0.00%)	
Experience of working anywhere with a psychiatric ward	**Yes**	66 (84.61%)	118 (92.18%)	200 (100.00%)	<0.001*
	No	12 (15.39%)	10 (7.82%)	0 (0.00%)	
Experience of working in a psychiatric ward during residency	**Yes**	64 (82.05%)	118 (92.18%)	200 (100.00%)	<0.001*
	No	14 (17.95%)	10 (7.82%)	0 (0.00%)	
Presence of psychiatric ward in current institution	**Yes**	50 (64.10%)	88 (68.75%)	154 (74.25%)	0.091
	No	28 (35.90%)	40 (31.25%)	48 (25.75%)	
Outpatient/inpatient AMATEM experience	**Yes**	10 (12.82%)	52 (40.62%)	158 (78.21%)	<0.001*
	No	68 (87.18%)	76 (59.38%)	44 (21.79%)	

Kruskal-Wallis and then Tamhane's T2 were used to compare numerical data. Chi-Square test was used to compare categorical data

Abbreviations: *SD* Standard Deviation, *AMATEM* Alcohol and Drug Addiction Research, Treatment, and Training Centre

*$p < 0.001$

The association between sociodemographic/clinical variables and being from group 2 and group 3 with binary logistic regression analysis

Binary logistic regression analysis was applied to reveal whether sociodemographic/psychiatric training characteristics and MAP-related clinical approaches/attitudes/experiences indicate which group the psychiatrists belongs to. Binary logistic regression analysis was applied separately for each independent variable. According to the binary logistic regression analysis, the *p* value of age, working duration in psychiatry, outpatient/inpatient AMATEM experience, number of MAP cases followed-up, treatment guideline follow-up, LAI antipsychotic use, most common LAI antipsychotic use, LAI antipsychotic use in maintenance treatment, most common typical oral antipsychotic use, maintenance dose of olanzapine, maintenance dose of risperidone, maintenance dose of aripiprazole, maintenance dose of amisulpride, experience of haloperidol plus biperiden intramuscularly use, experience of chlorpromazine intramuscularly use, experience of zuclopenthixol decanoate acuphase use, experience of extrapyramidal system side effect, and experience of delirium was determined to be less than 0.001. Binary logistic regression analysis of these 18 variables was performed (Beginning block, −2 log-likelihood = 440.741[a], constant $p < 0.001$, B = 0.456, Exp (B) = 1.578; Block one, −2 log-likelihood = 146.636[a]; Cox & Snell $R^2 = 0.590$; Nagelkerke R^2 0.800). It was aimed to create a meaningful model with fewer variables. Variables with a Nagelkerke R^2 of 0.200 or less were removed from the model. The Nagelkerke R^2 of number of MAP cases followed-up, LAI antipsychotic use, LAI antipsychotic use in maintenance treatment, most common typical oral antipsychotic use, experience of zuclopenthixol decanoate acuphase use, experience of extrapyramidal system side effect, and experience of delirium was above 0.200. Only one

Table 2 Experiences and clinical approaches of group 2 and group 3 in MAP treatment

Variables		Group 2 (*n*=128) *n* (%)	Group 3 (*n*=202) *n* (%)	*p* value
How many patients diagnosed with MAP have you been involved in their treatment process?	**1-5 patients**	72 (56.3%)	16 (7.9%)	<0.001**
	6-10 patients	36 (28.1%)	42 (20.8%)	
	11-50 patients	6 (4.7%)	52 (25.7%)	
	>50 patients	14 (10.9%)	92 (45.5%)	
Is there a treatment guideline you follow in MAP?	**Yes**	24 (18.7%)	84 (41.6%)	<0.001**
	No	104 (81.3%)	118 (58.4%)	
Do you think that inpatient treatment is necessary at any time during the treatment of MAP?	**Yes**	118 (92.2%)	186 (92.1%)	0.972
	No	10 (7.8%)	16 (7.9%)	
If inpatient treatment is preferred in MAP, do you think hospitalization in a closed ward is necessary?	**Yes**	84 (65.6%)	166 (82.2%)	0.001*
	No	44 (34.4%)	36 (17.8%)	
Do you think that the involuntary hospitalization decision should be issued routinely in MAP?	**Yes**	56 (43.8%)	108 (53.5%)	0.085
	No	72 (56.3%)	94 (46.5%)	
In a patient diagnosed with MUD who initially had no psychotic symptoms, would the psychotic symptoms added to the clinic later affect your antipsychotic choice?	**Yes**	102 (79.7%)	164 (81.2%)	0.737
	No	26 (20.3%)	38 (18.8%)	
Do the dopamine receptor-related properties of the molecule affect your antipsychotic choice in the treatment of MAP?	**Yes**	92 (71.9%)	172 (85.1%)	0.003*
	No	36 (28.1%)	30 (14.9%)	
Does the detection of an additional illicit drug in the current admission in the MAP affect your antipsychotic choice?	**Yes**	46 (35.9%)	132 (65.3%)	<0.001**
	No	82 (64.1%)	70 (34.7%)	
Have you ever administered haloperidol plus biperiden intramuscularly in the treatment of any patient diagnosed with MAP?	**Yes**	90 (70.3%)	186 (92.1%)	<0.001**
	No	38 (29.7%)	16 (7.9%)	
Have you ever administered chlorpromazine intramuscularly in the treatment of any patient diagnosed with MAP?	**Yes**	42 (32.8%)	114 (56.4%)	<0.001**
	No	86 (67.2%)	88 (43.6%)	
Have you ever administered zuclopenthixol decanoate acuphase intramuscularly in the treatment of any patient diagnosed with MAP?	**Yes**	44 (34.4%)	154 (76.2%)	<0.001**
	No	84 (65.6%)	48 (23.8%)	
Have you ever used any diazepam intravenously in the treatment of MAP?	**Yes**	18 (14.1%)	44 (21.8%)	0.080
	No	110 (85.9%)	158 (78.2%)	
Have you ever used any vanoxerine consta three monthly in the treatment of MAP?	**Yes**	2 (1.6%)	126 (12.9%)	<0.001**
	No	26 (98.4%)	176 (87.1%)	
Do you routinely prefer intravenous fluid replacement in the treatment of MAP?	**Yes**	22 (17.2%)	106 (82.8%)	0.028*
	No	56 (27.7%)	146 (72.3%)	

Chi-Square test was used to compare categorical data

Abbreviations: *MAP* Methamphetamine-Associated Psychotic Disorder, *MUD* Methamphetamine Use Disorder

*$p<0.05$, **$p<0.001$

variable with the highest Nagelkerke R^2 was taken from the questions on the same topic. Questions "LAI antipsychotic use in maintenance treatment" and "experience of zuclopenthixol decanoate acuphase use" were removed from the model because they questioned the same field as "LAI antipsychotic use experience in the treatment of MAP". According to the binary logistic regression analysis of the remaining five independent variables, the question that contributed the least to the model was number of MAP cases followed-up ($p=0.127$). This variable, which was more difficult to question with more than two answer options, was removed from the model. Only twenty participant responded to zuclopenthixol oral use, which is one of the answers to "most common typical oral antipsychotic use". When this variable was added to the regression model, the Hosmer and Lemeshov test p value remained below 0.05. Therefore, this variable was also removed from the model. As a result, a total of three independent variables were included in the model. All of these variables were two-choice questions and easy to apply. Data from the binary logistic regression model were presented in Table 7. According to the binary logistic regression analysis, the sensitivity of our model related to the determining the participants who was involved in complete treatment process of at least one MAP case was 81.2, and the specificity was 68.8 percent.

Table 3 Approaches of group 2 and group 3 to possible situations encountered during the MAP treatment process

Variables		Group 2 (*n*=128) *n* (%)	Group 3 (*n*=202) *n* (%)	*p* value
Which psychotropic is your first choice for insomnia complaints in the treatment of MAP?	**Quetiapine**	84 (65.6%)	160 (79.2%)	<0.001**
	Mirtazapine	22 (17.2%)	28 (13.9%)	
	Benzodiazepine	16 (12.5%)	4 (2.0%)	
	Trazodone	4 (3.1%)	0 (0.0%)	
	Olanzapine	0 (0.0%)	10 (5.0%)	
	Chlorpromazine	2 (1.6%)	0 (0.0%)	
Which psychotropic is your second choice for insomnia complaints in treatment of MAP?	**Quetiapine**	34 (26.6%)	40 (19.8%)	0.001*
	Mirtazapine	38 (29.7%)	80 (39.6%)	
	Benzodiazepine	32 (25.0%)	34 (16.8%)	
	Trazodone	8 (6.3%)	2 (1.0%)	
	Olanzapine	8 (6.3%)	12 (5.9%)	
	Chlorpromazine	8 (6.3%)	34 (16.8%)	
Which oral antipsychotic do you prefer most often in a patient diagnosed with MAP with antisocial personality traits?	**I do not use**	12 (9.4%)	0 (0.0%)	<0.001**
	Risperidone	94 (73.4%)	154 (76.2%)	
	Olanzapine	16 (12.5%)	40 (19.8%)	
	Paliperidone	6 (4.7%)	8(4.0%)	
Which antipsychotic do you prefer most often in a patient diagnosed with MAP who has a history of suicidal-homicidal thoughts-behavior and self-mutilation?	**I do not use**	4 (3.1%)	4 (2.0%)	0.167
	Risperidone	70 (54.7%)	132 (65.3%)	
	Olanzapine	44 (34.4%)	48 (23.8%)	
	Paliperidone	8 (6.3%)	12 (5.9%)	
	Aripiprazole	2 (1.6%)	2 (1.0%)	
	Amisulpride	0 (0.0%)	4 (2.0%)	
Does a history of suicidal-homicidal thought-behavior and self-mutilation in MAP encourage you to use LAI antipsychotics?	**Yes**	78 (60.9%)	144 (71.3%)	0.051
	No	50 (39.1%)	58 (28.7%)	
Which mood stabilizer do you use most often in the presence of antisocial personality traits, suicidal-homicidal thoughts-behavior and self-mutilation accompanying MAP?	**I do not use**	26 (20.3%)	28 (13.9%)	0.269
	Sodium valproate plus valproic acid	52 (40.6%)	82 (40.6%)	
	Carbamazepine	42 (32.8%)	70 (34.7%)	
	Lithium	8 (6.3%)	22 (10.8%)	
Which oral antipsychotic would you most frequently choose for a patient diagnosed with MAP who has a body mass index of around 18 and antisocial personality traits?	**I do not use**	12 (9.4%)	8 (4.0%)	0.049*
	Risperidone	18 (14.1%)	46 (22.7%)	
	Olanzapine	92 (71.9%)	140 (69.3%)	
	Paliperidone	4 (3.1%)	2 (1.0%)	
	Aripiprazole	2 (1.6%)	6 (3.0%)	
Have you ever experienced any extrapyramidal system side effects during MAP treatment?	**Yes**	40 (31.3%)	162 (80.2%)	<0.001**
	No	88 (68.7%)	40 (19.8%)	
What is the most common extrapyramidal system side effect you encounter during MAP treatment?	**I did not encounter**	84 (65.6%)	38 (18.8%)	<0.001**
	Dystonia	28 (21.9%)	86 (42.6%)	
	Akathisia	12 (9.4%)	42 (20.8%)	
	Parkinsonism	4 (3.1%)	36 (17.8%)	
Have you ever used biperiden and/or bornaprine for extrapyramidal system side effects that occur during MAP treatment?	**I did not encounter**	84 (65.6%)	38 (18.8%)	<0.001**
	Yes	44 (34.4%)	164 (81.2%)	
	No	0 (0.0%)	0 (0.0%)	
Have you ever encountered life-threatening conditions such as neuroleptic malignant syndrome, malignant catatonia, serotonin syndrome during MAP treatment?	**Yes**	0 (0.0%)	24 (11.9%)	<0.001**
	No	128 (100.0%)	178 (88.1%)	
Have you ever had a patient in whom delirium was added to MAP?	**Yes**	2 (1.6%)	74 (36.6%)	<0.001**
	No	126 (98.4%)	128 (63.4%)	

Chi-Square test was used to compare categorical data

Abbreviations: *MAP* Methamphetamine-Associated Psychotic Disorder

*$p<0.05$, **$p<0.001$

Table 4 Oral antipsychotic use characteristics of group 2 and group 3

Variables		Group 2 (*n*=128) *n* (%)	Group 3 (*n*=202) *n* (%)	*p* value
Which is the typical oral antipsychotic you prefer most in the treatment of MAP?	**I do not use**	62 (48.4%)	22 (10.9%)	<0.001**
	Haloperidol	64 (50.0%)	150 (74.3%)	
	Chlorpromazine	2 (1.6%)	18 (8.9%)	
	Zuclopenthixol	0 (0.0%)	12 (5.9%)	
Which atypical oral antipsychotic is your first choice in the treatment of MAP?	**Risperidone**	42 (32.8%)	82 (40.6%)	0.043*
	Olanzapine	74 (57.8%)	110 (54.6%)	
	Aripiprazole	4 (3.1%)	0 (0.0%)	
	Paliperidone	8 (6.3%)	8 (4.0%)	
	Amisulpride	0 (0.0%)	2 (1.0%)	
Which atypical oral antipsychotic is your second choice in the treatment of MAP?	**Risperidone**	80 (62.5%)	94 (46.5%)	0.046*
	Olanzapine	38 (29.6%)	84 (41.6%)	
	Aripiprazole	2 (1.6%)	10 (5.0%)	
	Paliperidone	6 (4.7%)	12 (5.9%)	
	Amisulpride	2 (1.6%)	2 (1.0%)	
Which atypical oral antipsychotic is your third choice in the treatment of MAP?	**Risperidone**	4 (3.1%)	10 (5.0%)	0.006*
	Olanzapine	8 (6.3%)	6 (3.0%)	
	Aripiprazole	54 (42.2%)	62 (30.7%)	
	Paliperidone	26 (20.3%)	74 (36.6%)	
	Amisulpride	24 (18.8%)	32 (15.8%)	
	Clozapine	12 (9.3%)	18 (8.9%)	
If you prefer olanzapine in the maintenance treatment of MAP, at what dosage ranges would you use it?	**1-10 mg/day**	70 (54.7%)	56 (27.7%)	<0.001**
	11-20 mg/day	52 (40.6%)	142 (70.3%)	
	>20 mg/day	6 (4.7%)	4 (2.0%)	
	I do not prefer	0 (0.0%)	0 (0.0%)	
If you prefer risperidone in the maintenance treatment of MAP, at what dosage ranges would you use it?	**1-4 mg/day**	116 (90.6%)	114 (56.4%)	<0.001**
	5-8 mg/day	12 (9.4%)	86 (42.6%)	
	I do not prefer	0 (0.0%)	2 (1.0%)	
If you prefer aripiprazole in the maintenance treatment of MAP, at what dosage ranges would you use it?	**1-10 mg/day**	54 (42.2%)	42 (20.8%)	<0.001**
	11-20 mg/day	38 (29.7%)	98 (48.5%)	
	21-30 mg/day	14 (10.9%)	44 (21.8%)	
	I do not prefer	22 (17.2%)	18 (8.9%)	
If you prefer amisulpride in the maintenance treatment of MAP, at what dosage ranges would you use it?	**1-400 mg/day**	42 (32.8%)	44 (21.8%)	<0.001**
	401-800 mg/day	36 (28.1%)	102 (50.5%)	
	>800 mg/day	8 (6.3%)	16 (7.9%)	
	I do not prefer	42 (32.8%)	40 (19.8%)	
How long do you continue antipsychotics in maintenance treatment of a first MAP episode?	**I do not use antipsychotics during maintenance**	2 (1.6%)	2 (1.0%)	0.254
	I stop as soon as the psychotic symptoms disappear	8 (6.3%)	10 (5.0%)	
	I use it for at least 1-6 months after the psychotic symptoms disappear	46 (35.9%)	54 (26.7%)	
	I use it for at least 6-12 months after the psychotic symptoms disappear	48 (37.5%)	76 (37.6%)	
	I use it for at least 1-3 years after the psychotic symptoms disappear	24 (18.8%)	56 (27.7%)	
	I use it for at least 3-5 years after the psychotic symptoms disappear	0 (0.0%)	2 (1.0%)	
	I will use it throughout life	0 (0.0%)	2 (1.0%)	

Table 4 (continued)

Variables		Group 2 (*n*=128) *n* (%)	Group 3 (*n*=202) *n* (%)	*p* value
How long do you continue antipsychotics in maintenance treatment of a second MAP episodes?	**I do not use antipsychotics during maintenance**	2 (1.6%)	2 (1.0%)	0.007*
	I stop as soon as the psychotic symptoms disappear	2 (1.6%)	2 (1.0%)	
	I use it for at least 1-6 months after the psychotic symptoms disappear	22 (17.2%)	14 (6.9%)	
	I use it for at least 6-12 months after the psychotic symptoms disappear	22 (17.2%)	38 (18.8%)	
	I use it for at least 1-3 years after the psychotic symptoms disappear	28 (21.9%)	44 (21.8%)	
	I use it for at least 3-5 years after the psychotic symptoms disappear	46 (35.9%)	68 (33.7%)	
	I will use it throughout life	6 (4.7%)	34 (16.8%)	
How long do you continue antipsychotics in maintenance treatment of a third or more MAP episodes?	**I do not use antipsychotics during maintenance**	2 (1.6%)	2 (1.0%)	0.012*
	I stop as soon as the psychotic symptoms disappear	2 (1.6%)	0 (0.0%)	
	I use it for at least 1-6 months after the psychotic symptoms disappear	10 (7.8%)	4 (2.0%)	
	I use it for at least 6-12 months after the psychotic symptoms disappear	12 (9.4%)	10 (5.0%)	
	I use it for at least 1-3 years after the psychotic symptoms disappear	20 (15.6%)	32 (15.8%)	
	I use it for at least 3-5 years after the psychotic symptoms disappear	8 (6.3%)	28 (13.9%)	
	I will use it throughout life	74 (57.8%)	126 (62.4%)	

Chi-Square test was used to compare categorical data

Abbreviations: *MAP* Methamphetamine-Associated Psychotic Disorder

*$p<0.05$, **$p<0.001$

Table 5 LAI antipsychotic use characteristics of group 2 and group 3

Variables		Group 2 (*n*=128) *n* (%)	Group 3 (*n*=202) *n* (%)	*p* value
Have you ever used LAI antipsychotics in treatment of MAP?	**Yes**	40 (31.3%)	148 (73.3%)	<0.001*
	No	88 (68.7%)	54 (26.7%)	
Which LAI antipsychotic is your first choice in treatment of MAP?	**I do not use**	70 (54.7%)	50 (24.7%)	<0.001*
	PP1M	48 (37.5%)	82 (40.6%)	
	Zuclopenthixol decanoate depot	10 (7.8%)	50 (24.7%)	
	Risperidone consta	0 (0.0%)	10 (5.0%)	
	Haloperidol decanoate	0 (0.0%)	8 (4.0%)	
	Aripiprazole maintena	0 (0.0%)	2 (1.0%)	
Have you ever used LAI antipsychotics in the maintenance treatment of MAP?	**Yes**	42 (32.8%)	150 (74.3%)	<0.001*
	No	86 (67.2%)	52 (25.7%)	
Does the price of the medication affect your choice of LAI antipsychotic in MAP treatment?	**Yes**	38 (29.7%)	122 (60.4%)	<0.001*
	No	90 (70.3%)	80 (39.6%)	

Chi-Square test was used to compare categorical data

Abbreviations: *MAP* Methamphetamine-Associated Psychotic Disorder, *LAI* Long-Acting Injectable, *PP1M* Once-Monthly Paliperidone Palmitate

*$p<0.001$

Table 6 Non-antipsychotic psychotropic use characteristics of group 2 and group 3 in MAP treatment

Variables		Group 2 (*n*=128) *n* (%)	Group 3 (*n*=202) *n* (%)	*p* value
Have you ever used any antidepressant in the treatment of MAP?	**Yes**	96 (75.0%)	180 (89.1%)	0.001*
	No	32 (25.0%)	22 (10.9%)	
Which antidepressant is your first choice in the treatment of MAP?	**I do not use**	26 (20.3%)	20 (9.9%)	<0.001**
	Sertraline	46 (35.9%)	90 (44.5%)	
	Escitalopram	12 (9.4%)	20 (9.9%)	
	Venlafaxine	16 (12.5%)	14 (6.9%)	
	Bupropion	12 (9.4%)	40 (19.8%)	
	Paroxetine	10 (7.8%)	2 (1.0%)	
	Duloxetine	4 (3.1%)	10 (5.0%)	
	Fluoxetine	2 (1.6%)	6 (3.0%)	
Have you ever used any benzodiazepine in the treatment of MAP?	**Yes**	92 (71.9%)	166 (82.2%)	0.027*
	No	36 (28.1%)	36 (17.8%)	
Which benzodiazepine is your first choice in the treatment of MAP?	**I do not use**	28 (21.9%)	32 (15.8%)	<0.001**
	Diazepam	40 (31.3%)	68 (33.7%)	
	Lorazepam	42 (32.8%)	92 (45.5%)	
	Alprazolam	10 (7.8%)	0 (0.0%)	
	Clonazepam	8 (6.3%)	10 (5.0%)	
Have you ever used any mood stabilizer in the treatment of MAP?	**Yes**	60 (46.9%)	136 (67.3%)	<0.001**
	No	68 (53.1%)	66 (32.7%)	
Which mood stabilizer is your first choice in the treatment of MAP?	**I do not use**	62 (48.4%)	68 (34.0%)	0.031*
	Sodium valproate plus valproic acid	38 (29.7%)	72 (36.0%)	
	Carbamazepine	28 (21.9%)	60 (30.0%)	
Have you ever used any modafinil in the treatment of MAP?	**Yes**	20 (15.6%)	46 (22.8%)	0.114
	No	108 (84.4%)	156 (77.2%)	
Have you ever used any psychostimulant in the treatment of MAP?	**Yes**	12 (9.4%)	34 (16.8%)	0.057
	No	116 (90.6%)	168 (83.2%)	

Chi-Square test was used to compare categorical data

Abbreviations: *MAP* Methamphetamine-Associated Psychotic Disorder

*$p<0.05$, **$p<0.001$

Table 7 Binary logistic regression analysis of group 2 and group 3 in terms of independent variables

Independent Variables	B	Sig	Exp (B)	95% C.I. for EXP (B)	
				Lower	Upper
LAI Antipsychotic Use Experience	1.123	< 0.001*	3.074	1.763	5.359
Experience of Extrapyramidal System Side Effect	1.374	< 0.001*	3.950	2.251	6.931
Experience of Delirium	2.664	< 0.001*	14.359	3.340	61.738
Constant	1.361	< 0.001*	3.899		

Binary logistic regression analysis was used. Model Summary: −2 log-likelihood = 313.187[a], Cox & Snell $R^2 = 0.321$; Nagelkerke R^2 0.435; Hosmer and Lemeshov test $p = 0.203$

Abbreviations: *LAI* Long-Acting Injectable

*$p < 0.001$

Discussion

This study examines the practices and attitudes of psychiatrists who continue to work actively in Turkey regarding MAP treatment. Although the participants were initially divided into three groups, the focus of the study was those with partial (group 1) or complete (group 2) MAP treatment experience. These two groups, who participated in the treatment process of at least one MAP

case, were compared in terms of sociodemographic data, psychiatric training, institutional, regional characteristics, MAP-related experience, clinical approaches, psychotropic preferences, and significant findings were obtained.

The fact that genders were similar between the groups made it easier to interpret the findings. Those whose current institution is a university hospital, city hospital, provincial/district state hospital, and community mental health centre have more partial MAP treatment experience. Complete MAP treatment experience is higher in participants whose current institution is a mental health and disease hospital. The reason for this is most likely the need for closed ward in MAP treatment and the closed wards are almost always located in a mental health and disease hospital in Turkey. The majority of patients diagnosed with MAP admitted to institutions other than mental health and disease hospitals are referred to mental health and disease hospitals before starting treatment and their treatment is usually completed there [14]. Participants involved in the complete MAP treatment process have higher AMATEM experience. This finding is expected since drug-related treatments in Turkey are often carried out in these centres [15].

The fact that MAP cases are mostly followed-up and treated in mental health and disease hospitals also affects the number of complete MAP treatment experience of the psychiatrists working there. Those who have experience with complete MAP treatment are more likely to follow any guideline. Considering that psychiatrists who are partially involved in MAP treatment often refer patients to a closed psychiatric ward, it can be understood why they do not need a guideline. Almost all of those involved in MAP treatment, both partially and completely, think that hospitalization is necessary at any stage of MAP treatment. Participants with complete MAP treatment experience think that hospitalization in MAP should be performed in a closed psychiatric ward. This approach to closed ward admission is understandable for participants with complete MAP treatment experience, who have witnessed all stages of MAP treatment and are more exposed to possible risks. It is seen that those with both partial and complete MAP treatment experience are undecided about involuntary hospitalization and the rates of both groups are similar. It is suggested that the medical, ethical and judicial dimensions of involuntary hospitalization be discussed in depth and that studies be carried out to eliminate the uncertainty on this issue. The patients diagnosed with MAP in the acute exacerbation period will have consequences including suicidal and homicidal behaviours [16]. The delusions of jealousy, reference, persecution, and auditory hallucinations in MAP cases lead to loss of insight and therefore rejection of voluntary admission [17, 18]. In such a case, the choice of involuntary hospitalization should be discussed, taking into account the high benefit of the patient.

Intramuscular antipsychotic administration use rates including haloperidol, chlorpromazine, zuclopenthixol decanoate acuphase were higher in participants who experienced complete MAP treatment. Antipsychotics can be administered intramuscularly for rapid and strong effectiveness in MAP accompanied by agitation and aggression [19]. Patients with these characteristics are generally inpatients. Since the rate of working in places with psychiatric ward was higher in the complete MAP treatment group, it can be said that this finding is an expected finding.

Quetiapine is most commonly used in the treatment of possible insomnia that occurs in MAP, and those who are involved in the complete treatment use quetiapine more frequently for this purpose. The potential benefits of quetiapine in substance use disorders may be related to its frequent use [20]. Majority of the participants involved in the MAP treatment, both partially and completely, most commonly favour oral risperidone as an antipsychotic, sodium valproate plus valproic acid, carbamazepine as a mood stabilizer in patients with antisocial personality traits, suicidal/homicidal thoughts/behaviours, and self-mutilation. Also, a history of suicidal/homicidal thoughts/behaviours and self-mutilation in MAP encourage the majority of participants to use LAI antipsychotics. A patient diagnosed with MAP whose body mass index is below normal limits, even if he/she has antisocial personality traits, changes the antipsychotic preference of psychiatrists from risperidone to olanzapine. The frequency of encountering extrapyramidal system side effects, life-threatening conditions and delirium was found to be higher among those working in institutions with service. Additionally, it has been observed that the most common extrapyramidal system side effect during MAP follow-up and treatment is dystonia.

While olanzapine is the most frequently preferred atypical oral antipsychotic in both groups, risperidone is the second most frequently preferred atypical oral antipsychotic. It is known that antisocial personality traits are common in MAP cases [21]. It was emphasized above that participants in both groups preferred risperidone more frequently in patients diagnosed with MAP with antisocial personality traits. Despite this, it can be argued that olanzapine is more frequently preferred as an atypical oral antipsychotic in the treatment of MAP. One possible explanation may be that risperidone is associated

with more extrapyramidal system side effects [22]. Aripiprazole and paliperidone are the most preferred atypical oral antipsychotics after olanzapine and risperidone. The participants who have experience with complete MAP treatment are more likely to use higher doses of olanzapine, risperidone, aripiprazole, and amisulpride in the maintenance treatment of MAP. The fact that participants with complete MAP treatment experience have been involved in the treatment of more patients diagnosed with MAP and have encountered many drug side effects may enable them to make courageous decisions. Non-antipsychotic psychotropic use was higher in participants who participated in the complete MAP treatment.

In both groups, the participants who think that antipsychotics should be continued for at least 6–12 months after the psychotic symptoms disappear in the maintenance treatment of the first MAP episode constitute the largest proportion (37.5% and 37.6%). However, when the results are examined in detail, it is seen that the participants do not have a common practice on this issue. It has been determined that the duration of antipsychotic use in the maintenance treatment of MAP varies over a wide range (1 month to 3 years). In both groups, the participants who think that antipsychotics should be continued for at least 3–5 years after the psychotic symptoms disappear in the maintenance treatment of the second MAP episode constitute the largest proportion (35.9% and 33.7%). When the results are examined, it is seen that the participants do not have a common practice in the second episode. Attitude differences have reached an extremely wide range, from 1 month to throughout life. Those who think that antipsychotics should be used throughout life in the third and subsequent MAP episodes are in the majority in both groups. However, disagreements regarding the duration of antipsychotic use in MAP maintenance continue here as well. On the other hand, participants with complete MAP treatment experience think that antipsychotics should be used for a significantly longer time in the second and subsequent MAP episodes.

No significant effect of gender was found on the variables examined in this study. As the working duration in psychiatry increases, the doses of antipsychotics used in the maintenance treatment of MAP and the duration of use of antipsychotics become longer. It is thought that this is directly related to the increase in patient experience. Binary logistic regression analysis determined that antipsychotic use characteristics and having encountered possible life-threatening situations were the most effective variables in revealing the experience of partial or complete MAP treatment. Again, according to binary logistic regression analysis, it is possible to determine which group the participant belongs to with a rate of 43.5% with three yes/no questions (experience of LAI antipsychotic use, extrapyramidal system side effect, and delirium).

Strengths, limitations and future directions

The most important strength of this study is that there is no study with similar features in the literature. Another strength of the current study is that participants representing psychiatrists actively working in Turkey were reached through an internet-based survey. Psychiatrists' practices and attitudes towards the follow-up and treatment processes of MAP are discussed in detail. The effects of psychiatric training and institutional characteristics on approaches are discussed. Just as the psychotic features of MAP cannot yet be clearly explained and positioned according to primary psychotic disorder, psychiatrists' views on the subject are far from a common practice. There are significant differences of opinion on very important topics such as hospitalization, features of oral/intramuscular/LAI antipsychotic use, approaches to possible conditions accompanying MAP, and antipsychotic use characteristics in maintenance treatment.

The cross-sectional nature of the study can be considered as a limitation. The validity of the responses to the survey has not been confirmed as it is an internet-based study. This study includes only adult psychiatrists working in Turkey. Considering that drug use characteristics vary regionally, it is not appropriate to generalize the results. The survey was distributed to psychiatrists in Yahoo and WhatsApp groups, which may introduce sampling bias as not all psychiatrists may be part of these groups. It is not known how often and to what extent psychiatrists use applications such as Yahoo and WhatsApp. It is not known which characteristics of physicians use these applications and show interest in online surveys. Participation in the survey was voluntary, leading to potential self-selection bias as psychiatrists who chose to participate may have different perspectives than those who did not.

These differences in approach suggest that the DSM-5-TR definition of MAP should be re-evaluated. It is thought that special importance should be given to the MAP section in the next edition of DSM. Undoubtedly, the item of MAP related to duration of psychotic symptoms will be one of the most discussed items. Additionally, the fact that MAP has different characteristics from other drug-associated psychotic disorders may be the subject of the next DSM edition. In this respect, this study will provide a different perspective to studies examining the similarities and differences between primary psychotic disorder and MAP.

Conclusions

There are many variables that affect psychiatrists' attitudes and practices regarding MAP treatment. The psychotic nature of MAP and psychiatrists' approaches to this nature appear to vary significantly. The duration of antipsychotic use in the maintenance treatment of MAP is an important matter of debate. The most important result of this study is that psychiatrists make courageous decisions such as more LAI preferences, administering higher doses of anipsychotics, selecting more potent drugs, using more antidepressants, benzodiazepines, mood stabilizers; as their experience participating in all phases of MAP treatment increases. The findings presented support the lack of any standardization in MAP treatment. There is a need for mental health organizations, primarily the Turkish Psychiatry Association, to come together and conduct algorithms and standardization studies on MAP treatment. Considering that methamphetamine and related problems are increasing, it is recommended that all psychiatrists, even if they are not directly involved in MAP treatment, increase their knowledge level about MAP treatment processes through in-service training. It is anticipated that the literature produced through future efforts by mental health organizations will guide government policies. It is essential to integrate standardized data related to MAP diagnosis, treatment and follow-up into continuous medical education. This study, which examines the approaches of psychiatrists to MAP treatment in Turkey, needs to be supported by further studies.

Abbreviations

MAP	Methamphetamine-associated psychotic disorder
LAI	Long-acting injectable
UNODC	United Nations Office on Drugs and Crime
MUD	Methamphetamine use disorder
DSM-5-TR	Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, Text Revision
AMATEM	Alcohol and Drug Addiction Research, Treatment, and Training Centre
TCC	Turkish Civil Code
PP1M	Once-monthly paliperidone palmitate

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-024-12134-1.

Supplementary Material 1.

Acknowledgements
We are grateful to all our participants.

Authors' contributions
MHO, YK, ABT, MG, OK, and DO designed this study. MHO, YK, DS, ABT, MG, OK, and DO collected the data and MHO and DO processed the data. MHO and CH analyzed and interpreted the data. MHO and DO prepared the manuscript. All authors have read and approved the fnal manuscript.

Funding
The authors declare no financial support.

Data availability
The data presented in this study are available on request from the corresponding author.

Declarations

Ethics approval and consent to participate
This study was designed according to the principles outlined in the Declaration of Helsinki. It was approved by the Ethics Committee of the Fırat University. Informed consent was obtained from all of the participants in the study (Date: 14/09/2023; Number: 2023/12–12).

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Received: 15 August 2024 Accepted: 18 December 2024
Published online: 04 January 2025

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