



Type of Aggression and Psychosis among patients of Methamphetamine use disorder (SHABU) with or without other poly-substances in Riyadh, Kingdom of Saudi Arabia Emergency Department

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Submit Date 2024-05-23

Revise Date 2024-06-20

Accept Date 2024-07-02



ABSTRACT

Background: One of the major health issues facing the world today is addiction. It is a rapidly developing health issue in Saudi Arabia. Given how intensely addictive methamphetamine is and how strongly its usage is linked to violent crimes and extremely aggressive conduct, methamphetamine addiction is one of the most hazardous health problems. There has been a concerning rise in the usage of crystal methamphetamine, often known as "Shabu," in the Saudi market in recent years. The aim of this work was to identify the type of aggressive behaviors and psychotic symptoms in patients' methamphetamine abuse and patients with polysubstance abuse without methamphetamine abuse in Emergency Department, Riyadh Hospitals.

Methods: The study was conducted upon 100 drug abuse participants who attended Riyadh Saudi Arabia Emergency Department seeking for treatment of drug dependence. All patients were subjected to drug screening and assessment of delusions, mood disorders and Modified Overt Aggression Scale.

Results: Verbal aggression, self-aggression and aggression against others were significantly higher in methamphetamine abusers' group than other polysubstance abusers group ($p < 0.05$). Methamphetamine addicts exhibited higher rates of restlessness, the need for physical restraint, spouse betrayal of delusion, disorientation, and self-harm than other groups of polysubstance abusers ($p < 0.05$).

Conclusion: Methamphetamine abusers displayed significantly higher rates of aggressive behaviors and specific psychotic symptoms compared to other polysubstance abusers.

Keywords: Aggression; Psychosis; Methamphetamine.

INTRODUCTION

Drug abuse is one of the world's fastest-growing health issues and a rapidly expanding problem. Abuse of drugs may lead to serious legal and psychological repercussions. Substance abuse refers to excessive use of a drug in a way that is detrimental to self, society, or both. The Kingdom of Saudi Arabia is irritated by this matter since young people who are productive were singled out [1].

Different communities routinely report co-occurring mental instability and addiction diseases, and these co-morbidities are frequently observed in Emergency Rooms (ERs), homeless shelters, obituaries, and even on the streets. Delusions and

mood swings brought on by methamphetamine-induced psychotic illnesses were common indicators of these social abnormalities [2, 3].

The use of methamphetamine poses a serious threat to global public health. Psychotic symptoms are reported by 13% to 53% of methamphetamine users, and this percentage is higher in those who are dependent on the drug [4]. Additionally, methamphetamine users are more likely to acquire schizophrenia [5].

While less so than cocaine, amphetamines can be addictive. Following cannabis, methamphetamine is the illicit substance that is used the most frequently. Their usage raises health issues over the world, particularly in East and South-East Asia.

According to United Nations Office on Drugs and Crime (UNODC) data, the most commonly used substance in China last year was Methamphetamine (MA), with 37 million individuals using the stimulant. There are more consumers of synthetic drugs than heroin. By the end of 2016, consumers of synthetic drugs made up 60.5% of all drug users [6].

Psychotic symptoms linked to major depressive disorder negatively impact the well-being of the affected person and exacerbate the impact on their social network. Growing use of MA and its risks raise concerns regarding psychotic symptoms among MA users [7].

It is unclear how methamphetamine use affects the risk of acute or chronic psychosis at the population level. The risk of psychosis doubles with methamphetamine use, and in individuals who are dependent on the substance, the risk of psychosis increases by more than ten times during periods of highly frequent use [8].

In many nations, violence is a major social issue that can lead to violent crimes and have legal repercussions. Numerous studies have also shown a link between drug usage and aggression [9]. A concerning rise in crystal methamphetamine abuse, particularly among younger Saudis, has occurred in the last few years, signaling significant changes in the country's drug market. This underscores the significance of examining co-morbid problems associated with methamphetamine abuse.

METHODS

The study was conducted on one hundred drug abusers (aged ≥ 18 years) who sought treatment for drug dependency at Emergency Department, Al Iman General Hospital, Riyadh, Saudi Arabia during the period from September 2023 to February 2024. These samples were selected by using the convenient sampling of non-probability sampling. All participants and their families provided written informed consent.

Ages over 18 years, native Arabic speaking ability, and a confirmed psychotic disorder as determined by the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (DSM)–IV -TR were included in the study. The diagnosis of methamphetamine abuse was made based on the self-reported history of abuse, the preliminary urine screening test, and the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition "DSM-IV" criteria [10] for methamphetamine dependency in the preceding six months. Previously, they had not been exhibiting clinically significant levels of withdrawal symptoms, like sleeplessness or decreased appetite.

Those who had been admitted to the hospital six months prior due to psychosis were excluded. Additionally, individuals were excluded if they had a history of epilepsy, attention deficit disorder, severe brain injury with a loss of consciousness lasting longer than 20 minutes or stroke.

Expert psychiatrists conducted clinical assessments and interviews with all patients, utilizing a pre-designed, structured questionnaire to gather information about their demographics, methamphetamine consumption history, and self-reported psychiatric and clinical symptoms [11]. Additionally, the interview served as a source of information regarding the existence or absence of various delusions, such as jealous delusion (the delusional belief that one is being betrayed by one's spouse), disorientation that was measured by Minimal state examination (mental confusion or impaired awareness, particularly regarding place, time, or personal identity), self-harm or self-mutilation (the deliberate injuring of one's own body without apparent suicidal intent), and symptoms of mood instability.

Drug screening: Samples of urine (often 10–50 ml) were taken from every abuser. All samples were examined using a dip stick (RightSign, China) to validate their history of methamphetamine misuse and rule out any related substances of abuse. Cannabis, Benzodiazepines, Morphine, Tramadol, Barbiturates, Cocaine, and Amphetamines were among the drugs that were examined. Immunoassay using a dip stick relies on an antibody's capacity to bind to the drug of abuse [12]. It is a quick qualitative screening test, and one of its primary drawbacks is that some drugs might cause false positive results. Given that medications such as antihistamines, nasal inhalers, tricyclics, chemically similar substances (like pseudoephedrine), quetiapine, metformin, proton pump inhibitors, and bupropion might result in falsely positive results for amphetamine screening tests [13].

Modified Overt Aggression Scale (M-OAS) was used to evaluate the type of aggressive behavior [14]. Four categories of aggressiveness are taken into consideration when rating aggressive behavior: verbal, self-violence, aggression against things, and aggression against people [15].

Statistical analysis

Data were analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percentage. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using range

(minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Chi-square test and student t-test were used. The significance of the obtained results was judged at the 5% level.

RESULTS

There was no statistically significant difference between the two groups' demographic data (Table 1). Also, there was no statistically significant difference between the two studied groups regarding average frequency of use in the preceding 6 months and duration of abuse (Table 2). Verbal aggression, self-aggression and aggression against others were significantly higher in

methamphetamin abusers group than other polysubstance abusers group while there was no significant difference regarding aggression against objects (Table 3). The methamphetamine abusers were found to have a higher prevalence of delusions or mood alterations overall, regardless of underlying socio-demographic factors. Additionally, both groups displayed symptoms of manifest mood instability and persecutory delusion, while restlessness and the need for physical restraint, spouse betraying delusion, disorientation, and self-harm were more common in methamphetamine abusers (Table 4).

Table (1): Demographic data of the studied groups.

		Methamphetamin Abusers group (n=52)	Other Polysubstance Abusers group (n=48)	P value
Age (years)	Mean ± SD	24.57±4.09	24.16±4.13	0.62
	Range	18-32	18-32	
Sex	Male	42 (80.8%)	37 (77.1%)	0.65
	Female	10 (19.2%)	11(22.9%)	
Education	Illiterate	10(19.2%)	11 (22.9%)	0.77
	Less than high school	4 (7.7%)	6 (12.5%)	
	High school	33 (63.5%)	26 (54.2%)	
	Bachelor’s degree or higher	5 (9.6%)	5 (10.4%)	
Marital status	Single	26 (50%)	20 (41.7%)	0.68
	Married	13 (25%)	15 (31.3%)	
	Divorced	13 (25%)	13 (27%)	
Occupation	Employed	32 (61.5%)	31 (64.6%)	0.95
	Unemployed	12 (23.1)	10 (20.8%)	
	Irregular work	8 (15.4%)	7 (14.6%)	
Residence	Rural	36 (69.2%)	31 (64.6%)	0.62
	Urban	16 (30.8%)	17 (35.4%)	
Social class	Low	38 (73.1%)	36 (75%)	0.82
	High	14 (26.9%)	12 (25%)	
Cigarette smoking	No	8 (15.4%)	7 (14.6%)	0.57
	Yes	44 (84.6%)	41 (85.4%)	

Table (2): Patterns of methamphetamine and other polysubstance abuse among the studied groups.

		Methamphetamin Abusers group (n=52)	Other Polysubstance Abusers group (n=48)	P value
Average frequency of use in the	Daily or nearly every day	37 (71.2%)	32 (66.7%)	0.62
	Used 2 or 3 days per week	15 (28.8%)	16 (33.3%)	

preceding 6 months				
Duration of abuse (in months)	Mean ± SD	9.11±2.85	9.68±2.71	0.31
	Range	3-14	5-14	

Table (3): Type of aggression among the studied groups.

		Methamphetamin Abusers group (n=52)	Other Polysubstance Abusers group (n=48)	P value
Type of aggression	Verbal aggression	37 (71.2%)	11 (22.9%)	< 0.001
	Aggression against objects	25 (48.1%)	14 (29.2%)	0.05
	Self-aggression	22 (42.3%)	10 (20.8%)	0.02
	Aggression against others	33 (63.5%)	20 (41.7%)	< 0.001

Table (4): Delusions and mood disorders among the studied groups.

		Methamphetamin Abusers group (n=52)	Other Polysubstance Abusers group (n=48)	P value
Restlessness and need to physical restrain	No	22 (42.3%)	33 (68.8%)	0.007
	Yes	30 (57.7%)	15 (31.2%)	
Persecutory delusion	No	17 (32.7%)	18 (37.5%)	0.61
	Yes	35 (67.3%)	30 (62.5%)	
Spouse betraying delusion	No	33 (63.4%)	40 (83.3%)	0.03
	Yes	19 (36.6%)	8 (16.7%)	
Symptoms of manifest mood instability	No	43 (82.7%)	38 (79.2%)	0.65
	Yes	9 (17.3%)	10 (20.8%)	
Disorientation	No	31 (67.3%)	39 (81.2%)	0.018
	Yes	21 (32.7%)	9 (18.8%)	
Self-harm	No	30 (57.7%)	38 (79.2%)	0.02
	Yes	22 (42.3%)	10 (20.8%)	

DISCUSSION

In our study, the majority of both methamphetamine abusers (80.8%) and other polysubstance abusers (77.1%) were male. Only 19.2% of the methamphetamine group and 22.9% of the polysubstance group were female. The sex distribution did not significantly differ between groups.

This pattern of predominant male representation is consistent with recent literature indicating that men tend to abuse methamphetamine and other illicit stimulants at higher rates compared to women [16]. Possible reasons include gender differences in risk-taking behaviors, sensation-seeking tendencies, peer influence effects, and access to drugs. The 4:1 ratio of men to women aligns with sex differences in global estimates of methamphetamine dependence as well [17].

Given the uneven distribution, this sample may not fully generalize to female methamphetamine and polysubstance abusers. Some work suggests women progress more rapidly to methamphetamine dependence and exhibit distinct physiological and psychosocial consequences compared to men [18]. Examining clinical correlates in an exclusively female sample could be an area for further study. However, in the current emergency department setting, results are more indicative of substance abuse patterns among males. Overall, the sex imbalance reflects broader gender disparities in stimulant misuse locally and globally.

In our study, the mean age of the methamphetamine abuser group was 24.57 ± 4.09 years, compared to 24.16 ± 4.13 years in the polysubstance group. The age range for both groups was 18-32 years. No significant age difference was found between groups.

The young mean age reflects that both methamphetamine abuse and polysubstance abuse disorders tend to first emerge in early adulthood, with peak use occurring in one's 20s and 30s [16]. This aligns with the mean ages found in other emergency room studies that was conducted in Upper Egypt of methamphetamine and club drug users [9]. The minimal age difference between groups suggests methamphetamine abusers enter treatment around the same age as abusers of other stimulants and substances in this setting.

The reason for these results is that Saudi Arabia's early adulthood is a period of social, cultural, and economic change, which might be conducive to drug use that disrupts social norms. It is also a time when peer pressure and influence are particularly strong [1].

In our study, 69.2% of the methamphetamine abuser group and 64.6% of the polysubstance user group resided in rural areas, with the remainder (30.8% and 35.4%, respectively) residing in urban locations. The residence proportions did not significantly differ between groups statistically.

This fairly equivalent urban-rural representation suggests emergency department encounters methamphetamine and polysubstance abuse disorders affect both rural and urban populations. Some studies propose higher methamphetamine use in rural areas due to lower pricing and easier access to ingredients for homemade methamphetamine production [19]. However, the current results reflect that substance abuse is prevalent across geography.

On the other hand, Hashisha et al. [16] found that the consumption of crystal methamphetamine is more prevalent in urban regions; this could be attributed to the openness of metropolitan social lives, increased stress, easy access to drug dealers, and simple supply of the drug [20].

In our study, in terms of patterns of substance use, there were also no major differences. Around 70% of both groups reported daily or near-daily use in the past 6 months. The mean duration of use was around 9-10 months for both groups as well. This indicates fairly comparable substance use patterns overall.

However, some notable differences emerged with respect to aggression and psychotic symptoms. Methamphetamine abusers showed significantly higher rates of verbal aggression, self-aggression, and aggression against others compared to the other polysubstance users. Over 70% of methamphetamine users exhibited verbal aggression specifically. This aligns with previous research indicating that methamphetamine intoxication is associated with violent behavior [21].

Regarding the link between misuse of crystal methamphetamine and aggressive behavior About half of the study group exhibited severe levels of hostility, according to Hashisha et al. [16]. Verbal aggression and violent behavior against others were the most common forms of aggression.

According to Torok et al. [22] there is a correlation between methamphetamine use and violent offending within the last year; in particular, stronger methamphetamine use was found to be substantially linked to a higher probability of offending. Methamphetamine use was significantly associated with violent offending across a number of indicators, such as a higher likelihood of being charged with common assault and weapon offenses

in the previous year and a higher likelihood of having committed a violent crime in the previous month compared to regular heroin users.

More frequent methamphetamine use is a major predictor of violent offending, according to McKetin et al. [23] which is in line with our findings.

According to a study done in Jeddah, Saudi Arabia by Al-Asmari [24], there is a glaring correlation between methamphetamine usage and criminality. Of the 47 cases, 19 (or 40%) had violent deaths fighting, shooting with a gun, or stabbing. Of these violent deaths, 53% were thought to be acts of violence against the victim and 47% were the consequence of violent behavior against another person.

Prakobsrikul et al. [25] and Ba'cskai et al. [26] reported that severe types of aggressiveness are closely linked to long-term crystal methamphetamine usage.

Numerous studies have found a linear relationship between the abuse of crystal methamphetamine and acts of violence and/or victimization in the community [27]. This relationship may be explained by the drug's ability to exaggerate an individual's reaction to threatening situations as well as its depressant effects on cognitive disorganization, which may have an impact on mood regulation [27].

Other researchers link this correlation to the possibility that methamphetamine consumption may cause an individual to behave erratically and to the economic pressures that drive drug abusers to commit crimes in order to earn the necessary funds to satisfy their drug needs [28].

Shrem and Halkitis [29] disagreed, explaining the link by claiming that persistent activation of the central nervous system can result in the induction of negative psychological states like hostility.

In our study, regarding psychotic symptoms, methamphetamine users had higher rates of restlessness/need for restraint, spouse-betraying delusions, disorientation, and self-harm ideation compared to polysubstance users. Rates of persecutory delusions and mood instability were similar between groups. The higher prevalence of psychosis among methamphetamine users is consistent with the drug's known psychotomimetic effects [30].

Bousman et al. [31] investigated the differences in positive symptoms among patients with methamphetamine psychosis. All patients with MA-induced psychosis had delusions, despite the fact that they discovered three different sub-profiles.

According to other research, methamphetamine psychosis is also linked to a high frequency of delusions of reference, auditory and visual hallucinations, strange speech patterns, and persecutory delusions [32].

Furthermore, Wearne and Cornish [33] discovered that whereas people with methamphetamine psychosis had delusions and paranoid hallucinations, the same individuals did not display disorganized speech or a cognitive problem.

According to Chen et al. [34] visual hallucinations were recorded by 46.5 and 21.3% of their methamphetamine psychosis sample, respectively. Visual hallucinations have also been found to occur in 68.8% of methamphetamine abstinent people (35) but other research indicates that they are the fourth most common positive symptom in methamphetamine psychosis [36].

McKetin et al. [37] discovered that MA-associated psychosis (MAP) was more frequently related with methamphetamine abuse or dependence than with "recreational" methamphetamine use in their Australian research of community methamphetamine users. Psychosis was more common in dependent methamphetamine users than in non-dependent users (27% vs 8%). These users had no past history of psychosis.

According to Ujike and Sato [38] there is a process of MAP that starts with psychotomimetic effects like stimulation and increased concentration, then progresses to "prepsychosis" with delusions, can lead to full psychosis with hallucinations and delusions of reference, and so on.

Rezai [39] listed a number of side effects of abusing crystal meth, including seizures, restlessness, and insomnia. Cohen et al. [40] found that the most common symptoms among methamphetamine addicts were paranoia and hallucinations.

According to Hashisha et al. [16], the study group most commonly self-reported headache, tingling or numbness, dizziness, tremors or shakes, hot or cold flushes, seizures, and profuse sweating as physical symptoms. While the most commonly self-reported psychological symptoms were irritability, disorientation, aggressiveness, and auditory and visual hallucinations.

A data from the United Nations Organization indicates that there is a rising trend in the frequency of seizures among people who consume crystal meth [41].

These findings are connected to crystal meth's central nervous system stimulant impact, which causes behavioral, physical, and psychological problems [42].

Crystal methamphetamine abusers exhibit a variety of depressive symptoms, as reported by Baker et al. [43], Hamdi et al. [20] and others. This could be explained by the fact that crystal methamphetamine directly affects the brain's monoamine regulation, which can result in a pseudo-depressive state that shares many characteristics of major depression, such as depressed mood, sleep disturbances, appetite disturbances, poor concentration, lack of motivation, restlessness, and irritability [42].

According to earlier research, abusing crystal methamphetamine is typically linked to serious methamphetamine-induced psychiatric illnesses [44].

In their study, Copeland and Sorensen found that crystal methamphetamine users had greater incidences of mental illnesses, such as major depressive disorder and anxiety disorders [16].

The etiology of crystal methamphetamine abuse and these psychiatric disorders is the same, and crystal methamphetamine abuse may cause some psychiatric disorders or reveal a previously latent psychiatric disorder, according to Lin et al. [45] numerous explanations for the association between crystal methamphetamine abuse and these comorbid psychiatric illnesses.

There has been prior research that show a link between serious mental health conditions and crystal methamphetamine addiction. This could be connected to the long-term effects of crystal methamphetamine addiction on dopamine transporters, which have a deleterious effect on memory and motor coordination [46, 47].

CONCLUSION

In conclusion, methamphetamine abusers displayed significantly higher rates of aggressive behaviors, including verbal aggression, self-aggression, and aggression against others, and specific psychotic symptoms, such as restlessness/need for restraint, spouse-betraying delusions, disorientation, and self-harm ideation compared to other polysubstance abusers. This research suggests that hospitalized methamphetamine addicts should have a thorough mental status evaluation, with a focus on delusions and mood disorders.

Ethics approval and consent to participate.

Local ethical committee approval was taken to conduct this study (AI-IMAN :IRB:102657-2023), and all the steps of the study are in accordance with Declaration of Helsinki and its last amendments (2013). Written informed consent was taken from the patients to participate in the current study. Patients were informed about the confidentiality of the data and they were able to stop

participation in the study at any time without giving any reasons.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Authors' contributions

D.I. contributed to study design, conceptualization, preparing, and interviewing the patients. E.E. collected data and analysis. D.K. contributed to study design, collecting, analyzing and interpreting the data. All authors have read and approved the manuscript for publication.

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To Cite:

Ibrahim, D., Elshafey, E., KHALIL, D. Type of Aggression and Psychosis among patients of Methamphetamine use disorder (SHABU) with or without other poly-substances in Riyadh, Kingdom of Saudi Arabia Emergency Department. *Zagazig University Medical Journal*, 2024; (1613-1621): -. doi: 10.21608/zumj.2024.289994.3398