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EVALUATION OF CLINICAL AND MENTAL CHARACTERISTICS OF INDIVIDUALS UTILISING SYNTHETIC CANNABINOIDS AND METHAMPHETAMINE- A COMPARITIVE STUDY

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ABSTRACT

Background: Because synthetic phthalates have methamphetamine-like psychoactive effects, they are frequently used to treat a variety of mental illnesses, such as aggression, self-harm, and psychosis. It is yet unknown how methamphetamine and synthetic cathinone differ in their clinical presenting patterns.

Aim: The purpose of the current study was to compare the clinical and psychiatric profiles of individuals who used synthetic cannabinoids and methamphetamine.

Methods: Research performed on inebriated patients hospitalized to the institute's Department of Psychiatry. In all participants, interview was done to collect psychopathological, lifestyle, and sociodemographic data. To evaluate the chemical in the urine sample, immunoassay, liquid chromatography-quadrupole time-of-flight mass spectrometry, and other techniques were used. To evaluate physical complications and correlations between the two groups, logistic regression was employed.

Results: A total of 24 participants with methamphetamine intoxication were matched with the 12 subjects who were found to be intoxicated by synthetic cathinone. The two groups showed comparable intensity of clinical psychotic symptoms and a significant risk of self-harm and violence. In both categories, the participants who were single, jobless, smokers, and habitual drinkers were more numerous. Synthetic cathinone intoxication was associated with more physical complications and a lower history of substance use in the family when compared to methamphetamine use.

Conclusion: The current study comes to the conclusion that there are similarities in the inclinations towards aggression, psychosis, and self-harm among the participants who are intoxicated with methamphetamine and synthetic cathinone. However, synthetic cathinone intoxication, which is frequently utilised in the psychiatric emergency department, is linked to an increased risk of physical problems.

Keywords: Cathinone, methamphetamine, psychoactive agents, psychosis, substance use

INTRODUCTION

Novel psychoactive substances (NPSs) are the substances most frequently used in the field of psychiatry because many of these agents have psychoactive effects similar to those of traditional illicit substances. They are still uncontrolled,

though. There are known to be over 500 different varieties of these novel psychoactive substances worldwide.¹ These new psychoactive compounds can be categorised as stimulants, sedatives, or hallucinogens based on their clinical psychoactive properties. One of the most popular new psychoactive compounds in Asia that has effects akin to methamphetamine is synthetic cathinone.² In India, the most often used illegal drugs are ketamine, methamphetamine, and heroin which are misused for decades and pose severe hazards to the mental and physical health of users.

The usage of these compounds has increased significantly recently, according to published statistics; however, because individuals may combine NPSs with other legal narcotics, reported data may be understated.³ Synthetic cathinone is typically mixed into snacks, coffee packets, and tea bags. In India, it is prohibited to use mephedrone and 3,4-methylenedioxypyrovalerone. But these drugs are often distributed by changing their chemical makeup, which makes it acceptable to use them in order to get under the legislation. Nevertheless, India lacks regulations on many forms of synthetic cathinone, which undervalues their potential danger.⁴ Individuals who use synthetic cathinones may exhibit symptoms of acute intoxication when they visit the psychiatric emergency department. Psychiatrists are considering treatment options and safety issues when patients exhibit agitation or self-harm.⁵

Synthetic cathinone intoxication presents with symptoms resembling acute aggravation of psychosis and stimulant intoxication, such as agitation, paranoia, and hallucinations.⁶ Inappropriate management of the combined comorbid psychiatric disorder that subjects with stimulant use disorder typically exhibit increases their risk of physical illness and psychosocial dysfunction, including infection, cardiovascular problems, high-risk sexual behaviour, and criminality.⁷ Subjects utilising NPSs may inadvertently consume more drugs than those using standard stimulants, such as nonprescription sedatives, which can lower their sympathomimetic toxidromes. However, based solely on the initial primary symptoms or mental manifestations, it is challenging to differentiate between methamphetamine intoxication and synthetic cathinone intoxication because to the limitations of their clinical examination effectiveness and the expense of utilising NPSs.⁸

One should not undervalue the danger of synthetic cathinone intoxication, which can result in death, failure of essential organs, and violent episodes. If people with stimulant intoxication and mental or physical difficulties are quickly identified as synthetic cathinone users, addiction interventions and individualised, individualised therapy may be carried out with ease.⁹ Therefore, the purpose of the current study was to compare the clinical and mental characteristics of individuals who used synthetic cannabinoids and methamphetamine. The purpose of the current retrospective clinical investigation was to evaluate the clinical and mental characteristics of individuals who used synthetic cannabinoids and methamphetamine in comparison. The research participants came from the psychiatric emergency room. First-episode psychosis, acute delirium, and a history of NPS use were the subjects of first urine toxicology.

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The purpose of the current retrospective clinical investigation was to evaluate the clinical and mental characteristics of individuals who used synthetic cannabinoids and methamphetamine in comparison.

MATERIALS AND METHODS

The research participants came from the psychiatric emergency room. First-episode psychosis, acute delirium, and a history of NPS use were the subjects of first urine toxicology. The World Health Organisation (WHO) defined violent behaviour as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation." This is how the violent behaviour was evaluated.

Subjects utilizing synthetic cathinones and methamphetamine had different crime rates. The physical side effects, which included rhabdomyolysis, severe renal failure, muscular weakness, and dystonia, were attributed to amphetamine

overdose. Transfer subjects were patients who had their vital signs changed due to physical problems and were moved to different wards. Based on the results of urine toxicology tests, 12 participants who were age- and gender-matched with 24 subjects, who were merely intoxicated with methamphetamine were added as control group. Synthetic cathinone poisoning was assessed in these patients based on these findings. Serum parameters, vital signs, length of stay in the psychiatric department, and length of hospitalization were evaluated based on prior institutional data. The collected data were statistically analysed using the independent t-test to compare the continuous and categorical data between the two groups using the SPSS software version 26.0 (Chicago, IL). The laboratory results in two groups were compared using the Mann-Whitney U test. The relationship between the usage of synthetic cathinones and the risk of physical complications was examined using logistic regression. A significance threshold of $p < 0.05$ was used.

RESULTS

Group I consisted of methamphetamine users, whereas Group II included users of cathinones. These are the clinical features of the two research subject groups. Group I and Group II research participants had mean ages of 31.3 ± 5.5 and 30.2 ± 6.3 years, respectively (0.46). With p-values of 1.0000, 1.000, 0.23, 0.32, and 0.33, respectively, the gender, marital status, work status, alcohol consumption, and smoking status did not significantly differ between the two groups. There was no statistically significant difference between the two groups' histories of bipolar disorder, depressive disorder, or psychotic disorder ($p = 0.33$). Substance abuse and psychotic illness showed non-significant differences between the two groups in terms of family history ($p = 0.33$ and 0.37, respectively). On the other hand, methamphetamine users had a considerably greater rate of mood disorder ($p = 0.02$) than cocaine users.

Methamphetamine users had a much greater criminal history ($p = 0.01$). There were no significant differences in self-harm, violence, or BPRS between the two groups ($p = 0.33$, 1.000, and 0.13, respectively). Delusions, hallucinations, and mental disorders are examples of psychotic consequences. There were no significant changes between the two groups for these symptoms ($p = 0.43$, 0.44, and 0.55, respectively). Table 1 indicates that there was a statistically significant difference ($p < 0.001$) in the frequency of physical issues between methamphetamine and cocaine users. When comparing the patients that needed to be hospitalized with those who didn't, 24 subjects required hospitalization whereas 12 subjects didn't. The average age of research participants who required hospitalization was 30.6 ± 6.1 years, whereas those who did not ($p = 0.46$) had a mean age of 31.6 ± 5.2 years.

Hospitalized and non-hospitalized patients did not vary significantly in terms of gender, marital status, work status, alcohol consumption, or smoking status ($p = 0.44$, 0.23, 0.23, 0.82, and 0.33, respectively). Subjects who were not hospitalized had a considerably greater history of bipolar, depressive, and psychotic illnesses than those who were hospitalized ($p = 0.006$). Hospitalized and non-hospitalized participants did not vary significantly in terms of family history, drug use, or psychotic illnesses ($p = 0.44$ and 0.34, respectively); however, non-hospitalized subjects had higher rates of mood disorders ($p = 0.02$). Table 2 shows that there were no significant differences in crime history, BPRS, aggression, self-harm, physical problems, thinking disorders, hallucinations, and delusions between hospitalized and non-hospitalized participants ($p = 0.82$, 0.87, 0.43, 1.000, 1.000, 0.75, 0.63, and 0.43, respectively).

Seven participants in the current research had no physical issues, whereas 29 suffered physical difficulties. The participants without physical issues were 32.1 ± 6.2 years old, whereas those with physical complications were 30.6 ± 5.7 years old ($p = 0.36$). Subjects with and without physical issues showed non-significant differences in gender, marital status, work status, alcohol consumption, and smoking status ($p = 1.000$, 1.000, 1.000, 0.55, and 0.74, respectively).

Subjects with physical problems had non-significantly greater personal histories of bipolar, depressive, and psychotic disorders ($p = 0.73$). Subjects with physical problems had a substantially greater family history of drug, mood, and psychotic disorders (p-values of 0.16, 0.74, and 1.000, respectively). Patients without physical issues had a substantially higher BPRS than patients with physical complications ($p = 0.003$). In patients with and without physical issues, the following variables showed no significant differences: $p = 1.000$, 0.13, 0.34, 0.26, and 0.54 for violence, self-harm, physical complications, mental disorders, hallucinations, and delusions, respectively (Table 2).

In evaluating the relationship between the likelihood of physical problems and the intoxication from synthetic cathinones associated with drug intoxication, the OR for BPRS was 1.06 in multivariate analysis and 1.05 in univariate analysis, with corresponding p-values of 0.005 and 0.27. Table 4 shows that the OR for participants using synthetic

cathinones and methamphetamine was 8.57 in univariate analysis and 9.33 in multivariable analysis, with p-values of less than 0.001 and 0.002, respectively. The purpose of the current retrospective clinical investigation was to compare the clinical and mental characteristics of individuals who used synthetic cannabinoids and methamphetamine. Methamphetamine users were included in Group I, and users of cathinones were in Group II.

Group I and Group II research participants had mean ages of 31.3 ± 5.5 and 30.2 ± 6.3 years, respectively (0.46). With p-values of 1.000, 1.000, 0.23, 0.32, and 0.33, respectively, the gender, marital status, work status, alcohol consumption, and smoking status did not significantly differ between the two groups. There was no statistically significant difference between the two groups for the history of bipolar disorder, depressive disorder, or psychotic illness ($p=0.33$). Substance abuse and psychotic illness showed non-significant differences between the two groups in terms of family history ($p=0.33$ and 0.37, respectively). On the other hand, methamphetamine users had a considerably greater rate of mood disorder ($p=0.02$) than cocaine users. Methamphetamine users had a considerably greater criminal history ($p=0.01$). There were no significant differences in self-harm, violence, or BPRS between the two groups ($p=0.33$, 1.000, and 0.13, respectively).

DISCUSSION

Delusions, hallucinations, and mental disorders are examples of psychotic consequences. There were no significant changes between the two groups for these symptoms ($p=0.43$, 0.44, and 0.55, respectively). With $p<0.001$, physical problems were far more common in cocaine users than in methamphetamine users. These results were in line with studies by Lo TW et al. in 2020) and Zuba D et al. from 2013, whose authors noted that the patients in previous research who used methamphetamine and cathinones had comparable clinical features to those of the current study. Twelve participants in the current research were not hospitalized, whereas 24 were not. The average age of research participants who required hospitalization was 30.6 ± 6.1 years, whereas those who did not ($p=0.46$) had a mean age of 31.6 ± 5.2 years.

Hospitalized and non-hospitalized patients did not vary significantly in terms of gender, marital status, work status, alcohol consumption, or smoking status ($p=0.44$, 0.23, 0.23, 0.82, and 0.33, respectively). Subjects who were not hospitalized had a considerably greater history of bipolar, depressive, and psychotic illnesses than those who were hospitalized ($p=0.006$). Hospitalized and non-hospitalized participants did not vary significantly in terms of family history, drug use, or psychotic illnesses ($p=0.44$ and 0.34, respectively); however, non-hospitalized subjects had higher rates of mood disorders ($p=0.02$). There were no significant differences between hospitalized and non-hospitalized participants in terms of crime history, BPRS, aggression, self-harm, physical problems, thinking disorders, hallucinations, and delusions ($p=0.82$, 0.87, 0.43, 1.000, 1.000, 0.75, 0.63, and 0.43, respectively).

These findings were consistent with research conducted in 2021 by Tran MTN et al. and in 2020 by Weng TI et al., in which the authors observed similar clinical features of patients with drug use disorders who needed to be hospitalized. Seven patients had no physical issues, whereas 29 subjects showed physical difficulties. The participants without physical issues were 32.1 ± 6.2 years old, whereas those with physical complications were 30.6 ± 5.7 years old ($p=0.36$). Subjects with and without physical issues showed non-significant differences in gender, marital status, work status, alcohol consumption, and smoking status ($p=1.000$, 1.000, 1.000, 0.55, and 0.74, respectively). Subjects with physical problems had non-significantly greater personal histories of psychotic, depressive, and bipolar illness ($p=0.73$).

Subjects with physical problems had substantially greater family histories of drug, mood, and psychotic disorders (p-values of 0.16, 0.74, and 1.000, respectively). Patients without physical issues had a substantially higher BPRS than patients with physical complications ($p=0.003$). Subjects with and without physical issues showed non-significant differences in violence, self-harm, physical complications, thinking disorders, hallucinations, and delusions ($p=1.000$, 1.000, 0.13, 0.34, 0.26, and 0.54, respectively). These findings were in line with earlier research by Orsolini L et al. (2019) and Wong AH et al. (2020), where the authors hypothesized comparable physical traits in individuals with and without physical difficulties.

The study's findings demonstrated that, for BPRS, the connection between the risk of physical problems and the intoxication caused by synthetic cathinones associated with drug intoxication was 1.06 and 1.05 for multivariate and univariate analysis, respectively, with p-values of 0.005 and 0.27. In both multivariable and univariate analysis, the OR

for participants taking methamphetamine and synthetic cathinones was 9.33 and 8.57, with p-values of less than 0.001 and 0.002, respectively. These outcomes were consistent with research by Palamar JJ et al. (2016) and Paillet-Loilier M et al. (2014), who found a comparable relationship between the risk of physical problems and intoxication from synthetic cathinones associated with drug intoxication.

CONCLUSION

The current study finds, taking into account its limitations, that there are similarities between the tendency for self-harm, aggression, and psychosis among the participants who are intoxicated with methamphetamine and synthetic cathinone. However, synthetic cathinone intoxication, which is frequently utilised in the psychiatric emergency department, is linked to an increased risk of physical problems.

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TABLES

S. No	Characteristics	Hospitalized (n=24)	Non-hospitalized (n=12)	p-value
1.	Mean age (years)	30.6±6.1	31.6±5.2	0.46
2.	Gender male	21 (87.5)	10 (83.33)	0.44
3.	Marital status-married	4 (16.6)	1 (8.33)	0.23
4.	Employed	13 (54.16)	5 (41.66)	0.23
5.	Alcohol	14 (58.33)	7 (58.33)	0.82
6.	Smoking	18 (75)	11 (91.66)	0.33
7.	Personal history			
a)	Bipolar disorder	1 (4.16)	2 (16.6)	0.006
b)	Depressive disorder	3 (12.5)	2 (16.6)	
c)	Psychotic disorder	4 (16.6)	5 (41.66)	
8.	Family history			
a)	Substance disorder	3 (12.5)	2 (16.6)	0.44
b)	Mood disorder	3 (12.5)	4 (33.3)	0.02
c)	Psychotic disorder	1 (4.16)	2 (16.6)	0.34
9.	Crime History	11 (45.83)	4 (33.3)	0.82
10.	BPRS	68.4±13.4	69.2±11.2	0.87
11.	Violence	13 (54.16)	7 (58.33)	0.43
12.	Self-harm	5 (20.83)	3 (25)	1.000
13.	Physical complications	5 (20.83)	3 (25)	1.000
14.	Psychotic symptoms			
a)	Thought disorder	6 (25)	4 (33.3)	0.75
b)	Hallucination	13 (54.16)	6 (50)	0.63
c)	Delusions	16 (66.6)	10 (83.33)	0.43

Table 1: Clinical characteristics of study subjects requiring and not requiring hospitalization

S. No	Characteristics	Physical complications (n=29)	No Physical complications (n=7)	p-value
1.	Mean age (years)	30.6±5.7	32.1±6.2	0.36
2.	Gender male	25 (86.20)	7 (100)	1.000
3.	Marital status-married	4 (13.79)	1 (14.28)	1.000
4.	Employed	15 (51.82)	3 (42.85)	1.000
5.	Alcohol	17 (58.62)	4 (57.14)	0.55
6.	Smoking	22 (75.86)	7 (100)	0.74

7.	Personal history			
a)	Bipolar disorder	2 (6.89)	1 (14.28)	0.73
b)	Depressive disorder	3 (10.34)	2 (28.57)	
c)	Psychotic disorder	7 (24.13)	2 (28.57)	
8.	Family history			
a)	Substance disorder	5 (17.24)	0	0.16
b)	Mood disorder	6 (20.68)	1 (14.28)	0.74
c)	Psychotic disorder	2 (6.89)	1 (14.28)	1.000
9.	Crime History	14 (48.27)	1 (14.28)	0.08
10.	BPRS	66.3±11.6	77.4±11.2	0.003
11.	Violence	16 (55.17)	4 (57.14)	1.000
12.	Self-harm	5 (17.24)	3 (42.85)	1.000
13.	Physical complications	5 (17.24)	3 (42.85)	0.13
14.	Psychotic symptoms			
a)	Thought disorder	9 (31.03)	1 (14.28)	0.34
b)	Hallucination	14 (48.27)	5 (71.42)	0.26
c)	Delusions	20 (68.96)	6 (85.71)	0.54

Table 2: Clinical characteristics of study subjects with and without physical complications

S. No	Variables	Multivariable analysis		Univariate analysis	
		OR (95% CI)	p-value	OR (95% CI)	p-value
1.	BPRS	1.06	0.005	1.05	0.27
2.	Methamphetamine	-	<0.001	-	0.002
3.	Synthetic cathinones	9.33		8.57	

Table 3: Correlation of physical complications risk and synthetic cathinones intoxication with substance intoxication