



Original Article

Predictors of Methamphetamine Use and Relapse



Farzane Jahanbakhsh¹, Mohammad Ali Gomroki¹,
Farzane Raaii¹, Ladan Shahba², Marjan Shamspour^{1*}

¹ Department of psychiatry, Shahid Beheshti hospital,
Afzalipuor Faculty of Medicine, Kerman University of
Medical Sciences, Kerman, Iran.

² Faculty of Medicine, Ke.C., Islamic Azad University,
Kerman, Iran.

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ABSTRACT

Methamphetamine (MAMP) is a stimulant that acts on the central nervous system (CNS). This substance, which is the second most consumed substance in the world, is therefore considered an important public health problem. The purpose of the present study was to identify the use and relapse antecedents for MAMP in an Iranian population, and to examine the relationships between attribution of these antecedents, demographic variables, psychiatric disorders and characteristics of MAMP use. A total of 170 patients admitted to Shahid Beheshti Hospital in Kerman, each with more than one hospitalization in the psychiatric department diagnosed with MAMP-induced disorders, were included in this study. Their data related to the causes of MAMP use and relapse were collected with a questionnaire. The relationships among the use and relapse antecedents of MAMP, demographic variables and MAMP-use characteristics were analyzed. For analytical statistics, correlation, regression, independent t-test and analysis of variance were performed using SPSS version 29, and a significance level of $P < 0.05$ was considered. The results of the analysis showed that male gender, low education, being unemployed, using other substances and aligning with the peer addicted group are the most important reasons for turning to MAMP use. On the other hand, unemployment and the use of other substances, along with addicted friends and the cheapness of MAMP, were among the most important reasons for relapse. The results indicate that multiple factors influence of use and relapse for MAMP, and may serve as a basis for construction of models for teaching to manage the antecedents and reduce the risk of relapse of MAMP use.

Keywords: Methamphetamine, predictors, substance abuse, relapse.

* Corresponding Author:

E mail: marjan1367shams@gmail.com

ORCID ID: 0000-0003-1963-7426



INTRODUCTION

Methamphetamine (MAMP) use has become a major public health issue worldwide (1). In Iran, according to official statistics, approximately 2 million people are abusing drugs, and in the recent years, the pattern of drug use has shifted from traditional substances to industrial substances, with MAMP abuse being at the forefront of this change (2).

Based on the Iranian Mental Health Survey (IranMHS) in 2011 (revised 2016), which was conducted through face-to-face interviews by trained psychologists with a national sample of 7841 people -3366 men and 4475 women- the prevalence of one-year use disorders in Iran per year for each illegal substance based on DSM-IV and DSM-5 criteria is 2.09% and 2.44%, respectively (3).

In addition, the prevalence of MAMP use was estimated at 590 per 100,000 people, and the prevalence of other stimulants at 300 per 100,000 people (4). Among the side effects caused by MAMP, we can mention brain and heart damage, mood disorders, violence and aggression, psychotic symptoms, cognitive impairment, poisoning and even death (5). Nearly one-third of adults abusing MAMP have attempted to commit suicide one or more times (6).

MAMP abuse is associated with an increased risk of HIV infection, hepatitis viruses, periodontal disease, pulmonary hypertension, adrenergic storm, stroke, circulatory collapse, and kidney failure. People who abuse MAMP are more likely to suffer from Parkinson's disease, depression, schizophrenia, and other neurological and cognitive complications (4).

Due to the serious physical, psychological and social consequences typically resulting from chronic abuse of the stimulant (5), a comprehensive evaluation of the factors related

to MAMP use and relapse is very important. Previous studies have implicated various causes in the use and relapse of MAMP.

These include psychiatric problems (6), smoking, family problems, socializing with friends involved in drug abuse (7), fathers' low level of education (8) and physical problems (9). To the best of our knowledge, no comprehensive study has been conducted in Iran to investigate the causes of MAMP use and relapse in people who have suffered from the side effects of this substance. The present study was designed and conducted for this purpose, and the information obtained from it can be used as a roadmap for MAMP prevention planning.

MATERIAL AND METHODS

Data collection

In sampling using the common methods of determining the sample size from the statistical population, 170 people were obtained as the sample population with a desired probability accuracy of $d = 5\%$ and a confidence coefficient of 90% ($t = 1.96$).

These participants were admitted to Shahid Beheshti Hospital in Kerman with a diagnosis of MAMP dependence or MAMP-induced disorders, each with at least one previous hospitalization for this reason.

The sampling method was convenience sampling over a period of three months, and data were collected using a questionnaire. After self-introduction and obtaining informed consent, the questionnaire was given to the patients. During the completion of the questionnaire, the researcher was present to answer the possible questions of the patients.

The questionnaire used in this research is a researcher-made questionnaire whose validity and reliability have been confirmed in previous



studies with Cronbach's alpha of 0.78 by Aghakhani et. al. in 2017 (8).

This questionnaire has two general parts. The first part contains questions about personal characteristics, including age, gender, marital status, occupation and other demographic information. The second part itself is divided into three smaller parts.

The first part contains 6 questions about drug abuse information. The second part contains 18 statements with a Likert scale and related to the causes of the tendency to use MAMP, and the final part contains 10 statements related to returning to MAMP.

The scoring of each question in the questionnaire ranged from 1 to 5, where the term “very much” received a score of 5 and the term “very little” received a score of 1.

Data analysis and presentation

To analyze the data, descriptive statistics in the form of tables and indices such as the mean and standard deviation was used, and for analytical statistics, correlation, regression, independent t-test and analysis of variance were used with SPSS version 29.

This study was reviewed and approved by the Ethics Committee of the Kerman University of

Medical Science, Iran, under the registration number IR.KMU.REC.1400.236.

RESULTS

According to the results of descriptive analyses, the rate of MAMP use in men is 3.72 times higher than in women; additionally, this ratio is 6.75 times higher among people with non-university education. The consumption of MAMP in unemployed people is 1.83 times that of employed people, and this ratio is 3.04 times that of people who have concurrent addiction to substances other than MAMP.

Based on the analysis which shows the reasons for the tendency to use MAMP, the persuasion of friends and their influence, curiosity and the need for euphoria are the most common mentioned reasons.

Also, the obtained data show that, the main reasons for returning to the abuse of MAMP include hanging out with friends involved with drug abuse, cheapness and availability of drugs, and unemployment.

Data analysis shows that among demographic characteristics, individual and family education level, being divorced, and living in rural areas compared to urban areas have a significant relationship ($P < 0.05$) with the tendency to abuse MAMP (Table 1)

Table 1

Determining the reasons for MAMP abuse and relapse according to demographic variables, based on independent t-test, and analysis of variance, according to the scores obtained from the questionnaire

Abuse					Relapse		
		Mean	Standard Deviation	P.V.	Mean	Standard Deviation	P.V.
Gender	Male	45.10	6.61	0.47	30.69	4.81	0.002
	Female	46	7.15		27.88	3.88	
Marital status	Unmarried	34.18	5.77	0.001	28.17	4.2	0.06
	Married	45.14	5.93		30.87	4.59	
	Widow	29	5.33		30	4.32	



	Divorce	47.86	6.52		29.94	5.2	
Education	Illiterate	38.66	6.35	0.001	26	3.46	0.23
	Elementary school	47.63	6.38		31.5	5.3	
	Secondary school	47.92	5.91		30.32	4.39	
	Diploma	45.17	5.76		29.83	4.88	
	Bachelor degree	38.46	6.67		29.31	2.66	
Education of mother	Illiterate	48.60	7.34	0.001	32.42	4.7	0.001
	Elementary school	46.88	5.77		29.98	4.7	
	Secondary school	46.42	4.43		30.33	4.6	
	Diploma	39.57	5.04		28.8	4.28	
	Bachelor degree	37.8	1.3		24	1.73	
	Master degree or higher	37	3.46		29	2.25	
Education of father	Illiterate	47.38	7.13	0.001	31.16	4.96	0.06
	Elementary school	47	5.55		30.38	4.62	
	Secondary school	41.55	3.89		28.8	4.84	
	Diploma	41.33	7.95		29.33	4.63	
	Bachelor's degree	38.5	3.14		30	1.15	
	higher	40	6.44		26.25	2.96	
Employee's status	Employment	44.83	8.22	0.51	30.53	4.39	0.38
	Unemployed	45.54	5.76		29.86	4.94	
History of addiction in the family	Yes	46.75	5.74	0.001	30.29	5.02	0.46
	No	42.38	7.56		29.71	4.19	
Cigarettes Smoking history	Yes	45.92	5.58	0.14	29.22	4.66	0.004
	No	44.41	7.99		31.32	4.64	
Concomitant drug(s) addiction	Yes	47.02	6.09	0.001	30.6	5.05	0.01
	No	40	5.72		28.57	3.31	
habitat	Urban areas	44.18	6.90	0.001	30.41	4.51	0.19
	Rural areas	47.80	5.54		29.38	5.24	



The situation came	weak	46.76	6.41	0.01	29.81	5.3	0.03
	medium	43.71	6.76		30.94	4	
	Good	43.92	6.70		27.46	3.57	
Duration of non-use after last withdrawal	Less than 1 month	46.17	6.18	0.14	29.57	5.87	0.28
	1-6 months	44.6	5.64		29.50	4.45	
	6-12 months	44.2	6.71		31.28	4.62	
	More than 12 months	45.81	4.66		30.02	4.72	
Duration of methamphetamine use from the beginning	Less than 1 year	43.5	12.19	0.05	26.16	3.37	0.007
	1-3 years	44.6	5.64		28.44	5.28	
	3-5 years	44.2	6.71		30.03	4.68	
	More than 5 years	47.2	6.25		31.38	4.29	
Prison history	Yes	47.38	6.62	0.007	30.73	5.14	0.25
	No	44.37	6.57		29.82	4.57	

According to the obtained results, only the age variable has a significant correlation with abuse, and the variable of frequency of

recurrence has a significant correlation with relapse (table2).

Table 2

Pearson and biserial correlations relating the tendency to MAMP abuse and relapse in hospitalized patients with relapse

Variable	Abuse		Relapse	
	Coefficient correlation	p	Coefficient correlation	p
Age	0.26	0.001*	0.19	0.01
Number of household members	0.02	0.79	0.03	0.69
Age of start of use	0.15	0.11	0.05	0.48
Frequency of recurrence	0.11	0.14	0.27	0.001

Increasing the level of education in the family decreases the tendency of people to abuse methamphetamine by an average of units. Also, people who are addicted to drugs other than MAMP have a higher tendency to abuse MAMP than people who only use MAMP (Table3).

In men, the return of MAMP abuse is less than in women. Also, the return to consumption in families that smoke is more than in families that do not smoke.



Table 3

Regression model of reasons for MAMP abuse tendency with demographic characteristics of hospitalized MAMP relapsed patients.

	Coefficients	Standard Error	T	P-value
constant	56.074	1.413	39.657	0.001
Education of family	-1.941	0.389	-4.987	0.001
Concomitant drug(s) addiction	4.604	1.178	-3.309	0.001

As the number of quits increases, return to consumption increases. And finally, with an increase of one unit in the duration of drug use

from the beginning, the return to MAMP abuse increases (Table 4)

Table 4

Regression model of reasons for returning to MAMP abuse with demographic characteristics of patients who relapsed to MAMP

	Coefficients	Standard Error	T	P-value
constant	23.735	1.896	12.517	0.001
Gender	-3.024	0.815	-3.708	0.001
Cigarettes Smoking history	2.302	0.666	3.459	0.001
Duration of non-use after last withdrawal	0.316	0.113	2.803	0.006
Duration of MAMP use from the beginning	1.703	0.428	3.98	0.001

DISCUSSION

The present study was conducted with the aim of determining the reasons for the tendency to start and relapse to MAMP. First, we evaluated the demographic characteristics of patients who have been admitted to the hospital more than once due to the use of MAMP.

In this research, 78.1% of participants relapsed into MAMP abuse in less than one year. In the study conducted by Brecht and his colleagues, 61% of the participants relapse within one year after completing the treatment period and 25% within 2-5 years (10). Appiah et al reported approximately 75% participants relapsed within 3 to 6 months after treatment (11). This finding can be justified considering the strong craving to use MAMP and persist

problems even after detoxification. This shows the great importance of support this period of time in supporting people who have succeeded in quitting MAMP. This highlights the importance of providing social support, psychological care, medication if necessary, and referral to support group like 12-step programs during this period.

In our study, the ratio of tendency and relapse to MAMP in men was 3.72 times higher than women; in other studies, the tendency to use substance was also greater in men (8, 12). This may be due to riskier decision-making and behavior in men (12).

In this study, the ratio of tendency and relapse to MAMP among people without university education were 6.75 times higher than those with



university education. Higher education often leads to better employment and social status, reducing the likelihood of drug abuse. In addition, educated individuals may also be more aware of drug dangers and have stronger refusal skills.

In our study, the tendency relapse in unemployed people was 1.83 times higher than employed ones. Another study showed higher relapse in unemployed people compared to those with part-time jobs. (79.0% vs. 0.2%). This finding confirms employment as a protective factor and planning for job creation could reduce the social burden.

Our findings showed that individuals who abused other substances alongside MAMP had 3.04 times higher tendency and relapse than those who only used MAMP. Kabisa et al. found people who used more than two substances had a 1.5 times higher risk of relapse than people who used one substance (15). Exposure to external clues of drug use, such as friends, the place of use, or the substance itself, is one of the most important reasons for slipping in drug users, and this risk is much higher in those who use several substances at the same time.

Regression analysis showed that lower education (personal and family), being divorced, rural residence, family drug abuse history, simultaneous use of other drugs and prison history were significantly related to the tendency to use MAMP. It is clear that all these risk factors are associated with lower social skills such as assertiveness or saying no. Investing in the education of community members, skill training and the use of mass media to inform people can have a significant contribution in reducing the use of MAMP.

The number of relapses, duration of MAMP abuse, smoking, mother's education and male gender had a significant relationship with relapse. Feeling of hopelessness after repeated

unsuccessful abstinence along with dysphoric mood that may occur after abstinence from stimulants are major reasons for relapse.

Therefore, monitoring patients and providing psychological and support services can be vital. One previous study (8) reported a significant relationship between father's education and return to MAMP use; however, our study newly identified a mother's education as related to relapse. The key role of the mother in raising children and teaching them life skills and maintaining family stability may protect family members against drug abuse.

According to the participants, the most important reasons for starting MAMP use. The reasons were persuasion by friends, curiosity, need for euphoria, lack of education opportunities and family drug abuse history. The influence of friends and peer groups was similarly reported in other studies (7,8,9,13,14). The frequency of repetition of this finding in different studies highlights the supervisory role of parents on children's relationships and friends, especially during adolescence. In addition, educating patients about this issue and directing them to self-help groups that provide them with a suitable environment for support and rehabilitation can be helpful in solving this problem. Other causes were also discussed earlier and we emphasize again on social education and awareness among the young community.

According to the obtained results, only the age variable has a significant correlation with abuse and frequency of recurrence has a significant correlation with relapse. Increasing family education levels decreases the tendency of people to abuse MAMP by an average of units. Also, people using other drugs than MAMP had a higher tendency to abuse MAMP compared to people who only used MAMP in men, the return of methamphetamine addiction



less than in women. Also, the return to consumption in families that smoke is more than in families that do not smoke. As the number of quits increases, return to consumption increases. And finally, with an increase of one unit in the duration of drug use from the beginning, the return to methamphetamine abuse increases.

Finally, we asked the participants to state the most important reasons for returning to MAMP use, and based on this, the most important reasons mentioned were as follows: Socializing with friends involved in drug abuse, cheap and available drugs, unemployment, not being accepted by friends and society, and family problems.

Among these, cheap and easy access to MAMP stands out, suggesting the need for stronger legal control.

CONCLUSION

According to the present study and comparing it with previous studies, the return to MAMP use is the highest during the first year after quitting. If we can provide the person who abuses MAMP with care and counseling in the first few months after quitting, it is expected that there will be a significant reduction in the number of relapses to MAMP.

In our study, it was reported that with the increase in the education of people and their family members, especially mothers, the tendency and return to use of MAMP decreases significantly.

This raises the importance of literacy and preferably skill training in families. In this study and similar previous studies, hanging out with addicted friends is known to be one of the main reasons for the tendency and return to substance abuse, including MAMP.

Another major reason for the return to abuse of MAMP is its cheapness and availability,

which needs to be handled by the police and other relevant bodies.

Limitations

Due to the fact that the sampling method in this research was available and was done only in one government center, one should be careful in generalizing its results to the whole society.

In addition, the cross-sectional nature of this study prevents causal conclusions between variables and we can only look at significant variables as a risk factor.

The fact that entering the study was voluntary and incomplete questionnaires were excluded from the study may cause bias in the study results.

And finally, the retrospective nature of the questionnaire data may have caused recall errors in completing them.

Ethical consideration

Participant information was kept strictly confidential, and only credible and reliable sources were utilized. The latest research methodologies were employed, ensuring that ethical considerations in the use of resources and research articles were strictly adhered to. *This study was reviewed and approved by Ethics Committee of the Kerman University of Medical Science, Iran, under the registration number IR.KMU.REC.1400.236.*

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Authors' Contribution:

F.J and M.Y conceived and designed the evaluation and drafted the manuscript. M.Sh and MA. G participated in designing the evaluation,



performed parts of the statistical analysis, and helped to draft the manuscript. F.R reanalyzed the clinical and statistical data and revised the manuscript. All authors read and approved the final manuscript.

Transparency declaration

There is no conflict of interests.

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