

Original Article

Prevalence of Ecstasy use and predisposing factors among Iranian female high school students

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Abstract

Objectives: To determine prevalence of ecstasy use and its predisposing factors among Iranian high school female students in Tehran, capital of Iran.

Methods: In this cross-sectional study, 2350 female students of 36 high schools from Tehran, were selected by multi-stage cluster sampling to determine prevalence of ecstasy use and its predisposing factors. SPSS- version 13 was employed to conduct analysis through chi-square, fisher's exact test and logistic regression methods.

Results: The prevalence of ecstasy use was 2.3% (95%CI: 1.7-2.9%). Party was the most prevalent place of first use (65%) and access was easy for most users (63%). In multivariate analysis, smoking (P-V=0.005), alcohol use (P-V=0.003), use of other substances (P-V<0.001), being in relationship with boys (P-V=0.015), families without one or two parents (P-V=0.020), night spending at friends home without parents' permission (P-V=0.001) were associated with ecstasy use.

Conclusion: Due to relation of ecstasy use with other substances, designed programmes should be comprehensive, with different strategies and collaboration of several sectors. The main strategies are to improve students' health literacy, family support, to limit supply and access, and to legislate appropriate regulatory laws.

Keywords: Ecstasy, Women health, Adolescent, Prevalence, Iran (JPMA 61:566; 2011).

Introduction

Ecstasy, the street name for the hallucinogenic stimulant 3, 4-methylenedioxy-methamphetamine (MDMA), is one of the most used substances in developed and developing countries and related health complications have been documented since last two decades.¹ Brain tissue destruction, decreasing emotional capabilities and even death could happen after use of ecstasy. Various abnormalities including psychiatric, vegetative, neuro-endocrine and cognitive disorders could be expected, following MDMA-induced neurotoxin brain damage.² Functional sequels may

persist even after longer periods of abstinence. MDMA users exhibit difficulties in coding information into long-term memory, display impaired verbal learning, are more easily distracted, and are less efficient at focusing attention on complex tasks.³

News about use of this drug by adolescents and students are reported from different parts of the world and Ecstasy initiation seems to play a role in the subsequent initiation of cocaine and heroin.⁴ Why the youth began to use Ecstasy and which factors contribute, have been studied in different countries. Monetary and opportunity cost, but not

income, significantly predicted ecstasy use and among the psychological measures, motivational cues were the strongest predictors of both use and dependence.⁵ Another study indicated that attitudes were associated most strongly with intention and use.⁶ The findings of a study suggest a pathway from early deviant behaviour to ecstasy use disorders, possibly mediated through illicit drug experimentation in early adolescence.⁶

It seems that change of cultural and social norms, family problems, lack of ability to analyze the situations, lack of self esteem, lack of educational programmes for prevention, lack of scientific and research approach are factors playing an important role in expanding ecstasy abuse.^{5,7} Another important problem is lack of knowledge about effects and consequences of ecstasy use among college students and general practitioners.⁸⁻¹¹

Findings of a study showed that, Ecstasy users were more likely to use marijuana, engage in binge drinking, smoke cigarettes, have multiple sexual partners, consider arts and parties as important, religion as less important, spend more time socializing with friends, and spend less time studying.^{4,12} Unlike other illicit drug users, ecstasy users were not academic underachievers and their satisfaction with education was not different from that of non-ecstasy users. Another study showed that multiple drug use was more frequent among users than among non-users.^{4,12-14} Other features that were significantly more accentuated among users than among non-users were the presence of tattoos and piercing, the frequency of attending raves and the preference for electronic music.¹²

Using ecstasy by Iranian women, girls and students are reported in the Mass Media and newspapers and some studies. Unfortunately, there is not enough research data about this status. According to a study, conducted by Mohtasham and colleagues, the prevalence of Ecstasy use among students was 2.4% in Lahijan, a city in Iran.¹⁵ According to Najafii and colleagues, the prevalence of ecstasy use among Iranian high school boys and girl students is 3% and 1.1%, respectively.¹⁶ They found that there was significant difference between Alcohol, Opium, Ecstasy, Cannabis and Cigarette use and sex. Higher educational levels and higher ages in boys were related to higher substance use. In addition, there was significant relationship between substance use in students and cigarette use among family members.

Considering available data, cultural context of the Iranian society, lack of data about risk factors especially for girls, this study was implemented and focused on the Ecstasy use of high school girls and its related risk factors, such as; parent's educational level, parent's occupation, history of father's unemployment, relationship with boys, physical,

emotional disorders, the route of primary familiarity with ecstasy, type of school, use of other drugs, smoking, drinking alcohol, history of ecstasy use in close family members, family problems, lack of information about ecstasy and if their parents were not living. Certainly, appropriate interventions could be developed to solve ecstasy problem after determination of risk factors.

Subjects and Methods

A cross-sectional method was employed to determine lifetime prevalence of ecstasy use and predisposing factors among female high school students in the city of Tehran, capital of Iran, in 2004. High school education in Iran consists of four stages; first grade; second grade; third grade; and pre-academic state. High school students enter the first grade at 15 and pre-academic state at 18. The number of high school female students in Tehran is approximately 100000, as target population of our study.

The projected sample size was 2334 pupils. The study was designed to meet 1.96, as level of confidence; 5%, as prevalence of ecstasy use based on results of other studies; and 1.25% as margin of error ($N = (1.96)^2 * (0.05 * 0.95 / (0.0125^2)) = 1167$). Due to cluster sampling, we assumed design effect as 2 and finally, aimed to recruit 2350 pupils.

Administratively, Tehran consists of 19 educational districts and we selected 3 districts according to the list of distinct numbers, randomly. Three Selected districts; 1, 2, 15, were located to the north, center and south of Tehran with 6100, 6500 and 10200 students, respectively. The sample size of each district was calculated according to proportion of students' population. In each district, 12 schools were selected by random sampling from the alphabetical list of schools. Between fifty to ninety students were selected randomly from each school proportional to the size of school's student population.

For designing the questionnaire, questions used by other similar researches in Iran, formed the main body of questionnaire. After adding new questions, Content validity was assessed by 10 experts from Ministry of Education, other relevant researchers and Ministry of Health, for appropriateness, necessity and relevance of questions. The initial plan for assessing scale reliability was to conduct a test-retest procedure with 30 participants and reporting Cronbach's alpha, but we encountered students who refused to fill the forms for the second time (probably due to being worried about revealing their personal data). For this reason, it was impossible for us to assess the reliability.

The final designed questionnaire, contained questions on demographic characteristics of students, use of ecstasy and probable risk factors, was assessed by the ethical review committee of Ministry of Education. The ethical committee

approved the questionnaire and study design, however, due to ethical concerns, some information on sexual behaviours were excluded from the questionnaire.

For gathering data, Preliminary meetings were held with the directors of the schools. For each school two trained interviewers explained to the students how to complete the questionnaires. They were acquainted with the objectives of the project and verbal consent was obtained. Then, questionnaires were filled by students in a confidential manner. There was little missing data in this study which did not have any effect on the results.

After gathering the data, the prevalence of ecstasy use and the association between predisposing factors and ecstasy use was examined through univariate and multivariate analysis. Chi square and binary logistic regression were used for univariate and multivariate analysis, respectively.

Statistical package for social sciences (SPSS-version 13) was employed to conduct the analysis. Results were presented as cross-tabulations and adjusted odds ratio (OR) with 95% confidence interval (CI).

Results

From a total of 2350 students, 2313 questionnaires were filled (response rate = 98%). In all 1986 (86.6%) and 360 (15.4%) students were from government and private high schools, respectively. Of these 765 (33%) students were in first grade, 707 (30%) in second grade, 813 (34%) in third

grade and 60 (3%) in pre-academic state.

Prevalence of ecstasy use was 2.3% (54 of 2313 students). Cost of ecstasy was high for 59% (23 of 39) and low for 41% (16 of 39) users. Access of ecstasy was easy for 63% (27 of 43) and difficult for 37% (16 of 43). Party was the most prevalent place of first use, with a percentage of 65 (17 of 26) and School was first place of use in 19% (5 of 26) users. The other characteristics of respondents and univariate analysis are displayed in Table-1 and 2. Univariate analysis showed that ecstasy use was more prevalent in private schools compared to public schools ($P < 0.001$), in immigrants from other cities in Iran to Tehran ($P 0.028$), and students with physical ($P < 0.001$) or mental disorder ($P 0.001$). In addition, low educational level of parents ($P < 0.001$), father's unemployment ($P < 0.001$), mother's employment ($P < 0.001$), stressful family environment ($P < 0.001$), large household size ($P < 0.001$), ecstasy use in intimate companions ($P < 0.001$) were associated with the use of ecstasy. At the end, there was a strong association between ecstasy use and alcohol use ($P < 0.001$), smoking ($P < 0.001$), use of the other substances ($P < 0.001$), being in relationship with boys ($P < 0.001$). More details of predisposing factors are displayed in Table-1 and 2.

In multivariate analysis and after adjustment, only smoking ($P 0.005$), alcohol use ($P 0.003$), use of other substances ($P < 0.001$), being in relationship with boys ($P 0.015$), families without one or two parents ($P 0.020$), night spending at friends home without parents' permission (P

Table-1: Association between ecstasy use and predisposing factors (univariate analysis).

	Total number	Ecstasy use: Number (%)	Univariate analysis P-V	Multivariate analysis P-V
Type of school				
Private	355	20 (5.6%)	< 0.001	0.135
Public	1920	34 (1.7%)		
Place of birth				
Tehran	1868	37 (2.0%)	0.028	0.712
Other than Tehran	427	16 (3.7%)		
Stressful family environment				
Yes	345	19 (5.5%)	< 0.001	0.825
No	1942	35 (1.8%)		
Having physical disorder				
Yes	142	17 (12.0%)	< 0.001	0.575
No	2154	37 (1.7%)		
Having mental disorder				
Yes	598	25 (4.2%)	0.001	0.179
No	1698	29 (1.7%)		
Smoking				
Yes	294	35 (11.9%)	< 0.001	0.005
No	1980	18 (0.9%)		
Alcohol drinking				
Yes	191	160 (16.2%)	< 0.001	0.003
No	2068	2047 (1.0%)		
Household size				
1 – 4	1006	18 (1.8%)	< 0.001	0.101
5 – 8	1268	29 (2.3%)		
> 8	22	6 (27.3%)		

Table-2: Association between ecstasy use and predisposing factors (univariate analysis) (continued).

	Total number	Ecstasy use: Number (%)	Univariate analysis P-V	Multivariate analysis P-V
Father educational level				
Illiterate	92	11 (12.0%)	< 0.001	0.331
school education	1515	28 (1.8%)		
academic education	674	15 (2.2%)		
Mother educational level				
Illiterate	134	12 (9.0%)	< 0.001	0.529
School education	1860	35 (1.9%)		
Academic education	294	7 (2.4%)		
Family condition				
Live with both parents	2182	39 (1.8%)	< 0.001	0.02
Live without one or both parents	102	15 (14.7%)		
Being in relationship with boys				
Yes	1212	48 (4.0%)	< 0.001	0.015
No	1034	3 (3.3%)		
Night spending with friends without parents' permission				
Yes	29	17 (58.6%)	< 0.001	0.001
No	2244	37 (1.6%)		
Use of other substances				
Yes	38	21 (55.3%)	< 0.001	< 0.001
No	2275	33 (1.5%)		
Father employment				
Unemployed	57	9 (15.8%)	< 0.001	0.63
Employed	2201	44 (2.0%)		
Mother employment				
Unemployed	1984	36 (1.8%)	< 0.001	0.167
Employed	311	17 (5.5%)		
Use of ecstasy by intimate companions				
Yes	391	31 (7.9%)	< 0.001	0.872
No	1922	23 (1.2%)		

Table-3: Association between ecstasy use and predisposing factors (multivariate analysis).

	B	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Smoking					
Yes	1.2	0.43	0.005	3.33	(1.44-7.72)
Alcohol drinking					
Yes	1.351	0.45	0.003	3.861	(1.60-9.33)
Family condition					
Live without one or both parents	1.45	0.62	0.02	4.26	(1.25-14.48)
Being in relationship with boys					
Yes	1.544	0.636	0.015	4.68	(1.35-16.29)
Night spending with friends without parents' permission					
Yes	2.55	0.75	0.001	12.74	(2.95-54.99)
Use of other substances					
Yes	2.68	0.59	< 0.001	14.56	(4.57-46.36)

0.001) were related with ecstasy use. More details are shown in Table-3.

Discussion

The prevalence of ecstasy abuse was 2.3% for female Iranian students in our study. Among different demographic, behavioural, familial and social factors, their relationship with ecstasy use, have been assessed. The role of behavioural risk factors such as smoking, alcohol use and other substances use is more prominent. The next important factors

were familial determinants such as families without one or both parents and lack of familial supervision. Night spending with friends without parents' permission is an indicator of insufficient supervision specially, in Iranian culture.

A few studies have been carried out in Iran to estimate ecstasy use. A study conducted in Lahijan, a small city in Iran, estimated ecstasy use 1.3% for female students and 2.4% for all respondents, in 2006.¹⁵ Other studies conducted in Guilan province,¹⁷ Ghazvin,¹⁸ Astara³ and Kurdistan,¹⁹ showed the prevalence of overall ecstasy use among students to be 4.2%

(2.2% for females), 1.5%, 5.6%, 2.7% (1.1 % for females) respectively. In a study conducted in Turkey, in 2004, the prevalence was 1.2% for female students and 3.31 for all.²⁰ Another study in Taiwan, from 2004 to 2006, the rate of ecstasy use was less than 1% for 11- 19 years old students.²¹ Some studies in developed countries point out a figure as 10% use of ecstasy in high schools of United States.^{4,12,22}

The phenomenon of polydrug use; concurrent use of ecstasy with other substances were confirmed in our study like the other studies.^{1,3,20} There is more smoke, alcohol and other psychoactive drugs use for ecstasy users. Furthermore, in smoke users, tendency to begin ecstasy use in future is much more.²²

Among familial and social factors, there is an important role for families without one or both parents and lack of family supervision. In a study conducted in the United States, living with both parents and effective family supervision has been mentioned as protective factors of ecstasy use.²² The relationship of ecstasy use with educational level and occupation of parents have been studied in a few studies. In Lahijan, Astara and our study, there wasn't any significant relationship between ecstasy use and education level of parents.^{3,15} It shows high socioeconomic state households aren't protected against the risk of ecstasy. Relationship with boys, as an inappropriate behaviour in Iranian culture for students, has been associated with ecstasy use in our study. The reason would be higher prevalence of ecstasy use among boys and their motivating role for ecstasy use. In Taiwan study, sexual relationship with boys is a predisposing factor of ecstasy use.²¹

Considering few conducted studies in Iran, our study with an appropriate sample size, fills an important informational gap of this area. Due to low incidence of ecstasy use among females, conducting researches with both sexes lead to insufficient power of other studies. For this reason, we limited our study to females to improve internal validity of the study. Due to specific cultural characteristics of Iran society, we employed a self-administered questionnaire. This identified the predisposing factors, not revealed in other studies, such as; being in relationship with boys; and spending nights with friends without parents' permission. These factors are indicators of lack of family supervision for Iranians. On the other side, this manner of designing the questionnaire causes low external validity of study and lack of possibility of exact comparison of results with other studies.

The estimated prevalence of ecstasy use for Iranian female students is alarming. Before conducting the study, we expected lower measures. Due to association of ecstasy use with other substances, designed programmes should be comprehensive, with different strategies and collaboration of

several sectors. The main strategies are to improve students' health literacy and their family, to limit supply and access, and to legislate appropriate regulatory laws.

Conclusions

The study concluded that stressful family environment, a smaller household size, unemployment of parents, spending nights with friends without the parent's permission and use of other substances was significantly related to Ecstasy use.

References

1. Leung KS, Ben Abdallah A, Copeland J, Cottler LB. Modifiable risk factors of ecstasy use: Risk perception, current dependence, perceived control, and depression. *Addict Behav* 2010; 35: 201-8.
2. Gouzoulis-Mayfrank E, Daumann J. Neurotoxicity of methylenedioxyamphetamines (MDMA; ecstasy) in humans: how strong is the evidence for persistent brain damage. *Addiction* 2006; 101: 348-61.
3. Amiri ZM, Shakib, AJ, Moosavi AK. Prevalence and risk factors of ecstasy use among college students in Astara, Islamic Republic of Iran. *East Mediterr Health J* 2009; 15: 1192-200.
4. Yacoubian Jr GS, Green MK, Peters RJ. Identifying the Prevalence and Correlates of Ecstasy and Other Club Drug (EOCD) Use Among High School Seniors. *J Ethn Subst Abuse* 2003; 2: 53-66.
5. Peters G, Kok G. A structured review of reasons for ecstasy use and related behaviours: Pointers for future research. *BMC Public Health* 2009; 9: 230.
6. Peters GJ, Kok G, Abraham CA. Social cognitive determinants of ecstasy use to target in evidence-based interventions: a meta-analytical review. *Addiction* 2008; 103: 109-18.
7. Hawks D, Scott K, Mc Bride M. Prevention of psychoactive substance use: a selected review of what works in the area of prevention. Geneva: World Health Organization, Department of Mental Health and Substance Dependence, 2002.
8. Hassanian Moghaddam H, Farnaghi F, Sarjami S, Zirak Zadeh H. The extent of awareness among medical students of Shaheed Beheshti University of Medical Sciences in the case of ecstasy. *J Legal Med Islamic Repub Iran* 2005; 39: 131-28.
9. Mazhari SH, Ziaediini H, Nakhai N, Rezafahimi F. Knowledge of general practitioners about ecstasy in Kerman. *Iranian J Psychiatr Clin Psychol (Andeeshah Va Raftar)* 2005; 42: 350-46.
10. Moasheri N, Miri M, Mashreghi Moghadam HR, Eslami MR. A Study of Birjand University students' knowledge and attitude towards taking Ecstasy pills. *J Birjand Univ Med Sc* 2007; 4: 55-60.
11. Khosravi Sh, Jahani F, Gazerani N, Eshrati B, Moghimi M. Determining knowledge and attitude of students in Arak University of medical sciences about Ecstasy based on Health Belief Model in 2006. *Rahavard Danesh, Journal of Arak University of Medical Sciences* 2007; 2: 15-21.
12. Yacoubian Jr GS, Peters RJ. Identifying the prevalence and correlates of Ecstasy use among high school seniors surveyed through 2002, monitoring the Future. *J Alcohol Drug Educ* 2005; 49: 55-71.
13. Strote J, Lee JE, Wechsler H. Increasing MDMA use among college students: results of a national survey. *J Adolesc Health* 2002; 30: 64-72.
14. Yen CF, Hsu SY, Cheng CP. Polysubstance use and its correlates in adolescent Ecstasy users in Taiwan. *Addict Behav* 2007; 32: 2286-91.
15. Amiri ZM, Rezaazadeh Sadeghi S, Khatibi Bane F. Ecstasy Use Among High School Students in Lahidjan (2005). *Iranian J Epidemiol* 2006; 2: 47-52.
16. Najafi K, Fekri F, Mohseni R, Zarrabi H, Nazifi F, Faghir Pour M, et al. Survey of the Prevalence of Substance Use Among High School Students in Guilan (2005-2006). *J Guilan Univ Med Sc Health Serv* 2007; 62: 67-79.
17. Zarrabi H, Najafi K, Shirazi M, Borna S, Sabahi E, Nazifi F. Prevalence of substance use among students of Guilan University of Medical Sciences (2005-2006). *J Qazvin Univ Med Sc Health Serv* 2009; 4: 69-74.
18. Yekkehfallah L, Momeni A, Torkashvand A, Jahani Hashemi H. Factors Associated with Ecstasy Use in Students of Qazvin University of Medical Sciences. *J Faculty Nursing Midwifery* 2009; 2: 73-80.
19. Shams Alizadeh N., Moghadam M., Mohsenpour B., Rostami Gooran N. Prevalence of substance abuse in medical students of Kurdistan

- University. Scientific Journal of Kurdistan University of Medical Sciences 2008; 2: 18-26.
20. Corapcioglu A, ogel K. Factors associated with Ecstasy use in Turkish students. 2004. *Addiction* 2004; 99: 67-76.
21. Chen WJ, Fu T, Ting T, Huang W, Tang G, Hsiao CK, et al. Use of ecstasy and other psychoactive substances among school-attending adolescents in Taiwan: National surveys 2004-2006. *BMC Public Health* 2009; 9: 27.
22. Wu P, Liu X, Fan B. Factors associated with initiation of ecstasy use among US adolescents: Findings from a national survey. *Drug Alcohol Depend* 2010; 106: 193-8.
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