

THE PREVALENCE AND PATTERN OF ILLICIT DRUG USE IN A MENTAL HEALTH HOSPITAL FROM TURKEY

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ABSTRACT

Substance abuse is a serious public health concern. This study aimed to examine the frequency of illicit drug use with respect to gender, age, years of substance use, and illicit psychoactive substance use pattern among persons who underwent urine drug screening in the Turkey a mental health hospital between 2015 and 2016. All of the urine samples were analyzed in the hospital's Center Clinical Laboratory. Results of the urine drug screenings were retrospectively obtained from the laboratory information system. The prevalence of substance abuse was as follows: amphetamine/ecstasy – 615 (9.2%), cannabis – 1659 (24.8%), opiates – 602 (9.0%), cocaine -54 (0.8%), and benzodiazepine – 527 (7.9%). Cannabis and opioid use were significantly higher in males than in females ($p < 0.001$, $p < 0.001$). There were 719 patients who used a combination of drugs. In almost all drugs, the prevalence of abuse is higher in the <20 and 20-29 age groups than other groups. In almost every age group, cannabis was the most commonly used illicit drug, followed by amphetamine/ecstasy, opiates, benzodiazepine, and cocaine. These data indicate a high prevalence of substance use, especially in the <20 and 20-29 age groups in eastern and southeast parts of Turkey.

Keywords: Illicit substance, drug abuse, urine drug screening, addiction, Turkey.

HIGHLIGHT

As in all over the world, the cannabis is most commonly used illicit psychoactive substance in the east and southeast parts of Turkey. In addition to, substance addiction is progressing towards the younger old. Especially, amphetamine/ecstasy and combine drug use are alarming problem in youth.

INTRODUCTION

Substance use is a serious public health concern (WHO, 2012; WHO, 2016). In 2010 worldwide, the annual prevalence of drug use among 15-64 years old was estimated to be 2.6-5.0% for cannabis, 0.3-1.2% for amphetamine-type stimulants (excluding "ecstasy"), 0.6-0.8% for opioids, 0.3-0.4% for cocaine, and 0.2-0.6% for "ecstasy"-group drugs (WHO, 2012). Cannabis is the

world's most commonly consumed one illicit psychoactive substance, and it is associated with an increased risk of many mental disorders (WHO, 2012; Karabulut *et al*, 2017).

Patterns of illicit psychoactive substance abuse vary across regions and countries (WHO, 2012; Kraus *et al*, 2003). Currently, there is insufficient reliable data on the prevalence of drug addiction in Turkey. However, it was reported that drug use is quite common in the Turkish population according to Turkish Monitoring Centre for Drugs and Drug Addiction in 2011 and European School Survey Project on Alcohol and Other Drugs (ESPAD) in 2003 (EMCDDA, 2017). It has been hypothesized that the increasing in Turkish population drug use may be due to the rapidly growing younger population, increased social communication (e.g., social media), globalization, and especially, Turkey's geographical location (Turkey is a transit zone between Asia and Europe) (EMCDDA, 2017; Telo *et al*, 2016).

The use of illicit substances is commonly detected by urine drug screening (UDS). UDSs are frequently ordered as a component of healthcare for psychiatric patients in mental health hospitals, especially those with a Probation Polyclinic of Alcohol and Drug Research, Treatment and Training Center (AMATEM). However, UDSs are also used in pre-employment screenings, for those on probation, and for judicial cases. Elazığ is an urbanized settlement in Eastern Turkey with a population of 578,789. Located in Elazığ is a Mental Health Hospital with 488 beds that serves 18 towns in the east and southeast of Turkey. This hospital is one of only a few centers in Turkey with AMATEM, which supplies social assistance and medical maintenance for drug addicts (Okan *et al*,

2016). The aim of study is to investigate the frequency of illicit drug with respect to gender, age, years of substance use and substance use patterns among all the persons who underwent UDS in the Elazığ Mental Health Hospital between 2015 and 2016.

METHODS

Initially, 15,055 UDS results were retrospectively obtained from the laboratory information system. After duplicate cases were identified and excluded by SSPS 20 (SPSS Inc., Chicago, IL, USA), there were 6,701 patients (mean age, 31 years, range 11-91 years) remaining (6,485 male, 216 female). Several patients had more than one positive UDS result; in these cases, we included only one positive UDS result, and excluded the rest. In 2015, all drug detection kits were analyzed using the Roche Hitachi Modular P800 (Diamond Diagnostics, Holliston, USA) via the Cloned Enzyme Donor Immunoassay (CEDIA, Fremont, USA) technique, and in 2016, all drug detection kits were analyzed using the Cobas integra 400 (Roche Diagnostics, Mannheim, Germany) via the Kinetic Interaction of Microparticles in Solution (KIMS, Roche Diagnostics, Mannheim, Germany). The amphetamine/ecstasy metabolites were analyzed by CEDIA in both 2015 and 2016.

The cut-off levels were as follows for both methods: cannabinoid – 50 ng/ml, amphetamine – 1000 ng/ml, benzodiazepine – 300 ng/ml, opiate – 300 ng/ml, and cocaine - 300 ng/ml. Patients who have not at least one of screening tests (cannabis, amphetamine, opiate, cocaine and benzodiazepine) were not included to this study. This study was approved by the Firat University Ethical Committee (number and date: 209803, 10.07.2017).

Drug Analysis

Urine samples were obtained according to regulations published by the Turkish Ministry of Health, Directorate General of Healthcare Services, Department of Laboratory (number and date: 2014/22, 07.07.2014). The urine samples were analyzed for amphetamine/ecstasy metabolites, cannabis, benzodiazepine, cocaine, and opioid metabolites in the hospital's Center Clinical Laboratory.

Statistical Analysis

Statistical analyses were performed using SPSS 20 (SPSS Inc., Chicago, IL, USA). The patients were grouped according to gender, age, and years of use using cross tabulations. The Chi-Square test or Fisher's exact test (when chi-square test assumptions did not hold due to low numbers) was used to compare differences among groups. The Kruskal-Wallis test was used to compare ordinal variables among substance users (substance use; yes/no) and age groups (6 groups). When a significant difference was detected among groups, the Mann-Whitney U test was used with a Bonferroni correction to adjust for multiple comparisons. Values of $P < 0.05$ were considered significant.

RESULTS

The results of all of the included UDSs are shown in Table 1 and Fig. 1. An analysis of polysubstance use is presented in Table 2. According to these findings, between 2015 and 2016, 6,701 patients (between 11-91 years age) underwent UDS (mean age: 31.93 ± 10.99 years age; 6,485 (96.8%) male, 216 (3.2%) female). Of the patients, 38.1% (n:2555) had a positive UDS for at least one illicit psychoactive substance (mean age: 29.4 ± 9.5 years). The mean age of the patients who had negative UDS was

33.49 ± 11.55 years. This difference was significant ($p < 0.001$). Of the included patients, 40.3% were in the 20-29 age group. The increase in the use of cannabis, amphetamines/ecstasy, and cocaine from 2015 to 2016 was not significant ($p = 0.666$, $p = 0.077$, $p = 0.055$, respectively). However, there was a significant increase in the use of benzodiazepine and opioids in 2016 ($p < 0.001$, $p = 0.019$, respectively).

The prevalence of substance use in the overall population was as follows: amphetamine/ecstasy - 9.2%, cannabis - 24.8%, opiates - 9.0%, cocaine - 0.8%, and benzodiazepine - 7.9%. Cannabis and opioid use was significantly higher in males than in females ($p < 0.001$, $p < 0.001$). Benzodiazepine use was significantly higher in females ($p < 0.001$). Of the 2,703 patients in the 20-29 age group, 1,227 had a positive UDS for at least one illicit psychoactive substance. Overall, 32.4% of cannabis users, 11.5% of amphetamine/ecstasy users, and 12.8% of opiate users were in the 20-29 age group (Table 1, Fig. 1). There was no significant difference among the <20 and 20-29 age groups regarding the use of cannabis, amphetamine/ecstasy, and opioids ($p = 0.081$, $p = 0.131$, $p = 0.028$ respectively). The frequency of cannabis and opioid use was significantly higher in the <20 and 20-29 age groups than in patients >30 years ($p < 0.001$, $p < 0.001$, respectively). Also, amphetamine/ecstasy use was significantly highest in subjects under age 20, while there was no significant difference in subjects above age 30 ($p < 0.001$). The >60 age group had the highest rate of benzodiazepine use, while the 40-49 age group had the highest rate of cocaine use ($p = 0.003$, $p = 0.07$, respectively).

As shown in Table 2, 10.7% of patients had polysubstance use (n=719, 708 male and 11 female). There was a significant increase in the frequency of polysubstance

use between 2015 and 2016 ($p=0.005$). However, there was no significant difference in polysubstance use between genders or between the <20 and 20-29 age groups. However, polysubstance use was significantly higher in the 20-29 age group than in those >30 ($p<0.001$), and it was significantly higher in the <20 group than in those >40 ($p<0.001$). There were 426 combined drug users who had both cannabis and amphetamine/ecstasy metabolites in their urine samples. The number of combined drug users who had only cannabis-opioid metabolites or amphetamine/ecstasy-opioid metabolites in their urine samples was 197 and 91, respectively. The most common polysubstance mixture was amphetamine/ecstasy and cannabis.

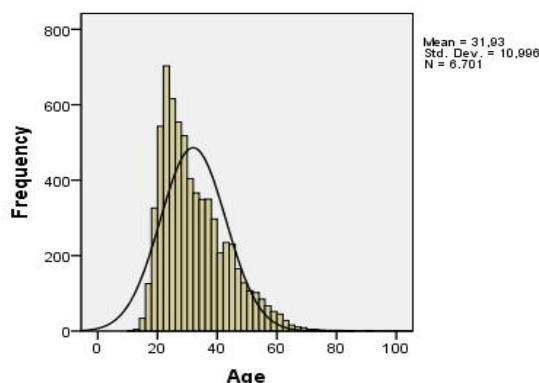


Fig. 1. The age distribution of patients who underwent UDS

DISCUSSION

In this study, the most commonly used illicit drug at almost every age was cannabis (marijuana, 24.8%), followed by amphetamine/ecstasy (9.2%), opiates (9.0%), benzodiazepine (7.9%), and cocaine (0.8%) (such as in Fig. 1). In 2016, when 2,718 children and adolescents for trends and gender differences of drug abuse were examined in an addiction treatment

center in İstanbul, Turkey; the prevalence of cannabis use was found 73.9% (Tanidir *et al.*, 2016). Similarly, another study conducted by the forensic medicine department of a university from Gaziantep, Turkey between 2007 and 2011 revealed that prevalence of cannabis use was 57.1% (Çöpoğlu *et al.*, 2016). The incidence of cannabis use was reported to be 12.4% in West and Central Africa (WHO, 2014). In North America, cannabis use increased from 14.9% in 2011 to 16.0% in 2012, while a study in Italy showed a constant decrease in cannabis abuse in high school students from 1999 to 2009 (WHO, 2014; Molinaro *et al.*, 2011).

In the present study, there was no significant rise in the prevalence of cannabis use between 2015 and 2016, and amphetamine/ecstasy was ranked as the second most commonly used drug after cannabis (9.2%). Consistent with results of the present study, in 2014, the World Drug Report also indicated that amphetamines were the second most commonly used illicit psychoactive substance worldwide (WHO, 2014). Further, in Turkey, the 2017 Country Drug Report from The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) reported that amphetamines and MDMA(3, 4-metilendioksietilamfetamin)/ecstasy were the second most commonly used illicit drugs after cannabis among those aged 15-64 in 2011 (EMCDDA, 2017). Another study examined 167 patients in the psychiatry department of Dicle Medicine Faculty, Diyarbakir, Turkey; for frequency of drug use, and detected that the second-most prevalently used illicit substances were methamphetamine (16%) and MDMA (18.6%) (Okan *et al.*, 2016). Therefore, based on the results of the current study and previous studies, amphetamine/ecstasy use has been quite common in the eastern and southeastern regions of Turkey.

Table 1. Frequency of drug use with respect to years, gender, and age groups in Elazig Mental Health Hospital

	Total number of subjects		Amphetamine/ecstasy			THC (Marijuana)			Opiates			Cocaine			Benzodiazepine		
	(n)	(%)	Positive (n)	Prevalence %	p	Positive (n)	Prevalence %	p	Positive (n)	Prevalence %	p	Positive (n)	Prevalence %	p	Positive (n)	Prevalence %	p
Overall	6701		615	9.2		1659	24.8		602	9		54	0.8		527	7.9	
Years																	
2015	3355	50.1	287	8.6	0.077	823	24.5	0.666	274	8.2	0.019	20	0.6	0.055	224	6.7	<0.001*
2016	3346	49.9	328	9.8		836	25.5		328	9.8		34	1		303	9.1	
Age groups																	
<20	723	10.8	98	13.6	<0.001*	210	29	<0.001*	71	9.8	<0.001*	2	0.3	0.07	43	5.9	0.005*
20-29	2703	40.3	311	11.5		877	32.4		347	12.8		19	0.7		192	7.1	
30-39	1766	26.4	158	8.9		400	22.7		100	5.7		21	1.2		143	8.1	
40-49	965	14.4	43	4.5		130	13.5		57	5.9		11	1.1		89	9.2	
50-59	413	6.2	4	1		34	8.2		19	4.6		1	0.2		43	10.4	
>60	131	2.0	1	0.8		8	6.1		8	6.1		0	0		17	13	
Gender																	
Male	6485	96.8	596	9.2	0.844	1637	25.2	<0.001*	600	9.3	<0.001*	53	0.8	0.567	496	7.6	<0.001*
Female	216	3.2	19	8.8		22	10.2		2	0.9		1	0.5		31	14.4	

*Significant difference at $p<0.05$

Table 2. Prevalence of polysubstance usage with respect to years, gender, and age groups in regional mental health hospital

	Total number of subject		Polysubstance usage		p-value
	(n)	(%)	Positive (n)	Prevalence %	
Overall	6701		719	10.7	
Years					
2015	3355	50.1	324	9.7	0.005*
2016	3346	49.9	395	11.8	
Age groups					
<20	723	10.8	94	13	<0.001*
20-29	2703	40.3	388	14.4	
30-39	1766	26.4	170	9.6	
40-49	965	14.4	53	5.5	
50-59	413	6.2	9	2.2	
>60	131	2.0	5	3.8	
Gender					
Male	6485	96.8	708	10.9	0.007*
Female	216	3.2	11	5.1	

*Significant difference at $p<0.05$

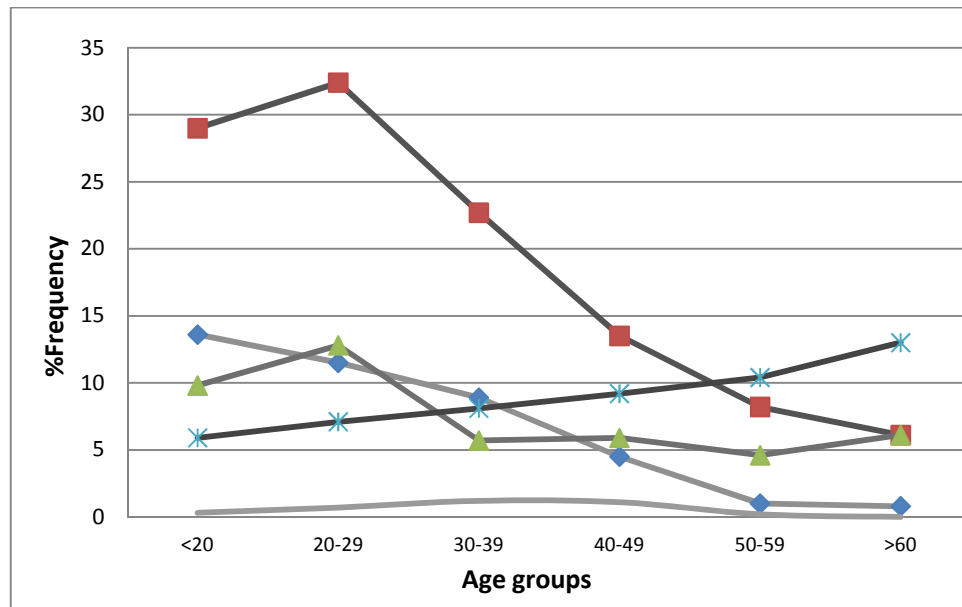


Fig. 2. Frequency of drug use with respect to years, gender, and age groups in Elazig Mental Health Hospital

In our current study, there were no significant differences in the prevalence of amphetamine/ecstasy use from 2015 to 2016. Annual Drug Testing Index of Quest Diagnostics Revealed that in the general U.S. workforce, 2015, Amphetamine positivity increased 44 percent since 2011 (Drug Testing index, 2016). Further, a study by The University of Michigan revealed that there was a significant rise in ecstasy abuse among high school students between 2010-2012; however, the annual prevalence did not change in 2013. (O'Malley *et al.*, 2014). In our current study, the incidence of amphetamine/ecstasy use was highest in the <20 age group. Another study from Turkey in 2014 indicated that the prevalence of ecstasy use among 20-year-old students peaked in both 1998 and 2001 (WHO, 2014). It has been reported that the onset of ecstasy use in teens may be related to the fact that teens are now exposed to a polydrug culture, in which the accessibility of

alternative drugs is easier, and the use of illicit substances like this is more socially acceptable (Reid *et al.*, 2007).

In our current study, the prevalence of opiate use was 9.0%. Another study from a forensic medicine unit in Gaziantep, Turkey including 412 cases determined that the prevalence of heroin use was 14.6% (WHO, 2014). In another study, which was based on treatment and police data, it was reported that high-risk opiate use in the cities of Ankara and Istanbul was 1.4 and 2.2 per 1000, respectively (Kraus *et al.*, 2017).

In addition, in the present study, we found a significant increase in the prevalence of opiate use between 2015 and 2016. Consistent with the findings of our current study, it was also reported from Turkey in 2016 that an increase in the prevalence of heroin use from 2011 to 2013 (Tanidir *et al.*, 2016). It has been

hypothesized that the increasing prevalence of opiate use in Turkey is due to the easy availability of opiates due to the transfer of drugs from Afghanistan to the Balkans through Turkey (Arslan *et al.*, 2015). However, a decline in the flow of heroin from Afghanistan to Europe through Iran and Turkey has been reported in recent years (WHO, 2014).

Additionally, it has been reported that the frequency of opiate use has been increasing globally over the last five years as an outcome of the increased abuse of prescription opioids; however, the prevalence of opiate use is unchanged throughout the world, and has been decreasing in some regions, such as Europe (WHO, 2014; Sharma *et al.*, 2016). In the current study, opiate use was more common in the <30 age groups. In addition, cocaine use was quite rare (0.8%) as compared to the use of other drugs. Similarly, a previous survey study reported the incidence of cocaine use among Turkish 10-th grade students as 1.37% in 1998, and as 2.45% in 2001 (Çorapçıoğlu *et al.*, 2004). Consistent with this finding, it was reported that cocaine is typically cultivated in the western countries, and is consumed in the Americas and Europe (WHO, 2014). Additionally, several studies have reported that cocaine is the second-most commonly used drug after cannabis in Europe (Mena *et al.*, 2013; Montarani *et al.*, 2014).

Overall, the drug addiction rate was more common in males in our current study. Likewise, several other studies have reported that men are at greater risk for addiction to almost all types of illicit drugs (Ahmadi *et al.*, 2011; Becker *et al.*, 2008; National Institute on Drug Abuse, 2017). In addition, results of our current study indicate that the use of both amphetamine/ecstasy and cannabis was the most common pattern

of polydrug use, followed by a mix of opiate and cannabis. Our current results also indicate that polysubstance usage was higher in the <20 and 20-29 age groups; however, it should be noted that all drug use, with the exception of benzodiazepine, was higher in the younger age groups (<20,20-29 age groups). Unfortunately, it has been reported that a majority of drug addicts consist of teenagers who are in the most vulnerable stages of development (Pumariega *et al.*, 2014; Centers for Disease Control and Prevention, 2016). Drug addiction in youth has been related to some serious outcomes, including violence, sexual promiscuity, sexually transmitted diseases (including HIV/AIDS and Hepatitis C), motor vehicle accidents, mortality from overdoses, school failure, depression, and suicidal thoughts (Pumariega *et al.*, 2014; Centers for Disease Control and Prevention, 2016).

These high frequencies of drug use, especially in the younger age groups, indicates that there is a crucial public health problem in the eastern and southeastern regions of Turkey (Centers for Disease Control and Prevention, 2016). Another study conducted among university students in the same region in 2010 reported that it is easy to obtain addictive drugs in the area (Deveci *et al.*, 2010). Our current study shows that the frequency of benzodiazepine use significantly increased between 2015-2016, especially in the older groups. This may be due to the large number of elderly psychiatric patients who are treated with benzodiazepine in hospitals.

Our current study has several limitations that should be taken into account. Confirmation tests (by GS-MS or LC-MS/MS) were not carried out in our laboratory, so it is impossible to determine if any of the results were false positive. In addition, the opiates and

amphetamine/ecstasy groups could not be identified as morphine, heroin, codeine, amphetamine, metamphetamine, MDA(metilendioksietilamfetamine), or MDEA. However, UDS is critical for determining substance use in patients who may be reliably self-report drug use. In our current study, the male-to-female ratio was not similar. However, this study highlighted that males are more prone to drug use in this region.

The individual characteristics and psychiatric diagnoses of the patients could not be evaluated due to the retrospective style of our study. Therefore, it is not known if the benzodiazepine use rates were due to treatment purposes or substance use disorders. In addition, these data were obtained from a mental health hospital located in the Elazig region. Therefore, these data are not representative of the prevalence of drug use in the entire region, especially due to the existence of the substance addicts who did not apply to this hospital.

CONCLUSION

In conclusion, this study provides an overview of the trends in illicit psychoactive substance use among 18 towns in the east and southeast parts of Turkey. Based on this data, the frequency of illicit psychoactive substance use is alarming, especially in the <20 and 20-29 age groups, and males have greater risk for drug addiction. Illicit psychoactive substance use, particularly of cannabis, was common among young patients. Amphetamine/ecstasy was the second most commonly used drug after cannabis.

Summaries including previous worldwide illicit psychoactive substance use data should be studied, and the substance

use data of individual countries also should be determined. If substance use in a particular region is better understood, better methods can be used to prevent substance use, especially in younger children.

AUTHORS' CONTRIBUTIONS

Conceived and designed the experiments: Zekiye Catak, Esra Kocdemir, and Suleyman Aydin(senior author). Analyzed the data: Zekiye Catak. Wrote the first draft of the manuscript: Zekiye Catak. Contributed to the writing of the manuscript: Zekiye Catak, Esra Kocdemir, Suleyman Aydin. Agree with manuscript results and conclusions: Zekiye Catak, Esra Kocdemir, Suleyman Aydin. Jointly developed the structure and arguments for the paper: Zekiye Catak, Esra Kocdemir, Suleyman Aydin. Made critical revisions and approved final version: Zekiye Catak, Esra Kocdemir, Suleyman Aydin. All authors reviewed and approved of the final manuscript.

ETHICAL APPROVAL

This study was approved by the Firat University Ethical Committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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