Mansoura Journal of Biology Vol. 35 (2) December, 2008.

DETECTION OF DRUGS OF ABUSE DURING DAILY PRACTICE IN EMERGENCY HOSPITAL, MANSOURA UNIVERSITY

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ABSTRACT

Drugs have played a major role in defining the sub cultural and counter cultural influences in society. The pervasive availability of psychotropic chemicals has profoundly altered the cultural environment and can causes a direct physiological and psychological change in the body. The study was conducted on patients (n=390) with acute poisoning by some drugs of abuse (Cannabis, benzodiazepines, barbiturates, opiates and ethyl alcohol). They were admitted to poison unit, emergency hospital, Mansoura University during the period from Nov 2001 to April 2005. In this study all patients were subjected for detection of drugs of abuse in urine by EMIT system and Gas Chromatography / Mass Spectrometry (GC/MS) for confirmation of the obtained results. The study showed that approximately 75% of patients were encountered in the age group 20–40 years. Also, the study revealed that the majority of patients were of low and moderate social classes. Cannabis was the first abused drug (37.69%) followed by opioids (27.18%). Female patients were likely to abuse benzodiazepines (57.14%). The study revealed that the percentages of positive urine samples by EMIT were; (27.18%, 14.87%, 11.54% 9.74% and 1.79), for cannabis, opiates, benzodiazepines, barbiturates and ethyl alcohol, respectively and by GC/MS were; 16.15%, 10.25%, 8.97% and 8.46% for cannabis, benzodiazepines, barbiturates and opiates, respectively, It is recommended that, immunoassay technique should be done on all urine samples of addicts and better to be confirmed using GC/MS. Also, continuous health education and prevention programs concerning health hazards of drug abuse among adolescents and young adults are highly indicated.

INTRODUCTION

Drug abuse is defined as the use of an illicit drug outside legitimate medical practice **[Schnoll (2000)]**. There are a wide variety of drugs and substances of abuse according to the world health organization inducing dependence include the following; opiates, sedatives hypnotics as barbiturates and benzodiazepines....etc, alcohol, amphetamines, cocaine, cannabis, hallucinogens as LSD....etc, volatile solvents/inhalants as glue...etc and others like tobacco, **[WHO (1990)]**. There are several factors that have been found to be associated with drug abuse. These factors are related to the drug concerned, the abuser's personality, habit, and the environment that favors the drug culture, **[WHO (1997) and Kosten (1997)]**. Human beings have looked for these drugs to make life more pleasure and to avoid or decrease pain, discomfort and frustration **[Pradhan (1997)]**.

Drug toxicity tests are most commonly performed on urine, since most drugs and their metabolites are excreted in urine in higher concentration than that in blood and because tests in urine are inexpensive and rapid. Immunoassay techniques such as the enzyme multiplied immunoassay technique (EMIT) are commonly used for drug screening techniques in part because they are rapid and require a small amount of samples. The first use of EMIT for the screening urine for drugs of abuse was reported by **[Rubenstein *et al.*, (1972)]**. Since that time, EMIT have seen ever increasing usage and toxicological laboratories offer an extensive service in the investigations of drugs of abuse and other poisons. The standard procedure for toxicological analysis requires the collection of both blood and urine samples **[Flanagan *et al.*, (1995)]**. It has not been possible to directly analyze whole blood by EMIT, due to the high background absorbance level **[Slightom (1978)]**. Gas Chromatography/Mass Spectrometry (GC/MS) is one of the most specific tools for drug testing with high sensitivity **[ELSohly (2003)]**. It is the reference method for confirmation of positive screening tests **[Lehrer (1990)]**.

The present work aimed to detect the types of drugs taken by overdose among patients from the laboratory point of view.

MATERIAL AND METHODS

Patients

This study was conducted on patients (n=390) of acute poisoning by some drugs of abuse who were admitted to poison unit at emergency hospital, Mansoura University during the period from the beginning of Nov 2001 to the end of April 2005.

Methods

In this study, data were collected as regards:

- Biosocial data: age, sex, social class, smoking habit and working status.
- Detection of drug abuse in urine samples by EMIT system.

A urine sample was taken from every patient immediately on admission and before initiation of treatment, the cut off concentrations of drugs of abuse tested was: opiates (300 ng/ml), barbiturates (200 ng/ml), benzodiazepines (200 ng/ml) and cannabinoids (50 ng/ml) in case of EMIT and (15 ng/ml) in case of GC/MS as well as ethyl alcohol. Positive results obtained were confirmed using GC/MS analysis (Hewllet Packard, 6890 series).

Statistical analysis:

The quantitative data were presented as mean ± standard deviation and the qualitative data were presented as number and percentage.

RESULTS

The study entailed 390 patients of acute poisoning by drugs of abuse admitted to poison unit at emergency hospital, Mansoura University during the period from Nov 2001 to April 2005.

Age and sex:

The age of patients ranged between 15–50 years with a mean age 25.72±7.05. The study showed that approximately half the patients were encountered in the age group 20<30 years (56.4%), followed by those aged 30<40 years (26.4%). Adolescents (15-20) years accounted for 10.77% of the patients. As regards sex, the present study revealed that males outnumbered females (92.8% and 7.2% respectively) with a sex ratio 12.9:1, Table (1).

Table (1): Patients (n=390) with drug abuse overdose by age and sex.

Age group	Male		Female		Total	
	No	%	No	%	No	%
15-	42	11.60	-	-	42	10.77
20-	205	56.63	15	53.57	220	56.41
30-	90	24.86	13	46.43	103	26.41
40-50	25	6.91	-	-	25	6.41
Total	**362**	100.0	**28**	100.0	**390**	100.0
Mean ± SD*	27.57±7.56		23.87±6.54		25.72±7.05	

*SD: Standard Deviation

Type of drug abuse overdose:

In the present study cannabis was the first abused drug (37.69 %), opiates was the second drug abused by patients (27.18%) followed by depressants (27.18%) whether of the benzodiazepine group (13.59%) or the barbiturate group (13.59%) and finally ethyl alcohol constituted (7.95%), Table (2).

Table (2): Patients (n=390) with drug abuse overdose by type of drug abuse and age.

Type of drug abuse overdose	Age group								Total	
	15-20		20-30		30-40		40-50			
	No	%	No	%	No	%	No	%	No	%
Cannabis	15	36	84	38.2	34	33	14	56.7	147	37.69
Opiates	11	24.9	65	29.6	25	23.7	5	21.3	106	27.18
Benzodiazepines	9	21.3	18	8.2	23	22.1	3	10	53	13.59
Barbiturates	5	12.9	36	16.5	12	11.6	-	-	53	13.59
Ethyl alcohol	2	4.9	17	7.5	9	9.6	3	12	31	7.95
Total	**42**	100	**220**	100	103	100	**25**	100	**390**	100

The study showed that female (n=28) were likely to abuse benzodiazepines (57.14%), the remaining abused; cannabis (17.86 %), barbiturates (17.86%) and opiates (7.14%), Table (3).

Table (3): Patients (n=390) with drug abuse overdose by type of drug abuse and sex.

Type of drug abuse overdose	Males		Females		Total	
	No	%	No	%	No	%
Cannabis	142	39.23	5	17.86	147	37.69
Opiates	104	28.73	2	7.14	106	27.18
Benzodiazepines	37	10.22	16	57.14	53	13.59
Barbiturates	48	13.26	5	17.86	53	13.59
Ethyl alcohol	31	8.56	-	-	31	7.95
Total	**362**	100	**28**	100	**390**	100

Type of drug abuse overdose, occupation and social class:

The study demonstrated that cannabis abusers were more likely to be students and unemployed (70.75% and 27.21% respectively) where about two thirds of them were of low social class. Benzodiazepines abusers were more likely to be unemployed and housewives (56.6% and 24.53% respectively). They were of moderate and low social class (58.49% and 35.85% respectively). The majority of barbiturates abusers were of low and moderate social class (60.38% and 32.07% respectively). Again they were more likely to be unemployed and students (54.72% and 39.62% respectively), Tables (4, 5).

Detection of drug abuse in urine samples:

In the present study urine samples were collected from patients. Each urine sample was screened for cannabinoids, opiates, benzodiazepines, barbiturates and ethyl alcohol. Immunoassay technique was used using EMIT system. The study revealed that the percentages of positive urine samples were; (27.18%, 14.87%, 11.54% 9.74% and 1.79), for cannabis, opiates, benzodiazepines, barbiturates and ethyl alcohol, respectively, Table (6).

Positive results obtained by EMIT system were confirmed by GC/MS which revealed that the percentages of cannabis, benzodiazepines, barbiturates and opiates were; 16.15%, 10.25%, 8.97% and 8.46% respectively, Table (7).

Table (4): Patients (n=390) with drug abuse overdose by type of drug abuse and occupation.

Type of drug abuse overdose	Unemployed		Students		Housewives		Total	
	No	%	No	%	No	%	No	%
Cannabis	104	70.75	40	27.21	3	2.04	147	100
Opiates	45	42.45	59	55.66	2	1.89	106	100
Benzodiazepines	30	56.6	10	18.87	13	24.53	53	100
Barbiturates	29	54.72	21	39.62	3	5.66	53	100
Ethyl alcohol	17	54.84	14	45.16	-	-	31	100
Total	**225**	57.7	**144**	36.92	**21**	5.38	**390**	100

Table (5): Patients (n=390) with drug abuse overdose by type of drug abuse and social class.

Type of drug abuse overdose	Social class						Total	
	Low		Moderate		High			
	No	%	No	%	No	%	No	%
Cannabis	75	51.02	42	28.57	30	20.41	147	100
Opiates	70	66.04	20	18.87	16	15.09	106	100
Benzodiazepines	19	35.85	31	58.49	3	5.66	53	100
Barbiturates	32	60.38	17	32.07	4	7.55	53	100
Ethyl alcohol	10	32.26	5	16.13	16	51.61	31	100
Total	**206**	52.82	**115**	29.49	**69**	17.69	**390**	100

Table (6): Percentages of positive urine samples of abuse drugs (n=390) By EMIT system.

Type of drug abuse overdose	Cut off ng/ml	No of urine samples	EMIT system Positive	
			No	%
Cannabis	50	147	106	27.18
Opiates	300	106	58	14.87
Benzodiazepines	200	53	45	11.54
Barbiturates	200	53	38	9.74
Ethyl alcohol	-	31	7	1.79
Total		**390**	**254**	

Table (7): Confirmatory tests by GC/MS for EMIT positive drugs (n=254)

Type of drug abuse overdose	Total No of urine samples	positive urine samples By EMIT	GC/MS Positive	
			No	%
Cannabis	147	106	63	16.15
Opiates	106	58	33	8.46
Benzodiazepines	53	45	40	10.25
Barbiturates	53	38	35	8.97
Ethyl alcohol	31	7	-	-
Total	**390**	**254**	**171**	

DISCUSSION

Most drugs of abuse are detectable by immunoassays, including amphetamine, opiate, barbiturate, benzodiazepine, cocaine, alcohol, P-C-P and cannabinoid. Once the urine sample has been identified as testing positive by a screening test, the specimen is retested with a more specific confirmatory test. Drug detection in urine depends to a great extent on the dose, duration of drug use and time sampling.

On the light of the results obtained through the study made on the patients, the mean patients' age was 25.72±7.05, Table (1). This is in accordance with **[Abdel-Magid & Salem (1996)]** who reported in their study that a lower mean age was 24.96 ± 9.47 years and **[El-Shafhy (1997)]** who recorded in his study that a higher mean age was 29.38 ± 8.73 years. The study showed that (82.8%) of the patients were encountered in the age group 20-40 years, Table (1). **Abdel-Magid *et al.*, (1997)** reported that (75%) of addicts were in the age group 20-40 years. This is the period of active life, work and responsibilities with more liability for exposure to stress and fear of failure, so they wrongly belief that drugs are considered the way to show their rejection of social standards and established ways of living **[Mcdonald (1987)]**. The adolescents (15-20) years accounted for (10.77 %) of the patients, **[Swadi (1999)]** explained the reasons of drug intake by adolescents to be due to sense of emptiness, emotional and rational difficulties associated with crises of adolescence as well as to establish their individually and independence. **Rexed *et al.*, (1984)** stated that drug abuse among adolescents and young adults impairs normal maturation and

development, as well impair judgment and has adverse effects on mental and physical functioning, in addition to potentiation of impulse and violent behavior. As regards sex, males outnumbered females (92.8 % and 7.2% respectively), Table (1). The great predominance of males over females was reported by **[Soliman *et al.*, (1991) and Kaminer (1999)]**. This predominance of males could be attributed to the fact that women experience more social disapproval of substance use and substance use is more stigmatized in women than men **[Brady & Randall (1999)]**.

The study revealed that most of patients were smokers; this could be attributed to the fact that cigarette smoking paved the way for substance abuse disorders. This consistent with study done by **[Aly *et al.*, (1988)]** they stated that cigarette smoking is an important risk factor associated with drug/substance abuse. This study demonstrated that only few of patients were married and the majority of them were singles, this explain that single adolescents are immature and emotionally unstable and may escape problems through drug abuse while marriage plays a role in maturation of personality with sense of responsibility for home and children. The study revealed that more than 50 % of patients started drug abuse in the age group 20 < 30 years and the remaining percentage in other age groups. **Yamamah (2003)** reported a mean age of starting abuse of 16.26 ± 1.11 years. In the present study cannabis was the first abused drug (37.69 %), Table (2). The same finding was reported by **[Abdel-Moneim *et al.*, (2002)]**. Patients with ethyl alcohol adulterated with methyl alcohol poisoning were more likely to be males in the age group 20-30 years. The study showed that female (n=28) were likely to abuse benzodiazepines (57.14%), Table (3). The study demonstrated that cannabis abusers were more likely to be students and unemployed (70.75% and 27.21%) respectively, where about two thirds of them were of low social class. The same finding was in agreement with the study of **[Abdel-Moneim *et al.*, (2002)]**. Benzodiazepines abusers were more likely to be unemployed and housewives (56.6% and 24.53%) respectively. They were of moderate and low social class (58.49% and 35.85%) respectively. The majority of barbiturates abusers were of low and moderate social class (60.38% and 32.07%) respectively. Again they were more likely to be unemployed and students (54.72% and 39.62%) respectively. This could be attributed to the low price and easy availability of these drugs as they are used in the treatment of other disorders. On the other hand, (54.84%) of ethyl alcohol adulterated with methyl alcohol intoxicated patients were unemployed, where (51.61%) of

them were of high social class, Tables (4, 5). The study revealed that the percentages of positive urine samples by EMIT were; (27.18%, 14.87%, 11.54%, 9.74% and 1.79), for cannabis, opiates, benzodiazepines, barbiturates and ethyl alcohol, respectively, Table (6). Positive results obtained by EMIT system were confirmed by GC/MS which revealed that the percentages of cannabis, benzodiazepines, barbiturates and opiates were; 16.15%, 10.25%, 8.97% and 8.46% respectively, Table (7).

In negative samples, detection of lower concentrations leads to problem in the toxicological interpretation of the result, because passive smoking must be considered. It must be remembered that negative results of other drugs obtained by GC/MS doesn't mean that those drugs weren't ingested, only they weren't detected due to their concentrations were below the sensitivity range of the assay used or the sampling time wasn't optimal. Thus GC/ MS analysis help to solve the false positive results obtained by EMIT.

CONCLUSION

The data of the present work revealed that some drugs of abuse are existing in our life, so adolescents and young adults are really in danger. Presence of these drugs has a serious effect on man health (mental and physical functioning), consequently his environment. The analytical and distribution data obtained in this work will be useful for the toxicologists working in this field.

RECOMMENDATIONS

From the previous study, the following recommendations are suggests:

1- Continuous health education and prevention programs concerning health hazards of drug abuse among adolescents and young adults and the importance of seeking early treatment.

2- Development of school and university programs designed to assist adolescents and young adults in developing problem solving and coping with stresses, conflicts and difficulties, instead of escaping to drugs abuse.

3- A screening immunoassay technique should be done on urine samples periodically at least for students and better to be confirmed using gas chromatography/ mass spectrometry as the later is more specific for drug testing with high sensitivity.

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الكشف عن عقاقير الإدمان أثناء العمل اليومى بمستشفى الطوارئ – جامعة المنصورة

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الهدف من هذا البحث هو دراسة معملية لانماط التسمم الحاد ببعض عقاقير الادمان نتيجة تناول المرضي جرعة زائدة. وقد اشتملت هذه الدراسة على ثلاث مائة وتسعون مريضا تم ادخالهم وحدة السموم بمستشفى الطوارئ- جامعة المنصورة نتيجة تناولهم جرعة زائدة من بعض عقاقير الادمان فى الفترة من بداية نوفمبر ٢٠٠١ وحتى نهاية أبريل ٢٠٠٥. وقد تم اخذ التاريخ المرضي للحالات وفحصهم معمليا وذلك بالكشف عن مخلفات الأدوية فى البول بإستخدام نظام تقنية المناعة الإنزيمية وجهاز كروماتوجرافيا الغازمع مقياس طيف الكتلة لتأكيد النتائج. وقد اسفرت الدراسة عن النتائج الاتية :معظم المرضى (٨٢.٨%) كانوا فى المرحلة العمرية ٢٠-٤٠ سنة اما نسبة المراهقين فكانت ١٠.٧٧% وكانت نسبة الذكورالى الاناث12.9 :١. كان 57.7 % من المرضى من العاطلين و52.82 % من ذوى المستوى المنخفض. اثبت البحث ان مادة الحشيش ٣٧.٦٩% كانت الاكثر شيوعا ثم مادة الأفيون ٢٧.١٨ % وكان عقار البنزوديازبين الاكثر شيوعا بين الاناث٥٧.١٤ %. وقد اظهرت الدراسة أن عينات البول الايجابية بإستحدام نظام تقنية المناعة الإنزيمية كانت على النحو التالى:عقارالحشيش27.18%، الافيون14.87%، البنزوديازبين 11.54%، الباربتيورات 9.74% وبجهازكروماتوجرافيا الغازمع مقياس طيف الكتلة اسفرت الدراسة عن النتائج الاتية : عقارالحشيش16.15%، البنزوديازبين 10.25% ، الباربتيورات 8.97% والافيون8.46%.

ويوصي البحث بالاتى:

– عمل برامج توعية مستمرة عن المخاطر الصحية للإدمان للمراهقين والشباب وأهمية اللجوء للعلاج المبكر.

– اجراء مسح دورى وخاصة لطلبة المدارس والجامعات للكشف عن أدوية ومواد الإدمان فى البول لإمكانية علاج الحالات وهى فى بدايتها باستخدام طريقة المناعة الإنزيمية ويفضل إستخدام جهازكروماتوجرافيا الغازمع مقياس طيف الكتلة للتأكد من وجود هذه العقاقيرأوأيضها.