

## ORIGINAL ARTICLE

# Pattern of Drugs of Abuse Identified in Chemical Samples

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## ABSTRACT

**Objective:** To determine the pattern of drugs of abuse in urine and blood samples processed at referral laboratory in Pakistan so that information on the type of drugs used can be identified and used for ready reference for future strategy.

**Study Design:** Observational study.

**Place and Duration of Study:** Clinical Laboratory of The Aga Khan University Hospital, Karachi, from July 2006 to March 2008.

**Methodology:** Retrospective review of records were done for the common drugs that are used for screening at the Clinical Laboratory include alcohol, amphetamine, barbiturates, benzodiazepines, cannabinoids, cocaine and opiates. Alcohol was tested in blood and others were identified using urine. Percentages of tests screened positive and negative for individual drugs were computed by using SPSS 16.0. The ratio between male and female users was also established.

**Results:** A total of 17,714 tests were performed for drugs. The mean age of the patients whose samples were processed was  $30 \pm 14.84$  years. Majority used benzodiazepines 520/1317 (39.5%) among the samples tested for drug of abuse, followed by cannabinoids 423/5450 (7.8%), alcohol 75/1302 (5.8%), barbiturates 32/1148 (2.8%), opiates 137/5640 (2.4%), cocaine 5/1655 (0.3%) and amphetamine 3/1202 (0.2%). In all, males 15411 (87%) were tested more frequently as compared to females 2303 (13%).

**Conclusion:** Males were more frequently tested for drug abuse; however, drug abuse is increasingly seen among females. Benzodiazepines are the most frequently used. The same pattern of drugs abuse existed in different gender and age group. There is a need to explore the pattern and type of drug abuse on national scale.

**Key words:** *Drugs of abuse. Screening. Database. Chemical samples.*

## INTRODUCTION

The legitimacy and social acceptance of any drug depends on its use and its effects. For example, use of marijuana for pleasure is illegal and considered socially unacceptable by many people, but medical use of marijuana to relieve nausea in a person with advanced cancer is an accepted medical practice.<sup>1</sup> In modern medical practice substance abuse is defined as a maladaptive pattern of substance use, leading to clinically significant impairment or distress, wherein the person may also suffer from tolerance and withdrawal.<sup>2</sup> It is a broad terminology to include drug abuse and other objects.

Testing for drugs of abuse can be performed on urine, blood, breath, hair, saliva, and sweat. Urine testing is most widely used because it is noninvasive, simple to obtain, and yields a detectable concentration of most drugs. A positive urine toxicology screen is an indication of recent drug use (past few days) but may not provide evidence of earlier use. The best evidence for long-term drug use is the combination of a good history and screening for particular drug in a given sample. The

drugs most commonly screened are alcohol, amphetamines cocaine, marijuana, and opiates. In addition to these, barbiturates and benzodiazepines are also screened as they are misused or abused heavily.

Approximately 208 million people or 4.9% of the world's population aged 15-64 use illicit drugs at least once in the last 12 months.<sup>3</sup> Drug abuse is widespread in Pakistan which is indicated by the fact that almost 5% of the population is using one or other type of narcotic agent in Pakistan.<sup>4,5</sup> In different countries over prescription and non-medical abuse of psychoactive drugs are also major issues of consideration.<sup>6-8</sup> These drugs are also used increasingly for recreational purposes. Well directed efforts are required to increase awareness about its demerits and also the need to understand pattern of drug usage in our population.

This study was conducted to determine the pattern of drugs of abuse in urine and blood sample.

## METHODOLOGY

A retrospective review of all tests requested for screening drugs of abuse at the referral laboratory in Karachi, from July 2006 to March 2008 were included in the study. Screening of drugs of abuse at laboratory included alcohol, amphetamine, barbiturates, benzodiazepines, cannabinoids, cocaine and opiates.

It was not known whether drugs were used on doctor's prescription or abused by subject's own wish. However,

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all the above drugs had potential of abuse and hence, the reason of using the word 'abuse' in the text.

Testing for amphetamine, barbiturates, benzodiazepines, cannabinoids, cocaine and opiates were performed on random urine sample. Analysis of barbiturates, benzodiazepines and cocaine were performed by Enzyme Immunoassay on Beckman Synchron Cx 7 while amphetamine, cannabinoids and opiates were tested by fluorescent polarization immunoassay on Axysm. Testing for alcohol was performed in plasma by an enzymatic method on Beckman Synchron Cx 7.

The data were analyzed using Statistical Package for Social Sciences (SPSS) 16.0. Percentages of tests, screened positive and negative for individual drugs were computed. The ratio between male and female users was also established. Mean ± standard deviation were computed for quantitative variables and number (percentage) for qualitative variables.

### RESULTS

Total of 17,714 tests were performed for 7 drugs. In the order of decreasing frequency, the most requested tests were opiates, 5640 (31.8%) followed by cannabinoids, 5450 (30.8%), cocaine 1655 (9.3%), benzodiazepines 1317 (7.4%), alcohol 1302 (7.3%), amphetamine 1202 (6.8%) and barbiturates 1148 (6.5%). The mean age of the patients whose samples were processed was 30±14.84 years. In all, males 15411 (87%) were tested more frequently as compared to females 2303 (13%, Table I).

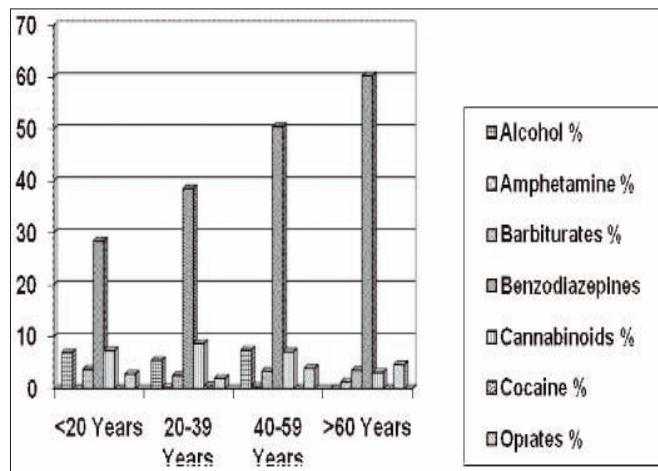
**Table I:** Pattern 'drug of abuse'-gender wise distribution.

Test name	Total abusers Positive/Total (%)	Male abusers Positive/Total (%)	Female abusers Positive/Total (%)
Alcohol	75/1302 (5.8)	71/1236 (5.8)	4/66 (6.1)
Amphetamine	3/1202 (0.2)	2/977 (0.2)	1/225 (0.4)
Barbiturates	32/1148 (2.8)	19/901 (2.1)	13/247 (5.5)
Benzodiazepines	520/1317 (39.5)	344/1020 (33.7)	176/297 (59.3)
Cannabinoids	423/5450 (7.8)	411/5099 (8.1)	12/351 (3.5)
Cocaine	5/1655 (0.3)	5/1364 (0.4)	0/291 (0.0)
Opiates	137/5640 (2.4)	116/4814 (2.4)	21/826 (2.5)
All drugs	1195/17714 (6.74)	968/15411 (6.28)	227/2303 (9.85)

The drug used the most was benzodiazepines (39.5%), among the samples tested for drug of abuse, followed by cannabinoids (7.8%) and alcohol (5.8%). Barbiturates and opiates were found to be positive 2.8% and 2.4% cases respectively followed by cocaine (0.3%) and amphetamine (0.2%).

Amongst those who were tested positive for benzodiazepine, 59.3% were females and 33.7% were males. The other drugs used by males were ranked as follows; cannabinoids (8.1%), alcohol (5.8%), opiates (2.4%) and barbiturates (2.1%). In females, alcohol was the second most common substance (6.1%), followed by barbiturates (5.5%), cannabinoids (3.5%) and opiates (2.5%). Amphetamine and cocaine were found to be least positive drugs used by both gender.

Analysis of data by stratification in different age groups shows that benzodiazepines is the most commonly used drug; it was found positive in 60.2% in > 60 years, 50.4% in 40-59 years, 38.5% in 20-39 years and 28.5% in < 20 years. Cannabinoids was used more frequently in younger age group 20-39 years (8.7%) as compared to alcohol which was found to be more popular among age group 40-59 years (7.4%). Barbiturates usage was found to be equal in all age groups. Opiates use was the second most common after the benzodiazepines in people > 60 years of age. Amphetamine and cocaine were the least popular drugs among all age groups (Figure 1).



**Figure 1:** Pattern 'drug of abuse' by age groups.

### DISCUSSION

There has been a rise in the consumption of psychoactive drugs mainly benzodiazepines and barbiturates in many parts of the world.<sup>9,10</sup> Due to the possible physical and behavioral consequences, as well as negative economical and social impact, from the consumption of psychoactive drugs, health providers have a responsibility to ensure the appropriate use of the prescribed medication. Over prescription and abuse of psychoactive drugs is commonly seen in different countries.<sup>7,11</sup> In Pakistan, all medicines, including psychoactive drugs, are easily available without a prescription from the doctor. This can incur health and social hazards at a significant level. For example, benzodiazepine abuse has been reported in 84% of cases of self-poisoning in Pakistan.<sup>12</sup> Recently 41% of benzodiazepine drug abuse has been reported from Pakistan.<sup>13</sup> In this study, it was found benzodiazepines as the top most drug detected in samples processed with approximately 40% of patients tested. Benzodiazepines use increases with advancing age as it is found in this study with 60% of total positive in age group > 60 years. Whereas in case of barbiturates use it's tends to be same in all age groups around 3% total positivity. This may be due to psychosocial problems, which are common in this age

group. Abuse of benzodiazepines and other anxiolytics<sup>14</sup> found to be more in women as compared to men<sup>15</sup> probably due to higher prevalence of depression and anxiety disorders as well as psychological distress. This is also reflected in this study data that females had higher percentage of positivity for benzodiazepines compared to males (59.3% vs. 33.7%).

According to the 5th National Survey conducted in 1993 by the Pakistan Narcotic Control Board, there were nearly 3 million drug dependents in Pakistan.<sup>5</sup> Cannabis was found as the most frequently used drug of abuse in a hospital based study at Faisalabad.<sup>16</sup> Younger age groups use cannabinoids as it is easily available in the form of cigarette, relatively cheap and less risky as compared to others.

According to WHO study, alcohol accounts for 3.5% of the drug abuse globally. Alcohol use is the leading cause of disability among men in the developed countries and the fourth leading cause of disability in developing countries.<sup>17</sup> In this study, alcohol was found to be at the third place among the drugs tested with 5.8% of total positive in the population presented to the laboratory. In a report of WHO, gender difference is noted in the consumption of alcohol; found to be 17% to 1% for male versus female.<sup>18</sup> Hao *et al.*<sup>19</sup> also found that the males use alcohol more than females, which is not found to be true in this study data. The present data shows alcohol use to be similar in females (6.1%) and males (5.8%). In the international literature, changes in women's education, employment, social status and economic independence have been implicated in the convergence of male and female drinking patterns. Neve *et al.*<sup>20</sup> held that as women gradually acquire equal rights in work and social situations, this might also be reflected in an inclination to drink in equal amounts and in the same manner as men. While this may not explain changes in drinking patterns of non-working females, it does reflect a general change in societal attitude to women's drinking.

A total of 0.4% of global population age 15-64 years consume opiates.<sup>3</sup> The 2006 National Assessment Report on Problem Drug Use in Pakistan estimates that there are 628,000 opiate users which are around 0.4% of total population of Pakistan.<sup>21</sup> The report estimated the average age of opiate users at 35.5 years. In this 2.4% opiate users of the total test requested and mean age was 30 years.

Cocaine and amphetamines are stimulant type drugs. In general, they cause euphoric emotions. 0.4% and 0.6% of global population age 15-64 years have used cocaine and amphetamine.<sup>3</sup> Increase in the use of these drugs is also seen in Pakistan especially in urban population.<sup>21</sup> It was not found to be that much common of the drugs in the population presented to our laboratory whereby 0.3% and 0.2% cases for cocaine and amphetamine respectively were found positive.

The numbers from available data clarify the pattern of drug abuse. Total abusers were 6.74%. Females (9.85%) were more drug abusers than males (6.28%). It is recommended that health awareness program regarding drug abuse should be organized in government as well as in private sector. One should not forget that effective intervention and prevention of drug related problems require a reliable database, upon which appropriate strategies may be considered and selectively implemented. One important issue which deals with the analytical aspect of drug measurement is quantification of the identified drug by screening. Establishment of a relationship between drug concentrations, type of drug and effect require accurate, precise and reliable methodologies. Selecting an appropriate analytical method is not easy and the choice depends on the availability of staff, expertise and equipment, the nature of the service to be provided and the range of drugs to be assayed which requires knowledge of the natural history of type of drug used in that population. Most of the laboratories are turning to liquid chromatographic-tandem-Mass Spectrometer because of the superior accuracy of results and their inter-laboratory comparability. The capital cost of the equipment may be considerable, and the skilled labour, required to develop and operate such systems, has important revenue consequences. Updated information is required to understand prevailing conditions of the individual drug abuser and the surrounding socioeconomic environment. We further need to explore the drug abuse data on national scale.

## CONCLUSION

Males were more frequently tested for drug abuse; however, drug abuse is increasingly seen among females. Benzodiazepines are the most frequently used. The same pattern of drugs abuse existed in different gender and age group. There is a need to explore the pattern and type of drug abuse on national scale.

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