PATTERN OF URINE TOXICOLOGY SCREENING IN A LAGOS PSYCHIATRIC HOSPITAL

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ABSTRACT

Toxicology screening has clinical and forensic applications in evaluating severe or life-threatening symptoms in patients presenting with signs and symptoms suggestive of intoxication or overdose. In both acute psychiatric and medical settings, urine toxicology has been found helpful in detection of substances of abuse. The aim of this study was to determine the pattern of substance use as detected by urine toxicology screening amongst patients at a psychiatric facility in Lagos Nigeria. A Total of 1555 subjects made up of males (1480) and females (75) were screened using the one step multi-6 drug test panel immunoassay for qualitative detection of Methadone, Methamphetamine, Benzodiazepine, Cocaine, Morphine and Tetrahydrocannabinol. 927 (59.6%) subjects were positive with one or more drugs passing the concentration cut off. Tetrahydrocannabinol (42.3%) and Benzodiazepine (49%) were found to be predominant in the population studied. This study shows the most common psychoactive substance used in this environment is cannabis and also, the significant agreement between clinical diagnosis and urine toxicology screening.

KEY WORDS: Urine screening, Toxicology, Substance use, clinical diagnosis.

INTRODUCTION

Drug testing can be done using a variety of samples such as hair, saliva and sweat. Blood samples are very useful but the half-life of many chemical compounds in the blood is short. As such, many toxicology laboratories have a preference for urine samples. Apart from the fact that large volumes are available for testing, many drugs and /or their metabo- lites remain detectable for a longer period in urine. For instance, tetrahydrocannabinol re- mains positive in urine for several weeks, es- pecially in chronic users (Regional Laboratory for Toxicology, 2007).

Toxicology screening has clinical and fo- rensic applications. Clinically, they are used in confirming diagnosis in patients present- ing with a history or symptoms sugges- tive of intoxication or overdose. Substances

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tested for include opiates, sedatives, cocaine, amphetamines, cannabinoids and alcohol. Competitive immunoassays are common analytical approach to urine drug screening. In these, specific antibodies bind to targeted chemical atoms and functional groups. Confirmation analysis is done with chromatographic procedures e.g. thin-layer, liquid and gas chromatography. Both the parent drug and the metabolites which can be useful in distinguishing recent from residual use are detectable in urine depending on the drug in question (Fraser *et al.,* 2002). In urine toxicology screening, metabolites can be tested in substances of abuse such as benzodiazepine, oxazepam and nor diazepam are primary metabolites detected in testing of this drug (Green, 1995).

In cannabinoids testing 11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid (9-carboxy-THC) and other metabolites of THC are detectable. Cocaine ingestion can be detected by presence of the metabolite benzoylecgonine in urine. Metabolite of morphine such as 3-morphine-glucuronide and 6-morphine are detectable in urine. In case of methadone, parent drug is detected because one third of the drug is passed out in urine without being metabolized (Moeller *et al*., 2008).

In both acute psychiatric and medical settings, urine toxicology has been found helpful in determining prevalence and influence of drugs of abuse (Mordal *et al.,* (2008). With respect to illicit drug use, Walsh *et al.* (2005) found that among drivers admitted to a level – 1 trauma centre, 65.7% tested positive for either commonly abused drugs or alcohol. Toxicology is generally more reliable than self-report in substance users. Vitale et al (2006) recorded 30% illicit drug use from urine toxicology as opposed to 9% self-report. Cocaine and cannabis were most prevalent, with greater prevalence of cocaine in the USA than in other countries where cannabis was most common. Illicit use was more common in men 20 – 40 years and strongly associated with violence-related injuries. Urine toxicology, together with self-report, continued group attendance, and improved social functioning has been found useful in monitoring response

in patients (Nigam *et al.,* 1992), comparing favourably with case manager ratings among outpatients with dual diagnosis (Ries *et al.*, 2005).

In our environment, few studies have highlighted the role of urine toxicology screening in the management of patients presenting with a putative history of substance use. It is also important to investigate the proportion of patients referred for toxicology screening who actually turn out to be positive for substances of abuse. The pattern of substance use is also important as this has implications for clinical intervention.

Aims

The aim of the study was to investigate the pattern of substance use as reflected by urine toxicology. Specific objectives included finding the proportion of patients referred for toxicology for putative substance use who actually test positive, and determining the proportion of the common substances screened for.

METHOD

Study design/sample collection.

This is a cross-sectional study in which fresh urine samples were collected from 1555 psychiatric patients sent to the laboratory on doctors' request for urine toxicology screening at the Psychiatric Hospital Yaba, Lagos, Nigeria between October 2006 and September 2009. The referrals were usually occasioned either by self-reported or proxy-reported substance use. A number of cases were also referred when the pattern of presentation of the patient suggested that substance use was a possible differential diagnosis. Ethical approval was obtained from the hospital ethical committee prior to commencement of the study.

Laboratory procedure

The test device is a one- step multi-6 Drug Test panel (Accubiotech), which is an immunoassay for the qualitative detection of methadone, methamphetamine, morphine, benzodiazepine, cocaine and tetrahydrocannabinoid.

These substances are detected in urine that passes the concentration cut-off. The protocol was followed according to the manufacturer manual. The test device was removed from the protective pouch and brought to room temperature. The urine sample produced by the patients was then poured inside the test container. The strip which contained the specific drug to be tested was then immersed into the urine for 10 seconds and the device was then placed on flat surface for about three to eight minutes, after which the results were interpreted. A drug strip with band in the control and test area is negative meaning no drug intoxication while drug strip with one band in the control area only was positive meaning presence of drug intoxication. Test results were only valid within ten minutes of processing. Results after ten minutes were not readable.

RESULTS

Out of the 1555 patients tested, 1480 (95.2%) were male and 75 (4.8%) were female patients. From the total number of patients tested, 927(59.6%) were positive with one or more substances. Altogether 1199 urine samples were positive for substance use and were detected from these patients (Table 3), while 628 patients were negative with no substance intoxication. Patients tested were between ages 15 to 65years, with mean age 28.7years [SD 8.4]. Tables 1 and 2 represent the age and sex distribution of the patients tested, while table 4 shows the pattern of substances screened for with respect to age.

Table 1: Relationship between sex and drug screen

Sex	Number of patients	Positive	Negative
Male	1480	878	602
Female	75	49	26
Total	1555	927	628

Positive= drug intoxication, Negative= No drug intoxication

Table 2: Age and sex distribution of patients

Age group (years)	Number of patients	Male	Female
<20	115	113	2
21-35	841	822	19
36-50	161	148	13
51-65	22	20	2
Unknown Age	416	377	39
Total	1555	1480	75

Table 3: Pattern of substance in urine samples

Drug/Substance	Number of substance positive in urine	Percentage of substance positive in urine
Methamphetamine	12	1.0%
Benzodiazepine	588	49.0%
Cocaine	44	3.7%
Morphine	45	3.75%
Methadone	3	0.25%
Tetrahydrocannabinol	507	42.3%
Total number	1199	100%

Table 4: Distribution of drug use in urine samples among males and females

Drug	Number of patients	Male	Female
Methamphethamine	12	10 (0.8%)	0 2(0.2%)
Benzodiazepine	588	554 (46.2%)	34 (2.8%)
Cocaine	44	39 (3.3%)	05 (0.4%)
Morphine	45	41 (3.4%)	04 (0.3%)
Methadone	3	3 (0.3%)	---
Tetrahydrocannabinoids	507	492 (41.0%)	15 (1.3%)
Total	1199	1139 (95%)	60 (5.0%)

Of the total sample, a sub-sample was selected randomly for comparison with clinical diagnosis from the patient health records file. This included a total of 129 predominantly male (96.8%) patients. Their diagnoses, following the International Classification of Diseases (ICD-10), were mainly mental and behavioural disorder following psychoactive substance use (83.3%), while 14.3% had a diagnosis of schizophrenia. The remaining 2.4% comprised of mood, personality and anxiety disorders.

Level of association between clinical diagnosis and urine toxicology findings was determined using Pearson chi squares. A clinical diagnosis of Mental and Behavioural Disorder was significantly associated with a positive urine toxicology (p = 0.014). History of cannabinoid use was also associated with positive tetrahydrocannabinol urine toxicology finding (p = 0.032).

DISCUSSION

The study reveals the pattern of psychoactive substance use among patients referred for possible use in a psychiatric hospital in Lagos, Nigeria. Majority of subjects referred for urine toxicology were males. In this setting, use of various psychoactive substances tends to be associated more with the male gender. This may be a reflection of prevailing societal values, considering that substances like alcoholic beverages are generally considered acceptable for men while drinking alcohol among women tends to be frowned at especially in religious settings. The number of women who drink alcohol is however increasing, a reflection of the adoption of liberal values among the younger generation. It is noteworthy that a proportion of the women screened were positive for various substances including cannabis, cocaine and opiates.

The study showed that patients between ages of 21 - 35 years were more often found testing positive to one or more of the substance tested. This is understandable considering that this age bracket is made up mostly of single students and young workers who have financial access, and are strongly influenced by peers. The party culture which encourages substance use in groups finds many adherents among this age bracket. This is also the backbone of the country's workforce, with major implications for productivity.

Cannabis was found to be the most commonly use out of the substances screened for, followed by benzodiazepines, cocaine and opiates. Studies in other parts of the world such as the United States also showed cannabis to be the most abused substance (Nordstrom and Levin, 2007). The relatively small proportion of cocaine and opioid use suggests a change in trend from twenty years ago, when these substances were quite common (Ladapo, 1987). This may be a reflection of the deterioration in the country's economic status, the high prevalence of cannabis in this study possibly being because of ease of accessibility of the substance as it is widely grown in most parts of the country.

Most patients presenting with agitation or aggressiveness often in the context of acute psychosis are sedated with benzodiazepines, which may account for the large proportion who tested positive for these substances.

The study showed a good association between a diagnosis of substance use disorder and positive urine toxicology findings. Specifically, a diagnosis of cannabis related illness correlated well with positive finding of tetrahydrocannabinol in the urine. It should however be noted that urine toxicology was done for patients who were putative substance users: it was not a routine investigation for all patients. The duration since last use was not entered into analysis. No attempt was also made to compare patient's self-report with urine toxicology finding.

Conclusion
This study underscores the importance of urine toxicology screening in diagnosis of substances of abuse. The study found cannabis to be the most commonly used psychoactive substance in a clinic population.

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