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Measuring Substance Use

Estimating the Prevalence of Opiates Use by Unlinked Anonymous Urine Drug Testing: A Pilot Study in Iran

NOUZAR NAKHAEE,[1] KOUROS DIVSALAR,[1]
MANZUME SHAMSI MEIMANDI,[2] AND SHAHRIAR DABIRI[3]

[1]Kerman Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran
[2]Department of Physiology, Afzalipour Medical School, Kerman University of Medical Sciences, Kerman, Iran
[3]Department of Pathology, Afzalipour Medical School, Kerman University of Medical Sciences, Kerman, Iran

In order to estimate the prevalence of opiate use and to cross-validate the current program of urine testing as the sole screening and detection method for finding opiate abusers in Iran, urine samples of 1120 men with a mean (±SD) age of 46.6 (±16.5) years referring to a large clinical lab for diagnostic and screening purposes in Kerman (the center of the biggest province in Iran) were assayed by anonymous, unlinked testing for opioid metabolites during 2004. The specimens were analyzed by an immunoassay screening test and a thin-layer chromatography (TLC) confirmation test. The initial screening test was positive in 28.8% (95% CI: 26.1–31.5) of cases (322 individuals), half of whom were confirmed by TLC. As a whole, 14.4% (95% CI: 12.4–16.6) of urine samples were positive for opioid metabolites. Although individuals referring to clinical labs do not exactly represent the general population, according to relatively high figures achieved in this study we suggest revising the urine test as the sole screening and detection method for finding Iranians who use opiates for non-medical reasons.. Research is needed to further pursue these findings.*

Keywords Opioid-related disorders; epidemiology; "substance abuse" detection; urine; male; Iran

Introduction

Opium use has existed in Iran since four centuries ago and it has been estimated that by 1949, 11% of Iranian adults were drug users (Nissaramanesh, Trace, and Roberts, 2005).

*The journal's style utilizes the category *substance abuse* as a diagnostic category. Substances are used or misused; living organisms are and can be *abused*. Editor's note.

Address correspondence to Dr. Nouzar Nakhaee, P.O. Box 76195-1447, Kerman, Iran. E-mail: nakhaeen@yahoo.com

Although opiates use is not a novel issue in Iran, it has had an increasing rate during the recent years (Mokri, 2002), so that in some studies about 21% of university students in Iran had a history of opium use during the last 6 months (Ghanizadeh, 2001). Alcohol consumption is forbidden in Muslim countries, but according to Dixon (1972), public opinion in Muslim countries, including Iran, "*does not view the consumption of narcotics as irreligious or morally reprehensible*." (p. 12)

It is necessary for the government to have comprehensive information about the frequency, pattern, time, place, and causes of drug use to develop preventive strategies (Jenkins, 2001). In Iran the Drug Control Headquarters (DCHQ) is the main policy-making body who plans and monitors the anti-drug activities and the Ministry of Health is responsible for coordinating and monitoring of the different aspects of treatment and laboratory services, including drug testing.

As a whole, a variety of methods are suggested to assess the prevalence of opiate use that have their own advantages and limitations (Kraus et al., 2003; World Health Organization [WHO], 2000). Urine test is a method used in Iran to recognize opiate use. Though the urine test is usually used for suspected populations such as arrested individuals (Makkai, 2001), those involved in car accidents (Marquet et al., 1998), or with specific aims as before job applications (Wu et al., 1999), in Iran it has a wider range of use such as the mandatory test for marriage application (Razzaghi, Rahimi, Hosseini, and Chatterjee, 1999). According to the law legislated in 1980, urine testing for opioids is mandatory before marriage, to obtain license for driving, and after applying for government jobs (Mokri, 2002). The shortcoming of this method is that many of those to be tested are informed in advance about the dating of urine collection and so the false negative results may increase due to adulteration (Mokri, 2002; Wu et al., 1999). Considering the importance and the widespread usage of urine test in evaluation of the prevalence of substance use which has been more emphasized recently (Fendrich, Johnson, Wislar, Hubbell, and Spiehler, 2004), we tried to estimate the prevalence of opiate use through urine testing of men referring to a large clinical laboratory in addition to cross-validating the current program of urine testing for marriage and employment indirectly.

Methods

Urine opiate (opium, heroin, morphine, and codeine) testing was done on urine specimens of 1120 men referring to a large clinical lab in Kerman, the center of the biggest province in Iran that is 1000 km to south of Tehran, during 2004. Since over 90% of opium users in Iran are men (Mokri, 2002; Razzaghi et al., 1999), and opium use is seen more frequently after adolescence (Ghanizadeh, 2001; Razzaghi et al., 1999), male gender and age above 15 years were considered as inclusion criteria. All stages of the study were performed without any information about the identity of individuals by anonymous unlinked testing (Warner, Walker, and Friedmann, 2003).

Urine samples were taken from those referred by physicians for urinalysis as a checkup test. The study was approved by the ethics committee. Urine sample analysis, in order to find opiates, was done at the Neuroscience Research Center at Kerman University of Medical Sciences in two stages: (a) Rapid situation assessment method: This immunoassay method has been designed for the qualitative tracing of opiates in urine and is able to recognize up to 300 ng/mL of opiates in urine (Kapur, 1993). It is just a qualitative screening test that may not determine the type of the opiate used. Furthermore, because of the high sensitivity and low specificity of immunoassay methods (Cone, 1997; Kapur, 1993), the possibility of cross-reaction and so false positive results (5.6%) with some drugs of similar chemical

structure exists (Kapur, 1993; Morgan, 1984). (b) Thin-layer chromatography (TLC): The initial positive results were confirmed by TLC procedure (Sam-Fannavar Co., Tehran, Iran). The method was able to identify the opiates with a high degree of specificity (Kapur, 1993).

Results

Out of 1,120 urine specimens, 92% (1034 cases) were from Iranian urban testees and the rest were rural Iranians.. The mean age (±SD) was 46.6 (±16.5) years. The age distribution of the studied sample did not match that of the population above 15 years old in the city ($P < 0.001$, $df = 5$, $\chi^2 = 631.7$).

The initial screening test was positive in 28.8% (322 individuals) of the total sample, of which there were 292 urban and 30 rural males (28.2 and 34.9% positive rate, respectively, $P = 0.19$, $df = 1$, $\chi^2 = 1.711$). At the second stage, 50.6% (161 cases) of the total 322 subjects with positive initial test became positive after TLC confirmation. The positive rate was 50.7 and 50.0% in the urban and the rural males, respectively ($P = 0.94$, $df = 1$, $\chi^2 = 0.005$). In other words the presence of opiates was confirmed in 14.4% (95% CI: 12.4–16.6) of total samples studied, of which 2.9% were codeine users and the remainder (11.5%) used other opiates (i.e., opium, heroin, and morphine). The percentage of TLC-positive individuals for the opiates according to age group is shown in Figure 1.

Discussion

The figures showing opiate use in Iran vary widely, which may be due to the different methods of evaluating the prevalence and to some extent neglecting the scientific bases of epidemiological studies so that no method by itself is sufficient for determining the prevalence of substance use (Kraus et al., 2003; WHO, 2000). Estimating the prevalence of such a stigmatized and illegal practice in the community is difficult in any country and may be even more difficult in Iran due to lack of reliable and sound background information.

Urine testing is one of the methods used for determining opiate use by researchers, especially after 1990s (Fendrich et al., 2004; Kapur, 1993). It is now used in Iran for legal but not for epidemiological purposes; but because the individuals are aware of the time when the test is held (in most cases), the results become negative in different ways despite

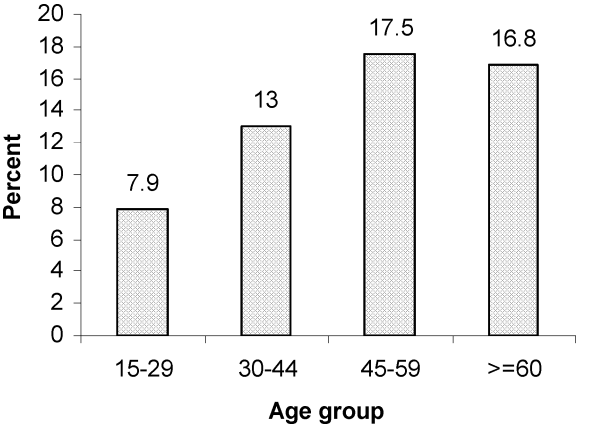

Figure 1. Prevalence of positive urine tests for opiates confirmed by thin-layer chromatography in 1120 men attending a clinical lab according to age group.

opiate use (Razzaghi et al., 1999). In 1998, only 1.3% of urine tests were reported positive for opiate use in applicants for marriage (Mokri, 2002), while the prevalence of opiate use (abuse and dependency) in the general population was 2.8% according to official reports in 1999 (United Nations Office on Drugs and Crime [UNODC], 2004).

In this study, urinalysis was performed in individuals who were not informed about opiate analysis on their urine samples. However, two limitations and some considerations should be mentioned before the interpretation of the results: (a) The age distribution of the studied sample was different from that of the latest census data on the region. (b) The individuals referring to clinical labs do not represent all the residents of the region since the probability of the disease is higher among them which may lead to opium use for different reasons such as pain palliation. (c) Some authorities in Iran believe that drug use among Iranian women as a hidden problem is rising rapidly (Nissaramanesh et al., 2005), so exclusion of women from this study may be concluded as a drawback.

Meanwhile, it should be noted that the positive individuals may have used the substance sporadically and not consistently, since a positive TLC test shows the substance use only during the last 1.5 days (Cone, 1997; Vandevenne, Vandenbussche, and Verstraete, 2000). One may argue that using poppy seed, which is mostly used for baking bread, may also lead to positive urine tests (Levine and Smialek, 1998). However, no such thing exists in the Kerman considering the bread offered in the regional markets.

Considering the ability of TLC for differentiating codeine users from the other substance users, even if we optimistically put the codeine users aside as therapeutic users, a high percentage (11.5%) of the studied 1120 individuals still used other opiates such as opium, heroin, or morphine, which is significantly higher than comparable studies (Mokri, 2002; Rajabizadeh, Ramezani, and Shakibi, 2004). In the latter study, urine tests were positive in 4.6% of drivers in spite of a positive result of 26.5% obtained by psychiatric interview. In a study held in 1999 in one of the major universities of Iran, 21% of the students reported opium use at least once during the last 6 months (Ghanizadeh, 2001). Also, in a household survey conducted in a southern rural region in Kerman, 17.1% of the studied population had a history of opium use and 5.3% of them reported opiate dependency (Ziaaddini and Ziaaddini, 2005). In another study conducted in Kerman, the prevalence of opium dependence reported 22.5% in a normal control group based on DSM-IV interview (Ghaffari-Nejad and Pouya, 2002). Estimates obtained by these studies carried out in different parts of Iran using different methodologies are roughly in line with each other, a fact that may be interpreted as indicative of their generalizability.

As noted, the variation of figures obtained by urine testing in Iran (around 1.5–2.5%) is far less than those obtained by self-reports. In the present study, the highest prevalence of opiates use was seen in the age range of 45- to 59-year-olds (17.5%), which is mcuh higher than the results reported based on urine testing. The difference may be to some extent due to the difference between the nature of the studied populations. On the other hand, in a survey conducted on urine samples of the injured drivers in traffic accidents in France, opiates use was confirmed in 10.5% of subjects, which was the same as the rate obtained in the patients admitted in other wards of the same hospital (Marquet et al., 1998). Considering all the above, it may be concluded that the prevailing information obtained by urine testing is lower than may otherwise be expected. Furthermore, considering Iran as a neighbor of the greatest opium producer in the world, and since Iran is among the countries that have the highest official rates of opiates use and also the largest opiate seizures in the world (UNODC, 2004), it seems the percentage of positive cases confirmed by urine test performed on urine samples of applicants for marriage and job (1.3%; Razzaghi et al., 1999) is far from reality. The findings of this study confirmed this claim. Even considering the lack of a complete

homogeneity of studied sample of the present study with the applicants for marriage or job, the figures achieved in this study imply the inadequacy and underreporting of the prevailing screening program. However, it should be mentioned that urine testing is still considered as a relatively acceptable test for epidemiological (Fendrich et al., 2004) purposes and screening specific population subgroups (Kapur, 1993; Makkai, 2001) despite the fact that those to be tested may alter the results through the ways such as dilution and adulteration (Cone, 1997). On the other hand, some studies have shown that considering the 300 ng/mL cut-off, we may even face about 23% false-negative rate depending on the kit type (Levine and Smialek, 1998). Consequently, some authorities suggest multiple assessment methods for screening because of the shortcomings of urine test (Cook, Bernstein, and Andrews, 1997).

As a whole, regarding the evidence and the figures obtained in this study, it seems that the rate of opiates use in Iran is now at an alarming level and it is better to revise the urine testing as the sole screening method. Other complementary strategies (e.g., methods to overcome adulteration) or using different biological specimens may be considered by researchers and policymakers (i.e., Ministry of Health and Drug Control Headquarters). A family of epidemiologic studies is needed to build conclusive evidence regarding the findings of this study.

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RÉSUMÉ

Estimation de la prèvalence de l'nsage des opiacés anonymes non d'urine tests de consommation de drogues: Un étude pilote en Iran

Pour estimer la prédominance d'utilisation opiacée et trans-valider le programme actuel d'urine évaluant comme la méthode de détection et de projection unique pour trouver le narcotique abusers en Iran, les échantillons d'urine de 1120 hommes avec un âge (±SD) moyen de 46.6 (±16.5) les années en faisant allusion à un grand laboratoire clinique pour les buts diagnostiques et cachants dans Kerman (le centre de la plus grande province en Iran), étaient assayed par anonymised désengrené en évaluant pour opioid metabolites pendant 2004. Les exemplaires ont été analysés par un immunoassay cachant l'épreuve et une couche fine chromatography (TLC) l'épreuve de confirmation. L'épreuve de Projection initiale était positive à 28.8% (CI de 95% : 26.1–31.5) des cas (322 individus), dont la moitié ont été confirmés par TLC. En masse 14.4% (CI de 95% : 12.4–16.6) de l'urine les échantillons étaient positifs pour opioid metabolites. Bien que les individus faisant allusion aux laboratoires cliniques ne représentent pas exactement la population générale, selon de relativement hautes figures accomplies dans cette étude nous suggérons de réviser l'épreuve d'urine comme la méthode de détection et de projection unique pour trouver le narcotique abusers. La recherche de plus est nécessaire pour prendre pour poursuivre ces conclusions.

RESUMEN

Estimación de la prevalencia del uso de opiáceos por disociados orina anónimas análisls de drogas: Un estudio experimental en el Irán

A fin de estimar el predominio del uso opiáceo y validar cruz el programa corriente de la orina que prueba como el único método de descubrimiento y proyección para encontrar

a abusadores opiáceos en Irán, las muestras de orina de los 1120 hombres con un medio (±SD) edad de 46.6 (±16.5) años refiriéndose a un laboratorio clínico grande para objetivos diagnósticos y que protegen en Kerman (el centro de la provincia más grande en Irán), eran assayed por anonymised desatado probando para opioid metabolites durante 2004. Los especímenes fueron analizados por un immunoassay que protege la prueba y una capa delgada chromatography (TLC) prueba de confirmación. La inicial que Protege la prueba era positiva en el 28.8% (CI del 95%: 26.1–31.5) de casos (322 individuos), mitad de quien fueron confirmados por TLC. En conjunto el 14.4% (CI del 95%: 12.4–16.6) de la orina las muestras eran positivas para opioid metabolites. Aunque los individuos que se refieren a laboratorios clínicos no representen exactamente la población general, según figuras relativamente altas conseguidas en este estudio aconsejamos revisar la prueba de orina como el único método de descubrimiento y proyección para encontrar abusadores opiáceos. La investigación adicional es necesaria para tomar para perseguir estas conclusiones.

THE AUTHORS

Nouzar Nakhaee, M.D., M.P.H. (Iran), is an associate professor of community medicine and director of the Division of Medical Ethics at the Kerman University of Medical Sciences. He researches primarily in the field of substance abuse. He also teaches courses in medical ethics and public health issues. He received his medical degree at the Shiraz University of Medical Sciences, where he also completed a residency in community medicine in 2001. He also completed an M.S. degree in public health (MPH) from the same university. He has written one book and has translated or co-translated five books on the above-mentioned issues from English to Persian. He has published several research articles in these areas. His research interests include substance abuse, reproductive health with a primary emphasis on preventive-based studies, and medical ethics.

Kouros Divsalar, M.S. (Iran), is a researcher in the field of substance abuse. He is a member of the Neuroscience Research Center in Kerman University of Medical Sciences. He is highly specialized in laboratory methods for assessing drugs of abuse. His interests include epidemiology of substance abuse and its relation to religious beliefs. He received an M.S. degree in laboratory sciences from Zahedan University (Iran) in 1992. He also completed an M.S. degree in mysticism from Azad University in Tehran at 2000. He translated *Ruzbihan Boghli: Mystical Experience and the Rhetoric of Sainthood in Persian Sufism*, by Carl W. Ernst.

Manzume Shamsi Meimandi, Pharm Dr., (Iran), is an instructor in the Department of Physiology and Pharmacology in Kerman University of Medical Sciences, Iran. Her research interests include experimental pain behaviors in animal models and also substance abuse research in health service. She has published several articles (about 17) in these fields. She was the head of Kerman Neuroscience Research Center, which was ranked as the first research center in substance abuse research in the country. She received a pharmacy doctorate from the University of Perugia (Italy) and M.Sc. degree in applied pharmacology from University of Bari in 1992.

Shahriar Dabiri, M.D., F.I.A.C., (Iran), is professor in the Department of Pathology, Kerman Medical School, Iran. His research interests include pathology of leishmaniasis, breast cancer, and experimental neuroscience. He has published over 50 articles (international and Persian) in the areas of the pathology of leishmaniasis, breast cancer, and experimental fields in neuroscience. He is a fellow of the International Academy of Cytology. He received his medical degree from Shiraz Medical School, Shiraz, Iran, in 1981.

Glossary

Opioids: natural and synthetic substances that have the characteristics of morphine.

Unlinked Anonymous Testing: urine drug testing in a manner that the identity of those who provided the samples could not be identified and are also unaware of the nature of the tests.

Urine Drug Testing: a constellation of screening and confirmatory tests performed on urine to identify the substance metabolites for various purposes.

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