A National survey on substance use among Iranian industrial workers

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Abstract

 Background: Recent evidence shows that the prevalence of substance abuse is 2.1% in Iranians aged 15-64 years, while reported rates are higher in studies that target industrial workplaces. Our study intends to provide a national picture of substance use among industrial workers in Iran.

 Methods: This survey was designed to collect data through interviews and dipstick urine tests. Using a multi-stage sampling approach, we recruited our study subjects from a representative sample of industrial workers from all provinces in 2015. Data were weighted to estimate the prevalence rate of substance use. Odds ratios were calculated through adapting logistic regression to test the strength of association between substance use (based on self-report and urine test) and sociodemographic factors including sex, age group, education level, marital status and worker's professional training status. All statistical analyses were conducted using SPSS Version 22. P <0.05 was considered significant.

 Results: We analyzed the data collected from 13,128 participants; both self-reported use and urine test results. Majority of the respondents were male (n=12077, 92%), aged 21-40 years old (n=9491, 72.3%), had finished middle/secondary school (n=8353, 63.6%) and were married (n=11012, 83.9%). Opium was the most popular abused substance (n=352, 2.7%) followed by alcohol (304, 2.3%), based on self-reports. Urine tests showed that 23.8% (n=3105) of the participants had a positive result for the use of opiates/opioids, crystal meth and/or cannabis. The highest rate of substance use reported from a province was 60.50%; the lowest provincial rate was 9.0%.

 Conclusion: Nearly a one-fourth of Iranian industrial employees are engaged in use of substances with significant geographical distribution. Urine test is the recommended method to assess the prevalence of drug use among industrial workers in Iran.

Keywords: Survey, Substance Use, Industrial Workers, Iran

Introduction

In this context, substance (a combination of drugs and alcohol) abuse refers to WHO definition; substance abuse has

referred to non-medical or unsanctioned patterns of use, irrespective of consequences. Thus, the definition published

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↑What is "already known" in this topic:
The present study is the first study to investigate the prevalence of substance use among Iranian industrial workers at the national level.

→What this article adds:
Nearly quarter (23.8%) of Iranian industrial workers have a history of substances use. Male gender, the 21-40 age groups, individuals with a less than primary school education and divorced or widow had greater odds of substance use based on their positive urine test. There was a significant difference between self-reported prevalence and estimates based on the urine test for cannabis, opiates/opioids, and crystal meth abuse. Urine test is the recommended method to assess the prevalence of drug use among industrial workers of Iran.

in 1969 by the WHO Expert Committee on Drug Dependence was "persistent or sporadic excessive drug use inconsistent with or unrelated to acceptable medical practice" (1).

Illicit drug use is responsible for 1.9% (0.89% - 1.3%) of total DALY (Disability Adjusted Life Years), and alcohol use is responsible for 0.7% (0.6-0.81) of total DALY (2). Substance use has significantly increased in the recent decade, especially among young people who are supposed to be the productive workforce (3).

Iran, like many other countries, has been dealing with the drug problem for a long time. In 2011, it was estimated that the prevalence of 12-month illicit drug use was 2.1% [approximately 1.12 million] among Iranians aged 15-64 years (4). Alcohol consumption in Iran is limited because of cultural sensitivities, and the frequency of consumption within a one-year period is estimated to be 2.31% in those aged 15 and more (5).

According to literature, substance use, including alcohol consumption, has a negative impact on workplace safety (6-9). Studies have also demonstrated that various groups of industrial workers follow different patterns of substance use (10, 11).

A study conducted in 2002-2004 estimated that 8.2% of full-time workers in the United States aged 18-67 use illicit substances. It also found that one out of five people aged 18-25 [19%] had used drugs during the month before the study. Furthermore, men used substances more than women [9.7% compared to 6.2%] and the prevalence of substance use varied according to the job type (10).

Two studies have focused on the prevalence of illicit drug use in the industrial environments of Iran. The first one was conducted in natural gas fields (11), and the second one targeted the steel companies of Esfahan province in 2009, according to an unpublished report of Iranian Drug Control Headquarters. These studies presented an estimate of 15-25 percent of substance use. There is, however, no comprehensive nationwide study on the prevalence of substance use in the industrial environments of Iran, what the current study intends to reveal. It also aims to provide baseline information from industrial workplaces as the initial phase of a large-scale health intervention.

Methods
Study design and sampling
Following the protocol previously described (12), this cross-sectional survey was conducted from October to December 2015. The target population included employees of industrial plants throughout all provinces of Iran. The sample size estimated to be 13,489 workers using a multistage cluster sampling method. We first classified the existing national list of workplaces according to the size of their employees into 5 categories: 10-49, 50-99, 100-499, 500-999 and 1000 employees or more. Then the stratified samples were selected randomly from the payroll of 609 plants countrywide, proportional to the size of employees in each province. All those who participated in the study were legal employees, aged 18 years or above and had informed consent. Employees of small worksites with less than 10 workers, night-shift workers and workers of military industries were excluded.

Instruments
A confidential questionnaire and urine test kits for substance use detection were used to collect data.

Urine dipstick (Acon Labs) kits with relatively high sensitivity were used to biochemically trace substance use among the participants. The sensitivity and specificity of these kits reported as 99% and 95%, respectively. Urine tests were applied on site after the interview part was completed. Kits were able to detect cannabis use up to 10 days before the test date while opium use could be traced if they were used in the past 4 days. The detection period for methamphetamine in the urine test was 3-5 days.

The results of urine tests were interpreted as positive, negative, and invalid based on the color change in the test and control lines of the applied strips.

Data collection
Urine sample collection was an immediate step after the interview and under the strict supervision of interviewers. Dipstick tests were applied on site.

Statistical analysis
We used the 2013 National Census of Industrial Workshops tool to weigh the survey data before estimating prevalence rates using Statistical Package of Social Studies Software [SPSS] version 22. Post-stratification weights were calculated based on age groups, sex and province of residence. P <0.05 was considered significant. Odds ratios were calculated through adapting logistic regression to test the strength of association between substance use (based on self-report and urine test) and sociodemographic factors including sex, age group, education level, marital status and worker's professional training status.

The prevalence of opioid and opiate use was determined with a positive dipstick test result as well as a negative history of taking specific medications that could affect the test result. The prevalence of alcohol consumption and the use of other substances was determined by a positive self-report.

The study received its ethical approval from an ethics committee in the Research and Training Office, Drug Control Headquarters. The interviewers received training on privacy and confidentiality standards.

Informed consent was obtained from all participants included in the study to meet universal ethical standards.

Results
A total of 223 (1.7%) employees refused to participate in an interview or to have their urine tested for substance use. Overall, 13,286 employees participated in the two steps of our study; however, we had to put aside 158 questionnaires (1.2%) as some errors occurred during the testing process. Finally, we analyzed the data collected from 13,128 workers.

Majority of the respondents were male (92%), aged 21-40 years old (72.3%), had finished middle/secondary school (63.6%) and were married (83.9%). About a third of the participants (34.9%) were unskilled workers, while,

Table 1. Demographic characteristics of the participants in the first national survey of substance abuse among industrial workers (Iran, 2015)

Variable	Level	n (%)
Sex	Male	12077 (92)
	Female	1051 (8)
Age group	≤ 20 y/o	107 (0.8)
	21-40 y/o	9491 (72.3)
	41-60 y/o	3478 (26.5)
	> 60 y/o	52 (0.4)
Education	Primary school or lower	1660 (12.7)
	Middle school/ high school	8353 (63.6)
	College or university degree	3107 (23.7)
Marital status	Single	2001 (15.2)
	Married	11012 (83.9)
	Divorced or widow	115 (0.9)
Worker's class	Skilled worker*	7508 (57.2)
	Unskilled worker	4579 (34.9)
	Other**	1041 (7.9)

* Any worker who has attended a vocational training program at a high school, college, university or technical school.
** Applies to jobs with no available institutional training program.

57.2% were skilled laborers. There were 2,325 (18%) current tobacco smokers who had started smoking at 21±6 years on average (Table 1).

Table 2 illustrates the prevalence of self-reported current use of various substances based on self-reports, and use prevalence supported by a positive urine dipstick test. Opium was the most popular substance used (2.7%) followed by alcohol (2.3%) based on self-reports. There was a significant difference between self-reported prevalence and estimates based on a urine test for cannabis, opiates/opioids, and crystal meth abuse. Overall, the prevalence of positive urine tests because of substance use was 23.8%, whereas the prevalence estimate was 5.8% based on self-reports. The prevalence rates for multiple drug use (users of more than 1 drug) were 3.7% and 1.01% based on urine tests and interviews, respectively. No one reported using ecstasy, heroin crack or cocaine in the past 30 days before the study.

Male gender, less than primary school and divorced or

Table 2. Prevalence of substance use based on self-reports and urine tests in industrial workers (Iran, 2015)

Substance		Current substance use*		Positive urine test	
		n	Weighted %(95% CI)	n	Weighted %(95% CI)
Cannabis	Hashish	19	0.10 (0.49-0.70)	-	-
	Grass	3	0.02 (0.01-0.03)	-	-
	Weed	1	0.01 (0.00-0.04)	-	-
	Marijuana	3	0.02 (0.00-0.05)	-	-
	Total	26	0.20 (0.15-0.26)	677	5.10(4.19-6.01)
Opioids and opiates**	Opium	352	2.70 (2.34-3.06)	-	-
	Opium juice	47	0.40 (0.27-0.77)	-	-
	Opium residue	5	0.04 (0.02-0.06)	-	-
	Juice of opium residue	28	0.20 (0.14-0.27)	-	-
	Heroin	3	0.02(0.00-0.04)	-	-
	Medicinal substances: tramadol, codeine, methadone, diphenoxylate, buprenorphine	64	0.50 (0.39-0.68)	-	-
	Total	472	3.80 (3.34-4.13)	1747	14.40 (13.95-14.85)
Crystal methamphetamine		16	0.10 (0.09-0.19)	883	7.3 (6.27- 8.33)
Alcohol		304	2.30 (2.17-2.43)	304	2.3(2.15-2.45)
Others		3	0.02 (0.00-0.04)	-	-
Total Substance use		725	5.82 (5.69-7.31)	3105	23.8 (22.9-24.6)
More than 1 substance use		123	1.01 (0.7- 1.4)	506	3.7 (3.5-4.1)

* Any self-reported substance use during the past 30 days
** Urine test applied in this study was not suitable to trace use of buprenorphine. Methadone use might impact the test result variably as well.

Table 3. Sociodemographic correlates of substance use in industrial workers based on self-reports (Iran, 2015)

Variable		Current substance use*			
	N	n (weighted raw %)	OR (95% CI)	AOR (95% CI)	P value
Gender					
Female	1049	189(0.24)	1	1	
Male	12231	746(6.62)	4.03(2.45-7.12)	4.29(2.5-7.18)	<0.001
Age group (years)					
≤ 20	107	3 (0.52)	1	1	
21-40	9491	149 (7.88)	0.55 (0.18-2.75)	1.09(0.43-2.76)	0.84
41-60	3478	101 (4.10)	1.03 (0.33-5.19)	1.4(0.56-3.68)	0.44
> 60	52	8 (2.21)	6.3 (1.41-38.09)	1.02(0.23-4.59)	0.97
Education					
≤ Primary school	1660	51(6.76)	1	1	
high school	8353	137 (4.30)	0.52 (0.37- 0.74)	0.69(0.56-0.85)	0.001
≥College	3107	73(1.07)	0.74 (0.50- 1.08)	0.40(0.30-0.54)	0.001
Marital status					
Single	3107	68(5.68)	1	1	
Married	11012	181(6.99)	0.47 (0.25- 0.63)	0.72(0.57-0.91)	0.006
Divorced or widow	115	14(4.11)	3.8 (1.9-7.1)	3.29(1.84-5.88)	<0.001
Worker's class					
Unskilled	4579	41(6.88)	1		
Skilled	7508	157(5.56)	0.84 (0.71- 0.99)	0.98 (0.82-1.16)	0.83
Other	1041	65(4.01)	1.25 (0.96-1.63)	1.16(0.89-1.52)	0.25

AOR: Adjusted Odds Ratio, * Any self-reported substance use during the past 30 days

Table 4. Sociodemographic correlates of substance use in industrial workers based on urine test (Iran, 2015)

Variable	N	Positive urine test			
		n (weighted raw %)	OR (95% CL)	AOR (95% CI)	P value
Gender					
Female	1049	132(4.70)	1	1	
Male	12231	2973(27.31)	2.27 (1.88- 2.74)	2.13(1.76-2.4597)	<0.001
Age group (years)					
≤ 20	107	36(17.75)	1	1	
21-40	9491	2352(27.21)	2.12(1.18-3.80)	2.12(1.17-3.85)	0.043
41-60	3478	1054 (21.10)	2.6 (1.45 – 4.67)	2.38(1.14-7.12)	0.128
> 60	52	19(8.40)	3.21 (1.40- 7.34)	0.82(0.31-1.67)	0.221
Education					
≤ Primary school	1660	723(22.63)	1	1	
high school	8353	2305(26.19)	0.85 (0.75- 0.96)	097(0.8-1.03)	0.17
≥College	3107	434(14.54)	0.50 (0.43-0.57)	0.57(0.49-0.67)	<0.001
Marital status					
Single	3107	251(25.01)	1	1	
Married	11012	2611(23.52)	1.17 (1.04-1.32)	0.92(0.81-1.04)	0.19
Other	115	598(11.33)	1.49 (0.98-2.28)	1.49(0.97-2.29)	0.066
Worker's class					
Unskilled	4579	1181(19.41)	1	1	
Skilled	7508	1550(22.23)	0.82 (0.76- 0.9)	0.91(0.83-1.001)	0.072
Other	1041	731(25.30)	1.15 (0.99-1.33)	1.09(0.93-1.27)	0.26

AOR: Adjusted Odds Ratio

widow had greater odds of substance use based on self-reports (Table 3)

Additionally, male gender, the 21-40 age groups, individuals with less than primary school education and divorced or widow had greater odds of substance use based on their positive urine tests (Table 4).

Three provinces including Sistan and Baluchestan (60.5%), Fars (43.4%), and Kermanshah (35.9%) had the highest rates, and West Azarbayjan (9.0%), Qom (12.6%) and Hamedan (12.7%) represented the lowest use rates, respectively.

Discussion

The astonishing estimate of biochemically proven substance use (23.8% of the target population) significantly outweighs the self-reported substance use rate (5.82%). Also, self-reports revealed that opioids and opiates form the most commonly used group of substances (3.8%). A simultaneous biochemical assessment confirms this predominance with 14.4% positive results. While opium is the most prominent drug used in the entire opioids and opiates group, and among all substances addressed in our study, alcohol is the second most reported substance used by industrial workers (2.30%).

Male gender has a strong association with substance use. Although the number of female participants was rather low because of the actual contribution of women in industrial labor, we believe our post-stratification adjustments could properly enhance the accuracy of the analyses we made. In addition, this finding is supported by another national study on substance use that addressed the general adult population of Iran (4).

Another variable that affects substance use is age. This association was significant for those aged 21-40 years. The association of drug use and being middle-aged is also consistent with past Iranian studies (4) and opposite to the findings of some international studies that suggest a higher prevalence in younger ages (13, 14).

In addition, low education levels and unskilled workers

are both factors that are associated with the problem.

It is obvious that substance use has a negative impact on employment and workforce participation (14). That is why drug testing in employment has become a routine practice with an increasing global trend (15); however, there are also doubts if testing is an effective approach, at least for workplace accident prevention (16). Using dipstick substance test and interview, our study was the first national survey that could provide unique baseline data on a major labor force problem; a crisis that is to be addressed by the Ministry of Health and the Ministry of Cooperatives, Labor, and Social Welfare through a comprehensive national intervention.

Studies on the prevalence of substance use during or before the work have yielded various results in different countries. In a study on substance use among 2,829 workers in the United States, 3.1% and 15% reported experiencing substance and alcohol use, respectively, during work hours (16, 17). In Australia, the prevalence of the reported alcohol use in different job types varied from 3.1% to 56%. Furthermore, the prevalence of substance use ranged from 6.6% to 46% (18-21).

Those who reported substance use are almost one-third of the entire employees diagnosed with substance use through biochemical tests (6.5 vs. 21.3%). A rather similar study in which morphine urine test was applied among employees of Asaluyeh Petrochemical Complexes, Iran, reported 23.3% substance use among the workers (11) . In another study that was conducted by Iranian Drug Control Headquarters in some industrial plants of Isfahan in 2009, it was reported 25.1% substance use, including 9.6% use of industrial opioids and stimulating drugs, and 15.5% for traditional substances such as opium. Additionally, the rate of alcohol consumption was 13.8%.

A recent national household survey reported opioids and opiates as the most commonly abused substances among 15-64 years old Iranians. The prevalence of drug abuse based on DSM-IV and DSM-5 criteria were 2.09% and 2.44%, respectively (4). Self-reported use is almost two

times more in our study than the above general population survey; however, we didn't study the problem using criteria of a mental disorder. Also, methodological differences between the two studies should be taken into account before concluding that drug abuse is higher in the labor force. Another survey that reported alcohol use frequency among Iranian urban population, 15 years and more, reported a frequency of 2.31% that is consistent with our finding (5).

We also learned that interviews definitely underreport substance use when the results are compared with accurate biochemical tests in Iranian industrial workers. Similarly, studies from other nations have reported a significant difference between self-reports and urine tests or hair analysis (22). It is highly recommended though, to use urine tests as the best tracking tool for future studies regarding drug use in workplaces.

Substance use among workers is significantly diverse geographically and ranges from 9.0% in West Azarbayjan to 60.5% in Sistan and Baluchestan. As drug trafficking from Afghanistan is a major problem (22), this finding is consistent with what another recent study (4).

This study has some limitations. Researchers, for example, were not able to address unregistered workshops and places with less than 10 workers because the available databases used to design the study and to develop its operation do not include these. Also, sensitive issues such as drug problems are socially harder to investigate among women in a conservative cultural context. In addition, women's contribution to industrial labor market is poor. That is why the number of participating women was not comparable with their male peers. Furthermore, researchers had to use work premises to do interviews and apply dipstick tests that might not be an ideal place for such a sensitive study subject.

Conclusion

Nearly a one-fourth of Iranian industrial employees are engaged in use substances with significant geographical distribution. Urine test is the recommended method to assess the prevalence of drug use among industrial workers in Iran. There are various well- known psychological, behavioral, and social reasons for the tendency toward drugs and alcohol; therefore, we didn't spare further effort to undertake a correlation analysis though. We believe, however, policymakers need to take all the major risk factors and the determinants into account while addressing substance use through their joint intervention plan which is supposed to have highly relied on best practices in the health literature. For this purpose, the highly diverse geographical distribution of the problem should be reflected properly while planning interventions. Finally, the current study can serve as a basis to establish a national monitoring or surveillance mechanism for workplace drug abuse.

Conflict of Interests
The authors declare that they have no competing interests.

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