Prevalence of drug and alcohol use in urban Afghanistan: epidemiological data from the Afghanistan National Urban Drug Use Study (ANUDUS)

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Summary

Background Previous attempts to assess the prevalence of drug use in Afghanistan have focused on subgroups that are not generalisable. In the Afghanistan National Urban Drug Use Study, we assessed risk factors and drug use in Afghanistan through self-report questionnaires that we validated with laboratory test confirmation using analysis of hair, urine, and saliva.

Methods The study took place between July 13, 2010, to April 25, 2012, in 11 Afghan provinces. 2187 randomly selected households completed a survey, representing 19 025 household members. We completed surveys with the female head of the household about past and current drug use among members of their household. We also obtained hair, urine, and saliva samples from 5236 people in these households and tested them for metabolites of 13 drugs.

Findings Of 2170 households with biological samples tested, 247 (11·4%) tested positive for any drug. Overall, opioids were the most prevalent drug in the biological samples (5·6%), although prescription drugs (prescription pain pills, sedatives, and tranquilliser) were the most commonly reported in the past 30 days in the questionnaires (7·6%). Of individuals testing positive for at least one substance, opioids accounted for more than 50% of substance use in women and children, but only a third of substances in men, who predominantly tested positive for cannabinoids. After controlling for age with direct standardisation, individual prevalence of substance use (from laboratory tests) was 7·2% (95% CI 6·1–8·3) in men and 3·1% (2·5–3·7) in women—with a national prevalence of 5·1% (4·4–5·8) and a prevalence of 5·0% (4·1–5·8) in Kabul. Concordance between laboratory test results and self-reports was high.

Interpretation These data suggest the female head of household to be a knowledgeable informant for household substance use. They also might provide insight into new avenues for targeted behavioural interventions and prevention messages.

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Introduction

Little research has been done on illicit drug use in Afghanistan, even though most of the world's opium originates in the country.[1] To develop interventions to reduce use, reliable epidemiological studies are needed. Knowledge of drug use in Afghanistan comes mainly from studies on subgroups such as female sex workers or drug users in treatment (from a voluntary counselling and testing centre),[2–5] and from a study of informants who might have known a drug user.[6] However, these methods introduce information and sampling biases that would misrepresent drug use.

To address this serious gap in knowledge, the Afghanistan National Urban Drug Use Study (ANUDUS) was launched under the direction of the University of Florida (UF) in July 13, 2010. With multistage sampling, ANUDUS randomly selected households from 11 provincial capitals to assess substance use in household members (through hair, saliva, and urine samples) and through questions to female heads of the household. We present the prevalence of household and individual substance use from both self-report and biological tests. We postulated that refusal rates would be low, that people would provide biological samples for testing, that women would be good reporters of the household behaviours, that prevalence of substance use would be higher for men than for women, that pharmaceutical drug use would be high, and that opioids would be the most commonly used substances.

Methods

Sampling

The survey was done in the capitals of 11 Afghan provinces with the least safety issues for the study teams. We purposively selected regions contiguous with Iran and central Asia where access to drugs was thought to be high (Kabul, Nangarhar, Balkh, and Hirat; figure 1). Additionally, mountainous terrain, severe weather, and war excluded some areas from the study. We stratified provinces into five regions: northeast (Badakhshan); east (Nangarhar); north (Faryab, Jawzjan, Balkh, and

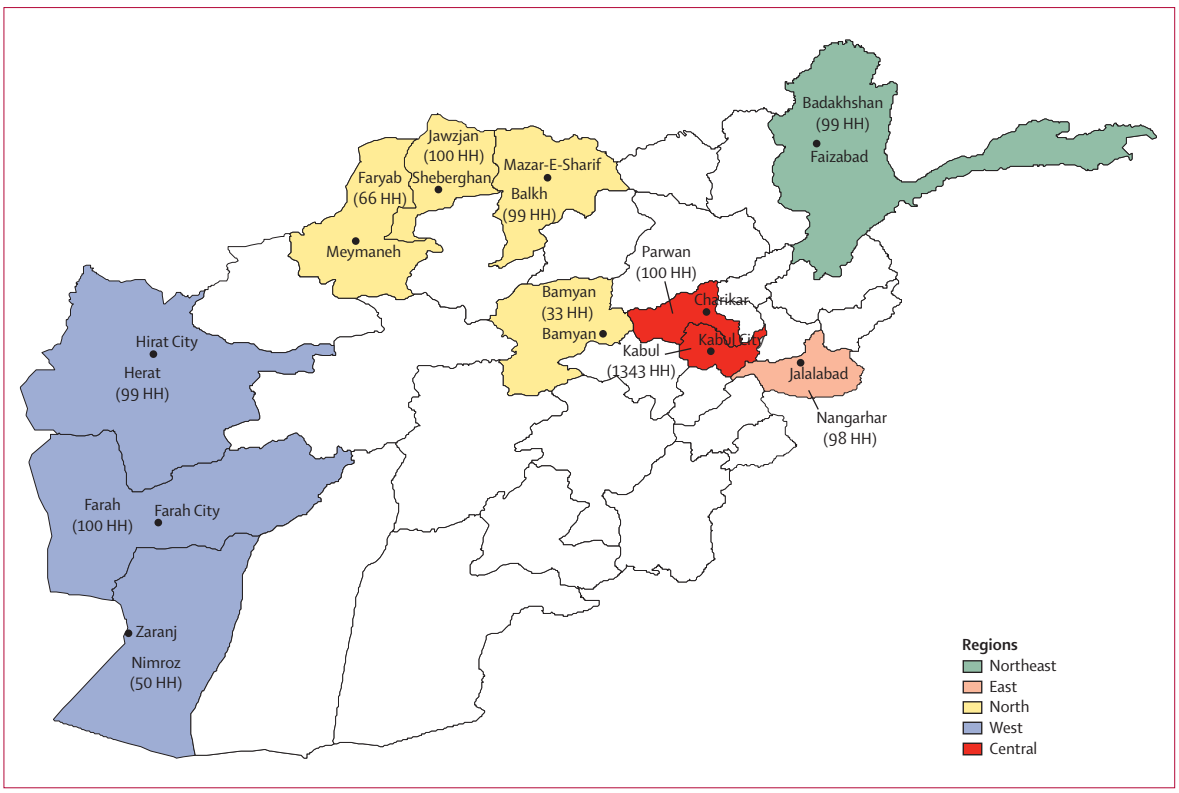

***Figure* 1: Map of provinces surveyed in the Afghanistan National Urban Drug Use Study (ANUDUS), 2012**
HH=households.

Bamyan), west (Hirat, Farah, and Nimroz); and central (Parwan). Kabul was included as a central region but was separated because of its large population.

We began phase one multistage sampling (July 13, 2010, to July 8, 2011) by selecting each province's capital city (figure 1). We enumerated police districts, used as the anchor point for sampling, and then selected them randomly. We then selected a random interval to choose households in each district. To maintain confidentiality, we do not report the start point and interval between houses. The overall phase one sample of 1007 households represented at least 0·25% of the population in each provincial capital.

Initially, we included three of 16 police districts for Kabul, limiting the statistical use of the sampling of this populous city. Thus, we started phase two (Nov 2, 2011, to April 25, 2012) in the remaining 13 police districts of Kabul. Based on a Kabul population of 3 289 000 people with a mean of 8·7 people living together (378 046 households), the 1180 households selected represented 0·31% of Kabul households.

Consent procedures were approved by the Afghanistan Ministry of Health and the Washington University School of Medicine Institutional Review Board, and protocols and assessments were approved by the Chesapeake Private Institutional Review Board (Columbia, MD, USA).

Field team and survey administration

The field staff (teams of two women and one man) included Afghan physicians, anthropologists, and support personnel. Field team members were trained in Dubai (United Arab Emirates) on proper field procedures, administration of the assessment and biological sampling, household enumeration techniques, and local and cultural aspects of recruitment and engagement. The male team member introduced the study to the neighbourhood elder and then began the household selection process. Once the household was designated, the male team member described the study to the male head of each household, obtained informed consent of the household in a culturally appropriate manner, and enumerated the household by age and sex with use of our enumeration matrix. Adults were defined as individuals aged 15 years or older. The female head of the household (defined as the woman who knew the most about the members of the household) was then approached separately for participation. We selected female heads of household because they are good reporters of family risk factors and outcomes.[7] Consenting women were surveyed by the two female team members, one who asked questions in Dari (the lingua franca [bridge] language in Kabul and in Afghanistan generally),[8] and the other who documented answers on the English language survey. Confidentiality was assured by moving to a secured, secluded area of the house. The ANUDUS

survey, developed by the UF and Afghanistan study team, included an enumeration matrix of the household, and questions about the home, neighbourhood characteristics, and patterns of drug and alcohol use for all members of the household, including children. The female head of household was queried about lifetime and past 30 day use of opium, heroin, cannabis or charas, prescription drugs (prescription pain pills, sedatives, and tranquillisers), alcohol, and tobacco; the reasons for use; and routes taken for any drugs, for men, women, and children in the household. We analysed data separately by sex and for adults only. Women who responded more than 0 to the question: "in the past 30 days, how many (PEOPLE) used opium?" were asked "which (PEOPLE) used opium?", and we coded the user according to the enumeration matrix. For heroin and cannabinoids, we assumed that if a woman reported use of heroin or cannabinoids for a male household member, then it was for the tested adult man. Codes linked to the enumeration matrix allowed the team to determine concordance between self-report and biological specimen data.

After internal pretesting, an Afghan scholar reviewed the assessment, which was then sent to the Afghanistan field team for cultural acceptability, feasibility testing, and Dari translation. A 2 week testing phase was done at the beginning of the study, and no data from the testing were used in this study. The team then did a vigorous review of the assessment to ensure the proper skip patterns (a series of questions associated with a conditional response). Protocol manuals were developed for quality control and fidelity checks throughout the study. Mostly, the testing helped add information to the protocol manual such as the best time of day to visit households and that female survey administrators should go in pairs. We also changed cannabis to charas and added new names for routes of drug use.

Laboratory sample collection and testing

In addition to survey data, the teams obtained hair, saliva, and urine samples from the female head of household (primary respondent), the oldest man, and the youngest child aged 4–14 years (if applicable). For children, parents took the child to the private bathroom and obtained urine while the child urinated. Samples from other household members were collected while the female head of the household was being interviewed. After the interview, the teams obtained hair, saliva, and urine samples from the female head of the household.

The teams sent the samples of hair, saliva, and urine to Des Plaines, IL, USA, for testing at the US Drug Testing Laboratories (USDTL). Survey data and specimens were always shipped separately to maintain the integrity and confidentiality of the data.

Hair samples were tested with use of the HairStat-10 test (USDTL, Des Plaines, IL, USA), with 1000 pg/mg screen limits for barbiturates, benzodiazepines, propoxyphene, and methadone; 500 pg/mg screen limits for amphetamines and cocaine; 300 pg/mg screen limit for phencyclidine (PCP); 200 pg/mg screen limits for opiates and oxycodone; and a 5 pg/mg screen limit for cannabinoids. The presence of 6-acetylmorphine was used for heroin use in hair, saliva, and urine. Saliva samples were tested using the OralStat-10 test (USDTL), with screen limits of 50 ng/mL for amphetamines, barbiturates, and methadone; 40 ng/mL for opiates, oxycodone, and propoxyphene; 20 ng/mL for benzodiazepines and cocaine; 10 ng/mL for PCP; and 4 ng/mL for cannabinoids. A 10-panel urine profile was done for urine samples, with a 1000 ng/mL screen limit for amphetamines; 500 ng/mL for ecstasy (MDMA); 300 ng/mL for cocaine, methadone, opiates, propoxyphene, and oxycodone; 200 ng/mL for barbiturates and benzodiazepines; 25 ng/mL for PCP; 20 ng/mL for cannabinoids and ethanol; and 10 ng/mL for 6-acetylmorphine. All positive tests were successfully confirmed by gas chromatography mass spectrometry (GC-MS) or liquid chromatography tandem mass spectrometry (LC-MS/MS).

We formulated several broad categories for drug use based on positivity for metabolites. Amphetamine-positive meant testing positive for amphetamine or methamphetamine. Barbiturate-positive was attributed to phenobarbital. Benzodiazepine use was attributed to diazepam, nordiazepam, oxazepam, temazepam, or zehydroxyalprazolam. Cannabinoid positivity was indicated by native tetrahydrocannabinol (THC—oral) or carboxy-THC (THCA—urine). We considered anyone testing positive for codeine, morphine, or 6-acetylmorphine in saliva or urine to have tested positive for opium or heroin. To confirm that ethanol was due to the ingestion of alcohol, rather than fermentation, we ran tests for ethyl glucuronide (EtG) and ethyl sulfate (EtS). Only tests that were positive for EtG were classified as alcohol positive.

Statistical analysis

Quality control measures were implemented from the point of the initial testing through the end of the field period. Each survey was reviewed for accuracy, skip-pattern errors, and potential inconsistencies in responses. Deidentified samples were reviewed for security in transport and proper coding. Fidelity to the protocols was monitored during weekly conference calls with the Afghan and Cottler teams.

Drug use was categorised by household and individual, and stratified by province, age and sex. To assess agreement (concordance) between self-reported recent drug use and positive laboratory tests, we report both the Cohen κ statistic and Yulee Y test.[9,10] A measure of 1 indicates high agreement that is not due to chance, whereas a measure of zero indicates chance agreement. A measure of –1 indicates high disagreement that is not due to chance.[11]

We used the results of the laboratory tests to calculate national prevalence. Because we tested more than one person per household, the individual prevalence is not equivalent to the true population prevalence of substance use in Afghanistan. To obtain such an estimate, we controlled for age through direct age standardisation and then used proc surveyselect in SAS 9.3 to randomly select one person tested per household. On the basis of this selection, overall national and Kabul prevalence rates were estimated to reduce the effect of clustering within households. To ensure this rate was not subject to chance, we did 100 simulations and took an average.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. LBC had full access to all the data in the study and maintains the database now. All authors had final responsibility for the decision to submit for publication.

	Northeast	East	North	West	Central		Total (n=2187)
	Badakhshan (n=99)	Nangarhar (n=98)	Balkh, Bamyan, Faryab, and Jawzjan (n=298)	Hirat, Farah, and Nimroz (n=249)	Parwan (n=100)	Kabul (n=1343)	
Age and sex							
Age of household members (years)	23·0 (6·4)	19·7 (4·8)	23·0 (6.8)	21·7 (7·2)	22·9 (7·4)	23·3 (7·7)	22·9 (7·4)
Number of people in surveyed household	8·3 (2·8)	10·7 (4·0)	8·2 (3·0)	7·8 (2·9)	8·2 (3·2)	8·9 (3·8)	8·7 (3·6)
Men and boys in household	4·5 (2·1)	5·5 (2·6)	4·1 (1·9)	4·0 (1·9)	4·1 (2·1)	4·5 (2·2)	4·4 (2·2)
Women and girls in household	3·9 (1·6)	5·3 (2·2)	4·2 (1·9)	3·9 (1·8)	4·1 (1·9)	4·4 (2·3)	4·3 (2·2)
Ethnic origin							
Tajik	91 (92%)	19 (19%)	112 (38%)	114 (46%)	99 (99%)	790 (59%)	1225 (56%)
Pashtum	1 (1%)	74 (76%)	25 (8%)	121 (49%)	1 (1%)	301 (22%)	523 (24%)
Uzbek	3 (3%)	0	106 (36%)	1 (<1%)	0	16 (1%)	126 (6%)
Hazara	0	0	45 (15%)	6 (2%)	0	225 (17%)	276 (13%)
Turkmen and other ethnic origins	4 (4%)	5 (5%)	10 (3%)	7 (3%)	0	11 (1%)	37 (2%)
International domicile							
One household member who lived in another country in past 5 years	8 (8·1%)	10 (10%)	46 (15%)	65 (26%)	13 (13%)	227 (17%)	369 (17%)

Mean (SD) given for continuous variables; numbers (%) given for categorical variables.

***Table* 1: Demographic characteristics of surveyed Afghan households by region**

	Northeast	East	North	West	Central		Total (n=2170)
	Badakhshan (n=99)	Nangarhar (n=97)	Balkh, Bamyan, Faryab, Jawzjan (n=295)	Hirat, Farah, Nimroz (n=249)	Parwan (n=97)	Kabul (n=1333)	
Amphetamines	0	0	0	2 (0·8% [0·0–1·9])	0	0	2 (0·1% [0–0·2])
Barbiturates	0	2 (2·1% [0·0–4·9])	1 (0·3% [0·0–1·0])	1 (0·4% [0·0–1·2])	0	9 (0·7% [0·2–1·1])	13 (0·6% [0·3–0·9])
Benzodiazepines	0	3 (3·1% [0·0–6·5])	6 (2·0% [0·4–3·6])	10 (4·0% [1·6–6·5])	4 (4·1% [0·2–8·1])	32 (2·4% [1·6–3·2])	55 (2·5% [1·9–3·2])
Any amphetamine, barbiturates, and benzodiazepines	0	5 (5·2% [0·8–9·6])	7 (2·4% [0·6–4·1])	12 (4·8% [2·2–7·5])	4 (4·1% [0·2–8·1])	40 (3·0 % [2·1–3·9])	68 (3·1% [2·4–3·9])
Cannabinoids	0	3 (3·1% [0·0–6·5])	5 (1·7% [0·2–3·2])	7 (2·8% [0·8–4·9])	3 (3·1% [0·0–6·5])	52 (3·9% [2·9–4·9])	70 (3·2% [2·5–4·0])
Ethanol	0	0	0	3 (1·2% [0·0–3·2])	1 (1·1% [0–3·2])	10 (0·8% [0·3–1·2])	14 (0·7% [0·3–1·0])
Any opioid	7 (7·1% [2·0–12·1])	2 (2·1% [0·0–4·9])	11 (3·7% [1·6–5·9])	33 (13·3% [9·0–17·5])	3 (3·1% [0–6·5])	66 (5·0% [3·8–6·1])	122 (5·6% [4·7–6·6])
Predominantly heroin*	3 (3·0% [0·0–6·4])	0	1 (0·3% [0–1·0])	8 (3·2% [1·0–5·4])	0	13 (1·0% [0·4–1·5])	25 (1·2% [0·7–1·6])
Predominantly opium*	5 (5·1% [0·8–9·5])	1 (1·0% [0–2·3])	9 (3·0% [1·0–5·0])	13 (5·2% [2·5–7·9])	2 (2·1% [0·1–4·1])	25 (1·9% [1·1–2·6])	55 (2·5% [1·9–3·2])
Predominantly codeine*	0	1 (1·0% [0–2·3])	1 (0·3% [0–1·0])	14 (5·6% [2·8–8·4])	1 (1·1% [0–3·2])	26 (2·0% [1·2–2·7])	43 (2·0% [1·4–2·6])
Prescription opioid*	0	0	0	0	0	5 (0·4% [0–0·7])	5 (0·2% [0–0·4])
Any positive test	7 [7·1% [2·0–12·1])	10 (10·3% [4·3–16·4])	21 (7·1% [4·2–10·1])	52 (20·9% [15·8–25·9])	9 (9·3% [3·5–15·1])	148 (11·1% [9·4–12·8])	247 (11·4% [10·0–12·7])

Data are n (% [95% CI]). Numbers are any households where one individual tested positive for substances in hair, urine, or saliva. *Categories not mutually exclusive for single household.

***Table* 2: Households that tested positive for substances by region**

Results

Of the 2683 households approached, 2187 (82%) completed the survey, representing 19 025 people. Reasons for not completing the survey were no individuals at home (135 households, 5% of households approached), no woman available for interview (104, 4%), survey break-off (ie, started the survey but failed to complete it; 4, 0·1%), and no woman living at home (3, 0·1%). Among households surveyed, 2170 provided at least one sample. 5236 people were tested. When missing data were accounted for, the sample totalled 2155 female heads of household (99%), 1370 adult men (63% of the 2170 households with men), and 1705 children (86% of the 1985 households with children). The lower test rate for men was attributable mainly to their schedules and bald heads; only five men declined despite being available and having hair (the reason for refusal was not asked). After repeated attempts to include the oldest man, we sampled the next oldest man, resulting in 20% of men being recruited in this way.

The mean age of the 19 025 people sampled was 22·9 years (table 1). The mean age of female respondents tested was 42·1 years (SD 13·3) and the mean age of male respondents was 44·7 years (19·4); the mean age of the children tested was 6·4 years (2·4). About nine people were living in the households, with male and female individuals equally distributed. Ethnic origin varied by region and province, with most households reporting Tajik ethnicity, followed by Pashtun (table 1). More than a sixth of the women reported that someone in their household had lived outside Afghanistan in the past 5 years (table 1).

Of 2170 households, 247 (11%) had at least one person who tested positive for at least one substance (table 2). Opioids were the most common finding in hair, urine, or saliva at the household level, with a prevalence of 5·6%. The west region had the highest household prevalence of opioids, whereas the lowest prevalence was in the east region (table 2). Seven households in Badakhshan had someone who tested positive for opioids, but no one tested positive for any other drugs (table 2). In a sensitivity analysis on individuals testing positive for opioids living or working outside Afghanistan in the past 5 years, no differences were found between those who lived or worked outside Afghanistan and those who did not. Income also did not differentiate opium or heroin users.

Cannabinoids were the next most commonly found substance in samples (70 households [3·2%]; table 2). Cannabinoid-positive tests were most frequent in Hirat and Kabul. Benzodiazepines were the third most frequently found substances (55 households [2·5%]). When amphetamines, barbiturates, and benzodiazepines were combined, the household prevalence was nearly the same as for cannabinoids (68 [3·1%]). Of note was the low prevalence for ethanol use (14 [0·7%]). No positive results occurred for PCP, MDMA, and cocaine.

In all provinces, more men (147; 10·7%) tested positive for substances than did women (92; 4·3%) and children (39; 2·2%; figure 2). Prevalence ranged from a low of 4% in Bamyan to a high of 28% in Nimroz, with prevalence highest in the west region. Except for in Badakhshan, more women tested positive for substances than did children (from 0% in Bamyan to 14% in Nimroz). Prevalence in children ranged from 0% in several provinces to 6% in Farah. Prevalence for women and children was also highest in the west.

In Kabul, 90 men (9·9%), 49 women (3·7%), and 22 children (2·6%) tested positive for a substance. When we stratified data for the Kabul province by geographical quadrants (northeast, northwest, southwest, and southeast), no significant differences were shown in demographic characteristics except for ethnic origins; people in the southwest were predominantly Hazara rather than Tajik. Of the 1343 households within Kabul, 148 households (11·1%) tested positive for at least one

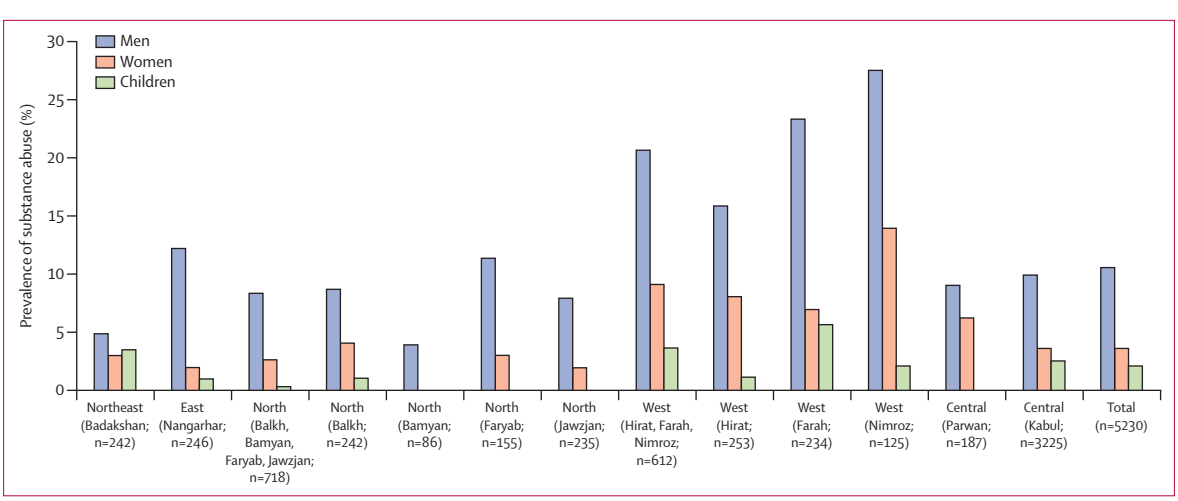

Figure 2: **Individual prevalence of positive tests for substance use by region, province, sex, and age**
Data based on positive results in hair, saliva, or urine tests. Categories are mutually exclusive.

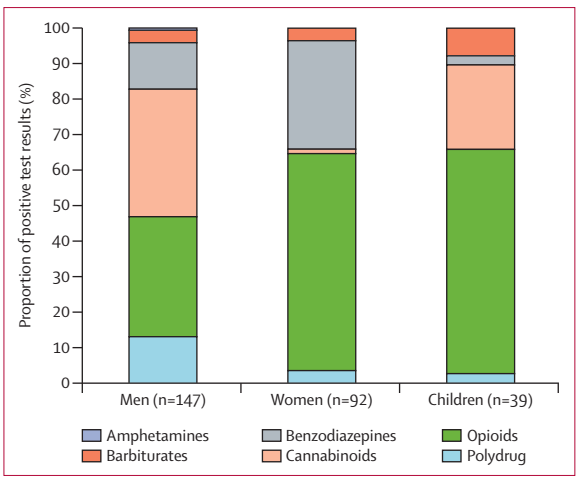

***Figure* 3: Patterns of positive tests by sex and age group**
Data based on positive results in hair, saliva, or urine tests. Categories are mutually exclusive.

See Online for appendix

substance. The drug most commonly shown by laboratory tests was opioids (66; 4·9%); whereas the most commonly self-reported substances were prescription drugs (126; 9·4%). When stratified by sex and age, men in the east of Kabul had the highest prevalence of substance use (12·3%) compared with other regions, whereas women (9·2%) and children (3·7%) from the west had the highest use.

After direct age standardisation, we estimate the national prevalence of substance use in Afghanistan to be 7·2% (95% CI 6·1–8·3) for men and 3·1% (2·5–3·7) for women. When adjusted for clustering within households, we estimate the national prevalence of drug use in Afghanistan to be 5·1% (4·4–5·8), and 5·0% (4·1–5·8) in Kabul.

Figure 3 shows the pattern of substance use in men, women, and children who tested positive for any substance. Those testing positive for more than one substance were considered polysubstance users. In the 278 individuals who tested positive, opioids accounted for just more than 60% of positive tests for substances in women and children, followed by cannabinoids in children (24%), and benzodiazepines among women (31%). In men, the most commonly found substance was cannabinoids (36%), followed by opioids (34%). Positive tests for cannabinoids were rare in women (1%). Amphetamines were found only in men. Men were five times more likely than were women and children to test positive for more than one substance (figure 3). Polysubstance use was largely attributed to opioids and benzodiazepines (46%), and to opioids and cannabinoids (33%). In the rest of polydrug users, opioids were found in all but one person.

We analysed self-reported household drug use and related behaviours (reported by female head of the household on behalf of all members) by region (table 3) and sex (appendix). The lifetime self-reported household prevalence of opium or heroin use for any reason was 4·5% for men and 3·3% for women (appendix). The past 30 day self-reported prevalence of opium or heroin use in men was five times that of women (1·5% *vs* 0·3%), and a third of the rate of lifetime prevalence, with percentages highest in the west regions (appendix). All women who reported past 30 day use of a substance in any family member within their household also consistently reported lifetime use for that same substance for themselves (data not shown). For cannabinoid (charas) use, the self-reported lifetime prevalence was 7·1%; nearly all use was in men, with a prevalence higher than for opium or heroin (appendix). Although more than half of the lifetime charas use was reported to be current (3·9%), no women were reported to be current users of charas. Prescription pain pills, sedatives, and tranquillisers were reportedly used by 18·4% of people in their lifetime and were the most commonly reported

	Northeast	East	North	West	Central		Total (n=2187)
	Badakhshan (n=99)	Nangarhar (n=98)	Balkh, Bamyan, Faryab, and Jawzjan (n=298)	Hirat, Farah, and Nimroz (n=249)	Parwan (n=100)	Kabul (n=1343)	
Any self-reported lifetime use of heroin or opium	5 (5·1% [0·7–9·4])	3 (3·1% [0·0–9·4])	19 (6·4% [3·6–9·2])	22 (8·8 [5·3–12·4])	3 (3·0% [0–6·3])	97 (7·2% [5·8–8·6])	149 (6·8% [5·8–7·9])
Any self-reported past 30 day use of heroin or opium	1 (1·0% [0–3·0])	0	7 (2·3% [0·6–4·1])	8 (3·2% [1·0–5·4])	2 (2·0% [0–4·7])	20 (1·5% [0·8–2·1])	38 (1·7% [1·2–2·3])
Any self-reported liftetime use of charas	8 (8·1% [2·7–13·5])	12 (12·2% [5·7–18·7])	20 (6·7% [3·9–9·6])	7 (2·8% [0·8–9·6])	9 (9·0% [3·4–14·6])	99 (7·4% [6·0–8·8])	155 (7·1% [6·0–8·2])
Any self-reported past 30 day use of charas	0	0	0	0	0	0	0
Any self-reported lifetime use of pills*	6 (6·1% [1·4–10·8])	10 (10·2 [4·2–16·2])	20 (6·7 [3·9–9·6])	32 (12·9% [8·7–17·0])	7 (7·0% [2·0–12·0])	328 (24·4% [22·1–26·7])	403 (18·4% [16·8–20·1])
Any self-reported past 30 day use of pills*	5 (5·1% [0·7–9·4])	3 (3·1% [0·0–6·5])	11 (3·7% [1·5–5·8])	18 (7·2% [4·0–10·4])	3 (3·0% [0–6·3])	126 (9·4% [7·8–10·9])	166 (7·6% [6·5–8·7])

Data are n (% [95% CI]). *Includes prescription pain pills, sedatives, and tranquillisers.

***Table* 3: Household drug use reported by the female head of the household by region**

	Northeast	East	North	West	Central		Total
	Badakhshan (n=99)	Nangarhar (n=98)	Balkh, Bamyan, Faryab, Jawzjan (n=298)	Hirat, Farah, Nimroz (n=249)	Parwan (n=100)	Kabul (n=1343)	(n=2187)
At present, is there							
Anyone in neighbourhood who uses opium?	9 (10·5% [4·0–16·9])	7 (9·2% [2·7–15·7])	19 (9·0% [5·2–12·9])	24 (16·8% [10·7–22·9])	10 (13·0% [5·5–20·5])	97 (12·7% [10·4–15·1])	166 (7·6% [6·5–8·7])
Anyone in neighbourhood who trades opium for goods or services?	4 (4·0% [0·2–8·2])	2 (2·7% [0·0–6·4])	3 (1·4% [0·0–3·0])	11 (7·2% [3·1–11·3])	1 (1·0% [0–3·0])	33 (4·5% [3·0–6·0])	54 (2·5% [1·8–3·1])
Anyone in neighbourhood who cultivates poppy?	4 (4·0% [0·2–8·2])	0	1 (0·3% [0·0–1·0])	0	1 (1·0% [0–3·0])	0	6 (0·3% [0·1–0·5])
Anyone who has been thrown out because of drug or alcohol use?	1 (1·0% [0·0–3·0])	1 (1·0% [0·0–3·0])	2 (0·7% [0·0–1·6])	3 (1·2% [0·0–2·6])	1 (1·0% [0–3·0])	11 (0·8% [0·3–1·3])	19 (0·9% [0·5–1·3])
Compared to 5 years ago, do you think that more women are using							
Opium or heroin?	19 (19·2% [11·4–27·0])	18 (18·4% [10·7–26·0])	101 (33·9% [28·5–39·3])	131 (52·6% [46·4–58·8])	35 (35% [25·6–44·4])	597 (44·5% [41·8–47·1])	901 (41·2% [39·1–43·3])
Cannabis?	17 (17·2% [9·7–24·6])	19 (19·4% [11·6–27·2])	74 (24·8% [19·9–29·7])	107 (43·0% [36·8–49·1])	28 (28·0% [19·2–36·8])	512 (38·1% [35·5–40·7])	757 (34·6% [32·6–36·6])
Pain pills, sedatives, or tranquillisers?	13 (13·1% [6·5–19·8])	21 (21·4% [13·3–29·6])	63 (21·1% [16·5–25·8])	93 (37·3% [31·3–43·4])	25 (25·0% [16·5–33·5])	535 (39·8% [37·2–42·5])	750 (34·3% [32·3–36·3])
Alcohol?	10 (10·1% [4·2–16·0])	13 (13·3% [6·5–20·0])	61 (20·5% [15·9–25·1])	80 (32·1% [26·3–37·9])	33 (33·0% [23·8–42·2])	444 (33·1% [30·5–35·6])	641 (29·3% [27·4–31·2])

Data are number of positive answers (% [95% CI]).

***Table 4*: Perception of drug use and societal issues by female head of the household**

drugs in women, with a prevalence nearly triple that of men (14·5% *vs* 5·3%; appendix). Reported alcohol use was low in men (data not shown); no alcohol use was reported for either women or children. Cigarette (chillum) use was the most commonly reported substance for adults (28·6%), but was rare in children (0·1%).

Overall 166 (7·6%) women reported that a neighbour used opium (table 4), but reports that people in their neighbourhood cultivated poppy or were thrown out of the household due to substance use were rare. 41% of the women surveyed believed that more women were now using opium or heroin compared with 5 years ago. This number was similar for cannabis; pills, sedatives, or tranquillisers; and alcohol (table 4). Perceptions about trends in use mimicked their reports about their neighbours' use.

We also collected self-reported lifetime use of mufara (a preparation made from opium, hashish and sugar and eaten like chocolate), petrol, shoe polish, acetone, datura (also known as dantoorah or gul-e-khapiray, which grows wild all over Afghanistan), ketamine, cough syrup, and glue. Use of all substances apart from petrol inhalation was negligible or non-existent, except for in Kabul where 60, 34, and 7 households reported lifetime use of inhaled petrol (4·5%), acetone (2·5%), and shoe polish (0·5%), respectively.

Agreement was high between test results and self-reports for opium or heroin in men and women and for household charas use (96–99%; table 5). There was moderate to excellent agreement between the woman's report of current heroin or opium use and the man's laboratory result (Yule's Y 0·78), excellent agreement between a woman's self-report and her own laboratory results (0·88), and moderate agreement for household cannabinoid use (0·68; table 5).

Discussion

ANUDUS is the first epidemiological study of households in Afghanistan to assess both self-report and laboratory-based testing for drugs and alcohol, and is now the most comprehensive assessment of substance use and its correlates in Afghanistan (panel). Our high response rate (81·5%) is higher than many epidemiological studies around the world[12]—attributed to the welcoming recruitment style of our interview team—adding to our confidence in the results.

Overall substance use in individuals (a positive laboratory test) was high, with a prevalence of 11% in men, 4% in women, and 2% in children. Opioids were the most common positive results. Opium use was most often found in the northeast and west regions, which could be due to higher access of the drugs. In all provinces, laboratory tests showed cannabinoids to be only the second most prevalent drugs. Contrary to expectations, we did not find a high prevalence of prescription opioids in any region. The low prevalence of polysubstance use among women (4%) and children (3%), compared with that of men (13%) was noteworthy (figure 3), indicating a need for more research in these areas.

	Survey negative report	Survey positive report	Concordance*	κ (95% CI)	Yule's Y (95% CI)
Opioid or heroin use in men in household					
Negative drug test	1320	12	97·4%	0·42 (0·27–0·58)	0·78 (0·69–0·86)
Positive drug test	24	14	..	..	..
Opioid or heroin use in female HoH					
Negative drug test	2143	2	99·5%	0·28 (–0·03 to 0·59)	0·88 (0·77–1·0)
Positive drug test	8	2	..	..	..
Cannabinoid use by any individual in household					
Negative drug test	2064	38	96·3%	0·33 (0·22–0·44)	0·68 (0·60–0·76)
Positive drug test	41	21	..	..	..

HoH=head of the household. *Percentage of individuals with results of tests that agreed with report.

***Table 5*: Concordance between tests (urine or saliva) and reports (self or from female HoH) of drug use in past 30 days**

***Panel*: Research in context**

Systematic review

Before we launched the study, we searched PubMed for English articles with no date restrictions with combinations of search terms including "substance use", "drug use", "amphetamines", "barbiturates", "benzodiazepines, "alcohol use", "opioid", "heroin", "opium", "codeine", "injection drug user", "mufara", "petrol", "shoe polish", "acetone", "datura", "ketamine", "cough syrup", "glue", and "Afghanistan". The search was last updated on May 31, 2014. Few studies have used credible methods.[2–6] Almost all of the previous studies were done with key informants and subgroups such as female sex workers or drug users receiving treatment, which introduced information and sampling biases that reduced generalisability.

Interpretation

In urban regions of Afghanistan, after age standardisation, 7% of men and 3% of women tested positive for drugs. The national prevalence of substance use was 5%. Our results show that the female head of the household was a knowledgeable informant about household substance use. There is some evidence for an increase in psychoactive drug use in Afghanistan and that children are increasing being exposed to opioids. These findings provide insight to help inform possible individual and community substance use intervention and prevention measures.

A strength of our study was our pairing of the biological samples with self-reports. Whereas average agreement with κ was shown for women and moderate agreement was shown for men, the more sensitive Yule's Y (which takes into consideration the base rate) showed excellent concordance between a woman's report of her own opium or heroin use, moderately high concordance for men's use, and moderate concordance for household cannabinoid use. Disagreement between reports and laboratory testing might have been due to several reasons: environmental exposure via another household member or a visitor to the household that the female head of household was unaware of; drug use by an individual who was not tested (37% of men selected were not home, were bald, or had refused testing); positive results caused by use of cough syrup or analgesics with opiates in them; or women's disinclination to reveal the truth. Drug concentrations nearly always suggested use by the individual rather than secondary exposure, but more laboratory tests might have been positive had more men been tested. After the first and second batch of test results, we put in place additional protocols to increase male participation. To avoid confusion with prescription medication, a separate question for pain pills, sedatives, and tranquilliser might have avoided any misclassification bias. However, our findings were consistent with global use patterns for higher prevalence of prescription pills for women than for men, adding confidence in our data. Additionally, the fact that the prevalence of ethanol via self-report agrees with the specimen testing is reassuring since drinking alcohol is taboo in Afghanistan. Concordance indicates that Afghans will divulge sensitive information when the justification for information is clearly stated and when the caring and professional team provide anonymity and privacy.

More women felt that people in their communities were using opium (8%) than our findings showed (6%). Moreover, 41% indicated that more women were using opium compared with 5 years ago. Although 30% said that there was an increase in women's use of alcohol recently, use determined by testing was low (0·07%) and attributed to men. This finding, and the better than average agreement between self-report and laboratory samples, reassured us that reports were accurate. Women were also consistent in distinctly answering questions about use. There were no logical instances where women would report 30 day use, but not lifetime use, and there was a strong association between use of substances and risk factors, such as neighbourhood use.

There were some limitations in our study. First, although we tried to survey the household members with the most knowledge of the household, these women still might not have known the exposure history of all other household members. Second, in cities such as Kabul and Hirat where homelessness is high,[13] the study design did not capture the homeless population, thus potentially leading to a bias in the estimate of the prevalence. Third, we did not ascertain the reliability of the questionnaire by resampling a fraction of the households, although questions were based on assessments that have been used in test-retest studies previously.[14–16] The high concordance between self-reported and laboratory-tested results suggests a good validity of the self-reported questionnaire. Fourth, although this is the most comprehensive survey of drug and alcohol use in Afghanistan, the national prevalence was estimated on the basis on data collected from urban areas of 11 provinces. Prevalence of pharmaceutical opioid and heroin use could be higher in urban areas, whereas more traditional forms of illicit drug

use such as opiate smoking and cannabis might be more common in more remote rural areas. Other limitations included our inability to find all selected men at home for sample collection. In future work, additional techniques should be explored to secure all selected participants.

More analyses are needed for the risk factors associated with both self-reported and tested prevalence of substance use from households and individuals. The use of petrol and acetone warrants further interventions.

In conclusion, we were humbled that household members allowed us into their homes; many were actually eager to participate in this survey. Although men were not as available as we expected them to be for testing, women rarely refused the survey or testing and were good to excellent reporters about their household. Our results suggest that drug use in Afghanistan is prevalent, higher in men than in women, and that the substance most commonly found in hair, urine, or saliva was opioids. Opioids were the most common positive result in women and children; however, the most commonly reported drugs by women were prescription drugs, with past 30 day prevalence for women twice that for men. This alarming prevalence deserves our continued attention.[17]

Contributors

LBC developed the assessment, planned the methods, oversaw the quality control, analysed and interpreted the data, and wrote and edited most of the Article. She also trained the field team in Dubai and participated in weekly conference calls with staff. SA oversaw part of the quality control, analysed part of the data, and wrote and edited the Article. BAG was involved in the toxicology analyses and edited the Article. MAG did the field work in Afghanistan and worked with LBC on quality control. He also edited the paper. DMM helped to conceptualise the study, helped to develop questions for analysis, participated in weekly conference calls; oversaw the hair, urine, and saliva drug testing; and edited the Article. HH was involved in the revision of the Article. MSG conceptualised the study from the beginning and edited the Article.

Declaration of interests

We declare no competing interests.

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