



SUBSTANCE ABUSE AND TRAUMA IN CAPE TOWN

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Objective. To obtain baseline data on the incidence of acute alcohol intoxication, chronic alcoholism and illicit drug usage among a cohort of injured patients.

Design. A prospective, descriptive study of 254 injured patients presenting at the trauma unit of Groote Schuur Hospital over an 'idealised week' in 1997. Alcohol consumption was assessed by means of the Lion SD2 alcolmeter. Chronic alcoholism was assessed using the CAGE questionnaire. Each patient's urine was analysed for four drugs (cannabis, morphine, opiates and methaqualone) using conventional 'wet' analysis. Sweat was tested for cannabis using a Drugwipe.

Main outcome measures. Sociodemographics, cause of injury, injury severity, acute alcohol intoxication, chronic alcohol usage and illicit drug involvement.

Results. Patients were predominantly male, coloured and an average of 31.3 years old. The majority had been injured as a result of interpersonal violence. Self-reported alcohol consumption was reliable but this was not so for self-reported drug usage. Sixty per cent of patients had positive alcohol levels on breath analysis. More than one-quarter of all the patients could be classified as chronic alcoholics on the CAGE questionnaire. On urine analysis, 40% of patients were found to have used at least one illicit drug in the recent past. The most commonly abused drugs were cannabis or a combination of cannabis and Mandrax, locally called a 'white pipe'. Use of the white pipe was confined almost exclusively to patients injured as a result of interpersonal violence.

Conclusions. Alcohol remains the most commonly abused substance among trauma patients, but there are growing numbers of patients who simultaneously abuse illicit drugs. This study will be conducted annually to detect trends and identify emerging problems.

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Alcohol consumption increases the risk of injury. There are numerous reports that document this relationship, both internationally and locally.^{1,2} However, much less is known about the effects of other drugs, both licit and illicit.

There is growing concern that drugs other than alcohol also affect performance and behaviour and therefore modify injury risk. However, there is insufficient scientific evidence to prove that they actually increase the likelihood of injury. Part of the reason for this is that there are a number of difficulties involved in trying to detect drug intoxication in injured patients. For instance: no single set of test procedures constitutes a standard drug screen and therefore sophisticated and costly equipment is required; urine drug screening may not necessarily indicate use or impairment at the time of the injury because drug metabolites may be excreted for days and even weeks after use;³ the clinical manifestations of alcohol and drug intoxication are often very similar; the extent of impairment attributable to drugs is uncertain because of the complex relationship between performance and drug concentrations; and self-reporting of substance abuse is of doubtful reliability.⁴

Bearing these limitations in mind, two local studies have indicated that substances other than alcohol may be present in victims of interpersonal violence⁵ and traffic trauma.⁶ The authors are not aware of any studies on the prevalence of chronic alcohol use among injured patients in South Africa, although international studies have shown this to be as high as 60%.⁷⁻⁹

Since the change of government in South Africa there has been a steady increase in the use and availability of illicit drugs.¹⁰ Longitudinal information is therefore necessary in order to identify changes in the nature, extent and negative consequences of substance abuse and to determine effective interventions. To this end, this substance abuse surveillance study set out to obtain baseline information regarding the magnitude of acute and chronic alcohol abuse as well as illicit drug usage among a cohort of trauma patients presenting at Groote Schuur Hospital. We present the results from the first year of a proposed annual study.

METHODS

Patients presenting with recent injuries (less than 6 hours old) at the trauma unit of Groote Schuur Hospital (GSH) in 1997 were included in the study. The concept of an 'idealised week' was used for sampling purposes because of the volume of patients attending this facility. Each day was divided into four 6-hour shifts. One shift was randomly selected per day so that over the 4-week study period a complete 24-hour period would be covered for each day. All patients attending during these times were included provided that they gave written consent.

A total of 254 patients was included. Socio-demographic data were recorded as well as the cause and type of injuries



sustained. The latter was coded using the Abbreviated Injury Scale (AIS90)¹¹ and the New Injury Severity Score (NISS).¹²

Acute alcohol intoxication was assessed by means of self report and breath alcohol concentration (BrAC) analysis using a Lion SD2 alcolmeter that had been validated in a similar cohort.¹³ Chronic alcohol misuse was assessed by means of the CAGE questionnaire.¹⁴ The CAGE has been validated in two South African studies: one on chronic alcohol use among tuberculosis patients¹⁵ and the other on residents in the Lesotho Highlands Water Project area.¹⁶

Participants were also questioned regarding their illicit drug usage and a urine specimen was analysed by the Department of Pharmacology of the University of Cape Town for cannabis (dagga), methaqualone (Mandrax), cocaine and opiates. Cocaine, opiates and cannabis were detected by fluorescence polarisation immunoassay using appropriate kits supplied by Abbott Laboratories. Methaqualone was detected in urine by a homogeneous enzyme immunoassay technique using the Emit immunoassay kit supplied by Behring. Subjects were considered to have tested positive for a drug if their levels exceeded 300 ng/ml for cocaine, 250 ng/ml for opiates, 25 ng/ml for cannabinoids and 300 ng/ml for methaqualone. These levels represent the lower limit of reliable detection for each assay.

Assessing illicit narcotics in human sweat appears to be a promising new technique for drug screening.¹⁷ In our study, cannabis was assessed by means of a Drugwipe strip which, according to its German manufacturer, can detect traces of illicit drugs in sweat by simply wiping the surface of the skin. In the presence of a substance such as cannabis the test strip should turn a shade of pink. Although these Drugwipe strips have been validated in small, controlled studies in Germany,¹⁸ there have been no attempts to do so in South Africa.

RESULTS

A total of 494 patients passed through the trauma unit during the study period. Two-hundred and sixteen patients did not fulfil the inclusion criteria, i.e. their injuries were more than 6 hours old, they were re-attenders or they were under 18 years of age. Of the 278 patients who met the inclusion criteria, 24 (8.6%) refused to give consent. These 24 patients differed from the study sample in that they were slightly (but not significantly) older, more likely to be female and had sustained 'accidental injuries'. We could not assess whether these patients had taken alcohol or drugs before sustaining their injury, and therefore could not relate their refusal to participate to substance usage.

Sample characteristics

Table I shows the characteristics of the 254 patients who were included in the study. The majority were male and coloured and the average age was 31.3 years (standard deviation (SD) 11.1 years). Most had been injured as a result of interpersonal

Table I. Characteristics of injured patients

	N	%
Gender		
Male	200	78.7
Female	54	21.3
Population group		
Black	106	41.7
Coloured	138	54.3
White	10	3.9
Age (yrs)		
< 20	19	7.5
20 - 29	114	45.1
30 - 39	65	25.7
40 - 49	32	12.6
50 - 59	18	7.1
60+	5	2.0
Cause of injury		
Interpersonal violence	139	54.7
Attempted suicide	4	1.6
Traffic	72	28.3
Other non-traffic 'accidents'	39	15.4
Injury severity (NISS)		
< 9	143	56.3
9 - 24	65	25.6
25 - 75	46	18.1
Time since injury (min)*		
< 60	51	23.3
60 - 119	64	29.2
120 - 179	36	16.4
180+	68	31.1

* Not known in 35 cases.

violence or traffic collisions and had sustained moderate injuries (median NISS = 8, interquartile range (IQR) 4 - 7). Most patients (58.6%) presented to the unit on a Saturday or Sunday. Less than one-quarter presented within an hour of being injured: on average, patients arrived 136 (99) minutes after they had sustained their injury. This was probably because many had attended facilities elsewhere before being transferred to GSH (a Level I trauma facility).

Alcohol usage

Breath alcohol concentration

BrAC analysis could be performed on 250 of the 254 patients. Results revealed that 40.8% of the patients had zero levels and that one-third had levels at or above 0.08 g/100 ml, i.e. the legal limit for drivers (Fig. 1). The mean alcohol level for those with positive results was 0.12 (0.1) g/100 ml.

Self-reported alcohol consumption

Forty-one of the 254 patients could not be interviewed because of the severity of their injuries. Of the remaining 213, 53 (24.9%) said that they never drink alcohol. Just over half of the patients acknowledged drinking alcohol in the 6 hours before their injury. Table II shows what alcoholic beverages were consumed, where, and in what quantity.

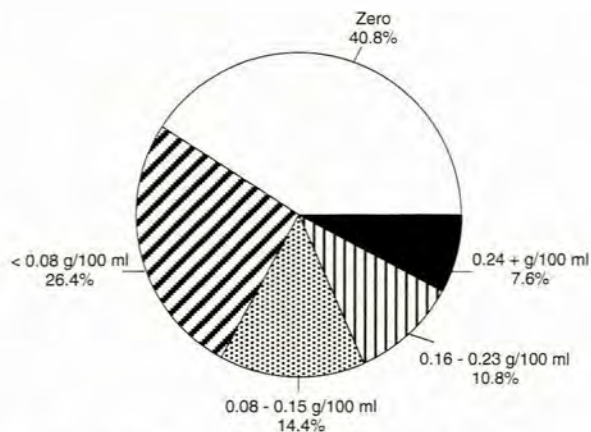


Fig. 1. Breath alcohol concentration among injured patients (N = 250).

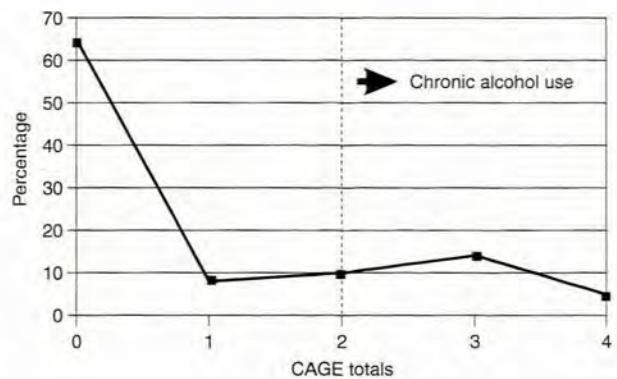


Fig. 2. Chronic alcohol usage among injured patients (N = 196).

Table II. Self-reported alcohol consumption among injured patients (N = 254)

Acknowledged drinking in 6 hours before injury (%)	50.1
Type of alcoholic beverage consumed (%)	
Beer	61.4
Spirits	22.8
Wine	15.7
Mean number of standard drinks consumed (SD)	6.1 (4.8)
Place where alcohol was consumed (%)	
At a bar/shebeen	17.9
At a party/club	13.7
With friends	41.1
At home	17.9
In another public place (e.g. park)	9.5

Most patients volunteered honest information with regard to their alcohol consumption. Compared with breath alcohol, self-reported alcohol consumption yielded a sensitivity of 86.7% and a specificity of 96.7%

Chronic alcohol usage

One hundred and ninety-six patients could be interviewed with regard to their chronic use of alcohol. Using a cut-off point of 2 on the CAGE questionnaire, 28% of them could be classified as problem drinkers or possible chronic alcoholics (Fig. 2). A disturbing 50% of injured pedestrians could be classified similarly.

Illicit drug usage

Drug screening

Urine samples were obtained from 196 of the patients (77.2%). Of these patients, 41.8% had at least one substance (other than alcohol) detected in their urine, primarily cannabis and Mandrax. Very few patients were found to be cocaine-positive. Although nearly one-quarter of patients were opiate-positive, these results had to be disregarded because many patients were given an opiate analgesic in the pre-hospital phase or at another institution.

Self-reported drug usage

Twenty-four of the 213 patients who could be interviewed indicated that they had used an illicit drug in the 48 hours preceding their injury. These 24 patients only acknowledged using cannabis or a combination of cannabis and methaqualone. When compared with urinary cannabinoid excretion, the validity of self-reported cannabis smoking in the 48 hours before injury was found to be very poor (sensitivity = 40%, specificity = 99.1%).

Sweat testing for cannabis

The validity and accuracy of the Drugwipe strip were disappointingly poor. Compared with urinary cannabinoid excretion it yielded a sensitivity of only 46.8% and a specificity of 77.3%. Furthermore, two major difficulties were encountered with the Drugwipe in the trauma unit. Firstly, it was often difficult to see subtle colour changes on the tester under artificial lighting, and secondly, if the Drugwipe was contaminated with blood then the tester automatically turned a shade of pink when dipped into water.

In general, the substance most commonly used before an injury was alcohol, although a significant proportion of patients abused a combination of substances (Fig. 3).

There appear to be few differences with regard to gender and the abuse of alcohol and cannabis (Table III), but all the patients who were positive for the combination of cannabis and Mandrax were men. Significantly fewer coloured patients were found to be cannabis-positive ($P = 0.007$) than users from other population groups. No differences in alcohol or 'white pipe' usage were found between the population groups.

Table IV gives a breakdown of substances abused according to cause category. Patients presenting as a result of interpersonal violence were most likely to be both alcohol- and drug-positive; however, patients injured in traffic collisions had much higher alcohol levels. 'White pipe' smoking was almost exclusively confined to the interpersonal violence group.

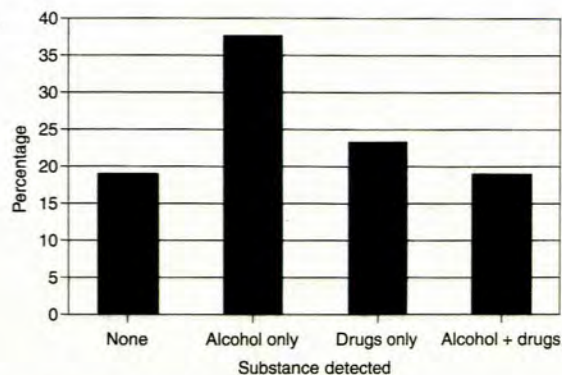


Fig. 3. Substances used by injured patients (250 patients assessed for alcohol use and 196 for drug abuse).

Table III. Substance abuse by gender and population group

	Alcohol-positive (%)	Cannabis-positive only (%)	Cannabis- and Mandrax-positive (%)
Gender			
Male (N = 200)	60.5	13.5	12
Female (N = 54)	57.4	13.0	0
Population group			
Black (N = 106)	64.2	20.8	4.7
Coloured (N = 138)	58.7	7.2	13.0
White (N = 10)	30.0	20.0	10.0

* Chi-square = 9.8, $P = 0.007$.

Cigarette smoking

Cigarette smoking among all injured patients was disturbingly common (Table IV). More than two-thirds of the injured patients acknowledged smoking a median of 10

(IQR 5 - 15) cigarettes per day. Although this habit may not in itself be a risk factor for injury, it may indicate a 'risk-taking'

Table V. Association between smoking and substance use before injury

	Odds ratio	95% confidence interval
Positive for any drug	2.10	1.0 - 4.4
Positive for alcohol	2.06	1.1 - 3.9

personality since there was a definite association between cigarette smoking and the use of both alcohol ($P = 0.0023$) and drugs ($P = 0.052$) in this cohort of injured patients (Table V).

DISCUSSION

Alcohol remains the substance most commonly abused by injured patients. Sixty per cent of our sample had positive alcohol levels, confirming results from studies of a similar nature in South Africa.¹⁹ On average, patients who had consumed alcohol had levels of 0.12 g/100 ml. Alcohol levels at the time of injury were possibly much higher since there was an average time delay of approximately 2 hours between the incident and alcohol testing. Many patients had been referred from a less sophisticated facility where they had received intravenous therapy.

Alcohol intoxication at the time of admission can be considered an indicator of possible chronic alcoholism.²⁰ Furthermore, a visit to the trauma unit could be the first and last opportunity that a doctor has to identify such alcoholics and send them for appropriate therapy.²¹ Using the CAGE questionnaire, our study found that one-quarter of the trauma patients could be labelled chronic alcoholics and that half of the injured pedestrians could be classified as such.

However, substances other than alcohol also appear to be a problem among trauma patients. Just over 40% of patients were found to have used at least one illicit drug. Unlike the USA

Table IV. Substance abuse among trauma patients according to cause of injury

	Violence (N = 139)	Traffic (N = 72)	Other (N = 43)	All trauma (N = 254)
Acute alcohol intoxication				
Self-reported alcohol consumption (%)	60.1	49.0	20.5	50.2
Alcohol-positive (%)	70.1	52.1	35.7	59.2
Mean alcohol level* in g/100 ml (SD)	0.11 (0.10)	0.14 (0.10)	0.11 (0.12)	0.12 (0.10)
Chronic alcohol use (%)				
CAGE 2+	29.4	26.4	26.3	28.1
Other substances (%)				
Cigarette smoker	72.1	60.0	66.7	68.2
Self-reported illicit drug user	15.4	5.9	5.1	5.7
Urine screen positive for any drug	44.5	37.3	40.0	41.8
Urine cannabis-positive	34.2	15.7	31.4	29.1
Urine Mandrax-positive	20.0	3.8	5.7	13.2
'White pipe'-positive	19.1	2.0	5.7	12.2
Urine cocaine-positive	2.7	2.0	0	2.0

* For alcohol-positive individuals only.



where cocaine is a major problem among trauma cohorts, cannabis is the most commonly abused drug in Cape Town. It appears to be a particular problem among men and those injured as a result of interpersonal violence. Both these risk factors have been identified in a previous study conducted at Tygerberg Hospital in 1995.⁵ Other street drugs such as cocaine, 'crack', heroin and 'brown sugar', although available, do not appear to be much of a problem, probably because they are very expensive. Cannabis, on the other hand, is cultivated in large quantities in southern Africa, particularly in KwaZulu-Natal and Lesotho, and is consequently inexpensive. One gram of cannabis costs approximately R1.²²

The Mandrax (methaqualone) and cannabis mixture (or 'white pipe', as it is known locally) appears to be a problem confined almost exclusively to patients injured as a result of interpersonal violence. This nexus has been previously shown in a study of fatally injured patients conducted in 1996.²³ Mandrax, a quinazoline derivative that was introduced as a non-barbiturate sedative-hypnotic in 1965 and removed from the market in 1985 because of its extensive misuse,²⁴ is still manufactured in Africa. Mandrax is sprinkled on top of the cannabis and is smoked in the broken neck of a bottle. It apparently causes the smoker to experience a short euphoric 'rush', followed by a tranquil state that can last up to 6 hours.²⁵ Like cannabis, Mandrax is relatively cheap – one Mandrax tablet costs between R25 and R35.²² Because the 'white pipe' is unique to South Africa there is no international literature on the relationship between this drug combination and trauma; consequently this disturbing nexus will have to be investigated in more depth locally.

A limitation of this study was that like most drug-related trauma studies in South Africa, drug screening was done on a sample of urine. As indicated previously, drugs such as cannabis can be excreted for up to 2 weeks after smoking. Our study can therefore only indicate the prevalence of illicit drug usage among injured patients. In order to assign causation one would have to do a case control study using serum drug analysis. Although this is possible in some First-World trauma centres where patients are transported by helicopter,²⁶ it is almost impossible in South Africa because of the long delays in presenting to hospital.

Our study showed that most injured patients volunteer information on their alcohol usage but appear to be a little less forthcoming with regard to their illicit drug usage. We thought that the Drugwipe would rectify this problem, but this screening tool was found to be very insensitive and therefore only marginally better than self-reporting by the patients. A group of Dutch researchers has also recently found that the Drugwipe cannot be used reliably as a screening tool.²⁷

RECOMMENDATIONS

Substance abuse among trauma patients is obviously a problem. However, drug screening is expensive and therefore

not feasible in South Africa. Despite its limitations we therefore recommend that all injured patients be questioned routinely regarding their alcohol and illicit drug usage. Such monitoring would not only assist clinicians in assessing and managing patients, but would also monitor substance abuse trends and quickly identify emerging problems. Furthermore, the CAGE questionnaire should be incorporated into the initial history-taking session and examining of trauma patients since it is short and quick to administer and accurately identifies chronic alcoholics who can then be offered appropriate referral.

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