Psychoactive substance (drugs and alcohol) use by Emergency Department patients before injury

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Abstract

Objective The aim of this study was to determine the prevalence and risk factors of alcohol, medication and illicit drug use before accidents in Emergency Department (ED)-treated trauma victims with internationally recommended methods to minimize registration bias.

Patients and methods The study design was cross-sectional and was carried out at Erasmus Medical Centre in Rotterdam. Alcohol, psychoactive medication and illicit drug use were assessed in an interview by an independent researcher on the basis of the standardized WHO questionnaire. During 84 shifts, covering 4 weeks 24/7, data on a comprehensive population of ED-treated injury patients were collected prospectively.

Results A total of 475 patients were included (response rate 87%). The prevalence of alcohol intoxication (defined as ≥ 3 U alcohol) before trauma was 19%. Alcohol-intoxicated trauma patients were significantly more often men [odds ratio (OR) 2.88, 95% confidence interval (CI) 1.54–5.40], of Dutch descent (native) (OR 2.26, 95% CI 1.24–4.13), unemployed or students (OR 1.77, 95% CI 1.03–3.04), and alcohol intoxication decreased with age (OR 0.98, 95% CI 0.96–0.99). Psychoactive medication was used by 7% of ED trauma patients; increasing age (OR 1.05, 95% CI 1.03–1.07) and living alone (OR 2.4, 95% CI 1.04–5.52) were risk factors. Illicit drugs were used by 4% of trauma patients. Overall, 27% of patients were under the influence of at least one psychoactive substance.

Conclusion Over a quarter of trauma patients visiting the ED had used alcohol, psychoactive medication and/or illicit drugs before their accident. By far, the majority of intoxications before trauma were because of alcohol (19%). We found higher prevalence rates of alcohol intoxication and lower prevalence rates for illicit drug use than others. Because of our comprehensive approach and high response rates, registration bias was minimized.

Keywords: alcohol, Emergency Department, intoxication, prevalence, trauma

Introduction

Background

The relationship between alcohol intoxication and trauma is well described in the literature, and studies have become available on the association between illicit drugs and medication among trauma patients in the Emergency Department (ED) [1–8]. However, accurate and valid prevalence rates of alcohol, psychoactive medication and illicit drugs among ED trauma patients are still scarce.

The overall prevalence rates for alcohol use among trauma patients vary between 4.6 and 35%, and for benzodiazepines, a prevalence of 4.2–21% of all trauma patients has been reported [1–6,9]. The prevalence of illicit drug use has been reported to be between 3.3 and 13.6% in European and South American studies. A study from the USA reports drug use in ~ 40% of trauma patients [7] and a South African study reports up to 62% of all violent trauma patients being positive for drug use in the ED [8].

Prevalence rates vary depending on the country and the location of the ED, but, more importantly, also on the measurement instrument used. It is difficult to find accurate numbers; studies are limited by selection bias, for example, because of low or unreported response rates or inclusion rates [1,4,6,8,9] or because the study focused on a selected patient group such as only admitted patients or only patients who underwent toxicological testing [2,9].

To reduce registration bias, dedicated research staff is recommended, which is reported to result in almost no sample bias [10]. Also, high inclusion rates of the comprehensive ED trauma population, in a 24/7 approach, are required. The standardized WHO questionnaire is a valid measurement tool (http://www.who.int/substance_abuse-/activities/en/InjuriesInstrumentEnglish.pdf); moreover, self-reported alcohol and drug use data are a valid method to measure prevalence [11].

Importance

Besides the scarcity of valid estimates of the prevalence of psychoactive substances, little data are available on the influence of different subgroups on the association between alcohol, drugs and trauma [12]. It has been shown that prevalence rates for alcohol and drugs vary widely between different age groups and different sexes. The highest prevalence

rates for drug and alcohol use are seen in young men [1,3,6,9].

It is unclear whether factors such as healthcare insurance status or patients' descent are risk factors for intoxications among trauma patients. Urbanization is increasing worldwide, the numbers of elderly are increasing in the population and cultural diversity in large cities is increasing as well [13,14]. Therefore, a need remains to further identify risk groups for alcohol, illicit drugs and medication use among trauma patients.

Aims of this investigation

The aim of this present study was to obtain accurate and valid prevalence rates for alcohol, illicit drugs and psychoactive medication among trauma patients presenting to the ED using internationally recommended methods to minimize bias. The secondary aim was to identify risk groups for the use of alcohol, drugs and psychoactive medication.

Patients and methods

Study design and setting

The design of the study was cross-sectional. The study was carried out at the ED of Erasmus Medical Centre, which is an inner-city academic hospital in Rotterdam (the population is ~ 615 000) and is one of 10 trauma centres in the Netherlands. Annually, about 25 000 patients visit the ED and ~ 33% present to the ED with an injury.

Selection of patients

Between October 2011 and February 2012, two independent researchers included patients in the study during 84 8-h shifts, covering 4 entire weeks 24/7. All shifts (day shift from 8:00 a.m. to 4:00 p.m., evening shift from 4:00 p.m. to 12:00 a.m. and night shift from 12:00 a.m. to 8:00 a.m.) and all days of the week were evenly represented. This resulted in a unique comprehensive ED population in which no specific patient groups or time frames were missed. Intentionally, no measurements were performed on public holidays to avoid potential bias because of possible overconsumption of psychoactive substances on holidays. All adult patients (18 years and older) presenting to the ED with a traumatic injury were eligible for inclusion. Patients brought by ambulance were included in the study. Patients attending for a follow-up visit were excluded as well as patients who were unable to provide informed consent because of acute medical treatment or Glasgow Coma Scale score of less than 15. Trauma was defined as any damage inflicted upon the body, accidental or intentional, as the direct result of an external force, with or without disruption of a structural continuity. Patients participated in an interview on the trauma, the use of illicit drugs, alcohol and the use of certain psychoactive pharmaceutical drugs (prescribed or self-medicated; see below).

Outcome measures

The primary outcome was the self-reported use of alcohol, illicit and therapeutic drugs and medication. The secondary outcome measures were patient characteristics including patient background, trauma mechanism, injured body region and time of presentation to the ED.

Methods and measurements

Two independent researchers interviewed the patients in the Dutch, English or German language. The researchers were not part of the medical team; they were not wearing white coats and did not participate in any clinical activity. The interview was based on the validated WHO questionnaire used in the 'WHO Collaborative Study on Alcohol and Injuries' (http://www.who.int/substance_abuse/ activities/en/InjuriesInstrumentEnglish.pdf) and a previously validated questionnaire on the prevalence of alcohol and substance use [11]. The interview included a discussion of the following subjects: demographics, trauma characteristics (e.g. type of trauma, time of trauma, site where trauma occurred, body region of injury), alcohol use, illicit drug use and the use of psychoactive medication (prescribed or self-medicated). Any illicit drug use in the 6 h before the accident was defined as a positive case. Alcohol use of at least 3 U in the 6 h before the accident was defined as a positive case of alcohol intoxication before trauma. Pharmaceutical drugs under investigation were drugs that may influence consciousness or alertness, such as sleeping pills, antidepressants, antihistamines, psychopharmaceuticals and certain analgesics. Patients on pharmaceutical drugs in category II and III, according to the International Council on Alcohol, Drugs and Traffic Safety (ICADTS), whose responses are considered to be comparable with blood alcohol levels of greater than 0.05%, were considered intoxicated by psychoactive drugs [15]. Medication in categories II and III included benzodiazepines, monoamine oxidase inhibitors, certain selective serotonin reuptake inhibitors and antihistamines, and opioids. Medication use of agents in category II and/or III (as described above) 24 h before the accident was defined as a positive case.

Patients' medical files were consulted by the researchers for additional information on the patients' condition at the time of presentation, the mechanism of injury, insurance status and diagnosis.

Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 19.0 (SPSS Inc., Chicago, Illinois, USA). Normality of continuous data was tested using the Shapiro–Wilk test. Descriptive analysis was carried out to describe baseline characteristics (i.e. intrinsic variables and injury-related variables) and outcome measures (i.e. prevalence

of substance use). Continuous data (e.g. age, time of presentation): mean ± SD (parametric data) or medians and interquartile range (IQR) (nonparametric data) were calculated. For categorical data (e.g. prevalence of substance use, sex, demographics), percentages were calculated. A $\chi 2$-test analysis was carried out to test whether the prevalence of alcohol and drug use was different for different trauma mechanisms. A P-value less than 0.05 was considered a threshold of statistical significance. Univariable and multivariable logistic regression analysis were carried out to model the relation between different covariates and the use of alcohol. The following variables were dichotomized for univariable and multivariable logistic regression analysis: level of education in high versus low and intermediate combined; domestic situation in alone versus not alone; and working situation in paid work versus nonpaid work. Age was added as a continuous variable. Other intrinsic and injury-related variables were added as covariates. Similar models were created to model the relation between covariates and the use of drugs. For illicit drugs, a multivariable regression analysis could not be carried out because the sample size was too small.

Ethical considerations

The study was carried out according to the principles of the Declaration of Helsinki (October 2008) (http://www.wma. net/en/30publications/10policies/b3/index.html) and institutional approval was obtained from the research ethics board before the initiation of the study.

Participation in this study was voluntary and no compensation was available. Patients were included after they provided informed consent in the Dutch, English or German language. The results of the interview were only available for the study, and not for the treating physician.

Results

Population characteristics

A total of 549 patients with traumatic injuries visited the ED during the study shifts, of whom 475 (87%) were included. A total of 524 (95%) patients were approached by the researchers to participate in the study, of whom 49
patients were excluded because of their inability to speak Dutch, English or German (n = 9), refusal to participate (n = 20) or necessity for immediate medical treatment (n = 20) (Fig. 1).

The patients included had a mean age of 38.3 years (SD 17.8) and 62% (n = 296) were men, 61% (n = 290) were of Dutch descent and 97% (n = 459) had healthcare insurance coverage. Most injuries were located on the upper extremities, and a fall was the most common cause of the accident. Most patients presented during daytime or evening hours. The patients excluded differed from patients included in that significantly more excluded
patients were admitted to the ICU ($P < 0.01$) and more
often violence or high-energy trauma was the cause of the accident ($P < 0.01$). Furthermore, excluded patients were more often uninsured ($P < 0.01$) (Table 1).

Alcohol

Nineteen per cent (n = 92) of trauma patients consumed at least 3 U of alcohol in the 6 h before trauma, and were considered alcohol intoxicated. Prevalence rates differed significantly in terms of time of presentation to the ED; during week days, 14% (n = 45) of trauma patients who visited the ED (n = 321) were alcohol intoxicated com- pared with 31% (n = 47) of 154 trauma patients during the weekend ($P < 0.01$). Differences in prevalence were also observed during the different work shifts: 7% (n = 15) during day shift, 17% (n = 30) during evening shifts and 52% (n = 47) during night shifts ($P < 0.01$).
The prevalence of any amount of alcohol consumption in the 6 h before trauma was 23% (n = 111). The median amount of alcohol consumed within 6 h before the trauma was 6 U (IQR 8.0): 8 U (IQR 9.0) for men (n = 89) and 4 U (IQR 2.8) for women (n = 22).
Sociodemographic risk factors for alcohol intoxication among ED trauma patients found by univariable regression analysis are male sex [odds ratio (OR) 3.23, 95% confidence interval

(CI) 1.8–5.69], age (OR 0.97, 95% CI 0.95–0.98) and working situation (OR 0.51, 95% CI 0.32–0.808). In addition, the reason for ED visit was significantly different for alcohol-intoxicated patients than other nonintoxicated patients. Violence was the reason for ED visits in almost 40% of cases compared with 8% in nonintoxicated patients. Univariable logistic regression analysis showed a strong relationship between violence and alcohol intoxication (OR 8.5, 95% CI 4.8–15.0; $P < 0.01$) (Table 3A).

Multivariable regression analysis also showed that Dutch descent (OR 2.3, 95% CI 1.2–4.1; $P = 0.01$) and living alone (OR 1.98, 95% CI 1.12–3.48; $P < 0.02$) are strong risk factors for alcohol intoxication (Table 3B).
Healthcare insurance coverage among the trauma patients studied was 97%, and (absence of) healthcare insurance coverage was not found to be a risk factor for alcohol intoxication among trauma patients.

Psychoactive medication

The prevalence of psychoactive medication use among ED trauma patients was 7% (n = 32). In 56% (n = 18) of cases, medication was used by women, and 41% (n = 13) of trauma patients who used psychoactive medication before their trauma were older than 75 years of age. There was a difference in the type of trauma, anatomical location of injury and follow-up of patients who used psychoactive drugs compared with patients who did not. Patients on medication visited the ED twice as often as a result of a fall. Their face was more often injured and their upper extremities were less injured compared with patients not on psychoactive drugs. Also, they were admitted to the hospital more often (Table 2B).
No significant differences in descent, level of education or healthcare insurance status were found. Univariable logistic analysis indicated that being female, older age, being single and being unemployed were associated significantly with the use of psychoactive drugs before trauma (Table 3A). However, after we carried out mul- tivariable logistic regression analysis of sociodemographic variables, only older age (OR 1.05, 95% CI 1.03–1.07; $P < 0.01$) and living alone (OR 2.4, 95% CI 1.04, 5.52; $P = 0.04$) were strong independent predictors for the use of psychoactive medication before trauma (Table 3B).

Illicit drugs

Illicit drugs were used by 4% (n = 18) of all trauma patients 6 h before their trauma. Cannabis was the most frequently used drug [n = 12 (63%)]. Other substances used were cocaine [n = 3 (16%)], MDMA (3,4-methylene-dioxy-N-methamphetamine) [n = 3 (16%)] and heroin [n = 1 (5%)]. No patients reported the use of alkyl nitrate (so-called 'poppers'), lysergic acid diethylamide, amphetamine, γ-hydroxybutyric acid, methadone or ketamine.

All patients intoxicated with illicit drugs were men and had healthcare insurance. Violence was three times more frequently the reason for ED visits among drug-intoxicated patients compared with non-drug-intoxicated patients (Table 2B). Univariable regression analysis showed no significant differences in age, descent, level of education and working situation between illicit drug-intoxicated and non- intoxicated patients. Only a significant association between aggression as cause of trauma and intoxication with illicit drugs was found (OR 3.68, 95% CI 1.31–10.32) (Table 3A).

Mixed intoxications

Among the study population, 27% (n = 128) of patients were intoxicated by one or more substances. As mentioned earlier, 19% (n = 92) of ED trauma patients were intoxicated with alcohol (≥3 U of alcohol in the past 6 h), 4% (n = 18) with illicit drugs and 7% (n = 32) with psychoactive drugs.

Among alcohol-intoxicated ED trauma patients, 10% (n = 9) had used illicit drugs and 4% (n = 4) had used psychoactive medication. Fifty per cent of the drug- intoxicated patients were alcohol intoxicated at the same time.

No patients were at the same time intoxicated with alcohol, illicit drugs and psychoactive medication. Intoxication with both alcohol and illicit drugs was observed in 2% (n = 9) of the studied population. Mixed intoxication with alcohol and psychoactive medication was observed in 1% (n = 4) of the ED trauma population. Only one ED trauma patient (< 0.01%) reported a mixed intoxication with illicit drugs and psychoactive medication.

Discussion

We have presented a study with validated measurement methods on a comprehensive ED trauma patient population. In this study, with high internal validity, we showed that a significant proportion (27%) of the ED population of trauma patients was intoxicated with alcohol, illicit drugs and/or medication. The prevalence for alcohol intoxication (defined as ≥ 3 U alcohol) before the trauma was 19%, which was considerably more than expected on the basis of the reported values in the literature. This prevalence of 19% was higher than reported in an earlier study in 2004 in which our hospital participated, where self-reported prevalence rates for alcohol use among trauma patients of 11% were described [4]. In the same study, the self-reported prevalence rate for illicit drug use among trauma patients was 10% [4].

However, in this study, we showed that illicit drugs were used by 4% of all trauma patients, which can be considered low compared with other studies [3–5,7–9]. The differences in the prevalence of alcohol and drug intoxication in our study could possibly be attributed to the differences in the recruitment of patients, leading to differences in inclusion rates of the studies. The response rate of our study is 87% compared with ∼24% in the earlier study [4]. Therefore, we believe that the results we present here are more valid estimates of the prevalence of intoxication among trauma patients.

For alcohol intoxication before trauma, we confirmed commonly identified risk groups such as male sex and young age [1,3]. In addition, in this study, we found that alcohol-intoxicated trauma patients were significantly more often of Dutch descent (native) and unemployed or students. Our study showed no relation between healthcare insurance status and intoxication before trauma. However, healthcare insurance coverage is high (97%) in our population, which may be the reason why healthcare status is not a significant risk factor for intoxication before trauma. Alcohol consumption and addiction is increasing among the so-called ‘baby boomers’. We therefore investigated whether age was a risk factor for alcohol intoxication among ED trauma patients. However, the risk of alcohol intoxication decreased with age; no increase in the prevalence of alcohol intoxication among elderly ED trauma patients was observed. Unlike others, we did not find older age as a risk factor for alcohol intoxication [16]. In our population, almost 40% of alcohol-intoxicated trauma patients were

involved in violence-related incidents, which is in the higher range compared with the literature [3,4].

The association between violence-related injury and drugs has been reported by others [2,17], especially the association with violence and nonsedative drugs. In our study, we confirmed violence as an independent risk factor for illicit drug intoxication. An inner-city hospital in Amsterdam has reported that the majority of drugs- related complaints were made by tourists [18]. In our study, we found that 50% of patients were of Dutch descent. Descent of the patient was, however, not an independent risk factor. The differences between the studies may be explained by the fact that although Rotterdam is a multicultural society, it houses fewer tourists than the capital city.

Psychoactive medication use among elderly trauma victims is a serious concern, especially considering the increase in the number of elderly [14]. In this study, an overall prevalence of 7% of medication use among trauma patients was found. A prevalence of 7% is in the middle of the range of earlier published studies. We consider our result a valid estimate for the comprehensive ED trauma population as earlier studies reported lower or unknown participation rates or investigated only a selection of ED patients [5,9]. Significantly more elderly patients and patients who live alone used psychoactive medication before the accident. Sex was not an independent risk factor, although, like others [9], there were more women among psychoactive medication-using patients.

Patients on psychoactive medication had significantly more often injuries to the face and significantly less often to the upper extremities compared with patients who had not taken psychoactive drugs. This is possibly because of patients' inability to break their fall with their hands or arms when they are on drugs that influence reaction time.

Prevention

The results of this study support the importance of prevention of alcohol abuse. Prevention programmes such as brief intervention for alcohol in the ED should be encouraged. In the primary care setting, as well as in the ED, brief interventions for patients with alcohol abuse have shown to be helpful preventative measures [19–21]. Brief intervention programmes are currently receiving attention worldwide [22]. In the Netherlands, the organization

‘Partnership Vroegsignalering Alcohol’ (PVA) has developed a screening and intervention tool for alcohol abuse patients, and a pilot has been conducted in a city hospital in The Hague, the Netherlands [23].

Secondary prevention of alcohol abuse, such as per- formed by the PVA, is directed at the target group of the current study: the intoxicated patient in the ED. The public health focus could additionally be directed at primary prevention. Patients could easily be reached and followed up through the general practitioners’ offices as the risk groups for alcohol intoxication include young men of Dutch descent who have healthcare insurance.

Motivational interviewing seems to be an effective method of intervention for adult substance abuse [24]. ED interventions targeted at substance abuse by adolescents are available; however, the results remain inconclusive [25,26].

Prevention programmes to reduce the use of psychoactive medication (or fall-risk increasing drugs) among the elderly have been started [27]. They may result in significant healthcare advances as hospitalization of the elderly because of trauma can result in morbidity and healthcare costs. Prevention of falls in the elderly may result in significant healthcare advances and should be encouraged [28].

Strengths and limitations

This study on the prevalence of alcohol, drugs and medication among trauma patients has high internal validity. Shifts covering day, evening and night hours, and all days of the week were represented evenly in the study, and a high inclusion rate of 87% was obtained. Methodological differences in the studies available led to variations in the prevalence rates of the use of alcohol, drugs and medication. In this study, we have used research staff to interview patients instead of questionnaires distributed by ED personnel. The use of research staff is reported to result in almost no sample bias [10].

There are some limitations to report. This study is a single-centre study carried out in an inner-city hospital. Prevalence rates should be extrapolated to the ED population at large with care. However, urbanization is increasing worldwide and immigration is increasing, especially in Western countries [13, 14]. This study provides information on a multicultural large city ED population. Holidays were excluded from the mea- surement period to obtain

a representable estimate of the prevalence of intoxications on average nonholidays. The results therefore cannot be extrapolated to public holidays. The methodology used (a patient interview) did not allow us to include patients with a Glasgow Coma Scale score less than 15, and prevalence rates are not representable for patients with decreased level of consciousness.

It is shown that self-reported alcohol and drug use data are a valid method to measure prevalence compared with voluntary testing of breath and urine [11]. However, a reporting bias cannot be excluded, especially in reporting drug use, as it may be socially more acceptable to report the use of alcohol and medication than the use of drugs. To minimize this potential bias, the interviewers were not part of the medical team as they were not wearing white coats and certainly not participating in medical activities. In addition, patients were informed that their answers or participation would not influence their treatment and would remain strictly private and would only be used for this study.

Conclusion

Over a quarter of trauma patients visiting the ED are intoxicated by alcohol, psychoactive medication and/or illicit drugs. The vast majority of intoxications before trauma are because of alcohol. Male sex, young age, liv- ing alone, Dutch (native) descent and no paid employment are independent risk factors for alcohol intoxication before trauma. The risk factors for the use of psychoactive drugs are older age and living alone. This study shows higher prevalence rates of alcohol intoxication compared with others and lower prevalence rates for illicit drug use than described previously. Registration bias was minimized because of the comprehensive approach and the high response rates.

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Conflicts of interest

There are no conflicts of interest.

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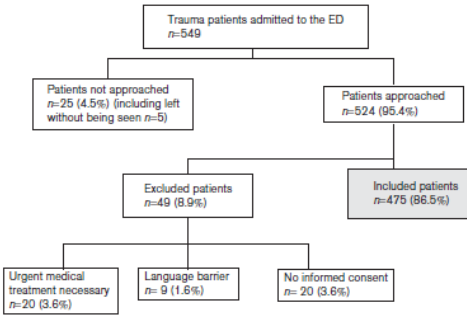
Figure 1:



Study flow chart. ED, Emergency Department.

Table 1:

Table 1 Characteristics for included and excluded patients

	Included patients (*n* = 475) [*n* (%)]	Excluded and not approached patients (*n* = 74) [*n* (%)]	*P*-value
Sex			0.12
Male	296 (62.3)	53 (71.6)	
Female	179 (37.7)	21 (28.4)	
Age [mean (SD)] (years)	38.3 (17.8)	39.2 (17.2)	
Age category (years)			0.89
18–25	141 (29.7)	20 (27)	
26–35	126 (26.5)	19 (25.7)	
36–45	63 (13.3)	12 (16.2)	
46–55	56 (11.8)	10 (13.5)	
56–65	47 (9.9)	5 (6.8)	
66–75	15 (3.2)	4 (5.4)	
> 75	27 (5.7)	4 (5.4)	
Location of injury on the body			< 0.01
Upper extremity	159 (33.5)	15 (20.3)	
Lower extremity	130 (27.4)	11 (14.9)	
Face	59 (12.4)	9 (12.2)	
Head	33 (6.9)	10 (13.5)	
Back	25 (5.3)	6 (8.1)	
Thorax and abdomen	15 (3.2)	7 (9.5)	
Multiple injuries	33 (6.9)	11 (14.9)	
Eye	16 (3.4)	5 (6.8)	
Other	4 (0.8)	0 (0)	
Type of trauma			< 0.01
High-energy trauma	34 (7.2)	11 (14.9)	
Violence	67 (14.1)	17 (23)	
Isolated extremity injury	104 (21.9)	5 (6.8)	
Cut wound	50 (10.5)	9 (12.2)	
Fall	165 (34.7)	21 (28.4)	
Isolated eye injury	15 (3.2)	5 (6.8)	
Low-energy traffic accident	17 (3.6)	0 (0)	
Other	23 (4.8)	6 (8.1)	
Presentation to the ED			
Week day	321 (67.6)	58 (78.4)	0.06
Weekend	154 (32.4)	16 (21.6)	
8:00 a.m. to 4:00 p.m.	204 (42.9)	29 (39.2)	0.58
4:00 p.m. to 12:00 a.m.	180 (37)	27 (36.5)	
12:00 a.m. to 8:00 a.m.	91 (19.2)	18 (24.3)	
Follow-up			< 0.01
Discharge	261 (54.9)	31 (41.9)	
Hospital admittance	68 (14.3)	20 (27)	
Admittance to ICU	0 (0)	4 (5.4)	
Outpatient clinic	144 (30.3)	13 (17.6)	
Left without being seen	2 (0.4)	6 (8.1)	
Healthcare insurance			< 0.01
Yes	459 (96.6)	65 (87.8)	
No	16 (3.4)	9 (12.2)	

ED, Emergency Department.

Table 2:

Table 2 Sociodemographic (A) and medical (B) patient characteristics for intoxicated and nonintoxicated patients

	Alcohol use		Psychoactive medication use		Illicit drug use	
	<3 U	≥3 U	No	Yes	No	Yes
(A) Sociodemographic characteristics	*	*	*	*	*	*
Sex						
Male	221 (57.7)	75 (81.5)	280 (69.6)	14 (43.8)	279 (63.6)	18 (100)
Female	162 (42.3)	17 (18.5)	160 (36.4)	18 (56.3)	179 (39.2)	0 (0)
Age categories (years)	*	*	*	*		
18–25	100 (26.1)	41 (44.6)	139 (31.6)	2 (6.3)	135 (29.5)	6 (33.3)
26–35	100 (26.1)	26 (28.3)	121 (27.5)	4 (12.5)	120 (26.3)	6 (33.3)
36–45	54 (14.1)	9 (9.8)	59 (13.4)	3 (9.4)	61 (13.3)	2 (11.1)
46–55	50 (13.1)	6 (6.5)	51 (11.6)	5 (15.6)	52 (11.4)	4 (22.2)
56–65	39 (10.2)	8 (8.7)	44 (10)	3 (9.4)	47 (10.3)	0 (0)
66–75	13 (3.4)	2 (2.2)	12 (2.7)	2 (6.3)	15 (3.3)	0 (0)
> 75	27 (7.0)	0 (0)	14 (3.2)	13 (40.6)	27 (5.9)	0 (0)
Descent						
Netherlands	230 (60.1)	60 (65.2)	264 (60.0)	24 (75)	281 (61.5)	9 (50)
Dutch Antilles	17 (4.4)	2 (2.2)	19 (4.3)	0 (0)	18 (3.9)	1 (5.6)
Suriname	17 (4.4)	4 (4.3)	17 (3.9)	3 (9.4)	20 (4.4)	1 (5.6)
Morocco	21 (5.5)	5 (5.4)	24 (5.5)	2 (6.3)	24 (5.3)	2 (11.1)
Turkey	25 (6.5)	4 (4.3)	28 (6.4)	1 (3.1)	28 (6.1)	1 (5.6)
South/Western Europe	16 (4.2)	3 (3.3)	19 (4.3)	0 (0)	19 (4.2)	0 (0)
Eastern Europe and Russia	16 (4.2)	5 (5.4)	21 (4.8)	0 (0)	20 (4.4)	1 (5.6)
Other	41 (10.7)	9 (9.8)	48 (10.9)	2 (6.3)	47 (10.3)	3 (16.7)
Working situation	*	*	*	*		
Employed	227 (59.3)	39 (42.4)	259 (59.0)	7 (21.9)	259 (56.7)	7 (38.9)
Unemployed	49 (12.8)	18 (19.6)	64 (14.5)	2 (6.3)	60 (13.1)	7 (38.9)
Disabled	21 (5.5)	5 (5.4)	18 (4.1)	7 (21.9)	25 (5.5)	1 (5.6)
Retired	41 (10.7)	4 (4.3)	30 (6.8)	14 (43.8)	45 (9.8)	0 (0)
Student	43 (11.2)	25 (27.2)	67 (15.2)	1 (3.1)	68 (14.2)	3 (16.7)
Domestic situation	*	*	*	*		
Alone	136 (35.5)	40 (43.5)	155 (35.2)	20 (62.5)	167 (36.5)	2 (11.1)
Lives with partner and/or children	191 (49.9)	34 (36.1)	209 (47.5)	11 (34.4)	210 (46.0)	9 (50.0)
Lives with family/parents	43 (11.2)	22 (23.9)	64 (14.5)	1 (3.1)	69 (15.8)	5 (27.8)
Other	11 (2.9)	5 (5.4)	15 (3.4)	0 (0)	14 (3.1)	2 (11.1)
Level of education						
Low	86 (22.5)	21 (22.8)	99 (22.5)	6 (18.8)	102 (22.3)	5 (27.8)
Intermediate	180 (47)	48 (52.2)	207 (47.0)	20 (62.5)	216 (47.3)	12 (66.7)
High	111 (29.0)	21 (22.8)	127 (28.9)	5 (15.6)	131 (28.7)	1 (5.6)
Healthcare insurance						
Yes	368 (96.1)	91 (98.9)	424 (96.4)	32 (100)	441 (96.5)	18 (100)
No	15 (3.9)	1 (1.1)	16 (3.6)	0 (0)	16 (3.5)	0 (0)
(B) Medical characteristics						
Bodily location of injury	*	*	*	*		
Upper extremity	136 (35.5)	33 (35.9)	152 (34.5)	6 (18.8)	157 (34.4)	2 (11.1)
Lower extremity	111 (29.0)	19 (20.7)	121 (27.5)	9 (28.1)	124 (27.1)	6 (33.3)
Face	33 (8.6)	26 (28.3)	56 (12.7)	3 (9.4)	55 (12.0)	4 (22.2)
Skull	24 (6.3)	9 (9.8)	29 (6.6)	3 (9.4)	30 (6.6)	3 (16.7)
Back	24 (6.3)	1 (1.1)	22 (5.0)	3 (9.4)	25 (5.5)	0 (0)
Thoracicabdomen	11 (2.9)	4 (4.3)	11 (2.5)	4 (12.5)	14 (3.1)	1 (5.6)
Multiple locations	27 (7.0)	6 (6.5)	29 (6.6)	3 (9.4)	32 (7.0)	1 (5.6)
Eye	13 (3.4)	3 (3.3)	16 (3.6)	0 (0)	16 (3.5)	0 (0)
Other	3 (0.8)	1 (1.1)	4 (0.9)	0 (0)	3 (0.7)	1 (5.6)
Reason for ED visit	*	*	*	*	*	*
(New) collapse	9 (2.1)	4 (4.3)	9 (2)	2 (6.3)	11 (2.4)	1 (5.6)
Traffic accident	49 (12.8)	8 (8.7)	55 (12.5)	2 (6.3)	54 (11.8)	3 (16.7)
Accident	259 (66.1)	42 (45.7)	288 (63.9)	26 (81.3)	288 (62.9)	7 (38.9)
Aggression/violence	30 (7.8)	36 (39.1)	63 (14.0)	2 (6.3)	59 (12.9)	7 (38.9)
Sexual abuse	0 (0)	1 (1.1)	1 (0.2)	0 (0)	1 (0.2)	0 (0)
Auto mutilation	2 (0.5)	0 (0)	2 (0.5)	0 (0)	2 (0.4)	0 (0)
Sport accident	41 (10.7)	1 (1.1)	42 (9.5)	0 (0)	407 (9.2)	0 (0)
Presentation to ED	*	*				
Weekday	276 (72.1)	45 (48.9)	295 (67.0)	23 (71.9)	309 (67.6)	12 (66.7)
Weekend	107 (27.9)	47 (51.1)	145 (33.0)	9 (28.1)	148 (32.4)	6 (33.3)
	*	*				
8:00 a.m. to 4:00 p.m.	189 (49.3)	15 (16.3)	185 (42.0)	18 (56.3)	201 (44.0)	3 (16.7)
4:00 p.m. to 12:00 a.m.	150 (39.2)	30 (32.6)	167 (38.0)	11 (34.4)	173 (37.9)	7 (38.9)
12:00 a.m. to 8:00 a.m.	44 (11.5)	47 (51.1)	88 (20.0)	3 (9.4)	83 (18.2)	8 (44.4)
Follow-up	*	*	*	*		
Discharge	207 (54)	54 (58.7)	246 (55.9)	14 (43.8)	251 (54.9)	10 (55.6)
Admittance to hospital	58 (15.1)	10 (10.9)	55 (12.5)	11 (34.4)	63 (13.8)	5 (27.8)
Outpatient follow-up	116 (30.3)	28 (30.4)	138 (31.4)	6 (18.8)	141 (30.9)	3 (16.7)
Left without being seen	2 (0.5)	0 (0)	1 (0.2)	1 (3.1)	2 (0.4)	0 (0)

Characteristics are presented as *n* (%). Population: *n* = 475 for alcohol and drugs; *n* = 472 for medication. Level of education: highest level of education in category: high: college; intermediate: high school; low: primary school or vocational training.
ED, Emergency Department.
*Significant difference for that specific characteristic by Pearson's χ^2-test ($P < 0.05$).

Table 3:

Table 3 Association of alcohol intoxication, psychoactive medication use and illicit drug use, with patient and trauma characteristics [univariable (A) and multivariable (B) logistic regression analysis]

	Alcohol		Psychoactive medication		Illicit drugs	
	OR (95% CI)	*P*-value	OR (95% CI)	*P*-value	OR (95% CI)	*P*-value
(A) Univariate logistic regression analysis						
Sex (male vs. female)	3.23 (1.84–5.69)	*0.00*	0.44 (0.22–0.92)	*0.03*		
Age (continuous variable)	0.97 (0.96–0.98)	*0.00*	1.06 (1.04–1.08)	*0.00*	0.98 (0.94–1.01)	0.15
Descent (Dutch vs. other nationalities)	1.25 (0.78–0.98)	0.36	2.00 (0.88–4.55)	0.10	0.63 (0.24–1.61)	0.33
Healthcare insurance (no insurance vs. insurance)	0.27 (0.04–2.07)	0.21				
Domestic situation (alone vs. not alone)	1.41 (0.89–2.25)	0.14	3.03 (1.44–6.37)	*0.00*	1.72 (0.67–4.42)	0.26
Working situation (no paid employment vs. paid employment)	1.96 (1.24–3.13)	*0.00*	4.96 (2.09–11.76)	*0.00*	2.09 (0.80–5.48)	0.14
Education (low and intermediate level vs. high level)	1.03 (0.60–1.76)	0.92	0.81 (0.32–2.03)	0.65	1.31 (0.46–3.76)	0.62
Violence as trauma mechanism	8.51 (4.82–15.00)	*0.00*	2.47 (0.58–10.58)	0.22	3.68 (1.31–10.32)	*0.01*
(B) Multivariable logistic regression analysis						
Sex (male vs. female)	2.88 (1.54–5.4)	*0.00*	0.62 (0.27–1.45)	0.27		
Age (continuous variable)	0.98 (0.96–0.99)	*0.01*	1.05 (1.03–1.07)	*0.00*		
Descent (Dutch vs. other nationalities)	2.26 (1.24–4.13)	*0.01*	1.00 (0.38–2.66)	1.00		
Healthcare insurance (no insurance vs. insurance)	0.24 (0.02–2.08)	0.20				
Domestic situation (alone vs. not alone)	1.98 (1.12–3.48)	*0.02*	2.40 (1.04–5.52)	*0.04*		
Working situation (no paid employment vs. paid employment)	1.77 (1.02–3.04)	*0.04*	2.84 (0.99–7.03)	0.05		
Education (low and intermediate level vs. high level)	1.16 (0.60–2.22)	0.66	0.44 (0.15–1.32)	0.14		
Violence as trauma mechanism	8.16 (4.09–16.30)	*0.00*	1.34 (0.26–6.89)	0.73		

Significance of *P* values are represented in italics.
CI, confidence interval; OR, odds ratio.