

# Visits for alcohol-related problems in a large urban Emergency Department. Results of a 15-year survey

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**Summary.** Alcohol abuse is associated with a high burden of morbidity and mortality. Nevertheless, definitive epidemiological data on alcohol-related visits in the emergency department (ED) is substantially lacking. This study was aimed to analyze the epidemiological patterns and temporal trends of alcohol-related visits in the local ED, and assessing the healthcare burden of cases needing hospital admission. All patients visited for alcohol-related problems between the years 2002-2016 were anonymously identified from the hospital database. All cases were classified according to the main cause leading to ED, age and gender, time of presentation, disposition. Overall, 8014 cases were identified (2249 women and 5765 men). Women were younger than men. The overall trend during the study period was characterized by a constant increase in the number of alcohol-related ED admissions. A significant number of subjects had multiple alcohol-related visits. A total number of 747 patients were visited twice, 259 three times and 107 four times. A mostly nocturnal pattern of ED presentation was observed in both genders, peaking between midnight and 2 AM, and an increased number of visits was recorded during the weekends. The vast majority of patients (64%) could be discharged within 6 hours, but a considerable number needed longer observation and treatment in the ED. Overall, 7551 patients were discharged from the ED, whilst 462 patients needed hospital admission, 179 for traumatic injuries and 283 for non-traumatic causes. The decreasing age of subjects admitted to the ED with alcohol-related problems should now be regarded as a public healthcare issue. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** alcohol, alcoholism, intoxication, drunkenness, emergency department

## Introduction

Alcohol abuse is associated with a high burden of morbidity and mortality in the general population, and this evidence is further exacerbated by an increasing pattern of alcohol consumption in many Countries around the world (1, 2). For example, it has been recently shown that the alcohol-related deaths have increased by 10% between 2003-2012 in the UK, with nearly 13% of all women and 18% of all men drinking enough

to reach an increased risk of harm (3). Although nearly two decades ago has already been emphasized that patients visited in the Emergency Department (ED) are more likely to present with alcohol-related problems than the general population, and that a high number of all ED admissions in the evening and night, or during the weekends, are associated with hazardous and harmful levels of drinking (4, 5), precise epidemiological data on alcohol-related visits in the ED is substantially lacking. Alcohol-related ED visits displayed an

increasing pattern between 2001-2011 in the US, with a rate growing higher than the overall ED visits and thus representing a growing burden placed on hospital resources (6). Screening programs and interventions have been recently implemented in some countries, but they have mostly produced limited, heterogeneous and often controversial results (7-9).

The major difficulties for obtaining reliable epidemiological data about alcohol-related ED visits are attributable to the substantial bias of collecting history about prior-day or prior-week drinking (10), but also to the fact that the different aspects of the clinical assessment do not efficiently contribute to reliably mirror the blood alcohol concentration (11). The lack of routine measurement of blood alcohol concentration is another important source of epidemiological bias, since this type of laboratory testing is rarely prescribed especially when the clinical picture is not really suggestive for intoxication or the test is ordered by legal authorities (12).

Therefore, this study was aimed to analyze the epidemiological patterns and temporal trends of alcohol-related visits in the local ED, and assess the healthcare burden of cases needing hospital admission.

## Methods

All patients visited for alcohol-related problems (including trauma) in the ED of the University Hospital of Parma from 1 January 2002 to 31 December 2016 (i.e., 5848 days) were anonymously identified from the hospital database. Cases were searched using both the ICD-9 code 3050 (comprehensive of the 5<sup>th</sup> digit), and the terms "alcohol", "alcoholism", "etilic", "drunkenness", "intoxication". All cases identified with these search criteria were then reviewed by two authors (I.C. and G.C.) for deleting potentially inappropriate or inaccurate registrations. The University Hospital of Parma is a 1100-bed general and teaching hospital, which currently serves a population of approximately 340,000 inhabitants. This healthcare facility is also a level 2 Trauma Center, and a reference hospital for management of patients with stroke and myocardial infarction.

All alcohol-related visits were subsequently classified according to the main reason leading the patient

to the ED (i.e., intoxication, car crash, traumatic injury, illness, scuffle and/or fight), age and gender, time of presentation, disposition (discharged from the ED vs. hospital admission). The statistical analysis was carried out using Mathematica9<sup>®</sup> (Wolfram, Champaign IL, US) and GraphPad (GraphPad Software, San Diego, California, USA).

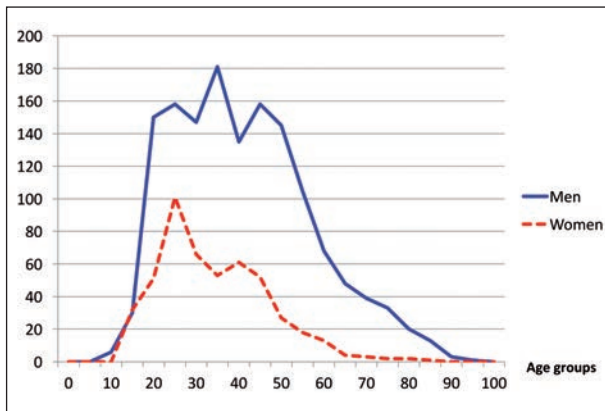
Due to local policy (i.e., retrospective study design and complete anonymization of patients' data), the consensus of the local ethical committee was unnecessary. Nevertheless, the investigation was performed in accordance with the Declaration of Helsinki, under the terms of relevant local legislation.

## Results

Overall, 8014 cases of alcohol-related ED visits were identified throughout the study period (2249 women and 5765 men), thus representing approximately 0.6% of all ED visits recorded during the same period. The age distribution of all cases classified according to the sex is shown in table 1. A highly significant difference was found for the age of admission between men and women (Chi-square with Yates correction,  $p < 0.001$ ). Overall, women were younger than men, as shown in Figure 1. In particular, the rate of alcohol-related ED admission in the age range comprised between 10-30 years was 32.4% in men and 41.1% in women (mean difference, 8.7%; Chi-square with Yates correction,  $p < 0.001$ ). In the age range comprised between 30-50 years the rate of alcohol-related

**Table 1.** Age distribution of all cases of alcohol-related emergency department (ED) visits classified according to the sex

| Age groups (years) | Men, N (%)   | Women, N (%) | Difference between genders (%) |
|--------------------|--------------|--------------|--------------------------------|
| 10-20              | 480 (8.3%)   | 299 (13.3%)  | -5%                            |
| 20-30              | 1387 (24.1%) | 622 (27.7%)  | -3.6%                          |
| 30-40              | 1439 (25.0%) | 432 (19.2)   | +5.8%                          |
| 40-50              | 1273 (22.1%) | 461 (20.5%)  | +1.6%                          |
| 50-60              | 595 (10.3%)  | 250 (11.1%)  | -0.8%                          |
| 60-70              | 311 (5.4%)   | 89 (3.9%)    | +1.5%                          |
| 70-80              | 218 (3.8%)   | 63 (2.8%)    | +1.0%                          |
| 80-90              | 56 (0.9%)    | 31 (1.4%)    | -0.5%                          |
| 90-100             | 6 (0.1%)     | 2 (0.1%)     | =                              |
| Total              | 5765 (100%)  | 2249 (100%)  |                                |

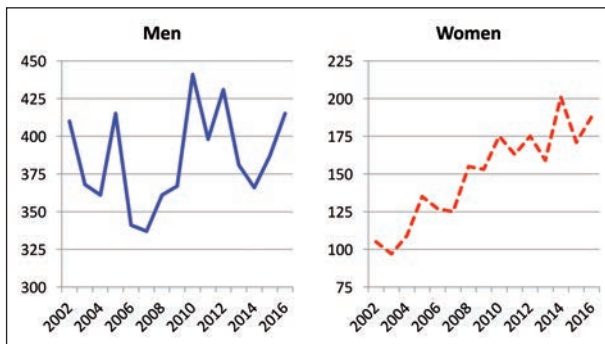


**Figure 1.** Age distribution of women and men of the entire study population

ED admission was 47.2% in men and 39.8% in women, respectively (mean difference, 7.4%; Chi-square with Yates correction,  $p < 0.001$ ) (Table 1).

The overall trend during the study period was characterized by a constant increase in the number of alcohol-related ED admissions, more accentuated in women than in men (Figure 2).

The main reasons leading patients to the ED are shown in table 2. Although most patients (i.e., 3402) were only visited once for alcohol-related problems



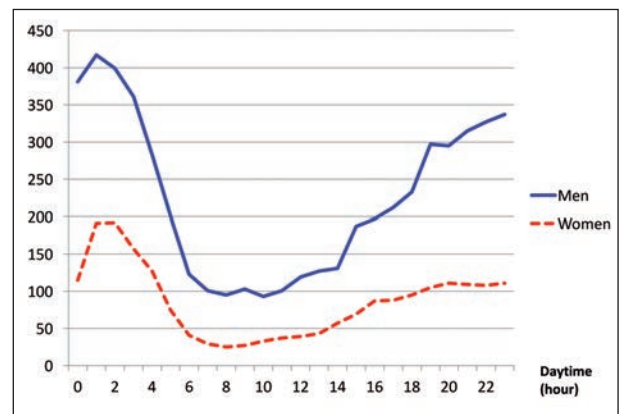
**Figure 2.** Temporal trends of alcohol-related emergency department (ED) visits in women and men

**Table 2.** Main causes of alcohol-related emergency department (ED) visits

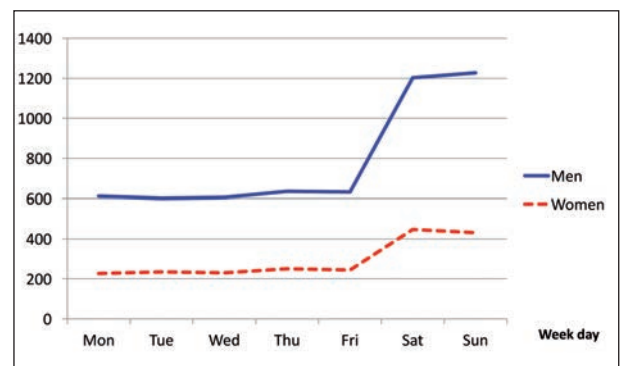
| Main reasons for ED alcohol-related visits | N (%)        |
|--|--------------|
| Non traumatic                              | 6299 (78.6%) |
| Car/bike accident                          | 759 (9.5%)   |
| Traumatic (not accident)                   | 610 (7.6%)   |
| Violence                                   | 346 (4.3%)   |

throughout the study period, a significant number of subjects had multiple alcohol-related visits. More specifically, 747 patients were visited twice, 259 patients were visited three times and 107 patients were visited four times. Some patients were also visited 5-12 times and a minority of them had a very high recurrence rate (i.e., 54 ED visits were recorded for one single male patient).

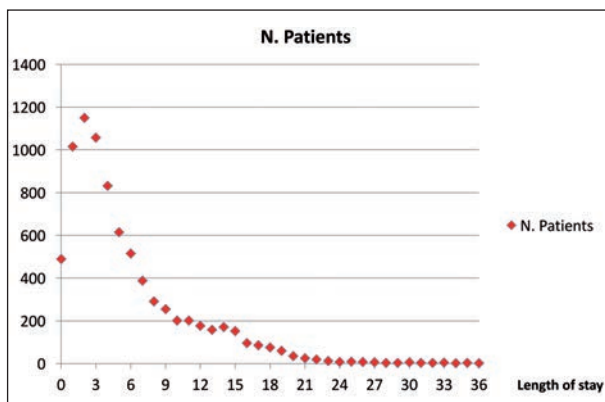
A mostly nocturnal pattern of ED presentation was observed in both genders, peaking between midnight and 2 AM (Figure 3), whilst no clear seasonality could be observed, except for a modest reduction of visits in August, probably due to the holiday period. Interestingly, a disproportionate increase of alcohol-related ED visits was found in the weekends, with the peak typically observed on Saturday nights (Figure 4). The pattern of length of stay (LOS) in the ED is shown



**Figure 3.** Pattern of daily distribution of alcohol-related emergency department (ED) visits in women and men



**Figure 4.** Pattern of weekly distribution of alcohol-related emergency department (ED) visits in women and men



**Figure 5.** Pattern of length of stay (LOS) in the emergency department (ED), for alcohol-related visits

in Figure 5. Although the vast majority of patients (i.e., 5143; 64%) could be discharged after a period of clinical observation lasting less than 6 hours, a considerable number of patients needed longer observation and treatment in the ED. In particular 2372 patients (i.e., 30%) remained in the ED between 6 and 24 hours, and 499 patients (6%) for more than 24 hours. Overall, 7551 patients (i.e., 94%) were discharged directly from the ED after treatment and observation until restoration of sobriety, whilst 462 patients (i.e., 6.2%) needed hospital admission, 179 of whom for traumatic injuries and 283 for non-traumatic causes (i.e., metabolic imbalance, psychiatric disorder, infections, etc.).

## Discussion

The most significant findings of this retrospective analysis of alcohol-related ED visits can be summarized as follows. First, a constant increase of alcohol-related visits has been recorded in a large urban ED throughout the 15-year observational period. A different age distribution could also be observed between genders, since female patients were more likely to be admitted to the ED for alcohol-related problems at a younger age than the male patients. A growing healthcare burden due to alcohol-related problems has also been observed during the study period, attributable to both an increased number of ED visits and larger hospital beds occupancy. More specifically, our data clearly showed that up to 6.2% of all alcohol-related

ED visits needed hospitalization for both associated traumatic injuries and various medical complications.

These findings are in substantial accordance with those previously published by Mullins et al., who also showed a constantly increasing number of alcohol-related visits in US EDs (6). This evidence poses serious challenges for all EDs around the world, since the emergency rooms may now be inappropriately seen as facilities in which alcohol screening and intervention could be widely implemented (7).

The number of ED visits for alcohol related problems was found to be more than double in men than in women in our study. This excess morbidity among male patients substantially confirms previous data obtained in different countries (12, 13-15). Unlike previous findings, however, an innovative finding emerged from our data is that the age of the female patients with alcohol-related ED visits is lower than that of their male counterparts.

In a recent study based on English adolescents (mean age, 13±2 years) visited in the ED, both genders were found to be identically represented regarding their alcohol-related behavioral patterns (16). Interestingly, significant associations were also observed between alcohol consumption, earlier onset of drinking and poorer health and social functioning (i.e., social consequences, such as accidents, problems with a parent, school or police) in the study of Donoghue et al. This evidence prompted the authors to conclude that the ED can offer an opportunity for identification of hazardous alcohol use in adolescents.

The link between public holidays, weekends and stronger effect of alcohol on the youth has already been suggested in previous studies (13), and can now be confirmed by our data.

However the described burden of alcohol-related visits on hospital activity is probably underestimated for several reasons. The first reason is that only the principal diagnosis is often recorded as an ICD-9 code in our local ED. It is hence likely that some physicians preferred to coding the trauma (e.g., head trauma or fracture after falling) related to alcohol abuse, rather than the alcohol intoxication. On the other hand, it is not really infrequent for alcoholic patients to leave the ED without being visited by an emergency physician, as reported in previous studies (17). Finally, some cas-



es of alcohol intoxication may be overlooked because an alcohol test is not routinely performed, especially when this is not considered clinically significant or is not ordered by the legal authorities (12).

In conclusion, our study confirms data published in other countries, thus reinforcing the need to be more proactive on the issue of alcohol abuse and on its substantial consequences in terms of health risks and utilization of healthcare resources. In particular, the decreasing age of subjects admitted to the ED with alcohol-related problems, especially in women, should now be regarded as a public healthcare issue.

## Acknowledgements

The Authors acknowledge Drs. Marco Brambilla and Marco Mignani of the Academic Hospital of Parma for the kind support in extracting data from electronic databases of the Institution.

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Received: 26 September 2017

Accepted: 28 November 2017

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