

# Alcohol levels in trauma victims

R. MÜLLER, L. C. J. VAN RENSBURG

## Summary

A group of 142 patients injured in motor vehicle accidents or assaults was investigated to ascertain patterns of alcohol usage and blood alcohol levels; 77% were positive for blood alcohol (range 0,01 - 0,492 g/dl; mean 0,212 g/dl). A correlation between alcohol levels and injury severity was found. In assaults, multiple injuries were associated with high alcohol levels because of less effective self-defence. Injured young pedestrians as well as injured occupants of motor vehicles showed alarmingly high alcohol levels. The increasing load placed on trauma services and the resultant burden to the taxpayer necessitates an urgent programme of public education designed to alter attitudes towards alcohol consumption.

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Violent injury and motor vehicle accidents account for the majority of the 40 000 patients treated annually at Tygerberg Hospital Trauma Unit. Overall there are two groups of patients. Firstly, there is a steady baseline admission rate of 3 - 5 patients per hour. Patients in this group have injuries due to mishaps which are often avoidable, e.g. falls causing fractured neck of femur. Secondly, the admission rate shows definite peaks in the late evening, particularly over weekends, with violence as the primary cause (Fig. 1). Many studies have shown the relationship between alcohol intake and accidental injury,<sup>1</sup> which is reflected in the laws governing drinking and driving. Psychological studies have also shown a definite trend towards uninhibited aggressive behaviour associated with intoxication.<sup>2,3</sup> The impression of a high incidence of alcohol intoxication in the violent-injury group admitted to the trauma unit prompted this preliminary study.

## Patients and methods

Patients over the age of 15 years admitted for injuries sustained in motor vehicle accidents and assaults were investigated. Several factors obviated blanket investigation, so patients were assessed in groups of 5 - 10 consecutive admissions at varying times to gain an overall impression of alcohol intake and trauma. Information was obtained by interviews regarding alcohol consumption patterns, type of liquor consumed, and circumstances surrounding the injury. Details of clinical examination and special investigations were documented. After consent had been obtained, blood was taken from an arm vein and submitted for full liver function testing and determination of alcohol levels. Liver function was estimated on the SMAC analyser and alcohol levels were estimated by gas chromatography.

Department of Surgery, University of Stellenbosch and Tygerberg Hospital, Parowvallei, CP  
 R. MÜLLER, M.B. CH.B., F.C.S. (S.A.), M.MED. (CHIR.)  
 L. C. J. VAN RENSBURG, M.B. CH.B., F.C.S. (S.A.), F.R.C.S., M.MED. (CHIR.)

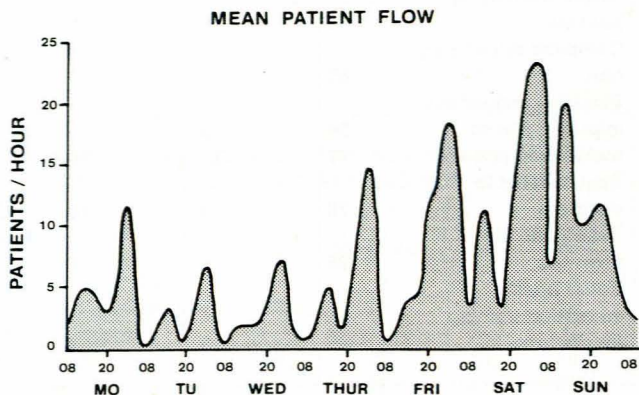


Fig. 1. Admission pattern: Tygerberg Hospital Trauma Unit.

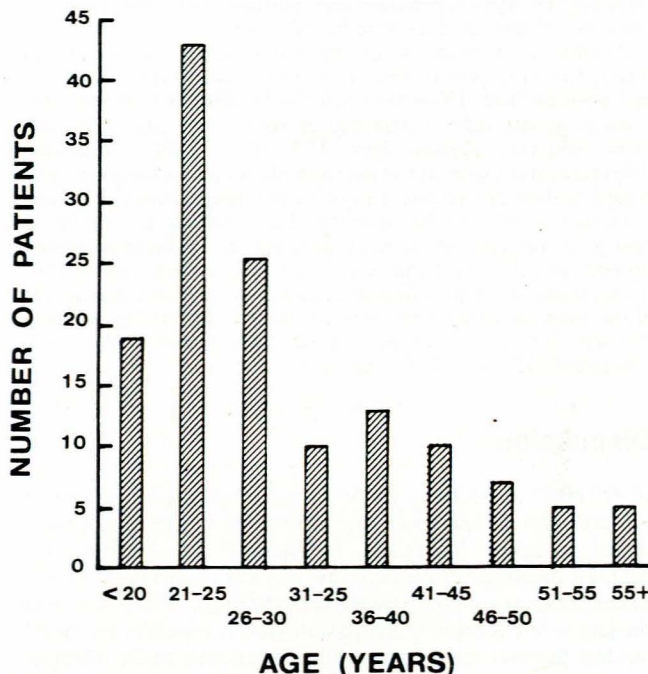


Fig. 2. Age distribution of patients.

Complete data were available on 142 of the 200 patients assessed. Of the sample group 64% were under 30 years of age (Fig. 2).

## Results

**Cause and nature of injury.** Motor accidents accounted for 27% of the sample, with vehicle occupants involved in 50%, pedestrians in 40% and motor cyclists in 10% of incidents. In the assault group, penetrating and blunt trauma accounted for roughly equal proportions. The weapons used varied considerably, bottles being a common means of blunt assault.

**Alcohol consumption.** Of the sample 13% denied using alcohol, and only 1 of the 21 patients in this group showed a positive blood alcohol level. Of the rest, 64% were regular weekend drinkers, 22% social and 14% daily drinkers, with no significant difference



between the racial groups. Beer was the favourite beverage in 42%, wine in 36%, spirits in 22%; 10% of the sample mixed drinks.

**Alcohol levels and liver function tests.** Of the sample group 77% had alcohol in their blood (mean level 0,212 g/dl) (Fig. 3). The highest level assayed was 0,492 g/dl in a motor cyclist. There was no statistical difference in levels between the racial groups. Liver function tests were within normal limits in all cases; in particular no patient had an elevated serum  $\gamma$ -glutamyltransferase (GGT) level.

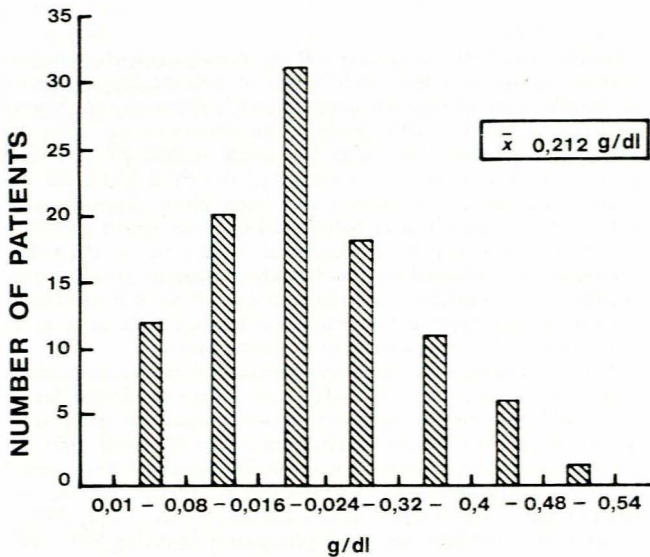


Fig. 3. Distribution of blood alcohol levels.

## Discussion

The incidence of unacceptably high alcohol levels in this group of patients is alarming. The broad correlation of alcohol levels and the clinical picture is shown in Table I, based on the work of Cooper *et al.*<sup>1</sup> This study supports the premise that alcohol consumption increases the liability to unnatural death as suggested by studies on drownings,<sup>4-7</sup> motor vehicle accidents,<sup>1</sup> and violent injury.<sup>8-12</sup> Numerous factors are involved but increased aggression, loss of self-preservation instincts, and impaired judgement are important.<sup>8,13,14</sup> The number of young adults involved reflects the tendency for excessive drinking in this group. Data on bar-room aggression indicate that violence and poor socio-economic circumstances go hand-in-hand.<sup>15</sup> Those assault victims who warded off the attack and received injuries to the upper extremity only showed a mean blood alcohol level of 0,12 g/dl, whereas those with

additional injuries had mean levels of 0,228 g/dl. This would indicate increased susceptibility to severe injury with higher alcohol levels. In the pedestrian group two distinct subgroups were apparent: young adults of whom a greater proportion have high alcohol levels (mean 0,196 g/dl), and an older group with fewer positive assays and a mean level of 0,082 g/dl.

The literature suggests that elevated serum GGT levels indicate regular excessive alcohol usage<sup>16</sup> and it is interesting that none of these patients had an elevated serum GGT level.

Figures from Central Statistical Services show that during the period 1961 - 1981 expenditure on food in the RSA increased 5-fold whereas that on alcohol increased 23-fold. In the present situation of economic depression and with 50% of the population under the age of 15 years the scene is set for an increase in avoidable trauma. The cost of curative medicine is prohibitive, and the burden of caring for these patients is borne by the taxpayer. An urgent educational programme to alter public attitudes to alcohol use would be more cost-effective than providing more trauma services.<sup>17,18</sup>

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TABLE I. CORRELATION OF BLOOD ALCOHOL LEVELS AND THE BROAD CLINICAL PICTURE\*

Alcohol (g/dl)	Occasional drinkers	Regular drinkers
0 - 0,05	Sober	Sober
0,06 - 0,09	Mildly intoxicated	Sober
0,10 - 0,15	Moderately intoxicated	Mildly intoxicated
0,16 - 0,20	Highly intoxicated	Moderately intoxicated
0,21 - 0,25	Highly to very highly intoxicated	Moderately to highly intoxicated
0,26 - 0,30	Very highly intoxicated	Highly to very highly intoxicated
0,31 - 0,40	Stuporous to comatose	Very highly intoxicated to stuporous
0,41 - 0,50	Comatose to dead	Comatose to dead

\*Based on Cooper *et al.*<sup>1</sup> with permission.