SUMMARY

Pedestrian accidents are a substantial road safety problem in Victoria, comprising 20 percent of fatalities and 13 percent of hospital admissions in 1987.

This study used a case-control method to investigate the role of alcohol, consumed by the pedestrian, in predisposing serious injury accidents. The risk of accident involvement was found to increase substantially at blood alcohol levels exceeding 0.15 grams/100 ml. One quarter of the accident victims registered a BAC at this level. The effect of alcohol on accident involvement was greatest for those aged 20 to 39 years and least for those aged over 60 years. Risk relationships were similar for males and females.

METHOD

This study investigated the role of alcohol in non-fatal, serious injury pedestrian accidents among adults aged between 20 and 79 years.

Victim Sample The victim sample comprised 114 people who attended casualty or were admitted to one of five major Melbourne metropolitan hospitals during a twelve month period between 1 July 1985 and 31 December 1986.

Data Collected from accident victims included:

- hospital interview with accident victim.
- BAC data from compulsory blood analysis (required by legislation in Victoria for all victims of traffic accidents).
- Checking of details from records (medical record, ambulance report, police accident report, forensic results).

Control Sample The control sample comprised 225 pedestrians located at the accident sites. Interviews took place within half an hour either side of the accident time, either within four weeks of the accident or one year later. Blood alcohol data was obtained from a breath test on a Lion Alcometer.

RESULTS

The distribution of BAC readings for victims and control subjects is presented in Table 1. The following points can be made:

- The distribution of BAC readings was different for victims and controls ($X^2=47.43$, $p<0.001$).
- Substantially fewer victims than controls had zero blood alcohol readings.
- Forty percent of accident victims and 14 percent of controls had some
alcohol in their blood.

The effect of BAC on pedestrian accidents first became statistically detectable in the 0.10 to 0.15 BAC range ($X^2=5.29$, $p<0.05$).

At BAC levels in excess of 0.15 the effect of BAC on accident involvement was considerable ($X^2=2.66$, $p<0.001$). Twenty four percent of victims and only two percent of controls had BAC readings greater than 0.15.

**TABLE 1: BAC READINGS: VICTIMS AND CONTROLS SUBJECTS**

<table>
<thead>
<tr>
<th>BAC READING</th>
<th>VICTIM</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-.01</td>
<td>68</td>
<td>193</td>
</tr>
<tr>
<td>&gt;.01-.05</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>&gt;.05-.10</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>&gt;.10-.15</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>&gt;.15</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>114</td>
<td>225</td>
</tr>
</tbody>
</table>

Relative Risk  The level of alcohol involvement amongst accident victims and control subjects can alternatively be expressed as an accident risk ratio.

In essence, the control pedestrian data is used as a measure of exposure, indicating the degree to which various levels of alcohol consumption occur in the general pedestrian population. The relative risk ratio corrects the number of accidents for exposure, and then compares accident involvement at various levels of alcohol consumption to the sober condition.

This method has the effect of setting the relative risk to one when alcohol is not present. Therefore, the relative risk at a specified BAC level can be interpreted as the factor by which the risk is changed relative to the risk when sober.

The alcohol-related accident risk curve with 95 percent confidence limits is presented in Figure 1. The relative risk of having a pedestrian accident was minimal at BAC levels below 0.10, began to increase in the 0.10 to 0.15 BAC range and was high at BAC levels in excess of 0.15. At BAC levels exceeding 0.15, the risk of being involved in a pedestrian accident was fifteen times greater (95% confidence limits; 6, 41) than when there was no alcohol in the blood.
FIGURE 1

Further analysis indicated the following:

- The relative risk of accident involvement at BAC levels exceeding 0.15 was much greater for those aged 20 to 39 years (relative risk = 21) than those aged 40 to 79 years (relative risk = 11). This may be explained by the greater risk of accident involvement for the older group when unaffected by alcohol.

- Risk relationships appeared to be similar for males and females.

- A substantial proportion of pedestrian accident victims had been drinking in hotels or other licensed premises prior to the accident.

DISCUSSION

The findings that 40 percent of victims had been drinking and 24 percent had blood alcohol levels exceeding 0.15 are representative of the situation for both fatal and non-fatal pedestrian accidents in Victoria and elsewhere. (Jordan, 1981; Struik, Alexander, Cave, Fleming, Lyttle and Stone; 1988)

The relative risk patterns identified here generally confirm the results of other studies which indicate that pedestrian accident risks begin to increase at BAC levels between 0.08 and 0.12, rising rapidly at higher BAC levels. (Blomberg, Preusser, Hale and Ulmer, 1979; Clayton, Booth and McCarthy, 1977; Honkanen, Ertama, Kuosmanen, Linnoila and Visuri, 1976; Hadden, Valien, McCarol and Umberger, 1963).

In comparison, the alcohol-related risk curve for drivers begins to increase at lower BAC levels (between 0.05 and 0.08) and rises steeply thereafter (Borkenstein, Crowther, Shumate, Ziel and Zylman, 1964).

The alcohol-related risk curve for drivers formed the basis for the development of drink-driving countermeasures in Australia and elsewhere. In Australia, most jurisdictions have legislation which prohibits driving with a BAC exceeding 0.05.

The identification of an alcohol-related risk curve for pedestrian has similar countermeasure implications.

Countermeasure strategies to address the intoxicated pedestrian problem can be tackled at three main levels of intervention:

1. Preventing potential pedestrians from becoming intoxicated to high risk levels.

   Examples of countermeasures of this nature include Responsible Hospitality Practice Programs in hotels and licensed premises designed to prevent patrons from becoming drunk. (Carvolth, 1985; Peters 1985)
(2) Preventing those pedestrians who are intoxicated from being exposed to the traffic environment.

This type of countermeasure is generally based on alternative transportation options such as courtesy buses, designated driver programs and taxi schemes.

Public drunkenness legislation serves a similar function.

(3) Reducing the risks for drunk pedestrians who are exposed to the traffic environment.

Engineering countermeasures such as barrier fencing, median refuges and improved lighting at "black spot" locations are designed to manipulate the environment to reduce pedestrian accident risks.

The most significant gains would be expected to follow from a co-ordinated countermeasure approach comprising elements at each of the three levels identified and utilizing both behavioural and engineering strategies.

BIBLIOGRAPHY


Figure 1: Relative Risk by BAC

<table>
<thead>
<tr>
<th>BAC Reading</th>
<th>Victim</th>
<th>Percentage</th>
<th>Control</th>
<th>Percentage</th>
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<tr>
<td>0-.01</td>
<td>68</td>
<td>59.6%</td>
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<td>85.8%</td>
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Total: 114 100.0% 225 100.0%