



removal of accessible bone and bullet fragments, debridement of non-viable necrotic brain tissue and dural repair. Adjuvant antibiotics and anticonvulsants should be given and ventilation should be performed where necessary.

4. Patients who have large space-occupying extra-axial haematomas should be treated with surgical drainage and medical supportive treatment.

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## INTOXICATION, CRIMINAL OFFENCES AND SUICIDE ATTEMPTS IN A GROUP OF SOUTH AFRICAN PROBLEM DRINKERS

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**Background.** Incidence rates of crime and alcohol abuse in South Africa are unacceptably high. Research suggests a relationship between alcohol and both crime and suicide. This study aims to add to the information base on this topic in South Africa.

**Methods.** This is a cross-sectional record study of criminal offences and suicide attempts in 269 admissions to an alcohol rehabilitation unit in the Western Cape. Types of criminal offences and suicide attempts are described. Relationships are sought between crime, violent crime and suicide attempts on the one hand, and demographic and alcohol-related variables on the other.

**Results.** One hundred and four subjects (39%) had criminal convictions, the majority of which were committed while the subjects were intoxicated. The commonest alcohol-related crimes were driving-related (17% of subjects) and crimes of violence (15%). Male gender, younger age at initiation of drinking, and earlier onset of problem drinking were significantly associated with criminal behaviour. Violent crime was associated with earlier onset of initial, regular and problem drinking, and maternal alcohol abuse. Suicide attempts (24% of subjects) were associated with female gender, white racial group, not being in a marital relationship, younger current age and early age of problem drinking.

**Conclusions.** There was an association between intoxication and both violent crime and suicide attempts. The importance of population studies and the need for intervention programmes aimed at teenagers who are drinking, are emphasised.

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Problem drinking is one of the major public health concerns facing South Africa. About 6% of South Africans over the age of 15 are alcohol dependent<sup>1</sup> and 15% of high school pupils report episodes of binge drinking.<sup>2</sup> Likewise, the prevalence of criminal behaviour in South Africa is unacceptably high.<sup>3</sup> Since Lombroso (1835 - 1909), arguably the first modern criminologist, there has been a belief that alcohol is an important factor in criminality.<sup>4</sup> Research in other countries confirms that use of alcohol is intimately related to crime.<sup>5-8</sup> Alcohol has been identified as one of the principal statistical correlates of violent behaviour.<sup>9-15</sup> This has also been found with regard to specific offences such as interpersonal violence<sup>16</sup> in general, and family violence<sup>17</sup> in particular, as well as murder and rape.<sup>16,18</sup> Parry and Bennetts<sup>1</sup> give a comprehensive review of the association between alcohol, crime and violence in South Africa.

Not only is problem drinking associated with crime, but strong associations with suicidal behaviour have also been described. On the basis of follow-up studies, Miles<sup>19</sup> estimated that approximately 15% of alcoholics eventually commit suicide. After surveying research done in the UK, Williams<sup>20</sup> reported that 56% of males and 37% of females who had attempted suicide had consumed alcohol within the 6 hours preceding the attempt. Alcohol was present in between 15% and 25% of successful suicides. Compared to this, Knobel<sup>21</sup> found that in Cape Town 92% of all suspected suicides had blood alcohol concentrations over 0.08 g/100 ml. Among those with drinking problems, suicide attempters start drinking at an earlier age,<sup>22,23</sup> and drinkers of hard liquor are at the highest risk.<sup>24</sup>

It is tempting to argue that if South African society can find ways to prevent alcohol abuse and improve the successful treatment of alcohol problems, it can reduce the incidence of criminal behaviour<sup>25</sup> and suicide. However, such a theory is premature. First, because much of the relevant research was undertaken abroad, the findings are not necessarily applicable to South Africa. Second, even internationally, many basic questions in the field remain unanswered.<sup>26,27</sup> For example, the exact relationship between alcohol and criminal behaviour in general,<sup>28-31</sup> and violent behaviour in particular,<sup>32-35</sup> is not clear, and is much more complex than was initially thought. Not only does the effect of alcohol play a role, but so do the effects of multiple interactive physiological, environmental, situational, social, historical and cultural factors.<sup>4</sup> Authors such as Greenfield and Weisner<sup>30</sup> believe that studies of the general population are optimal in order to generate useful information in this area. In contrast, past studies often used incarcerated offenders<sup>6,8,36</sup> or subjects in a laboratory<sup>37</sup> and failed to distinguish between subgroups of problem drinkers.<sup>38-42</sup>

## OBJECTIVES

Comprehensive studies of the general population in accordance with Greenfield and Weisner's<sup>30</sup> recommendations would be

very costly. However, data that are routinely collected from people who voluntarily participate in a short-term residential alcohol rehabilitation programme can make a valuable contribution to the knowledge in this area. We therefore examined the records of these subjects in order to: (i) determine the occurrence of self-reported criminal behaviour and suicide among them; (ii) determine whether there was an association between intoxication and offences in general, violent offences, and history of suicide attempts; and (iii) compare the characteristics of participants who report having committed offences (particularly violent crimes) or attempted suicide, with the characteristics of those who did not.

## METHODS

### Subjects

Information on 269 subjects admitted to an alcohol rehabilitation unit in the Western Cape had been routinely captured on a database over a 13-month period. Criteria for admission to the unit included the following: (i) a primary diagnosis of alcohol abuse or dependence;<sup>43</sup> (ii) subjects should not require intensive medical treatment; (iii) their cognitive abilities, clinically evaluated, to be such that they are able to participate in group activities; and (iv) there should be no criminal court case pending.

### Procedure

A medical practitioner (MR), using a semi-structured questionnaire, interviewed all the subjects in person on admission and captured these data on a database. Demographic data included age, sex, marital status, socio-economic status (classification of Hollingshead and Redlich),<sup>44,45</sup> education, employment status, and race. Detailed drinking histories included several questions. Subjects were asked the age at which: (i) they had had their 'very first drink'; (ii) they had started drinking on a regular basis (e.g. every weekend), but without negative effects; and (iii) they had experienced alcohol-related problems for the very first time (medical, marital, occupational, social, or people had first cautioned them or complained about their drinking). They were asked the reasons for the commencement of 'regular' (non-problem) drinking. These reasons included 'social' (for peer group acceptance and keeping company with their friends), to 'socialise' (to decrease social anxiety), as an anxiolytic in general, and in response to traumatic or stressful life events or circumstances.

Other questions routinely asked sought information related to the severity of the drinking problem: history of withdrawal convulsions, alcohol-related hallucinations (alcohol withdrawal delirium or hallucinosis), and use of an 'eye-opener'. The drinking pattern ('binge', 'weekend' or 'uninterrupted') was also recorded. Information regarding family history included whether a parent had ever experienced problem drinking.



As part of the routine interview subjects were asked whether they had a criminal record, the nature of such offence(s), and whether they were intoxicated at the time. No attempt was made to quantify the level of intoxication. They were also asked about previous suicide attempts and whether these had occurred during alcohol intoxication. Any thoughts about suicide that did not translate into definite action were not recorded.

In classifying the offences reported we adapted the classification of Bradford *et al.*<sup>28</sup> Attempting to establish the underlying motivation (as they suggested) was impossible, especially as the information was gathered from records. We therefore used a classified system where the offences were placed in one of the following four classes: (i) violent crimes, i.e. where a person was threatened or physically harmed, including sex offences; (ii) property crimes, i.e. where the property of an identifiable person or institution was appropriated or damaged; (iii) victimless crimes, i.e. where the criminal behaviour apparently was not directed at a specific person or institution, e.g. being in possession of drugs; and (iv) driving-related crimes.

### Statistical tests

The McNemar chi-square test for matched categories was performed to test whether there was an association between a subject being intoxicated at the time and: (i) offences in general; (ii) violent offences; and (iii) history of suicide attempt(s).

The Statgraphics Statistical Graphics system (version 6) was used to compare subjects who had committed crimes while intoxicated with the rest of the sample. Further comparisons were made between subjects who had committed violent crimes while intoxicated, and the rest of the sample. Subjects who had attempted suicide were compared with those who had not attempted suicide. For these comparisons Yates' corrected chi-square test, Fisher's exact test or the Mann-Whitney *U*-test were used where appropriate.

Because of the large number of variables examined (23 in all), the observed significance level was adjusted to decrease the probability of type I error. The Bonferroni correction involves multiplying the significance level obtained by the number of statistical tests. In our case, for a test to be significant at the 0.05 level, the *P*-value would have to be < 0.0022. The Bonferroni method is too conservative if variables are not independent of one another, and significant associations are likely to be missed. We therefore used *P* < 0.005 as the criterion for statistical significance.

### RESULTS

The 269 subjects comprised 226 men and 43 women, with mean (standard deviation (SD)) age 38.4 (8.43) years and 9.2 (3.22) years of completed education. One hundred and eighty (67%)

came from social classes IV and V (skilled, semi-skilled and unskilled labourers). One hundred and nine (41%) were married and currently living with their spouse and 127 (47%) were in full-time employment.

### Criminal offences and intoxication

Of the 269 subjects, 104 (39%) had a criminal record. Of these, 96 (92%) had committed crimes only while intoxicated, 6 (6%) only when sober, and 2 (2%) on occasions when they had been sober and on occasions when they had been intoxicated. (McNemar  $\chi^2$  77.66, *P* < 0.0001). Table I lists the number and types of offences.

Table I. Criminal offences in the 269 subjects

	Subjects	% of total sample
<b>Crimes committed while intoxicated*</b>		
Violent crimes	40	15
Property crimes	19	7
Victimless crimes	12	4
Driving-related crimes	46	17
Total†	98	36
<b>Crimes committed while sober*</b>		
Violent crimes	1	< 1
Property crimes	3	1
Victimless crimes	4	1
Total	8	3

\* Two subjects are included in both categories (i.e. intoxicated and sober)

† Some subjects had multiple convictions and some are represented in more than one category, hence 'Total' is not the sum of the figures in the 'Subjects' column, but represents the number of subjects who had been convicted of a particular crime.

### Differences between offenders who committed offences (while intoxicated) and the rest of the sample

Subjects who had been convicted of crimes committed while intoxicated (intoxicated offenders) were compared with the rest of the sample. The six sober offenders are included in the latter group because crimes committed during sober periods differed in nature from those committed when the subjects were intoxicated (Table I); only a small proportion of offenders were sober at the time of the crime. Intoxicated offenders (*N* = 98) did not differ significantly from the rest of the sample (*N* = 171) with regard to age, race, marital status, educational status, socio-economic status, drinking pattern, employment status, history of paternal and maternal alcohol abuse, history of suicide attempts, reason for regular drinking, use of eye-openers, history of alcohol-related hallucinations, history of alcohol withdrawal convulsions, age when regular drinking started, and use of other substances. Significant differences are shown in Table II. Offending was significantly associated with male sex, early age of first drink and problem drinking.

**Table II. Significant differences between offenders who committed offences while intoxicated, and the rest of the sample**

	Offenders (N = 98)	Rest (N = 171)	P
Male	93 (95%)	133 (78%)	0.0002
Age at initiation of drinking, mean (SD)	16.2 (2.63)	18.4 (4.27)	0.0001
Age at onset of problem drinking, mean (SD)	26.3 (7.15)	30.2 (8.45)	0.0002

Note: Because of the large number of variables examined, differences were considered significant at the 0.005 level.

As alcohol has been identified as one of the principal statistical correlates of violent behaviour,<sup>9,10</sup> an association was specifically sought between intoxication and violent crimes.

### Violent offences and intoxication

Forty-one subjects (15%) had been convicted for violent crimes. Forty (98% of the violent offenders) had been intoxicated at the time of the crime and only one subject (2%) was convicted for a violent crime committed while sober. There were no violent offenders who had committed crimes during sober and during intoxicated episodes (McNemar  $\chi^2$  35.22,  $P < 0.0001$ ).

### Differences between offenders who committed violent offences while intoxicated and the rest of the sample

Intoxicated violent offenders ( $N = 40$ ) did not differ significantly from the rest of the sample ( $N = 229$ , including 1 subject who committed a violent offence while sober) with regard to current age, sex, race, employment status, socio-economic and educational status, marital status, history of paternal alcohol abuse, history of suicide attempts, history of alcohol-related hallucinations or convulsions, reason for regular drinking, use of eye-openers, drinking pattern, and abuse of other substances. Significant differences are shown in Table III. Violent alcohol-related crimes were associated with maternal alcohol abuse, early age of first drink, regular drinking and problem drinking.

### Suicide attempts and alcohol intoxication

Of 268 subjects who had answered the question regarding suicide attempts, 64 (24%) admitted to at least one attempt. Three persons could not tell whether they had been under the influence at the time. Four (6%) of the 64 had attempted suicide on occasions when they had been sober and also when intoxicated, 49 (77%) had made attempts only while intoxicated, and 8 (3%) only while sober. (McNemar  $\chi^2$  28.07,  $P < 0.0001$ ). The types of suicide attempts are given in Table IV.

**Table III. Significant differences between offenders who committed violent offences while intoxicated, and the rest of the sample**

	Violent offenders (N = 40)	Rest (N = 229)	P
Maternal alcohol abuse*	12 (33%)	27 (13%)	0.002
Age at initiation of drinking, mean (SD)	15.5 (2.90)	18.0 (3.94)	0.0001
Age at onset of regular drinking, mean (SD)	19.6 (4.18)	22.9 (6.63)	0.004
Age at onset of problem drinking, mean (SD)	24.4 (6.57)	29.5 (8.25)	0.003

\* Not all subjects could give information about their parents. Denominators for those with and without violent offences are 38 and 217 respectively.  
Note: Because of the large number of variables examined, differences were considered significant at the 0.005 level.

**Table IV. Suicide attempts in 61 subjects\* admitting to such attempts**

	Number <sup>†</sup>	Percentage <sup>§</sup>
A: While intoxicated <sup>†</sup> (N = 53)		
Drug/medication overdose	40	75
Poison ingestion	5	9
Firearm	1	2
Moving vehicle (train, automobile)	3	6
Sharp instrument (e.g. wrist slashing)	12	23
Hanging	3	6
B: While sober <sup>†</sup> (N = 12)		
Drug/medication overdose	8	67
Burning/electrocution	3	25
Sharp instrument	1	8

\* Excludes 3 subjects who could not remember whether they had been intoxicated.  
† Four subjects are included in both categories (i.e. intoxicated and sober).  
‡ Number of persons attempting suicide by means of a specific method. Some subjects made use of more than one method.  
§ Denominators for the proportions of groups A and B are 53 and 12, respectively.

### Characteristics of suicide attempters

Persons who had attempted suicide (with or without intoxication) ( $N = 64$ ) did not differ from the others ( $N = 204$ ) with regard to employment status, socio-economic status, parental alcohol abuse, reasons for drinking, age of initiation of drinking and regular drinking, drinking pattern, educational status, abuse of other substances, use of eye-openers, history of alcohol-related hallucinations or convulsions, criminal offences or educational status. Significant associations with suicide attempts (Table V) included female sex, white racial group, no spouse, younger (current) age, and earlier onset of problem drinking. It is worth mentioning a result that was not significant at the 0.005 level — a higher proportion of those who had attempted suicide had mothers who had abused



**Table V. Significant differences between the subjects who had attempted suicide and those who had not**

	Suicide attempts (N = 64)	No suicide attempts (N = 204)	P
Female	20 (31%)	23 (11%)	0.003
Race, white	29 (45%)	50 (24%)	0.003
Married with spouse	15 (23%)	94 (46%)	0.002
Current age, mean (SD)	35.8 (8.58)	39.3 (8.25)	0.004
Age at onset of problem drinking, mean (SD)	24.8 (7.79)	30.1 (7.96)	< 0.0001

Note: Because of the large number of variables examined, differences were considered significant at the 0.005 level.

alcohol (28%) compared with those who had not attempted suicide (12%) ( $P = 0.006$ ).

Because a longer drinking history may account for those with early onset of drinking having had more opportunity to attempt suicide, suicide attempters were compared with non-attempters with regard to the number of years since problem drinking had started. Suicide attempters had a slightly longer average problem drinking history (10.8 years versus 9.0 years respectively,  $P = 0.040$ ). We did not enquire whether subjects had attempted suicide before or after problem drinking had started.

## DISCUSSION

The main findings of this study of a group of South African problem drinkers admitted for alcohol rehabilitation are that 39% had been convicted of a criminal offence and nearly one-quarter had attempted suicide. Driving-related and violent crimes were the most frequently reported offences. There was a significant association between alcohol intoxication and both offending behaviour and suicide attempts.

The finding that criminal behaviour in general, and violent crimes in particular, were significantly related to intoxication are in keeping with previous reports.<sup>5-18</sup> In fact, more than 90% of the offences reported were committed while the person was intoxicated.

The variables significantly associated with criminal behaviour in general were male gender, early age of first drink and problem drinking. Early initial, regular and problem drinking were also significantly associated with violent crimes. This is in accordance with the findings of Bergman and Brismar<sup>22</sup> who found an association between violence and early onset of drinking.

Regarding parental problem drinking, Bergman and

Brismar<sup>22</sup> reported that compared with their non-violent group there was no significant difference in the drinking habits of mothers. However, they found that a significantly higher proportion of subjects in the violent group reported having biological fathers who were problem drinkers. We, on the contrary, did not find a significant difference with regard to fathers, but found that a significant proportion of mothers of those in the violent group had drinking problems. The finding of an association between maternal alcohol abuse and violent crime is in keeping with reports of antisocial behaviour in adolescents who had been exposed to alcohol *in utero*.<sup>46</sup> The present study, however, did not attempt to determine whether our subjects' mothers had been drinking when they were pregnant. Genetic fetal and postnatal environmental factors may all play a role in the antisocial behaviour found in offspring of alcohol-abusing mothers.

The finding that 24% of subjects in this sample had made one or more suicide attempts is in line with the findings of Miles,<sup>19</sup> who estimated that approximately 15% of alcoholics eventually commit suicide. The significantly younger age at which suicide attempters in this study had had their first drink and started drinking regularly is similar to that of Bergman and Brismar<sup>22</sup> in Sweden and Roy *et al.*<sup>23</sup> in the USA. Other findings that support those of Roy *et al.*<sup>23</sup> are that attempters are significantly more likely to be female and young. Unlike Roy *et al.*<sup>23</sup> we did not find any significant socio-economic differences or significant alcohol abuse by parents. In our study a higher proportion of those who had attempted suicide had mothers who had abused alcohol (28%); 12% of those who had not attempted suicide had had mothers who were alcohol abusers. However, this difference was not statistically significant at the 0.005 level.

This study has a number of limitations. Since a treatment sample was used, selection bias may have occurred, and results cannot be generalised to all problem drinkers. Problem drinkers may have a propensity to minimise or deny their problem. It is possible that the number and type of offences were underreported. On the other hand, people may maintain that they were intoxicated while committing an offence as an excuse or mitigating factor. The significant associations between intoxication and suicidal behaviour and offences may result from the fact that persons who are intoxicated may be more likely to find themselves in settings where they are enabled to behave inappropriately. An intoxicated person may also be more likely to be apprehended while committing a crime than a sober person. Another limitation is the retrospective nature of the study. Because these data were captured without this study in mind, variables directly related to the study questions (e.g. degree of intoxication, specific details and temporal relationships related to criminal behaviour and suicide attempts) were not explored in greater detail. Nonetheless, records were fairly complete and as most



of the data had been collected by one person soon after admission of each subject, the way in which the data were recorded was fairly consistent.

## CONCLUSION

Despite its limitations, this study confirms findings of research in other countries. It demonstrates a significant association between alcohol intoxication and offending behaviour, including violent crime, and suicide attempts in a group of South African problem drinkers. However, studies of the general population are necessary to clarify the magnitude and repercussions of these associations for society in general. An important implication of this study is that any intervention programme aimed at preventing the development of problem drinking should also be aimed at teenagers who drink.

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