

PAPER

PATHOLOGY/BIOLOGY

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Alcohol Ingestion and Age of Death in Hanging Suicides

ABSTRACT: Retrospective review of 100 consecutive, nondecomposed cases of suicide because of hanging was conducted at Forensic Science SA, Australia. Alcohol was detected in 38 cases (38%). The percentage of victims who had ingested alcohol significantly decreased with age ($r^2 = 0.81$), with alcohol detected in 57.1% of those aged ≤ 24 years, compared to 28.5% of those aged between 55 and 64 years, and 0% of those aged ≥ 65 years. A similar linear relationship between alcohol ingestion and age was found for cases with blood alcohol levels >0.05 g/100 mL ($r^2 = 0.73$). The mean ages of those with detectable alcohol (35.2 years) levels >0.05 g/100 mL (35.1 years) and levels >0.1 g/100 mL (37.2 years) were all significantly less than in those with no detectable alcohol (44.4 years) ($p < 0.005$, <0.005 , <0.05 respectively). A clear relationship between alcohol ingestion and younger age was shown in hanging suicides.

KEYWORDS: forensic science, hanging, suicide, alcohol, intoxication, disinhibition, risk factor

Methods of suicide vary among communities and between age groups depending on availability and understanding of the lethal potential of certain substances or activities (1). The most frequent methods of suicide in Australia are hanging (54%), drug toxicity (12%), and poisoning by other methods (including vehicle exhaust) in 12% (2). It has been reported that both acute and chronic alcohol use increases the risk of suicidal behavior (3). Given the large numbers of hanging deaths in South Australia, we decided to investigate the specific role of alcohol ingestion in these fatalities and the possible relationship to the age of the victim.

Materials and Methods

Retrospective review of consecutive cases of suicide because of hanging was conducted at Forensic Science SA, Adelaide, Australia, commencing in December 2008. Forensic Science SA is the state forensic facility where medicolegal autopsies are performed. The population served is approximately 1.6 million. A total of 100 cases were selected. Each case had undergone full police and coronial assessment with a complete autopsy examination, including toxicological evaluation for alcohol and common prescription and nonprescription drugs. Cases where decomposition had been noted by the examining pathologist were excluded from the study given the possibility of production of alcohol by postmortem putrefactive bacterial action. The age, gender, and blood alcohol levels were recorded. Blood alcohol (ethanol) concentrations were determined by standard methodology as the mean of duplicate analyses of peripheral blood samples using gas chromatography. Statistical evaluation was performed using the Pearson correlation coefficient.

Results

Deaths in the 100 cases had occurred over a 19-month period from June 2007 to December 2008. Thirty-five cases were excluded because of decomposition. The 135 cases represented 51% of the 266 suicides occurring over the same time period. The age range of victims was 15–94 years (mean 40.9 years) with a male to female ratio of approximately 6:1 (Fig. 1).

Alcohol was detected on toxicological screening in 38 cases (38%). The age range was 15–57 years (mean 35.2 years) with a male to female ratio of 34:4. Male victims were aged from 15 to 57 years and female victims 23–45 years. Alcohol was not detected in 62 cases (62%). The age range was 15–94 years (mean 44.4 years) with a male to female ratio of 51:11.

Plotting the presence of alcohol against the age at death revealed a significant decrease in recent alcohol ingestion with age ($r^2 = 0.81$) (Fig. 2). Specifically, 57.1% of those aged 24 years and under had ingested alcohol, compared to only 28.6% of those aged between 55 and 64 years and 0% of those aged 65 years or more. Plotting the percentage of cases where the blood alcohol was >0.05 g/100 mL showed a similar linear relationship between alcohol ingestion and age ($r^2 = 0.73$). Specifically, 50.0% of those aged 24 years and under had a blood alcohol >0.05 g/100 mL, compared to only 28.5% of those aged between 55 and 64 years and 0% of those aged 65 years or more.

In 30 cases, the blood alcohol level was greater than 0.05 g/100 mL, and in 23 cases, the level was above 0.1 g/100 mL. The mean ages of those with detectable alcohol (35.2 years) levels >0.05 g/100 mL (35.1 years) and levels >0.1 g/100 mL (37.2 years) were all significantly less than in those with no alcohol (44.4 years) ($p < 0.005$, <0.005 , <0.05 , respectively).

Discussion

This study has shown a striking relationship between the age of death and recent alcohol ingestion in victims of suicide by hanging.

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Received 19 Mar. 2010; and in revised form 23 May 2010; accepted 12 June 2010.

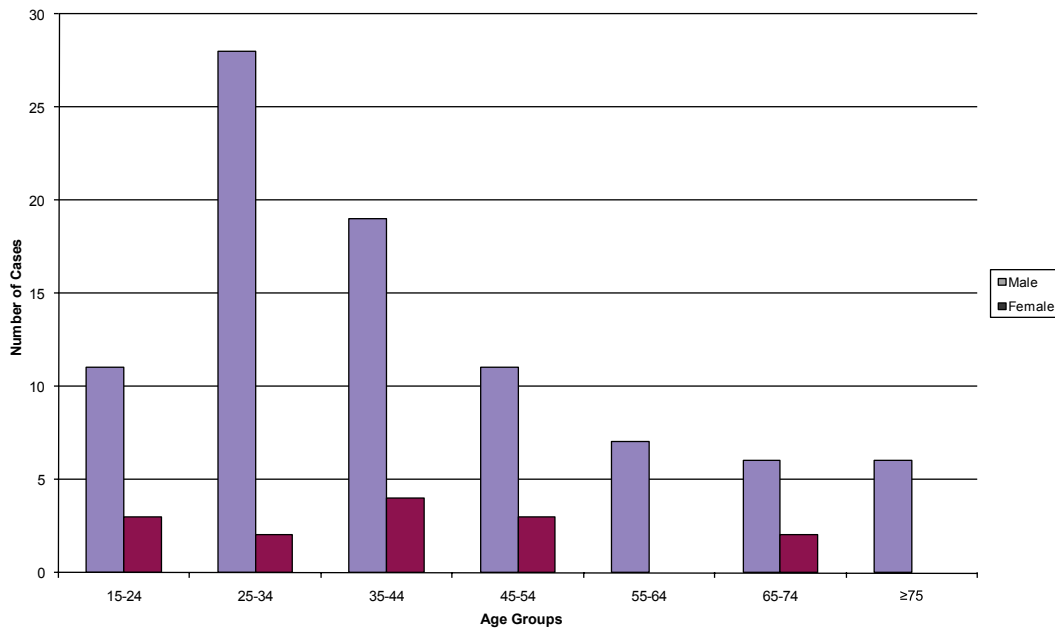


FIG. 1—Age and gender of 100 victims of suicide by hanging in South Australia (2007–2008).

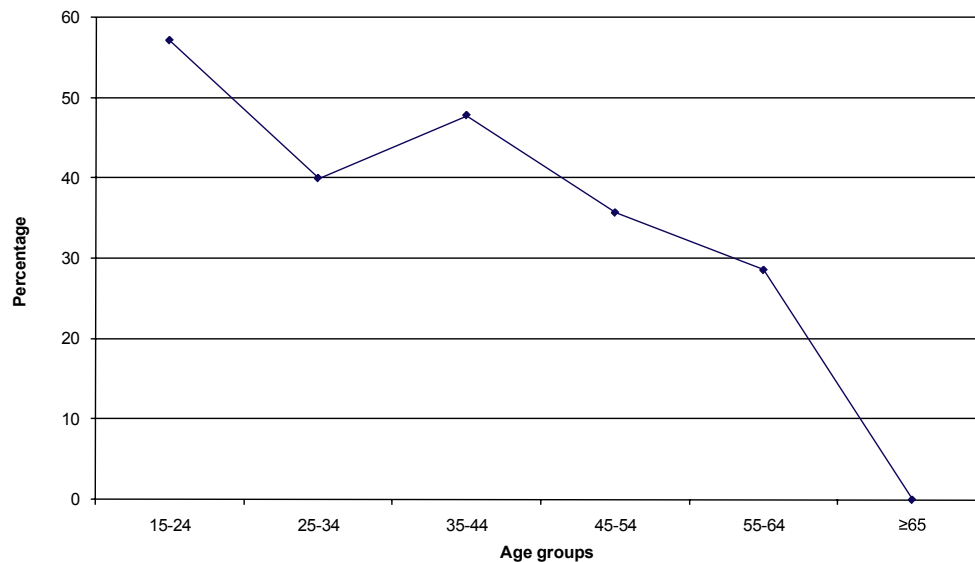


FIG. 2—Percentage of cases according to age where alcohol was detected in 100 victims of suicide by hanging in South Australia (2007–2008).

Although only 38% of victims had alcohol identified, this was strongly associated with age with the probability of alcohol use decreasing in an almost linear manner with increasing age (Fig. 2).

Alcohol is known to be a risk factor for suicide with the amount and type of alcohol consumed, and the pattern of drinking impacting on suicidal behavior (4). Alcohol may be deliberately consumed prior to a suicide attempt as a form of self-medication to reduce the possibility of perceived pain or to reduce fear of the act. Alternatively, alcohol may act as a disinhibiting agent and promote risk taking, thus precipitating suicidal actions in an individual who may otherwise not have taken this step. This is of particular concern as this may suggest that a certain number of the suicides where alcohol was identified may have represented impulsive acts fueled by intoxication (5–7).

Alcohol consumption is becoming an increasing issue in the young. In 1998, the World Health Organization reported that 66%

of Australian youths had ingested alcohol in the preceding 12 months and that 23% had consumed seven or more standard drinks at least once a week compared to only 10% of adults (8). “Binge” drinking, where large amounts of alcohol are consumed at one sitting (≥ 5 drinks), is also becoming an issue in younger individuals (8–11) and has been associated with an increase in suicidal thoughts and attempts (3).

The percentage of suicide victims who have ingested alcohol varies among studies and over time. While a study in Western Australia from 1986 to 1988 found that only 24.5% of suicidal hanging cases had alcohol detected (12), this had increased to 30% in a study from 1988 to 1992 (13). A study from New South Wales, Australia, reviewing cases from 1997 to 2006 showed a positive blood alcohol in 40.6% of nonoverdose suicide cases overall and in 42.8% of hanging cases (14), the latter result similar to the current data.

Although a recent study of suicides in Australia did not show any relationship between age and the likelihood of a particular substance being detected (14), our results demonstrate that in the population studied, there was a clear relationship between alcohol ingestion and age in hanging suicides. A previous study on suicide from Switzerland (15) showed that only 26% of suicide victims aged <25 years were positive for blood alcohol, but this is markedly lower than our level of 57% in hanging victims. Given that alcohol is a recognized risk factor for suicide, that alcohol drinking in the young appears to be increasing in prevalence in Australia, and that a high percentage of victims of hanging suicides under 25 years of age are intoxicated, this may reflect an association that warrants further investigation.

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