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PAPER

PATHOLOGY/BIOLOGY

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Cluster Hanging Suicides in the Young in South Australia

ABSTRACT: Retrospective review of hanging suicides in individuals aged ≤17 years was undertaken at Forensic Science South Australia, Australia, over two 5-year periods: 1995–1999 and 2005–2009. Seven cases of hanging suicides were identified from 1995 to 1999, with a further 14 cases from 2005 to 2009, an increase of 100% ($p < 0.001$). Hanging accounted for 33.3% of all suicides in this age group (7/21) from 1995 to 1999, compared with 93.3% of the total number of suicides (14/15) in the second 5-year period. In contrast, Australian national data from 1998 and 2008 showed a 30% decrease in hanging suicides in the young, from one case/100,000 population in 1998 to 0.7 in 2008. Cluster suicides occur in the young and are often initiated by direct communication. As it is possible that Internet-based social sites may facilitate this phenomenon, investigations should include an evaluation of the victim's Internet access given the potential risk of similar actions by peers.

KEYWORDS: forensic science, suicide, hanging, cluster, children, adolescents, Internet

Suicide represents a significant cause of premature death, accounting for 2191 deaths in Australia in 2008 (1). Suicidal behavior and, in particular, preferred suicide methods vary among different populations, with accessibility to injurious agents and perceptions of the lethal effects of a substance or activity being significant factors in determining choice. The latter perceptions may be influenced by the age and sex of victims (2).

Hanging is a form of ligature strangulation in which compression of the neck results from the gravitational effect of the weight of the body (3). It is a method with high lethality (4) and is the most frequent means used to commit suicide in Australia (1). Following an apparent increase in South Australian cases of child and adolescent hanging suicides (5), the following study was undertaken.

Materials and Methods

A retrospective review of cases of hanging suicides in individuals aged 17 years and below was undertaken at Forensic Science South Australia (SA) over two 5-year periods: 1995–1999 and 2005–2009. All cases had undergone full autopsies with police and coronial investigations. The case files were reviewed and data were grouped into the two 5-year periods. The age, sex, toxicological findings (when available), and circumstances of death were summarized.

Forensic Science SA is the South Australian state forensic facility where medicolegal autopsies are performed. The population served is *c.* 1.6 million (6). The manner of death was determined for each case after investigations had been completed.

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In addition, the Australian Bureau of Statistics database (http://www.abs.gov.au/) was also accessioned for similar cases to provide national Australian data for comparison purposes. The population of Australia is *c.* 22.1 million (6) and each state and territory operates under a coronial system. All cases listed in the national database were subject of coronial investigations.

Statistical analyses were performed utilizing Fisher's exact test to compare the distribution of hanging suicides in individuals aged 17 years and below in the two time periods. Differences were considered statistically significant when $p < 0.05$.

Results

Seven hanging suicides were identified in individuals aged 17 years and below in the first 5 years of the study, with a further 14 cases found between 2005 and 2009 ($p < 0.001$) (Fig. 1). Hanging accounted for 33.3% of all suicides in this age group (7/21) from 1995 to 1999, compared with 93.3% of the total number of suicides (14/15) in the second 5-year period (Fig. 2). The 21 victims of hanging were aged between 10 and 17 years (mean = 15.7 years), with a male-to-female ratio of 2.6:1. There was evidence that several of the victims from the latter time period knew one another and had communicated socially through the Internet. Specifically, three of the victims who died within a 5-month period in 2006 attended the same school, and a fourth who also died at that time had close friends at the school. In this group, one of the victims was known to be a frequent user of the Internet, and two others had been using chat rooms just before their deaths. Further information on the extent and type of specific communication among the victims was not available.

The total number of suicides in this age group in South Australia showed a reverse trend over the time of the study, with 21 cases in 1995–1999 (four cases per year), falling to 15 cases in 2005–2009 (three cases per year). Given the relatively low numbers of

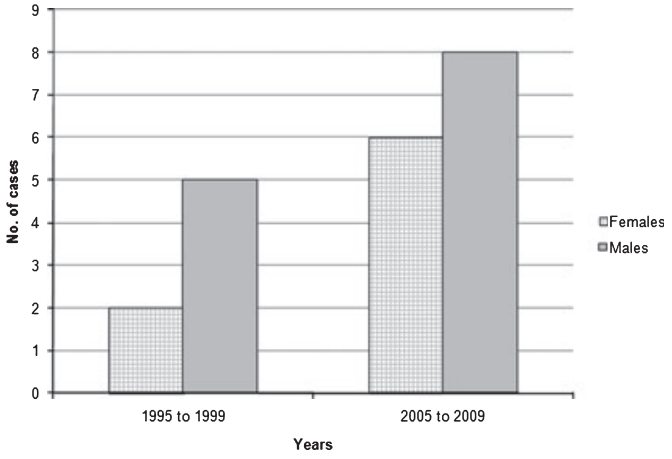

FIG. 1—*Cases of hanging suicides in individuals aged 17 years and below in South Australia over two 5-year periods (1995–1999 and 2005–2009), by gender.*

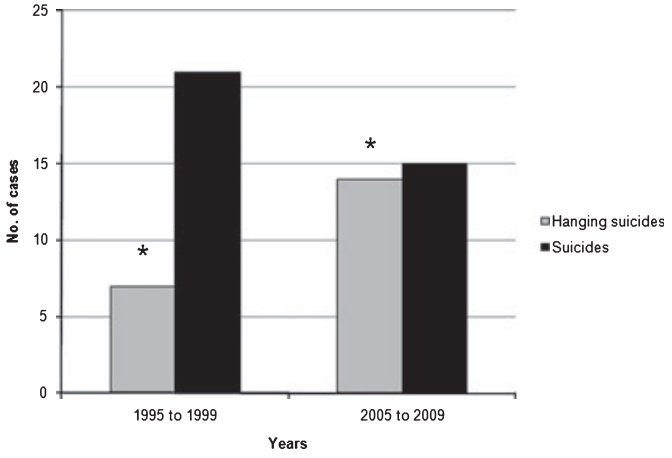

FIG. 2—*Cases of suicide in individuals aged 17 years and below in South Australia over two 5-year periods (1995–1999 and 2005–2009), (*p < 0.001).*

TABLE 1—*Toxicological results for cases of hanging suicides in individuals aged 17 years and below in South Australia over a 5-year period (2005–2009).*

	Age Group				
	<15 Years		15–17 Years		
Substance	M	F	M	F	Totals
Ethanol (<0.05 g/L)			1		1
Cannabinoids			2		2
Cannabinoids + Ethanol (<0.05 g/L)			1		1
Other medication*			1		1
Negative	1		2	6	9

*Paracetamol.

suicides, absolute numbers have been used rather than rates per 100,000 population.

Toxicological results were only available for the suicide victims from 2005 to 2009 (Table 1). Only three of the victims had consumed alcohol, all of whom were aged >15 years, with only low levels detected (<0.05 g/L). Cannabinoids were found in only three cases (21.4%). None of the victims had antidepressant medications detected.

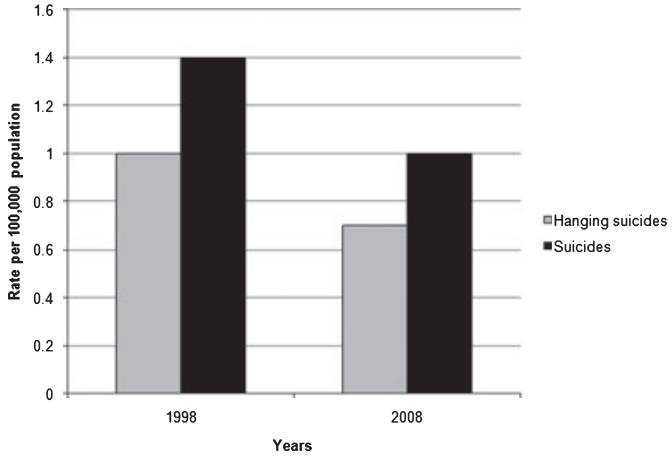

FIG. 3—*Suicide rates in individuals aged 17 years and below in Australia over two 1-year periods (1998 and 2008) (6).*

National data were available in 1998 and 2008 from the Australian Bureau of Statistics database, which showed one case of youth (≤17 years) suicide by hanging per 100,000 population in 1998, compared with 0.7 in 2008, a decrease of 30%. The total number of suicides in this age group also declined from 1.4 cases per 100,000 population in 1998 to 1.0 in 2008 (1) (Fig. 3).

Discussion

Suicide represents a significant proportion of unnatural deaths and accounts for more fatalities than motor vehicle crashes and homicides (1,2). In 2008, suicide was ranked as the 14th leading category of death in the general Australian population, accounting for 1.5% of all fatalities, with 1151 hangings (53% of cases) (1).

In adolescence, suicide is the third leading cause of death in the United States and is associated with interpersonal conflict, abuse (physical or sexual), social isolation, and a family history of suicidal behavior (7). Although anxiety, depression, and substance abuse are additional risk factors, suicide among peers may also act as a triggering event (8).

In the current study, data revealed that there has been a statistically significant increase in hanging suicides in the young in South Australia in recent years. This trend has occurred despite decreases in overall youth suicides in South Australia, as well as nationally (Figs. 2 and 3). It also goes against the national trend of reduced hanging suicides in the young (Fig. 3). The increase constitutes a suicide cluster, defined as "an excessive number of suicides occurring in close temporal and geographic proximity" (9). Suicide clusters tend to occur in small communities and are particularly likely to occur in adolescents and young adults. It has been estimated that cluster suicides account for 2% of all suicides in those aged 15–19 years in the United States and that this may increase to 13% in certain states (10,11).

Toxicological analyses from the 14 most recent hanging victims in the current study did not reveal the presence of antidepressant medications or significant amounts of alcohol to suggest either that the victims were being medically treated or that the deaths had been influenced by the disinhibiting effects of ethanol (12). Although the reasons for the local South Australian trend are not certain, clusters of suicides are known to be influenced by certain factors such as media transmission and word of mouth

discussion, the latter occurring among friends (9). The role of the media in adolescent cluster suicides has, however, been debated with some studies failing to demonstrate a link (13). The role of imitation is, however, of concern as it has been shown that individuals with similar vulnerabilities to suicide tend to form peer groups (14).

Enhanced communication through Internet social Web sites may be an emerging factor that lends itself to facilitating the transmission of suicidal ideation and thus to "copycat" actions, particularly among the young (15). For example, there were indications that several of the victims in the latter time period of the current study were known to each other and had communicated through Web sites. Social networking Web sites may inadvertently romanticize suicide or idealize it as a heroic deed through the appearance of "memory walls" for users to pay tribute to victims. This type of focusing on suicide may initiate "copycat" acts among peers or in those who identify with the victim (16). This form of imitation has also been reported to be method-specific (17,18), with cases often occurring within a geographic and timely proximity to one another. Another factor that has been reported in teenagers is the association of depression with excessive Internet usage (19). The possibility of cell phones also being used to transmit similar messages should also be considered.

Although there have been increasing numbers of deaths in the United States among adolescents owing to the "choking game," where episodes of cerebral hypoxia are intentionally induced to cause brief periods of euphoria (20,21), no such events have been identified in South Australia.

A disturbing example of a suicide cluster has been reported in the media from a town in South Wales, UK, where 25 young individuals (aged between 15 and 28 years) have died from hanging within a 3-year period (22). It is alleged that many of the victims had profiles on a social networking Internet site (23), and at least four of the adolescent victims knew one another (24).

Thus, although the numbers in the current study are low, these data demonstrate a recent increase in South Australian cases of hanging suicides in individuals aged 17 years and below. If cluster suicides in the young are initiated by communication among peers, it is possible that Internet-based social sites and electronic messaging may lead to an increase in this phenomenon, given that direct contact at all times is greatly facilitated. The investigation into youth suicide should, therefore, include an evaluation of the victim's email and cell phone communications and Internet access, given the potential risk of similar actions by peers and the possibility that this may reveal useful information regarding motivation or triggering events.

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