

PAPER

PATHOLOGY/BIOLOGY

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Recent Trends in Suicides Utilizing Helium

ABSTRACT: Retrospective review of cases of suicide involving helium inhalation was undertaken at Forensic Science South Australia over a 25-year period from 1985 to 2009. No cases of helium-related suicides were identified in the first 15 years of the study, with one case between 2000 and 2004 and eight cases between 2005 and 2009. Australian data were also reviewed from 2001 to 2009 that showed 30 cases between January 2001 and June 2005, compared to 79 cases between July 2005 and December 2009, an increase of 163%. A review of Swedish data between 2001 and 2009 showed no cases between January 2001 and June 2005, compared to seven cases between July 2005 and December 2009. Thus, all three areas showed recent and striking increases in cases of suicide involving helium inhalation. Given the availability of helium and the recent promotion of this method of suicide, it is quite possible that this may represent a newly emerging trend in suicide deaths.

KEYWORDS: forensic science, suicide, helium, asphyxia, plastic bag, Internet

Methods that are used in cases of suicide vary over time and among different communities. Factors that influence preferred methods include knowledge of the particular lethal effect of a substance or activity and the availability of the material or device that is being utilized (1). A well-known example of this is the higher rate of gunshot suicides in countries or professions where there is ready access to firearms (2).

In recent times, there has been considerable press coverage of assisted suicides with publications, such as *Final Exit*, and sites on the Internet detailing methods that can be used ([3]; <http://www.internationaltaskforce.org/hemlockcf.htm> [accessed February 15, 2010]). One of the recently discussed methods involves the use of plastic bags with the inhalation of helium gas. Following an apparent increase in local South Australian cases, the following study was undertaken.

Materials and Methods

Retrospective review of cases of suicide where helium inhalation was an essential component to the fatal episode was undertaken at Forensic Science SA over a 25-year period from 1985 to 2009. All cases had undergone full autopsies, including toxicology, with police and coronial investigations. Case files were reviewed and data grouped into 5-year periods. The age, sex, and circumstances of death were summarized. Forensic Science SA is the state forensic facility where medico-legal autopsies are performed. The population served is approximately 1.6 million. The manner of death for each case was determined by the State Coroner after investigations had been completed.

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In addition, the Australian National Coronial Database (<http://www.ncis.org>) and the Swedish National Forensic Database (Swedish National Board of Forensic Medicine; <http://www.rmv.se>) were also accessioned for similar cases to provide national data for comparison purposes. The population of Australia is approximately 21.4 million (<http://www.abs.gov.au/ausstats>), and each state and territory operates under a coronial system. All cases listed in the national database were the subject of full coronial investigations. The population of Sweden is approximately 9.3 million (<http://www.scb.se>). All cases listed in the national database were the subject of full police and forensic investigations.

Results

Data from South Australia revealed no cases of helium-related suicides in the first 15 years of the study, with one case between 2000 and 2004 and eight cases between 2005 and 2009 (Fig. 1). The latter represented approximately 1% of the total number of 896 suicides in South Australia between 2005 and 2009. The nine victims were aged between 19 and 69 years (mean = 44.1 years, median = 40.0 years) with a male to female ratio of 2:1. In all cases, methods of suicide involved placing the head in a plastic bag, with a tube attached to an opened cylinder of helium inserted under the plastic. A copy of a suicide manual and evidence of access to Internet sites detailing methods of suicide were found in two cases (22%).

There has been no increase in suicide numbers in South Australia over the time of the study, with 3569 cases between 1984 and 2004 (178.5 cases/year), compared to 896 between 2005 and 2009 (179/year), with only 169 cases in 2009.

Data were available in Australia from 2001 to 2009 from the National Coronial Database. Over that time, there were 109 cases of suicides involving the use of helium (these included the nine

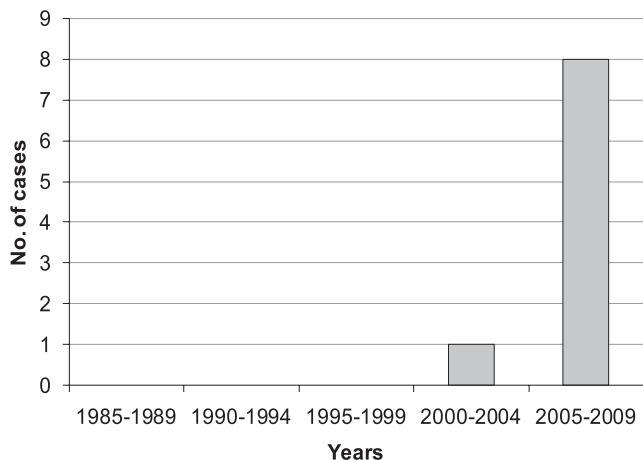


FIG. 1—Cases of suicide utilizing helium inhalation in South Australia over a 25-year period (1985–2009), divided into 5-year periods.

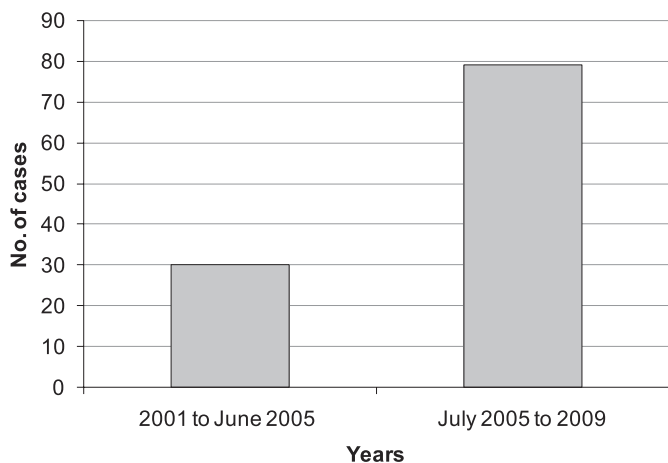


FIG. 2—Cases of suicide utilizing helium inhalation in Australia over a 9-year period (2001–2009), divided into two time periods (January 2001–June 2005 and July 2005–December 2009).

cases from South Australia). Dividing the 9-year period into two halves showed that 30 cases had occurred in the first half, between January 2001 and June 2005, compared to 79 cases in the second half, between July 2005 and December 2009, an increase of 163% (Fig. 2). At the time of this report, coronial files of 90 cases had been finalized. In these cases, the most frequent age range was 20–29 years, with a male to female ratio of 4:1. Official national suicide numbers for 2009 are not yet available; however, the most recent data indicate that the total number of suicides in Australia has been declining from 2722 in 1997 to 2457 in 2001 and 1881 in 2007 (4,5).

In Sweden between 2001 and 2009, there were a total of seven suicides recorded where helium had been utilized. Dividing the 9-year period into two halves showed that no cases had occurred in the first half, between January 2001 and June 2005, compared to seven cases in the second half, between July 2005 and December 2009 (Fig. 3). Official national suicide numbers for 2009 are also not yet available; however, the most recent data indicate that the total number of suicides in Sweden has been relatively stable with 1196 in 2001 and 1126 in 2006 (<http://www.socialstyrelsen.se> [accessed March 4, 2010]).

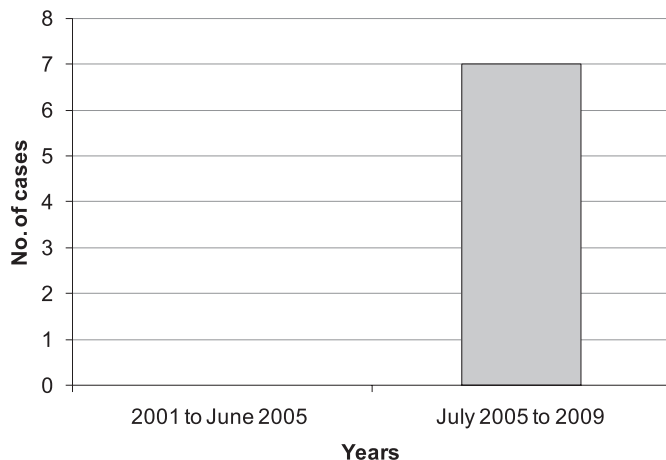


FIG. 3—Cases of suicide utilizing helium inhalation in Sweden over a 9-year period (2001–2009), divided into two time periods (January 2001–June 2005 and July 2005–December 2009).

Discussion

Suicide refers to the deliberate act of killing oneself (6) and accounts for a significant and yet largely preventable number of deaths each year in many countries. In 2007, suicide was ranked as the 15th leading cause of death in Australia, accounting for 1881 deaths. Over three-quarters of these deaths (77%) were men (5). Suicide is also the leading external cause of death in Australia, with more deaths attributed to acts of deliberate self-destruction than to either motor vehicle collisions or homicides (5,7).

Preferred methods of suicide vary at different ages, with accessibility, availability, lethality, and familiarity with devices being significant factors in determining choice (7,8). In 2007, the most frequent method of suicide in Australia was hanging (54% of cases), followed by drug toxicity (12%) and poisoning by other methods (including motor vehicle exhaust) in 12% (5). Suicide by asphyxiation with a plastic bag is uncommon and represents only a small fraction of suicide deaths in South Australia (1.2% of suicides between 1984 and 2004; [9,10]), although the method is highly lethal and death can ensue in minutes (11).

Helium is a low-density, colorless, odorless, tasteless, nontoxic, and nonflammable inert gas. It may cause or contribute to asphyxiation by displacing oxygen in enclosed spaces. Thus, the channeling of helium from a gas cylinder into a plastic bag over the head or into a mask attached to the face may result in a rapid loss of consciousness and death (12–15). Other gases with a predominant suffocating effect include argon, propane, nitrogen, and methane (16,17).

Suicide by helium asphyxiation seldom leaves any visible marks on the body, and so the pathological investigation of the cause and manner of such deaths can be very difficult. If the plastic bag and other materials have been removed, and in the absence of an impression or ligature mark caused by fastening a plastic bag around the neck, the cause of death may be incorrectly attributed to coincidental underlying disease (10,12,13). Another difficulty is that helium cannot be detected using standard toxicological analyses of blood and urine samples (12). For these reasons, there is a potential for underreporting of helium-related deaths. Given the use of plastic bags with helium suicides, there are several lethal mechanisms that may come into play involving smothering from occlusion of the external airways by plastic, neck compression from the ligature or a tie used to fasten the plastic

bag, and asphyxiation from oxygen displacement by helium (10,13).

Following an apparent increase in suicide deaths in South Australia where helium had been used, it was decided to retrospectively review suicides over the preceding 25 years. This clearly demonstrated an increase in cases, although the numbers are small (Fig. 1). For this reason, national Australian and Swedish data were accessed to determine whether the same trends were apparent in two larger, but geographically separated populations. Data revealed that there has also been an increase in such cases in other parts of Australia and in Sweden. The increase in helium deaths does not appear to be part of a general trend in increasing suicide numbers, as the overall numbers of suicides in South Australia, Sweden, and Australia have either remained constant or have fallen over recent years.

Given that there is now detailed suicide literature (and Internet sites) that promote the use of inert gases with plastic bags as a relatively simple, fast, nondisfiguring, and painless method of self-killing (16,18), it is perhaps not surprising that this upward trend has emerged. The following was taken from the website <http://www.internationaltaskforce.org/hemlockcf.htm> (accessed February 15, 2010), reporting Dr. Richard MacDonald at the 13th National Hemlock Biennial Conference in San Diego, California, United States in 2003: "we have had to shift to techniques using plastic bags and helium. That, remarkably has become an acceptable method of hastening death...It is a very speedy process and it has never failed in our program." Biddle et al. (18) have pointed out that although it has been illegal in Australia since 2006 to use the Internet to promote suicide or to provide practical details, international sites are still freely accessible. Helium canisters are also readily acquired from party-hire businesses for balloon inflation. The authors have previously demonstrated a significant increase in the number of suicides using plastic bags or wrapping, without helium, in South Australia between 1984 and 2004—an increase that again raised the possibility of the effect of suicide manuals and information on suicide techniques (10).

Thus, although case numbers are low, these data demonstrate a recent and striking increase in cases of suicide where helium inhalation has been utilized. Given the ready availability of helium and the recent promotion of this method of suicide, it appears likely that investigators will increasingly encounter such cases.

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