

Suicidal Drowning

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ABSTRACT: Autopsy protocols at the office of the Chief Forensic Pathologist were reviewed with respect to suicidal drowning. Within the years 1987 to 1991, 247 people have committed suicide in the Province of Newfoundland. Of that number, 22 committed suicide by drowning, representing 8.9% of all suicides, and the fourth leading cause of suicidal death.

When considering suicide in the age group of 50 years and older, ($n = 68$), which accounts for 27.5% of all suicides, drowning represents 25% of all suicidal deaths, and within females in this group represents the most common form of suicidal death (45.5%). The presence of alcohol or other drugs is decidedly unusual in such victims. Of the 22 drowning suicides, 19 were committed in the ocean, two were committed in fresh water and one committed in a residential well. These results contrast to similar studies performed in locations in which access to water could be reasonably considered a factor in choosing a method of suicide.

KEYWORDS: pathology and biology, suicide, drowning, age-related

The province of Newfoundland occupies Canada's east coast, adjacent to the North Atlantic, and possesses 28 957 km of shoreline. Of the province's 568 474 inhabitants, 91% live in proximity to the ocean [1]. In addition to geographic location, the sea has provided a source of employment for the province throughout most of its history.

Previous studies have shown that the presence of an ocean or a large body of water, is associated with a greater suicide rate specifically by drowning [2]. This study was undertaken to determine if drowning, as a method of committing suicide, is prevalent within the province; to develop a profile of the suicidal drowning victim; and to compare the findings with other studies performed in locations in which access to water could be reasonably considered a factor in choosing a method of committing suicide.

Material and Method

The office of the Chief Forensic Pathologist is embodied to assist the authorities in the investigation of all sudden unexpected deaths that occur within the province of Newfoundland. In the event of unnatural deaths, scene investigation, complete autopsies, and toxicological analysis are performed on all victims. Completed autopsy protocols are reviewed, and maintained at the central office.

Autopsy protocols of all suicidal drowning were reviewed for a five year period from

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TABLE 1—Suicidal drowning by age and sex (percent of total).

Age group	Male	Female	Total
<20	0	1 (4.5)	1 (4.5)
21–30	0	0	0 (0)
31–40	2 (9.1)	1 (4.5)	3 (13.6)
41–50	0	1 (4.5)	1 (4.5)
51–60	7 (31.8)	4 (18.2)	11 (50)
61–70	2 (9.1)	1 (4.5)	3 (13.6)
>70	3 (13.6)	0	3 (13.6)
Total	14	8	22

1987 to 1991 with respect to the age and sex of the victim, the presence or absence of ethanol or other drugs, and the location of the terminal event with respect to salt- or fresh-water drowning. Furthermore, all cases of suicide in victims age 50 years of age and older, were reviewed with respect to the method of suicide used. The total number of suicides in the population during the study period was also determined. Suicide as a manner of death was determined using the operational criteria of self infliction and intent as outlined by Rosenberg et al. [3]. Furthermore all files were reviewed by the author to establish such criteria existed.

Results

During the study period of 1987 to 1991 there were a total of 247 suicides reported, with an average annual suicide rate of 8.6 per 100 000 population. Of these 247, 213 were male and 34 were female. Of the total suicides, 22 (8.9%) were committed by drowning, consisting of 14 male and 8 female victims.

The average age of the victims was 56.7 years with a range of 15 to 83 years of age. Analysis of suicidal drowning with respect to age and sex is shown in Table 1.

Body fluids of all 22 suicide victims were analyzed for ethanol, two (9.1%) of which tested positive. Both victims were male (Table 2). Body fluids from 18 of the 22 victims were analyzed for the presence of drugs, three (16.7%) of which tested positive. One victim had more than one drug present. In no cases were drug levels beyond the therapeutic range (Table 3).

With respect to the location of the terminal event, 19 (86.4%) occurred in the ocean, two in fresh water and one in a residential well. There were no cases of bathtub suicides. During the study period there was one drowning victim whose manner of death was undetermined.

Of the 247 total suicides committed during the study period, 68 (27.5%) occurred in individuals aged 50 years and older, consisting of 57 male and 11 female victims. Sui-

TABLE 2—Blood alcohol concentration in suicide victims (positive in only 2 of 22 victims tested).

Age	Sex	BAC
57	Male	41 mmol/L (189 mg%)
58	Male	29.6 mmol/L (136.5 mg%)

TABLE 3—*Drugs detected in suicide victims (positive in only 3 of 18 victims tested).*

Age	Sex	Drug	Concentration
40	Male	Trimipramine	trace
55	Male	Bromazepam	30 μg %
59	Female	Trimipramine	75 μg %
		Flurazepam	22 μg %

cidal drowning accounted for 25% of all suicides within this age group, and represented 21% of male, and 45.5% of female suicides (Table 4).

Discussion

As a method of committing suicide, drowning would appear to enjoy a certain popularity within the population of Newfoundland, with the average five year suicidal drowning rate of 8.9%. An opinion as to whether drowning, as a method of suicide is universally common depends on ones source of reference [4,5], but in this study represents the fourth most common method of suicide.

The suicidal drowning rate of 8.9% compares to a study by Auer from Uusimaa province in Finland [6], in which is reported a rate of 7.9%, but is higher than a study reported by Copeland from Dade County Florida [5] with a suicidal drowning rate of 4.5%. In both these locations there is easy access to water. Both studies analyzed suicidal drowning over a period of nine and five years, respectively. Suicidal drowning in fresh water was considerably higher in both studies constituting 49% and 68.6%, respectively, which contrasts to the overwhelming preference for salt water in this study. This perhaps reflects the easy access to the ocean in Newfoundland.

In all three studies men comprised the most victims numerically although the age groups differed significantly. In this study the most common victim was a male between the ages of 51 and 60 years, while the Uusimaa study reported that the more common victims were males between the ages 21 and 30 years. Furthermore, the Dade County Florida study reported males older than 70 years as being most common, meanwhile a study by Nichter and Everett from Pinellas County Florida reported the most common age group to be over 60 years of age but did not specify the sex [7]. Why such diversity should exist, not only between different countries but also within the same state cannot be determined from this study, but is most likely due to differing sociocultural environments.

Since in both the study just described and that by Auer [6], males outnumber females as suicide victims, the preponderance of males is to be expected. However, when one

TABLE 4—*Methods of suicide in individuals 50 years of age and older.*

Male	Percent	Female	Percent
Gunshot wound	29.8%	Drowning	45.5%
Hanging	24.6%	Drug overdose	27.2%
Drowning	21%	Gunshot wound	9.1%
Drug overdose	21%	Hanging	9.1%
Other	3.6%	Jumping	9.1%

considers suicide methods in males and females independently, it is apparent that as a method, drowning is more often the choice for females, with 23.5% of female suicide victims choosing drowning as a method, compared with 6.6% of males. More interestingly when one considers the age group 50 years of age and older, drowning is the method of choice in females, and the third most common method in males tied with drug overdose. Again sociocultural phenomenon most likely play a role in explaining these findings. One must also consider however that this study deals with successful suicides rather than suicide attempts, and thus drowning may simply represent a method with less chance of survival, than say, drug overdose.

Concomitant alcohol use was decidedly uncommon in this study with 90.9% of victims testing negative for the presence of alcohol. This compares with the 82.4% testing negative in the Uusimaa study and contrasts with the 41.4% testing positive in the Dade County study. It has been stated in textbooks of forensic medicine that suicidal drowning often occurs against a background of alcohol intoxication [4], however in light of this study, the presence of alcohol in a drowning victim would point away from suicide as a manner of death, at least in the context of Newfoundland.

In comparison, for suicides in general, a positive blood alcohol has been reported in 36% of suicide victims in a study by Kubo et al. [8] and in 29.4% of suicides in a study by Loftus and Dada [9]. Furthermore, preliminary data on the suicide population within the Province of Newfoundland shows that 28.6% of all suicide victims are legally intoxicated at the time of committing suicide. This would suggest that the use of alcohol is not a contributing factor in suicidal drowning, but that it may contribute to other methods of committing suicide.

In contrast to suicidal drowning, accidental drowning is often associated with a positive blood alcohol. A study by Kringsholm et al. from Denmark demonstrated a positive blood alcohol in 61% of accidental drowning victims [10], while Cairns et al. from New Zealand showed an almost 50% positive blood alcohol in their study involving accidental drowning [11].

It is thus apparent that the profile of the typical suicidal drowning victim is relevant only to the location in which the drowning took place, and that generalizations should be made with caution. Furthermore, while males may predominate in terms of numbers, as a choice, suicidal drowning is more popular with females and that in this study, most popular in females 50 years of age and older. Furthermore the presence of a positive blood alcohol in a drowning victim, should alert the investigator to critically review all aspects surrounding the drowning incident before assigning suicide as the manner of death.

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