

## Suicide: A Ten-Year Retrospective Study

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**ABSTRACT:** Suicide is a complex phenomenon associated with psychological, biological, and social factors, claiming approximately 30,000 lives each year in the United States. We retrospectively reviewed all cases referred to the Medical Examiners' Office/Forensic Pathology Section at the Medical University of South Carolina from January 1988 to December 1997. The cases of suicide totaled 678. All of the cases were analyzed as to age/race/sex, method of suicide, time of year, and toxicological results. Files were also reviewed to determine if the victim left behind a suicide note. The ages ranged from 12 to 94 years; males comprised 79.5% of the victims, and whites 78.3%. The male to female and white to black ratios were both 3.9:1. The most common methods were gunshot wounds, accounting for 64.6% of the cases. No correlation existed with time of year, and the number of cases was not increased around major holidays. The group of victims 65 years and older and the pediatric group under the age of 18 were also examined separately.

**KEYWORDS:** forensic science, forensic pathology, gunshot wound, manner of death, South Carolina

### Introduction

Even though there are approximately 30,000 suicides each year in the United States, one every 20 min, the suicide rate in the United States is at the midpoint of the national rates reported to the United Nations by industrialized countries (1). Many cases of suicide are straightforward and obvious to law enforcement and to the victim's family. However, other cases are a challenge to investigate and require thorough examination of all aspects of the case. Statistical analyses of suicide rates since the early 1900's provide a general association between personal characteristics of individuals that kill themselves (2). However, for the forensic investigator and pathologist accurately to assign cause and manner of death in alleged suicides, one must first be aware of the common histories, scenarios, risk factors, demographics, and methods of suicide. The authors report an analysis of such variables to further enhance the understanding and investigation of this entity.

### Materials and Methods

We retrospectively reviewed all cases referred to the Medical University of South Carolina Forensic Pathology/Charleston County Medical Examiners' Office from January 1988 to December 1997. The cases were from the 46 counties in South Carolina,

particularly in the southern and southeastern regions. South Carolina has a coroner system, and referral of cases is at the discretion of the coroner. We examined age/race/sex of the victim, method of suicide, time of year, and toxicological results. The files were also reviewed for psychiatric history, previous suicide attempts, and as to whether a note was left. These same parameters were applied to victims less than 18 years of age and to those 65 years and older. The four most common methods of suicide were also individually examined as to the above variables.

### Results

Race and gender of the 678 suicides are shown in Table 1. Males comprised 79.5% (539) of the victims and females 20.5% (139), giving a male to female ratio of 3.9:1. The average age was 39 years, with a range of 12 to 94 years. Further examination of the mean ages showed the average white victim to be 41 years, black victim 32 years, male victim 38 years, and female victim 41 years.

Gunshot wounds were the leading method of suicide accounting for 64.6% (438) of the cases. Other methods consisted of hanging 11.95% (81), overdose 10.91% (74), carbon monoxide poisoning 3.83% (26), drowning 3.24% (22), fall from height 2.95% (20), poisoning 0.74% (5), incised wounds 0.59% (4), pedestrian-train 0.59% (4), pedestrian-automobile 0.15% (1), automobile-train 0.15% (1), thermal injury 0.15% (1), and suffocation 0.15% (1) (Table 2). Overdose is defined as ingestion of prescription medications, over the counter medications, or illegal substances, and poisoning is defined as ingestion of a substance that is not normally ingested. As for time of year, the cases were evenly distributed between months, ranging from 6.93% (December) to 9.59% (July). For the holiday season, extending from late November to early January, the number of cases was not increased (Table 3). Of all cases, 73.3% (497) were autopsied, and 26.7% (181) were investigated.

Examination of the 438 gunshot wound cases reveals that 84% (367) of the wounds were to the head, 14% (62) to the chest, and 2% (9) to the abdomen. White victims accounted for 81% (355), blacks 17.4% (76), other races 1.6% (7), with a white to black ratio of 4.7:1. Males accounted for 84.5% (370) and females 15.5% (68), giving a male to female ratio of 5.4:1. The mean age of the self-inflicted gunshot wound was 41 years (range 12–94 years), blacks 32 years, whites 44 years, males 41 years, and females 45 years. Russian roulette accounted for 1.4% (6) of self-inflicted gunshot wounds and 0.9% of the total suicide cases.

Hanging, the second most common suicide method, claimed 81 lives (11.95%), with a white to black ratio of 2.7:1 and male to female ratio of 14:1. Blacks comprised 26% (21), whites 70.3% (57); other races 3.7% (3), males 85% (69), and females 15% (12). The mean hanging victim age was 32 years, for blacks 30 years, whites 33 years, other races 23 years, males 32 years, and females 31 years.

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TABLE 1—Gender and race of all suicide victims.

	Number of Victims	Percentage of Cases
White	531	78.3
Black	135	19.9
Other Races	12	1.8
Male	539	79.5
Female	139	20.5

TABLE 2—The methods of suicide.

Method	Number of Victims	Percentage of Cases
Gunshot wound	438	64.60
Hanging	81	11.95
Overdose	74	10.91
Carbon monoxide poisoning	26	3.83
Drowning	22	3.24
Fall from height	20	2.95
Poisoning	5	0.74
Incised wound	4	0.59
Pedestrian-train	4	0.59
Pedestrian-automobile	1	0.15
Automobile-train	1	0.15
Thermal injury	1	0.15
Suffocation	1	0.15

TABLE 3—The month of year when the suicide occurred.

Month	Number of Victims	Percentage of Cases
January	54	7.96
February	60	8.85
March	66	9.74
April	55	8.11
May	53	7.82
June	58	8.55
July	65	9.59
August	58	8.55
September	52	7.67
October	57	8.41
November	53	7.82
December	47	6.93

Overdose ranked as the third most common method of suicide, accounting for 10.91% (74) of the total cases. Whites comprised 86.5% (64) of the cases and blacks 13.5% (10). Females comprised 51% (38) of the cases and males 49% (36), with a male to female ratio of 0.9:1. White victims outnumbered black victims by 6.4:1. The mean age of the overdose victim was 43 years (range 15–77 years). White victim mean age was 43 years, while the black victim mean age was 40. Females were on average 4 years older than males, with mean ages of 45 and 41 years, respectively.

The fourth leading method of suicide, carbon monoxide poisoning, showed a 25:1 ratio for both the male to female and white to black ratios. Of the 26 suicides in this category, 96.2% (25) were male, 3.8% (1) female, 96.2% (25) white, and 3.8% (1) black. Mean ages of the victims were white 41 years, black 15 years, male 40 years, female 31 years, with an overall mean age of 40 years.

Review of case investigations revealed a suicide note was left in 22% (150) of the cases, and no note was found in 12% (84). In 66% (444), there was no mention of a note.

Toxicology reports showed that alcohol was identified in 38% (258) of victims, of whom 21% (140) were defined as legally intoxicated in the state of South Carolina (greater than or equal to 100 mg/dL). Prescription medications were identified in 23% (155) of the victims, while an illegal substance was found in 7.3% (50). Nicotine was present in 26% (176) of the cases. No toxicological investigation was performed on 5.5% (37) of the victims.

A documented psychiatric diagnosis was positive in 19% (128) of the victims, and 7.7% (52) had a documented previous suicide attempt. Incarcerated inmates comprised 2.2% (15) of all suicides, while 2.8% (19) were victims of a homicide/suicide.

The elderly and pediatric populations were analyzed separately. Victims 65 years and older totaled 11.5% (78) with a white to black ratio of 15.5:1 and the male to female ratio of 6:1. The mean age of this population was 73 years (range 65–94), and gunshot wounds accounted for 81% (63) of the deaths. A premortem diagnosis of cancer was documented in 26% (20) of the cases, while 46% (48) had a chronic or debilitating disease, which significantly altered lifestyle. Of the 36 victims less than 18 years of age, which comprised 5.3% of all suicides, the white to black and male to female ratios were 2.5:1 and 4.1:1, respectively. The mean age of death in the pediatric group was 15 years (range 12–17), and self-inflicted gunshot wounds accounted for 81% (29) of the cases. Eleven percent (4) of the pediatric victims had a previous psychiatric history, but only one victim was known to have made a previous attempt. Seventeen percent (6) had ethanol present, but only one victim was legally intoxicated. In two cases, an illegal substance was found, and in both cases it was marijuana. Nicotine was found in 19.4% (4) of cases. A suicide note was found in 11% (4) of cases.

For the year 1998 in South Carolina, whites comprised 69% of the population, blacks 31%, males 48%, and females 52%. Sixty-three percent of the population is between the ages of 18 and 64 years, with individuals 17 years and younger constituting 25% and people 65 years and older, 12%.

## Discussion

Deaths by suicide are a challenge to investigate. Awareness and understanding of the features of suicide are crucial for proper classification of these deaths. In the current study, the average age of the victim was 39 years, and the white male was the most common victim. Studies have shown that males are three times more likely to commit suicide than females (1). Rates of suicide among whites has been reported as nearly twice that of nonwhites, but our study shows almost a 4:1 white to black ratio (1). The peak age range for black suicide victims is 25–34 years, with our results falling into this range (3). Male suicide victims have been reported to peak at 45 years, but our results show a slightly younger victim at 38 years (1). Likewise, females peak around age 55, and our study shows an average age of 41 years (1).

Within the elderly population, the average age was 73 years, and most commonly a white male with a method of gunshot wound. Young adults characteristically experience job, financial, and relationship problems and the elderly experience personal loss and physical illness (4,5). Approximately one half of our elderly victims had a chronic or debilitating disease, and 26% had a premortem diagnosis of cancer. Unlike other sectors of the population, elderly suicide victims are likely to have a chronic or debilitating disease. Suicide is the third leading manner of death in the teenage and young adult population (2,3,6). Our pediatric population was defined as under the age of 18 years, and with an average age of 15 years. The typical victim was a white male with a method of gunshot wound. Within our pediatric population, the presence of the

aforementioned risk factors and variables, i.e., alcohol, nicotine, illegal drugs, positive psychiatric history, presence of a note, was not significant. Aside from race and sex, our study could not identify typical pediatric suicide victims.

One important step to understanding this entity is to dispel any myths and falsehoods surrounding suicides. Often, an investigator/coroner will not label a death as a suicide unless a note is found with the body (2). A note was documented in only 22% of our cases reviewed over the past ten years. Another myth about suicides is that they tend to occur around holidays (1,2). Our study shows that this is not only false, but suicides actually declined from late November to early January. Many potentially suicidal people seek comfort, escape, and relief in alcohol prior to committing suicide (7). Toxicological examination is an important aspect of investigating all suicide deaths. But does the absence of alcohol decrease one's suspicions of suicide? Studies have shown a positive relationship between alcohol abuse, suicide attempts, and completed suicides (8). Ethanol was identified in 38% of our victims, and 21% were legally intoxicated. Smoking has also been linked to suicidal ideation and suicidal behavior (9). Toxicological analysis in our study revealed 26% positive for nicotine. However, since nicotine may be an effective self-medication in some depressed individuals, we do not see this positive finding in suicide victims as unexpected. In terms of a positive psychiatric history, surprisingly, only 19% of our victims had such a documented history. Therefore, the lack of a positive history should not preclude the possibility of suicide.

### Conclusions

When classifying suicide as a manner of death, an error in the classification can have social, legal, and financial ramifications. To

completely understand suicide, we must be familiar with its risk factors, victim demographics, methods, and scenarios, as well as its myths and falsehoods. We hope this ten-year retrospective study will aid law enforcement and forensic investigators when dealing with this complex issue.

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