

PAPER**PATHOLOGY/BIOLOGY**

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Case Series of Completed Suicides by Burning Over a 13-Year Period*

ABSTRACT: Suicide by burning is an extreme act that is uncommon in the United States and throughout the Western world. The characteristics of people who complete such acts are not well understood. To address this issue, we examined the death records of the King County Medical Examiner's Office in Washington State over the 13 years from 1996 to 2009. Twenty-five cases of suicide by burning were identified and used to characterize decedent demographics, circumstances of death, and motivating factors. Compared to other methods of suicide, burning demonstrated a significant overrepresentation of decedents who were women, 40–59 years of age, and Asian/Pacific Islander. They also tended to have previous psychiatric illness and/or substance abuse issues. Self-burning predominantly occurred at the decedent's residence with the intent of suicide given. There was no unifying theme in motivating factors. Together, these data represent the characteristics of people whose death is because of suicide by burning in King County, Washington.

KEYWORDS: forensic science, forensic pathology, suicide, self-immolation, burning, autopsy

Self-burning is an extreme and dramatic form of suicide that is relatively rare in the United States and other Western countries (1–5). While there has been some recent data describing those who attempt suicide by burning (5), there are few detailed reports of completed suicide by burning and the factors that surround these deaths in the United States, with even fewer described from the perspective of forensic pathology (reviewed in [2]). One earlier report from Denmark documents detailed demographic and circumstantial data about suicides by burning over a 10-year period, but it is not clear whether this is representative of cases in the United States (3). Here, we present a case series of completed suicides by burning in King County, Washington over a 13-year period. Motivating factors and intent are discussed to further characterize these deaths.

Materials and Methods

The King County Medical Examiner's Office (KCMEO) serves a mixed, predominantly urban population of approximately 1.9 million in western Washington State, bordering the Puget Sound. The KCMEO assumes jurisdiction over all unexpected and unnatural deaths, including suicides. In addition, the KCMEO performs scene investigation and autopsy in most unnatural deaths, depending on how well injuries are documented in the medical records. Cases from January 1996 to September 2009 were selected from the KCMEO records based on the manner of death being suicide with at least one immediate or contributing cause being burns. Demographic information collected included the decedent sex, age,

employment status, birthplace, race/ethnicity, marital status, U.S. armed forces status, documented psychiatric illness and/or substance abuse, and suicide history. Case characteristics recorded include incident scene location, death location, length of hospitalization prior to death, total body surface area burned, whether intent was given, decedent identification method, and whether an autopsy was performed. For comparison, selected demographic information pertaining to suicides from January 1996 to December 2007 was collected from the KCMEO published annual reports and included decedents' race, age, sex, and marital status. Total suicide demographics for 2008 and 2009 were not yet available. Statistical analyses were performed using two-tailed *t*-test analysis.

Results

Over the 13 years from 1996 to 2009, 25 cases of suicide by burning were recorded by the KCMEO, representing <1% of all suicide deaths in King County, Washington. The number of deaths per year ranged from zero to three. The decedents' demographics are summarized in Table 1. There was approximately the same number of deaths in men as in women by this method. The average age of decedents in our series was 45.6 years; 64% of the decedents were between the ages of 40 and 59, with 92% between ages 20 and 59. No cases of suicide by burning were younger than 20 years, and only two (8%) were older than age 59. The majority (68%) was employed and not married (60%). Only one of the decedents had a history of service in the U.S. armed forces. The decedents were predominantly white (72%) with the next largest group being Asian/Pacific Islander (24%). However, the Asian/Pacific Islander population in suicide by burning (24%) is significantly larger than that of total suicide by other methods (6%). More than half (64%) of the decedents had a history of psychiatric illness and/or substance abuse, with almost half (44%) having previously

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TABLE 1—Decedent demographic information.

	Suicides by Burning (1996–2009) (N = 25)		Total Suicides (1996–2007) (N = 2538)	
	n	%	n	%
Sex				
Women**	12	48	565	22
Men**	13	52	1973	78
Age (years) [†]				
<20	0	0	126	5
20–39	7	28	898	35
40–59*	16	64	1011	40
60–79	2	8	345	14
>79	0	0	158	6
Employment status				
Employed	17	68		
Unemployed	2	8		
Homemaker	4	16		
Unknown	2	8		
Born in U.S.				
Yes	14	56		
No	11	44		
Race				
White**	18	72	2228	88
Black	0	0	97	4
Asian/Pacific Islander***	6	24	163	6
Native American	0	0	23	1
Other	1	4	27	1
Marital status				
Married	8	32	757	30
Married but separated	2	8	N/A	N/A
Not married	15	60	1781	70
U.S. armed forces				
Yes	1	4		
No	24	96		
Documented psychiatric illness and/or substance abuse				
Cases with documentation	16	64		
Psychosis	3	12		
Depression	2	8		
Substance abuse	3	12		
Two or more of above	4	16		
Unspecified	4	16		
Suicide history				
Prior threats and/or attempts	11	44		

Two-tailed *t*-test analysis performed between groups where **p* < 0.05, ***p* < 0.005, ****p* < 0.001.

[†]Average age for suicide by burning case series is 45.6 years and the age range is 23–73 years.

threatened and/or attempted suicide. None of the previous attempts included burning, but they did include overdose, jumping out of a moving vehicle, and cutting wrists.

Circumstances surrounding the deaths are summarized in Table 2. The most frequent (52%) incident location was the decedent's residence. Among the cases where information pertaining to accelerant use was available (68%), gasoline was used above others (56%); other accelerants included propane and unknown accelerants. Intent of death was demonstrated in 60% of cases and was usually given verbally before, during, or after the act of lighting oneself on fire. Only 16% of cases had notes of intent present, although it is possible that more were present but were consumed by burning. Identification of the decedents was predominantly (68%) achieved by use of circumstantial evidence, such as hospital records and photo identification. Autopsy was performed in the majority of cases (76%). Almost half (52%) died at the incident scene with the remaining being hospitalized prior to death (Table 3). Of those that were hospitalized, the highest percentage

TABLE 2—Circumstances surrounding death for 25 cases of suicide by burning.

	n	%
Incident scene		
Residence	13	52
Vehicle	4	16
Outdoors*	7	28
Other [†]	1	4
Death scene		
Incident scene	13	52
Hospital	12	48
Total body surface area burned [‡]		
0–25%	1	4
26–50%	2	8
51–75%	4	16
76–100%	11	44
Unspecified	7	28
Accelerant		
Gasoline	14	56
Propane	1	4
Unknown accelerant	2	8
Accelerant use not in death reported	8	32
Intent given		
Verbal declaration	11	44
Written note	4	16
None	10	40
Decedent identification method		
Radiography (skeletal or dental)	6	24
Fingerprints	2	8
Circumstantial evidence	17	68
Autopsy performed		
Yes	19	76
No	6	24

*Away from residence.

[†]This scene was inside a restaurant.

[‡]Seven cases unspecified range of 20–100%.

TABLE 3—Length of hospitalization for 12 cases of suicide by burning.

Length of Hospitalization (Days)	n	%
<7	7	58
7–14	2	17
15–21	1	8.3
22–30	1	8.3
>30	1	8.3

Average length 10.7 days; longest length was 60 days.

(58%) died within the first week. Largely (61%), the decedents had >75% total body surface area burns. Carbon dioxide saturation levels were measured in 11 of the nonhospitalized decedents and of those, only four cases demonstrated levels elevated >5% (17, 27, 45, and 84%). Carbon dioxide levels would provide little relevance in those who were hospitalized given the time for physiological responses to correct hypercapnia, and thus carbon dioxide levels were not measured in these cases. This indicates that oxygen displacement may have contributed to the cause of death in a minority of the total suicides by burning.

Discussion

Our study characterizes the deaths of suicide by burning in a series of 25 cases spanning a 13-year period in King County, Washington. Age, race, sex, and marital status demographics support the findings of previous studies on the subject (3,5). The greatest number of suicides were committed by whites; however,

the Asian/Pacific Islander population was a significantly overrepresented demographic in suicide by burning cases. In our series, 24% of suicides by burning were Asians, whereas that same group comprised only 6% of all suicides. The reason for this discrepancy is not clear, but it should be mentioned that all of the Asians in this case series were born in Asia, not the United States. Perhaps, there was a cultural influence that led to burning as a method for suicide, such as what is seen throughout the world (1,2,6–11). There were roughly equal numbers of men and women in this series, which is in contrast with both the male predominance of all suicides in King County, as well as the female predominance of suicide by burning seen throughout the world (1,2,6–9,12). However, women were significantly overrepresented in our series compared to that of suicides by other methods. That the majority of cases in our series had a documented psychiatric illness and/or substance abuse problems is consistent with other reports of suicide by burning in Western countries (2,4,5,13). However, in our series, the least common single psychiatric illness documented was depression (8%) and the most common were psychosis (12%) and substance abuse (12%). The incident scene was frequently found to be the decedent's residence, which has also been seen in a report by a group from Denmark (3). Our data also show that more than half (60%) of the decedents display intent of death by burning and are hospitalized prior to death in nearly half (48%) of cases. These observations are in contrast with the previous study, which showed that most were dead at the scene (3).

Although our data revealed no overwhelming trends in demographics for those who commit suicide by burning as opposed to other methods, there were diverse psychological motivating factors present with the limited amount of data available with respect to intent. These included protest, punishment of others, and punishment of self. The term "self-immolation" somewhat romanticizes suicide by burning and is often reserved for those cases where suicide is thought to be committed for self-sacrificial reasons in the context of particular cultural beliefs or political protests (10). This act has been reported throughout the world and is a major cause of burns and of suicide generally in India, Sri Lanka, and Iran (1,2,6–9,11,12). In our case series, only one decedent indicated that his death was a political protest. His note of intent declared that he was engaging in self-immolation for the "freedom and democracy of the American public." He carried out the act in a public setting where several bystanders watched him pour accelerant on himself and ignite. In our series, there were no apparent cases of sati, which is the eastern cultural practice of a wife throwing herself on the funeral pyre of her recently deceased spouse. There were, however, three incidents in which decedents ignited themselves while arguing with a spouse or significant other, suggesting possibly that the partner was to be punished by bearing witness to the act. In only two cases did the circumstances suggest that self-punishment may have been a motivating factor. In one case, a man set fire to himself <1 h after he was caught cheating on his wife, who was not at the scene during the suicide. In another case, a man who set himself ablaze immediately before hanging himself from the third story of a parking structure admitted in a note at the scene to

having a sexual relationship with a minor, which was the subject of an ongoing police investigation at the time of his death.

In summary, our case series demonstrates that people who die from suicide by burning in King County, Washington tend to be between 20 and 59 years old and white, but with Asian/Pacific Islanders being overrepresented for their population. Men and women are equally represented in this series, but women are overrepresented when compared to suicide by methods other than burning. Incident locations were commonly at the decedent's residence with half requiring hospitalization. Most decedents had documented psychiatric illness and/or substance abuse problems. Intent of death either verbally or in writing was prevalent. Our series, while complete, still only represents one region in the U.S. There needs to be more studies like this to fully understand the demographics, circumstances, and motivations behind suicide by burning in the rest of the U.S. Perhaps this information may be used in the future to identify those at risk for suicide by burning and provide targeted appropriate intervention and therapy.

Conflict of interest: The authors have no relevant conflicts of interest to declare.

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