

The Medium, not the Message: How Tattoos Correlate With Early Mortality

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Abstract and Introduction

Abstract

Objectives. At autopsy, tattoos are recorded as part of the external examination. An investigation was undertaken to determine whether negative messages that are tattooed on a decedent may indicate a predisposition to certain fatal outcomes.

Methods. Tattooed and non-tattooed persons were classified by demography and forensics. Tattoos with negative or ominous messages were reviewed. Statistical comparisons were made.

Results. The mean age of death for tattooed persons was 39 years, compared with 53 years for non-tattooed persons ($P = .0001$). There was a significant contribution of negative messages in tattoos associated with non-natural death ($P = .0088$) but not with natural death. However, the presence of any tattoo was more significant than the content of the tattoo.

Conclusions. Persons with tattoos appear to die earlier than those without. There may be an epiphenomenon between having tattoos and risk-taking behavior such as drug or alcohol use. A negative tattoo may suggest a predisposition to violent death but is eclipsed by the presence of any tattoo.

Introduction

Tattoos have been part of body art and expression in many cultures since antiquity.^[1,2] The purposes of tattoos are as varied as the people who have them and may include such motives as personal expression, identification, military classification, gang affiliation, marking of prisoners, or memorializing personal history, among others.^[1-3] The prevalence of tattoos is not certain, but estimates range from 6% to 24% in the United States.^[1,4] Tattoos appear to be more prevalent in the teenage and young adult population than among people of the older decades,^[1,3,5-7] although they are seen in all age groups. Until recently, there appears to have been a preference among men for obtaining tattoos,^[7] but they have become widely accepted among women.

The circumstances under which people procure tattoos are varied, including ritual bonding,^[7] expression of individuality, the influence of friends,^[1] or no reason.^[3,6] An association of wide-ranging risk-taking behavior has been observed among persons with tattoos, including drug abuse, risky sexual behavior, suicidal behavior risk, smoking, and truancy.^[1,2,4,7] Eating disorders may also be risk factors among women with tattoos.^[1]

While these associations are frequent, it is important to note that tattoos are not causally linked to these behaviors or risk factors.^[1] Rather, these behaviors appear to be associations that may share underlying relationships with the person who has tattoos, but the tattoos per se do not cause a particular outcome.

Tattoos are recorded at autopsy as part of the external examination and can be useful for the identification of a decedent or may sometimes give an indication of a specific risk factor that could have been related to the cause of death, such as a gang affiliation in a violent death. This study investigated whether other associations exist between tattoos and cause or manner of death,

particularly whether messages tattooed on a decedent might have connotations that may indicate a predisposition to types of fatal outcomes.

Materials and Methods

Cases from a 15-year period were reviewed (1997–2012). The cases were drawn from the author's experience as a deputy medical examiner and pathologist in Linn County, Iowa, and adjacent or nearby counties. All cases with satisfactory records and reports were reviewed. Exclusions were made when key data, such as the cause of death, nature of tattoos observed, or toxicology results, were not available. Only adults (18 years or older) were included in the tattooed and non-tattooed groups.

All persons were classified by age, race, sex, cause of death, manner of death, and toxicology findings. Overdoses included acute drug intoxications with a single drug, multiple drug intoxications, and fatal blood alcohol concentrations. Persons with tattoos were categorized based on the messages or interpretations of the tattoos, which were correlated with the demographic and forensic data. In particular, tattoos with negative, frightening, violent, or ominous messages were compared with the subjects' outcomes. Specifically, tattoos that showed skulls, the Grim Reaper, a devil, a demon, a monster, weapons, threatening gang signs, or explicitly negative statements (e.g. "I'd feel better dead," an actual tattoo of a suicide victim) were treated as negative messages. The locations of tattoos on the subjects were also noted.

The types of messages and other tattoo content were compared with the demographic and forensic data. Statistical comparisons were made with standard *t* tests, linear regression, and χ^2 tests. Kaplan-Meier survival curves and Cox proportional hazards regression analyses were performed with the statistical package MedCalc for Windows, version 12 (MedCalc Software, Ostend, Belgium).

Results

The demographic data of the population studied are reported in. The tattooed population consisted of 138 people; the non-tattooed population consisted of 300 people. By the criteria described in Materials and Methods, many people had tattoos with negative content ($n = 29$), many more had tattoos with nonnegative content ($n = 109$), and the largest group was people with no tattoos ($n = 300$). Men were no more likely to be tattooed than were women. Hispanics and Asians were too few in number to be separated in the statistical analysis. However, there was a highly statistically significant correlation of tattooing based on race, with African Americans much more likely to be tattooed than whites ($P = .0001$). Similarly, there was a significant correlation between age and race, with African Americans with tattoos dying at a younger age (mean, 32 years) than whites with tattoos (mean, 40 years) ($P = .0089$). In general, however, people who died at a younger age were more likely to have tattoos than did people who died at an older age ($P = .0001$).

Table 1. Demographics of People With and Without Tattoos.^a

Characteristic	Men	Women	Total
Tattoo			
Mean age, y	39	38	39
Race			
White	79	31	110
African American	17	8	25
Hispanic	3	0	3

Non-tattoo			
Mean age, y	52	56	53
Race			
White	200	86	286
African American	6	1	7
Hispanic	4	1	5
Asian	0	2	2
Total	309	129	438

^aValues are presented as number of subjects unless otherwise indicated.

The mean age of death without adjustment for the manner of death for tattooed persons was 39 years (range, 18–81 years) compared with 53 years (range, 18–91 years) for non-tattooed persons ($P = .0001$). This survival advantage was also maintained when analyzing for natural vs non-natural/violent manner of death by the Kaplan-Meier method (results to follow). The causes of death are reported in. The cause of death was highly correlated with the presence of tattoos for gunshot wounds ($P = .0008$) and overdose ($P = .0002$). The cause of death was highly correlated with the absence of tattoos for atherosclerotic cardiovascular disease ($P = .0001$). There was no relationship between the presence and absence of tattoos for persons who died of other causes.

Table 2. Cause of Death in Tattooed and Non-tattooed Groups.

Cause of Death	Tattooed, No.	Non-tattooed, No.	P Value
Abdominal aortic aneurysm	3	7	
Alzheimer disease		3	
Amyotrophic lateral sclerosis		1	
Anaphylaxis		2	
Arrhythmia		5	
Asphyxiation		4	
Asthma	2	2	
Atherosclerotic cardiovascular disease	9	67 ^a	.0001
Blunt-force injury	21	51	
Bowel infarction		2	
Carbon monoxide poisoning	2	8	
Carcinoma	1	11	
Chronic obstructive pulmonary disease	1	2	
Cerebrovascular accident		8	
Cirrhosis	3	2	
Congestive heart failure	2	2	
Diabetic ketoacidosis	2	6	
Diffuse alveolar damage	2		
Drowning		5	
Electrocution		1	

Fatty liver		2	
Gastrointestinal hemorrhage	3	6	
Gunshot wound	26 ^a	22	.0008
Hanging	8	6	
Huntington chorea		1	
Hypertensive heart disease	6	8	
Hypothermia	1		
Indeterminate	4	2	
Lung disease		3	
Myocarditis	2		
Obesity		1	
Overdose	24	29 ^a	.0002
Peritonitis		3	
Pneumonia	5	22	
Pulmonary embolus	1	5	
Seizure		3	
Sepsis	1	1	
Sharp-force injury	3	2	
Strangulation	1		
Total	138	300	

^aCause of death significantly related to this population.

Tattoos were distributed on the subjects' bodies as follows (the number of subjects on whom tattoos appeared at the given site but not the total number of tattoos per site; many persons had tattoos on many body sites): head and neck (n = 13), chest (n = 31), abdomen (n = 14), back (n = 34), right upper extremity (n = 80), left upper extremity (n = 73), flank (n = 1), right lower extremity (n = 21), and left lower extremity (n = 25).

The categories of tattoos found on the decedents were as follows (numbers indicate the number of times the specified class of tattoo was seen on the tattooed subjects; many classes of tattoos could be found on a given individual): names, personal titles, or initials (n = 51); animals (n = 50); religious symbols or messages (n = 25); symbol other than religious (n = 23); heart (n = 23); flower (n = 20); skull (n = 18); tribal (n = 16); negative statement (n = 7); devil or demon (n = 6); Chinese characters (n = 6); Grim Reaper (n = 5); overtly sexual (n = 4); monster (n = 3); gang affiliation (n = 3); weapons (n = 3); swords (n = 2); and miscellaneous (n = 18). In summary, 32 subjects had tattoos considered negative (i.e. skulls, the Grim Reaper, a devil, a demon, a monster, weapons, threatening gang signs, or explicitly negative statements), while 106 subjects had neutral or positive connotations in their tattoo choices.

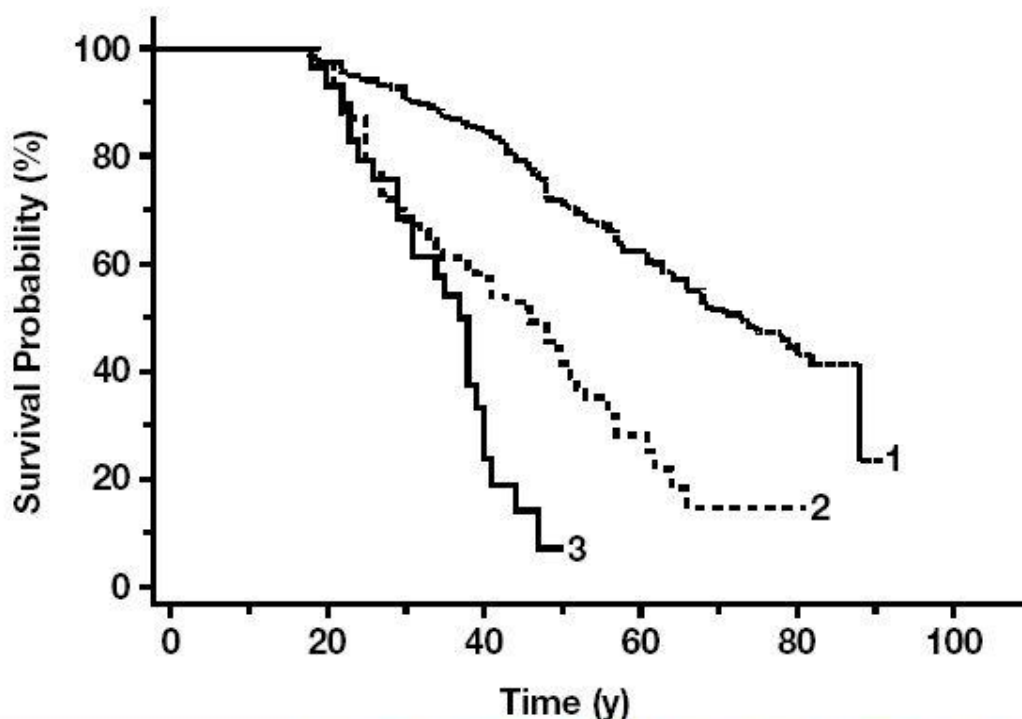
The manners of death are summarized in the Kaplan-Meier survival analysis tested probability of death by non-natural or violent manner of death over time, which is presented in Figure 1. Significant differences were noted between persons with no tattoos, persons bearing tattoos with nonnegative messages, and persons with tattoos bearing negative messages. Analyzed this way, the non-tattooed population lived to a mean age of 67 years (n = 300), persons with nonnegative

messages lived to a mean age of 47 years (n = 109), and persons with negative-message tattoos lived to a mean age of 35 years (n = 29) ($P = .0001$).

Table 3. Manner of Death and Content of Tattoo.

Manner of Death	Negative Tattoo, No.	Nonnegative Tattoo, No.	Total Tattoos, No.	No Tattoo, No.
Accident	9	29	38	64
Homicide	7	12	19	8
Suicide	9	22	31	49
Natural	6	39	45	176
Indeterminate	1	4	5	3

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Source: Am J Clin Pathol © 2014 American Society for Clinical Pathology

Figure 1.

Mortality of persons with tattoos. Kaplan-Meier survival analysis: line 1 represents persons with no tattoos; line 2 represents persons with tattoos that do not have negative content; line 3 represents persons with tattoos with negative content. Persons with no tattoos are significantly likely to live to older ages than persons in both groups. Persons with tattoos of negative content are significantly likely to die at younger ages than either group.

The Cox proportional hazards regression analysis model evaluated the potential contribution of sex, race, use of drugs or alcohol, presence of tattoos, and the content of tattoos in manner of death. When analyzed for death by non-natural manner, sex and race did not contribute to the risk of death at a younger age. The use of alcohol and illicit drugs, however, contributed significantly to death at a younger age in non-natural cases ($P = .0001$).

As noted in the Kaplan-Meier analysis, the presence of any tattoo was confirmed to have a strong correlation with mortality by a non-natural manner ($P = .001$). As a group taken together, tattoos with negative messages contributed to risk of mortality by a non-natural manner ($P = .0088$). When specific types of negative tattoos were compared with the presence of any tattoo, most images or messages did not have a definite contribution to early mortality, but images of weapons or gang signs may have importance in early non-natural death ($P = .02$). When analyzed in the Cox analysis for mortality by natural manner, the absence of a tattoo continued to be associated with death in a nonviolent manner ($P = .0006$). The presence of any tattoo contributed to mortality at a younger age ($P = .0066$), but the role of a negative message was not sufficiently strong to contribute to natural mortality at a younger age. Non-white race contributed to natural death at a younger age, however ($P = .0076$).

Table 4. Drug or Alcohol Use in Tattooed and Non-tattooed Groups.^a

Drug or Alcohol Use	Tattooed	Non-tattooed	P Value
Prescription drugs	15	45	
Illicit drugs	27	15	.0001
Alcohol	29	44	.0001
Mean BAC, mg/dL	41	25	.0526

BAC, blood alcohol concentration.

^aValues are presented as numbers unless otherwise indicated.

Discussion

Tattoos have a long history in many societies, including ancient Egypt, pre-Columbian America, China, and Polynesia, among others.^[1,4] The name of the practice as we use it today comes from the Polynesian word *tau-tau*, meaning the tapping of the skin to create a permanent marking.^[1,4] The term entered the Western lexicon through the travels of European sailors as they explored the Pacific and encountered and then adopted the practice. Indeed, the so-called tribal tattoo in current use is named after the designs that Polynesian tribes used in rites of passage.

The present data are unavoidably confounded. Young people are more likely to have tattoos than are older people,^[1,3,5-7] and the leading causes of death in the United States in the young age group are accidents, homicides, and suicides, which are all non-natural manners of death. So is the presence of a tattoo or the presence of youth the primary "risk factor" for these deaths? The Cox proportional hazards regression analysis helps to evaluate the relative contributions of the different factors that may be involved, but acknowledgment of the limitations of the present findings is prudent. Still, the present study identifies a significant difference between the ages of persons who die with tattoos compared with those without tattoos. The difference is 14 years and appears to be independent of sex, race, or manner of death. When manner of death is factored in, the survival difference is even more appreciable: 20 years for a tattoo with a nonnegative message and 32 years for a tattoo with a negative message. African Americans in the study group appear more likely to be tattooed. They also appear to die at a younger age than do whites. The confounded data are clarified a bit by the Cox analysis. The presence of any tattoo, a negative message, use of illicit drugs, and alcohol appear to contribute to death at a younger age in violent cases, while the presence of a tattoo and non-white race contribute to death at a younger age in natural cases. Persons who die from gunshot wounds or overdose are also more likely to be tattooed, while those who die from atherosclerotic cardiovascular disease are more likely not to be tattooed. The presence of a tattoo with negative content may be associated with death by a non-natural manner,

and as a group, tattoos with negative messages contribute to the risk of mortality by a non-natural manner. Images of gang signs and weapons may be particularly prone to this risk.

Specific correlations between race and cause of death were found in other studies.^[2,7] For example, a large study of tattoos and mortality based on a New Mexico population found that Hispanic ethnicity was significantly associated with the presence of a religious tattoo and that homicide victims were significantly more likely to have tattoos than were victims of accidents and were more likely to have a gang tattoo than others.^[7] The significant difference in age of death was observed in that study, as in this one. Similarly, a small study of an Australian population found an association between the presence of a tattoo of an anti-establishment folk hero and violent death from suicide or homicide among relatively young white men.^[2]

Differences between study groups likely reflect differences in the populations that are studied. According to the US Census Bureau, the estimated population of Iowa is 3,074,186 people, of whom 92.8% are white, 3.2% are African American, 5.3% are Hispanic, and 2.0% are Asian. By comparison, of 313,914,040 people in the United States overall, 77.9% are white, 13.1% are African American, 16.9% are Hispanic, and 5.5% are Asian.^[6] It is likely that the substantially lower proportion of African Americans and Hispanics in Iowa prevents detection of some correlates that may be confirmed in larger, more diverse populations. Religious iconography and messages, or folk heroes, may be culturally dependent and thus might not be reproducible in different populations. This article's study group is based in a culture and sensibility of the Midwestern United States and may have too much homogeneity to discern specific ethnic or racial differences in expressions of tattoo art.

Still, the association between tattoos and relatively early death by any manner, not necessarily violent, was striking. However, the presence of a tattoo is not de facto a predictor or marker of a poor outcome in health and survival but rather may represent an epiphenomenon. The association between having tattoos and risk-taking behavior has long been observed clinically,^[1,2,4,7] especially with people who obtain tattoos at younger ages. There is an indication of this observation at autopsy, in that persons with tattoos are significantly more likely to have an illicit drug detected than persons without tattoos and are more likely to die by a non-natural manner with drugs or alcohol. These correlations may be associated with the greater incidence of fatality from overdose in this group.

Regarding the message or imagery of the tattoo, there may be trends suggesting that some types of tattoos may have some kind of association with certain outcomes, and some of the messages that people imprint in their skin, including negative ones, appear to be related to a violent or non-natural death. However, the remarkable finding in these data was that tattoos of any kind may be associated with earlier death from many causes and manners.

There have always been inherent risks in the process of tattooing, such as bleeding, tears, infections, allergic or inflammatory reaction, flare reaction within the tattoo area ("koebnerization"), activation of native disease such as lupus, pseudolymphomatous reaction, or pseudoepitheliomatous hyperplasia.^[1,4,5] Some of these risks have been mitigated by federal regulation of inks and state or local requirements for sterile instruments and clean procedures.^[5] The rate of clinical complications from tattoos presently is approximately 2%.^[4]

The behavioral risks that may accompany the mind-set that welcomes a tattoo have been described.^[1,2,4,7] They may include a "live for today" attitude, in which long-term consequences of personal decisions may not be considered in detail. Indeed, tattooing may be a paradigm of this phenomenon: while one embraces a certain tattoo at the time he or she receives it, the person may feel differently about the tattoo later; removal is fairly common some years after the original

procedure.^[1,5] Such an inclination to commit to a permanent body marking could be related to a predisposition to make other short-term decisions that may have fatal consequences in serious situations that could lead to accidents, suicide, or homicide. This behavioral model is less clear for death by natural causes, however, which is also correlated with death at a younger age for many tattooed persons in the data shown herein. The exception to this trend is death from atherosclerotic cardiovascular disease, which remained predominantly an affliction of non-tattooed persons. This difference may simply be a result of overall survival, however; possibly people with tattoos did not live late enough into middle or elderly age to develop complications of atherosclerosis.

References

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