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Causes of Death among U.S. Military Personnel: A 14-Year Summary, 1980–1993

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Data extracted from the Report of Casualty (DD Form 1300) of the Department of Defense's Worldwide Casualty System were used to describe the 27,070 deaths among active duty personnel for the 14-year period 1980 through 1993. Ninety-five percent of all military deaths occurred among males and 84% among enlisted personnel. Unintentional injuries were the leading cause of death among both males (61%) and females (52%). Diseases accounted for about 20% of all deaths and represented the second most significant cause of death for both male and female service personnel. Suicide was the third leading major cause of death among males (13%), followed by homicide (5%); among females this order was reversed, with homicide (14%) exceeding suicide (12%). About 2% of all deaths resulted from combat. The findings presented here are useful in identifying cause-specific high-risk groups in each of the four service branches and directing appropriate prevention strategies.

Introduction

The Department of Defense (DoD) publishes periodic summaries of all active duty casualties by type (hostile and nonhostile) and cause of death, branch of service, geographic location, and year of occurrence. Also included are basic decedent demographic information such as gender, race, pay grade, and age at death.[1,2] Although annual military strength totals and rates of death for all causes are generated for each service, these summaries do not provide detailed epidemiologic or risk information.

Over the past several decades an abundant peer-reviewed literature has accumulated relating to various causes of death among the active duty military forces. These articles can most easily be grouped into the broad cause of death categories—injury, natural causes, suicide, homicide, or death due to combat action—and are often specific to one service, cover a short time period, and rarely address similar causes of death experienced in the other services. It is not within the scope of this paper, however, to present a review of the literature. (The authors conducted an extensive literature review of all causes of death in the military. A complete reference list and summary table are available upon request.)

The purpose of this study is to provide a comprehensive summary of the leading causes of death among the men and women on active duty who accounted for over 28 million person years of service during the 14-year period 1980 through 1993. The deaths are examined by demographic variables, including age group, gender, race, and pay grade, both by individual service (Air Force, Army, Marine Corps, and Navy) and collectively for all services. Fatalities will also be described in terms of the most common manner of death within each causal group.

Methods

Casualty Data

The Report of Casualty (DD Form 1300) is the official record of death for all military personnel who die while serving on active duty. The DD Form 1300 is the primary source of information for the DoD Worldwide Casualty System (WCS), maintained and operated since 1979.[1] Casualty data for each military service is routinely compiled on a fiscal year basis, October 1 through September 30, and consolidated by the DoD. For this study, however, military casualties were analyzed by calendar year to facilitate future, in-depth comparisons with national data with the same age profile and for a similar period of time. The WCS data, consisting of all deaths that occurred among active duty personnel during the 14-year period January 1, 1980, through December 31, 1993, were obtained in electronic form.

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The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Navy, Department of Defense, Department of Health and Human Services, or the U.S. Government.

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Strength (Population) Data

Complete data on the number of active duty personnel by service, gender, age, race, and enlisted/officer status were obtained from the DoD Defense Manpower Data Center for each year of the study period. Age at death was grouped into three periods: 17 to 24 years, 25 to 34 years, and 35 years and older. Race classifications were white, black, and other; the other race category included Asians/Pacific Islanders, Native Americans, and those persons whose race was unknown. Enlisted personnel were grouped as either junior (E1–E4) or senior (E5–E9), and commissioned and warrant officers were grouped together. Variable-specific fatality rates per 100,000 military personnel were calculated for each service, and for all services collectively, using 14-year tabulations of active duty strength.

Definition of the Cause of Death Categories

All causes of death were reviewed and initially grouped into six categories: unintentional injury, disease and illness (natural causes), homicide, suicide (self-inflicted injury), hostile action (injury resulting from operations of war), and other. Although the WCS cause of death codes have their own classification system, the description and definition for these major categories subjectively parallel those in the International Classification of Diseases, 9th Revision (ICD-9).[3] ICD-9 codes for the first five of these categories are defined as follows: (1) unintentional injury, external cause of injury (E code) E800 through E949 and E970 through E989; (2) illness, nature of death (N code) N001 through N799; (3) homicide, E960 through E969; (4) suicide, E950 through E959; and (5) hostile action, E990 through E999. The final category, (6) other, has no defined parameters in ICD-9, but includes military deaths whose cause is under investigation or pending, and those deaths where the cause is undetermined or unknown. The deaths of 26,101 active duty members were further analyzed after the exclusion of deaths due to hostile action (n = 561) and those classified in the other category (n = 408) from the study population.

Adjustment of Rates

Overall mortality rates may be affected by both age-specific rates and the age distribution of the individual service populations. For each cause of death category, a direct "age adjustment" or "age standardization" procedure was used to remove the influence that the age composition of the four military populations may have on summary fatality rates.[4,5] The collective military population for the 14-year study period was used as the "standard population." At the bottom of each cause-specific table (Tables I through IV), summary unadjusted and age-adjusted fatality rates are provided for each service and for the entire military population. Fatality rates presented throughout this paper are unadjusted except where otherwise noted.

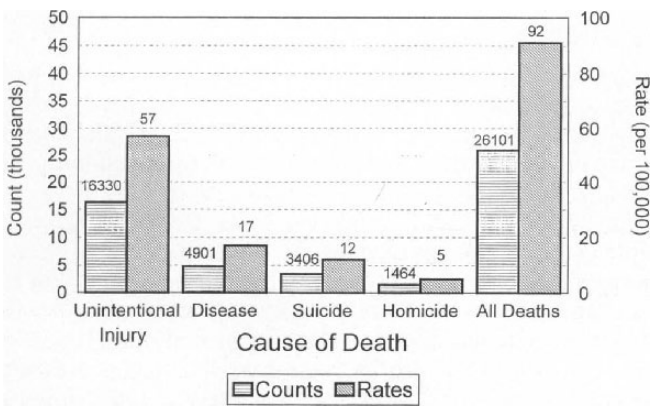

Fig. 1. Number and rate for all military fatalities by cause of death, 1980–1993.

Results

During the 14-year period from 1980 through 1993, 26,101 men and women serving on active duty died, at an annualized rate of 92 per 100,000. Males accounted for more than 95% of these deaths, whites 78% of the deaths, enlisted personnel 87% of the deaths, and those aged 34 or less 81% of the deaths. Figure 1 provides a summary of the distribution of deaths and overall fatality rates for the four leading causes of death. Death due to unintentional injuries was the leading cause of death among both males (61%) and females (52%). Disease and illness was the second leading cause of death in both genders, accounting for about one in every five deaths. Suicide (13%) was the third leading cause of death among males, followed by homicide (5%); among females this order was reversed: homicide (14%) exceeded suicide (12%).

Unintentional Injury

The Marine Corps experienced the fewest unintentional injury deaths but had the highest rate compared to the other services (Table I). The unintentional-injury death rate for the Air Force was about 25% below the overall military death rate for both unadjusted and age-adjusted. The rate of unintentional injury death was inversely related to age where the rate steadily decreased as age increased. This pattern was consistent in each service branch. The highest unintentional-injury fatality rate was observed in the Marine Corps' 17- to 24-year age group.

Males experienced over 23 times as many unintentional injury deaths as females and had a male-to-female fatality rate ratio of 2.6. The gender fatality rate ratio of 3.9 in the Marine Corps was the highest rate among all the services. Four of every five unintentional injury victims were white, with rates about 1.3 times higher than blacks. With the exception of the Marine Corps, blacks had higher unintentional-injury death rates than those in the other race category. The greatest race rate differentials occurred in the Navy, where the rate among whites and blacks were 2.9 and 2.2 times higher, respectively, than the rate among sailors of other races.

Unintentional-injury fatality rates among enlisted and officer groups varied between the services. In the Air Force and Navy, the highest unintentional-injury death rates were observed among junior enlisteds, whereas in the Army and Marine Corps, the highest rates occurred among officers. Marine Corps officers had the highest unintentional-injury fatality rate observed during the 14-year period for all strata—33% higher than the overall Marine Corps unadjusted rate.

The overall rate of unintentional-injury death decreased over the 14-year period at an average rate of about 3.5% per year (Fig. 2). Among males, the number of unintentional injury deaths decreased 60% (from 1,499 in 1980 to 603 in 1993) and the rate decreased by half: 80 to 41 per 100,000. The overall number of

TABLE I

NUMBER OF FATALITIES AND ANNUALIZED FATALITY RATE (PER 100,000) FOR UNINTENTIONAL INJURY DEATHS BY SERVICE, AGE, GENDER, RACE, AND ENLISTED/OFFICER STATUS

	Air Force		Army		Marine Corps		Navy		All Military	
Group	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate
Age										
17–24	1,563	55	3,854	80	1,449	86	2,841	77	9,707	75
25–34	1,182	37	1,857	50	542	71	1,364	49	4,945	47
35 +	519	30	664	39	93	36	402	31	1,678	34
Gender										
Male	3,088	46	6,081	66	2,058	80	4,431	63	15,658	61
Female	176	18	294	27	26	21	176	25	672	23
Race										
White	2,836	45	4,594	68	1,689	83	3,973	64	13,092	61
Black	362	31	1,481	51	300	59	527	49	2,670	47
Other	66	25	300	48	95	65	107	22	568	37
Enlisted/officer status										
E1–E4	1,653	49	3,912	76	1,427	85	2,720	74	9,712	70
E5–E9	808	27	1,838	49	376	50	1,292	42	4,314	41
Officer	803	57	625	43	281	103	595	61	2,304	56
Total	3,264		6,375		2,084		4,607		16,330	
Unadjusted		42		62		77		59		57
Age-adjusted[a]		45		63		72		60		59

[a]Age-adjusted using the standard population.

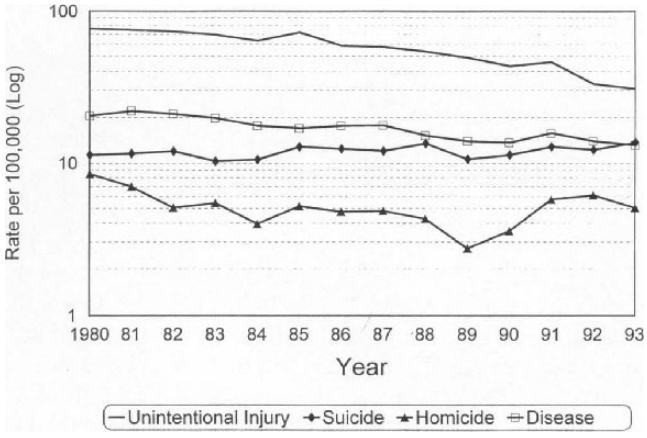

Fig. 2. Cause-specific military fatality rates by year.

fatal unintentional injuries among women also decreased 60% during the period (from 57 to 23), with a commensurate rate decrease of 64%, from 33 to 12 per 100,000. The singular incident that had the most impact on the unintentional-injury fatality rate occurred in December 1985, when 248 male soldiers from the 101st Airborne Division were killed during take-off in a plane crash in Gander, Newfoundland. As a result of this incident the overall rate of unintentional-injury death among males increased 16% from 1984 to 1985 (from 64 to 74 per 100,000) and 57% for Army males (from 65 to 102 per 100,000). The following year the rate decreased to 55 per 100,000 among all males and to 64 among Army males.

There were distinctive differences in the types of unintentional injuries that killed active duty men and women. Although 79% of female unintentional-injury deaths were attributable to motor vehicles, compared to 62% in males, the rate among males was twice that of females, 40 and 20 per 100,000, respectively. Aircraft crashes were the second most prevalent cause of fatal injury among both males (16%) and females (7%); however, it was a more common cause of death among males, as the vast majority of the U.S. military pilot population is male. Rates of unintentional-injury death related to specific causes were consistently higher among males than females. The proportion and rate of death due to drowning, falls, and gunshot wounds were similar in both genders.

Disease

Disease and illness combined constituted the second leading cause of death among the active duty force, accounting for a comparable proportion among both men (19%) and women (20%). The Marine Corps experienced the fewest disease-related deaths and the lowest rate, compared to the other three services (Table II). Rates increased from the youngest to the middle age group in all services, but showed a precipitous 4.5-fold increase overall from the middle to the oldest age group.

Overall and service-specific disease fatality rates among males were approximately twice those of females. With the exception of the Navy, rates among blacks were higher than rates for whites and persons of other races. The greatest fatality-rate race differential for disease (3.1) was observed in the Air Force between black and persons of other races.

Among enlisted personnel, the lowest disease-related fatality rates, in each service, occurred in the junior group, whereas the highest rates were observed in the senior enlisted group, particularly in the Army. Rates among officers were slightly lower than rates among the senior enlisteds, except in the Air Force, where the rate among officers was 44% less than the overall Air Force rate.

The number of disease-related deaths in the military decreased by about half (417 in 1980 to 219 in 1993) and the rate decreased by about one-third (20 to 13 per 100,000) during the 14-year study period (Fig. 2). Most of this differential was attributable to rate decreases among males, whereas rates among females remained relatively constant throughout the period.

TABLE II

NUMBER OF FATALITIES AND ANNUALIZED FATALITY RATE (PER 100,000) FOR DISEASE-RELATED DEATHS BY SERVICE, AGE, GENDER, RACE, AND ENLISTED/OFFICER STATUS

	Air Force		Army		Marine Corps		Navy		All Military	
Group	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate
Age										
17–24	161	6	419	9	124	7	274	8	978	8
25–34	309	10	525	14	71	9	327	12	1,232	12
35 +	767	45	1,134	66	101	39	689	53	2,691	54
Gender										
Male	1,162	17	1,967	21	288	11	1,223	17	4,640	18
Female	75	8	111	10	8	7	67	10	261	9
Race										
White	968	15	1,360	20	198	10	1,020	16	3,546	17
Black	251	22	645	22	78	15	183	17	1,157	20
Other	18	7	73	12	20	14	87	18	198	13
Enlisted/officer status										
E1–E4	236	7	539	11	146	9	329	9	1,250	9
E5–E9	785	27	1,177	32	113	15	760	25	2,835	27
Officer	216	15	362	25	37	14	201	21	816	20
Total	1,237		2,078		296		1,290		4,901	
Unadjusted		16		20		11		17		17
Age-adjusted[a]		15		22		14		18		18

[a]Age-adjusted using the standard population.

TABLE III

NUMBER OF FATALITIES AND ANNUALIZED FATALITY RATE (PER 100,000) FOR SUICIDE BY SERVICE, AGE, GENDER, RACE, AND ENLISTED/OFFICER STATUS

	Air Force		Army		Marine Corps		Navy		All Military	
Group	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate
Age										
17–24	340	12	621	13	242	14	421	12	1,624	12
25–34	354	11	460	12	104	14	322	12	1,240	12
35 +	190	11	210	12	32	12	110	9	542	11
Gender										
Male	828	12	1,225	13	368	14	828	12	3,249	13
Female	56	6	66	6	10	8	25	4	157	5
Race										
White	775	12	970	14	303	15	752	12	2,800	13
Black	89	8	245	8	59	12	71	7	464	8
Other	20	8	76	12	16	11	30	6	142	9
Enlisted/officer status										
E1–E4	425	13	684	13	245	15	444	12	1,798	13
E5–E9	366	12	518	14	116	15	354	11	1,354	13
Officer	93	7	89	6	17	6	55	6	254	6
Total	884		1,291		378		853		3,406	
Unadjusted		11		13		14		11		12
Age-adjusted[a]		12		13		14		11		12

[a]Age-adjusted using the standard population.

Two-thirds of the male deaths from disease were due to heart attack or heart-associated condition, compared to 40% of females at rates of 12 and 4 per 100,000, respectively. Cancer was the second leading cause of disease-related death among males (6%) and the third leading cause among females (7%), with comparable rates, 1 per 100,000. Respiratory failure was the second leading cause of disease-related death among women (11%) and the third leading cause among men (4%). Other causes accounted for 42% of disease-related deaths among females and about 25% among males.

Suicide

Although deaths due to suicide accounted for a similar proportion of all deaths in both genders, it was the third leading cause of mortality among active duty males (13%) and the fourth leading cause among active duty females (12%).

The Marine Corps had the fewest suicides but experienced the highest rate compared to the other services (Table III). Personnel younger than 25 years of age accounted for 48% of the suicides; 64% of the Marine Corps suicide victims were in this age group compared to between 39 and 50% in the other services. The highest age group-specific suicide rates, in any service, occurred in both the 17- to 24-year and 25- to 34-year age groups of the Marine Corps. In the Air Force and Army, rates were the same in the two oldest age groups, and there was a slight decreasing trend noted in the Navy and Marine Corps for the same age groups.

Over 95% of all military suicide victims were male, with a rate 2.6 times higher than females. The 3.0 male-to-female rate differential in the Navy was the greatest observed for any of the services. Suicide rates among whites were substantially higher than among blacks and persons of other races. With the exception of the Army, suicide rates in the latter two race groups for the other three services were similar. The greatest suicide rate race differential (2.1) was observed between whites and persons of other races in the Navy.

Ninety-three percent of all military suicide victims were enlisted personnel, with an overall rate just over twice that of officers. Rates were remarkably similar for both enlisted groups within each of the services. The highest suicide rate during the 14-year period was observed for Marine Corps whites and both groups of enlisted personnel.

Although the number of self-inflicted deaths remained relatively constant throughout the 14-year period, there was about a 20% increase in the overall suicide rate (Fig. 2). Rates among males increased 25% over the period, from 12 per 100,000 in 1980 to 15 per 100,000 in 1993. This latter rate was the highest annual rate observed during the period. On average, military males committed suicide 232 times annually. There was little change in the rates for females over the period, and rates among males were higher compared to females each year. On average, 11 women committed suicide annually in the military. The highest annual suicide rate for females—9 per 100,000—occurred in 1983.

Firearms were the predominant method and accounted for a similar proportion of suicides in both males (61%) and females (55%); the rate among men, 7 per 100,000, was over twice that of women, 3 per 100,000. Men hung themselves 15% of the time compared to 11% of females, but at a rate two times higher than females, 2 and 1 per 100,000, respectively. Carbon monoxide was used in about 10% of both male and female suicides, with males experiencing a rate twice that of females. Similar distribution patterns were observed in whites and blacks for these methods of suicide. No matter what method was employed, rates were consistently higher among males than females.

Homicide

Homicide was the third leading cause of death among females (15%) and the fourth leading cause among males (5%). The Marine Corps had the fewest homicide victims and the highest service-specific rate compared to the other services (Table IV). As age increased, homicide rates decreased, a consistent pattern across all services.

Eighty-seven percent of all victims were male; however, females had a rate (6.4) substantially higher than the rate for males (5.0). The Air Force experienced the greatest military female-to-male rate ratio at 1.7, whereas female Marines had the highest gender-specific rate during the study period. In each service, rates among blacks were noticeably higher than for whites or persons of other races. Blacks had an overall rate about 2.4 times that of whites and persons of other races. Young adults and blacks were at highest risk of homicide, especially in the Marine Corps.

Over 95% of all homicide victims were enlisted personnel. The homicide rate among all enlisted personnel was over three times the rate observed for all officers. In each service, the risk of

TABLE IV

NUMBER OF FATALITIES AND ANNUALIZED FATALITY RATE (PER 100,000) FOR HOMICIDE BY SERVICE, AGE, GENDER, RACE, AND ENLISTED/OFFICER STATUS

	Air Force		Army		Marine Corps		Navy		All Military	
Group	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate
Age										
17–24	97	3.4	363	7.5	139	8.3	233	6.3	832	6.4
25–34	76	2.4	226	6.0	50	6.6	122	4.4	474	4.5
35 +	29	1.7	68	3.9	11	4.2	50	3.9	158	3.2
Gender										
Male	163	2.4	563	6.1	186	7.2	366	5.2	1,278	5.0
Female	39	4.0	94	8.6	14	11.3	39	5.5	186	6.4
Race										
White	134	2.1	342	5.1	122	6.0	259	4.2	857	4.0
Black	64	5.5	282	9.6	66	12.9	137	12.8	549	9.7
Other	4	1.5	33	5.3	12	8.2	9	1.9	58	3.8
Enlisted/officer status										
E1–E4	113	3.3	408	8.0	148	8.8	250	6.8	919	6.6
E5–E9	75	2.5	222	6.0	42	5.5	136	4.4	475	4.5
Officer	14	1.0	27	1.9	10	3.7	19	2.0	70	1.7
Total	202		657		200		405		1,464	
Unadjusted		2.6		6.4		7.4		5.2		5.1
Age-adjusted[a]		2.8		6.3		7.0		5.3		5.2

[a]Age-adjusted using the standard population.

homicide was highest in the junior enlisted group, decreasing through the senior enlisted and officer groups.

Although the overall trend in homicide rates decreased during the 14-year study period, the pattern of rates was erratic, particularly from 1987 through 1992 (Fig. 2). Rates among males decreased 40% from 8.4 per 100,000 in 1980 to 5.0 per 100,000 in 1993. An average of 91 males died as a result of homicide annually, with a high of 157 in 1980 and a low of 48 in 1989. Rates among males were lower than among females in all years except 1981 and 1991. Rates among females decreased a similar amount—39%, from 9.2 in 1980 to 5.6 in 1993, but exhibited greater variability than rates among males, primarily due to the relatively low annual number of observed female homicides. An average of 13 females were victims of homicide each year, with a high of 19 in 1985 and a low of 8 in 1981.

The proportion of males killed by firearms (63%) was nearly twice that of females (35%), with a rate of 3.1 per 100,000 compared to a rate of 2.3 per 100,000 among females. Stabbing instruments were used in about one-fourth of both male and female homicides and at rates of 1.2 and 1.8 per 100,000, respectively. A much higher proportion of female victims (18%) were strangled compared to males (2%) and at a rate nearly 11 times higher than among active duty males. Firearms were also the most common method of homicide used against victims of all races.

Discussion

Beary et al., in describing the ten composite leading causes of death for active duty military personnel for the 2-year period 1981 to 1982, also utilized data from the DoD Worldwide Casualty System.[6] The emphasis in this study was to make estimates of associated costs for major causes of mortality and to use these data to assist in the formulation of health policy. The number of deaths for each cause were listed in rank order with their associated dollar costs. The leading causes of death included private motor vehicle accidents, heart attacks/heart-associated conditions, suicides, aircraft crashes, and homicides. There was no differentiation by age, race, gender, pay grade, or branch of service. In the present study, although two of these causes (motor vehicle accidents and aircraft crashes) were subsumed under unintentional injuries, and heart attacks/heart-associated conditions were counted under disease, the leading causes of death overall have remained the same. Both of these studies, as well as studies recently completed on suicides[7,8] and homicides,[9] indicate that the WCS and the Report of Casualty can provide timely and valuable demographic information on all active duty deaths. Additional information that could help explain the circumstances relating to death are usually not provided on the Report of Casualty, however. For example, whether a death occurred on- or off-duty or whether alcohol was involved in a motor vehicle crash are not detailed on the DD Form 1300. Other limitations of the Report of Casualty, as well as ways to improve the usefulness of the report in concert with additional sources of information to provide a more complete epidemiological description of active duty deaths, have been discussed in detail elsewhere.[7,9,10]

The fatality data provided through WCS can be used in four important ways. First, new or previously unrecognized hazards can be identified. For example, WCS data showed that military women had a higher rate of homicide compared to their male counterparts and civilian females.[9,11] Second, high-risk groups can be targeted for further research and prevention efforts. In addition to the young women who have been identified to be at high risk of homicide,[9] other groups such as white enlisted males aged 20 to 34 have been identified to be at a significant risk of suicide compared to other demographic subgroups.[7,8]

Third, trends of cause-specific death rates can be followed and interpreted over time. It has been noted that the number of suicides committed annually has remained relatively steady over the 14-year study period, but since the size of the military population has been steadily decreasing over the past 5 years, the rate of suicide has therefore been increasing. Although the overall rate of homicide in the military has decreased since 1980, the increasing rates observed from 1989 to 1992 should be watched carefully to see if the trend continues. During this 4-year span homicide rates increased 125% from 2.7 to 6.1 per 100,000. The fact that the rate has increased is not surprising, since overall rates in the U.S. (for persons age 17–54) have risen about 5% per year from 1987 to 1991 (12.8–15.8 per 100,000),[11] but the amount of the rate change is alarming.

Finally, fatality data can be used to determine the nature and magnitude of a specific cause of death. Both the rates and absolute numbers of deaths are important; rates depict the risk faced by various demographic or occupational subgroups, whereas the numbers indicate the magnitude of the problem or the number of lives that could be saved. Approximately one-third of all deaths during the study period involved motor vehicles. Within each service, four to five occupational groups accounted for about one-quarter of the motor vehicle accidents. Similarly, deaths due to heart attacks, cancer, and suicide appear to be concentrated in several occupational groups. Although it was not within the scope of this paper to determine the role that occupation may play in the mortality experience of active duty personnel, it will be the subject of future research. Military commanders, in concert with local civilian communities, may find these data useful, for example in redefining motor vehicle and motorcycle training and safety programs directed at those occupational groups identified to be most at risk. Thus, prevention strategies that emphasize those causes that account for the highest proportion of morbidity and mortality should have the greatest impact on increasing military readiness.

There were notable differences in the age composition of each service when compared to the other services. For example, 22% of the Air Force population was 35 years of age or older compared to between 10% and 17% in the other branches. Sixty-two percent of the Marine Corps active duty population was less than 24 years of age compared to between 37 and 47% in the other three services. Thus, the key question to be answered is whether these age differences affect the fatality rates.

Our results show that fatality rates for unintentional injury-related deaths, suicides, and homicides steadily decreased as age increased in each of the four service branches. In comparing overall unadjusted and age-adjusted fatality rates for suicide, there was virtually no difference except in the Air Force (Table III). For homicide, there were some differences, but since the rates were less than 10 per 100,000, small numerical changes

translated into larger proportional changes between the unadjusted and age-adjusted rates (Table IV). For unintentional injuries, the Marine Corps was the only service that experienced an increase from the unadjusted to the age-adjusted fatality rate—7% (Table I). In contrast to the other three major causes of death among active duty military, disease-related fatality rates increased as age increased in all services, particularly from the middle to the older age groups (Table II). With the exception of the Air Force, overall unadjusted fatality rates increased modestly when adjusted for age. Based on these comparisons of unadjusted and age-adjusted fatality rates, age appears not to be a significant factor in explaining the differences in overall fatality rates observed in our study.

Although the leading causes of death remained essentially the same from the beginning to the end of the 14-year study period, the overall fatality rates declined steadily, particularly for unintentional injuries and disease-related deaths. To what may we attribute this decline? It may very well be a combination of many interacting factors that cannot be easily separated. Although the same level of health care is available to both enlisted personnel and officers alike, the quality of this care, especially emergency and trauma medicine, has improved in the military. The quality of personnel enlisting in the military has also improved, suggesting that the smarter they are the less likely they are to take risks not only at work but in their personal lives as well. Safety indoctrination and task-specific training are common in all the services, contributing to increased safety awareness and vigilance. Also, with increasing emphasis on nutrition, fitness, and exercise, these same persons are taking better care of themselves and are less likely to become ill.

This paper has addressed the primary causes of death among men and women serving on active duty in the U.S. armed forces. These data can be used to identify differences between the military and general populations through frequency, rate, and temporal comparisons. These comparisons will also be the subject of future research on death in the military.

Summary

Published literature related to various causes of death of active duty military personnel are generally cause- and service-specific, focused on well-defined subgroups for varying periods of time. The present study provides a comprehensive overview of the distribution and rate of death from all causes across all four military branches, and collectively for the entire active duty force, for the 14-year period 1980 through 1993. The descriptive epidemiologic and demographic data presented here can be used by military commanders to target prevention efforts at those high-risk groups where the most lives can be saved and the most direct impact on increased force readiness can be effected.

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