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Suicides in the Military: 1980–1992

CDR James C. Helmkamp, MSC USN

Data abstracted from the Report of Casualty (DD 1300) is used to describe suicides of active duty personnel for the period 1980 through 1992. The Marine Corps had the fewest suicides (345), but the highest rate (13.65 per 100,000) compared to the other services: Army (1,205/12.38), Air Force (828/11.31), and the Navy (800/11.01). Personnel 17 to 24 years of age accounted for 48% of the suicides and had the highest age group-specific rate, 12.34. White males accounted for 79% of all suicides and had the highest rates across all age groups. Males had significantly higher rates than females in the Air Force, Army, and Navy. The risk of suicide among all active duty males was over two times that of all active duty females and about half that of males in the general population. Active duty females had a risk slightly lower than females in the total population. Enlisted personnel had rates two times higher than officers. Firearms were used in 61% of the male and 55% of the female suicides.

Introduction

Suicide was the third leading cause of death among persons 15 through 34 years of age in the United States from 1970 through 1988,^{1–5} exceeded only by unintentional injury deaths and homicides. Among white persons of the same age group, suicide ranked as the second leading cause of death from 1970 through 1987.^{1,3} Although most suicides occur among persons less than 40 years of age, the highest rates generally occur among the elderly. Men are at higher risk than women across all age and race groups,^{1,3} and white males consistently had the highest suicide rates, with black and other males the second highest, followed by white, black, and other females.^{1,2,4} From 1970 to 1980, a majority of the increase in suicide rates observed for males was due to the sharp increase in rates among white males.^{1,2}

Partonen et al.⁶ found that although suicide mortality in

drafttees was lower than among civilian men of the same age in the three Nordic countries, it remains a major cause of death during Finnish military service. In a study of drafttees during the 10-year period 1981 to 1990, suicide was prevalent among drafttees early in their military service and later during specialization training.

Only recently have military suicides been reported in non-military-oriented literature. Rothberg (personal communication, January 1994) suggests three reasons why military suicides have historically received relatively little attention: (1) suicides are considered rare events because of the relatively low number of suicides and their distribution across time and space; (2) suicides are viewed as a psychiatric problem and their management has typically been placed outside the mainstream of command responsibility—mental health “owned” the problem; and (3) suicides have been viewed as an individual rather than a collective problem, and therefore, a problem without a solution.

Reviewing historical profiles of suicides in the individual services, data for the Army have been published more frequently compared to the other services.^{7–13} Yessler⁷ offered one of the earliest reviews of Army suicides when he compared rates from 1910 to 1916 to rates observed from 1954 to 1958. Dattel^{8–10} and Rothberg^{11–13} and their colleagues conducted a series of six biennial reviews of active duty Army suicide data from 1975 through 1986. These reports provided demographic data and information on the circumstances surrounding the suicidal act, particularly psychosocial factors.

In the Air Force, Eggertsen and Goldstein¹⁴ noted that suicide was the fourth leading cause of death during the period 1958 through 1964, exceeded only by motor vehicle accidents, aircraft accidents, and diseases of the circulatory system. Others have discussed Air Force suicides in the early 1970s¹⁵ and 1980s.¹⁶ This latter study described suicides in a manner similar to previous Army summaries.^{8–13}

The first definitive summary of suicides in Navy and Marine Corps personnel was provided by Schuckit and Gunderson.¹⁷ Their review of data from July 1965 through December 1971 was limited to males. Chaffee¹⁸ and Dennett^{19,20} continued to describe Navy and Marine Corps suicides through the 1970s, and Helmkamp²¹ included suicide in a summary of all active duty deaths in the Navy in 1986.

Division of Safety Research, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, 1095 Willowdale Road, MS 180P, Morgantown, WV 26505-2888.

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In a study outlining Department of Defense (DoD) health promotion efforts against the leading causes of mortality among the entire active duty population, suicide was listed as the third leading cause of death behind motor vehicle accidents and heart attacks/heart-associated conditions for the period 1981 to 1982.²² Redman and Walter,²³ in their epidemiological summary of suicides for active duty members for the 3-year period 1982 through 1984, also indicated that suicide was the third leading cause of death. Rothberg and colleagues,²⁴ in summarizing the demographics and risk factors noted in the Redman and Walter study, concluded that risk factors for suicide were generally similar in the military and civilian populations; however, there were age and gender differences. In the military, the younger age groups accounted for more suicides compared to similar age groups in the general population. Rates for age- and race-matched suicides were lower for DoD males, but higher for DoD females, when compared to their civilian counterparts.

A common psychosocial thread noted in many of the military suicides summarized previously was the emotional turmoil and personal problems that the victims were experiencing prior to their fatal, self-destructive behavior. The leading sources of stress that were key antecedent factors in their suicides included love relationships that failed, trouble with the law, work-related problems, financial difficulties, and health problems.

The DoD publishes periodic summaries of all active duty casualties, including suicides; however, these summaries do not provide detailed epidemiological or risk information.²⁵ In this study, suicides among active duty personnel in the four military services—Air Force, Army, Navy, and Marine Corps—and collectively in all the services, are described for the 13-year period 1980 through 1992. Temporal trends are presented and demographic risk comparisons are made between the military services and with the U.S. resident population with the same age profile and for a similar period of time.

Methods

Military Suicides

The DoD maintains and operates the automated Worldwide Casualty System (WCS), whose primary source of information is the Report of Casualty (DD 1300).²⁶ The DD 1300 is the official record of death for all officer and enlisted personnel who die while on active duty. Casualty data are compiled on a fiscal-year basis, October 1 through September 30.²⁵ For this study, suicides were compiled and analyzed by calendar year.

A subset of the WCS data consisted of all fatalities that occurred during the 13-year period January 1, 1980, through December 31, 1992. Included among these fatalities were deaths due to unintentional injuries, natural causes, suicide, homicide, and other causes, including hostile action.

Military Strength (Population)

Data on the number of active duty military stratified by age, gender, race, and officer/enlisted status were obtained from the DoD Defense Manpower Data Center for each year of the study period. Variable categories were the same as described for homicides in the first paper of this series.²⁷ Rates and rate

ratios, per 100,000 military personnel, were calculated for the entire military and each service using the 13-year summary of active duty military person-years at risk. Poisson regression is used to model incidence density data from rare events such as suicide, where the data used are the numbers or rates of suicide in the military population.²⁸ More detailed discussions of the WCS,^{26,27} the DD 1300,^{21,26,27} military population data,²⁷ and the Poisson regression^{27,28} are provided elsewhere.

National Suicide and Population Data

Data on suicides occurring in the U.S. resident population, ages 17 through 54 years, were obtained from the National Center for Health Statistics (NCHS) compressed mortality files for the 12-year period 1980 through 1991.²⁹ Population data for the same aged population and the same 12-year period were obtained from the Bureau of the Census.³⁰ Limitations of military mortality data, particularly on deaths that occur outside the U.S., and population data provided by these sources, were discussed in the first paper of this series on homicide.²⁷

Definition of Suicide

In this study, only deaths attributed to suicide were analyzed. For both the military and national populations, these deaths were defined as self-inflicted fatal injury according to the International Classification of Diseases, 9th Revision (ICD-9), external cause of death E codes E950 through E959.³¹

Results

Among active duty military personnel, deaths due to suicide (12%) represented the third leading cause of mortality, after unintentional injury (61%) and natural causes (18%). During the 13-year period studied, 3,178 service members were victims of self-inflicted fatal injuries. The overall crude suicide rate for all services combined was 11.84 per 100,000 active duty military. The Marine Corps had the fewest suicides (345) and the highest rate, 13.65 per 100,000, compared to the other services: Army, 1,205/12.38; Air Force, 828/11.31; and Navy, 800/11.01. The age at death for all military suicide victims ranged from 17 to 54 years and the mean age at death was 26.8 years for males and 26.3 years for females. The mean age of enlisted suicide victims was significantly less than that of officer suicide victims, 26.1 and 34.0 years, respectively ($p < 0.001$).

Table I describes the suicide experience, by age, gender, race, and officer/enlisted status, for each service and collectively for the four services. Active duty military younger than 25 years of age accounted for 48% of the suicides; in the Marine Corps, 63% of victims were under 25 years of age compared to between 39% and 50% in the other services. The highest age group-specific rate of suicide, in any service, occurred in the 17- to 24-year-old group in the Marine Corps: 13.86 per 100,000.

Over 95% of all military suicide victims were male and 83% were white compared to the total military population composed of 90% males, 75% whites, and 20% blacks. Males had significantly higher rates than females in the Air Force, Army, and Navy, and in the military as a whole ($p < 0.001$). Overall, males had a suicide rate 2.19 times higher than females ($p < 0.000$) (see Appendix). Whites had significantly higher rates

TABLE I

ACTIVE DUTY MILITARY AND NATIONAL SUICIDE RATES (PER 100,000) BY SERVICE, AGE, GENDER, RACE, AND OFFICER/ENLISTED STATUS

Group	Air Force		Army		Marine Corps		Navy		All Military ^a		National ^b	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Age												
17-24	319	11.71	590	12.83	219	13.86	399	11.48	1,527	12.34	54,309	13.99
25-34	330	11.01	419	11.88	97	13.66	302	11.61	1,148	11.67	77,551	15.63
35-54	179	11.21	196	12.24	29	12.19	99	8.31	503	10.89	102,408	15.35
Gender												
Male	773	12.06	1,144	13.13	336	13.93	777	11.75	3,030	12.54	183,414	23.79
Female	55	6.07	61	5.98	9	7.75	23	3.53	148	5.49	50,854	6.51
Race												
White	731	12.25	907	14.20	277	14.48	707	12.13	2,622	13.05	210,799	16.06
Black	81	7.34	231	8.34	53	10.97	63	6.39	428	8.01	18,022	9.69
Other	16	6.43	67	11.52	15	11.38	30	6.61	128	9.04	5,447	10.25
Officer/enlisted												
E1-E4	396	12.34	645	13.23	221	14.10	426	12.25	1,688	12.86	—	—
E5-E9	342	12.30	478	13.62	109	15.39	322	11.89	1,251	12.65	—	—
Officer	90	6.77	82	6.05	15	5.90	52	5.75	239	6.22	—	—
Total	828	11.31	1,205	12.38	345	13.65	800	11.01	3,178	11.84	234,268	15.10

^aDepartment of Defense, 1980-1992, ages 17 to 54 years.^bNational Center for Health Statistics, 1980-1991, ages 17 to 54 years.

than either blacks or members of other races for all services combined ($p < 0.001$) (see Appendix).

The rate among enlisted suicide victims was about twice the rate among officers. Over 92% of all military suicide victims were enlisted personnel; this proportion was not unrealistic since 86% of the military population during the 13-year study period was enlisted. Rates were remarkably similar for both enlisted groups within each of the services. The highest variable-specific suicide rate was observed among Marine Corps senior enlisted personnel, 15.39 per 100,000.

Table II provides gender and race (blacks and whites only) subgroup suicide rates for the three age groups for all services combined. As a group, white males accounted for at least three-quarters of the suicides within each age group. White males in the two youngest groups had rates significantly higher compared to similarly aged black males ($p < 0.001$). Suicide rates among white males were highest in the youngest age group, then decreased steadily through the two oldest groups. Rates among white females were highest in the oldest age group, 10.13 per 100,000, and significantly higher than rates among black females in the two youngest groups, $p < 0.01$ and $p < 0.05$, respectively.

There was a 16% increase in the suicide rate among military males during the 13-year study period, from 11.92 per 100,000 in 1980 to 13.24 in 1992. The highest annual rate observed for males was 14.32 in 1988. On average, military males committed suicide 233 times annually. Rates among males were higher than rates among females during each year. The suicide rates for females showed a very modest decrease of 5% during the study period, from 5.19 per 100,000 in 1980 to 4.94 in 1992. The female rates appeared to fluctuate more than rates among males, primarily due to the relatively low number of cases occurring annually among military women. On average, 11

TABLE II

ACTIVE DUTY MILITARY AND NATIONAL SUICIDE RATES (PER 100,000) BY AGE, RACE, AND GENDER SUBGROUPS

Group	All Military ^a		National ^b	
	n	Rate	n	Rate
Age group: 17-24				
White male	1,240	14.87	40,223	24.63
Black male	168	7.76	4,001	15.14
White female	60	6.64	7,575	4.80
Black female	10	2.63	701	2.55
Age group: 25-34				
White male	862	13.37	54,659	26.01
Black male	181	10.16	6,073	21.27
White female	43	5.95	13,704	6.61
Black female	8	2.41	1,192	3.69
Age group: 35-54				
White male	399	11.42	69,638	24.52
Black male	61	9.74	4,757	14.66
White female	18	10.13	25,000	8.62
Black female	0	ND ^c	1,298	3.35

^aDepartment of Defense, 1980-1992, ages 17 to 54 years.^bNational Center for Health Statistics, 1980-1991, ages 17 to 54 years.^cND = not determined (due to small number of deaths).

women committed suicide annually in the military. The highest annual rate for females, 9.10 per 100,000, occurred in 1983.

There were differences between males and females in how suicides were committed (Table III). Firearms were the predominant method of suicide overall, followed by hanging and use of carbon monoxide. Although the proportion of males and females who used firearms was similar, 61 and 55%, respec-

TABLE III
ACTIVE DUTY MILITARY AND NATIONAL SUICIDES AND RATES (PER 100,000) BY METHOD OF SUICIDE AMONG MALES AND FEMALES

Method	All Military ^a					National ^b				
	Male		Female			Male		Female		
	(n=2,585)		(n=129)			(n=183,414)		(n=50,854)		
	%	Rate	%	Rate	Crude Rate Ratio ^c	%	Rate	%	Rate	Crude Rate Ratio ^c
Firearm	60.8	7.52	55.0	3.11	0.41	60.6	14.42	42.7	2.78	0.19
Hanging	14.6	1.81	10.9	0.61	0.34	15.7	3.73	8.9	0.58	0.15
Carbon monoxide	8.5	1.06	10.1	0.57	0.54	9.0	2.13	11.4	0.75	0.35
Other	16.1	1.99	24.0	1.36	0.68	14.7	3.51	37.0	2.41	0.69

^aDepartment of Defense, 1980–1990, ages 17 to 54 years.

^bNational Center for Health Statistics, 1980–1991, ages 17 to 54 years.

^cFemale-to-male (per 100,000).

tively, the rate at which males used this method was 2.42 times greater than among females. Men hung themselves nearly three times more frequently than their female counterparts. Carbon monoxide was used in about 10% of both male and female suicides, with males experiencing a rate 1.86 times greater than females. Similar distribution patterns were observed in whites and blacks for the use of firearms, hanging, and carbon monoxide in carrying out their successful suicidal gestures.

Discussion

The risk for suicide, and comparative patterns of risk for various demographic groups, appear to differ between the military and the U.S. population as a whole. Although white males were at greatest risk in both populations, the pattern among age groups differed (Table II). Rates among both white and black males in the military were less in all age groups compared to rates among their counterparts in a similarly aged national population for a comparable period of time. Although rates among white males in the general population remained relatively stable across the three age groups, rates steadily decreased among military white males as age increased. The highest rates among black males in both populations occurred in the middle age group.

Military males committed suicide about half as often as their counterparts in the national population. Although females in the military had overall suicide rates that were only slightly lower than in the national population, white females in the military had higher rates than females in the national population in both the youngest and oldest groups (Table II).

Suicide rates generally remained steady in both the national and military populations during the respective study periods, although the military rates, particularly among females, exhibited more variability. Annual rates for civilians were consistently 15 to 20% higher than total military rates. U.S. males were at highest risk followed by military males, U.S. females, and military females. Annual rates and temporal trends previously identified for the Army,^{10–13,23} Air Force,^{16,23} Navy,^{21,23} and Marine Corps²³ were corroborated by the current data.

Army enlisted and officer suicide rates confirm the decreasing trend noted by Dattel^{9,10} and Rothberg and colleagues.^{11,12} Schuckit and Gunderson¹⁷ indicated that rates for Marine en-

listed personnel and Marine officers for the period 1965 to 1971 were about two times greater than the rates for their Navy counterparts. This trend remained the same in the 1980 to 1992 data, although the magnitude of difference was much less; Marine enlisted rates were about 19% higher than Navy enlisted rates and Marine officer rates were about 3% higher than those of Navy officers (Table I).

Enlisted suicide victims were significantly younger (26 years) than officer victims (34 years); this translates to an average of about 7 to 9 years of service time for enlisted compared to about 11 to 13 years of service time for officers. These findings agree with those of previous military studies. It was not surprising that the 20 warrant officers who committed suicide were significantly older than the enlisted victims, particularly since all warrant officers had been enlisted prior to becoming officers. Warrant officers had about 14 to 15 years of service at the time of their deaths.

The rates presented in Table I are variable specific and do not account for the potential influence of other variables on the resulting crude rates. The regression analysis, however, simultaneously adjusts for all variables of interest and their impact on the rate. Comparison of crude and Poisson regression rate ratios in the Appendix suggest that there was little difference between the two sets of rate ratios for any of the model variables.

Firearms were the most common method of suicide among males and females in both populations, but to a lesser extent among females. Within both populations, the rate at which males committed suicide, no matter what method was employed, was consistently higher than the rate among females. McIntosh and Jewell³² suggest that part of the rate differential observed between males and females in the general population is that females use less lethal methods (especially drugs) more often than males. The less lethal methods require more time to result in death, thus increasing the chances for a change of mind or discovery and rescue. These same factors may also be operating in the military environment.

The use of firearms as the preferred method of self-destruction in the military suggests that this may be due to the perceived increase in the availability of firearms to military personnel while on duty (e.g., watches, guard duty, etc.). However, military firearms are considered to be controlled equipment and their use and the expenditure of ammunition is strictly

accounted for at all times. Historical military data have indicated that more than 90% of suicides occur in locations other than a place of duty or while a military member is in an official duty status. Thus, the same demographic and socioeconomic factors that may be interacting in the general population, in regard to the availability and use of firearms, would appear to be prevalent in the military population. The Report of Casualty provided no information on where firearms may have been obtained by military personnel. Eggertsen¹⁴ notes that it is unlikely that being denied access to a specific instrument of destruction would affect the final outcome if the individual is determined to complete his or her self-destructive behavior.

With the noted similarity of method of suicide across both populations, the question continues to be asked why there are risk differences between the two. The military population differs from the national population in several demographic factors including age, race, and gender, and has been described by various researchers as "screened,"¹⁴ "selectively recruited,"³³ and "closed."³⁴ Rock³⁵ describes the military as providing continuous and integrated medical, social, and recreational services with living arrangements and employment often different from those in civilian life. Rothberg (personal communication, January 1994) suggests that the military population tends to be better educated, healthier, and supported by medical and mental health systems that place a major emphasis on wellness. Furthermore, most members of the military are subject to much closer supervision and assessment than their civilian counterparts.

The Worldwide Casualty System and the DoD Report of Casualty (DD 1300)^{25,26} have been shown to provide useful epidemiologic information and a timely and valuable source of case ascertainment for active duty deaths;^{21,22,27} however, they have several limitations. The DD 1300 has no information on psychosocial issues that may have been prevalent in the victim's life. Information relating to family, legal, medical, or work-related problems are not usually recorded on the DD 1300. Although provisions for duty status (e.g., on/off duty, on-leave, in-patient, etc.) are made on the DD 1300 (item 5g), it is reported at the option of each service and currently is not consistently used.²⁶ Mandatory reporting of duty status would provide valuable information on the "work-relatedness" of military deaths and facilitate comparisons with existing national occupational fatality data bases.³⁶

The Report of Casualty provides little causal explanation of a given fatality. Information relating to the situational risk factors for suicide, as defined by O'Carroll et al.,³ are not available on the DD 1300. The cause and circumstances (item 5f) reported on the DD 1300 are often limited to the manner of death only (e.g., hostile action, accident, homicide, self-inflicted [suicide], illness, terrorist activity, or determination pending). Data on the method of death are not available after 1990 and future comparisons with both military and national data will be limited. Item 5f should be expanded to provide a descriptive free-text narrative to more clearly explain the circumstances and method of death.

Alternative sources of military suicide data such as medical and hospitalization records,¹⁷⁻¹⁹ autopsy reports,⁹ line of duty (LOD)/misconduct investigation reports,^{8-13,15,16,20} and survivor interviews²⁰ have been shown to provide valuable information. Jones indicated that the identification and retrieval of

Air Force personnel and investigative records was difficult.¹⁵ Although some studies have suggested that LOD files may not represent exhaustive suicide counts,³⁷ Dennett and Howard²⁰ described naval service LOD/Misconduct Investigation Reports as "particularly well suited for epidemiological research . . . the completed LOD investigation is a rich source of social and psychological material."

After individual service review and disposition, information related to a military suicide (e.g., LOD reports, police reports, medical files, etc.) as well as other deaths are forwarded to the National Personal Records Center (NPRC) to be archived with an individual's other administrative, medical, and personnel records. Methodology to retrieve computerized and hard copy medical data sources for epidemiological use from NPRC files has been successfully demonstrated for neurological and cardiac events.³⁸ This approach, which resulted in a high degree of validity in case identification and confirmation, could easily be applied to suicides.

Eggertsen¹⁴ and Jones¹⁵ indicated that military suicides were probably underreported and that rates would be higher if it was assumed that not all vehicle-related deaths were the result of accidents. Eggertsen¹⁴ stated that accidental death was the most likely category within which suicides may go unrecognized. The NCHS estimates that the proportion of suicides that occur among active duty military personnel is probably underreported (to NCHS) by the states because of differing requirements in recording the usual industry and occupation of the military member on the death certificate at the time of death (personal communication with NCHS Division of Data Services, July 1993). If all military suicides ($N = 3,178$ for the period 1980 to 1992) are captured by NCHS, these cases represent less than 2% of all suicides in a similarly aged national population. The NCHS suicide data can then be described as accurately representing the nonmilitary or general population with little confounding by military cases. The DoD data represent a full enumeration of suicides occurring among the active duty Armed Forces population.

Some occupational comparisons were made between the Air Force¹⁵ and the general population; however, comprehensive DoD comparisons with civilian occupational fatality data are needed. Individual service occupational codes are being reviewed and grouped to facilitate these comparisons. This will enable better identification of high-risk groups and the development of intervention strategies.

Summary

The objective of this study was to review historical information on military suicides and provide a current epidemiological profile of suicides across the military services for the 13-year period 1980 through 1992. Demographic data reported in this study confirmed previous findings for suicides among the individual services and among all active duty personnel. Although data in this study described the composite military suicide as a second-term enlisted (E4-E6) white male, 26.7 years old, who killed himself with a firearm, it also demonstrated that there were differences between the suicide experience of active duty personnel in each of the services and that suicide can occur at any age or paygrade. While suicides can be described in terms of epidemiological characteristics, one must keep in mind that

suicide is an infrequently occurring event that often cannot be predicted or prevented. There is no interview technique, biochemical or psychological test that will accurately predict who will attempt suicide.³⁹ This study did not address the dynamic psychosocial factors that have been shown to strongly influence successful self-destructive behavior and that have been previously thoroughly documented by the individual services. This study does, however, offer a more complete description of incidence, rate, and temporal information, particularly for military female suicide victims, than previously existed.

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Appendix: Poisson Regression Analysis

Total active duty population, 1980–1992: 26,853,045 (100%).

Baseline variables and proportion of population base:

Service—Army	36%
Gender—male	90%
Race—white	75%
Paygrade—junior enlisted (E1–E4)	49%
Age—young (17–24)	46%

Years 1980–1992 in model but results not shown.

Model Variables	Coeff	StdErr	p Value	Rate Ratio	Crude Rate Ratio ^a
Air Force	-0.133	0.046	0.004	0.876	0.914
Marine Corps	0.000	0.062	0.998	0.999	1.103
Navy	-0.208	0.046	0.000	0.813	0.889
Female	-0.786	0.085	0.000	0.456	0.438
Black	-0.565	0.053	0.000	0.568	0.614
Other race	-0.388	0.091	0.000	0.679	0.693
Officer	-0.920	0.081	0.000	0.399	0.484
Senior enlisted	-0.131	0.053	0.013	0.877	0.984
Midage (25–34)	0.141	0.051	0.006	1.151	0.946
Oldest (35–54)	0.149	0.070	0.032	1.161	0.883

^aDerived from Table I crude rates: $\frac{\text{variable of interest}}{\text{baseline variable}}$

$$\begin{aligned} \text{Examples: } \frac{\text{Female}}{\text{Male}} &= \frac{5.49}{12.54} = 0.438. \\ \frac{\text{Senior enlisted}}{\text{Junior enlisted}} &= \frac{12.65}{12.86} = 0.984. \end{aligned}$$

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