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A historical comparison of U.S. Army & U.S. civilian suicide rates, 1900–2020

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ABSTRACT

Studies examining the perceived association of war time and increasing suicide rates in the U.S. military and U.S. civilian populations have proliferated since the beginning of the Global War on Terror (GWOT). However, additional historical analysis is needed to better place the recent surge in active-duty U.S. Army and U.S. civilian suicide rates into context and better inform researchers, healthcare providers, and policy makers. To do so, a cross sectional study that extracted empirical data from U.S. government websites, publications, and journal articles published from 1900 to 2022 was conducted to identify longitudinal trends. From 1900 to 2020, active-duty U.S. Army soldier and U.S. civilian suicide rates appear to fluctuate similarly, but with soldier rates often displaying more dramatic changes. Since 1900, active-duty U.S. Army soldier and similarly aged U.S. civilian male suicide rates have gradually converged, with the differences in rates narrowing over time. War does not historically appear to increase suicide rates in active-duty U.S. Army soldiers or U.S. civilians. More recently, given the apparent convergence of U.S. Army and similarly aged U.S. civilian male annual suicide rates, larger more universal factors than combat may be similarly affecting both populations.

1. Introduction

Much has been written in the lay media over the past two decades about suicides among active-duty service members and military veterans, with much of this coverage referring to an "epidemic" of soldier suicides. While the U.S. federal government, Department of Defense (DoD), Veterans Affairs (VA), and non-profit foundations have launched suicide prevention efforts aimed at military veterans and service-members, we have not yet made an effort to understand suicide in the larger historical context of society and culture. Yet, it may be counter-productive to focus on military-related suicides apart from societal context. That is, without considering comparative rates among civilians or long-term historical data on suicide rates among both civilian and military populations.

One recent study found that age- and sex-adjusted suicide rates among service members were lower than or comparable to civilian suicide rates every year from 2005–2014 (Reimann and Mazuchowski, 2018). This is useful context in that it suggests combat trauma in the Global War on Terror (GWOT) may not be a primary driver of military suicides. However, examining historical rates over a ten-year period should not be considered sufficient for understanding long-term historical trends. For that, one needs at least fifty to one hundred years or longer. The reason is that suicide rates may fluctuate by as much as 20–40% in any given year due to random error and macro trends in suicide rates can take the better part of a century or more to become observable (Eaton et al., 2006).

We previously conducted a historical epidemiological study of active-duty U.S. Army suicides over the course of almost two hundred years (Smith et al., 2019). Reported results showed an overall trend in increasing annual suicide rates among service members through the nineteenth century, peaking in 1883 with a rate of 118.69 suicides per 100,000 soldiers. After that point, the documented suicide rate decreased in three successive waves corresponding to the end of the following wars: the Spanish-American War (1898), World War I (1914–1918), and World War II (1939–1945). WWII had the historically lowest reported rate, with 5 suicides per 100,000 in 1944/45. Rates

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during the Cold War (approximately 1945–1991) stabilized at about 10–15 suicides per 100,000 soldiers.

This is consistent with Durkheim's conclusion from 1897 that suicide rates tend to decline during active phases of war (Durkheim, 1951). However, the Army suicide rate increased during the Afghanistan and Iraq Wars, eventually rising to 36.4 per 100,000 in 2020 (Department of Defense 2022). In other words, military suicides did not decrease as expected during the GWOT. For example, there were a total of 278 recorded suicide deaths among active-duty U.S. Army troops during the four years of the entire U.S. Civil War (1861–1865), less than the total annual number since 2001 (Frueh and Smith, 2012).

Altogether, the data show that U.S. servicemember suicide rates have increased substantially since the start of the GWOT. However, we do not currently know what is driving these suicides. Is it military-specific factors (e.g. higher incidence of TBI), per se, or other factors inherent in a changing modern society? The answer to this question has profound implications for public health suicide prevention efforts. One way to address this important question is to compare military and civilian suicide rates over time. In the current study, we examine historical suicide rate data for U.S. Army servicemembers and civilians dating back to 1900.

2. Method

2.1. Study overview

U.S. Army cross-sectional data were retrieved from U.S. military health and personnel readiness reports and academic journals articles that were published from 1900 to 2022 (Smith et al., 2019). U.S. civilian population data came from the Center for Disease Control and Prevention's National Vital Statistics System (NVSS), and the age-adjusted rates were based on the direct method 2000 census estimates. To more closely resemble the U.S. Army population, U.S. civilian age groups 5–15, 65–74, 75–84, and 85 and over were omitted from figures two and three. Because the U.S. Army and U.S. civilian data used in this study were publicly available, deidentified historical data, this research was exempt from institutional review per Common Rule. Therefore, approval of ethical considerations for the protection of human subjects was not required nor were informed consent forms collected. This study complies with Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

2.2. Data variability and integrity

For the U.S. civilian population, the authors acknowledge reclassifications over time to the International Classification Disease (ICD) codes and factors including consistency of state reporting to the NVSS while possibly influencing data variability, do not pose so great a threat to data integrity that they undermined the overall reliability of the data (see: eAppendix 1). For the U.S. Army, the authors considered but ultimately declined to include U.S. Army female suicide data. The reason was the authors could not find enough publicly available data, and when they did, there were very few instances in which the number of U.S. Army active-duty female suicide deaths met the threshold for stable rate estimates. As such, and in accordance with CDC guidelines and the DoD Defense Suicide Prevention Program (DoDI 6490.16 Section 3.4 (h)), the female self-inflicted death numbers were deemed too low for their rates to be statistically accurate (see: eAppendix 2). Given the data publicly available, it proved impossible to isolate the U.S. Army active-duty male soldier suicide rate based on the available data. As a result of the inability to separate the U.S. Army active-duty solider suicide rate by sex, this specific limitation probably resulted in a slight lowering of the overall annual U.S. Army suicide rate when it is being used as a stand in to compare the U.S. Army rate to U.S. civilian males as female suicide rates have historically been lower than males.

3. Results

While the U.S. Army began publishing annual suicide rates in 1843, presently the CDC only has confidence in annual suicides rates for U.S. civilians from 1900 onward due to a lack of uniformity and reliability in U.S. state-level tracking and reporting in the 19th century. Thus, Fig. 1 graphs U.S. Army, age adjusted U.S. civilian, age adjusted U.S. civilian male, and age adjusted U.S. civilian female suicide rates from 1900–2020. Overall, U.S. Army annual suicide rates followed trends in the civilian population, but did so in a more dramatic fashion. That is, increases in U.S. civilian rates corresponded to more drastic spikes in U.S. Army rates, while decreases in U.S. civilian rates corresponded to steep declines in U.S. Army rates. As an extreme example, the precipitous decline in suicide rates during WWII saw U.S. Army rates even fall below the U.S. civilian age adjusted female rates for 1944–1945, an occurrence never reported before or since.

The elevated U.S. Army and civilian suicide rates in the first half of the 20th century that decreased in two successive phases during World War I (1914–1918) and World War II (1939–1945), appear to stabilize by midcentury possibly indicating a dramatic shift in suicide mortality. While the most recent (2006–2020) increase in U.S. Army suicide rates is significant when compared to U.S. Army rates over past few decades (1950–2000), the recent increase in suicide rates is present to a more gradual degree in U.S. civilians as well. Nevertheless, the recent increase in U.S. Army rates above overall U.S. civilian, U.S. civilian male, and U.S. civilian female rates is not unprecedented or unique. For example, during the 120 years graphed in Fig. 1, the U.S. Army annual rate was higher than the age adjusted U.S. civilian female annual rate in 119 of the years (99.1%), U.S. civilian annual rate 88 of the years (75.8%), and U.S. civilian male rate annual 51 of the years (42.5%).

In an effort to increase similarities in populations for more precise comparisons, Fig. 2 graphs the overall U.S. Army suicide rate against the U.S. civilian male age-specific death rates (ASDR) by civilian male age ranges from 1900–2020. Specifically, the study used the CDC reported male ASDR for suicide in male ages ranges of 15–24, 25–34, 35–44, 45–54, and 55–64 as these are the age ranges that most closely resemble the U.S. Army population. Unfortunately, the U.S. Army only started reporting annual suicide rates for female soldiers towards the later decades of the 20th century, despite women officially serving in the U.S. Army since 1948.

Until such time as the U.S. Army provides more complete historic rates for women, the authors acknowledge the limitations and statistical problems associated with being unable to accurately separate male and female solider suicide rates. Nevertheless, the authors elected to use the overall U.S. Army rate as an approximation of the U.S. Army male rate because historically women tend to constitute a small percentage of the U.S. Army population. The resulting Fig. 2 seems to show U.S. Army suicide rates paralleling U.S. male civilian rates in a more focused fashion to what was displayed in Fig. 1, as U.S. Army rates following trends in the civilian male rate are easier to identify when the civilian male population is subdivided into the age ranges selected. However, U.S. Army rates appear to break from the U.S. civilian male paralleling trend from about 1975 to roughly 1990, when U.S. Army rates decreased and stabilized below the U.S. civilian male rate.

Intriguingly, data shown in Fig. 2 also seem to exhibit a new, previously unidentified trend; that is a long-term compression or narrowing of the different annual rates of suicide between the civilian male age ranges as well as with that of the U.S. Army. For example, starting in 1900, the suicide rates are relatively stratified and spaced out, ranging from 7.7 for 15–24 age range to 40 for 55–64 age range for civilian males, and a rate of 29.8 for the U.S. Army. The standard deviation between all six rates graphed for the year 1900 is 10.8. However, by the end of the graph (2020), the rates appear to be converging on a much narrower range of rates with 22.4 for 15–24 age range to 27 for 55–64 age range for civilian males and a rate of 36.4 for the U.S. Army. The standard deviation between all six rates graphed for the year 2020 is 4.1,

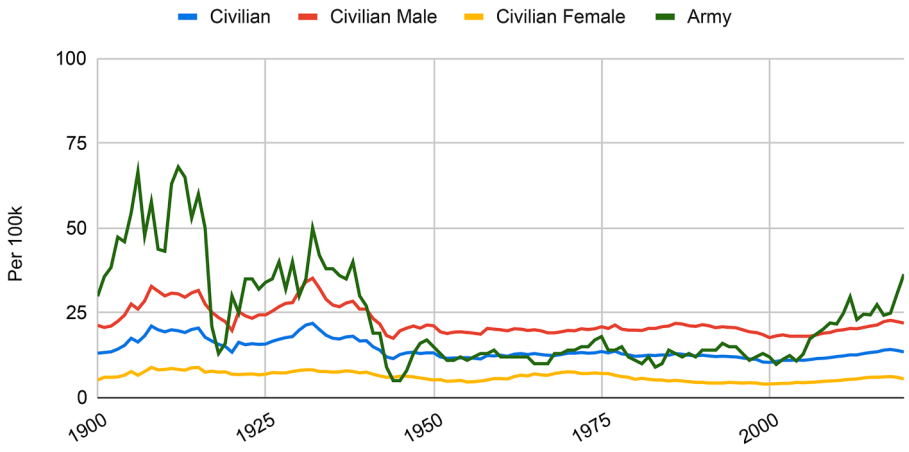

Fig. 1. U.S. Army, Civilian, Civilian Female, and Civilian Male, Annual Suicide, 1900–2020.

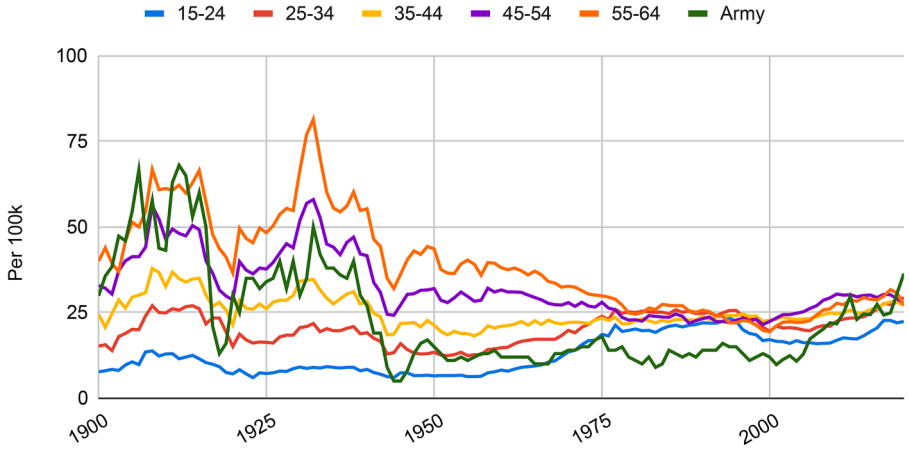

Fig. 2. U.S. Army and Civilian Male Age-Specific Mortality Rates, Annual Suicide, 1900–2020.

or an 81.6% decrease in standard deviation from that calculated for 1900.

The trend of U.S. Army and civilian male rates narrowing is first observed in approximately 1950 (standard deviation 12.4) with the narrowing of the suicide rates continuing until 1975 (standard deviation 4.3), for a reduction of standard deviation between suicide rates of 65.3%. From 1975 onward, the U.S. Army rate decreased below the civilian male rates and seemingly broke the paradigm of suicide rates compression. However, the trend of U.S. Army and civilian male suicide rates from 1950–1975 narrowing does not look to be a historical anomaly, as the phenomenon appears to begin again from 2001 (standard deviation 4.7) to 2019 (standard deviation 2.9), for a reduction of

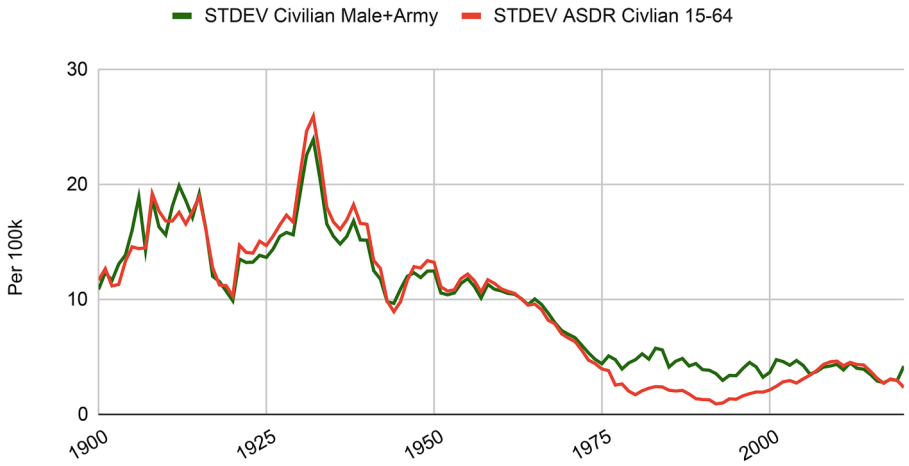

Fig. 3. U.S. Army and Civilian Male Age-Specific Mortality Rates, Annual Suicide, Standard Deviation, 1900–2020.

standard deviation between suicide rates of 38.2%. Thus, the U.S. Army and U.S. civilian male rates appear to presently be in midst of the second, albeit less pronounced, compression of annual suicide rates. If this compression will continue is a cause for further study as U.S. Army and U.S. civilian rates may be diverging again given the increase in U.S. Army suicide rates of 36.4 for 2020 and 36.18 for 2021, which were significantly above their U.S. civilian male peers in 2020 and could be in 2021 as well (Department of Defense 2022).

To more closely examine the change in standard deviation over time, Fig. 3 graphs the standard deviation between the U.S. civilian male age specific death rates for the five civilian male age ranges from Fig. 2 as well as the standard deviation for these civilian male age ranges with the U.S. Army rates included from 1900–2020. Examining standard deviation over time allowed for the analysis of the change in standard deviation between rates (with lower standard deviation meaning rates are more similar) as well as to see if inclusion of the US Army rate substantively changed the graph, which would mean the US Army rate was further outside of the civilian standard deviation for that time period. The graph appears to show the steady decline in standard deviation between suicide rates for both the civilian male age ranges selected and with the U.S. Army rates included over the course of 120 years. Given that adding the U.S. Army – i.e., one additional rate per year – to the civilian male standard deviation rate should only minimally affect the overall standard deviation, it is again worth noting the gap between the civilian male and civilian male plus the U.S. Army lines from approximately 1975 to 2006. The gap indicates that greater divergence between the civilian male and U.S. Army annual suicide rates for that period. The historic trend of U.S. Army rates following the fluctuations in the U.S. civilian male population appears to resume from 2007 to 2019 before diverging again in 2020.

4. Discussion

This historical cross-sectional study represents the most extensive historical examination to compare suicide among male active-duty personnel in the U.S. Army to U.S. civilians over the same time period (1900 to 2020). For an overview of the U.S. Army's relationship to suicide in the 20th Century, please see eAppendix 3. Results indicate that since 1900, U.S. Army annual suicide rates for males generally paralleled trends in the civilian population, but did so in a more dramatic fashion. Increases in U.S. civilian rates corresponded to more drastic spikes in U.S. Army rates, while decreases in U.S. civilian rates corresponded to steep declines in U.S. Army rates. The recent (2006–2020) increase in male U.S. Army suicide rates is significant when compared to U.S. Army rates over the past few decades (1950–2000), but a similar pattern of increased suicides is present to a more gradual degree in U.S. civilians as well, especially males. This suggests that military and civilian suicide rates are not independent from each other, which in turn suggests larger societal factors are driving both military and civilian suicides. In other words, societal and cultural factors likely play a much larger role in military suicides than the military-specific factors of combat trauma or posttraumatic stress disorder (PTSD), per se.

Since 1900, active-duty U.S. Army soldiers and similarly aged U.S. civilian male suicide rates have gradually converged (i.e., compressed), with the differences in rates narrowing over time. This first happened from about 1950–1975, but has started again from about 2004-present, as all rate lines seem to be more or less converging. This suggests a set of common factors that are affecting men of a similar age irrespective of military service. Notably, this pattern holds true only for males, not females. Civilian female suicide rates historically have run well below that of civilian and military males.

Since about 2006, suicide rates of U.S. Army and civilian males in the age groups of 35–44, 45–54, and 55–64 have increased substantially. This current spike in U.S. Army suicides may not be an aberration, but a new and sustained trend. Alternatively, it may represent a return to "normal" after an unusually and consistently low rate for U.S. Army suicides from 1975–2004. During the last quarter of the twentieth century U.S. Army suicides dropped below that of civilian males. What happened during this time period is worth more study.

4.1. Limitations

This report has several limitations. While every effort was made to only include active-duty members as categorized by the U.S. Army, military reporting undoubtedly included individuals who served as reservists as well. Nevertheless, the study focused on tracking suicide rates for active-duty service members in the U.S. Army, however the military chose to define them. Similarly, the study did not attempt to adjust or account for variations in reporting and changing methodologies that resulted in the U.S. civilian annual suicide rates as produced by the U.S. Centers for Disease Control and Prevention's National Vital Statistics System (NVSS). Analyzing historical data involves inherent challenges, and caution is to be urged because, then as now, there is always a level of uncertainty in the determination of suicide. We place faith in the fidelity of historical reporting, as admittedly imperfect as it was. Discussions of what constitutes a fact aside, this study focused on changes and paradigm shifts during long periods more than on attempting to claim with absolute certainty each annual return—something cautioned against even in modern military and medical reporting. Finally, we are limited in what we are able to know about female suicides in the U.S. Army because of relatively small numbers of females, their relatively recent inclusion in the U.S. Armed Forces (1948), and the fact that adequate data capture for females is even more recent than their inclusion in the military.

4.2. Conclusions

These results suggest that suicide rates among U.S. males (U.S. Army service members and civilians) have surged upward since 2006 and represent a new historical trend that is worrisome. While the U.S. federal government, Department of Defense, Veterans Affairs, and non-profit foundations have launched suicide prevention efforts aimed at veterans and servicemembers, these programs have generally not yet made an effort to understand suicide in the larger historical context of society and culture. Rather than understanding military suicides as being primarily driven by combat trauma or PTSD, to be effective, prevention efforts should strive to understand military suicides through the lens of larger societal factors.

Historical epidemiology may allow for increased testing of causal theories against a longer timeline, considering that, if a model cannot explain the past, it draws into question its prognostic applicability. With the collection of additional historic data sets, researchers may be able to parse out a host of comparative factors associated with U.S. military and civilian suicide. Such historical data may open new avenues, perspectives, and collaborations in a more holistic search to better understand our suicide epidemic and to make more informed policy decisions to reduce rates of this tragic outcome for civilians and servicemembers alike.

Details of contributors

All four authors fulfill the criteria for authorship. All authors participated in the conception and design of this study, interpretation of data, manuscript preparation, and have approved of the final version. All authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. There is no one else who fulfills the criteria for authorship who has not been included as an author.

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Because the data in this manuscript were deidentified historical data from the 1900 forward, this research was exempt from Institutional Review Board review. Approval of ethical considerations for the protection of human subjects was not required. All data is publicly available. The views, opinions, and/or findings contained in this presentation are those of the author(s) and should not be construed as an official Department of Defense position, policy, or decision.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2023.115182.

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