

An epidemiological study on risk factors for suicidal behavior among Danish veterans deployed between 1990 and 2009

Author: Lene Klüver, Bo Andersen Ejdesgaard, Lilian Zollner, Centre for Suicide Research, Denmark. Correspondence: info@csrmail.dk

Introduction

To date, it is still unclear whether military personnel are a high-risk group concerning suicide related deaths. Research examining risk factors for suicidal behavior, other than military specific variables, have been scarce. The purpose of this study is to compare the suicide rates among Danish veterans to the general population and to examine pre-deployment risk factors for suicidal behavior among all Danish military personnel deployed between 1990 and 2009.

Method

In this study the veteran population was linked to several Danish registers on the basis of their identification number. Data on veterans was provided by the Defence Command Denmark. The data included information on mission participation and the time periods of deployments of each individual. Veterans with invalid identification numbers, inconsistent data and/or with no mission data were excluded from this study.

Information about suicide and suicide attempts were found in the following registers: The Register of Causes of Deaths (RCD, 1970-2009), The Psychiatric Central Register (1969-2009), The National Patient Register (1977-2009), and The Register for Suicide Attempts (1989-2009).

In addition the Integrated Database for Longitudinal Labour Market Research (1980-2009) was used for information on residences, level of education, and periods of unemployment.

Study population

The data sample consisted of 25,645 individuals who were deployed to international missions between January 1, 1990 and December 31, 2009 with a total number of 46,841 deployments. Among the veterans 1,298 (5.06%) were women. During the study period, none of these women had suicidal behavior during or after deployment.

41 suicides were identified in the time after the first deployment and before this study's end date. A total of 116 veterans had suicidal behavior (committed and attempted suicide) during or after deployment and before December 31, 2009.

Statistical analysis

The analysis consisted of two parts. In the first part, the suicide rate among veterans was compared to the suicide rate in the general Danish population by calculating standardized mortality ratios. Expected deaths from suicide were calculated from RCD and standardized by calendar year, gender, and 5-year age groups. This method took into account the age and gender differences in suicide rates and that the number of suicides had declined in the period. It was also taken into consideration that a number of veterans had died from other causes than suicide during 1990-2009 and that some veterans had emigrated.

The second part was a nested case-control study in order to explore the effects of various pre-deployment risk factors. For each of the 116 cases with suicidal behavior, controls were sampled from veterans of the same gender, from the same mission and of similar age (± 2 years).

Overall, 116 cases and 8,464 controls were chosen for the study of general risk factors; educational level, degree of unemployment, admission to hospital for mental disorder and pre-deployment suicide attempts, as well as the risk factors parents' death and parents' suicide. While 50 cases and 4,997 controls were chosen for the study of the remaining risk factors from family history and during childhood.

Risk factors were analysed on two levels. In the first level (crude

analysis) only one factor was in the model (univariate conditional logistic regression). In the second level (adjusted analysis) we added all significant factors from the crude analysis in the model. The adjusted model was determined by using stepwise conditional logistic regression, including factors at a 5% significance level.

Results

The standardized mortality ratio was accumulated over the years 1990-2009. Here, 41 veterans committed suicide while the expected number of suicides was 37.9. This corresponds to a SMR of 1.08 ($p = 0.6142$) indicating that the number of suicides among the veterans was at the same level as the background population, when considering the different age and gender distribution between the two groups and the declining number of suicides over time.

When the SMR was calculated for suicide in the countries with the largest number of deployments, only Croatia differed as nearly significant with a SMR of 1.50 ($p = 0.051$). Further investigation of the time period 1992-1996 which included the mission to Croatia, revealed that units with the highest number of casualties (wounded and dead) also had a significant higher suicide rate than the background population. Unit UNPROFOR 3, 4, 6 and UNCRO 8 experienced the highest number of casualties in that time period. They had a total of 16 observed suicides while the expected number was 9.0, which corresponds to a SMR of 1.78 ($p = 0.0193$).

The results of the nested case-control study showed that veterans with a high degree of unemployment prior to their first deployment ($>40\%$ on average within a year) had an increased risk of suicidal behavior. Even after adjusting for all other significant factors from the crude analysis, high degree of unemployment remained a significant risk factor (OR = 9.11; $p = 0.005$).

In the study, 298 veterans had a total of 883 admissions to hospital for mental disorder prior to deployment. Pre-deployment admission to hospital for mental disorder was significantly associated with suicidal behavior in the crude analysis. In the adjusted analysis it remained significant ($p = 0.003$) and the odds for having suicidal behavior was 10.47 times higher among those who had ever been admitted to a hospital for mental disorder prior to deployment compared to those who was never hospitalized for mental disorder before deployment.

In the veteran population of 25,645 individuals, 57 veterans attempted suicide prior to deployment. Pre-deployment suicide attempts was significantly associated with suicidal behavior and in the adjusted analysis it remained one of the significant factors (OR = 14.00; $p = 0.02$).

Only fathers' degree of unemployment during the veterans' childhood, not the mothers', significantly increased the risk for suicidal behavior in the crude analysis. It was the only risk factor from family history and childhood that remained significant in the adjusted analysis (OR = 1.99; $p = 0.027$).

Conclusion

In this study, standardized mortality ratios reveal that the overall suicide rate of Danish veterans ($n = 25,645$) is not significantly different from the general population. However, an increased risk of suicide is identified in units who experience a high number of casualties. A nested case-control study finds that pre-deployment suicide attempts, pre-deployment mental disorders, pre-deployment unemployment and fathers' unemployment during the veterans' childhood are significant risk factors for suicidal behavior. The findings highlight the need to focus on pre-deployment risk factors in the screening process and that units faced with severe casualties should be a prime target in military suicide prevention.