

Suicidality among military-connected adolescents in California schools

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Abstract Previous research indicates that suicidal ideation is higher among military-connected youth than non military-connected youth. This study extends prior work by examining suicidal ideation, plans, and attempts in military-connected and non military-connected adolescents. Data were gathered from 390,028 9th and 11th grade students who completed the 2012–2013 California Healthy Kids Survey. Bivariate comparisons and multivariate logistic analyses were conducted to examine differences in suicidal ideation, plans, attempts, and attempts requiring medical attention between military and not military-connected youth. In multivariate logistic analyses, military-connected youth were at increased risk for suicidal ideation (OR = 1.43, 95 % CI = 1.37–1.49), making a plan to harm themselves (OR = 1.19, CI = 1.06–1.34), attempting suicide (OR = 1.67, CI = 1.43–1.95), and an attempted suicide which required medical treatment (OR = 1.71, CI = 1.34–2.16). These results indicate that military-connected youth statewide are at a higher risk for suicidal ideation, plans, attempts, and attempts requiring medical care because of suicidal behaviors. It is suggested that policies be implemented to increase awareness and screening among primary care providers, school

personnel, and military organizations that serve military-connected youth.

Keywords Military · Adolescents · Suicidality · Mental health

Introduction

In the United States, recent national estimates show that more than 15 % of adolescents reported serious consideration of suicide, 12.8 % reported making a plan, and 7.8 % reported making an attempt in the preceding 12 months, though some variation exists across gender and ethnicity [1]. Suicidal thoughts and suicide attempts during adolescence have been linked to completed suicides and greater psychosocial difficulties in adulthood [2, 3]. Presently, a growing body of research demonstrates that mental health problems, including suicidal ideation in addition to depression and other internalizing and externalizing symptoms, arise more frequently among military-connected youth in the United States (i.e., children and adolescents with a parent/guardian in the military) as compared to their non military-connected peers [4–10]. Compared to non military-connected adolescents, these youth also report higher rates of substance use, violence, victimization, and weapon-carrying. In turn, these same behaviors have been associated with increased suicide risk [2, 3, 11, 12]. Across studies, the rates of elevated risk have consistently been found to be associated with parental deployment.

In 1973, the United States transitioned to a volunteer armed forces. Presently, those who serve in the military now account for less than 1 % of the U.S. population (vs. 9 % in World War II) [13]. The U.S. has been continuously involved in international combat for more than a decade (since the

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terrorist attacks on the World Trade Center on September 11, 2001). Because of the much smaller military, deployments have been longer (some 18 months or more) and increased in number over this period of time (some service persons have been deployed four or more times). Research indicates that a significant proportion of returning veterans could have been exposed to or experienced traumatic events that lead to mental health problems [14–16] or may have physical injuries which require a long-term recovery period in addition to working to re-integrate into their families and communities. When a service person returns home from deployment with physical and psychological injuries their children are impacted. Further, these extended and repeated absences from home take a psychological toll on their children.

It is in this context that today's military-connected adolescents tend to experience multiple geographic relocations and frequent parental deployments which can result in increased worry about a family member, difficult role transitions throughout the deployment cycle, and changes in relationships within the family system [5, 6, 15, 17–24]. Thus, these stressors associated with the prolonged war, in conjunction with normative adolescent stressors, may be associated with a possible increase in suicide risk among military-connected adolescents.

Understanding the continuum of suicidality among military-connected youth has urgent policy and practice implications. Two recent studies have assessed military-connected youth suicidal ideation [4, 5], however, to our knowledge, no studies conducted in the context of the past decade of war have examined adolescent suicidality beyond ideation. The U.S. Congress and the U.S. Department of Defense have recently emphasized the need to improve our understanding of the challenges facing military families in the context of the global War on Terror [25, 26]. This has included providing accurate estimates of suicidal behaviors for military families in addition to active-duty personnel [26]. A bill currently under consideration in Congress would establish a standardized system of tracking suicidal behaviors in order to better address suicidal risk in military personnel and their family members [27].

Given existing evidence suggesting increased rates of suicidal ideation among military-connected youth, larger and more in-depth investigations into the mental health of military-connected youth are necessary [4]. Hence, this study seeks to contribute to the extant research on adolescent suicide risk in two ways. First, this study assesses the prevalence of suicidal ideation and behavior among both military-connected and not military connected adolescents attending the same schools and living in the same geographic communities across the state of California. Second, this study is the first to explore multiple dimensions of suicidality which might be associated with military-connectedness that include suicidal ideation, having a plan for

suicide, the number of attempts, and any suicidal attempts resulting in medical treatment.

Methods

The data used in this study are from the ongoing large-scale California Healthy Kids Survey (CHKS), conducted by WestEd on behalf of the California Department of Education. All public schools in the state of California are invited to administer the survey to their students in 5th, 7th, 9th, and 11th grades. Generally, approximately 85 % of schools statewide participate in the survey in any given year. The CHKS consists of a core survey module that gathers demographic background data (e.g., grade, sex, and race/ethnicity) and inquires about students' health-related behaviors including drug use, violence, mental health, and school safety. Schools and districts can also opt to survey youth in their schools using several modules that collect additional details for specific behavioral health issues (e.g., physical health and nutrition or safety and violence).

The survey was administered by school staff members familiar with questionnaire administration or by WestEd employees if a school site chose to hire professionally trained survey administrators. Proctoring instructions were given to all survey administrators and an introductory script was read to the student participants. Participants were encouraged to answer questions honestly and assured their responses would remain anonymous and they were allowed to withdraw from the survey at any time. The survey took approximately 50 min to complete.

The data collected in 2012–2013 from 9th to 11th graders were used in the present study. Fifth and seventh graders were omitted from this study as they are not asked questions about suicidality. In addition, not every district opted to ask questions from the safety and violence module which includes more detailed questions about suicidal behaviors. Responses from youth in 1029 schools ($n = 390,028$) who were asked about suicidal ideation and 261 schools ($n = 26,142$) that opted to administer the safety and violence module were included in the analysis. Overall, in the 2012–2013 administration approximately 80 % of schools with 9th to 11th grade students participated. The student participation rate was approximately 85 % [28].

Dependent Variables

The core module given to all students in the sample has the question: during the past 12 months, did you ever seriously consider suicide? Schools and districts could opt to use the more detailed Safety and Violence module which also asked the following: During the past 12 months, did you make a plan about how you would attempt suicide; during the past

Table 1 Percentages of military-connected youth by demographic and suicidality information

	Total N (%)	Not military-connected	Military-connected
Military-connected			
Yes	27,547 (8.8)		
No	283,953 (91.2)		
Sex***			
Male	189,734 (49.1 %)	47.3	53.2
Female	196,832 (50.9 %)	52.7	46.8
Grade***			
9th	205,172 (52.6 %)	51.2	56.8
11th	184,856 (47.4 %)	48.8	43.2
Race/ethnicity***			
AI-AN ^a	3707 (0.97 %)	0.83	1.18
Asian	46,991 (12.3 %)	12.7	14.8
Black	13,608 (3.6 %)	3.2	4.3
White	90,041 (23.5 %)	25.1	18.6
Multiple races	36,341 (9.5 %)	9.3	10.1
Hispanic/Latino	193,046 (50.3 %)	49.0	51.2
Suicidal ideation (core)***			
Yes	67,302 (19.0 %)	18.1	23.5
Suicidal behavior (module)			
Made a plan (yes)*	3225 (12.6 %)	12.0	13.7
Attempts (yes)***	2313 (8.9 %)	7.3	11.8
Attempt requiring medical treatment (yes)***	692 (2.7 %)	2.1	3.7

^a American Indian–Alaska native

* $p < 0.05$, ** $p < 0.01$,

*** $p < 0.001$

12 months, how many times did you actually attempt suicide; and did attempted suicide in the past 12 months result in medical treatment of an injury/poisoning/overdose? These questions were all coded as dichotomous variables (yes or no).

Independent Variables

The independent variables included whether the student had a parent currently serving in the military, grade, sex, and race/ethnicity. Race/ethnic categories consisted of American Indian/Alaska native, Asian American/Pacific Islander, Black, White, multiple races, and Hispanic/Latino ethnicity.

Data Analysis

The Statistical Analysis System (SAS) version 9.3 was used in the analysis. Frequency distributions and cross-classification tables (χ^2 analysis) were performed to compare socio-demographic characteristics and key variables related to military connection. Separate multiple logistic regressions (MLR) were employed to predict the probability of each of the suicidality measures. The analysis of responses of students in schools should take into account the effect of student

clustering within schools. Proc surveyfreq and proc surveylogistic were utilized to control for clustering in schools.

Results

Demographic characteristics of the sample are presented in Table 1. Youth who reported that they had a parent serving in the military had statistically significantly higher prevalence of all four suicidal measures (see Table 1). For example, approximately 24 % of military-connected youth reported seriously considering suicide compared to 18.1 % of non military-connected youth (Rao-Scott $\chi^2 = 273.98$, $p < 0.0001$). The prevalence of suicide attempts was approximately 7.3 % amongst non military-connected youth and nearly 12 % amongst military-connected youth (Rao-Scott $\chi^2 = 45.97$, $p < 0.0001$).

Controlling for grade, sex, and race/ethnicity military connection was a statistically significant predictor in all four models (see Table 2). Military-connected youth were at increased risk for suicidal ideation (OR = 1.43, 95 % CI = 1.37–1.49), making a plan to harm themselves (OR = 1.19, CI = 1.06–1.34), attempting suicide (OR = 1.67, CI = 1.43–1.95), and attempting suicide which required medical treatment (OR = 1.71, CI = 1.34–2.16).

Table 2 Multiple logistic regressions of suicidal ideation, suicide plans, attempts, and attempts requiring medical treatment

Predictors	Suicidal ideation <i>n</i> = 300, 146 OR (95 % CI)	Plan for ending life <i>n</i> = 23, 252 OR (95 % CI)	Attempted suicide <i>n</i> = 23, 504 OR (95 % CI)	Attempt with medical treatment <i>n</i> = 23, 122 OR (95 % CI)
Grade				
9th (reference)	1.00	1.00	1.00	1.00
11th	0.97 (0.95–0.98)***	0.99 (0.93–0.99)	0.91 (0.86–0.96)***	0.87 (0.78–0.97)*
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.92 (1.88–1.96)***	1.78 (1.63–1.94)***	1.39 (1.25–1.55)***	1.34 (1.12–1.61)**
Race/ethnicity				
White (reference)	1.00	1.00	1.00	1.00
AI-AN ^a	1.36 (1.23–1.49)***	1.76 (1.17–2.65)**	2.54 (1.72–3.73)***	3.07 (1.58–5.94)***
Asian	1.11 (1.06–1.17)***	1.07 (0.96–1.21)	0.89 (0.74–1.06)	0.73 (0.54–0.98)
Black	1.04 (0.97–1.11)	1.06 (0.72–1.56)	1.78 (1.23–2.58)**	2.47 (1.28–4.75)
Multiple	1.37 (1.32–1.42)***	1.38 (1.17–1.62)***	1.61 (1.37–1.89)***	1.47 (1.07–2.01)*
Hispanic/Latino	1.12 (1.09–1.16)***	1.12 (0.99–1.27)	1.65 (1.40–1.94)***	1.46 (1.13–1.90)
Military-connection				
None (reference)	1.00	1.00	1.00	1.00
Parent	1.43 (1.37–1.49)***	1.19 (1.06–1.34)**	1.67 (1.43–1.95)***	1.71 (1.34–2.16)***

^a American Indian–Alaska native* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion

Addressing the prevalence of adolescent suicidality is a public health priority in the U.S. [29, 30]. The present study confirmed and extended findings from prior regional and state findings related to the potential increased risk of suicidal ideation amongst military-connected youth [4, 5]. A number of factors may account for the higher rates of suicidal thoughts and behaviors among military-connected students. Previous literature has connected the experience of family member and parental deployment with suicidal ideation among military-connected youth [4, 5]. Given the high rates of deployment associated with Operation Iraqi Freedom, Operation Enduring Freedom and Operation New Dawn [31], military-connected youth who have experienced parental and family member deployment may be accounting for the elevated rates of suicidal ideation and behavior among our sample. Further, this population may be at greater risk of experiencing mental health symptoms and diagnoses, including depression, which increases their risk for suicidal ideation and suicidal behaviors [4, 5, 8, 9]. Finally, rates of other risky behaviors, including substance use, weapon carrying, gang membership, violence and victimization, may be higher among this population [5, 19, 32, 33]. These behaviors have been associated with suicidality in adolescents, which may further increase risk among military-connected youth [2, 3].

Given the high rates of suicidal thoughts and behaviors found in both groups in this sample, these results suggest

the need to increase screening for suicidality among all adolescents, and particularly among military-connected youth. The American Academy of Pediatrics' policy statement on suicidality in adolescents suggests that pediatricians, in addition to mental health workers and school personnel, should be prepared to screen for these issues during annual doctor visits [26, 29, 34]. Given the elevated rates of suicidality among military-connected youth, military-connectedness during wartime should be considered an additional risk factor for adolescent suicidal behavior, which primary care providers should take into consideration as part of a comprehensive suicidality assessment.

Further, these results should be considered alongside evidence which suggests the need for increased support for military families overall. Recent results of a survey of military families indicate that spouses of service members also report higher rates of suicidal ideation [35]. Several organizations have called on the Department of Defense to begin tracking suicidality among military families in addition to collecting information about these behaviors among service members [26, 35]. The prevalence of suicidal ideation among military families, as well as additional evidence which suggests that family functioning may be adversely affected by wartime military service, indicates the need for further mental health services and additional supports for the entire military family system [17, 36].

Other studies have found that military-connected youth report higher rates of weapon carrying (gun or knife) and this may be associated with access to weapons [33]. It is possible that access to weapons in the home could place youth at increased risk for suicide attempts. Globally, firearms in the home have been found to be related to increased suicide [37]. In Israel anti-suicide policies required those serving in the Israeli Defense Force (IDF) to leave their service weapons on base when they take leave or on weekends. This policy was subsequently found to be associated with a significant decrease in suicides among their target population [37]. Thus, it may be important that safe weapon storage be implemented in military-connected homes.

To our knowledge, this study represents the largest examination of multiple dimensions of suicidality among a general population military-connected adolescent sample in the United States. Despite this strength, the use of self-report is a notable limitation. Given the potential for stigma, suicidal ideation, plans to commit suicide and attempts may be under-reported. Further, the current data do not include information on parental deployments or caregiver mental health. Future research should include these important covariates. Notwithstanding, the findings in the present study mirrors results from prior studies in California and Washington state with smaller samples and more limited suicidality measures [4, 5]. Additionally, our overall rates are similar to those found nationally [1].

The results of this study may also be important for those countries who may move from conscription to voluntary armed forces and/or those who have already made the transition and find themselves involved in current conflict. When service is mandated there is a national sense of normalcy for military service and the potential for all to be exposed to the consequences of combat. Thus, in times of war (as seen in the United States during World War II), the country rallies behind their troops. The voluntary military is one where the cost of combat is shared by only a small portion of the population [13]. Currently, the global fight against multiple terrorist cells continues to be widespread throughout the Eurasian and Asian continents. Countries that find themselves involved in heavy conflict using a voluntary military should take steps in advance to invest in infrastructure to increase knowledge of military-connected youth and their needs in schools and amongst community mental health providers. There have been international calls to focus on individual casualties and to increase resources for service persons who return from combat with physical or psychological injuries with little focus on their children. Thus, many military connected youth may feel invisible and that there is little concern about their need for services. For example, teachers and other pupil personnel in schools should be aware of military-connected youth that

they serve. It is recommended that other countries conduct research to determine whether their military-connected youth are being impacted adversely compared to their civilian counterparts.

Overall, the findings emphasize the need to address suicidality among military-connected adolescents and their families. The prevalence of those youth who are contemplating suicide and those who take action towards ending their own lives indicate the severity of this issue and demand intervention on multiple levels and in multiple contexts [26, 34]. Physicians, mental health providers, and school staff need tools to carefully assess military-connected youth and their families and resources to provide treatment and support for these youth [26]. Primary health care providers, mental health providers, schools, and other community organizations should work to increase their awareness of the presence of military-connected youth and families that they serve. Special consideration should be given for the potential of deployments, relocations, and other adolescent stressors to impact the mental health of military-connected youth. These findings indicate that prevention and intervention programs and protocols should focus on all aspects of suicidality including ideation, plans, attempts, and attempts requiring medical attention.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Human Subjects Statement This work constitutes secondary data analysis and was approved by the USC IRB as an exempt study.

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