



Depression and mental health service use among 12–17 year old U.S. adolescents: Associations with current parental and sibling military service

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ABSTRACT

Objective: To examine whether having a parent and/or a sibling currently serving in the military is associated with major depression and use of mental health services among 12–17 year old adolescents in the United States.

Method: Descriptive and multivariate logistic regression analyses are conducted using pooled data from the 2016–2019 National Survey of Drug Use and Health (NSDUH). Analyses are weighted and standard errors are adjusted for the complex sampling design.

Results: Adolescents are more likely to have a sibling than a parent currently serving in the military. Having a sibling currently in the military increases the likelihood of having a lifetime and a past-year major depressive episode (MDE), but not a past-year MDE with severe role impairment or use of mental health services. Having a parent in the military is not associated with any measure of MDE, but increases use of specialty outpatient, specialty inpatient/residential, and non-specialty mental health services net of MDE and sociodemographic controls.

Conclusion: Considerable attention has focused on risk and resilience among the dependent children of current service members. A better understanding of how the current military service experiences of siblings, as well as parents, influences related adolescents' mental health, mental health care service use, substance use, and health behaviors has the potential to contribute to programs and interventions that can enhance the well-being of youth with intra-generational, as well as inter-generational, connections to the military. Adolescents who have a sibling currently serving in the military are an at-risk population for MDE and potentially other mental and behavioral health problems.

1. Introduction

Adolescence is a life-course stage characterized by rapid social and emotional development and considerable stress associated with personal growth, individuation, the negotiation of autonomy, and difficulties navigating social integration across a range of dynamic contexts (De Goede et al., 2009; Hewlett, 2013; McLean et al., 2014; Rueger & Malnecki, 2011). Approximately one half of lifetime mental health disorders begin in adolescence, but many adolescents do not receive needed mental health care services (Merikangas et al., 2010; Merikangas et al., 2011; National Institute of Mental Health, 2019). It is estimated that approximately 25% of adolescents experience mental disorders with severe impairment, which can have long-term life-course consequences (Center for Behavioral Health Statistics and Quality, 2013; Center for Behavioral Health Statistics and Quality, 2014). Major depression is a prevalent mental health disorder among adolescents that is not always treated. In 2017, 13.3% of adolescents experienced one or more major depressive episode (MDE) in the previous 12 months, with 71% of them experiencing severe impairment but only 40% of them receiving treatment (National Institute of Mental Health, 2019). Documented increases

over time in the prevalence of MDE, MDE with impairment, and associated suicide risk among adolescents are substantial public health concerns in the United States (Miron et al., 2019; Mojtabei et al., 2016; Mojtabei & Olsson, 2020).

The linked-lives principle of the life-course perspective emphasizes how what happens in the lives of those to whom our lives are connected influences our own life-course trajectories, opportunities, and outcomes (Elder et al., 2003). Familial and network ties provide adolescents with social, psychological, and economic resources and support that can promote positive development and buffer stressors and strains encountered in everyday life (Bowers et al., 2015; Helsen et al., 2000; Kawachi & Berkman, 2001). However, such ties can also be the source of stressors and strains that emerge due to abuse, neglect, dependence, and/or conflict or because circumstances create stressors or “costs” within relationships defined by positive emotional bonds and care (Geldhof et al., 2019; Kessler & McLeod, 1984; Repetti et al., 2002, 2009). The circumstances that might cause adolescents to experience distress within the context of caring relationships include a family member's illness, moving away from friends, or concern about a friend or relative who is perceived to be at-risk due to their circumstances or behaviors (Mmari

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et al., 2010; Simoni & Bauldry, 2020; Smith, 2015; Smith & Rose, 2011).

At present, there are more spouse, child, and other family dependents of persons on active duty in the armed forces of the United States than there are active-duty service members (Department of Defense, 2018). A substantial literature documents increased emotional distress and mental health problems among children and adolescents who have one or more parent currently serving in the military (Cozza & Lerner, 2013; Huebner, 2019; MacDermid Wadsworth et al., 2017; Sullivan et al., 2019). Having a parent who is currently serving in the military can increase emotional distress and mental health problems via a variety of mechanisms, including loss of support, anxiety when a parent deploys and is absent from the home for a lengthy period of time, stress associated with adjustments in the family system, and spillover distress associated with the distress of others (Chandra et al., 2010; Lester & Flake, 2013; MacDermid Wadsworth et al., 2017; Sullivan et al., 2019). While such experiences can foster resilience for some adolescents, they can overwhelm others to the point that they experience significant emotional disturbance that in some cases requires clinical diagnosis and treatment (Cederbaum et al., 2014; Chandra et al., 2010; Easterbrooks et al., 2013; Gilreath et al., 2013; Huebner, 2019; Sullivan et al., 2019).

For many adolescents, the loss and worry they experience when a parent is currently serving in the military also occurs when they have a sibling who is currently serving. However, less attention has been paid to the mental health consequences of having a sibling than having a parent in the military (Cederbaum et al., 2014; Gilreath et al., 2013; Rodriguez & Margolin, 2011). Among adolescents who experience strains in their relationships with parents, ties to siblings, perhaps especially older siblings who are more likely to have left home to join the military, may be as or more salient than ties to parents. As such, military service-related changes in access to siblings, loss of support, and/or worry about their sibling's safety may be particularly salient for adolescent well-being (Rodriguez & Margolin, 2011). This hypothesis is supported by evidence that having a sibling in the military has a significant bivariate association with feeling sad or hopeless, depressive symptoms, suicidal ideation, and various measures of lifetime substance use (Cederbaum et al., 2014; Gilreath et al., 2013). Taken together, available theory and evidence related to the consequences of parental and sibling military service for adolescents supports the following hypotheses: (1) Adolescents who have a parent who is currently serving in the military will be at increased risk for a MDE (and possibly other mental health disorders) relative to adolescents who do not have a parent currently serving in the military; and (2) Adolescents who have a sibling who is currently serving in the military will be at increased risk for a MDE (and possibly other mental health disorders) relative to adolescents who do not have a sibling currently serving in the military.

A related set of concerns is associated with access to mental health care. Access to needed mental health care among adolescents is not equally distributed in the United States (Lipari et al., 2016). Subpopulations have variable access to institutions, which shape their access to institutional resources and opportunities (London & Heflin, 2015). Current service in the military is an attribute of adult parents and siblings. For adolescents, it signifies a connection to an institution whose meaning with respect to access to resources depends on whether it is a parent (i.e., inter-generational tie) or a sibling (i.e., intra-generational tie) who is currently serving. The military provides a range of benefits and services to its current members and their dependent family members (Department of Defense, 2019a; Department of Defense, 2019b; Westat, 2010). For current service members who are parents, this includes access for their dependent children to a broad range of basic health care services through TRICARE, as well as special programs for the children of deployed service members (Cozza & Lerner, 2013; Huebner, 2019; Sullivan et al., 2019). In contrast, having a sibling who is currently serving in the military does not confer the same access to health care services that having a parent in the military does. Adolescents with a sibling but no parent in the military have the same less-than-universal

access to mental health services as adolescents in the general population (Merikangas et al., 2011; National Institute of Mental Health, 2019). Thus, available theory and evidence supports the following hypotheses related to use of mental health care services: (1) Adolescents who have a parent who is currently serving in the military will be more likely to use mental health services than adolescents who do not have a parent currently serving in the military; and (2) Adolescents who have a sibling currently serving in the military will have similar use of mental health services as adolescents who do not have a sibling currently serving in the military.

2. Method

2.1. Data

The National Survey of Drug Use and Health (NSDUH) is conducted annually by the Substance Abuse and Mental Health Services Administration, which is under the auspices of the U.S. Department of Health and Human Services. The NSDUH is administered to a representative sample of the civilian, noninstitutionalized population of the United States aged 12 and older. The sample is selected using a multistage area probability sampling method (Substance Abuse and Mental Health Services Administration, 2018). Data for this paper were obtained from the 2016, 2017, 2018, and 2019 NSDUH because those are the only years that the survey instrument includes questions about whether a parent or a sibling is currently serving in the military. The analytic sample for the current study includes 48,211 12–17 year old adolescents.

2.2. Measures

Familial Ties to the Military. In each year, participants are asked about family members who are currently serving in the armed forces of the United States. Participants are first asked to consider a list of biological, step, or adoptive family members—spouse, unmarried partner, mother, father, son or sons, daughter or daughters, brother or brothers, sister or sisters—regardless of whether they do or do not live with the participant, and to indicate whether any of them are “currently serving in the United States military.” Individuals who want to hear and view a definition of “military” are instructed to press F2 on the computer on which they are completing the survey. The definition provided to those who request it is: “To serve in the military is to be employed as a member of one of the branches of the United States Armed Forces, Reserve components or National Guard, including the Coast Guard.” All participants who answer “yes” to this screening question are then asked to identify which family members are currently serving. For this study, the categories “father or mother in the military” and “sister or brother in the military” are used to define two separate dichotomous measures respectively signifying having a parent and having a sibling currently serving in the military.

Major Depressive Episode (MDE). In this study, the measurement of mental health disorder is limited to MDE because that is the primary measure of mental health disorder available in the NSDUH. Three dichotomous, NSDUH-derived measures of MDE are utilized in this study: lifetime MDE, past-year MDE, and past-year MDE with severe role impairment (Substance Abuse and Mental Health Services Administration, 2018). The measurement of each is described below.

Lifetime MDE classifies an adolescent as having a MDE if he or she reports experiencing at least five of nine symptoms of MDE, where one of the symptoms is a depressed mood or loss of interest or pleasure in daily activities. As is the case in the adult depression module in the NSDUH, in the adolescent depression module, participants are asked introductory questions to determine whether they have had a worst period of time when they experienced feeling sad, empty, depressed, discouraged, or a loss of interest. Participants who screen positive on at least one of these introductory questions are asked questions related to nine specific

symptoms of MDE derived from the Diagnostic and Statistical Manual of Mental Disorders. These questions ask participants to consider the worst period of time that stood out in his or her mind. If the participant does not recall a worst period of time, s/he is asked to answer the questions in reference to the most recent period of time when the participant experienced any or all of the following: sadness, discouragement, or lack of interest in most things. No exclusions are made for a MDE caused by medical illness, bereavement, or substance use disorders.

Table 1 provides the survey questions and scoring algorithms used to assess each of the nine symptoms of MDE. The nine symptoms of MDE that are assessed in relation to the worst/most recent period are: (1) depressed mood most of the day; (2) markedly diminished interest or pleasure in all or almost all activities most of the day; (3) weight; (4) insomnia or hypersomnia; (5) psychomotor agitation or retardation; (6) fatigue or loss of energy; (7) feelings of worthlessness; (8) diminished ability to think or concentrate or indecisiveness; and (9) recurrent thoughts of death or recurrent suicide ideation.

The two other measures of MDE use a positive score for lifetime MDE as a starting point and add additional criteria. Participants are coded positive for past-year MDE if they score positive on lifetime MDE and report that during the past 12 months they have had a period of depression lasting 2 weeks or longer, while also reporting some of the other symptoms of MDE in the past year. Participants are coded positive for MDE with severe impairment if they have had a MDE in the past year and report that MDE caused them to experience functional impairment in one or more major life activities. Level of MDE-caused functional impairment in the past 12 months is assessed in four domains using the Sheehan Disability Scale (SDS). (Leon et al., 1997).

For adolescents, the SDS measures mental health-related impairment

in four major life activities or role domains with questions tailored specifically for persons aged 12 to 17. The module includes four questions that are assessed on a 0 to 10 visual analog scale with categories of “no interference” (0), “mild” (1–3), “moderate” (4–6), “severe” (7–9), and “very severe” (10). Adolescents are instructed to think about the time in the past 12 months when problems with their mood were at their worst and use the 0 to 10 scale to describe how much their depression symptoms caused problems with their ability to do each activity during that time. The specific activities queried for adolescents are: chores at home; ability to do well at school or work; ability to get along with family; and ability to have a social life. To derive the dichotomous indicator, a maximum impairment score was defined as the single highest severity level of role impairment across all four SDS role domains. All ratings greater than or equal to 7 on the original SDS scale were considered to be indicative of severe impairment.

Mental Health Service Use. Three composite categories of mental health service use in the past year were assessed: specialty outpatient; specialty inpatient/residential; and non-specialty. Each category combines information from several distinct indicators. All source measures focus on problems with behavior or emotions that are not caused by alcohol or drugs. Any specialty outpatient mental health service use in the past year is measured on the basis of an affirmative response to at least one of four source variables. The source variables measure whether the participant received outpatient treatment: in a day treatment facility; at a mental health clinic; from a private therapist; or from an in-home therapist. Any inpatient/residential mental health service use in the past year is measured on the basis of an affirmative response to one of two source questions that assessed whether the participant stayed overnight in hospital and/or stayed in a residential treatment facility.

Table 1

National Survey of Drug Use and Health (NSDUH) questions and scoring algorithms used to assess nine symptoms of major depressive episode (MDE).

Symptom	Survey Questions	Coding Algorithm
Depressed mood most of the day	Did you feel sad, empty, or depressed most of the day nearly every day?; Did you feel discouraged about how things were going in your life most of the day nearly every day?	Participants who answered yes to either question were scored positive for this symptom.
Markedly diminished interest or pleasure in all or almost all activities most of the day	Did you lose interest in almost all things like work and hobbies and things you like to do for fun?; Did you lose the ability to take pleasure in having good things happen to you, like winning something or being praised or complimented?	Participants who answered yes to either question were scored positive for this symptom.
Weight	Did you have a much smaller appetite than usual nearly every day during that time?; Did you have a much larger appetite than usual nearly every day?; Did you gain weight without trying to during that [worst/most recent] period of time? (Because you were growing? Because you were pregnant? How many pounds did you gain?); Did you lose weight without trying to? (Because you were sick or on a diet? How many pounds did you lose?).	Participants who had much smaller or larger appetite than usual during that time, as well as participants who gained or lost 10 or more pounds without trying were scored positive for this symptom.
Insomnia or hypersomnia	Did you have a lot more trouble than usual falling asleep, staying asleep, or waking too early nearly every night during that [worst/most recent] period of time?; During that [worst/most recent] period of time, did you sleep a lot more than usual nearly every night?	Participants who answered yes to either question were scored positive for this symptom.
Psychomotor agitation or retardation	Did you talk or move more slowly than is normal for you nearly every day? (Did anyone else notice that you were talking or moving slowly?); Were you so restless or jittery nearly every day that you paced up and down or couldn't sit still? (Did anyone else notice that you were restless?)	Participants scored positive for this symptom if they answered yes to either question and indicated that their psychomotor agitation or retardation was noticed by someone else.
Fatigue or loss of energy	During that [worst/most recent] period of time, did you feel tired or low in energy nearly every day, even when you had not been working very hard?	Participants who responded yes were scored positive for this symptom.
Feelings of worthlessness	Did you feel that you were not as good as other people nearly every day? (Did you feel totally worthless nearly every day?).	Participants who answered yes to both questions were scored positive for this symptom.
Diminished ability to think or concentrate or indecisiveness	During that [worst/most recent] period of time, did your thoughts come much more slowly than usual or seem confused nearly every day?; Did you have a lot more trouble concentrating than usual nearly every day?; Were you unable to make decisions about things you ordinarily have no trouble deciding about?	Participants who responded yes to any of these three questions were scored positive for this symptom.
Recurrent thoughts of death or recurrent suicide ideation	Did you often think about death, either your own, someone else's, or death in general? During that period, did you ever think it would be better if you were dead? Did you think about committing suicide? (Did you make a suicide plan? Did you make a suicide attempt?)	Participants who answered yes to any of these questions scored positive for this symptom.

Source: Substance Abuse and Mental Health Services Administration (2018).

Any non-specialty mental health service use in the past year is measured on the basis of an affirmative response to at least one of five source variables. The source variables measure whether the participant received mental health services from: a school social worker, school psychologist, or school counselor; a special school or program within a regular school for students with emotional or behavioral problems; a pediatrician or other family doctor; a juvenile detention center, prison, or jail; and/or a foster care or therapeutic foster care provider. For each of the source variables, adolescents who did not report a positive response but answered all of the questions were included in the “no” category. Adolescents who did not report a positive response and did not answer all the questions were included in the unknown category and treated as missing in the analyses that follow.

For the purpose of the current study, a measure of any mental health

Table 2
Population characteristics, 12–17 year old adolescents, pooled data from the 2016–2019 National Survey of Drug Use and Health (NSDUH) (N = 48,211).

	Un-weighted N	%	[95% CI]
Parent Currently in the Military			
Yes	1921	3.6	[3.3–3.9]
No	46,290	96.4	[96.1–96.7]
Sibling Currently in the Military			
Yes	2157	4.3	[4.0–4.5]
No	46,054	95.7	[95.5–96.0]
Gender			
Female	23,807	49.6	[49.0–50.2]
Male	24,404	50.4	[49.8–51.0]
Race/Hispanic Ethnicity			
White/Non-Hispanic	25,871	53.4	[52.7–54.1]
Black/Non-Hispanic	6219	13.3	[12.7–13.8]
Hispanic/All Races	10,583	23.5	[22.8–24.2]
Other Races/Non-Hispanic	5538	9.9	[9.4–10.4]
Age			
12 Years	6821	14.1	[13.7–14.5]
13 Years	7904	16.0	[15.6–16.5]
14 Years	8092	17.1	[16.7–17.5]
15 Years	8426	17.3	[16.9–17.7]
16 Years	8610	17.9	[17.4–18.4]
17 Years	8358	17.6	[17.2–18.1]
Education			
<9th Grade	15,810	32.2	[31.7–32.7]
9th Grade	7684	16.0	[15.6–16.5]
10th Grade	7661	15.9	[15.5–16.4]
11th Grade	7379	15.3	[14.9–15.7]
>11th Grade	4980	10.8	[10.4–11.2]
Missing	4697	9.8	[9.4–10.3]
Criminal Justice Involvement			
Yes	1155	2.2	[2.0–2.3]
No	47,056	97.9	[97.7–98.0]
Self-Rated Health			
Excellent	16,385	35.0	[34.2–35.7]
Very Good	19,978	40.7	[40.0–41.3]
Good	9761	20.0	[19.5–20.6]
Fair/Poor	2087	4.4	[4.2–4.6]
Living Arrangements			
With Both Parents	32,928	70.5	[69.8–71.3]
With Mother Only	11,131	21.2	[20.5–21.8]
With Father Only	2221	4.3	[4.1–4.5]
With Neither Parent	1931	4.0	[3.8–4.3]
Family Income			
<\$20,000	7039	13.9	[13.4–14.5]
\$20,000–\$49,999	13,231	26.7	[26.0–27.4]
\$50,000–\$74,999	7316	14.3	[13.9–14.7]
>=\$75,000	20,625	45.1	[44.1–46.1]
Residential Location			
Large Metropolitan Area	21,771	56.5	[55.7–57.3]
Small Metropolitan Area	16,774	29.5	[28.6–30.3]
Non-Metropolitan Area	9666	14.1	[13.6–14.6]
Year			
2016	12,646	25.0	[24.3–25.7]
2017	12,104	25.1	[24.5–25.7]
2018	11,671	24.9	[24.2–25.5]
2019	11,790	25.1	[24.4–25.7]

service use was derived. This variable measures use in the past year of any of the 11 mental health services noted above for problems with behavior or emotions that were not caused by alcohol or drugs.

Sociodemographic Controls. Multivariate analyses include a range of sociodemographic controls. These include several sociodemographic variables that are exogenous to associations between familial ties to the military and MDE and/or use of mental health services: sex, age, and race/ethnicity. The set of sociodemographic control variables also includes a range of potentially confounding variables that may be endogenous to these associations: education, criminal justice system involvement, self-rated health, living arrangements, family income, and residential location. Additionally, survey year is included in all models as a methodological control. The categories for each variable included in the analyses are shown in [Table 2](#).

2.3. Analytic approach

Descriptive and multivariate logistic regression analyses were conducted using Stata, version 16.0. Analyses are weighted unless otherwise indicated and standard errors are adjusted for the complex sampling design. In preliminary multivariate analyses, the interaction of parental and sibling military service was included and found to never be statistically significant. Hence, although there are some adolescents who have both a parent and a sibling currently serving in the military (unweighted N = 414), the analyses that follow do not distinguish them as a distinct subgroup.

3. Results

3.1. Population description

[Table 2](#) presents a description of the population of 12–17 year old adolescents represented by the weighted sample. More adolescents had a sibling than a parent currently serving in the military (4.3% versus 3.6%). Half were female and slightly fewer than half were racial/ethnic minority: 13.3% were non-Hispanic Black, 23.5% were Hispanic (any race), and 9.9% were other races (non-Hispanic). The percentage at each individual year of age ranged from 14.1% (12 years old) to 17.9% (16 years old). About one-third were in the 8th grade or less, one-third were in the 9th and 10th grades, and one-third were in the 11th grade or higher. About two percent had a history of criminal justice involvement. More than 75% were in very good or excellent health, while 4.4% were in fair/poor health. Approximately 71% lived with both parents. While 13.9% lived in families with income under \$20,000 per year, 45.1% lived in families with income of \$75,000 or more. Over half (56.5%) lived in large metropolitan areas. About one-quarter of participants were interviewed in each year.

The sociodemographic characteristics of adolescents who have a parent or a sibling currently serving in the military are significantly different from those of adolescents who respectively do not have a parent or sibling currently serving in the military. Significant associations with parental military service status are observed for gender, race/ethnicity, age, education, criminal justice involvement, and residential location (not shown). Significant associations with sibling military service are observed for race/ethnicity, family income, living arrangements, education, and residential location (not shown).

3.2. Major depressive episode (MDE)

Overall, 19.9% of 12–17 year old adolescents experienced a MDE in their lifetime (95% confidence interval [CI] = 19.4%–20.5%). A smaller percentage (14.5%, 95% CI = 14.0%–15.0%) experienced a MDE in the past year, and an even smaller percentage (10.2%, 95% CI = 9.9%–10.6%) experienced a past-year MDE with severe role impairment.

[Table 3](#) presents results of bivariate and multivariate logistic regression analyses of the associations between current parental and

Table 3

Logistic regression analysis of major depressive episode (MDE) by current parental and sibling military service status among 12–17 year old adolescents, pooled data from the 2016–2019 National Survey of Drug Use and Health (NSDUH) (N = 48,211).

PANEL A: LIFETIME MDE										
	N ¹ MDE = 1	% MDE	[95% CI]	p	OR ²	[95% CI]	p	OR ³	[95% CI]	p
Parent Currently in the Military										
Yes	391	20.6	[18.0–23.5]		1.10	[0.91–1.32]		1.11	[0.92–1.35]	
No	9340	19.9	[19.3–20.5]		–			–		
Sibling Currently in the Military										
Yes	521	24.8	[22.8–26.9]	***	1.36	[1.19–1.54]	***	1.36	[1.19–1.55]	***
No	9210	19.7	[19.1–20.3]		–			–		
PANEL B: PAST YEAR MDE										
	N ¹ MDE = 1	% MDE	[95% CI]	p	OR ²	[95% CI]	p	OR ³	[95% CI]	p
Parent Currently in the Military										
Yes	294	15.4	[13.1–17.8]		1.15	[0.94–1.39]		1.16	[0.95–1.41]	
No	6812	14.5	[13.9–15.0]		–			–		
Sibling Currently in the Military										
Yes	368	17.3	[15.8–19.0]	***	1.25	[1.10–1.42]	**	1.24	[1.09–1.42]	**
No	6738	14.4	[13.8–14.9]		–			–		
PANEL C: MDE WITH SEVERE ROLE IMPAIRMENT										
	N ¹ MDE = 1	% MDE	[95% CI]	p	OR ²	[95% CI]	p	OR ³	[95% CI]	p
Parent Currently in the Military										
Yes	225	11.3	[9.4–13.6]		1.22	[0.97–1.53]		1.24	[0.98–1.56]	
No	4813	10.2	[9.8–10.6]		–			–		
Sibling Currently in the Military										
Yes	257	11.7	[10.4–13.2]	*	1.15	[0.98–1.35]		1.14	[0.98–1.34]	
No	4781	10.2	[9.8–10.6]		–			–		

Statistical Significance: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.

1. N = un-weighted number of participants with MDE; total un-weighted cell size provided in Table 2. All other analyses are weighted.

2. OR = odds ratio. Logistic regression model includes controls for: sex, age, race/ethnicity, and survey year.

3. OR = odds ratio. Logistic regression model includes controls for: sex, age, race/ethnicity, education, criminal justice system involvement, self-rated health, living arrangements, family income, residential location, and survey year.

sibling military service statuses, respectively, and three dichotomous measures of MDE: lifetime MDE, past-year MDE, and MDE with severe role impairment. As seen in Panel A, having a sibling currently serving in the military is significantly associated with lifetime MDE in the bivariate analysis, in the multivariate analysis that only includes controls for the exogenous sociodemographic factors (sex, age, race/ethnicity) and year of data collection, and in the fully specified model that includes all of the control variables. In the full model, the odds of lifetime MDE are increased 36% among adolescents with a sibling currently serving in the military relative to adolescents who do not have a sibling currently serving in the military (odds ratio [OR] = 1.36, 95% CI = 1.19–1.55). Parental military service status is not significantly associated with lifetime MDE in any of the analyses.

Panel B presents results for past-year MDE and the pattern of results is the same as in Panel A. In the full model, the odds of past-year MDE are 24% higher among adolescents with a sibling currently serving in the military relative to adolescents who do not have a sibling currently serving in the military (OR = 1.24, 95% CI = 1.09–1.42).

Panel C presents the results for MDE with severe role impairment and the pattern of results is different than that shown in Panels A and B. There is a significant bivariate association between MDE with severe role impairment and having a sibling currently serving in the military. However, this becomes non-significant in the multivariate model that includes the exogenous control variables and remains non-significant in the fully specified model. There are no significant associations between current parental military service status and MDE with severe role impairment among adolescents.

3.3. Mental health service utilization

Table 4 presents results of bivariate and multivariate logistic regression analyses of mental health service utilization. Results are presented for use of any mental health care, any specialty outpatient

mental health service, any specialty inpatient/residential mental health service, and any non-specialty mental health service. For each outcome, results from full models that include the measures of parental and sibling military service status, all of the control variables, and a control for one of the three MDE measures are presented. In all multivariate models, regardless of the measure of MDE used, the odds of using mental health services are substantially and significantly higher among those who have experienced a MDE than among those who have not experienced a MDE. Across the full set of models presented in Panels A to D, the odds of using mental health services net of other variables are between 2.74 and 5.88 times higher among adolescents who experienced a MDE as measured in the model than among adolescents who did not.

Panel A presents the results for use of any mental health care. As seen in Panel A, in all of the analyses, use of any mental health care is significantly higher among adolescents who have a parent currently serving in the military. Current sibling military service is not associated significantly with any use of mental health care in any of the analyses. Across the three multivariate models, adolescents who have a parent currently serving in the military are 21%–22% more likely to use mental health services net of other factors. To some extent, having a sibling currently serving in the military influences mental health service use indirectly due to its association with lifetime and past-year MDE, both of which are associated with substantial increases in use of mental health services.

Panels B to D present parallel analyses that focus on type of mental health service use: any specialty outpatient mental health service; any specialty inpatient/residential mental health service; and any non-specialty mental health service. While there is some variation in the pattern of results at the bivariate level, multivariate results for each mental health service subtype are consistent with those reported above for any mental health care. Current parental military service status is always significantly associated with an increased likelihood of using mental health services regardless of the subtype, and current sibling

Table 4

Logistic regress analysis of mental health service use by current parental and sibling military service status among 12–17 year old adolescents, pooled data from the 2016–2019 National Survey of Drug Use and Health (NSDUH)(N = 48,211).

PANEL A: ANY MENTAL HEALTH SERVICE USE													
	N ¹ Yes = 1	% Yes	[95% CI]	p	OR ²	[95% CI]	p	OR ²	[95% CI]	p	OR ²	[95% CI]	P
Parent Currently in the Military													
Yes	540	27.9	[25.5–30.4]	**	1.22	[1.09–1.38]	**	1.22	[1.07–1.38]	**	1.21	[1.07–1.37]	**
No	11,712	24.2	[23.7–24.7]	–	–	–	–	–	–	–	–	–	–
Sibling Currently in the Military													
Yes	605	25.9	[23.9–28.0]	–	0.99	[0.87–1.13]	–	1.02	[0.91–1.16]	–	1.05	[0.93–1.18]	–
No	11,647	24.3	[23.7–24.8]	–	–	–	–	–	–	–	–	–	–
Lifetime MDE	–	–	–	–	4.16	[3.87–4.47]	***	–	–	–	–	–	–
Past-Year MDE	–	–	–	–	–	–	–	4.24	[3.96–4.52]	***	–	–	–
MDE With Severe Role Impairment	–	–	–	–	–	–	–	–	–	–	5.02	[4.64–5.44]	***
PANEL B: ANY SPECIALTY OUTPATIENT MENTAL HEALTH SERVICE USE													
	N ¹ Yes = 1	% Yes	[95% CI]	p	OR ²	[95% CI]	P	OR ²	[95% CI]	p	OR ²	[95% CI]	p
Parent Currently in the Military													
Yes	309	16.0	[13.7–18.7]	–	1.27	[1.05–1.53]	*	1.26	[1.04–1.53]	*	1.24	[1.02–1.51]	*
No	6815	14.0	[13.6–14.4]	–	–	–	–	–	–	–	–	–	–
Sibling Currently in the Military													
Yes	343	13.9	[11.9–16.1]	–	0.89	[0.73–1.08]	–	0.93	[0.76–1.13]	–	0.95	[0.78–1.17]	–
No	6781	14.1	[13.7–14.5]	–	–	–	–	–	–	–	–	–	–
Lifetime MDE	–	–	–	–	5.11	[4.71–5.54]	***	–	–	–	–	–	–
Past-Year MDE	–	–	–	–	–	–	–	4.92	[4.54–5.34]	***	–	–	–
MDE With Severe Role Impairment	–	–	–	–	–	–	–	–	–	–	5.88	[5.41–6.38]	***
PANEL C: ANY SPECIALTY INPATIENT/RESIDENTIAL MENTAL HEALTH SERVICE USE													
	N ¹ Yes = 1	% Yes	[95% CI]	p	OR ²	[95% CI]	p	OR ²	[95% CI]	p	OR ²	[95% CI]	p
Parent Currently in the Military													
Yes	84	4.2	[3.2–5.6]	**	1.61	[1.17–2.22]	**	1.61	[1.17–2.20]	**	1.59	[1.15–2.19]	**
No	1279	2.6	[2.4–2.8]	–	–	–	–	–	–	–	–	–	–
Sibling Currently in the Military													
Yes	84	3.1	[2.5–3.9]	–	0.99	[0.78–1.25]	–	1.01	[0.80–1.27]	–	1.01	[0.80–1.27]	–
No	1279	2.6	[2.5–2.8]	–	–	–	–	–	–	–	–	–	–
Lifetime MDE	–	–	–	–	2.74	[2.35–3.19]	***	–	–	–	–	–	–
Past-Year MDE	–	–	–	–	–	–	–	2.90	[2.55–3.30]	***	–	–	–
MDE With Severe Role Impairment	–	–	–	–	–	–	–	–	–	–	3.66	[3.18–4.21]	***
PANEL D: ANY NON-SPECIALTY MENTAL HEALTH SERVICE USE													
	N ¹ Yes = 1	% Yes	[95% CI]	p	OR ²	[95% CI]	p	OR ²	[95% CI]	p	OR ²	[95% CI]	p
Parent Currently in the Military													
Yes	342	18.5	[16.5–20.6]	**	1.17	[1.02–1.33]	*	1.16	[1.01–1.34]	*	1.15	[1.01–1.32]	*
No	7708	15.9	[15.4–16.3]	–	–	–	–	–	–	–	–	–	–
Sibling Currently in the Military													
Yes	396	18.0	[16.1–20.0]	*	1.08	[0.91–1.27]	–	1.10	[0.94–1.30]	–	1.13	[0.96–1.32]	–
No	7654	15.9	[15.4–16.4]	–	–	–	–	–	–	–	–	–	–
Lifetime MDE	–	–	–	–	3.44	[3.17–3.72]	***	–	–	–	–	–	–
Past-Year MDE	–	–	–	–	–	–	–	3.46	[3.22–3.71]	***	–	–	–
MDE With Severe Role Impairment	–	–	–	–	–	–	–	–	–	–	3.75	[3.46–4.08]	***

Statistical Significance: * = p < 0.05; ** = p < 0.01; *** = p < 0.001.

1. N = un-weighted number of participants who used that type of mental health care service (yes = 1). All other analyses are weighted.
2. OR = odds ratio. Logistic regression model includes controls for: sex, age, race/ethnicity, education, criminal justice system involvement, self-rated health, living arrangements, family income, residential location, and survey year.

military service status is not associated with use of any subtype of mental health service use.

3.4. Supplemental analysis

It is possible that the observed associations between current parental military service status and mental health service use by adolescents reflect an underlying, general propensity to use health care services. To explore this possibility, I re-estimated each of the models presented in Table 4 with a control for any outpatient visit in the prior 12 months (=1) versus no outpatient visit in the prior 12 months (=0) included in the model. In all cases, having a parent currently serving in the military remained significantly associated with an increased odds of using mental health services. These supplemental analyses suggest that the association between having a parent currently in the military is

specifically associated with increased use of mental health services among 12–17 year old adolescents.

4. Discussion

This study adds to the literature in several important ways. First, findings indicate that 12–17 year old adolescents are more likely to have a sibling than a parent currently serving in the military (4.3% versus 3.6%). This finding based on nationally representative data differs from estimates reported on the basis of data collected in California, which suggest that, among adolescents, the ratio of parents to siblings currently serving in the military is approximately 2:1 (Cederbaum et al., 2014; Gilreath et al., 2013). Data that would allow for further documentation and investigation of current familial connections to the military and their consequences are generally not available in national

surveys, which generally have minimal information on households that include current military personnel and even less information on family members who live in other households or are deployed to the military (Chandra & London, 2013).

Second, although there is a substantial focus in the literature on the health and well-being of military children, most studies do not compare children in military families to children in veteran families, families with no connection to the military, or “civilian” families (i.e., veteran families and families with no connection to the military combined) (Cozza & Lerner, 2013). While military children and adolescents are policy-relevant populations and there are good reasons to focus attention exclusively on them, there are also good reasons to conduct research that compares military, veteran, and non-military children and adolescents. Somewhat unexpectedly and counter to what was hypothesized, findings from this study indicate that adolescents who have a parent currently serving in the military are no more likely to have a lifetime MDE, a past-year MDE, or experience MDE with severe role impairment than adolescents who do not have a parent currently serving in the military. A number of factors might have contributed to this observed equivalence, including the possibility that distress associated with parental participation in the military is manifested in ways that are not measured by MDE. Another factor may be the presence of heterogeneous and countervailing risk and resilience factors among adolescents in military and non-military families that, on balance, result in comparable levels of MDE risk. Adolescents with a parent currently in the military undoubtedly face unique stressors that are not faced by adolescents who do not have a parent in the military (Chandra et al., 2010; Lester & Flake, 2013; MacDermid Wadsworth et al., 2017; Sullivan et al., 2019). However, there are some stressors that are unique or more prevalent among adolescents who do not have a parent in the military (e.g., lack of access to needed health care). Comparative research that comprehensively and consistently measures stress exposure across subgroups of adolescents whose parents have direct (active duty), indirect (veteran), and no ties to the military would contribute greatly to our understanding of MDE and other mental health outcomes among adolescents.

A third contribution of the current study is the finding that having a sibling currently serving in the military is consistently associated with an increased risk of lifetime and past-year MDE, but not MDE with severe role impairment, in both bivariate and multivariate analyses. This is the first national study to document these associations. These findings differ somewhat from findings based on analyses of data from California, which merits some discussion (Cederbaum et al., 2014). Consistent with the current study, the California study documented that having a sibling currently in the military was associated more consistently with feeling sad or hopeless, suicidal ideation, well-being, and depressive symptoms than having a parent currently serving in the military. In bivariate analyses, sibling military status was associated with all four outcomes, while parental military status was only associated with suicidal ideation. Controlling for deployment status in the prior 10 years, along with grade, gender, and race/ethnicity, reduced all of the sibling associations to non-significance; in multivariate analyses, parental military status was associated significantly with lesser well-being. While this analytic approach was justified based on the fact that some adolescents with no parent currently in the military had a veteran family member who had deployed in the prior decade, including number of deployments in the model is highly collinear with having a parent or sibling currently in the military: 81.6% of those with no family member currently in the military had zero deployments, compared to 16.6% of those with a parent currently serving in the military and 37.3% of those with a sibling in the military. Unfortunately, these investigators do not report results from multivariate models that do not include number of deployments, which would have allowed for more direct comparison with the findings reported in the current study. A similar analytic concern emerges in another study using the data from California, which focuses on substance use outcomes (Gilreath et al., 2013).

The final substantive contribution of this study relates to differential

access to mental health services based, in part, on differential access to institutional resources (London & Heflin, 2015). As hypothesized, in bivariate analyses and multivariate models that control for a broad range of sociodemographic characteristics and either lifetime MDE, past-year MDE, or MDE with severe role impairment (each measure included in a separate model), adolescents with a parent currently in the military were more likely to use specialty outpatient, specialty inpatient/residential, and non-specialty mental health services, while adolescents with a sibling currently serving in the military did not have differential use. However, because it is associated with increased lifetime and past-year MDE, both of which substantially increase use of mental health services, having a sibling currently serving in the military increases mental health service use indirectly. It is conceivable that the higher use of mental health services among those with a parent serving in the military is related to distress and mental health problems other than MDE, which are not present among adolescents with a sibling currently serving in the military, and/or greater access to mental health services as a result of being a dependent child of a parent who is currently serving in the military.

This study conceptualizes parental and sibling military service as potentially different stressors among adolescents, and measures associations of these stressors with well-validated measures of MDE. This study also examines whether, net of MDE and other sociodemographic factors, adolescents' access to resources (i.e., mental health treatment) differs in response to how adolescents are situated as a result of parental versus sibling connection to the military. Although this study makes policy-relevant contributions by pointing to the vulnerability of adolescents who have a sibling currently serving in the military, it has a number of limitations. These include: the focus on a single mental health diagnosis (MDE); the inclusion of the Reserve components and National Guard in the definition of military provided to participants who requested a definition of “military”; non-measurement of parental and sibling veteran status; lack of information on the military service experiences of parents and siblings (e.g., number of deployments, combat exposure); and lack of a systematic assessment of stressors consistently obtained from all adolescents regardless of parental and sibling military service status.

The results reported in this paper document robust associations between having an older sibling currently serving in the military and both lifetime and past-year MDE among 12–17 year old adolescents. However, it is important to note that it is not possible to ascertain with cross-sectional data when the younger sibling's lifetime, and to some extent past-year, MDE occurred in relation to their older sibling's current military service. Moreover, there may be unmeasured factors that are associated with both increased MDE among younger siblings and increased entry into the military among older siblings. There is a need for future data collection that addresses these issues and research that more directly identifies the mechanisms by which parental and sibling military service experiences affect adolescent well-being and mental health service use. A better understanding of how the current military service experiences of parents and siblings influences adolescent mental health, mental health care service use, substance use, and health behaviors has the potential to contribute to programs and interventions that can enhance the well-being of military-connected adolescents (Chandra et al., 2010; Cozza & Lerner, 2013; Huebner, 2019; MacDermid Wadsworth et al., 2017; Sullivan et al., 2019). The results presented in this paper suggest that adolescents who have a sibling currently serving in the military are an at-risk subpopulation for whom assessment and intervention development is warranted.

Author statement

I am the sole author of this article. I am responsible for all aspects of the paper, including the conceptualization of the problem, the literature review, the data analysis, and interpretation of the results.

Ethical statement

This research is based on anonymized public-use data and therefore qualifies as exempt from human subject research review.

Declaration of competing interest

None.

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