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Utilization of and Barriers to Treatment Among Suicide Decedents: Results From the Army Study to Assess Risk and Resilience Among Servicemembers (Army STARRS)

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Objective: To examine suicide decedents' use of mental health treatment and perceived barriers to initiating and maintaining treatment. ***Method:*** We used a psychological autopsy study conducted as part of the Army Study to Assess Risk and Resilience Among Servicemembers (Army STARRS) that compared suicide decedents (n = 135) to soldiers in two control conditions: those propensity-score-matched on known sociodemographic and Army history variables (n = 137) and those with a history of suicidal thoughts in the past 12 months (n = 118). Informants were next of kin and Army supervisors. ***Results:*** Results revealed that suicide decedents were significantly more likely to be referred to services and to use more intensive treatments (e.g., medication, overnight stay in hospital) than propensity-matched controls. However, decedents also were more likely to perceive significant barriers to treatment-seeking. All differences observed in the current study were between propensity-matched controls and decedents, with no observed differences between suicide ideators and decedents. ***Conclusions:*** Many suicide decedents used some form of mental health care at some point in their lives; however, they also were more likely than propensity-matched controls to perceive barriers that may have prevented service use. The lack of differences between suicide ideators and decedents suggests that more information is needed, beyond knowledge of treatment utilization or perceived barriers, to identify and intervene on those at highest risk for suicide. These findings underscore the importance of reducing attitudinal barriers that may deter suicidal soldiers from seeking treatment, and also improving risk detection among those who are attending treatment.

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continued

What is the public health significance of this article?

Prior studies have suggested that many suicide decedents have no contact with mental health care providers in the months preceding their deaths; however, these studies have relied largely on care that is documented in medical records. We sought to better understand treatment utilization (including those not commonly documented such as the use of crisis hotlines and clergy) and perceived barriers to initiating and maintaining treatment among soldiers who died by suicide using a psychological autopsy study. Although suicide decedents were more likely to utilize intensive treatment options compared to propensity-matched controls, they were also more likely to perceive attitudinal barriers to treatment, highlighting the continued importance of addressing stigma to ensure at-risk soldiers seek the help they need.

Keywords: mental health, suicidal, stigma, barriers, military

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The rate of suicide in the U.S. Army has steadily increased in recent years (Schoenbaum et al., 2014). Recent estimates indicate that nearly 24 per 100,000 soldiers die by suicide (Pruitt et al., 2016), exceeding the suicide rate in the general U.S. population for the first time in decades (Kuehn, 2009; Nock et al., 2013). Given this concerning trend, suicide prevention has become an increasingly urgent priority for the Army.

Despite the general widespread availability of health care in the Army, and an increase in suicide prevention initiatives like screening and training of gatekeepers (Zamorski, 2011), ensuring that at-risk soldiers are identified and subsequently receive treatment remains a challenge. For instance, previous research found that approximately half of all service members who died by suicide had contact with the health care system in the month prior to their death (Ribeiro et al., 2017; Trofimovich, Skopp, Luxton, & Reger, 2012). In contrast, only about one quarter (28%) of these suicide decedents interacted with a mental health care provider in the month prior to their death (Ribeiro et al., 2017). These findings highlight the importance of understanding why some at-risk individuals do not seek out health care services, and particularly, mental health services, in the months preceding their suicide deaths, given these encounters may represent critical opportunities for intervention.

Unfortunately, many people at risk may not seek or maintain health care services they need due to attitudinal (e.g., stigma) and structural (e.g., unavailability of treatment) barriers (Andrade et al., 2014; Mojtabai et al., 2011). Stigma is perhaps the most widely studied attitudinal barrier, and is commonly reported as a reason for not seeking mental health services both within and outside the military (Britt et al., 2008; Greene-Shortridge, Britt, & Castro, 2007; Hoge et al., 2004; Hom, Stanley, Schneider, & Joiner, 2017; Mojtabai et al., 2011; Valenstein et al., 2014; Zinzow et al., 2013). Specific to the military, service members have reported concerns about the stigma of receiving mental health care, including being perceived as weak or being treated differently by unit leaders or peers (e.g., Gorman, Blow, Ames, & Reed, 2011; Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009). Other research has described concerns about stigma related to service members' careers, including concerns about having mental health care documented in their military records (e.g., Gorman et al., 2011; Valenstein et al., 2014) and, relatedly, that their use of these services would negatively affect their military careers (e.g., ability to redeploy or earn promotions; Gorman et al., 2011; Hoge et al., 2004; Pietrzak et al., 2009). In addition to stigma, negative attitudes toward treatment, including belief that treatment does not work, lack of trust in mental health professionals, or the belief that

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getting mental health treatment should be a last resort, are also cited as attitudinal barriers to treatment among service members (e.g., Gorman et al., 2011; Kim, Britt, Klocko, Riviere, & Adler, 2011). Finally, lack of perceived need for treatment and a desire to handle problems on one's own are frequently listed as a common reason for both not seeking treatment and for discontinuing ongoing treatment services among military personnel (e.g., Naifeh et al., 2016; Stecker, Fortney, Hamilton, & Ajzen, 2007).

Beyond attitudinal barriers, structural barriers to treatment seeking have also been examined (e.g., inconvenience, lack of time, transportation, unavailability of treatment, not knowing where to go to get help; Britt et al., 2008; Hoge et al., 2004; Mojtabai et al., 2011). However, attitudinal barriers are typically weighed as much more important than structural by individuals considering initiation or continuation of treatment (Mojtabai et al., 2011; Naifeh et al., 2016). In fact, in a longitudinal study testing predictors of treatment seeking among soldiers, Adler, Britt, Riviere, Kim, and Thomas (2015) found that attitudes toward treatment was the only barrier that significantly predicted whether soldiers sought out treatment postdeployment. That is, soldiers with negative attitudes toward treatment (e.g., "I do not trust mental health professionals") or who reported a desire to handle one's own problems without treatment were less likely to seek services, whereas those reporting favorable beliefs about treatment (e.g., "Mental health counseling can be helpful for those who need it") were more likely to utilize services (Adler et al., 2015).

Although prior studies have provided valuable information about health care utilization and barriers to treatment seeking by service members, several important questions remain unanswered. First, though the existence of both attitudinal and structural barriers to treatment appears to be well-established among general samples of service members, little is known about how these barriers may have influenced the decisions to forego treatment among service members who died by suicide. Prior research suggesting that the perception of treatment barriers may be highest among those with the most severe symptoms supports an explicit focus on suicide decedents beyond general samples of service members (Hoge et al., 2004). Second, prior research has relied primarily on documentation of use of military health care services (e.g., Ribeiro et al., 2017), which does not include the wider range of services that suicide decedents may have accessed prior to their death (e.g., use of civilian mental health services, counseling with a religious leader). Given that service members and veterans often use services outside of military health care settings where they would not be documented in their military records (e.g., talking to a chaplain, attending nonmilitary/VA health care facilities; Elbogen et al., 2013; Gorman et al., 2011), it is important to examine the extent to which suicidal soldiers may rely on these types of services as well.

In this study, we examine treatment utilization and barriers to treatment seeking among suicide decedents in the U.S. Army. We did so using a psychological autopsy study conducted as part of the Army Study to Assess Risk and Resilience Among Servicemembers (Army STARRS). Army STARRS is a large, epidemiological study that is comprised of several distinct components (see *www.starss-ls.org* for more information). Although many prior articles have been published from other components of Army STARRS, the results from the psychological autopsy study reported in this article have been presented in only one prior article on the association between mental disorders and suicide (Nock et al., 2017), and the current results focused on treatment utilization and barriers are novel and do not overlap with those presented in any prior Army STARRS papers. The Army STARRS psychological autopsy study was designed to compare suicide decedents to soldiers in two different control conditions: (a) those propensity-score-matched on known sociodemographic and Army history variables and (b) those with a history of suicidal thoughts in the past 12 months but who did not die by suicide. In the current article, these two control conditions allowed us to examine what treatment related factors might be predictive of suicide death above and beyond known risk factors and the presence of suicidal thoughts, respectively.

Method

Sample

In the current study, cases (i.e., suicide decedents) were U.S. Army soldiers who died by suicide while on active duty between August 1, 2011, and November 1, 2013. This sample excluded soldiers in the Army Reserve and National Guard. In addition, soldiers who died by suicide while deployed supporting Operation Enduring Freedom and Operation Iraqi Freedom (Afghanistan, Iraq, and Kuwait), were excluded from the study, given these soldiers were also excluded from the pool of available control soldiers based on the design of Army STARRS. For each suicide decedent included in the study (n = 135; 46.6% of the cases who died by suicide during this period), we interviewed a next of kin (e.g., close family members, usually the spouse or a parent), and/or first line Army supervisor. Excluded cases (n = 155) did not differ from the included cases on demographic (e.g., age, sex, race/ethnicity, marital status) or Army variables (e.g., rank, age of entry into Army).

We then selected two unique groups of control soldiers. First, drawing from a large sample (N = 5,428) of representative soldiers who participated in the Army STARRS All Army Study (AAS; Ursano et al., 2014), we used propensity score matching to select a set of controls (n = 137) matched to Army suicide decedents from 2004 to 2009 on a number of variables, including: year/month person record, demographics (i.e., sex, age, race/ethnicity, marital status, number of dependents, education, religion), Army career variables (i.e., rank, age at Army entry, number of times demoted, number of months since last demotion, number of times promoted, number of months since last promotion, Armed Forces Qualification Test score, current or previous stop-loss, number of episodes of continuous service, count of total months in Army), and deployment/combat experiences (e.g., deployment status, number of months since last deployment, number of prior injuries).

Second, to identify predictors that distinguish those who die by suicide from those who think about suicide but do not kill themselves, we selected another set of controls who endorsed suicidal ideation in the past 12 months (n = 118) per self-report responses in the AAS. For both sets of controls (i.e., propensity-method and 12-month ideators), participants were sampled with replacement (no duplicate participants were present in our final analytic control samples). Selected controls did not differ from eligible nonselected soldiers on sex, marital status, race/ethnicity or age of entry into the Army. They did differ slightly on a few variables (i.e., controls were slightly older, had more dependents, were higher rank, and had higher level of education), but these effects were small in magnitude (rs = .09–.18).

Recruitment Procedures

Cases. From January 2012 to March, 2014, families of soldiers who had died by suicide within the past 2–3 months were contacted by the Army Casualty and Mortuary Affairs Operation Center to ask about their interest in being contacted by a member of our research team to learn about the study. Of the 290 families contacted during this process, 101 next of kin were identified, though two were ineligible due to a language barrier or being deceased. Of eligible next of kin (n = 99), the majority (n = 61; 61.6%) completed an interview, 13 (12.1%) refused to participate, and 25 (25.3%) could not be reached. In addition to next of kin, first line Army Supervisors were identified by the Office of the Deputy Undersecretary of the Army. Of the 213 supervisors identified by the Office of the Deputy Undersecretary of the Army, 59 indicated they did not know the decedent and were deemed ineligible. Among eligible supervisors (n = 154), 107 (69.5%) agreed to participate, 7 (4.5%) refused to participate, and 40 (26.0%) could not be reached.

Controls. Using our matching procedures, Army soldiers (n = 738) were invited to participate in this study via e-mail or telephone. Of these invited soldiers, 293 (39.7%) completed a screener and identified a next of kin and supervisor, 110 (14.9%) refused to participate, and 335 (45.4%) did not respond and could not be reached. A total of 236 next of kin were identified by controls, most of whom completed interviews (n = 236, 80.5%). Of the remaining next of kin, 5.8% (n = 17) refused to participate and 13.7% (n = 40) could not be reached or did not complete an interview. A total of 293 supervisors were also identified, though 30 were deemed ineligible after indicating they did not know the identified control. Of the eligible supervisors (n = 263), most completed an interview (n = 153, 58.2%). Of the remaining supervisors, 9.5% (n = 25) refused to participate and 35.0% (n = 92) could not be reached or did not complete an interview. Response rates and survey completion rates were similar for both sets of controls (i.e., propensity-matched and ideators). The recruitment, consent, and data protection procedures in the above surveys were approved by the human subjects committees of Harvard University (Harvard University Area Institutional Review Board Number F18173; Harvard Medical School Institutional Review Board Number M18189) and all other collaborating organizations.

Measures

Data were gathered using a structured psychological autopsy interview developed for use in the current study. This interview was created using a multistep measure-development procedure that involved (a) comprehensive literature reviews of prior autopsy studies; (b) review of measures used in these prior studies; (c) following recommendations regarding best practice procedures for autopsy studies (i.e., Conner et al., 2011, 2012); (d) as possible, paralleling the assessment of constructs in other Army STARRS studies to more easily allow for comparison across study components; and (e) as possible, paralleling the questions asked of next of kin and supervisors to allow for comparisons across informants. The interview included 26 sections assessing a wide range of potential risk and protective factors for suicide (e.g., mental disorders, prior suicidal behavior). Informants (i.e., next of kin and supervisors) were interviewed about either the deceased (cases) or living (controls) soldiers identified for this study. We have previously reported findings from this dataset regarding the association between mental disorders, prior self-injurious behavior, and suicide death (Nock et al., 2017). In this study, we investigate differences between cases and controls in prior treatment utilization, including potential barriers to treatment-seeking and reasons for discontinuation of services. Other constructs assessed in this autopsy study will be reported on in future, separate articles.

Treatment history. We assessed soldiers' prior utilization of treatment using items adapted from the Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel (Bray et al., 2009) and prior research (Hoge et al., 2004), along with items created for the purposes of this study. These items assessed soldiers' use of a variety of mental health services (e.g., self-help group, telephone hotline, psychological counseling, pharmacological treatment, hospitalizations) over the lifetime. We also assessed their use of some services (e.g., attending psychological counseling) in the 30 days preceding the soldiers' suicide death for cases (past 30 days for controls). Additionally, we collected information on whether soldiers had sought these services within a military facility (including the VA) or at civilian facilities.

Barriers to treatment-seeking. We assessed potential factors affecting soldiers' willingness to receive mental health counseling or services using items adapted from the Joint Mental Health Advisory Team 7 (2011) and from prior research (Hoge et al., 2004; Kessler, 2007). Informants were asked to report on factors that may have prevented soldiers from seeking out services ("Do you think the following factors might have prevented [soldier's name] from receiving mental health counseling or services if he/she ever had a problem?"). Items primarily assessed for stigma-related barriers to treatment (e.g., concern about treatment harming career; concerns about being seen as weak). Additionally, we assessed for structural/organizational barriers such as whether or not mental health services were available.

Discontinuation of services. For soldiers who received mental health counseling or services at some point in his or her life, we also assessed for whether or not those individuals had ever stopped going to treatment ("You mentioned that he/she received mental health counseling or services at some point in his/her life. Had/has he/she ever stopped going to treatment?"). We assessed for several factors that may have been involved in treatment discontinuation, including whether soldiers believed the problem was getting better and no longer needed help, or the cost of treatment. These items were adapted for use from prior research (Hoge et al., 2004; Kessler, 2007).

Interviewer Training

Professional lay-interviewers from the Survey Research Center in the Institute for Social Research at the University of Michigan conducted the informant telephone interviews. These interviewers each completed a General Interviewer Training course, and also periodically completed refresher courses throughout the data collection time period to prevent interviewer drift (Heeringa et al., 2013).

Statistical Procedure

Sample weights. The sample was weighted to adjust for selection bias. We developed poststratification weights using known population information gathered from the Army snapshot dataset, which is a monthly picture of demographic information of all Army soldiers based on predictors of suicide identified in administrative records within the Historical Administrative Data Study (Schoenbaum et al., 2014). Separate weights were calculated for each of the three groups included in the study (i.e., cases, propensity-matched controls, and 12-month ideator controls). To create poststratification weights, we first included relevant variables (e.g., demographic and Army-related variables) in a forward stepwise regression model to select important variables predicting participation in the study. Next, we modified the weights to reflect the respective population distribution (i.e., the population of all deaths in the Army for cases, the entire AAS population for propensity-matched controls, the population of the AAS with past 12-month ideation for ideator controls) on the regression variables. Finally, we trimmed large weights and normalized these weights to reflect original sample size counts.

Data analysis. Prior to primary analyses, we compared cases and controls on demographic and Army history variables using Wald χ^2 tests, also estimating odds ratios and 95% confidence intervals. Variables that emerged as significantly different from these comparisons (for next of kin: deployment status, number of years of active service; for supervisors: deployment status) were retained as covariates in all subsequent analyses (see Table 1 in the online supplemental materials).

To investigate differences between cases and controls on lifetime treatment utilization and barriers to treatment, we conducted a series of univariable logistic regression analyses (i.e., each item presented in Tables 1–3 entered into separate regression equations) predicting case status (no/yes) for both control groups. Coefficients were exponentiated from these models to create odds ratios with 95% confidence intervals. We conducted analyses separately for each group of informants (i.e., next of kin and supervisors), given they often have access to different types of information (e.g., next of kin about lifetime treatment history and supervisors about more recent treatment or treatment within military health care system). To correct for multiple comparisons, we implemented a false discovery rate (Benjamini & Hochberg, 1995), taking a conservative approach by simultaneously adjusting all p values presented in Tables 1–3, using the *p.adjust* function in R (R Studio Team, 2015). False-discovery-rate-corrected p values are reported in Tables 1–3.

Our main focus was on lifetime treatment utilization and barriers to treatment. We also had data available for past 30-day use of treatment, but had many small cell sizes that precluded comparisons between groups in many cases (i.e., $n = 0$), or that resulted in likely unstable estimates (i.e., cell sizes $n < 5$). Thus, these results should be interpreted with caution, and we predominantly focus on our lifetime results. However, we include these results in supplemental materials for transparency and reference (see Tables 2a and 2b in the online supplemental materials).

Results

Treatment History

As reported by next of kin, soldiers who died by suicide were more likely to have been referred to a mental health specialist over their lifetime than were propensity-matched controls (Table 1). Examination of overall lifetime history of treatment revealed that suicide decedents also were more likely than propensity-matched controls to have received a prescription/medication or been admitted to an overnight stay in a hospital for mental health problems. All of these observed differences were even more pronounced when examining just the past 30 days (Table 2a in the online supplemental materials). There were no other differences in the lifetime type of treatments received between suicide decedents and propensity-matched controls, including psychological counseling/therapy or other services unlikely to be documented in medical records, such as self-help groups, Internet support groups, or hotlines. There were no differences between soldiers who died by suicide and those with suicidal thoughts in the lifetime receipt of any type of treatment.

Examination of specific types of treatment providers seen revealed that suicide decedents were significantly more likely to have seen a mental health professional at a military facility than were propensity-matched controls (Table 1). There were no differences in the receipt of treatment from any other specific types of provider. There also were again no significant differences in treatment receipt between suicide decedents and suicide ideators.

A similar pattern emerged when examining supervisor reported lifetime history of treatment. Like next of kin, supervisors indicated the higher likelihood of suicide decedents compared to propensity-matched controls to be referred to a mental health specialist, to have received a prescription/medication, and to have been hospitalized than propensity-matched controls (Table 1). These effects were also more pronounced during the past 30 days (Table 2b in the online supplemental materials). Differing from next-of-kin reports, supervisors also noted the higher likelihood of suicide decedents than propensity-matched controls to attend psychological counseling, to attend self-help groups, and to utilize a greater variety of treatment providers at both military and civilian facilities. Specifically, their reports coincided with next-of-kin reports that suicide decedents were more likely to have received treatment at a military facility from mental health professionals than propensity-matched controls, but in addition, supervisors reported suicide decedents' significantly higher use of military medical doctors, chaplains, and support from civilian providers (i.e., clergy/spiritual advisors). As with next-of-kin reports, no significant differences emerged when comparing suicide decedents to recent suicide ideators.

Barriers to Treatment-Seeking

As reported by next of kin, suicide decedents experienced more perceived barriers to treatment than did propensity-matched controls (Table 2). In fact, next of kin of suicide decedents were more likely to endorse the presence of 10 of the 13 different perceived barriers assessed. The largest effects were reported for the following barriers: concerns about loss of confidence from members of unit, concerns about being seen as weak, and concerns that treat-

Table 1
Mental Health Treatment History

Treatment history variables	Next-of-kin report										Supervisor report								
	Cases, (N = 61)	Controls (propensity), (n = 128)				Controls (12-month ideation), (n = 108)				Cases, (N = 107)	Controls (propensity), (n = 80)				Controls (12-month ideation), (n = 73)			
	Yes %	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	*OR*	[95% CI]	p_{fdr}
Lifetime history of treatment																		
Referred to a mental health specialist	70.4	32.9	4.6	[2.3, 9.0]	.0011	42.2	2.9	[.7, 11.4]	.3542	54.3	24.0	3.8	[2.2, 6.6]	.0011	34.9	2.2	[.5, 10.1]	.6618
Had a session of psychological counseling/therapy that lasted ≥30 min with any type of professional	61.7	47.1	1.9	[1.0, 3.6]	.2066	59.6	1.1	[.3, 4.1]	.9945	48.0	23.3	3.2	[1.8, 5.6]	.0011	40.5	1.5	[.3, 6.4]	.9223
Received a prescription/medicine for emotions, nerves, or mental health (or substance use) from any type of medical doctor	51.7	23.2	3.6	[1.8, 6.9]	.0017	39.2	1.7	[.4, 6.5]	.8335	36.5	10.0	5.4	[2.7, 10.9]	.0011	22.0	2.2	[.4, 12.5]	.7548
Admitted to an overnight stay in a hospital/facility for emotions, nerves, mental health, or use of alcohol or drugs	29.1	6.8	4.2	[1.8, 9.9]	.0065	18.6	1.3	[.2, 6.4]	.9477	22.0	3.7	6.9[a]	[2.5, 19.3]	.0017	15.1	1.6	[.2, 12.5]	.9453
Used self-help group for help with emotions/nerves	21.3	13.5	1.3	[.6, 2.9]	.8958	16.4	1.0	[.2, 6.5]	.9945	20.6	5.4	5.6	[2.3, 13.8]	.0017	12.2	2.2	[.2, 19.9]	.8607
Used Internet support group/chat room to get help for problems with emotions/nerves	4.0	4.7	.6[a]	[.1, 2.8]	.8623	1.1	3.9[a]	[.0, >1,000]	.9453	4.5	1.4	3.0[a]	[.5, 16.4]	.5226	4.0	1.0[a]	[.0, 42.2]	.9945
Used a hotline for problems with emotions/nerves	3.1	3.4	.8[a]	[.2, 4.6]	.9800	1.7	2.0[a]	[.0, 224.7]	.9477	2.9	1.0	2.1[a]	[.3, 16.4]	.8607	1.4	1.9[a]	[.0, 791.8]	.9800
Type of service provider seen																		
Mental health professional at military facility	47.8	23.6	2.8	[1.5, 5.4]	.0111	38.8	1.4	[.3, 5.5]	.9453	44.7	19.5	3.4	[1.9, 6.1]	.0011	39.9	1.3	[.3, 5.7]	.9477
General medical doctor at military facility	31.3	13.6	2.6	[1.2, 5.7]	.0733	21.4	1.6	[.3, 7.7]	.8958	28.5	9.7	3.6	[1.7, 7.5]	.0061	22.3	1.4	[.2, 8.1]	.9453
Military chaplain	36.2	20.0	1.8	[.9, 3.6]	.3143	28.2	1.2	[.3, 5.2]	.9477	31.2	10.2	3.7	[1.8, 7.6]	.0023	16.8	2.2	[.3, 14.5]	.8335
Medic in his/her unit	6.3	2.5	3.1[a]	[.7, 13.3]	.3394	4.8	1.5[a]	[.1, 28.8]	.9477	12.2	3.9	2.7[a]	[.9, 8.0]	.2390	6.8	1.5	[.1, 26.3]	.9477
Self-help support group at a military facility	18.9	11.4	1.6	[.7, 3.8]	.6312	9.1	2.6	[.3, 25.4]	.8280	11.9	8.2	1.6	[.7, 3.8]	.6618	7.4	1.8	[.1, 27.0]	.9453
Mental health professional at a civilian facility	25.0	16.9	1.6	[.7, 3.5]	.5335	23.1	1.0	[.2, 4.5]	.9945	18.2	7.1	3.0[a]	[1.3, 6.9]	.0554	13.1	1.5	[.2, 12.8]	.9453
General medical doctor at a civilian facility	7.9	8.6	1.0	[.3, 3.0]	.9945	8.9	.9	[.1, 9.0]	.9945	7.2	.6	13.2[a]	[1.2, 144.9]	.1488	3.6	2.1[a]	[.0, 95.7]	.9453
Civilian clergy or spiritual advisor	6.3	19.6	.4[a]	[.1, 1.1]	.2620	11.9	.5[a]	[.1, 4.2]	.8623	12.9	2.2	6.0[a]	[1.6, 22.4]	.0386	4.4	3.2	[.1, 100.9]	.8623
Civilian self-help support group	3.1	1.6	2.4[a]	[.4, 15.8]	.7424	2.5	1.4[a]	[.0, 82.8]	.9934	5.0	3.0	1.3[a]	[.3, 5.1]	.9453	1.6	3.0[a]	[.0, 924.4]	.9453

Note. *OR* = odds ratio; CI = confidence interval; fdr = false discovery rate. *p* values have been corrected using fdr. Next-of-kin report analyses controlled for deployment status and years of active service; supervisor report analyses controlled for deployment status (see Table 1 in the online supplemental materials).
[a] Unstable estimate involving cell sizes $n < 5$.

Table 2
Barriers to Treatment-Seeking

	Next-of-kin report									Supervisor report								
	Cases, (N = 61)	Controls (propensity), (n = 128)				Controls (12-month ideation), (n = 108)				Cases, (N = 107)	Controls (propensity), (n = 80)				Controls (12-month ideation), (n = 73)			
Treatment barrier	Yes %	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	*OR*	[95% CI]	$\boldsymbol{p_{fdr}}$
Lack of trust in mental health professionals	38.4	10.6	4.2	[2.0, 9.0]	.0017	9.9	4.4	[.6, 34.2]	.4172	16.9	6.1	3.4	[1.4, 8.1]	.0386	6.6	3.1[a]	[.2, 53.1]	.8335
Lack of availability of mental health services	8.5	1.5	2.1[a]	[.3, 14.2]	.8335	1.1	3.2[a]	[.0, >1,000]	.9453	1.7	.0	—	—	—	.0	—	—	—
Seeking treatment too embarrassing	52.3	23.6	3.3	[1.7, 6.4]	.0023	20.8	3.6	[.8, 17.4]	.3205	18.7	9.0	2.7	[1.2, 5.9]	.0660	19.3	1.1	[.2, 6.9]	.9945
Concerns that treatment would harm career	59.6	22.2	4.8	[2.5, 9.2]	.0011	22.4	4.8	[1.0, 22.1]	.1826	15.8	9.9	1.9	[.9, 4.1]	.3394	12.9	1.3	[.2, 11.4]	.9477
Concerns about loss of confidence from members of unit	58.6	22.0	5.9	[3.0, 11.6]	.0011	24.7	5.6	[1.1, 27.8]	.1500	21.6	12.6	2.1	[1.0, 4.2]	.1600	25.3	.9	[.2, 4.8]	.9945
Concerns about being treated differently by leadership	61.9	27.0	4.5	[2.4, 8.6]	.0011	32.3	4.2	[.9, 18.5]	.2155	14.5	9.7	1.7	[.8, 3.7]	.5156	25.6	.5	[.1, 3.0]	.8607
Concern about being blamed by leaders for having problems	46.0	18.1	4.1	[2.1, 7.9]	.0011	21.4	3.1	[.7, 14.5]	.3915	7.5	8.4	1.0	[.4, 2.6]	.9945	14.4	.5	[.1, 4.6]	.8976
Concerns about being seen as weak	73.3	34.8	5.5	[2.8, 11.0]	.0011	37.9	5.6	[1.3, 23.9]	.0879	24.1	11.7	2.3	[1.1, 4.7]	.0879	23.4	1.0	[.2, 5.5]	.9945
Concern about treatment affecting security clearance	50.2	25.4	3.0	[1.6, 5.8]	.0061	21.6	4.4	[.9, 21.3]	.2390	10.4	12.9	.7	[.3, 1.6]	.8280	12.8	.9	[.1, 7.6]	.9945
Leaders discourage the use of mental health services	32.6	10.6	4.2	[2.0, 8.8]	.0011	17.3	2.4	[.5, 12.6]	.6508	4.1	1.6	3.0[a]	[.6, 16.1]	.4808	5.7	.8[a]	[.0, 18.7]	.9945
Concerns about medicine interfering with job ability	45.5	14.9	4.2	[2.1, 8.2]	.0011	16.1	4.5	[.8, 24.2]	.2620	16.1	9.7	1.7	[.8, 3.8]	.4673	15.3	1.1	[.1, 8.0]	.9945
Belief that psychological problems tend to work themselves out without help	37.1	36.5	1.2	[.6, 2.3]	.8958	23.1	2.3	[.5, 10.1]	.6508	16.1	11.9	1.5	[.7, 3.2]	.6736	13.1	1.2	[.1, 10.3]	.9934
Belief that getting mental health treatment should be a last resort	49.7	34.8	2.1	[1.1, 4.0]	.1040	24.9	3.6	[.8, 15.9]	.2995	16.6	9.0	2.2	[1.0, 4.9]	.1949	17.9	1.0	[.1, 6.5]	.9945

Note. *OR* = odds ratio; CI = confidence interval; fdr = false discovery rate. *p* values have been corrected using fdr. Next-of-kin report analyses controlled for deployment status and years of active service; supervisor report analyses controlled for deployment status (see Table 1 in the online supplemental materials).
[a] Unstable estimate involving cell sizes $n < 5$.

Table 3
Reasons for Discontinuation of Treatment Among Soldiers Receiving Treatment Over Lifetime

Reason for discontinuing treatment	Next-of-kin report										Supervisor report								
	Cases, (N = 61)	Controls (propensity), (n = 128)				Controls (12-month ideation), (n = 108)					Cases, (N = 107)	Controls (propensity), (n = 80)				Controls (12-month ideation), (n = 73)			
	Yes %	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	*OR*	[95% CI]	p_{fdr}		Yes %	Yes %	*OR*	[95% CI]	p_{fdr}	Yes %	*OR*	[95% CI]	p_{fdr}
Didn't need help anymore or thought problem got better	32.6	32.7	1.0	[.5, 2.0]	.9945	35.6	.8	[.2, 3.0]	.9468		9.6	11.5	.8	[.3, 1.8]	.8976	11.6	.9	[.1, 8.5]	.9945
Thought that treatment would not work	24.4	8.3	3.7	[1.6, 8.6]	.0130	13.0	2.1	[.3, 13.9]	.8335		5.0	3.5	1.5[a]	[.4, 5.6]	.8623	.5	11.3[a]	[.0, >1,000]	.9223
Thought problems could be handled without treatment	40.7	29.5	1.8	[.9, 3.4]	.2733	26.7	1.8	[.4, 7.5]	.8335		8.6	5.4	1.7	[.6, 4.7]	.6736	6.9	1.5	[.1, 26.5]	.9477
Talked to friends or relatives instead	21.8	20.2	1.2	[.6, 2.6]	.8976	20.6	1.2	[.2, 5.8]	.9800		9.6	7.2	1.4	[.5, 3.5]	.8623	6.3	1.7[a]	[.1, 32.0]	.9468
Difficulties with time, transportation, or scheduling of treatment	13.4	6.9	2.1	[.8, 5.3]	.3843	8.6	1.7	[.2, 15.7]	.9223		3.3	4.0	.9[a]	[.2, 3.5]	.9934	1.6	2.5[a]	[.0, 730.5]	.9477
Thought treatment cost too much money	1.6	.9	2.0[a]	[.2, 25.3]	.9219	2.1	.8[a]	[.0, 71.4]	.9945		.8	.0	—	—	—	.0	—	—	—

Note. *OR* = odds ratio; CI = confidence interval; fdr = false discovery rate. *p* values have been corrected using fdr. Next-of-kin report analyses controlled for deployment status and years of active service; supervisor report analyses controlled for deployment status (see Table 1 in the online supplemental materials).
[a] Unstable estimate involving cell sizes $n < 5$.

ment would harm career. No significant differences emerged comparing suicide decedents to suicide ideators.

Compared to next of kin, supervisors generally reported fewer differences in perceived barriers to treatment (Table 2). The only significant difference observed between suicide decedents and propensity-matched controls was lack of trust in mental health professionals. No other significant differences were observed, and no significant differences emerged when comparing supervisor reports of suicide decedents to recent suicide ideators.

Discontinuation of Services

We also examined whether there were differences between suicide decedents and control soldiers regarding their rates of discontinuing services among those who had received them. Next of kin for all three groups reported similar rates of treatment discontinuation that were not significantly different (52.3% of suicide decedents had ever discontinued treatment compared with 43.9% of propensity-matched controls and 50.5% of ideators). These levels were higher than those reported by supervisors (18.0%, 15.5%, and 14.7%, respectively), though levels did not differ significantly between groups. We also compared reasons for discontinuing treatment (Table 3). Only one significant difference between groups emerged according to next-of-kin reports: suicide decedents were more likely than propensity-matched control soldiers to endorse beliefs about treatment not working as a reason for discontinuing treatment.

Discussion

There were four key findings in this study. First, suicide decedents were significantly more likely to be referred to mental health services and to use more intensive treatment options (e.g., medication, overnight stay in hospital) than were propensity-matched control soldiers. Second, suicide decedents also were significantly more likely than propensity-matched controls to access this treatment through military facilities, and, according to supervisor reports, more likely to use civilian treatment options and to use less formal services (e.g., self-help groups, chaplains/clergy). Third, suicide decedents were more likely than propensity-matched controls to perceive a range of specific barriers to initiating treatment. Fourth, all of the differences observed in this study were between suicide decedents and propensity-matched controls; no differences were observed between soldiers who thought about suicide and those who died by suicide. Each of these findings warrants further comment.

First, next of kin and supervisor reports converged on the finding that most suicide decedents in the Army received a referral to a mental health specialist, and that, compared to propensity-matched controls, were more likely to use more intensive treatments (e.g., medication, overnight stay in hospital). We found that of all mental health service options assessed in the current study, suicide decedents were most likely to use mental health care within military facilities (e.g., talking to a mental health professional), and that they used these services at a significantly higher rate than propensity-matched controls. Our results align with prior research (i.e., Ribeiro et al., 2017), in that we found roughly a third of suicide decedents utilized military mental health services in the month prior to their deaths (compared to 27.9% reported by Ribeiro et al., 2017). We note that this finding of suicide decedents utilizing more treatment (and more intensive options) is likely accounted for, in part, by the presence of more mental health symptoms among cases than propensity-matched controls, which has been reported in a prior study (Nock et al., 2017). However, we observed less consistency in the rate of using other, less intensive forms of treatment based on discrepant next of kin and supervisor reports. Thus, the role of mental health symptoms appears most related to utilization of intensive treatment options, whereas it is less clear, based on differing next of kin and supervisor reports, whether higher rates of treatment utilization are universally observed among suicide decedents.

Second, the results of this study also revealed that according to supervisor reports, suicide decedents were more likely than propensity-matched controls to have used less formal services (e.g., self-help groups) and to have had contact with more types of providers over their lifetimes, including: mental health professional or a medical doctor at military facilities, military chaplain, and civilian clergy/spiritual advisor. We note that for these findings, supervisor reports differed from next-of-kin reports, in that next-of-kin reports did not note any significant differences between cases and controls on these other treatment options. It may be that supervisors were more likely to have access to this information as a consequence of their roles (e.g., soldiers may have to get time off approved by supervisors to utilize services). It may also be the case that, as noted above, the most robust differences between these groups, with consistent reports from both next of kin and supervisors, were related to use of more intensive treatment options. In addition, another possibility is that for some treatment options (e.g., hotline services or Internet support groups) we may not have observed any differences because these services could be accessed in relative anonymity. As such, next of kin and supervisors may not have known whether soldiers accessed this type of support.

The current findings also indicated that nearly half of next of kin (44.4%) and one third of supervisors (33.8%) said that suicide decedents were referred to a mental health specialist in the 30 days before their death. This finding suggests that for many soldiers, others perceived that they were struggling with some kind of mental health problem and were sufficiently concerned to recommend that they get care. Thus, although we must continue to improve methods of identifying people at risk of suicidal behavior, these results also stress the importance of effectively referring and engaging those known to be at some level of risk.

Third, and unfortunately, our results highlighted that there are substantial attitudinal and structural barriers to care among those at risk for suicide compared to propensity-matched controls, according to next-of-kin reports. Consistent with prior research (e.g., Hom et al., 2017; Mojtabai et al., 2011; Naifeh et al., 2016), attitudinal barriers to treatment (e.g., stigma) were reported more frequently than were structural barriers (e.g., unavailability of treatment). In particular, concerns about stigma from unit members (e.g., loss of confidence from members of unit, being seen as weak) were among the largest effects observed in next-of-kin reports. Notably, the barrier endorsed the least frequently for suicide decedents—from both next of kin and supervisors—was lack of available mental health services, suggesting that soldiers generally perceive and have awareness of mental health resources available to them. However, given structural barriers do not appear to be of primary concern, this finding underscores previous research (e.g., Gorman et al., 2011) describing that stigma related to mental health treatment remains one of the most pressing challenges within the military. Despite the correlational and retrospective nature of these findings, they further support ongoing Department of Defense efforts to reduce stigma (e.g., Acosta et al., 2014), and suggest that there may be utility in targeting these perceptions in suicide prevention programs to increase help-seeking among soldiers at risk for suicide. Though other research has provided recommendations for how to best address the presence of these stigma-related barriers, such as increased education and outreach on mental illness and treatment; (Gorman et al., 2011; Zinzow et al., 2013), more research is needed to determine the effectiveness these existing strategies (e.g., Hom et al., 2017).

Notably, we only found these differences between decedents and propensity-matched controls on these stigma variables when examining next-of-kin reports. Given the nature of these perceptions, it is perhaps not surprising that they would not have been voiced by the suicide decedents to their supervisors. It is also possible that next of kin and supervisors have different views on stigma themselves, which contributed to differential reporting of these types of barriers. For example, given increasing emphasis reducing mental health related stigma in the military (Acosta et al., 2014), supervisors may be less likely to perceive the presence of these barriers than are next of kin, who likely receive fewer antistigma messages. We also note that next of kin generally reported more barriers to treatment *and* the receipt of more treatment among suicide decedents compared to propensity-matched controls. Though initially counterintuitive, this association may reflect the overall high severity of symptoms and distress experienced by suicide decedents (as described above), in that decedents had greater treatment needs, and, because of higher levels of distress, were more likely to discuss concerns (e.g., barriers to treatment) with others. As such, the high rates of reported treatment use and barriers to treatment may reflect informants' perceptions about the severity of symptoms present among soldiers before their deaths. Alternatively, because both treatment utilization and barriers to treatment were assessed over the lifetime, it is possible suicide decedents who did perceive barriers at one point later sought out services despite these perceived barriers. Unfortunately, this temporal sequencing—including whether changes in beliefs about barriers occurred or whether soldiers went to treatment despite perceiving barriers—cannot be explicitly examined within the current data.

Importantly, all of the differences we have described thus far distinguished cases from propensity-matched controls. The inclusion of a second ideator control group in the current study also allowed us to examine which factors distinguish between suicide ideators and decedents, a notoriously difficult distinction to make (Nock, Kessler, & Franklin, 2016). However, we did not observe any differences in treatment utilization, barriers to treatment, or reasons for discontinuation between decedents and ideators. This finding indicates that although these variables may have utility in differentiating those likely to die by suicide from propensity-matched controls, they are not sufficient to inform us which ideators may go on to die by suicide. That is, although prior psychiatric treatment is the most robust risk factor for suicide death (Franklin et al., 2017), our results suggest that knowledge of whether a soldier has attended treatment is not enough, on its own, to identify who is at highest risk, given we observed similar rates of treatment utilization among soldiers thinking about suicide as we did for those who died by suicide. Thus, though our results help to characterize treatment usage among suicide decedents, ultimately, additional research is needed to improve risk detection efforts among those seeking treatment (and among those *not* seeking treatment—an even more challenging goal). In other Army STARRS work, some progress has been made in this area through the use of algorithm-based models predicting suicide risk among treatment-seeking soldiers posthospitalization (Kessler et al., 2015) and following outpatient mental health treatment (Kessler et al., 2017). In addition to treatment utilization, because ideators and decedents perceive similar barriers to treatment, continued attention and efforts to reduce these perceptions (e.g., stigma from unit) is needed, as we described previously.

One reason for the lack of observed differences between cases and ideators may be because our ideator group (weighted to be representative of soldiers with past 12-month ideation in the entire AAS) was particularly severe, and thus appeared very similar to the suicide decedents. This explanation is possible because our inclusion criterion for the ideator group was presence of suicidal ideation in the last year, which combined any soldier who had ideation into one group, even though subsets of ideators may have had more or less severe symptoms. Future studies should use severity variables, or other risk factor variables, rather than only presence/absence of ideation, to consider subsets of ideators to better identify variables involved in the transition from ideation to attempt. Other recent Army STARRS work has used this type of approach, using self-report items on mental health symptoms and severity/persistence of ideation to identify level of risk among ideators (i.e., those endorsing presence of ideation; Nock et al., 2018; Zuromski et al., 2019). In these respective cross-sectional and longitudinal studies, ideators in the top 10% of risk accounted for a majority (Nock et al., 2018) or near-majority (Zuromski et al., 2019) of suicide attempts, indicating that most ideators are not at high risk for attempt. Applied to the current study, it is possible that combining ideators into one group limited our ability to detect differences between ideators and decedents. Future studies with more participants should consider use of risk strata (i.e., low, medium, high) to compare ideators with decedents, which might better illuminate treatment variables of predictive utility.

Lastly, our results also highlight the importance of continuing to engage soldiers even after they have initiated treatment to address factors contributing to early termination of services. Though few treatment discontinuation variables differentiated suicide decedents from controls, the differing patterns of responses from informants warrants mention; overall, next of kin reported much higher levels of treatment discontinuation compared to supervisors (i.e., 52.3% of next-of-kin-reported suicide decedents stopped treatment at some point compared to only 18.0% of supervisors). This difference may simply be reflective of the larger time interval on which next of kin are reporting (i.e., lifetime, compared to supervisors who have likely known soldiers for much less time). Alternatively, this difference may reflect a higher degree of follow-up with soldiers by next of kin on their treatment, during which soldiers may have discussed their reasons for discontinuing services. From an Army operations perspective, a stronger emphasis on supervisor follow-up with soldiers may be indicated—the knowledge that a soldier has been referred for treatment is not sufficient to confirm at-risk soldiers are actually following through and getting the care they need. Encouraging this type of dialogue would also allow supervisors to work with soldiers to resolve any perceived barriers to continuing these services (e.g., finding a new provider, getting another referral). Given research emphasizing the importance of unit cohesion and leadership behavior in reducing stigma (Britt, Wright, & Moore, 2012; Wright et al., 2009), fostering dialogue on the progress of treatment may also have the added effect of helping to quell perceptions of negativity from leadership.

Limitations

Our results should be interpreted in the context of several important limitations. First, as is the case with any psychological autopsy study, the data in this study were retrospectively collected via third-party informants' reports, and not directly from the soldiers themselves. Further, because these data were collected from informants following a suicide, it is possible that hindsight bias may have contributed to overreporting on some variables (e.g., inflated reporting of the presence of treatment barriers among suicide decedents by next of kin). Second, although this study represents the most comprehensive and largest psychological autopsy study among military personnel to date, our sample of suicide decedents captured only a third of all suicides that occurred in the Army during our study period. Though the majority of informants identified in the current study agreed to participate and completed the survey, it is possible our sample of suicide decedents—and consequently, our selected control groups—are not fully representative of Army soldiers. Third, our final sample size was relatively small, though larger than prior psychological autopsy studies both in and outside of the military (e.g., Brent et al., 1993; Farberow, Kang, & Bullman, 1990), which may have precluded our ability to detect small effects or to conduct more nuanced analyses of treatment-related variables. Fourth and finally, our assessment of available mental health services and treatment barriers was not exhaustive; in particular, recent work has highlighted the need to better refine measures that can capture the complex nature of stigma (Coleman, Stevelink, Hatch, Denny, & Greenberg, 2017), which should be considered in future research.

Conclusions

These limitations notwithstanding, our findings provide insight on suicide decedents' mental health treatment utilization, including use of nonmilitary and less formal mental health services that have not previously been examined. We found that many suicide decedents used some form of mental health care at some point in their lives, but they also were much more likely than propensity-matched controls to endorse a wide range of barriers that may have prevented service use. However, we did not identify any treatment variables distinguishing between decedents and ideators, suggesting that more information is needed, beyond knowledge of treatment utilization, to identify and intervene upon those at highest risk for suicide. Our findings underscore the importance not only of reducing attitudinal barriers that may be deterring suicidal soldiers' utilization of treatment, but also ensuring that, among those who are attending treatment, better risk detection procedures be developed to identify those at highest risk for transitioning from suicidal ideation to attempt.

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