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Past Childhood Abuse and Present Alcohol Use as Risk Factors for Suicidal Ideation and Suicide Attempt in United States Active Duty Personnel, 2008

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14. ABSTRACT

Suicide rates across the United States Department of Defense (DoD) were higher than the national average in 2007 and 2008. Two risk factors for suicide that put the DoD population at increased risk are male gender and younger age. Identifying additional risk factors for suicidal ideation and suicide attempt provides more precise target areas for prevention. The 2008 DoD Health Related Behaviors Survey (HRBS) of active duty military revealed a high prevalence of members with past childhood abuse and a notable rate of current heavy drinking among members. Prior studies in the general population demonstrated associations between childhood abuse or alcohol abuse and suicidal ideation or suicide attempt. Little is known, however, about these associations in military populations or about the combined effect of both factors (past childhood abuse and current alcohol use). Using the HRBS, associations were investigated between suicidal ideation or suicide attempt and (1) past childhood abuse, (2) present alcohol use, and (3) the two factors combined. Positive associations were found including a three-fold increased risk in those who experienced both past childhood abuse and present alcohol use.

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Suicidal ideation, suicide attempt, alcohol abuse, childhood abuse, alcohol use, active duty military

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1.0 SUMMARY

Suicide rates across the United States Department of Defense were higher than the national average in 2007 and 2008. Two risk factors for suicide that put the Department of Defense population at increased risk are male gender and younger age. Identifying additional risk factors for suicidal ideation and suicide attempt provides more precise target areas for prevention. The 2008 DoD Health Related Behaviors Survey of active duty military revealed a high prevalence of members with past childhood abuse and a notable rate of current heavy drinking among members. Prior studies in the general population demonstrated associations between childhood abuse or alcohol abuse and suicidal ideation or suicide attempt. Little is known, however, about these associations in military populations or about the combined effect of both factors (past childhood abuse and current alcohol use). Using the Health Related Behaviors Survey, associations were investigated between suicidal ideation or suicide attempt and (1) past childhood abuse, (2) present alcohol use, and (3) the two factors combined. Positive associations were found including a three-fold increased risk in those who experienced both past childhood abuse and present alcohol use.

2.0 INTRODUCTION

According to the World Health Organization, suicide rates in the United States (U.S.) fluctuated between 10 and 11 per 100,000 between 2000 and 2005 (Ref 1). Among U.S. military members, the suicide rate has fluctuated between 10 and 17 per 100,000 between 2001 and 2008 (Ref 2). In 2007 specifically, the military experienced more than 14 suicides per 100,000 compared to 11 per 100,000 in the general U.S. population (Ref 2,3). In 2008, the rates across all services were also higher than the national civilian average (Ref 4). Risk factors for suicide include male gender, younger age, history of mental disorders, and previous suicide attempt (Ref 3). In 2008, 46% of the Department of Defense (DoD) were age 25 or below and 86% male (Ref 5), two factors that put the DoD population at increased risk. Identifying additional risk factors for suicidal ideation and suicide attempt can provide target areas for prevention efforts.

The DoD Health Related Behaviors Survey (HRBS) has been conducted periodically since 1980 and includes questions about suicidal ideation and suicide attempt. The most recent completed HRBS, conducted in 2008, revealed that 40% of U.S. active duty members had experienced physical or sexual abuse at some point during their lifetime, the majority of which (83%) occurred before the age of 18. The survey, in conjunction with previous years' surveys, showed that the percentage of heavy drinkers (defined as ≥5 drinks for men and ≥4 drinks for women at least once a week in the past 30 days) has persisted over the 28-year period at about 20% (Ref 6). This study hypothesizes that childhood abuse and current alcohol use are associated with suicidal ideation and suicide attempt among military members. It is possible that these two factors combined (childhood abuse and current alcohol use) have an effect that is greater than the individual effects alone.

In the general population, the odds of suicide attempt were significantly higher among those abused as children, compared to those who were not (Ref 7,8). Childhood abuse also increases the risk of both alcohol use disorders and suicidal ideation (Ref 9). Other literature has shown a relationship between childhood abuse and suicide attempt among alcoholics (Ref 10,11).

Few studies have examined the relationship between childhood abuse and suicidal ideation or attempt among military populations. One study among female veterans showed an association between childhood abuse and suicidal ideation and suicide attempt (Ref 12). However, another study of veterans showed no association between childhood victimization and suicide attempt (Ref 13). A study among male veterans showed a relationship between alcohol abuse and suicidal ideation and suicide attempt (Ref 12). Another study conducted of U.S. active duty military showed that abuse was associated with both later alcohol use and suicidal ideation (Ref 14). These studies are limited in their generalizability, as they were conducted either among a homeless population, among inpatient Vietnam-era veterans, or in an inpatient psychiatric facility.

An unpublished study by the Naval Health Research Center of female U.S. Navy basic trainees found that those who experienced sexual assault (in childhood or adulthood) were more likely than nonvictims to report suicidal ideation or behavior (Ref 15). Two additional studies, one among U.S. Navy recruits and one among male U.S. Marine Corps recruits, found significant associations between childhood victimization and current alcohol problems (Ref 16,17). These studies did not investigate suicide, ideation, or attempt. In short, literature examining the association between childhood abuse and suicidal ideation and suicide attempt among active military populations is sparse.

Literature surrounding the association between alcohol use and suicidal ideation or attempt in military populations is also sparse. However, as in studies among the general population, alcohol is often included as a co-factor where suicide is the outcome. Studies among European military populations have shown direct associations between alcohol abuse and suicide attempt (Ref 18-20). Those who attempted suicide were more likely to have a history of abuse and to have abused alcohol (Ref 21). A study of active duty U.S. Marines showed a positive association with suicide attempt in those with a history of either childhood abuse or alcohol abuse (Ref 22). To the author's knowledge, this is the only published study on childhood abuse or alcohol use and suicidal ideation or attempt among U.S. military members.

There is a lack of rigorous studies on the combination of childhood abuse and alcohol abuse and risk of suicidal ideation or attempt among active military personnel. Both of these factors are independently associated with suicidal ideation and suicide attempt. In addition, those with a history of childhood abuse have increased risk of alcohol abuse. Therefore, it is proposed there is a synergistic interaction between childhood abuse and alcohol abuse. This synergy would result in increased risk of suicidal ideation or suicide attempt beyond the additive effect of the two factors alone.

3.0 METHODS

This study performed secondary data analysis of existing data from the 2008 DoD HRBS. Data were collected anonymously by an independent research organization (Research Triangle Institute International) via self-administered questionnaires given to active duty personnel (excluding recruits, cadets, those absent without leave, and incarcerated members). The survey used a dual-mode sampling design due to the wide geographic distribution of military members. The dual mode allowed for on-site administration at large installations (including shipboard) and for mail-based administration at smaller locations. The first part of the sampling strategy used data from the Defense Manpower Data Center to partition the sample frame by service and major command. The frame was proportional by installation size, and at least two installations per

major command were included. The combined response rate for both the on-site and mailed surveys was 70.6% for all services (Ref 6). The rate was calculated by dividing the number of completed surveys by the total number of subjects accessible for the study (e.g., those not deployed or on temporary duty status). There were 28,546 respondents from the U.S. Army, Navy, Marine Corps, and Air Force (DoD) and the U.S. Coast Guard (Department of Homeland Security). The data are weighted to represent a total force of 1,352,767 (to include the inaccessible but not the excluded populations). A weight may be viewed as an inflation of an individual data point to represent a larger number of individuals by certain characteristics such as gender and pay grade. Thus, the weighted sample mirrors the population distribution of the total U.S. Armed Forces population.

The objective of this study was to determine if individual associations existed between suicidal ideation or suicide attempt and past childhood abuse or present alcohol use in U.S. active duty military personnel. Additionally, a synergistic interaction between past childhood abuse and present alcohol use was investigated as a combined risk factor for suicidal ideation or suicide attempt. Data analysis was performed using SAS for Windows Versions 9.1.3 and 9.2 (SAS Institute Inc., Cary, NC) to organize variables, generate frequency tables, and perform chi-square tests and multivariable logistic regression. In the logistic regression model, the dependent variable was the combined responses to the questions about suicidal ideation and suicide attempt. One independent variable, childhood abuse, was the combined responses to the questions about physical or sexual abuse before age 18. The other independent variable, alcohol use, was the combined responses to questions about drinking behaviors. Covariates included in the logistic regression model were age and gender, due to their known associations with the outcome. Also included were race/ethnicity and rank (enlisted vs. officer), which approximate socioeconomic status in military populations. Marital status was also included, as it often provides a protective effect on suicide.

4.0 RESULTS

Overall, the U.S. Army made up 38% of the weighted sample, the Navy 23%, Marine Corps 13%, Air Force 23%, and Coast Guard 3%. About 20% of the weighted sample was classified as heavy drinkers, and about 35% of the total sample experienced some sort of abuse (either physical or sexual) before the age of 18. About 15% of respondents either had thoughts of suicide (ideation) or had attempted suicide at some point during their lives (together considered cases). Table 1 shows the frequency of respondents with both unweighted and weighted percentages for cases and controls by drinking and abuse status. Being a heavy drinker or experiencing abuse prior to the age of 18 was independently associated with the outcome. These associations were statistically significant ($p < 0.0001$).

Table 2 displays frequencies of the five selected covariates (age, rank, marital status, race/ethnicity, and gender) for cases and controls with both unweighted and weighted percentages. Compared with controls, cases were more likely to be young (age 25 or younger), unmarried, and female enlisted members whose race/ethnicity was either Other Non-Hispanic or Hispanic (as compared to White, Non-Hispanic or Black, Non-Hispanic). Because of these apparent differences between groups, these five factors were investigated for their association with suicidal ideation or suicide attempt using a chi-square statistic. All five were significantly associated with the outcome; thus, they were included as covariates in the subsequent model. All five were also associated with one independent variable, heavy drinker, and three of the five

(rank, race/ethnicity, and gender) were associated with childhood abuse, the other independent variable (data not shown).

Table 1. Frequency of Respondents with Both Unweighted and Weighted Percentages for Cases and Controls by Drinking and Abuse Status

Risk Factor	Cases				Controls			
	Unwt Freq	Unwt %	Wt Freq	Wt %	Unwt Freq	Unwt %	Wt Freq	Wt %
Heavy Drinker								
Yes	871	24.89	49,228	28.33	3,502	15.88	188,171	18.25
No	2,629	75.11	124,539	71.67	18,555	84.12	843,160	81.75
Childhood Abuse								
Yes	1,941	55.46	91,910	48.04	7,861	35.64	357,311	32.81
No	1,910	54.57	99,393	51.96	15,443	70.01	731,864	67.19

Table 2. Frequencies of the Five Selected Covariates for Cases and Controls with Both Unweighted and Weighted Percentages

Covariate	Cases				Controls			
	Unwt Freq	Unwt %	Wt Freq	Wt %	Unwt Freq	Unwt %	Wt Freq	Wt %
Age								
≥35	830	21.03	34,762	17.71	7,142	30.08	4,338	25.45
26-34	1,129	28.61	2,591	26.79	7,521	31.68	4,455	29.90
21-25	1,408	35.68	0,235	35.78	6,934	29.21	4,709	31.07
17-20	579	14.67	8,734	19.73	2,143	9.03	3,795	13.57
Rank								
Enlisted	3,427	86.85	177,460	90.39	18,349	77.29	5,977	81.04
Officer	519	13.15	8,861	9.61	5,391	22.71	4,182	18.96
Marital Status								
Married	1,911	48.43	3,408	47.58	13,782	58.05	5,751	56.36
Not Married	2,035	51.57	102,913	52.42	9,958	41.95	5,453	43.64
Race/Ethnicity								
Other Non-Hispanic	504	12.77	21,871	11.14	2,111	8.89	2,516	8.57
Hispanic	635	16.09	22,853	11.64	3,196	13.46	2,499	10.09
Black, Non-Hispanic	601	15.23	30,726	15.65	3,528	14.86	3,668	16.24
White, Non-Hispanic	2,206	55.90	120,871	61.57	14,905	62.78	6,236	65.10
Gender								
Female	1,349	34.19	34,316	17.48	6,128	25.81	2,764	13.97
Male	2,597	65.81	162,005	82.52	17,612	74.19	6,488	86.03

Table 3 shows the results of the multivariable logistic regression model. In the adjusted model, heavy drinkers had a 63% increased risk (odds ratio of 1.632) of suicidal ideation or attempt compared to nonheavy drinkers. Likewise, those who experienced childhood abuse had an 82% increased risk (odds ratio of 1.821) of suicidal ideation or attempt compared to those who did not experience abuse as children (in an adjusted model). These were both statistically significant associations. When both covariates (heavy drinker and childhood abuse) were considered, the risk of suicidal ideation or attempt was about three times as high (odds ratio of 2.972) for heavy drinkers who also experienced childhood abuse (compared to those who were not heavy drinkers and did not experience childhood abuse). This risk estimate was statistically significant. A second model included an interaction term (heavy drinker multiplied by childhood abuse), and the risk of suicidal ideation or attempt was essentially the same whether or not the interaction term was included (3.007 vs. 2.972). Therefore, it is concluded that no interaction exists between the two covariates (heavy drinker and childhood abuse).

Table 3. Results of the Multivariable Logistic Regression Model[a]

Risk Factor	Odds Ratio	95% Confidence Interval
Heavy Drinker	1.632	(1.454, 1.831)
Childhood Abuse	1.821	(1.656, 2.004)
Heavy Drinker & Childhood Abuse	2.972	(2.408, 3.670)
Heavy Drinker & Childhood Abuse Plus Interaction Term (Heavy Drinker x Childhood Abuse)	3.007	(1.849, 4.890)

[a]Adjusted for age, rank, marital status, race/ethnicity, and gender.

5.0 DISCUSSION

After adjusting for age, rank, marital status, race/ethnicity, and gender, heavy drinkers had increased risk of suicidal ideation or attempt compared to nonheavy drinkers. Those who experienced childhood abuse had increased risk of suicidal ideation or attempt compared to those who did not (in an adjusted model). Those who were heavy drinkers and experienced past childhood abuse had nearly three times as great a risk of suicidal ideation or attempt (compared to those who were not heavy drinkers and did not experience childhood abuse) after adjusting for age, rank, marital status, race/ethnicity, and gender.

In the civilian population, male gender tends to be associated with suicide more frequently than female gender. However, in this study, females made up a higher percentage of cases than males. It may be that females in the military face stressors that male military members do not. Alternatively, it may be that women who join the military are at higher risk due to other factors not investigated in this study.

Over time, the HRBS has shown that heavy drinking in the military has persisted for decades. It should be noted that the HRBS began in 1980, and the Uniform Drinking Age Act was enacted in 1984, essentially returning the legal drinking age to 21 years old in most states (Ref 23). Many military members are under age 21 and have been included in the survey since 1980. The U.S. military strongly prohibits under-age drinking, which may introduce a fear of reporting alcohol use among respondents. This potential reporting bias is thought to be mitigated by the anonymous nature of the study, thus reducing social desirability bias. If there were a reporting bias, it would likely result in an underrepresentation of the true rate, which would bias the risk estimate toward the null. The same limitation is true for measures of suicide and abuse, as members may be reluctant to disclose such personal information.

Another limitation is that data are cross-sectional, so the timeline of exposure and outcome and, thus, cause-and-effect relationships cannot be determined. It is possible that a suicide attempt preceded current heavy alcohol use, for example. Another disadvantage of the study is the presence of missing data, since respondents were allowed to skip questions. Missing data were approximately 10% for heavy drinkers, approximately 5% for those who experienced childhood abuse, and approximately 3% for suicidal ideation or suicide attempt.

One advantage of this study is that it uses data from all four DoD components as well as the U.S. Coast Guard. This study is also unique because it examined suicide attempt as well as ideation. Many studies focus on completions and/or attempts that generate urgent care visits. Not all suicide attempts generate clinic visits, and ideation could only be captured in a survey, preferably anonymous. The anonymous nature of the study is another advantage.

A screening program to identify those with past childhood abuse would provide a targeted group for preventative intervention. If members were screened upon entrance into the military, mental health treatment could be initiated immediately to help prevent future suicidal behavior. Based on this screening, the military could alternatively deny enlistment to those at highest risk or limit them from certain career fields that put them at greatest risk. Targeted alcoholism education and suicide prevention programs are recommended for this group. Continued efforts to reduce heavy drinking in the military overall should be continued. Alcohol abuse not only increases one's risk for suicidal behavior, it also costs the DoD millions of dollars in medical visits and lost work days annually (Ref 24).

6.0 REFERENCES

1. World Health Organization, *Mental Health: Country Reports and Charts Available*, 2011, URL: http://www.who.int/mental_health/prevention/suicide/country_reports/en/. Accessed 4 Jan 2012.

2. Gahm GA, Reger MA, *The DoD Suicide Event Report (DoDSER)*, (n.d.), URL: http://www.dcoe.health.mil/DCoEV2/Content/navigation/documents/gahm.pdf. Accessed 28 Nov 2011.

3. National Institute of Mental Health, *Suicide in the U.S.: Statistics and Prevention*, NIH Publication No. 06-4594, National Institute of Mental Health, Rockville, MD, 27 Sep 2010, URL: http://www.nimh.nih.gov/health/publications/suicide-in-the-us-statistics-and-prevention/index.shtml. Accessed 7 Oct 2010.

4. McMichael WH, "Suicide Rates Remain High: Top Officers Urge 'Supportive Climate' for Troubled Troops," *Air Force Times*, 23 Mar 2009, URL: http://www.airforcetimes.com/news/2009/03/airforce_suicide_032309w/. Accessed 7 Sep 2010.

5. Department of Defense, *Demographics 2008: Profile of the Military Community*, URL: http://www.militaryhomefront.dod.mil/12038/Project%20Documents/MilitaryHOMEFRONT/Reports/2008%20Demographics.pdf. Accessed 28 Nov 2011.

6. Bray RM, Pemberton MR, Hourani LL, et al., *2008 Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel*, Report RTI/10940-FR. Research Triangle Institute International, Research Triangle Park, NC, 2009, URL: http://www.tricare.mil/tma/studiesEval.aspx; Accessed 1 Mar 2011.

7. Molnar BE, Berkman LF, Buka SL, "Psychopathology, Childhood Sexual Abuse and Other Childhood Adversities: Relative Links to Subsequent Suicidal Behavior in the US," *Psychological Medicine*, **31**, 2001, pp. 965-77.

8. Santa Mina EE, Gallop RM, "Childhood Sexual and Physical Abuse and Adult Self-Harm and Suicidal Behaviour: A Literature Review," *Canadian Journal of Psychiatry*, **43**, 1998, pp. 793-800.

9. Makhija N, Sher L, "Childhood Abuse, Adult Alcohol Use Disorders and Suicidal Behaviour," *Quarterly Journal of Medicine*, **100**, 2007, pp. 305-9.

10. Kroll PD, Stock DF, James ME, "The Behavior of Adult Alcoholic Men Abused as Children," *Journal of Nervous and Mental Disease*, **173**, 1985, pp. 689-93.

11. Bácskai E, Czobor P, Gerevich J, "Suicidality and Trait Aggression Related to Childhood Victimization in Patients with Alcoholism," *Psychiatry Research*, **165**, 2009, pp. 103-10.

12. Benda BB, "Gender Differences in Predictors of Suicidal Thoughts and Attempts Among Homeless Veterans that Abuse Substances," *Suicide and Life-Threatening Behavior*, **35**, 2005, pp. 106-16.

13. Hiley-Young B, Blake DD, Abueg FR, Rozynko V, Gusman FD, "Warzone Violence in Vietnam: An Examination of Premilitary, Military, and Postmilitary Factors in PTSD In-Patients," *Journal of Traumatic Stress*, **8**, 1995, pp. 125-41.

14. Brown GR, Anderson B, "Psychiatric Morbidity in Adult Inpatients with Childhood Histories of Sexual and Physical Abuse," *American Journal of Psychiatry*, **148**, 1991, pp. 55-61.

15. Merrill LL, *Premilitary Trauma Symptomatology Among Female U.S. Navy Basic Trainees*, U.S. Army Medical Research and Materiel Command, Fort Detrick, MD, Dec 1996, URL: http://www.dtic.mil/dtic/tr/fulltext/u2/b221466.pdf. Accessed 14 Mar 2012.

16. Trent L, Stander V, Thomsen C, Merrill L, "Alcohol Abuse Among U.S. Navy Recruits Who Were Maltreated in Childhood," *Alcohol and Alcoholism*, **42**, 2007, pp. 370-5.

17. Young SY, Hansen CJ, Gibson RL, Ryan MA, "Risky Alcohol Use, Age at Onset of Drinking, and Adverse Childhood Experiences in Young Men Entering the US Marine Corps," *Archives of Pediatrics & Adolescent Medicine*, **160**, 2006, pp. 1207-14.

18. Allebeck P, Allgulander C, "Suicide Among Young Men: Psychiatric Illness, Deviant Behaviour and Substance Abuse," *Acta Psychiatrica Scandinavica*, **81**, 1990, pp. 565-70.

19. Rossow I, Amundsen A, "Alcohol Abuse and Suicide: A 40-Year Prospective Study of Norwegian Conscripts," *Addiction*, **90**, 1995, pp. 685-91.

20. Rossow I, Romelsjo A, Leifman H, "Alcohol Abuse and Suicidal Behaviour in Young and Middle Aged Men: Differentiating Between Attempted and Completed Suicide," *Addiction*, **94**, 1999, pp. 1199-207.

21. Mehlum L, "Attempted Suicide in the Armed Forces: A Retrospective Study of Norwegian Conscripts," *Military Medicine*, **155**, 1990, pp. 596-600.

22. Holmes EK, Mateczun JM, Lall R, Wilcove GL, "Pilot Study of Suicide Risk Factors Among Personnel in the United States Marine Corps (Pacific Forces)," *Psychological Reports*, **83**, 1998, pp. 3-11.

23. National Institute on Alcohol Abuse and Alcoholism, *Research Findings on Underage Drinking and the Minimum Legal Drinking Age*, 28 Aug 2008, URL: http://www.niaaa.nih.gov/AboutNIAAA/NIAAASponsoredPrograms/drinkingage. Accessed 28 Nov 2011.

24. Rhem KT, *Alcohol Abuse Costs DoD Dearly*, About.com, 6 Jun 2000, URL: http://usmilitary.about.com/library/milinfo/milarticles/blalcohol.htm. Accessed 29 Dec 2011.

LIST OF ABBREVIATIONS AND ACRONYMS

DoD	Department of Defense
HRBS	Health Related Behaviors Survey
U.S.	United States