

ARIC Manuscript Proposal # 1452

PC Reviewed: 11/11/08
SC Reviewed: _____

Status: A
Status: _____

Priority: 2
Priority: _____

1.a. Full Title: Association between exposure to combat-related stress and physical well-being in aging men: the Atherosclerosis Risk in Communities (ARIC) Study

b. Abbreviated Title (Length 26 characters): Combat Stress & Well-Being

2. Writing Group:

Writing group members: Anna M. Johnson; Kathryn M. Rose; Gerardo Heiss

Other ARIC investigators interested in joining this writing group are encouraged to contact Dr Johnson.

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. AMJ

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ARIC author to be contacted if there are questions about the manuscript and the first author does not respond or cannot be located (this must be an ARIC investigator).

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3. Timeline: To be completed by December 2009.

4. Rationale:

According to the 2000 U.S. Census, over 26 million or 12.7% of the adult US population served in the military at some time in their lives. The effects of military service in general and military combat in particular are so pervasive yet so little studied that they have been termed the “hidden variable” in the aging of older American men. [1, 2] The specific psychosocial stress experienced by veterans who have engaged in active combat is a unique and traumatic stressor that includes both psychological and physical components. [3] The impact of such stress on an individual’s general wellbeing and self-perceived health is not well understood. Studies of individuals in the community with post-traumatic stress disorder (PTSD) and depression have found that those with more lifetime trauma, recent stressful events and PTSD symptoms are more likely to have greater impairments in daily life functioning, higher use of health services and lower general well-being than individuals with comparable levels of disease and functional limitations and demographic profiles that do not have a history of these exposures or conditions. [4, 5, 6, 7, 8, 9] However, the impact of combat stress, in particular, on general wellbeing and functioning has not been as well studied. Furthermore, the studies that have investigated this association have focused primarily on short-term effects of exposure to combat among veterans of conflicts such as the Gulf War. [10, 11, 12] These studies have consistently found that veterans of recent wars who have been exposed to combat are more likely to have lower general well-being and higher rates of symptom reporting than veterans who served outside the Gulf War theater. To our knowledge, only one study to date has investigated the longer-term impact of combat on well-being, and this study did find a positive relationship.[13] The current study provides the opportunity to add to this sparse body of knowledge and investigate the longer-term effects of combat on health and well-being among veterans of earlier conflicts such as World War II, Korea and Vietnam.

The military service and combat exposure data collected as part of the ARIC ancillary study “Life Course SES, Social Context and Cardiovascular Disease (LC-SES) Study” provide an extraordinary opportunity to address this issue. Standardized, extensive symptom and self-reported health measurements are available, as are behavioral, psychological, and socioeconomic measures. Furthermore, in contrast to most studies, ARIC includes both veteran and population “controls” and men from birth cohorts with military service including World War II and the Korean and Vietnam conflicts. Given these advantages, and the small and inconclusive extant literature, this study will make a significant contribution to the extant literature and potentially provide insights for planning subsequent studies on this subject.

5. Main Hypothesis/Study Questions:

- a.) Is exposure to combat stress (compared to military service without combat and no military service) associated with less favorable general well-being?
- b.) Does this association vary by war/conflict era (World War II, Korean War, Vietnam Conflict)?

6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).

The subset of participants included in the current study will consist of 5,368 men (1,097 black and 4,271 white) who were queried about military service and a variety of combat exposures during the LC-SES Study (2001-2002). Women are excluded as only 48 of all ARIC women in the LC-SES study indicated that they had served in the armed services, and of these only four had been exposed to military stress. A breakdown of the male participants by sociodemographic and military exposures can be found in Table 1. Individuals who did not give consent for non-cardiovascular research will be excluded from the analysis dataset.

The following series of seven questions on the LC-SES questionnaire detailing military experience will be analyzed: (1) age at entry into the service, (2) length of service, and whether (3) served overseas, (4) in a combat zone, (5) under fire or fired at the enemy, (6) had seen others wounded or killed, or (7) had been wounded or missing in action. According to preliminary analyses of these data, among those who served in the military, 36% had been exposed to at least one combat related exposure, including service in a combat zone, being under enemy fire, firing at the enemy, seeing others wounded or killed in the war and having been wounded or missing in action during the war. We propose to investigate whether exposure to such combat stress (compared to military service without combat and no military service) is associated with less favorable general well-being.

The primary measure of general well-being will be measured by the individual's self-reported health status as available from each annual follow-up visit in the form of the question "How would you rate your health compared to others?" This self-reported measure has been shown to correlate highly with general physical health and survival. [14, 15]

We will also examine a series of questions asked at each annual follow-up visit which evaluate functional status, missed work, general health status and disability: (1) Are you able to do heavy work around the house? (2) Are you able to walk up and down stairs without help? (3) Are you able to walk half a mile without help? (4) Are you able to go to work? (5) During the past 4 weeks, have you missed work for at least half a day because of your health? (6) On how many days has this happened? (7) Are you able to do your usual activities, such as work around the house or recreation? (8) During the past 4 weeks, have you had to cut down on your usual activities (such as work around the house or recreation), for half a day or more because of your health? (9) On how many days has this happened? Finally, from each annual follow-up visit, we will examine the mean number of hospital admissions per year and the mean number of reported annual visits to a medical practitioner.

Attributes considered as potential covariates in the hypothesized associations include: age, gender, race, duration of military service, age at induction into the military, health insurance, vital exhaustion (a measure of depression or psychological health measured using the Maastricht Questionnaire of Vital Exhaustion [16]), as well as measures of socioeconomic position prior to exposure to military stress (father's education) and following exposure to military stress (adult education and income), social support using the Lubben Social Network Scale [17] and the

Interpersonal Support Evaluation List [18], substance use (pack years of cigarette smoking, current smoking status, alcohol intake) and comorbidity (Charlson Index). Also, from each annual follow-up visit, we will include use of psychotropic medications (specifically antidepressant, antianxiety and antipsychotic medications) and pain medications (both over-the-counter and prescription).

A challenge of this analysis that we anticipate is the potential impact of selective survival. Combat exposure was not assessed until 12-14 years after baseline, at which time 17% of male baseline participants had expired. Thus, it is possible that selective survival may have biased our findings. To address this concern, we conducted a pilot study on a subset of decedents from North Carolina for whom veteran status was recorded on death certificates. Briefly, we found a small (2%) but not statistically significant excess mortality among veterans, even after adjustment for age, race and education. These results are reassuring as they suggest that the potential magnitude of survivorship bias, if extant, would have been small in these data.

7.a. Will the data be used for non-CVD analysis in this manuscript? ☒ Yes ☐ No

b. If Yes, is the author aware that the file ICTDER03 must be used to exclude persons with a value RES_OTH = "CVD Research" for non-DNA analysis, and for DNA analysis RES_DNA = "CVD Research" would be used? ☒ Yes ☐ No

(This file ICTDER03 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

8.a. Will the DNA data be used in this manuscript? ☐ Yes ☒ No

8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER03 must be used to exclude those with value RES_DNA = "No use/storage DNA"? N/A

8.c. If yes, is the author aware that the participants with RES_DNA = 'not for profit' restriction must be excluded if the data are used by a for profit group? N/A

9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at:
<http://www.csc.unc.edu/ARIC/search.php>

☒ Yes ☐ No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?

- MS#1260: Association between exposure to combat-related stress and psychological health in aging men (Rose KM)

12. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.

Table 1. Characteristics of ARIC Participants by Socio-demographic Characteristics and Reported History of Military Service

QUESTIONNAIRE ITEM	N	MEAN (SD) / %
Respondents to questions about military service	5368	100%
History of military service (%)	3312	62
Age Group (%)		
45-49	648	44
50-54	772	54
55-59	988	72
60-64	906	81
Race (%)		
Black	442	40
White	2872	67
Education (%)		
<12 years	456	42
12 years or equivalent	1282	65
12+ years	1570	68
Respondents with history of military service	3304	100%
Age when entered armed forces (mean, years)	3304	19.6 (2.4)
Years served in active duty (mean years)	3312	3.7 (4.3)
Served overseas in armed services (%)	2199	66
Served in combat zone (%)	980	30
Under enemy fire or fired at enemy (%)	704	21
See others wounded or killed during the war (%)	858	26
Ever wounded /MIA during war (%)	155	5
Era of service		
World War II (1941-1945)	745	22
Korean War (1950-1953)	1013	30
Vietnam Conflict (1961-1975)	705	21
Multiple conflicts/wars	137	4
Between conflicts/wars	714	22
Military service summary variable (%)	5386	
No reported military service	2064	22
Military Service, no reported combat exposures	2118	40
Military Service, with 1+ combat exposures	1184	38

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