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Award Number: W81XWH-08-2-0031

TITLE: Identification of and At-Risk Interventions for Pre-Deployment Psychophysiologic Predictors of Post-Deployment Mental Health Outcomes

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REPORT DATE: October 2013

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
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REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE October 2013		2. REPORT TYPE Annual		3. DATES COVERED 15 September 2012 – 14 September 2013	
4. TITLE AND SUBTITLE Identification of and At-Risk Interventions for Pre-Deployment Psychophysiological Predictors of Post-Deployment Mental Health Outcomes				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER W81XWH-08-2-0031	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Jeffrey M. Pyne, Regina Stanley E-Mail: PyneJeffreyM@uams.edu; Regina.Stanley2@va.gov				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Biomedical Research Foundation, Little Rock Little Rock, AR 72205				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Please see next page.					
15. SUBJECT TERMS PTSD, Mental Health, Prevention, Projection, Prediction					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 7	19a. NAME OF RESPONSIBLE PERSON USAMRMC
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (include area code)

14. ABSTRACT

Objectives and Rationale:

The primary objectives of this proposal are to develop objective pre-deployment predictors of PTSD and test two pre-deployment resiliency interventions. Objective predictors include: 1) physiologic reactivity to combat-related virtual reality environments and white noise startle and 2) cognitive bias assessment. We also will test two pre-deployment resiliency interventions: 1) video game-based heart rate variability biofeedback training and 2) computerized cognitive bias training. Objective assessment and training measures are more reliably measured and could be early indicators of resilience/vulnerability.

Study Design:

We will collect pre-deployment physiologic reactivity and cognitive bias data from Army National Guard and/or Reserve members within 12 months of OIF/OEF deployment. We plan to consent up to 600 soldiers in order to complete 500 pre-deployment assessments. Subjects will be randomized to one of three groups: heart rate variability biofeedback training, cognitive bias training, or no additional training. Follow-up data will be collected at 3- and 12- months post-deployment.

Major Findings: Using the pre-deployment data we found significant cross-sectional correlations in the expected directions between the cognitive bias assessment (sensitivity and response bias) and the Post-Traumatic Cognitions Inventory, Connor-Davidson Resilience Scale, Brief Symptom Inventory, and PTSD Checklist Avoidance Cluster. These findings provide evidence to support the validation of the cognitive bias assessment used in this study. We also found significant inverse correlations between pre-deployment heart rate variability (SDNN and HF) measures and prior deployment. We did not find significant correlations between pre-deployment HRV and self-report PTSD symptom severity.

Using pre-deployment HRV to predict 3-month post-deployment PTSD symptom severity and covariates that were correlated with post-deployment PTSD in bivariate analyses ($p < 0.20$), we found SDNN was a significant predictor of continuous and dichotomous PTSD symptom severity. For example, pre-deployment SDNN was a significant predictor ($\beta = -0.085$, adj. partial $R^2 = 0.029$, $p = 0.0048$) of post-deployment PCL. Compared to those subjects in the highest pre-deployment SDNN quartile, being in the lowest SDNN quartile was associated with a significantly higher post-deployment PCL score ($\beta = 5.61$, adj. partial $R^2 = 0.066$, $p = 0.0028$). Similarly in logistic regression using $PCL \geq 35$ or < 35 , being in the lowest SDNN quartile was associated with being six times as likely to have a post-deployment $PCL \geq 35$ ($OR = 6.25$, $95\%CI = 1.635-23.889$, $p = 0.007$).

Using the entire sample, there is no evidence of the resilience trainings decreasing symptoms of PTSD at 3 months post-deployment compared with the control group. However, among soldiers 26 years old and older the biofeedback training group did show a significantly lower scores on the PCL than the control group ($p = 0.01$).

Analyses with 12-month data are pending.

Project Status: Pre-deployment baseline, 3-month (early post-deployment), and 12-month post-deployment assessments are completed. We are getting the 12-month data ready to analyze. The follow-up rate for early post-deployment assessments was 308/411 (75%). The follow-up rate for the 12-month post-deployment data collection was 235/411 (57%).

Table of Contents

	<u>Page</u>
Introduction	5
Body	5
Key Research Accomplishments.....	6
Reportable Outcomes	6
Conclusion.....	6
Appendix.....	7

Introduction

The purpose of this research study is to identify objective pre-deployment predictors for post-deployment post-traumatic stress disorder (PTSD) and to test two pre-deployment interventions designed to reduce post-deployment mental health problems. A total of 500 Army National Guard or Reserve members who are planning to deploy for Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) operations within the next 12 months will be recruited for the study.

Body

The tasks outlined below have begun are scheduled to be completed during the upcoming reporting period.

Task 14: Collect post-deployment data (Mos. 27-42):

- Collect 12-month outcome data (Mos. 36-42). We did not collect physiologic reactivity or cognitive attribution bias data at 12-months because this was the last interview and there were no plans to collect outcome data after 12-months post-deployment. Pyne, CAVHS

Progress: Partially complete. The 12-month post-deployment data collection was completed in-person, over the phone, and by mail.

The assessments included paper and pencil questionnaires only. The in-person assessments were completed during a total of 4 Medical Readiness Events and 1 drill weekend. The major barriers to completing the in-person assessments were competing with the soldier's busy drill weekend schedules and the lack of available incentives to complete the follow-up assessments. A total of 165 12-month post-deployment assessments were completed in-person.

A total of 240 participants that did not complete the 12-month post-deployment interview in person received questionnaires in the mail (some participants received more than one questionnaire in the mail). Participants were asked to complete the questionnaires and return them in a self-address postage-paid envelope. Participants who did not return the questionnaires were contacted by phone and given the option of having the interviewer administer the questionnaires to them over the phone or completing and returning them by mail. Follow-up calls were made to participants who agreed to return the questionnaires but did not. The major barriers to completing the assessments by mail included incorrect contact information, soldiers not answering the phone, and not following through after they agreed to complete and return the questionnaires. A total of 68 assessments were completed by mail and 2 assessments were completed over the phone. Overall, a total of 235 12-month post-deployment assessments were completed and resulted in a 12-month follow-up rate of 57% (235/411). See the table (Appendix A) for details.

- Refine analysis plan for post-deployment data (Mos. 27-42). Williams, UAMS

Task 15: Data analysis and report writing (Mos. 42-48):

- Complete data analysis and report writing (Mos. 42-48). Pyne, CAVHS

Progress: Ongoing.

- Baseline data analysis is ongoing examining the relationship between psychophysiological predictors and pre-deployment mental health symptom severity and history of previous deployments.
- Early Post-deployment data is being prepared for analysis.

Key Research Accomplishments

- Collecting the 12-month Post-deployment data from 235 soldiers during their drill weekends, Medical Readiness Events, by mail, and over the phone was a huge accomplishment. Contributing factors included 1) Willingness of research the team to travel to various locations in Virginia to collect data on soldiers whenever they were available; 2) Support of commanders – providing space and allowing soldiers time to participate in the study.

Reportable Outcomes

Presentations

- Identification of and At-Risk Interventions for Pre-deployment Psychophysiological Predictors of Post-deployment Mental Health Outcomes – Progress Review. Oral presentation at Military Operational Medicine Research Program (MOMRP) In Progress Review. August 2012, Fort Detrick, MD.
- Identification of and At-Risk Interventions for Pre-deployment Psychophysiological Predictors of Post-deployment Mental Health Outcomes – Progress Review. Oral presentation at Military Operational Medicine Research Program (MOMRP) In Progress Review. August 2013, Fort Detrick, MD.

Conclusion

The following tasks outlined in the SOW were completed during this reporting period.

- Completed 12-month post-deployment data collection on 235 participants

APPENDIX A

Summary of 12-month Post-Deployment Follow-up Assessments

Unit	PI Dropped ¹	Subject Withdrew	Did Not Deploy ²	Unable to Contact (attempt average, range)	Follow-ups Completed In-person	Follow-ups Completed by Mail & Phone (attempt average, range)	Total Follow-ups Completed	Completion Rate ³
2-224 th	1	6	3	42 (2.5, 0-4)	36	30 (1.9, 0-6)	66	58%
2-183 rd	0	5	12	123 (2.4, 0-6)	129	40 (1.7, 0-5)	169	57%
Total	1	11	15	165 (2.4, 0-6)	165	70 (1.8, 0-6)	235	57%

Total Pre-deployment Baseline Assessments Completed = 427 (2-224th (Aviation) = 118, 2-183rd (CAV) = 309)

Total early Post-deployment Assessments Completed = 308 (2-224th (Aviation) = 80, 2-183rd (CAV) = 228)

¹Withdrawn from the study, due to the fact that we have reason to believe that another individual completed the baseline assessment in his place

²No longer eligible for the study

³Completion Rate = Total follow-ups completed divided by eligible post-deployment assessments (# baselines completed – # PI dropped (n=1), # did not deploy (n=15))