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Identifying Children of Service Members at Risk for
Psychological Health Problems Following Parent Deployment

PRINCIPAL INVESTIGATOR: Julie Wargo Aikins, PhD

CONTRACTING ORGANIZATION: Wayne State University
Detroit, MI 48202

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14. ABSTRACT Parental deployment can disrupt the care children receive both as a result of deployment-related separation and the potentially destabilizing impact of deployment on the remaining caregiver and daily routines. This study will follow 230 intact military families with a child between 4-7 years in a longitudinal pre- mid- and post-deployment study. At pre- and post-deployment, Service Members and their Spouses complete questionnaires and interviews regarding their psychological health, marital and family functioning, and parent functioning. Spouses complete questionnaires regarding children's psych health and development at pre- mid- and post-timepoints. Children participate through doll and puppet play interview. Teacher ratings of the child are collected at all timepoints. The objectives of this study are to: 1) Determine the impact of Service Member's post-deployment psychological health on children ages 4 to 7 years old, and; 2) Identify those particular Service Member's Psychological Health-related symptoms that place children at risk for negative outcomes and assess the means by which these symptoms undermine children's adjustment directly by the Service Member and indirectly via negative impact on the Spouse. Current progress includes successful IRB review and survey development. The PI changed institutions and the award was transferred to her new institution. The US Marine Corps has agreed to host the study with the I Marine Expeditionary Force at Base Camp Pendleton. Data collection is ongoing.									
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INTRODUCTION

Parental deployment can disrupt the care children receive both as a result of deployment-related separation and the potentially destabilizing impact of deployment on the remaining caregiver and daily routines. This study will follow 230 intact military families with a child between 4-7 years in a longitudinal pre-, mid-, immediate post-deployment and post-deployment follow-up study. At pre- and both post-deployment timepoints, Service Members and their Spouses complete questionnaires and interviews regarding their psychological health, marital and family functioning, and parent functioning. Spouses complete questionnaires regarding children's psychological health and development at pre- mid- and 2 post-timepoints. Children participate through doll and puppet play interview. Teacher ratings of the child are collected at all timepoints. The objectives of this study are to: 1) Determine the impact of Service Member's post-deployment psychological health on children ages 4 to 7 years old, and; 2) Identify those particular Service Member's Psychological Health-related symptoms that place children at risk for negative outcomes and assess the means by which these symptoms undermine children's adjustment directly by the Service Member and indirectly via negative impact on the Spouse.

BODY

The majority of work accomplished in the first 12 months of this award included the finalization of the assessment protocols and successful obtainment of IRB approval from The University of Connecticut. In August 2012, the Principle Investigator and Co-PI left their respective institutions for Wayne State University. New IRB approval was obtained at Wayne and the award was transferred to the new institution. Coordination of recruitment with combat brigades at Fort Drum is pending deployment cycles and approval of command. As a recruitment alternative, we were also working with the USMC to study a deploying MEU. Given the differences in deployment cycles between Army and Marine Corps, we will only study one of these groups.

In the 2014/2015 year, efforts focused on securing a commitment from the United States Marine Corps to host the study. In Winter 2014, the Drs. Aikins presented the study to the Marine and Family Programs Division, Headquarters Marine Corps, Quantico, VA. Several suggestions were made regarding revising the study to fit USMC-specific details of the deployment lifecycle. In December 2014, we received a letter of support from BGen Sanborn, Director, Marine and Family Programs Division. We then submitted our revised IRB protocol to our local Academic Institution and received approval of the USMC-based protocol in March 2015. The study was recognized by I Marine Expeditionary Force (I MEF) at Base Camp Pendleton in July, 2015. I MEF supports the 15th, 13th and 11th Marine Expeditionary Units (MEUs) on a rotating deployment schedule.

It was determined in the Fall of 2015 that a renewed FWA amendment between Wayne State University and the Department of the Navy was required prior to data collection. This was an unexpected requirement, which took until December 2015 to complete. This

delay attributed to our collecting only 6 families with the 15th MEU prior to their deployment in early Winter 2016.

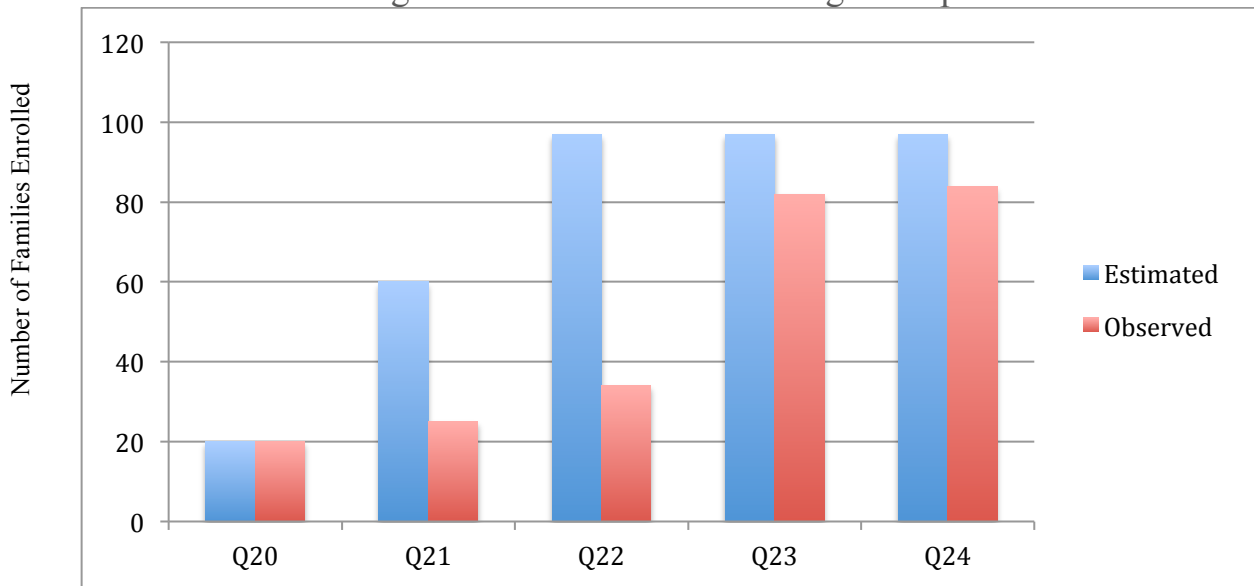
In order to improve recruitment, several options were considered in 2016, including adding Camp LeJeune as a second study site and opening recruitment at Camp Pendleton to non-MEU deployments. In discussions with Behavior Research Specialists at Quantico, it was determined that there were no “hard” accurate number of families with children in our study age range (ages 4-7) per Base Camp across MEFs, although it was generally estimated that Camp LeJeune would have some amount of families of interest. It was also determined that revising our protocol to add Camp LeJeune would require a protocol review at Quantico, a selection of a Camp LeJeune site PI, and USMC IRB review, in addition to our University IRB and HRPO approval. The estimated time for these reviews and selection was given at approximately a year. Therefore, this option was not considered feasible. After discussion with the Marine Corps Community Services director at Camp Pendleton, it was decided that recruitment of non-MEU deploying families would be a favorable option, particularly as our IRB protocols did not specify that the deployments were MEU-specific. A 1 year No Cost Extension request that included this revised recruitment strategy was submitted in late Summer 2016.

Our primary 2016 recruitment focus was with MEU deployments at Camp Pendleton. Unfortunately, a Family Readiness Officer took a surprise medical leave and was unable to disseminate our recruitment documents for the predeployment cycle. In that absence, we focused on Battalion deployments. Our shift in recruitment allowed us to enroll 17 new families in the 2016/2017 year bringing our total sample to 19 families.

During the 2017 award year, new research assistants were trained and added to the research team at Camp Pendleton. Data collection has continued, both through MEU and non-MEU deployments at Camp Pendleton. Meetings with regiment FROs, the Head-FRO for the 2nd Battalion, MCCS directors and co-directors, Camp Pendleton service providers, the branch heads of all of Child Development Centers, USMC Community Counseling Center directors, the program manager for all Community Counseling Centers on base, USMC care therapists, and the FOCUS Resilience training Camp Pendleton director all resulted in significant improvements in recruitment. Attendance at town hall meetings, resilience trainings, and pre-deployment briefings were also used as mechanisms for continuing to distribute information regarding Project CAPS in order to facilitate recruitment. In addition, a targeted Facebook advertising campaign was undertaken to promote further recruitment efforts. These efforts allowed us to recruit an additional 65 families, bringing our total sample to 84 families enrolled. Finally, mid-, post-, and follow-up home visits continued as each family reached these time points in the study.

Camp Pendleton recruitment table (total sample N=97).

FIGURE 1: Recruitment growth over time to reach target sample size of N=97



During the 2018-2019 year, we will recruit the final 13 families needed for the adjusted sample size. We have added a member to our project staff in California whose primary function is to assist with this final recruitment push. We believe that with her help and a large upcoming MEU deployment will be able to finish necessary enrollment efforts and complete data collection phases with these families. During the 2017 NCE we requested the elimination of the 6-month post-deployment follow-up assessment from the Statement of Work so as to complete data collection within the timeframe available. However, we continue to collect this data using funds provided by the PIs own institutional funding accounts as a means for understanding the impact of deployment after the immediate reintegration period.

Based on the feedback of the members of the 2018 IPR, we recruited a statistical consultant, Liying Zhang, and revised our data analysis plan. This revised plan was submitted with our 3rd NCE request. Following preliminary analyses, Growth Mixture Modeling will be adopted as a primary data analysis strategy. The revised data analysis plan created in consultation with Dr. Zhang is included below. In addition, based on the updated data analysis plan, a revised sample size estimate of $n = 97$ was deemed necessary for powering the analyses.

I. Statistical Analysis Plan

(1) Quantitative Longitudinal Survey Data

a. Preliminary analysis. The distribution of each variable will be examined including checking for out-of-range values, outliers and abnormal values using graphical methods (e.g., boxplots and histograms). Descriptive summaries will be calculated to ensure that all values are within expected ranges. We will verify that the distributions of measures meet the assumptions of the statistical tests to be used, applying a formal test such as the Shapiro-Wilk's test. Transformations will be used when distributional assumptions are not fulfilled for inferential tests. Descriptive analysis will be employed to describe the characteristics of the sample (e.g., maternal, paternal, children's, and family context characteristics) for each of four time points at pre-deployment, deployment, and post-deployment. A general description of the main variables of interest will provide mean, standard deviation, and range for continuous variables with normal distribution and median and range for non-normal distribution; t-test or non-parametric test will be employed to examine the statistical significances in differences. For categorical variables, raw counts with proportions will be provided; and chi-square test will be used. In this study, age of children will be grouped into two categories (at age 4 years or 5-7 years) to be consistent with the content of proposed home-based interaction observation; gender differences in children's outcomes will be compared. Pearson correlations and multiple linear regressions will be conducted to examine the statistical significances of relationship among all scales of interests, including Service Member's (SM) PTSD, dissociative symptoms, depressive symptoms, and alcohol use, family context of stress, parent-child interaction, quality of parenting, marital relationship, maternal-child relationship, paternal-child relationship, child's psychological adjustment related scales (e.g., self-regulation, emotion regulation, externalizing behavior problems, internalizing difficulties, social adjustment, and school adaption).

b. Analysis on the longitudinal changes of children's psychological health outcomes. Analysis to examine the longitudinal changes in children's psychological adjustment and to compare changes in these outcomes among different groups (e.g., aged 4 years vs. 5-7 years, girls vs. boys), adjusting for other covariates, will be conducted. The means, standard deviations (SD), and 95% confidence intervals (95% CI) of each specific scale at different time points will be computed and the differences of the scales at different time points will be compared using linear mixed model (LMM).

c. Developmental trajectory analysis for children's psychological health outcomes. The developmental trajectory analysis, also known as the growth mixture model (GMM), will be employed. It is assumed that there are no interindividual differences in changes within each subgroup. In other words, the extent of interindividual differences (Covariance) is constrained to zero. Therefore, latent class growth modelling (LCGM), a subset of GMM, will be used. With LCGM, we will determine the distinctive trajectories of psychological adjustment problems and negative risk behaviors in children living in the military families and associated SMs' risk factors (e.g., PTSD, dissociative symptoms, depressive symptoms, alcohol misuse) and family factors (e.g., family context of stress, marital relationship, parent-child interaction, quality of parenting, parent-child relationship). To reach aims in this study, first, we will plot the changes of the specific psychological problems and overall combined psychological problems over four time points for each individual child. Second, we will explore whether there are multiple trajectory patterns of psychological health problems among children living in SM families and the numbers of the trajectory patterns. Using data at four time points from the longitudinal study, the developmental trajectories of children's psychological adjustment problems reported by children will be detected and quantified. For children's psychological adjustment problems, we assume the existence of multiple subgroups with children aged at 4 and aged at 5-7; and the existence of multiple subgroups with girls and boys. Therefore, we will examine whether the numbers of group and patterns differ for girls and boys, and differ for aged 4 years and aged 5-7 years. The SAS PROC TRAJ procedure in SAS 9.4 will be implemented to identify the number of groups and quantify the trajectory patterns of children's psychological problems across the four time points. The GMM can be estimated using maximum likelihood (ML) or Bayesian methods. The number of group models will be evaluated using Schwarz's Bayesian information criterion (BIC) and the

optimal trajectory groups will be identified with a high BIC value – compared to the previously tested model there is no significant improvement in model fit to the data. Based on the posterior probability, each child will be classified into specific subgroups with different developmental trajectories. Finally, we will describe the children’s psychological adjustment for the trajectory subgroups and compare the factors among the subgroups.

d. Developmental trajectory analysis for maternal rated children’s psychological adjustment outcomes. The growth mixture model (GMM) will be used to identify and quantify developmental trajectory subgroups for mother rated children’s psychological adjustment problems using data at four time points from the longitudinal study.

e. Developmental trajectory analysis for SM psychological problems. The growth mixture model (GMM) will be used to identify the number of groups and quantify the trajectory patterns of SM’s psychological problems across the time points. Children’s psychological health outcomes will be compared among the SM’s psychological developmental trajectory subgroups.

f. Mediation and Moderation Analysis. Among children who are in the high risk trajectory subgroup with increasing psychological difficulties, the structural equation modeling (SEM) will be used to investigate the direct effect of SM’s mental problems at pre-deployment and at post-deployment on these children’s health outcomes; and its indirect effects mediating through family context factors. Confirmatory factor analysis (CFA) will be conducted to test the hypothesis of a relationship between observed variables and their underlying latent constructs. In the SEM, combined SMs’ psychological problems (e.g., PTSD, dissociative symptoms, depressive symptoms, alcohol misuse) and marital relationships will be the two exogenous variables and these two variables are assumed to be high correlated. Parenting and parent-child relationship are the endogenous variables that are treated as the mediators. Children’s psychological adjustment in the high risk trajectory subgroup will be the outcomes. SEM will be performed using AMOS 25.0. Similar statistical methods will be conducted on data based on reports from children, mothers, and fathers will be compared.

g. Missing data. Missing data (if the percentage of missing data more than 5%) will be handled using multiple imputation with assumption of data being missing at random using the R-MICE package. All statistical analyses will use SPSS 25.0, AMOS 25.0, SAS 9.4, and R software packages.

(2) Qualitative Home-based Interaction Observation Data.

Videos will be coded in the lab for each task by trained research assistants. Trained raters will code the data and establish inter-rater reliability. After reliability has been established at 80% coders will be allowed to begin coding study videos. Inter-rater reliability will be maintained at 80% so as to ensure accurate study coding.

II. Sample Size Estimate

We employ a sample size estimation procedure developed by Brown and Prescott for longitudinal studies with repeated measures.

$$N = \frac{(Z_{(1-\alpha/2)} + Z_{(1-\beta)})^2 (r + 1)[1 + (T - 1)\rho]}{ED^2 r T}$$

where N is the sample size in total; $Z_{(1-\alpha/2)}$ is the $(1 - \alpha/2)$ percentile point of the standard normal distribution; $Z_{(1-\beta)}$ is the $(1-\beta)$ percentile point of the standard normal distribution; r is the ratio of the number of subjects in the compared groups ($r = 1$; e.g., the ratio of the number of subjects in boys and girls); T is the number of follow-up measurements ($T=4$); ρ is the intraclass correlation coefficient among the repeated measurements; and ED is effect size. We choose a value of $\rho=0.7$ in sample size calculation. In addition, we assume an effect size $ED=0.5$ (large), and an alpha of 0.05. According to the Brown and Prescott formula, a total sample size of 97 will result in a power of 0.80.

$$N = \frac{(Z_{(1-\alpha/2)} + Z_{(1-\beta)})^2(r+1)[1+(T-1)\rho]}{ED^2rT} = (1.96+0.84)^2 \times (1+1) \times [(1+(4-1))0.7 / 0.5^2 \times 1 \times 4] \approx 97$$

Given the very low attrition rate based on the experience of our pilot study, we do not take the attribution rate into account with the sample size of 97.

A 1-year No Cost Extension request that included this revised sample size was submitted in late Summer 2018.

Measures

Below is a list of constructs, the measures or means by which they are being assessed, and the rationale for why each construct is important to the study.

Service Member psychological functioning – to be completed by the Service Member prior to and following deployment:

- PTSD Checklist Military Version – measures PTSD symptoms
- Dissociative Experiences Scale – measures Dissociative symptoms
- Center for Epidemiological Studies Depression Scale – measures depressive symptoms
- Difficulties in Emotion Regulation Scale – measures difficulties with emotion regulation that are often co-occurring difficulties with poor psychological functioning
- Penn State Worry Questionnaire – measures general anxiety and worry symptoms
- Michigan Alcohol Screening Test – measures alcohol misuse
- State-Trait Anger Inventory – measures difficulties with anger that often co-occur with difficulties with poor psychological functioning

Each of these measures are necessary for understanding Service Members' pre-deployment level of psychological functioning as well as their post-deployment level of functioning in order to ascertain the ways in which functioning across time points and changes in that functioning influence spouse functioning, marital relationship functioning, parenting, and child well-being.

Service Member's exposure to stressful events prior to and during deployment as well as their social support following deployment will be assessed with the 14-dimension Deployment Risk and Resiliency Inventory. *This measure will allow us to gain a better assessment of Service Member's stressful experiences and those factors that might mitigate stress and as such serve to moderate risk to families and children.*

Spouse psychological functioning – to be completed by the spouse prior to, during, and following deployment:

(please see list above regarding what measures assess)

- PTSD Checklist Civilian Version
- Dissociative Experiences Scale
- Center for Epidemiological Studies Depression Scale
- Difficulties in Emotion Regulation Scale
- Penn State Worry Questionnaire
- Michigan Alcohol Screening Test
- State-Trait Anger Inventory

Each of these measures are necessary for understanding Spouses' pre-, mid-, and immediate post-deployment and follow-up post-deployment level of psychological functioning. Spouses play an important role in moderating the impact of deployment and Service Member functioning on children – as such it is necessary for us to ascertain how spouses are functioning at each time point. We hypothesize that one mechanism by which child well-being may be undercut is through spouse functioning to be negatively impacted by the Service Member's functioning.

Service Member and Spouse Attachment Representations – to be completed with the Service Member and Spouse prior to deployment and following deployment.

It is hypothesized the organization of Service Member and spouse's attachment representations may influence children's psychological health and well-being. In addition, attachment representations may be viewed as one assessment of Service Member's and spouses' own well-being.

Marital and Family Functioning - to be completed by the Service Member prior to and following deployment and by the spouse prior to, during, and following deployment:

Dyadic Adjustment Scale – measures marital functioning
Conflict-Tactics Scale
Family Adaptability and Cohesion Scales

Marital and family functioning will serve as an indicator of family well-being. Measuring this construct at each time point is necessary in order to monitor changes in well-being in this domain. In addition, it is hypothesized that marital conflict may also contribute to increased child difficulties and therefore serve as predictive role in the model as well.

Parent-Child relationship quality and parent's experience of parenting –

- Parenting Stress Index – Short Form – Service Member will complete prior to and following deployment and spouse will complete before, during, and after deployment
- Caregiving Helplessness Questionnaire - Service Member will complete prior to and following deployment and spouse will complete before, during, and after deployment
- Free Play and clean up observation of parent and child with toys – Child will engage in these interactions with their father prior to and following the deployment and with their mother prior to, during, and after the deployment.

Parenting behaviors, attitudes, and perceptions have all been found to be important contributors to child well-being and as such is an important construct to be measured at each time point as a predictor of child adjustment.

Child psychological functioning and adjustment -

- Child Behavior Checklist – to be completed by Service Member prior to and following deployment and spouse prior to, during, and following deployment
- Child Behavior Checklist – Teacher Report Form – to be completed by child's teacher (whoever is teaching the child at that time point) at each of the data collection time points
- Sessa Puppet Interview – conducted by research assistant with the child at each of the three time points
- Doll Play – conducted by a research assistant with the child as a measure of attachment status.
- Caregiver Helpless Questionnaire – the 4-item Child Frightened subscale and 6-item Child Caregiving Towards Parents subscale will be used to assess children's feelings of fright in response to parent's symptomatology or behavior.

Child adjustment from parent, teacher, and child perspectives are one of the key outcomes of the study.

Child developmental skills –

- Child Behavior Questionnaire – Very Short Form – This measure of temperament will be completed by Service Members prior to and following the deployment and by spouses prior to, during, and following the deployment

- Cleanup - This task will also be used to measure compliance as a measure of self regulation.
- Delay Task (M & M or Marshmallow) – This measure of self regulation will be conducted with the child by the research assistant.
- Persistence Task (Puzzle or Circles) – This measure of self regulation will be conducted with the child by the research assistant.
- Emotion Regulation Checklist – This measure will be completed by the Service Member prior to and following deployment and by the spouse prior to, during, and after deployment.
- Problem solving tasks (Puzzles and Mazes or Pegs and Beads and Anagrams) – These tasks will be completed by Service Members and spouses with their children as a measure of emotion regulation.
- Wait task - This task will be completed by the research assistant with the child in the presence of one parent as a measure of child emotion regulation and self regulation.
- Social Skills Rating Scale – This measure will be completed by Service Members and spouses as a measure of preschool children’s development of age appropriate skills in interacting with peers.
- Preschool Behavior Questionnaire – Teachers will complete this 30-item measure as a measure of children’s interpersonal competence and social adjustment in the classroom.
- Preschool Social Competence Scale – Teachers will complete this 39-item measure which assess children’s level of cooperation, assertiveness, and prosociability in interaction with peers.
- Measure adapted from Lansford et al. (2006) project– Parent’s will complete this 14-item questionnaire as a measure of school age children’s social acceptance, popularity, friendship formation, and friendship quality among early school age children.
- Teacher-Child Rating Scale – 10-item social subscale – Teachers will complete this 10 item subscale as a measure of preschool children’s social behavior and skills that contribute to peer acceptance.
- 5 –item academic competencies and difficulties subscale will be completed by teachers as a measure of school age children’s school competencies.
- Behavior Assessment System for Children – 13 items will be used from this measure to assess preschool children’s “work related skills” such as their ability to try new things, adjust to changes in routines, pay attention, and persist when learning.
- ECLS – Adapted versions of questionnaires regarding academic competence will be given to teachers of school age children. These 21-item questionnaires measure specific skills that children should demonstrate at each grade.

The other key outcome of the study is children's ability to attain stage salient tasks at each developmental stage. These measures and tasks are designed to assess these.

In addition, sociodemographic information will including age, marital status, household composition, education, personal/household income, spouse/partner occupational status/history, race/ethnicity, and current living situation (e.g. on base, off base, with extended family etc.) will be collected as well as military specific information including service member's military history such as current rank, history of deployment (i.e. number of deployments, longest and shortest deployment), length of time stationed at Camp Pendleton.

The Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981) a measure of receptive language will be used as an estimate of children's intellectual functioning

KEY RESEARCH ACCOMPLISHMENTS

- Protocol design completed and survey assessments finalized.
- IRB approval obtained.
- PI Transferred from University of Connecticut to Wayne State University
- Award transferred to new Institution.
- Coordination of recruitment with combat brigades at Fort Drum or MEU with USMC is pending deployment cycles and approval of command.
- LOS from USMC.
- Local IRB approval of USMC protocol.
- Hiring of Project Coordinator, June 2015
- Equipment and materials purchase, June 2015
- Recruitment underway, December 2015

REPORTABLE OUTCOMES

IRB approval was obtained and the assessments were finalized. After a significant delay, the award was transferred to the new institution. Data collection began December 2015. A No Cost Extension was awarded in late Fall 2016. Data collection continued in 2016, with successes in reaching families in deploying MEUs and battalions. A final No Cost Extension was awarded in late Fall 2017.

CONCLUSION

With this award, we hope to identify the specific pathways of influence a Service Member's Psychological Health related problems influence their spouse and child's well being and provide a guide for improving resilience.

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Optimizing and Validating a Brief Assessment for Identifying Children of Service Members at Risk for Psychological Health Problems Following Parent Deployment

12280001



PI: Wargo Aikins

Org: Wayne State University

Award Amount: \$1,416,671

Study/Product Aim(s)

- 1) Determine the impact of Service Member's post-deployment psychological health on children ages 4 to 7 years old.
- 2) Identify those particular Service Member's Psychological Health-related symptoms that place children at risk for negative outcomes and assess the means by which these symptoms undermine children's adjustment directly by the Service Member and indirectly via negative impact on the Spouse.

Approach

97 intact military families with a child between 4-7 years in a longitudinal pre- mid- post- and follow-up deployment study. Pre and post deployment Service Members and their Spouses complete questionnaires and interviews regarding their psych health, marital and family functioning, and parent functioning. Spouses complete questionnaires regarding children's psych health and development at pre- mid- and post-timepoints. Children participation through doll and puppet play interview. Teacher ratings of child at all timepoints.



Accomplishment: Protocol development completed and under IRB review. PI has changed institutions. Data collection of families is ongoing. A final No Cost Extension was granted to complete the project in 2018.

Timeline and Cost

Activities	CY	14	15	16	17	18/19
Protocol development and regulatory approvals		■				
Pre deployment data collection					■	■
Mid deployment data collection					■	■
Post deployment data collection					■	■
Analyze, process and publish data						■
Estimated Budget (\$K)		\$464K	\$564K		\$964K	\$1.4M

Goals/Milestones

CY18 Goals Recruit and enroll subjects

- 97 military families assessed at pre-deployment
- 97 military families assessed at mid-deployment
- 97 military families assessed at post-deployment
- complete military families assessed at post-deployment
- Write manuscript for submission to peer-reviewed scientific journal
- Final report due to DMRDP

Comments/Challenges/Issues/Concerns

- Timeline delay due to grant transfer and transition to USMC site

Projected Expenditure: 1.4M Actual Expenditure: \$1.06M