THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN: SERVICE MEMBERS IN NEED OF SERVICE

By

Meghan H. Lacks

April, 2016

Director of Dissertation: Dr. Angela L. Lamson

Major Department: Human Development and Family Science

Given the growing number of women who serve in the military, it is critical that mental health clinicians, medical providers, researchers, and policy makers are aware of the unique biological, psychological, social, and spiritual health concerns of active duty women. A holistic approach to health and health care recognizes that the mind, body, and spirit are all relevant in the context of health and illness and thus essential to determining readiness and fit for duty. While the health of women veterans has received some attention in the research, a chasm exists in the literature on the biopsychosocial-spiritual (BPSS) health of active duty women. This dissertation includes six chapters, comprising an introduction to the dissertation, a literature review on active duty women's biopsychosocial-spiritual health, two publishable manuscripts: (a) a systematic review of research published on the BPSS health of active duty women, and (b) an empirical research study on the BPSS health experiences of active duty women, and a discussion chapter that offers future clinical, research, and policy implication to better serve this population.

THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN: SERVICE MEMBERS IN NEED OF SERVICE

A Dissertation Presented to

The Faculty of the Department of Human Development & Family Science

East Carolina University

In Partial Fulfillment of the Requirements for the Degree

Doctor of Philosophy in Medical Family Therapy

by

Meghan H. Lacks

April, 2016

THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN:

SERVICE MEMBERS IN NEED OF SERVICE

by

Meghan H. Lacks

APPROVED BY:

DIRECTOR OF
DISSERTATION:_____
Angela L. Lamson, PhD

COMMITTEE MEMBER: _____
Heather Littleton, PhD

COMMITTEE MEMBER: _____
Damon Rappleyea, PhD

COMMITTEE MEMBER: _____
Carmen Russoniello, PhD

CHAIR OF THE DEPARTMENT OF HUMAN DEVELOPMENT & FAMILY SCIENCE:

_____
Sharon Ballard, PhD

DEAN OF THE GRADUATE SCHOOL: _____
Paul J. Gemperline, PhD

DEDICATION

For my husband. You have always been my roots, grounding me in your love and support and providing me with a strong foundation and security, but over the last several years you have also given me the wings I need to fulfill my dreams. Your selflessness, support, and empowerment have allowed me to take risks and accomplish things I never would have thought possible. There are no words to capture the love and admiration I have for you – thank you for all you are and all you do.

Also, I want to dedicate this work to all of the previous and current military men and women of the United States. You all sacrifice so much of yourselves and your families in the name of service and there is no amount of gratitude that could do justice to what you all deserve. I hope to dedicate my career to serve you and your families as you have served me and mine.

ACKNOWLEDGEMENTS

As a systemic therapist, I cannot take credit for the completion of this dissertation without acknowledging those in my system who supported me over the last few years. First, to my major advisor and mentor, Angela, thank you for being my mentor over the last five years and for going above and beyond what is asked of you as a major to provide me with an abundance of opportunities that have allowed me to follow my passion. Thank you for all of the late night/early morning phone calls and for helping me to strengthen my writing skills. Thank you for always being in my corner and for fighting for what is best for me. Most importantly, thank you for helping me balance being a first-time mom and doctoral student and for reminding me that at the end of the day, my family is what *really* matters. To my committee, thank you for providing the feedback and support needed for me to accomplish one of the biggest projects of my life.

To all of my parents, thank you for teaching me the value of hard work and determination. Thank you for being available to me when I needed to feel supported and loved. Thank you for loving me the way you always have. You all set the example for how to love selflessly. To my friends, thank you for feeding me, babysitting Nola, validating my complaints, and encouraging me to get to the finish line. Thank you for becoming my family. To my Whit, there are no words to thank you to the degree that you deserve. I am where I am today because of your encouragement and endless support. Thank you for being my roots and wings. Lastly, to my Magnolia Lee, thank you for filling our lives with so much joy, laughter, and unconditional love. You are my motivation. I pray that you chase your dreams, no matter how challenging it becomes. Never forget that you are indeed magical.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 3

CHAPTER 5

LIST OF FIGURES

CHAPTER 3

CHAPTER 4

CHAPTER 5

PREFACE

Growing up in a military family, I have felt an immense amount of gratitude and pride for our men and women in uniform. I have always looked to military personnel with admiration and respect for their decision to sacrifice their own lives and time with their families to serve our country, but I never thought it would be possible to take this passion from my personal life into my professional career. When I came to ECU for my master's degree in Marriage and Family Therapy (MFT), I was afforded the opportunity to work on my thesis with Dr. Angela Lamson on a project working in a medical clinic with military couples. This project was the first time I was able to integrate my love of being an MFT with my passion for military members and their families. This experience ignited my desire to use my skills and training as an MFT to support and enhance the unique experiences of military couples and families. As I continued to work in the medical clinic, I began to witness the importance of both the systemic training I had learned as an MFT (von Bertalanffy, 1968) and the addition of the biopsychosocial-spiritual (BPSS) (Engel, 1977, 1980; Wright, Watson, & Bell, 1996) approach I had learned as a MedFT; both were essential when working with military personnel and their families in order to provide holistic care.

After graduating with my master's in MFT, the only logical next step to take was to continue working towards my PhD in Medical Family Therapy (MedFT) under Dr. Lamson. The training I have received as a MedFT has furthered my passion for using a BPSS approach to research, policy, and care for military personnel. Although my passion was initially with military couples and families, as I began working toward my dissertation, I quickly learned that there is very limited research on the BPSS health of active duty women. After exploring the issues pertaining to active duty women through coursework, I realized the dearth of information that

focused on military women. My hope is that this research helped to shed light on the strengths and challenges of being a woman in the military and that the findings capture the attention of clinicians, researchers, and policymakers. I intentionally explored ways to better analyze biological, psychological, social, and spiritual health constructs that commonly influence active duty women in order to offer an initial understanding of the common factors within and between these four constructs.

Furthermore, in my future I hope to be able to help create evidence-informed policies that support the needs of military personnel, couples, and families. More specifically, I hope to create policies that support the inclusion of MFTs/MedFTs in the treatment of military and Veteran populations. A first step in this journey is reflected in my doctoral internship with the American Association for Marriage and Family Therapy (AAMFT). As the Policy and Research Analyst for AAMFT, I have worked to (1) create competencies for MFTs who work with military populations, (2) increase efforts to improve military and Veterans' access to MFTs through policy changes, (3) write a monthly military-focused newsletter that includes new research, professional development opportunities, upcoming conferences and trainings, and job opportunities for behavioral health providers working with military populations, and (4) track job openings for MFTs across the Department of Defense and the Department of Veterans Affairs.

CHAPTER 1: INTRODUCTION

Women have held roles in the military since the beginning of American history. According to the National Center for Veterans Analysis and Statistics (2011), during the American Revolution, several hundred women disguised themselves to fight alongside men because women were not allowed to enlist in the military. Then, during the Civil War, the military utilized women to assist in healthcare settings, but after the war ended, the military sent women back to their homes and continued to use men in healthcare positions (Holm, 1992). Next, in 1898, the military recruited 1,200 - 1,500 women as contract nurses for the Spanish-American War and during this conflict there were more than twenty women who died from war related causalities (National Center for Veterans Analysis and Statistics, 2011).

It was not until World War I that women were able to be a part of the war effort in more expansive ways. By this time, the military began requiring physical examinations for military personnel, which made it more difficult for women to disguise themselves as men (National Center for Veterans Analysis and Statistics, 2011). Women continued to fight for their right to serve and due to the demands from this war, Congress decided to allow women to hold a variety of jobs beyond those associated with healthcare settings (i.e., nurses), such as telephone operators and clerks (National Center for Veterans Analysis and Statistics, 2011). Women's contribution during this war demonstrated that they already possessed or could quickly learn the skills needed by the military and in 1917, the Navy opened enlistment for women (National Center for Veterans Analysis and Statistics, 2011). During World War 1, more than 10,000 women served and almost 200 women were killed during their time in service (National Center for Veterans Analysis and Statistics, 2011).

During World War II, women served as nurses, linguists, postal clerks, intelligence analysts, truck drivers, pilots, and cooks. Throughout this conflict, women served stateside and

overseas and were even held as Prisoners of War (National Center for Veterans Analysis and Statistics, 2011). By the end of World War II, approximately 280,000 women were serving in all branches of the military all across the world (Holm & Bellafaire, 1998) and over 200 were killed in service (National Center for Veterans Analysis and Statistics, 2011).

In 1948, Congress passed the Armed Forces Integration Act, which allowed women to become permanent members of the military, but women were still restricted to only represent two percent of the entire military force (National Center for Veterans Analysis and Statistics, 2011). However, in 1967, with the passing of the Women's Armed Services Integration Act, the two-percent restriction was removed and women were allowed to serve in senior officer ranks for the first time in history (Department of Defense [DoD], 2009). The next major policy shift that influenced women's ability to serve in the military was in 1973, when the draft ended and the military transitioned into an All-Volunteer Force because there were not enough men volunteering to meet the needs of the military. By 1980, there were approximately 171,000 women serving in the active duty force (National Center for Veterans Analysis and Statistics, 2011).

During the Persian Gulf War (1990-1991), approximately 40,000 women deployed and women were allowed to fly combat aircrafts for the first time in history (National Center for Veterans Analysis and Statistics, 2011). Currently, women make up approximately 15% of the active duty military force and that number continues to rise (DoD, 2012). Over 200,000 women have served in combat in Afghanistan in Operation Enduring Freedom and Operation Iraqi Freedom and over 140 have sacrificed their lives during these conflicts (National Center for Veterans Analysis and Statistics, 2011). Although women have played various roles in the military over the centuries, recent changes in policies increased the number of women in the

military and broadened the types of jobs they can hold. More specifically, in 2013, the 1994 Direct Combat Exclusion Rule was lifted, which has allowed women to hold positions that they were once prohibited from having (e.g., ground combat and Special Forces; Roulo, 2013). Since the overturn of the rule in 2013, more than 91,000 new jobs (i.e., 95% of all military occupational specialties) in various units are now available to enlisted and officer women (Cronk, 2015).

Although research is still ongoing to determine how to ensure that current operational standards are gender-neutral, since the repeal in 2013 women have been allowed to contribute to the mission of the military in new ways (DoD, 2015). For example, women participated in the Marine Corps' basic infantry training, and the Costal Riverine Force of the Navy opened over 200 jobs to women and taught them combat skills, land navigation, fundamentals about weapons and equipment, urban operations, and offensive and defensive patrols and communications (DoD, 2015). In addition, the Army opened more combat engineer positions to female soldiers where they have learned how to detect improvised explosive devices, basic combat construction, and field fortifications (DoD, 2015). Not only does this new policy direct each service branch to include women personnel in every job field, but since it also affords women the opportunity to work in additional positions that will allow them to gain combat experience (e.g. tactical career fields), it will advance their careers and allow for promotions to flag and general officer ranks (Service Women's Action Network [SWAN], 2015). In fact, women officers and senior non-commissioned officers (NCOs) in the Marine Corps are now able to serve in 21 battalions related to artillery, tank, and engineering that they would not have been able to prior to the repeal of the 1994 policy (Lin, 2014).

Regardless of the 1994 Combat Exclusion Policy, due to the wars in Iraq and Afghanistan, women have been exposed to and engaged in combat because of the demands of battle and the need for all personnel, regardless of gender, to be combat-ready (Congressional Research Service [CRS], 2015). In fact, the lifting of the 1994 policy reflects the reality that women have served, been injured, and killed in Iraq and Afghanistan; 161 women have died in action, 1,015 have been wounded in action, over 9,000 have received Army Combat Action Badges, and two have received Silver Stars as a part of these conflicts (CRS, 2015).

With that being said, more women are now integrated into new jobs, such as ground combat units, which are resulting in new challenges related to women's health. For example, researchers have found that women are twice as likely to have musculoskeletal injuries during combat-related training and have higher rates of non-battle related injuries compared to their men counterparts (United Kingdom Ministry of Defense, 2014). Further, researchers have found that the size of personal protective gear and body armor worn during deployments is not designed for women's body types and is not inclusive of all women's sizes; some women are forced to choose gear that is too big for their stature leading to chafing bruising, abrasion, and limited mobility (Naclerio, Stola, Trego, & Flagerty, 2011).

In addition, common women's health issues (e.g., birth control, menstrual cycle control, and feminine hygiene) are negatively impacted by conditions during deployment, which can influence her mission readiness (Naclerio et al., 2011). Not only do women experience unique physical health challenges during deployment, but they also report that their perceptions of how to prevent and cope with stressors while deployed are unique compared to their male and non-deployed female counterparts, particularly as they balance their roles as mothers, partners, and military service members (Naclerio et al., 2011). In addition, researchers have found that women

experience more mental health diagnoses after they return from deployment as compared to pre-deployment (Armed Forces Health Surveillance Center, 2009).

Since the service branches are still adjusting to the lifting of the 1994 policy and are currently conducting research on how to best integrate women into new roles, a combination of new policy changes and job opportunities (e.g. tactical career fields; SWAN, 2015) may indicate that women in today's military are facing unique experiences compared to those of previous generations. Given that women are experiencing new jobs and opportunities related to combat exposure in the military, understanding women's health experiences may be more salient than ever before in history. This is especially true, since most of the models used to predict the impact of deployments on psychological health were designed based on men's experiences of war, and thus, cannot be generalized to predict women's outcomes (Street, Vogt, & Dutra, 2009).

Biopsychosocial Systems Metatheory

In order to better explore these unique experiences, a theory was needed that could capture complex and systemic factors that influence the lives of individuals. As such, the biopsychosocial systems metatheory (Anchin, 2008) was used as the foundation for this dissertation. Below is a description of the advantages of incorporating this metatheory into this dissertation, including a brief comparison to more limiting frameworks, such as the biomedical approach. While a comparison of value added could be provided between this metatheory and any other theory that is not the purpose of the dissertation. Rather, the point here is to denote the value of using a metatheory to understand the health and health disparities of a population who is underserved.

According to Anchin (2008), the biopsychosocial systems metatheory exemplifies the all-inclusive and holistic nature of both Engel's biopsychosocial model (Engel 1977; 1980) and

general systems theory (von Bertalanffy, 1968) because it encompasses the breadth of phenomena and the complexity of human nature that exists from micro to macro levels of health. Anchin (2008) described how the biopsychosocial systems metatheory does not determine or delineate the specific language or concepts used to understand the subsystems of the biopsychosocial model (i.e., biological, psychological, and social subsystems); rather, it offers a framework to systematically organize the interconnectedness between these subsystems. Anchin (2008) also argued that one of the strengths of the biopsychosocial systems metatheory is that it allows for human nature to be understood through the processes that exists within, between, and among each subsystem; thus, the specific concepts within each subsystem (i.e., within bio or psycho or social) can be examined, along with the interplay between the different subsystems (i.e., between bio and psycho, bio and social, psycho and social, psycho and bio, and social and bio, and social and psycho). Previous researchers have used the biopsychosocial model along with systems theory to guide their work (Barrett, 2012; Melchert, 2011; Meyer & Melchert, 2011), but this dissertation is the first to examine the biopsychosocial systems metatheory with a military population.

As mentioned above, the biopsychosocial systems metatheory is not the only framework that exists to understand health. However, through this study, it is possible that a well-developed design and exploratory analysis will help to overcome some of the chief complaints related to the biopsychosocial model (Smith, Fortin, Dwamena, & Frankel, 2013). These criticisms have included that the biopsychosocial model (1) is not operationally defined and thus, not able to be tested or evaluated, (2) is too general, and (3) lacks a specific method to obtain biopsychosocial information from individuals. These criticisms, along with the use of the more widely used biomedical approach, are potential reasons the biopsychosocial systems metatheory has not been

included in mainstream medicine. The biomedical approach has been most commonly used in medicine traditionally because of the influence of personalized 'miracle' drugs in modern medicine (Suls, Krantz, & Williams, 2013). However, practitioners have begun to recognize that medication use and adherence is affected by patients' psychosocial issues (e.g., self-regulation skills, relationship with their provider, patients' emotions, etc.), which are not accounted for in the traditional biomedical model (Suls, Krantz, & Williams, 2013). These recent outcomes could likely be better addressed if grounded in and analyzed through the biopsychosocial systems metatheory

Researchers have found that incorporating psychosocial health experiences during medical interviews was not only more comprehensive than assessing only biomedical health information, but patients also had improved health outcomes and higher patient satisfaction when psychosocial information was collected (Stewart et al., 2000). Thus, if this dissertation followed how research has been conducted historically, (i.e., only focusing on the biomedical health of individuals) the psychosocial components of active duty women's health experiences and the systemic relationships between the subsystems would be missed. The biopsychosocial systems metatheory can be further enhanced by considering the spiritual health of active duty women (i.e., the biopsychosocial-spiritual systems metatheory). Wright, Watson, and Bell (1996) identified spirituality as the core beliefs that are central to how an individual experiences health and illness and recognized it as a construct that was unique from the bio, psycho, and social domains of the BPS model. Through this dissertation, the biopsychosocial-spiritual health of active duty women is explored, along with an analysis of the within and between biological, psychological, social, and spiritual constructs. Following is a description of the purpose and

design of this dissertation using an adaptation to the biopsychosocial systems metatheory including the addition of spirituality.

Purpose and Design

For the purpose of this dissertation, the biopsychosocial systems metatheory is adapted to include spirituality in order to better understand the overall health of active duty women and to identify potential health disparities that could inform assessment and treatment practices in the future. While researchers have published on biological, psychological, social, or spiritual outcomes for military women, to date, no known research exists on the relationship between the biopsychosocial-spiritual (BPSS) health factors in an active duty women population. This research is necessary in order to fully capture the overall health experiences of women in the military and to best meet their unique needs based on their BPSS health. As such, the purpose of this dissertation is to explore the BPSS health of active duty women through a review of the literature, a systematic review, and an empirical study. Ultimately, the purpose of this research is to offer information toward future metrics and treatment protocols in order to better assess and treat the overall health of active duty women.

This dissertation evolves from a literature review exploring each of the subsystems of the biopsychosocial-spiritual systems metatheory (Chapter 2) into a systematic review (Chapter 3) that seeks to identify research that encompassed the interplay of biopsychosocial-spiritual health experiences of active duty women. Then, based on the results of the systematic review, the design for an empirical research study is offered in Chapter 4. The structural basis of the study is provided (i.e., the participants, recruitment procedures, measures) as well as an attempt to respond to previous researchers' concerns about the biopsychosocial-spiritual systems

metatheory. Specifically, models include the exploration of the intra- biological, psychological, social, and spiritual components of health as well as how these subsystems are related.

More specifically, Chapter 2 offers an in-depth review of the literature on the health experiences of active duty women compared to active duty men and civilian women. This chapter is organized by the biological (e.g., reproductive health, health care access and quality, and casualties), psychological (e.g., suicide rates, barriers to behavioral healthcare, and trauma exposure), social (e.g., social and occupational support), and spiritual (e.g., seeking mental health treatment from a chaplain) health factors that active duty women experience.

Then, a systematic review is presented in Chapter 3. The systematic review was conducted to address the question: "What are the biopsychosocial-spiritual health factors associated with military service in the lives of active duty women?" After a systematic search of four databases, 221 articles met the inclusion criteria for the review. Through the analysis of the sample and results of each of the articles, the 221 articles were categorized into two different groups. The first group included articles whereby the authors purposefully examined active duty women's health (n = 79). The second group included 142 articles that reported on the health of mixed samples (e.g., civilian women or active duty males and active duty women). However, in some of these articles active duty women may have been minimally mentioned (e.g., in some instances only a statement or brief paragraph was included on active duty women). Results from the review indicated that there are biological, psychological, and social health outcomes for active duty women, but spirituality has yet to be examined in this population.

Based on the results from Chapter 3, the methodology for an empirical study was constructed. The methodology for this study is presented in Chapter 4. Through this study, active duty women were recruited to participate in an electronic survey. Participants completed a self-

report survey with measures assessing biological, psychological, social, and spiritual health factors. Data analysis is also presented in this chapter.

Chapter 5 is a publishable manuscript including the results from the exploratory study design outlined in Chapter 4. In this chapter, the relationships within and between the biopsychosocial-spiritual health domains was explored using bivariate correlations. Several significant correlations are presented. Also, mediating and moderating regressions were used to examine women's biopsychosocial-spiritual health as it relates to her number of deployments and length of time in the service. Then, a discussion of significant contributions, limitations, and research and policy implications are included.

Chapter 6 of this dissertation presents an argument for future research as well as clinical and policy implications based on the results from the study. This chapter suggests that researchers should attend to the BPSS systems metatheory and they should acknowledge the systemic interactions between BPSS variables in their work. This chapter also presents implications regarding the use of BPSS assessments for providers and policy implications for the Department of Defense that honor the health of active duty women.

Summary

Although women have played crucial roles in the military since the beginning of our country's history, recent policy changes are affording more women the opportunity to be employed by the military and in various jobs compared to previous generations. Researchers have found that military women experience many health disparities compared to military men and civilian women, yet there is limited information about the biopsychosocial-spiritual health factors that are relevant for active duty women. The significant contribution of this dissertation is to fill some of the existing chasm within the literature related to the health of active duty women,

in order to promote future research, clinical, and policy changes that support women's overall health needs.

REFERENCES

Aldous, W. K., Robertson, J. L., Robinson, B. J., Hatcher, C. L., Hospenthal, D. R, Conger, N. G., & Murray, C. K. (2011). Rates of gonorrhea and chlamydia in U.S. military personnel deployed to Iraq and Afghanistan (2004–2009). *Military Medicine, 176*(6), 705–710. doi:10.7205/MILMED-D-10-00218

Anchin, J. C. (2008). Pursuing a unifying paradigm for psychotherapy: Tasks, dialectical considerations, and biopsychosocial systems metatheory. *Journal of Psychotherapy Integration, 18*(3), 310-349. doi:10.1037/a0013557

Armed Forces Health Surveillance Center. (2009). Health of women after deployment in support of Operation Enduring Freedom/Operation Iraqi Freedom. *Medical Surveillance Monthly Report, 16*(10), 2-9.

Barrett, R. H. (2012). *The couple's relationship with diabetes: Transformation, partnership, and management* (Doctoral dissertation). Retrieved from ProQuest. (Order No. 3548744).

Besterman-Dahan, K., Gibbons, S. W., Barnett, S. D., & Hickling, E. J. (2012). The role of military chaplains in mental health care of the deployed service member. *Military Medicine, 177*(9), 1028-1033.

Bostock, D. J., & Daley, J. G. (2007). Lifetime and current sexual assault and harassment victimization rates of active-duty United States Air Force women. *Violence Against Women, 13*(9), 927-944. doi:10.1177/1077801207305232

Campbell, J. C., Garza, M. A., Gielen, A. C., O'campo, P., Kub, J., Dienemann, J., Jones, A. S., & Jafar, E. (2003). Intimate partner violence and abuse among active duty military women. *Violence Against Women, 9*(9), 1072-1092. doi:10.1177/1077801203255291

Congressional Research Service (CRS). (2015). Women in combat: Issues for Congress. Retrieved from http://www.fas.org/sgp/crs/natsec/R42075.pdf

Cronk, T. M. (2015). Official provides update on combat jobs for women. Retrieved from http://www.defense.gov/News-Article-View/Article/604531

Department of Defense (DoD). (2009). Defense Department Advisory Committee on Women in the Services report. Retrieved from http://dacowits.defense.gov/Portals/48/Documents/Reports/2009/Annual%20Report/dacowits200 9report.pdf

Department of Defense (DoD). (2012). Demographics report. Retrieved from http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Department of Defense (DoD). (2013). Defense Department rescinds direct combat exclusion rule; Services to expand integration of women into previously restricted occupations and units. Retrieved from http://www.defense.gov/Releases/Release.aspx?ReleaseID=15784

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196,* 129-136. doi:10.1126/science.847460

Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137,* 535-544.

Friedl, K. E., Nuovo, J. A., Patience, T. H., & Dettori, J. R. (1992). Factors associated with stress fracture in young army women: Indications for further research. *Military Medicine, 157*(7), 334-8.

Holm, J. (1992*). Women in the military: An unfinished revolution* (Revised ed.). Toronto: The Random House Ballantine Publishing Group: Toronto.

Holm, J. M., & Bellafaire, J. (1998). *Defense of a nation: Servicewomen in World War II*. Washington, DC: Military Women's Press.

Hourani, L. L. & Yuan, H. (1999). The mental status of women in the Navy and Marine Corps: Preliminary findings from the 1995 Perceptions of Wellness and Readiness Assessment. *Military Medicine, 164*(3), 174-181.

Lin, C. J. (2014). One year later, military criticized over rate of progress for women in combat. Retrieved from http://www.stripes.com/news/one-year-later-military-criticized-over-rate-of-progress-for-women-in-combat-1.264805

Magann, E. F., & Nolan, T. E. (1991). Pregnancy outcome in an active-duty population. *Obstetrics & Gynecology, 78*(3), 391-393.

Melchert, T. (2011). *Foundations of professional psychology: The end of theoretical orientations and the emergence of the biopsychosocial approach* (1st ed.). Boston, MA: Elsevier.

Meyer, L., & Melchert, T. P. (2011). Examining the content of mental health intake assessments from a biopsychosocial perspective. *Journal of Psychotherapy Integration, 21*(1), 70-89. doi:10.1037/a0022907

Naclerio, A., Stola, J., Trego, L. & Flagerty, E. (2011). The concerns of women currently serving in the Afghanistan theater of operations. Retrieved from http://usarmy.vo.llnwd.net/e2/c/downloads/262501.pdf

National Center for Veterans Analysis and Statistics. (2011). America's women veterans. Retrieved from http://www.va.gov/vetdata/docs/specialreports/final_womens_report_3_2_12_v_7.pdf

Roulo, C. (2013). Defense Department expands women's combat role. Retrieved from http://www.defense.gov/news/newsarticle.aspx?id=119098

Rychnovsky, J., & Beck, C. T. (2006). Screening for postpartum depression in military women with the Postpartum Depression Screening Scale. *Military Medicine, 171*(11), 1100-1104.

Service Women's Action Network (SWAN). (2015). Women in combat. Retrieved from http://servicewomen.org/women-in-combat/

Smith, R. C., Fortin, A. H., Dwamena, F., & Frankel, R. M. (2013). An evidence-based patient-centered method makes the biopsychosocial model scientific. *Patient Education and Counseling, 91*(3), 265-270. doi:10.1016/j.pec.2012.12.010

Stewart, M., Brown, J.B., Donner, A., McWhinney, I.R., Oates, J., Weston, W.W., & Jordan, T. (2000). The impact of patient-centered care on outcomes. *The Journal of Family Practice, 49*(9), 796–804.

Street, A. E., Vogt, D., & Dutra, L. (2009). A new generation of women veterans: Stressors faced by women deployed to Iraq and Afghanistan. *Clinical Psychology Review, 29*(8), 685–694. doi:10.1016/j.cpr.2009.08.007

Suls, J., Krantz, D. S., & Williams, G. C. (2013). Three strategies for bridging different levels of analysis and embracing the biopsychosocial model. *Health Psychology, 32*(5), 597-601. doi: 10.1037/a0031197.

United Kingdom Ministry of Defense. (2014). Women in ground close combat (GCC) review paper. Retrieved from https://www.gov.uk/government/publications/women-in-ground-close-combat-gcc-review-paper.

Witvliet, C. V. O., Phillips, K. A., Feldman, M. E., & Beckham, J. C. (2004). Posttraumatic mental and physical health correlates of forgiveness and religious coping in military veterans. *Journal of Traumatic Stress, 17* (3), 269-273.

Wright, L. M., Watson, W. L., & Bell, J. M. (1996). *Belief: The heart of healing in families and illness.* New York: Basic Books.

CHAPTER 2: THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN: SERVICE MEMBERS IN NEED OF SERVICE

Women have been an active part of the military since the beginning of American history. Women have held various roles in the military over the centuries, from dressing up as male soldiers to fight in the American Revolution and Civil War, to serving as nurses and linguists during World II, or as combat soldiers in Afghanistan in Operation Enduring Freedom (OEF; National Center for Veterans Analysis and Statistics, 2011). The transition to an all-volunteer force in 1973 allowed women to serve in more capacities than ever before (National Center for Veterans Analysis and Statistics, 2011). In fact, approximately 7,000 women served during the Vietnam Conflict, but over 200,000 have served in Iraq and Afghanistan (Leland & Oboroceanu, 2010). More specifically, women make up approximately 15% of today's active duty military force and 18.2% of the Reserve and Guard forces and this number continues to rise (Department of Defense [DoD], 2012).

Women in today's military have unique experiences compared to active duty women in previous generations due to recent policy changes. For example, the 1994 Direct Combat Exclusion Rule, that once prohibited women from holding certain jobs in the military (e.g., ground combat and Special Forces) has been lifted, allowing women to fill more positions than ever before (Roulo, 2013). Since this rule was lifted in 2013, over 14,000 new roles have opened up, allowing women to be assigned to various units (DoD, 2013). Since the number of women in the military is continuing to rise and there are recent policy changes that increase the opportunities women have in the military, it is essential to better understand the unique experiences of women in the military.

The purpose of this literature review is to explore the literature pertaining specifically to active duty women. Initially, it was unclear what issues (for active duty women) were unique to active duty military life and what factors were unique to women or gender, thus the research in this review is written about active duty women in comparison to active duty men and civilian women. These comparisons help to highlight factors that are most unique to women who are also active duty. In order to honor the complex and systemic issues that influence active duty women, research pertaining to biological, psychological, social, and spiritual health were used to guide the literature review.

Thus, this paper includes (a) a description of the biopsychosocial systems metatheory (Anchin, 2008) and the inclusion of spirituality as an adaptation to this metatheory (Wright, Watson, & Bell, 1996) (i.e., BPSS systems metatheory). A description of the BPSS systems metatheory is provided, along with a justification for why this metatheory was chosen over other options (e.g., biomedical model and biopsychosocial model), (b) a review of the biological, psychological, social, and spiritual health factors that influence active duty women in comparison to their active duty men and civilian women counterparts), and (c) a series of recommendations for future researchers that recognizes the need for a systematic review to capture the research that looks at all four of the biological, psychological, social, and spiritual domains of health and in a way that honors their systemic interaction rather than assessing a silo of health (e.g., psychological health) as if it were not influenced by other health factors (e.g., physical, social, or spiritual health).

Biopsychosocial Systems Metatheory and the Addition of Spirituality

Prior to writing this literature review, many theoretical foundations were explored. The biopsychosocial approach (Engel, 1977, 1980) and systems theory (von Bertalanffy, 1968) were

two aspects of health that quickly emerged as the best way to ground research related to active duty health for women. Engel (1977, 1980) argued that in order to accurately assess and treat patients, the interconnectedness between biological, psychological, and social factors must be taken into account. In addition, through systems theory, von Bertalanffy (1968) argued that a whole is greater than the sum of its parts and that each part of a system influences every other part; biological, psychological, and social health experiences should all be considered when assessing one's health and a change in one domain influences a change in the others. While a considerable amount of research has been conducted with systems theory (Mele, Pels, & Polese, 2010; Rousseau, 2015; Steinglass, 1984), the BPS approach was not initially constructed for research purposes (Smith, Fortin, Dwamena, & Frankel, 2013). However, in 2008, literature began to emerge that integrated systems theory and the biopsychosocial approach into a metatheory (Anchin, 2008), along with recommendations on how to test bio, psycho, and social constructs for research purposes.

Anchin (2008) argued for BPS research that would not only assess within each domain individually, but would also honor the systemic relationships between the domains. He recognized the strengths of Engel's work (1977; 1980) and general systems theory (von Bertalanffy, 1968), which when combined, posited that all phenomena from micro to macro levels were linked together and that a change in one level influenced a change in another. The biopsychosocial systems metatheory offered one additional consideration that better reflects modern health and health care delivery (i.e., a recognition that mental and behavioral health are as important as physical health). Anchin (2008) recommended that researchers see the micro and macro levels of health on a continuum (rather than through a hierarchy as was originally developed in the BPS approach), where differences within and between each domain are

accounted for as equally important and not subsumed to be more or less important as any other level of health.

Anchin (2008) suggested that using the biopsychosocial systems metatheory when conducting research allows for opportunities to fully understand the *whole* person. An example that exemplifies the importance of not only recognizing individual domains, but the interactions they create, can be better understood when thinking of the molecular components of water. That is, the unique properties of water cannot be understood by examining the individual properties of hydrogen and oxygen, rather, the interaction of hydrogen and oxygen must be considered together in order to better examine the properties of water (Anchin, 2008). Thus, in order to comprehensively understand the health of active duty women, it is essential to analyze within each health domain (biological, psychological, and social health) as well as the interrelationships between the domains.

However, as we prepared this literature review, we recognized that the biopsychosocial systems metatheory was missing one additional factor, spiritual health, thus an adaptation to the metatheory was made in order to better capture overall health. The spiritual component was added to Engel's biopsychosocial approach by Wright, Watson, and Bell (1996) because the researchers argued that an individual's beliefs about health and illness must also be considered. Therefore, understanding the spiritual health factors that are relevant for active duty women is necessary to include in order to fully capture the overall health of active duty women, and as such, was added to the biopsychosocial systems metatheory (i.e., BPSS systems metatheory).

Although the BPSS systems metatheory is not the only model used to explain health conditions, this metatheory was chosen to describe health experiences for this article because it honors the complexity and inter-relatedness of the various aspects of health and does not assume

that there is only one cause or solution to health conditions (Borrell-Carrio, Suchman, & Epstein, 2004). This perspective is unique compared to other models, such as the biomedical model, where the use of prescribing medications is most common (Suls, Kranz, & Williams, 2013). In contrast, the BPSS systems metatheory accounts for the conditions (e.g., the patient's emotions, ability to self-regulate, and their relationship with their healthcare provider, etc.) that influence an individual's adherence to a biomedically-focused treatment plan (Suls, Kranz, & Williams, 2013). Furthermore, the BPSS systems metatheory is a more comprehensive lens to health compared to the biomedical model, because the biomedical model alone does not explain multifaceted aspects of health (e.g., role of environmental biohazards, psychological symptoms, social satisfaction, or spiritual distress on health outcomes; Suls, Kranz, & Williams, 2013).

Therefore, the themes that will be discussed in this review are categorized into biological/physical (sexual and reproductive health, obesity, casualties, and health care access and quality), psychological (suicide, barriers to behavioral healthcare, trauma exposure), social (parenting and social support), and spiritual health experiences. Then, to address the concerns that previous researchers have reported about the lack of research assessing both within and between BPSS domains, the researcher will conclude with clinical, research, and policy recommendations for future research. These recommendations will argue that researchers, clinicians, and policy makers should acknowledge the systemic interaction of the biological, psychological, social, and spiritual domains of health instead.

The Biological, Psychological, Social and Spiritual Health Experiences of Active Duty Women

Although the number of women in the military continues to increase and women's contributions to readiness, unit cohesion and morale have been recognized (Harrell & Miller,

1997), there are still challenges that women experience as being part of military culture. For example, women in the military experience more unintended pregnancies than civilian women (Lindberg, 2011), the incidence of sexually transmitted infections in military women is disproportionately greater than military men (Aldous et al., 2011), and death rates for military women deployed to OEF (35.9%) and Operation Iraqi Freedom (OIF) (14.5%) are greater than for men deployed to the same conflicts (17% and 12%, respectively; Cross, Johnson, Wenke, Bosse, & Ficke, 2011).

With that being said, it is essential to explore the experiences of women in the military in order to best understand and support their unique needs. This is especially true since little research appears to focus on active duty women compared to active duty men and civilian women. This is important because our military is an all-volunteer force, thus creating an environment where women need to feel supported and loyal to their units is essential not only for job retention, but also for a healthier military (Goodman et al., 2013).

Biological Health Experiences of Women in the Military

There are several gender differences between the biological health of men and women military personnel and between military women and their civilian counterparts that are worth describing in effort to understand women's military experience. The biological factors that are punctuated most in the literature include sexual and reproductive health, obesity, health care access and quality, and casualties.

Sexual and Reproductive Health. There are several factors related to reproductive health that impact women in the military. First, in a sample of active duty Army men and women deployed to Iraq and Afghanistan, Aldous et al. (2011) found that deployed women had significantly higher rates of gonorrhea between the ages 18-24 and 25-29 in comparison to

deployed men, even though the U.S. rates from the Center for Disease Control (CDC) show that prevalence for gonorrhea in women is only slightly higher than the prevalence for men in the general population (i.e., civilian men and women; CDC, 2012). In addition, the same authors found that chlamydia rates were higher for women who deployed to Iraq compared to men that deployed to Iraq. These discrepancies are especially important since Manski et al. (2014) found that active duty women reported several barriers to seeking health care while deployed. More specifically, deployed women reported that having access to a female provider was uncommon and they felt uncomfortable and intimidated to be seen by male gynecologists, thus they were less likely to make appointments to address reproductive health issues.

Along with that, Goyal, Borrero, and Schwarz (2011) reported that unintended pregnancies are also a health concern for active duty women and their unborn child. The authors found that unintended pregnancies are an issue among active duty women because of a lack of education and contraceptive use during deployments. Unintended pregnancies are an even greater concern when the conception occurred through acts of sexual assault, rape, and trauma. Manksi et al. (2014) reported that deployed women who found out they were pregnant during deployment were often stereotyped as trying to avoid duty work and experienced discrimination, social isolation, and career-related consequences (e.g., loss of rank or pay). Also, the same authors found that pregnancies for active duty women could negatively impact morale and unit readiness if the other personnel in the unit had to compensate for the pregnant woman's responsibilities. These complications exist in many cases without knowing the systemic and complicating factors surrounding the conception, pregnancy, or delivery experiences.

Obesity. In addition to the concerns related to sexually transmitted infections and unintended pregnancies, Hill and Gloeb (2013) found that the prevalence of obesity and being

overweight among active duty women (before pregnancy) has continuously increased over a seven-year period. In fact, obesity rates for active duty women are now approaching their civilian counterparts (Tanofsky-Kraff et al., 2013). A number of health complications can emerge for women who are obese, including challenges with infertility (Wang et al., 2003) and labor complications (e.g., congenital anomalies; Stothard, Tennant, Bell, & Rankin, 2009). These findings are pertinent due to the adverse complications associated with being overweight, such as mission readiness and health care costs for the military (Hill & Gloeb, 2013). Since active duty women have higher incidence of STDs, report barriers to seeking medical health care, and experience complications surrounding pregnancy, it is essential to understand women' health care access and quality.

Health Care Access and Quality. In addition to understanding women's experiences with reproductive health in the military, access to and quality health care are also relevant to consider. First, Manski et al. (2014) found that deployed women reported that they did not seek medical care while deployed for several reasons. For example, deployed women did not seek medical treatment because they feared that seeking medical help would exacerbate the perception that women are weak or that they are trying to avoid their work responsibilities. Also, women reported that they worried about confidentiality since they would have to inform their chain of command about their need for medical care in order to attend an appointment. Women reported that this was a deterrent because they felt embarrassed to disclose their health needs, particularly with male commanders.

Unfortunately, almost no research exists on the health care needs of active duty military women, even though it appears that they experience unique barriers compared to military men when seeking healthcare during deployments (Manski et al., 2014). Perhaps most concerning for

active duty women is the research about the higher prevalence of interpersonal stress, anxiety, and depression compared to active duty men (Vogt, Pless, King, & King, 2005), even though they are reported to have more favorable health outcomes compared to civilian women (Lehavot, Hoerster, Nelson, Jakupcak, & Simpson, 2012).

As women transition from active duty to veteran status, women veterans tend to underutilize Veterans Administration healthcare relative to male veterans (Washington, Bean-Mayberry, Riopelle, & Yano, 2011). Researchers found that veteran women had either delayed their health care or had unmet health needs (Yano & Frayne, 2011). Researchers have found that being uninsured, not knowing about VA care benefits, beliefs about VA providers not being sensitive to their gender, and military sexual assault history significantly predicted women's delay in health care (Washington et al., 2011). Not only are there disparities in reproductive health for active duty men and women and in the access to and quality of health care for women active duty personnel and veterans, but casualty rates are also relevant in understanding biological and physical health.

Casualties. Although more service members are surviving war injuries in the current conflicts compared to previous wars due to medical advancements, Cross et al. (2011) found that deployed men may benefit more from these advancements more than women. For example, Cross et al. (2011) found that the percentage of women casualty deaths from OEF and OIF was greater than for men. More specifically, in OIF, 14.5% of wounded women died, whereas 12% of wounded men died. Also, in OEF, 35.9% of wounded women died, whereas 17% of wounded men died. The authors reported that additional research is needed to determine which exposures are contributing to the fatal injuries of active duty women. These gender differences are incongruent with the civilian population where men are two times more likely to die from trauma

related injuries than women (Centers for Disease Control and Prevention, 2007). These findings are important because guerilla warfare tactics (e.g., improvised explosive devices) used in the current war threaten deployed military personnel in a variety of roles in addition to tactics used in previous wars (e.g., direct combat; Vogt et al., 2011). This indicates that military personnel encounter more surprise attacks than in previous wars, putting all active duty personnel at greater risk, including women in support units and direct combat roles, perhaps contributing to changes in psychological health.

Psychological Health of Women in the Military

There are several gender differences in the psychological health of men and women military personnel and between military women and their civilian counterparts that are worth exploring in effort to understand the women military (active duty and veteran) experience. The psychological factors that have received the most attention in the literature include suicide rates, barriers to behavioral healthcare, and trauma exposure.

Suicide Rates. The psychological health of women military personnel is of grave concern, particularly since women in the military have had a three-fold increased risk for suicide and, after separation from the military, have a 79% greater likelihood to commit suicide than civilian women (Ghahramanlou-Holloway et al., 2014). These researchers also found that all military women who had committed suicide in 2011 were enlisted at the time of death and almost 90% had never experienced a deployment. This finding indicates that there must be other factors, besides deployment, that have the ability to negatively influence the psychological health of women in the military (e.g., history of physical or sexual abuse, interpartner relational issues, or exposure to other traumas). Perhaps other concerns that may contribute to the escalation of

mental and behavioral health symptoms toward suicidal ideations are the barriers (real or perceived) to seeking treatment.

Barriers to Behavioral Healthcare. Goodman et al. (2013) found that active duty military women reported that they feared seeking behavioral health care because of the ramifications from leadership and peers knowing about their issues and the negative effect it could have on their career. This is particularly concerning given that researchers have found that active duty women have a higher prevalence of interpersonal stress, anxiety, and depression compared to active duty men (Vogt, Pless, King, & King, 2005). A comparison of active duty women to civilian women was conducted by Lehavot et al. (2012), who found that, mental health was better for current active duty military women in comparison to civilian women, but worse for women who have left military service. However, Hoglund and Schwartz (2014) found that non-deployed women in the military had high odds of adverse mental health, when compared with civilian women (more than 1.5 times the odds) and non-deployed military men (more than 2.5 times the odds).

At best, information about behavioral health and mental illness for active duty women is inconsistent, however, it is clear that those who have screened positive for mental health diagnoses are more likely to feel stigmatized or experience perceived barriers to treatment (Hoge et al., 2004). Also, Manski et al. (2014) found that deployed active duty women reported that they feared seeking mental health care because they worried their commander would deem them unsuitable for the military and would question if they were stable enough to perform their job. Thus, active duty women are likely to avoid seeking mental health care in order to preserve their careers, even if they are experiencing challenges to their mental health or negative ramifications from traumatic events.

Trauma Exposure. Along with higher rates of suicide and barriers to seeking mental healthcare, military women have higher rates of trauma exposure compared to civilian women. In fact, Bostock and Daley (2007) found that the lifetime prevalence of rape for active duty women was twice as high as civilian women (28% versus 13%, respectively). In addition to trauma discrepancies between active duty and civilian women, researchers have also found discrepancies between active duty women and active duty men. For example, Hourani and Yuan (1999) found that active duty women were five times more likely to develop posttraumatic stress disorder and two times more likely to experience a major depressive episode compared to active duty men. More recent research by Vogt et al. (2011) found that active duty women had higher levels of deployment related stress (e.g., sexual harassment during deployment) than active duty men. The same authors also found that combat exposure was similar for deployed active duty men and women even though, at the time of their study, women were not permitted to have ground combat roles.

With that being said, there is a need to not only understand women's experiences of combat related stress, but also other stressors during deployments (e.g., sexual harassment) that have the ability to influence their mental and physical health (Sadler et al., 2000). For example, Dutra et al. (2011) found an association between posttraumatic symptoms and sexual harassment in active duty women coming home from deployment. More specifically, the authors found that military sexual trauma was more highly associated with posttraumatic symptoms than combat exposure during deployments, indicating that women's social health experiences may also be impacted by being active duty.

Social Health Experiences of Women in the Military

Along with the biological and psychological experiences of women in the military, social health (e.g., relationship satisfaction, financial well-being, social support) is also important to understand in order to fully capture women's military experience. The social experiences that have garnered the most attention are related to parenting and social support.

Parenting. Active duty women with children reported that support from family readiness groups and their units were significantly important when going through a deployment, but that most resources were structured for military men with civilian wives (i.e., spouses of military men) rather than active duty women (e.g., deployed single mothers; Goodman et al., 2013). Along with that, the same authors found that one major issue women service members faced during deployments was when the person designated to care for their child was unexpectedly unable to do so after they were already deployed. Women reported that commanders did not allow them to take leave to find someone else to watch their children and that became a critical concern and significant distraction while trying to focus on their mission (Goodman et al., 2013).

In addition, single mothers who are service members and in dual-military families are required to have family care plans that dictate who will take care of their children during deployments (DoD, 2010), but if women cannot find an adequate caregiver they may be forced to leave the military all together (Goodman et al., 2013). Single mothers in the military may experience challenges before and after deployments because they are trying to transport their children to a caregiver while preparing for deployment or reintegrating after a deployment (Goodman et al., 2013). More specifically, military policy states that it is the parents' responsibility to transport children to the caregiver in preparation for deployment using their own leave time and money, which becomes complicated for single mothers who have to

rely on their units to approve time away from work. This issue becomes even more challenging during deployments if family readiness resources do not collaborate with non-traditional caregivers (e.g., grandparents or male spouses), thereby resulting in a lack of support for families and a lack of information being shared to families regarding their deployed family member.

Social Support. In addition to experiencing unique challenges related to motherhood, active duty women are more likely to report higher levels of stress related to a lack of job control and social support than active duty men (Mota et al., 2012). This finding supports the notion that the ratio of men to women in the military (85:15, respectively) creates a stressful environment for women, further complicating their overall biopsychosocial health and potential for military readiness (Mota et al., 2012). Along with understanding the biological, psychological, and social health experiences of active duty women, exploring women's spiritual health is also imperative in order to fully capture their overall health.

Spiritual Health Experiences of Women in the Military

There is very limited research on the spiritual health experiences of active duty military women. In the BPSS approach, spirituality can refer to affiliation with an organized religion, but also encompasses an individual's set of beliefs and how they make meaning out of their life. With consideration for this description in mind, there is only one known article that discusses spirituality pertaining to active duty women. Besterman-Dahan, Gibbons, Barnett, and Hickling (2012) reported that women who were deployed to Iraq or Afghanistan were more likely to seek mental health or substance use counseling from both military chaplains and traditional mental health services compared to deployed active duty men; however it was unclear from the article which provider was approached first for services or the outcomes from the time spent with the provider. Spirituality is a component of health that is clearly missing from research with active

duty women, and thus impossible to compare as a strength or concern in relation to active duty men or civilian women.

Recommendations

While women veteran's health care has received more attention recently in the research, much less research exists on the biopsychosocial-spiritual health of active duty women. With a gap in the literature, clinicians and providers cannot be expected to be aware of the needs of active duty women and respond to care using best practices or evidence based research. Active duty women deserve more than an assumption that the biological/physical and psychosocial treatments that have been used or standardized with active duty men are effective or appropriate for active duty women. Thus, researchers, clinicians, and policy makers must work together to better understand the biopsychosocial-spiritual symptoms, concerns, risks, and barriers to treatment for active duty women in order to better support their readiness and fit for duty. This section includes recommendations for clinicians, researchers, and policy makers.

Clinical

Mental health clinicians, medical providers, and spiritual leaders or chaplains must work together to determine if and how active duty women are being set up for success toward a long career in the military. Assessments for biological, psychological, social, and spiritual health must become part of health care visits, including screenings for physical health concerns, interpersonal stressors, anxiety, depression, and sexual assaults or trauma in order to reduce the likelihood for suicidal ideations and attempts and promote healthy functioning from enlistment through separation/retirement and beyond. Due to common co-morbidities with physical health diagnoses and mental health diagnoses, such as depression and anxiety, some screenings, such as, the Patient Health Questionnaire-9 (Spitzer et al., 1999) and Generalized Anxiety Disorder-7

(Spitzer, Kroenke, Williams, & Löwe, 2006), should be conducted during medical appointments. The outcomes from these screenings may help clinicians and providers better understand the psychosocial health factors of their patient or open up opportunities to discuss spiritual health that may influence readiness or exacerbate physical health concerns.

Research

In addition to the recommendations for clinicians described above, there are several recommendations for future researchers based on the results of this review. First, although this review reported on some of the common biopsychosocial-spiritual health outcomes of active duty women, a more comprehensive systematic review that not only encompasses the biological, psychological, social, and spiritual health outcomes of active duty women, but also the relationships between these factors is needed to better understand the health experiences of active duty women. Specifically, a needs assessment should be conducted with active duty women (either cross-sectionally or longitudinally) to determine the most common biopsychosocial-spiritual and systemic needs at enlistment, deployment, rank, separation, and retired or veteran status, including an assessment of the barriers to treatment and potential solutions to these barriers. Then, researchers could seek to develop and evaluate measurements that assess BPSS systemic health outcomes and that influence the assessment and treatment of active duty women's health.

Second, researchers should conduct biopsychosocial-spiritual research that not only assesses within each factor individually, but also honors the systemic relationships between the factors. Thus, in order to comprehensively understand the health of active duty women, the interrelationships between the domains must be addressed simultaneously. This recommendation stands up against siloed care, research, and programs that do not encompass all

domains (e.g., bio, psycho, social, and spiritual) of health. This complex and comprehensive research is necessary to gain cumulative knowledge about the health of active duty women (Henriques, 2003).

Policy

The findings from this review indicate that there should be policies developed in order to help reduce the health challenges women face in the military. For example, the Department of Defense (DoD) or the command of each military branch should create policies that encourage active duty women to seek medical care while deployed. These policies should include ensuring confidentiality about medical needs for deployed women, in order for her to feel less concerned about repercussions from her command. Lastly, the DoD should evaluate current policies for active duty women who are single mothers or who are in dual-military marriages, since concerns about childcare have been reported as significant stressors and distractions for active duty women.

Summary

There are a variety of challenges that women in the military experience compared to men in the military and civilian women. Some experiences of women in the military are similar to men in the military. For example, both active duty men and women deployed to OEF/OIF report similar levels of resiliency to combat related stressors during deployments (Vogt et al., 2011), which indicates that women are no more susceptible to the negative effects of combat than men. However, other researchers have found that active duty women experience higher levels of posttraumatic stress due to physical and sexual trauma in the military aside from combat exposure (Mota et al., 2012). This indicates that further research is needed in order to examine the impact that military-related stress has on the BPSS systemic health of women. This review

supports the BPSS systems metatheory to better understanding the health experiences of women in the military, active duty and veterans. Understanding the unique challenges of women in the military is essential in creating service delivery models that support the biopsychosocial-spiritual and systemic health of women in order to maintain mission readiness and retain women in the military. Through a BPSS systemic approach to care, women who are active duty can be served in the same way that they serve their country, with respect, honor, and knowing that their safety comes first.

REFERENCES

Aldous, W. K., Robertson, J. L., Robinson, B. J., Hatcher, C. L., Hospenthal, D. R, Conger, N. G., & Murray, C. K. (2011). Rates of gonorrhea and chlamydia in U.S. military personnel deployed to Iraq and Afghanistan (2004–2009). *Military Medicine, 176*(6), 705–710. doi:10.7205/MILMED-D-10-00218

Anchin, J. C. (2008). Pursuing a unifying paradigm for psychotherapy: Tasks, dialectical considerations, and biopsychosocial systems metatheory. *Journal of Psychotherapy Integration, 18*(3), 310-349. doi:10.1037/a0013557

Besterman-Dahan, K., Gibbons, S. W., Barnett, S. D., & Hickling, E. J. (2012). The role of military chaplains in mental health care of the deployed service member. *Military Medicine, 177*(9), 1028-1033.

Borrell-Carrio, F., Suchman, A. L., & Epstein, R. M. (2004). The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine, 2*(6), 576-582. doi:10.1370/afm.245

Bostock, D. J., & Daley, J. G. (2007). Lifetime and current sexual assault and harassment victimization rates of active-duty United States Air Force women. *Violence Against Women, 13*(9), 927-944. doi:10.1177/1077801207305232

Carney, C. P., Sampson, T. R., Voelkler, M., Woolson, R., Thorne, P., & Doebbeling, B. N. (2003). Women in the Gulf War: Combat experience, exposures, and subsequent health care use. *Military Medicine, 168*(8), 654-661.

Cassels, C. (2009). *Young women veterans at high risk for suicide*. Retrieved from http://www.medscape.com/viewarticle/703424

Centers for Disease Control and Prevention. (2006). *United States all injury deaths and rates per 100,000.* Retrieved from http://webappa.cdc.gov/cgi-bin/broker.exe

Centers for Disease Control and Prevention (2012). *2012 Sexually transmitted diseases surveillance.* Retrieved from http://www.cdc.gov/std/stats12/gonorrhea.htm

Cross, J. D., Johnson, A. E., Wenke, J. C., Bosse, M. J., & Ficke, J. R. (2011). Mortality in female war veterans of operations Enduring Freedom and Iraqi Freedom. *Clinical Orthopaedics and Related Research, 469*(7), 1956–1961. doi:10.1007/s11999-011-1840-z

Department of Defense (DoD). (2010). *Instruction: Family care plans*. Retrieved from http://www.dtic.mil/whs/directives/corres/pdf/134219p.pdf

Department of Defense (DoD). (2012). *Demographics report*. Retrieved from http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Department of Defense (DoD). (2013). Defense Department rescinds direct combat exclusion rule; Services to expand integration of women into previously restricted occupations and units. Retrieved from http://www.defense.gov/Releases/Release.aspx?ReleaseID=15784

Dutra, L., Grubbs, K., Greene, C., Trego, L. L., McCartin, T. L., Kloezeman, K., & Morland, L. (2011). Women at war: Implications for mental health. *Journal of Trauma Dissociation, 12*(1), 25-37. doi:10.1080/15299732.2010.496141.

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196,* 129-136. doi:10.1126/science.847460

Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137,* 535-544.

Ghahramanlou-Holloway, M., Tucker, J., Neely, L. L., Carreno-Ponce, J. T., Ryan, K., Holloway, K., & George, B. (2014). Suicide risk among military women. *Psychiatric Annals, 44,* 189-193. doi:10.3928/00485713-20140403-06

Goodman, P., Turner, A., Agazio, J., Throop, M., Padden, D., Greiner, S., & Hillier, S. L. (2013). Deployment of military mothers: Supportive and nonsupportive military programs, processes, and policies. *Military Medicine, 178,* 729-734. doi:10.7205/MILMED-D-13-00501

Goyal, V., Borrero, S., & Schwarz, E. B. (2012). Unintended pregnancy and contraception among active duty servicewomen and veterans. *American Journal of Obstetrics & Gynecology, 206*(6), 463–469. doi:10.1016/j.ajog.2011.11.018

Harrell, M., & Miller, L. (1997). *New opportunities for military women: Effects upon readiness, cohesion, and morale.* Santa Monica, CA: RAND Corp.

Hill, C. C., & Gloeb, D. J. (2013). Military maternal weight trends and perinatal outcomes. *Military Medicine, 178*(8), 880-886. doi:10.7205/MILMED-D-13-00031

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351,* 13-22. doi:10.1056/NEJMoa040603

Hoglund, M. W., & Schwartz, R. M. (2014). Mental health in deployed and nondeployed veteran men and women in comparison with their civilian counterparts. *Military Medicine, 179*(1), 19-25. doi:10.7205/MILMED-D-13-00235.

Holland, J. C., & Bultez, B. D. (2007). The NCCN guideline for distress management: A case for making distress the sixth vital sign. *Journal of the National Comprehensive Cancer Network, 5,* 1-5.

Hourani, L. L. & Yuan, H. (1999). The mental status of women in the Navy and Marine Corps: Preliminary findings from the 1995 Perceptions of Wellness and Readiness Assessment. *Military Medicine, 164*(3), 174-181.

Lehavot, K., Hoerster, K. D., Nelson, K. M., Jakupcak, M., & Simpson, T. L. (2012). Health indicators for military, veteran, and civilian women. *American Journal of Preventive Medicine, 42,* 473-480. doi:10.1016/j.amepre.2012.01.006.

Leland, A., & Oboroceanu, M. J. (2010). *American war and military operations casualties: Lists and statistics.* Retrieved from http://fas.org/sgp/crs/natsec/RL32492.pdf

Lindberg, L. D. (2011). Unintended pregnancy among women in the US military. *Contraception, 84*(3), 249–251. doi:10.1016/j.contraception.2011.01.017

Manski, R., Grindlay, K., Burns, B., Holt, K., & Grossman, D. (2014). Reproductive health access among deployed US servicewomen: A qualitative study. *Military Medicine, 179*(6), 645-652. doi:10.2105/AJPH.2013.301576

Mele, C., Pels, J., & Polese, F. (2010) A brief review of systems theories and their managerial applications. *Service Science, 2,* 126-135. doi:10.1287/serv.2.1_2.126

Mota, N. P., Medved, M., Wang, J., Asmundson, G., Whitney, D., & Sareen, J. (2012). Stress and mental disorders in female military personnel: Comparisons between the sexes in a male dominated profession. *Journal of Psychiatric Research, 46*(2), 159-167. doi:10.1016/j.jpsychires.2011.09.014

National Center for Telehealth & Technology. (2012). *Department of Defense suicide event report.* Retrieved from http://t2health.dcoe.mil/sites/default/files/dodser/DoDSER_2011_Annual_Report.pdf

National Center for Veterans Analysis and Statistics. (2011). *America's women veterans.* Retrieved from http://www.va.gov/vetdata/docs/specialreports/final_womens_report_3_2_12_v_7.pdf

Roulo, C. (2013). *Defense Department expands women's combat role.* Retrieved from http://www.defense.gov/news/newsarticle.aspx?id=119098

Rousseau, D. (2015). General systems theory: Its present and potential. *Systems Research and Behavioral Science, 32*(5), 522-533. doi:10.1002/sres.2354

Sadler, A.G., Booth, B. M., Nielson, D., & Doebbeling, B. N. (2000). Health-related consequences of physical and sexual violence: Women in the military. *Obstetrics and Gynecology, 96*(3), 473-480. doi:10.1111/j.1748-0361.2003.tb00576.x

Smith, R. C., Fortin, A. H., Dwamena, F., & Frankel, R. M. (2013). An evidence-based patient-centered method makes the biopsychosocial model scientific. *Patient Education and Counseling, 91*(3), 265-270. doi:10.1016/j.pec.2012.12.010

Spitzer, R., Kroenke, K., & Williams, J. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Journal of the American Medical Association, 282,* 1737-1744. doi:10.1001/jama.282.18.1737

Spitzer, R. L., Kroenke, K., Williams, J. W., & Löwe, B. (2006). A brief measure for assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine, 166*(10), 1092-1097. doi:10.1001/archinte.166.10.1092

Steinglass, P. (1984). Family systems theory and therapy: A clinical application of general systems theory. *Psychiatric Annals, 14*(8), 582-586. doi:10.3928/0048-5713-19840801-09

Stothard, K. J., Tennant, P. W., Bell, R., & Rankin, J. (2009). Maternal overweight and obesity and the risk of congenital anomalies: A systematic review and meta-analysis. *Journal of the American Medical Association, 301*(6), 636–650. doi:10.1001/jama.2009.113.

Suls, J., Krantz, D. S., & Williams, G. C. (2013). Three strategies for bridging different levels of analysis and embracing the biopsychosocial model. *Health Psychology, 32*(5), 597-601. doi: 10.1037/a0031197.

Tanofsky-Kraff, M., Sbrocco, T., Thelm, K. R., Cohen, L. A., Mackey, E. R., Stice, E., … Stephens, M. B. (2013). Obesity and the U. S. military family. *Obesity, 21,* 2205-2220. doi:10.1002/oby.20566

Vimalananda, V. G., Miller, D. R., Palnati, M., Christiansen, C. L., & Fincke, B. G. (2011). Gender disparities in lipid-lowering therapy among veterans with diabetes. *Women's Health Issues, 21*(4), 176-181. doi:10.1016/j.whi.2011.04.009.

Vogt, D., Pless, A., King, L., & King, D. (2005). Deployment stressors, gender, and mental health outcomes among Gulf War I veterans. *Journal of Traumatic Stress, 18,* 272–284. doi:10.1002/jts.20018

Vogt, D., Vaughn, R., Glickman, M. E., Schultz, M., Drainoni, M. L., Elwy, R., & Eisen, S. (2011). Gender differences in combat-related stressors and their association with postdeployment mental health in a nationally representative sample of U.S. OEF/OIF veterans. *Journal of Abnormal Psychology, 120*(4), 797-806. doi:10.1037/a0023452

Wang, X., Chen, C., Wang, L., Chen, D., Guang, W., & French, J. (2003). Conception, early pregnancy loss, and time to clinical pregnancy: A population-based prospective study. *Fertility and Sterility, 79*(3), 577–584. doi:10.1016/S0015-0282(02)04694-0

Washington, D. L., Bean-Mayberry, B., Riopelle, D., & Yano, E. M. (2011). Access to care for women veterans: Delayed healthcare and unmet need. *Journal of General Internal Medicine, 26*(2), 655-661. doi:10.1007/s11606-011-1772-z

Women in the Military Service for America Memorial. (2013). *Statistics on women in the Military.* Retrieved from http://www.womensmemo¬rial.org/Press/stats.html.

Wright, L. M., Watson, W. L., & Bell, J. M. (1996). *Belief: The heart of healing in families and illness.* New York: Basic Books.

CHAPTER 3: A SYSTEMATIC REVIEW OF THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH FACTORS ASSOCIATED WITH MILITARY SERVICE FOR ACTIVE DUTY WOMEN

Although the number of enlisted active duty service members has decreased as a whole since the end of conscription in 1973, the number of active duty women has continued to increase (Patten & Parker, 2011). In fact, there are currently over 200,000 active duty women in today's military (Department of Defense [DoD], 2015) compared to approximately 40,000 in the early 1970s (Patten & Parker, 2011). Women have held important roles in the military since the beginning of American history, even when they were not necessarily allowed to participate. For example, most women served in traditional roles, such as cooks or nurses (DoD, 2015), while others chose to risk their lives and disguise themselves as males in order to fight alongside their male counterparts.

Women make up approximately 15% of today's active duty military and 18.2% of the Reserve and Guard forces (DoD, 2012). Not only are more women volunteering for military service now than ever before in America's history, but due to recent policy changes, they are also allowed to apply for more jobs, specifically, combat-related positions (DoD, 2013). Since the number of women in the military is continuing to rise and there are more job opportunities for women in the military, it is important to understand the unique health effects they experience that differ from civilian women and active duty males.

Along with that, due to all of the factors that coincide with military service (e.g., deployments, frequent relocations, and long duty hours) it not surprising that researchers have found that active duty status has the ability to significantly influence the biological (Aldous et al., 2011), psychological (Culbertson & Rosenfeld, 1994), social (Escolas, Hildebrandt, Maiers, Baker, & Mason, 2013), and spiritual (Besterman-Dahan, Gibbons, Barnett, & Hickling, 2012)

health of service members. Thus, the framework that serves as the foundation for this review is the biopsychosocial-spiritual (BPSS) approach (Engel, 1977, 1980; Wright, Watson, & Bell, 1996). This approach posits that in order to fully capture an individual's health, the interconnectedness between biological, psychological, social, and spiritual factors must be taken into account. In other words, biological, psychological, social, and spiritual health cannot be understood independently from one another because these domains are inter-related; one cannot have biological health concerns without psychological, social, or spiritual ramifications and vice versa. This approach is a relevant foundation for this review because life in the military has the ability to influence women' biological, psychological, social, and spiritual health in positive and challenging ways.

Although there are numerous health benefits from being active duty (e.g. free access to healthcare and stable housing and income), military culture also has the ability to negatively affect the biological (e.g., higher rates of sexually transmitted infections during deployment; Aldous et al., 2011), psychological (e.g., sexual harassment; Sadler et al., 2003), social (e.g., conflicts between military and family responsibilities; DoD, 2012), and spiritual (e.g., negative religious coping is associated with higher post-trauma scores; Witvliet, Phillips, Feldman, & Beckham, 2004) health of service members. Researchers have focused on many of these outcomes with women veterans (Sadler, Booth, Cook, & Doebbeling, 2003; Washington, Bean-Mayberry, Riopelle, & Yano, 2011), but few researchers have explored the biopsychosocial-spiritual effects of military service on active duty (AD) women.

Previous systematic reviews with women military samples have focused on the health of women veterans (Goldzweig, Balekian, Rolón, Yano, & Shekelle, 2006), deployment and PTSD in women combat veterans (Conard & Sauls, 2014), and the effects of physical training on load

carriage performance, including women military samples (Knapik, Harman, Steelman, & Graham, 2012). However, to date, researchers have not conducted a systematic review on the biopsychosocial-spiritual health of active duty women. Thus, the purpose of this systematic review was to explore the question: What are the biopsychosocial-spiritual health factors associated with military service in the lives of active duty women?

Method

The methodology for this article was guided by Cooper's (2010) approach to systematic reviews. Four databases were selected for this systematic review: Military and Government Collection, PsycINFO, CINAHL, and PubMed via Medline. These databases were selected based on their different foci, including current research pertaining to all branches of the military, psychology, nursing and allied health, and biomedical literature, respectively. Initially, the lead researcher conducted a pilot search combining the terms "active duty," "female," "women," "biological," physical," "emotional," mental," "psychological," "trauma," "relational," "social," "spirituality," "religion," "faith," "health," "illness," and "injury" conjointly in each database. Then, the lead researcher conducted a second pilot search using more broad terms ("active duty" combined with "female" and "women") in each database. The results from the second pilot search, using the broader terms, provided a more comprehensive list of articles and included all of the titles that were also in the first pilot search. Thus, the lead researcher determined that more global search terms were necessary in order to maximize the likelihood for capturing relevant research. As such, the terms "active duty" combined with "female" and "women" were selected and used across all four databases. No limit for year was set in the search parameters. The searches were conducted in February through May of 2015, and captured articles dating from 1973 to 2015.

The inclusion criteria for this review included articles that were: (a) peer-reviewed, (b) using samples that included women while they were on active duty in the U.S. military, and (c) reporting any physical, psychological, social, and/or spiritual outcomes. Articles were excluded from this review if results were not reported independently for active duty women and if the purpose of the study was to test an intervention or evaluate a program. Although these studies are important, these articles were excluded because the purpose of this review was to explore the health outcomes of women who identified as active duty in the military, not to examine how programs or interventions influence women' health. Quantitative and qualitative studies (i.e., empirical research articles) were included, but case studies, theoretical or conceptual articles, and opinion or editorial writings were not included as part of this review.

The initial keyword search yielded 2,055 results. Thus, the titles and abstracts (only), were reviewed for fit, resulting in 815 articles. In order to ensure that all relevant articles were captured, even if the abstract did not specifically mention active duty women health outcomes, the article was included into the next step. After duplicate titles were removed, 462 unique articles were identified. Next, the primary researcher reviewed the method and results sections of the 462 remaining articles. The articles' methods and results were analyzed using the inclusion and exclusion criteria, whereby 221 articles were ultimately determined to fit the purpose of this review. As the primary researcher continued to examine the articles, it became clear that even though all of the articles met the inclusion criteria, most articles only briefly referenced active duty women' unique health outcomes (e.g., only one statement or finding in the results section pertained specifically to women).

Since the purpose of this review was to focus only on the health outcomes of active duty women, the primary researcher chose to separate the 221 articles into two distinct categories. The

first category (i.e., Category 1: Active Duty Women Only Sample) included articles whereby the authors purposefully examined AD women' health (*n* = 79). The second category (i.e., Category 2: Mixed Samples) included articles that reported on the health of active duty women, but the purpose of the study was not intentionally focused on AD women (only; *n* = 142), but also included other samples (e.g., civilian women or active duty males). Given that most of the articles in Category 2 provided little insight into health concerns specific to AD women, greater detail will be shared about the articles in Category 1, with less information provided about the intricacies of Category 2 results. Although the remaining 142 articles are not described in depth, Table 3 shows the biopsychosocial-spiritual health outcomes of those studies.

Results

Results from the systematic review were distributed into one of two categories: Category 1: Active Duty Women Only Sample (see Table 2) and Category 2: Mixed Samples (see Table 3). The results from Category 1 represented the following active duty branches: Air Force (*n* = 11), Army (*n* = 15), Navy (*n* = 10), Marine Corps (*n* = 2), Marine Corps Recruits (*n* = 2), more than one branch (*n* = 21), and samples that were only identified as "active duty military" (*n* = 18). The results for Category 1 are organized into six domains based on the biopsychosocial-spiritual health outcomes reported in the article: (1) biological health outcomes only (*n* = 49); (2) psychological health outcomes only (*n* = 8); (3) social health outcomes only (*n* = 4); (4) biological and psychological health outcomes (*n* = 6); (5) biological and social health outcomes (*n* = 5); and (6) psychological and social health outcomes (*n* = 7). Although spiritual outcomes were part of the inclusion criteria for this study, no articles were identified in this category on spirituality, religion, or faith.

Biological Health Outcomes

Of the 49 articles that only reported biological health outcomes, all but one used a quantitative method to gather data. The biological health outcomes most commonly reported through these articles were in relation to pregnancy (n = 27) and general women's health issues (n = 10). For the purpose of this review, "women's health issues" refers to health issues unique to women; for example, endometriosis, mammograms, cervical pathology, menses, and other gynecological issues are included in this group. Other common outcomes included meeting military fitness standards (n = 6) and injuries (n = 5). Researchers indicated that pregnancy and postpartum negatively influenced AD women's ability to pass military fitness standards [5,6, 13, 22, 24] and that there were risks associated with being both AD and pregnant (e.g., preterm labor, pregnancy-induced hypertension, and urinary tract infections) [19, 23, 25, 26, 27, 32, 34, 35, 39, 45, 46].

In addition, with regard to women's health issues, researchers reported that not having a regular menses increased the risk of AD women to have a musculoskeletal injury [40, 44] and that occupational roles (e.g., standing for long periods of time, flying in jet aircrafts, and being exposed to volatile organic compounds) could adversely affect women's health (e.g., increased risk for breast cancer and menstrual cycle issues) [17, 41]. However, other researchers reported that AD women reported greater utilization of healthcare services (e.g., mammography screening and recent Pap examinations), which positively influenced their overall health [15, 30, 38] compared to civilian, National Guard, and Reserve women. Overall, 62% of the results in this Category are biologically focused. These results demonstrate that although active duty women have access to healthcare services, being active duty still creates physical health challenges (e.g., risky pregnancies and occupational hazards to their health). Not only did the results from this

review identify studies with only biological health outcomes, but also those that focused only on psychological health outcomes.

Psychological Health Outcomes

All of the data from the eight articles that reported on psychological health outcomes for active duty women were collected via quantitative methods. The most common outcomes for this domain were related to disordered eating behaviors (n = 3) and post-partum depressive symptoms (n = 2). Researchers reported that 33.6% of AD women met criteria for abnormal eating behaviors [51]. Another author reported an 8% prevalence rate for eating disorder diagnoses in AD women [52]. More specifically, researchers found that for AD women nurses, 1.1% met the criteria for anorexia nervosa, 12.5% met the criteria for bulimia nervosa, and 36% met the criteria for eating disorder not otherwise specified [54]. In addition, researchers found that approximately 50% of AD women scored positive for post-partum symptoms after delivery and 40% reported symptoms after six weeks [56]. However, researchers have also indicated that combat exposure may influence maternal depression [55]. Psychologically-focused articles only represented 10% of this Category. Although there were limited articles in this domain, it is clear that the psychological outcomes reported in these articles are worthy of attention (e.g., postpartum depression and the prevalence of eating disorders in this population). In addition to psychological health outcomes, this review found studies that specifically reported on social health outcomes.

Social Health Outcomes

Each of the four articles included in this domain used a quantitative method to collect data. The codes relevant for this domain were related to social adjustment, sexual behaviors, harassment, intimate partner violence and marital status. First, researchers reported that women

socially adjust to military life better than males (e.g., males reportedly experience more loneliness and boredom) [58]. Also, almost half of AD women in one sample reported risky sexual behaviors (e.g., having more than one sexual partner and not using condoms) [59]. In another study, 30% of women reported a lifetime prevalence rate of intimate partner violence (IPV; physical or sexual assault) with 21.6% reporting that IPV occurred during their military service [61]. Also, researchers found that the lifetime prevalence rate of rape for AD women was more than twice as high as the general population (28% and 13%, respectively) [60]. The same authors found that 31.3% of AD women had been sexually harassed by a military supervisor, while 26.7% had been sexually harassed by a military co-worker. Socially-focused outcomes only represented 5% of the articles in this Category. These results indicate that even though women adjust to military life better than males do, they also endure interpersonal violence, rape, and sexual harassment by supervisors and co-workers, all of which have the potential to damage her biological, psychological, social, and spiritual health. Unfortunately, very few articles emerged that included an interconnectedness between the BPSS outcomes.

Biological and Psychological Health Outcomes

All six of these articles were conducted using quantitative methods. A common finding in this domain was related to general women's health issues and pregnancy with depression (n = 3). Researchers found that while pregnant, 24% of AD women screened positively on the Edinburgh Postnatal Depression Scale and 11% of those women reported suicidal ideation [62]. In addition, researchers reported that being pregnant significantly predicted higher psychological stress levels [63] and active duty pregnant women had an increased risk for stress during pregnancy compared to women dependents [64]. Although this domain only represented about 7% of the articles in Category 1, the results demonstrate the interconnectedness between biological (e.g., pregnancy)

and psychological (e.g., depression and suicidal ideation) health issues. However, no biological issues beyond pregnancy were addressed in this domain. Only a slightly greater number of articles connected the interplay of biological and social health outcomes for active duty women.

Biological and Social Health Outcomes

There were five articles in this domain and each of them used quantitative methods. A common theme in this section was related to pregnancy or general women's health issues (e.g., knowledge about their reproductive system and douching behaviors) combined with sex behaviors or marital status (n = 4). Researchers reported that younger women military members had more sexual intercourse with more partners, reported less contraceptive use, and less knowledge about how their reproductive system works compared to older active duty women [68]. In addition, researchers found that over half of military women douched in the past year and that sexual activity was associated with more douching behaviors [69]. The same authors report that this finding is concerning since active women have access to health counseling which explains the hazards of douching (i.e., the vagina self-cleanses and can be infected by internal cleansers).

Further, researchers reported that marital status was a more significant predictor of preterm delivery than a host of medical conditions; 26% of single women had preterm deliveries compared to 11% of married women, and 37% of divorced or separated active duty women [72]. However, five years prior to that study, other researchers found that there was no significant difference between pregnancy complications and marital status [70]. This domain represented 6% of the articles in Category 1, with limited areas of focus via biological health (e.g., douching and preterm deliveries) and their connection to social health factors (e.g., risky sex behaviors and

marital status). The final combination of the BPSS approach that emerged through the review was with psychological and social health outcomes.

Psychological and Social Health Outcomes

There were seven articles coded into this domain and each of them used quantitative methods to obtain data. A common theme in the articles from this domain were related to depression (n = 5). Researchers reported that post-partum depression was related to social support and poor marital satisfaction [73]. In addition, researchers found that women experiencing bidirectional violence were more likely to be depressed than women perpetrating unilateral violence [75]. Also, researchers reported that 4.6% of military women who had experienced abuse had co-morbid PTSD and depression [78]. Also, researchers found that higher levels of social support predicted fewer depressive symptoms for AD women [79]. Another finding in this domain was related to post-trauma symptoms and harassment. Researchers found that more than 50% of women reported being sexual harassed while deployed and military sexual harassment was the only significant predictor identified for PTSD symptoms [74]. This domain represented approximately 8% of this Category. The findings in this domain indicate that psychological health experiences (e.g., depression and PTSD) are connected to social health (e.g., social support, satisfaction with spouses, interpersonal violence, and harassment), but unfortunately the results are limited to a small fraction of the potential psychological symptoms or diagnoses and social factors that could influence AD women.

As mentioned previously, there were no studies that reported on the spiritual health of women in the military and there were no studies found in this Category that reported on the combination of the biological, psychological, and social health for active duty women. Along with the biopsychosocial (BPS) health outcomes presented from Category 1, there are also

relevant biopsychosocial-spiritual findings from the Category 2 group, whereby AD women were mixed with other samples (e.g., civilian women or active duty men). Again, the description of these findings from Category 2 is limited due the lack of information that specifically pertained to AD women within these articles.

Health Outcomes for Category 2: Mixed Samples

The results from Category 2 represented the following active duty branches: Air Force (= 15), Army (*n* = 43), Navy (*n* = 12), Marine Corps (*n* = 2), more than one branch (*n* = 57), and samples that were only identified as "active duty military" (*n* = 13). The results for Category 2 are organized into eight domains based on biopsychosocial-spiritual outcomes. The domains relevant for this category are: (1) biological health outcomes only (*n* = 74); (2) psychological health outcomes only (*n* = 35); (3) social health outcomes only (*n* = 23); (4) spiritual health outcomes only (*n* = 1); (5) biological and psychological health outcomes (*n* = 1); (6) biological and social outcomes (*n* = 2); (7) psychological and social health outcomes (*n* = 4); and (8) biological, psychological, and social health outcomes (*n* = 2) (as denoted in bold font in Table 3).

It is clear that Category 2 includes a greater number of articles and a more diverse selection of domains compared to Category 1. Although the quantity of the articles in this category is greater, the depth of the outcomes specifically pertaining to active duty women was lacking compared to the first category. While all of the articles in this group met the inclusion criteria for this review, after analyzing all 221 articles (categories one and two), it became clear that the level of attention given to active duty women in the results of these articles was deficient. Oftentimes, only a brief one-sentence statistic was reported. With this being said, the data gathered from the articles in this category is still significant in understanding the health experiences of active duty women. In fact, this category captured a different side of women's

health issues that were not captured in category one (i.e., this category had less women-specific health concerns, such as pregnancy, and more universal outcomes). This category also included more articles that demonstrated the interconnectedness between the biopsychosocial-spiritual outcomes for women compared to the first category [see Table 3 for additional details regarding the health outcomes for each domain in this category].

Discussion

The articles included in this review span across four decades and describe the biological, psychological, and social health experiences of active duty women. Most of the articles (62%) only reported biological or physical health outcomes and the most recent articles included in this review (i.e., published in 2014) were found in this domain. This finding indicates that researchers may still be interested in learning more about the biological health of active duty women, but it raises concerns about researchers continuing to focus only on the physical health of women military members, rather than taking a biopsychosocial-spiritual approach. Along with that, not only were there are only eight articles that solely reported psychological health outcomes, but 62% of those articles were conducted over fifteen years ago. This indicates that researchers have given little attention to the psychological health of active duty women even though there has been a marked rise in PTSD and other mental health concerns among AD personnel (NIH, 2015).

On the other hand, for Category 1 findings, when examining the articles that incorporated more than one domain (e.g., biological and social outcomes), these types of articles have been published more recently. In fact, if the last three domains were combined (Biological AND Psychological Health Outcomes, Biological AND Social Health Outcomes, and Psychological AND Social Health Outcomes; $n = 18$), only two of the articles were published over fifteen years ago (approximately 10%). However, only two of those eighteen articles were

published in the last five years. This finding suggests that researchers may have been trying to use a more holistic approach to examining the health experiences specifically for AD women, but that approach has halted in the last few years. Taking a biopsychosocial-spiritual approach to better understanding the needs and outcomes of this population is necessary, particularly given the findings from the studies that included more than one domain. After all, health has biopsychosocial-spiritual complexities and systemic implications and thus should not be assessed at a "unit" level (i.e., biological health domain level) only.

Some of the most unique contributions that this systematic review brings to the literature are: 1) A review of a considerable amount of research that exists with AD women in the analysis of results (n = 223). However, the majority of these researchers were not intentionally focused on AD women as their sample of interest (n = 142), and while 79 articles did have AD women as the sample of interest, zero articles included biological, psychological, and social or biological, psychological, social, and spiritual assessments with AD women. This finding was surprising, given the use of BPS and BPSS in both medical (Marsac, Kassam-Adams, Delahanty, Widaman, & Barakat, 2014) and mental health (Gatchel, 2004) literature and particularly for military populations who must manage physically demanding job criteria, the need for psychological resilience, the potential for relational conflict, and an awareness that they belong to a system that is greater than his or her individual self, and 2) It was predicted that most of the articles including AD women would be focused on biological/physical health, though it was astonishing how little focused on women beyond pregnancy/breastfeeding or sexual health concerns. After all, AD women have been assigned to a variety of physically demanding positions and yet almost no articles (6.3%) attended to her pain, injuries, or fractures. Although this systematic review brings unique contributions to the literature, there were limitations with this study.

Limitations

While a great deal of time and detail went into the method and analysis of the literature, some limitations do exist in relation to this article. For example, articles that did not clearly distinguish between active duty and non-active duty women were excluded and as such, it is possible that significant research was left out of the analysis. Also, while this systematic review was thorough, it was not exhaustive. For example, there may be other databases that were not accessed in which articles may have met the research criteria (e.g., ERIC, SocINDEX) and this analysis did not include a search of unpublished articles (e.g., dissertations). Lastly, this analysis was not able to access military databases that include research that is closed to civilian researchers.

Implications

Based on the findings from this review, more research is needed that represents the BPSS components of health for active duty women. This is especially true since there were no findings that captured the spiritual health of active duty women. In addition, since none of the articles represented fully captured the BPSS, or even BPS, approach, researchers should expand their research questions and methodology to encompass each of these domains. This may require researchers to collaborate outside of their field in order to bridge biomarkers with psychosocial or spiritual assessments. These studies may also lend themselves to dyadic research, in order to determine how social relationships (e.g., marriage or cohabitation) influence biological, psychological, and spiritual health outcomes.

Along with future research implications, there are also policy implications based on the findings from this review. Findings in this review support that AD women experience high rates of unplanned pregnancies (Robbins, Chao, Fonseca, Snedecor, & Knapik, 2005), an increased

risk of adverse health issues during pregnancy compared to pregnant civilian women (Spandorfer, Graham, & Forouzan, 1996), greater challenges to adhere to military fitness standards postpartum (Chauhan et al., 2013), and single active duty women reported that their commands were not supportive during their pregnancy (Biggs, Douglas, O'Boyle, & Reig, 2009). All of these findings indicate that there should be policies in place to help reduce the health challenges women face in the military. For example, educational policies should be constructed for primary care providers and/or women's health providers in order to extend best practices to AD women in relation to education on safe sex and the risk factors (e.g., occupational hazards) associated with adverse health issues during pregnancy. Also, best practices could be constructed via the Department of Defense or the command of each military branch in order to better acknowledge the challenges women face as their bodies recover from pregnancy and childbirth and allow for more flexibility regarding fitness standards. Furthermore, the Department of Defense should create policies that promote, rather than stigmatize, women for reporting sexual harassment, military sexual trauma, or abuse in the workplace. This policy should be reinforced stateside and during deployments.

This study aimed to explore the existing research on the BPSS health of active duty women. The results of this study show that there is more data on the biological health compared to the psychological and social health of AD women. There is even less research demonstrating the interconnectedness between biological, psychological, and social health and only one out of the 223 articles included a focus on spirituality with active duty women. Based on the findings from this review, it is imperative that researchers continue to conduct studies that capture the overall health experiences of active duty women and policy makers work to improve AD women' opportunities toward success throughout their military career.

REFERENCES

*Note: * represents Category 1 articles. ** represents Category 2 articles*

*Abel, E. (1998). Mary J. Nielubowicz Award. Sexual risk behaviors among ship-and shore-based Navy women. *Military Medicine, 163*(4), 250-256.

** Abraham, J. H., DeBakey, S. F., Reid, L., Zhou, J., & Baird, C. P. (2012). Does deployment to Iraq and Afghanistan affect respiratory health of US military personnel? *Journal of Occupational and Environmental Medicine, 54*(6), 740-745. doi:10.1097/JOM.0b013e318252969a

**Adams, R. S., Larson, M. J., Corrigan, J. D., Horgan, C. M., & Williams, T. V. (2012). Frequent binge drinking after combat-acquired traumatic brain injury among active duty military personnel with a past year combat deployment. *Journal of Head Trauma Rehabilitation, 27*(5), 349–360. doi:10.1097/HTR.0b013e318268db94.

*Agazio, J. G., Ephraim, P. M., Flaherty, N. B., & Gurney, C. A. (2002). Health promotion in active-duty military women with children. *Women & Health, 35*(1), 65-82. doi:10.1300/J013v35n01_05

*Albright, T. S., Gehrich, A. P., Buller, J. L., & Davis, G. D. (2005). Acute dysuria among female soldiers. *Military Medicine, 170*(9), 735-738.

*Albright, T. S., Gehrich, A. P., Wright Jr, J., Lettieri, C. F., Dunlow, S. G., & Buller, J. L. (2007). Pregnancy during Operation Iraqi Freedom/Operation Enduring Freedom. *Military Medicine, 172*(5), 511-514.

Aldous, W. K., Robertson, J. L., Robinson, B. J., Hatcher, C. L., Hospenthal, D. R, Conger, N. G., & Murray, C. K. (2011). Rates of gonorrhea and chlamydia in U.S. military personnel deployed to Iraq and Afghanistan (2004–2009). *Military Medicine, 176*(6), 705–710. doi:10.7205/MILMED-D-10-00218

*Anderson, M. K., Grier, T., Canham-Chervak, M., Bushman, T. T., & Jones, B. H. (2014). Risk factors associated with higher body fat in US Army female soldiers. *US Army Medical Department Journal*, 75-82.

*Appolonio, K. K., & Fingerhut, R. (2008). Postpartum depression in a military sample. *Military Medicine, 173*(11), 1085-1091.

*Armed Forces Health Surveillance Center (AFHSC). (2011). Uterine fibroids, active component females, US Armed Forces, 2001-2010. *Medical Surveillance Monthly Report, 18*(12), 10.

** Armed Forces Health Surveillance Center (AFHSC). (2012). Deaths by suicide while on active duty, active and reserve components. *Medical Surveillance Monthly Report*, 19(6), 7-10.

*Armitage, N. H., Severtsen, B. M., Vandermause, R., & Smart, D. A. (2014). Training for the Air Force Fitness Assessment: The experience of postpartum women. *Military Medicine, 179*(7), 766-772. doi:10.7205/MILMED-D-13-00437

*Armitage, N. H., & Smart, D. A. (2012). Changes in Air Force fitness measurements pre-and post-childbirth. *Military Medicine, 177*(12), 1519-1523. doi:10.7205/MILMED-D-12-00248

*Bales, K., Washburn, J, & Bales, J. (2012). Breastfeeding rates and factors related to cessation in a military population. *Breastfeeding Medicine, 7*(6), 436-441. doi:10.1089/bfm.2011.0113

**Barrett, D. H., Boehmer, T. K., Boothe, V. L., & Flanders, W. D. (2003). Health-related quality of life of US military personnel: A population-based study. *Military Medicine, 168*(11), 941-947.

**Barnett, S. D., & Brundage, J. F. (2001). Incidence of recurrent diagnoses of Chlamydia trachomatis genital infections among male and female soldiers of the US Army. Sexually Transmitted Infections, 77(1), 33-36.

**Besterman-Dahan, K., Gibbons, S. W., Barnett, S. D., & Hickling, E. J. (2012). The role of military chaplains in mental health care of the deployed service member. *Military Medicine, 177*(9), 1028-1033.

*Biggs, R. L., Douglas, B. H., O'Boyle, A. L., & Reig, T. S. (2009). The impact of pregnancy on the individual and military organization: A postpartum active duty survey. *Military Medicine, 174*(1), 61-75.

**Bobo, W. V., Hoge, C. W., Messina, M. A., Pavlovcic, F., Levandowski, D., & Grieger, T. (2004). Characteristics of repeat users of an inpatient psychiatry service at a large military tertiary care hospital. *Military Medicine, 169*(8), 648-653.

**Bohnker, B. K., Page, J. C., Rovig, G. W., Betts, L. S., & Sack, D. M. (2004). Navy Hearing Conservation Program: 1995-1999 retrospective analysis of threshold shifts for age, sex, and officer/enlisted status. *Military Medicine, 169*(1), 73-76.

**Bohnker, B. K., Sack, D. M., Wedierhold, L., & Malakooti, M. (2005). Navy physical readiness test scores and body mass index (Spring 2002 cycle). *Military Medicine, 170*(10), 851-854.

*Boling, R. O., Abbasi, R., Ackerman, G., Schipul Jr, A. H., & Chaney, S. A. (1988). Disability from endometriosis in the United States Army. *The Journal of Reproductive Medicine*, *33*(1), 49-52.

*Borsay-Trindle, L. A., Pass, C. M., & Gilzean, S. M. (1991). Unplanned pregnancy among active-duty Army females as a readiness issue. *Military Medicine*, *156*(2), 82-86.

*Bostock, D. J., & Daley, J. G. (2007). Lifetime and current sexual assault and harassment victimization rates of active-duty United States Air Force women. *Violence Against Women*, *13*(9), 927-944. doi:10.1177/1077801207305232

**Bryan, C. J., & Cukrowicz, K. C. (2011). Associations between types of combat violence and the acquired capability for suicide. *Suicide and Life-Threatening Behavior*, *41*(2), 126-136.

**Bryan, C. J., Elder, W. B., McNaughton-Cassill, M., Osman, A., Hernandez, A. M., & Allison, S. (2013). Life meaning following combat among Air Force security forces personnel. *Military Psychology*, *25*(4), 354-364. doi:10.1037/mil0000005

*Buttemiller, R. (1984). Prematurity among United States Air Force active-duty gravidas. *Military Medicine*, *149*(12), 665-668.

**Camarca, M. M., & Krauss, M. R. (2001). Active tuberculosis among US Army personnel, 1980 to 1996. *Military Medicine*, *166*(5), 452-458.

**Cameron, K. L., Hsiao, M. S., Owens, B. D., Burks, R., & Svoboda, S. J. (2011). Incidence of physician-diagnosed osteoarthritis among active duty United States military service members. *Arthritis & Rheumatism*, *63*(10), 2974-2982.

*Campbell, J. C., Garza, M. A., Gielen, A. C., O'campo, P., Kub, J., Dienemann, J., Jones, A. S., & Jafar, E. (2003). Intimate partner violence and abuse among active duty military women. *Violence Against Women*, *9*(9), 1072-1092. doi:10.1177/1077801203255291

**Capaldi, V. F., Guerrero, M. L., & Killgore, W. D. (2011). Sleep disruptions among returning combat veterans from Iraq and Afghanistan. *Military Medicine*, *176*(8), 879-888.

**Carlton, J. R., Manos, G. H., & Van Slyke, J. A. (2005). Anxiety and abnormal eating behaviors associated with cyclical readiness testing in a naval hospital active duty population. *Military Medicine*, *170*(8), 663-667.

*Catterson, M. L., & Zadoo, V. (1993). Prevalence of asymptomatic chlamydial cervical infection in active duty Army females. *Military Medicine*, *158*(9), 618-619.

*Chauhan, S. P., Johnson, T. L., Magann, E. F., Woods, J. Y., Chen, H. Y., Sheldon, I. V., & Morrison, J. C. (2013). Compliance with regulations on weight gain 6 months after delivery in active duty military women. *Military Medicine, 178*(4), 406-411. doi:10.7205/MILMED-D-12-00394

Conard, P. L., & Sauls, D. J. (2014). Deployment and PTSD in the female combat veteran: A systematic review. *Nursing Forum, 49*, 1–10. doi:10.1111/nuf.12049

**Constantian, A. R. (1998). Mental health status and visit rates of active duty members and their families: Findings from the 1994-1995 Department of Defense Health Beneficiary Survey. *Military Medicine, 163*(7), 471-476.

Cooper, H. M. (2010). *Research synthesis and meta-analysis: A step-by-step approach* (4th ed.). SAGE Publications, Inc.

**Culbertson, A. L., & Rosenfeld, P. (1994). Assessment of sexual harassment in the active-duty Navy. *Military Psychology, 6*(2), 69-93. doi:10.1207/s15327876mp0602_1

*Davis, G., Sherman, R., Wong, M. F., McClure, G., Perez, R., & Hibert, M. (1999). Urinary incontinence among female soldiers. *Military Medicine, 164*(3), 182-187.

Department of Defense (DoD). (2012). Demographics report. Retrieved from http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Department of Defense (DoD). (2013). Defense Department rescinds direct combat exclusion rule: Services to expand integration of women into previously restricted occupations and units. Retrieved from http://www.defense.gov/Releases/Release.aspx?ReleaseID=15784

Department of Defense (DoD). (2015). Special report: Women's history month. Retrieved from http://www.defense.gov/home/features/2015/0315_womens-history/

**Dlugosz, L. J., Hocter, W. J., Kaiser, K. S., Knoke, J. D., Heller, J. M., Hamid, N. A., & Gray, G. C. (1999). Risk factors for mental disorder hospitalization after the Persian Gulf War: US Armed Forces, June 1, 1991–September 30, 1993. *Journal of Clinical Epidemiology, 52*(12), 1267-1278.

**DuBois, C. L., Knapp, D. E., Faley, R. H., & Kustis, G. A. (1998). An empirical examination of same-and other-gender sexual harassment in the workplace. *Sex Roles, 39*(9-10), 731-749. doi:10.1023/A:1018860101629

*Dutra, L., Grubbs, K., Greene, C., Trego, L. L., McCartin, T. L., Kloezeman, K., & Morland, L. (2010). Women at war: Implications for mental health. *Journal of Trauma & Dissociation, 12*(1), 25-37. doi:10.1080/15299732.2010.496141

**Eckart, R. E., Shry, E. A., Scoville, S. L., Thompson, C. M., Stajduhar, K. C., & Krasuski, R. A. (2004). Cardiopulmonary and mental health diagnoses surrounding the September 11 terrorist acts in a military population. *Military Medicine, 169*(9), 675-680.

**Eilerman, P. A., Herzog, C. M., Luce, B. K., Chao, S. Y., Walker, S. M., Zarzabal, L. A., & Carnahan, D. H. (2014). A comparison of obesity prevalence: Military health system and United States populations, 2009-2012. *Military Medicine*, *179*(5), 462-470. doi:10.7205/MILMED-D-13-00430

*Eitzen, J. P., & Sawyer, R. G. (1997). Sexually transmitted diseases: risk behaviors of female active duty US Army recruits. *Military Medicine, 162*(10), 686-689.

**Elnitsky, C. A., Chapman, P. L., Thurman, R. M., Pitts, B. L., Figley, C., & Unwin, B. (2013). Gender differences in combat medic mental health services utilization, barriers, and stigma. *Military Medicine*, *178*(7), 775-784. doi:10.7205/MILMED-D-13-00012

*Enewold, L., McGlynn, K. A., Shriver, C. C. D., & Zhu, K. (2012). Mammography screening by race/ethnicity among US servicewomen, 2009–2010. *Military Medicine*, *177*(12), 1513.

**Enewold, L. R., Zhou, J., Devesa, S. S., de Gonzalez, A. B., Anderson, W. F., Zahm, S. H., & Zhu, K. (2011). Thyroid cancer incidence among active duty US military personnel, 1990–2004. *Cancer Epidemiology Biomarkers & Prevention*, *20*(11), 2369-2376.

**Enewold, L., Zhou, J., McGlynn, K. A., Devesa, S. S., Shriver, C. D., Potter, J. F., Zahm, S. H. and Zhu, K. (2012), Racial variation in tumor stage at diagnosis among Department of Defense beneficiaries. *Cancer, 118*, 1397–1403. doi: 10.1002/cncr.26208

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*, 129-136.

Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137*, 535-544.

**Escolas, S.M., Hildebrandt, E.J., Maiers, A. J., Baker, M. T., & Mason, S. T. (2013). The effect of attachment style on sleep in postdeployed service members. *US Army Medical Department Journal*, 35-45.

*Evans, M. A., & Rosen, L. (1997). Pregnancy planning and the impact on work climate, psychological well-being, and work effort in the military. *Journal of Occupational Health Psychology*, *2*(4), 353-361. doi:10.1037/1076-8998.2.4.353

*Evans, M. A., & Rosen, L. N. (2000). Demographic and psychosocial risk factors for preterm delivery in an active duty pregnant population. *Military Medicine, 165*(1), 49-53.

**Fertig, J. B., & Allen, J. P. (1996). Health behavior correlates of hazardous drinking by Army personnel. *Military Medicine, 161*(6), 352-355.

*Fischer, J. R., & Berg, P. H. (1999). Urinary incontinence in United States air force female aircrew. *Obstetrics & Gynecology, 94*(4), 532-536.

**Foran, H. M., Heyman, R. E., & Smith Slep, A. M. (2014). Emotional abuse and its unique ecological correlates among military personnel and spouses. *Psychology of Violence, 4*(2), 128-142. doi:10.1037/a0034536

*Forgey, M. A., & Badger, L. (2010). Patterns of intimate partner violence and associated risk factors among married enlisted female soldiers. *Violence and Victims, 25*(1), 45-61. doi:10.1891/0886-6708.25.1.45

*Fox, M. E., Harris, R. E., & Brekken, A. L. (1977). The active-duty military pregnancy: A new high-risk category. *American Journal of Obstetrics and Gynecology, 129*(6), 705-707.

*Friedl, K. E., Nuovo, J. A., Patience, T. H., & Dettori, J. R. (1992). Factors associated with stress fracture in young army women: indications for further research. *Military Medicine, 157*(7), 334-8.

*Frommelt, R. A., Peterson, M. R., & O'Leary, T. J. (2000). A comparison of cervical pathology between United States Air Force women who did and did not serve in the Persian Gulf War. *Annals of Epidemiology, 10*(5), 285-292.

*Furrell, B. L., & Allen, M. F. (1973). Physiologic/psychologic changes reported by USAF female flight nurses during flying duties. *Nursing Research, 22*(1), 31-36.

**Garland, F. C., Mayers, D. L., Hickey, T. M., Miller, M. R., Shaw, E. K., Gorham, E. D., & McNally, M. M. (1989). Incidence of human immunodeficiency virus seroconversion in US Navy and Marine Corps personnel, 1986 through 1988. The *Journal of the American Medical Association, 262*(22), 3161-3165.

Gatchel, R. J. (2004). Comorbidity of chronic pain and mental health disorders: The biopsychosocial perspective. *American Psychologist, 59*(8), 795-805. doi:10.1037/0003-066X.59.8.795

**Gibbons, S. W., Barnett, S. D., Hickling, E. J., Herbig-Wall, P. L., & Watts, D. D. (2012). Stress, coping, and mental health-seeking behaviors: gender differences in OEF/OIF health care providers. Journal of Traumatic Stress, 25(1), 115-119. doi:10.1002/jts.21661

**Gibbons, S. W., Hickling, E. J., Barnett, S. D., Herbig-Wall, P. L., & Watts, D. D. (2012). Gender differences in response to deployment among military healthcare providers in Afghanistan and Iraq. *Journal of Women's Health, 21*(5), 496-504. doi:10.1089/jwh.2011.3097.

**Graham, W.F., Hourani, L.L., Soresnson, D., & Yuan, H. (2000). Demographic differences in body composition of Navy and Marine Corps personnel: Findings from the perception of wellness and readiness assessment. *Military Medicine*, *165*(1), 60-69.

*Greer, J. A., Zelig, C. M., Choi, K. K., Rankins, N. C., Chauhan, S. P., & Magann, E. F. (2012). Return to military weight standards after pregnancy in active duty working women: Comparison of Marine Corps vs. Navy. *Journal of Maternal-Fetal and Neonatal Medicine*, *25*(8), 1433-1437.

Goldzweig, C. L., Balekian, T. M., Rolón, C., Yano, E. M., & Shekelle, P. G. (2006). The state of women veterans' health research: Results of a systematic literature review. *Journal of General Internal Medicine, 21*(3), 82–92. doi:10.1111/j.1525-1497.2006.00380.x

**Gubata, M. E., Oetting, A. A., Niebuhr, D. W., & Cowan, D. N. (2013). Accession medical waivers and deployment duration in the US Army. *Military Medicine*, *178*(6), 625-630. doi:10.7205/MILMED-D-13-00010

**Gunderson, E. E., Garland, C. F., & Gorham, E. D. (2005). Health surveillance for asthma in the US Navy: Experience of 9,185,484 person-years. *Annals of Epidemiology*, *15*(4), 310-315.

**Gunderson, E. K., & Hourani, L. L. (2001). The epidemiology of mental disorders in the US Navy: The psychoses. *Military Psychology*, *13*(2), 99-116. doi:10.1207/S15327876MP1302_03

*Haas, D. M., & Pazdernik, L. A. (2007). Partner deployment and stress in pregnant women. *The Journal of Reproductive Medicine*, *52*(10), 901-906.

* Haas, D. M., & Pazdernik, L. A., & Olsen, C. H. (2005). A cross-sectional survey of the relationship between partner deployment and stress in pregnancy during wartime. *Women's Health Issues, 15*, 48-54. doi:10.1016/j.whi.2004.12.002

**Hakre, S., Brett-Major, D. M., Singer, D. E., O'Connell, R. J., Sateren, W. B., Sanchez, J. L., ... & Scott, P. T. (2011). Medical encounter characteristics of HIV seroconverters in the US Army and Air Force, 2000–2004. *Journal of Acquired Immune Deficiency Syndromes*, *56*(4), 372-380.

**Hansen, C. J., Russell, K. L., Smith, T. C., Neville, J. S., Krauss, M. R., & Ryan, M. A. (2007). Asthma hospitalizations among US military personnel, 1994 to 2004. *Annals of Allergy, Asthma & Immunology*, *98*(1), 36-43.

**Harrison, L., Brennan, M. A., & Levine, A. M. (2000). Physical activity patterns and body mass index scores among military service members. *American Journal of Health Promotion*, *15*(2), 77-80.

**Hartstein, B. H., Boor, D. D., & Nystuen, C. M. (2009). Comparison of medical visits by active duty and National Guard soldiers at a forward deployed medical facility in Iraq. *Military Medicine, 174*(11), 1167-1171. doi:10.7205/MILMED-D-00-6109

*Hatch, M., Berkowitz, G., Janevic, T., Sloan, R., Lapinski, R., James, T., & Barth Jr, W. H. (2006). Race, cardiovascular reactivity, and preterm delivery among active-duty military women. *Epidemiology, 17*(2), 178-182.

**Hatzfeld, J. J., & Gaston-Johansson, F. G. (2010). Disparities in US Air Force preventive health assessments and medical deployability. *Military Medicine, 175*(1), 25-32.

**Hay, M. S., & Elig, T. W. (1999). The 1995 Department of Defense sexual harassment survey: Overview and methodology. *Military Psychology, 11*(3), 233-244. doi:10.1207/s15327876mp1103_2

**Helfer, T. M., Canham-Chervak, M., Canada, S., & Mitchener, T. A. (2010). Epidemiology of hearing impairment and noise-induced hearing injury among US military personnel, 2003–2005. *American Journal of Preventive Medicine, 38*(1), S71-S77.

**Helmkamp, J. C. (1995a). Suicides in the military: 1980–1992. *Military Medicine, 160*(2), 45-50.

**Helmkamp, J. C. (1995b). Homicide victims in the military: 1980-1992. *Military Medicine, 160*(2), 51-56.

**Helmkamp, J. C., & Kennedy, R. D. (1996). Causes of death among US military personnel: A 14-year summary, 1980–1993. *Military Medicine, 161*(6), 311-317.

**Hemler, D. E., McAuley, R. A., & Belandres, P. V. (1988). Common clinical presentations among active duty personnel with traumatically induced reflex sympathetic dystrophy. *Military Medicine, 153*(10), 493-495.

**Herrell, R., Henter, I. D., Mojtabai, R., Bartko, J. J., Venable, D., Susser, E., Merikangas, K.R., & Wyatt, R. J. (2006). First psychiatric hospitalizations in the US military: The National Collaborative Study of Early Psychosis and Suicide (NCSEPS). *Psychological Medicine, 36*(10), 1405-1415. doi:10.1017/S0033291706008348

**Herzog, C. M., Chao, S. Y., Eilerman, P. A., Luce, B. K., & Carnahan, D. H. (2015). Metabolic syndrome in the military health system based on electronic health data, 2009-2012. *Military Medicine, 180*(1), 83-90. doi:10.7205/MILMED-D-14-00039

**Hilber, D., Mitchener, T. A., Stout, J., Hatch, B., & Canham-Chervak, M. (2010). Eye injury surveillance in the US Department of Defense, 1996–2005.*American Journal of Preventive Medicine, 38*(1), S78-S85.

*Hill, C. C., & Gloeb, D. J. (2013). Military maternal weight trends and perinatal outcomes. *Military Medicine, 178*(8), 880-886. doi:10.7205/MILMED-D-13-00031

**Hill, O. T., Kay, A. B., Wahi, M. M., McKinnon, C. J., Bulathsinhala, L., & Haley, T. F. (2012). Rates of knee injury in the U.S. Active Duty Army, 2000-2005.*Military Medicine, 177*(7), 840-844.

**Hill, O. T., Wahi, M. M., Carter 3rd, R., Kay, A. B., McKinnon, C. J., & Wallace, R. F. (2012). Rhabdomyolysis in the US Active Duty Army, 2004-2006. *Medicine and Science in Sports and Exercise, 44*(3), 442-449.

**Horowitz, N. J., Kerns, D. G., & Davies, W. (2000). The incidence of known diabetes among US Army active duty dental patients. *Military Medicine, 165*(5), 368-71.

*Hourani, L., & Hilton, S. (2000). Occupational and environmental exposure correlates of adverse live-birth outcomes among 1032 US Navy women. *Journal of Occupational and Environmental Medicine, 42*(12), 1156-1165.

**Hourani, L. L., Williams, T. V., & Kress, A. M. (2006). Stress, mental health, and job performance among active duty military personnel: findings from the 2002 Department of Defense Health-Related Behaviors Survey. *Military Medicine, 171*(9) 849-856.

*Hourani, L. L. & Yuan, H. (1999). The Mental Status of Women in the Navy and Marine Corps: Preliminary Findings from the 1995 Perceptions of Wellness and Readiness Assessment. Military Medicine, 164(3), 174-181.

*Hourani, L. L., Yuan, H., & Bray, R. M. (2004). Psychosocial and lifestyle correlates of premenstrual symptoms among military women. Journal of Women's Health, 13(7), 812-821. doi:10.1089/jwh.2004.13.812

**Howland, J., Bell, N. S., & Hollander, I. E. (2007). Causes, types and severity of injury among army soldiers hospitalized with alcohol comorbidity. *Addiction, 102*(9), 1411-1420.

**Hsiao, M. S., Cameron, K. L., Huh, J., Hsu, J. R., Benigni, M., Whitener, J. C., & Owens, B. D. (2012). Clavicle fractures in the United States military: Incidence and characteristics. *Military Medicine, 177*(8), 970-974. doi:10.7205/MILMED-D-12-00075

**Hyams, K. C., Riddle, J., Rubertone, M., Trump, D., Alter, M. J., Cruess, D. F., & Bailey, S. (2001). Prevalence and incidence of hepatitis C virus infection in the US military: A seroepidemiologic survey of 21,000 troops. *American Journal of Epidemiology, 153*(8), 764-770.

*Irwin, D. E., Savitz, D. A., Bowes Jr, W. A., & André, K. A. S. (1996). Race, age, and cesarean delivery in a military population. *Obstetrics & Gynecology, 88*, 530-533.

*Irwin, D. E., Savitz, D. A., Hertz-Picciotto, I., & St André, K. A. (1994). The risk of pregnancy induced hypertension: black and white differences in a military population. *American Journal of Public Health, 84*(9), 1508-1510.

*Irwin, D. E., Savitz, D. A., St André, K. A., & Hertz-Picciotto, I. (1994). Study of occupational risk factors for pregnancy-induced hypertension among active duty enlisted navy personnel. *American Journal of Industrial Medicine, 25*(3), 349-359.

Ivins, B. J., Schwab, K. A., Baker, G., & Warden, D. L. (2005). Hospital admissions associated with traumatic brain injury in the US Army during peacetime: 1990s trends. *Neuroepidemiology, 27*(3), 154-163. doi:**10.1159/000096127

**Jordan, N. N., Lee, S. E., Nowak, G., Johns, N. M., & Gaydos, J. C. (2011). Chlamydia trachomatis reported among US active duty service members, 2000-2008. *Military Medicine, 176*(3), 312-319. doi:10.7205/MILMED-D-10-00212

**Kelley, P. W., Miller, R. N., Pomerantz, R., Wann, F., Brundage, J. F., & Burke, D. S. (1990). Human immunodeficiency virus seropositivity among members of the active duty US Army 1985-89. *American Journal of Public Health, 80*(4), 405-410.

*Kirstein, L. (1978). Female soldiers' social adjustment. *Military Medicine, 143*(10), 695-697.
Knapik, J. J., Harman, E. A., Steelman, R. A., & Graham, B. S. (2012). A systematic review of the effects of physical training on load carriage performance. *Journal of Strength and Conditioning Research, 26*(2), 585-597.

**Knox, J. B., Orchowski, J. R., & Owens, B. (2012). Racial differences in the incidence of acute low back pain in United States military service members. *Spine, 37*(19), 1688-1692.

**Knox, J., Orchowski, J., Scher, D. L., Owens, B. D., Burks, R., & Belmont, P. J. (2011). The incidence of low back pain in active duty United States military service members. *Spine, 36*(18), 1492-1500.

**Kress, A. M., Peterson, M. R., & Hartzell, M. C. (2006). Association between obesity and depressive symptoms among US Military active duty service personnel, 2002. *Journal of Psychosomatic Research, 60*(3), 263-271. doi:10.1016/j.jpsychores.2005.08.011

**Lane, M. E., Hourani, L. L., Bray, R. M., & Williams, J. (2012). Prevalence of perceived stress and mental health indicators among reserve-component and active-duty military personnel. *American Journal of Public Health, 102*(6), 1213-1220.

**Lauder, T. D., Baker, S. P., Smith, G. S., & Lincoln, A. E. (2000). Sports and physical training injury hospitalizations in the army. *American Journal of Preventive Medicine, 18*(3), 118-128.

*Lauder, T. D., Dixit, S., Pezzin, L. E., Williams, M. V., Campbell, C. S., & Davis, G. D. (2000). The relation between stress fractures and bone mineral density: Evidence from active-duty Army women. *Archives of Physical Medicine and Rehabilitation, 81*(1), 73-79.

*Lauder, T. D., Williams, M. V., Campbell, C. S., Davis, G. D., & Sherman, R. A. (1999). Abnormal eating behaviors in military women. *Medicine & Science in Sports & Exercise, 31*(9), 1265-1271. doi:10.1097/00005768-199909000-00006

*Lauder, T. D., Williams, M.V., Campbell, C.S., Davis, G., Sherman, R., & Pulos, E. (1999). The female athlete triad: Prevalence in military women, 164(9), 630-635.

**Lea, C. S., Efird, J. T., Toland, A. E., Lewis, D. R., & Phillips, C. J. (2014). Melanoma incidence rates in active duty military personnel compared with a population-based registry in the United States, 2000-2007. *Military Medicine, 179*(3), 247-253. doi:10.7205/MILMED-D-13-00356

**Lee, R. U., & Crum-Cianflone, N. F. (2008). Increasing incidence and severity of coccidioidomycosis at a naval air station. *Military medicine, 173*(8), 769.

**Lee, T., & Nang, R. N. (2000). The epidemiology of varicella hospitalizations in the US Army. *Military medicine, 165*(10), 791-795.

*Lehavot, K., Hoerster, K. D., Nelson, K. M., Jakupcak, M., & Simpson, T. L. (2012). Health indicators for military, veteran, and civilian women. *American Journal of Preventive Medicine, 42*(5), 473-480. doi:10.1016/j.amepre.2012.01.006

**Levine, M. E. (1995). Seasonal symptoms in the sub-Arctic. *Military Medicine, 160*(3), 110-114.

**Lincoln, A. E., Smith, G. S., Amoroso, P. J., & Bell, N. S. (2002). The natural history and risk factors of musculoskeletal conditions resulting in disability among US Army personnel. *Work: A Journal of Prevention, Assessment and Rehabilitation, 18*(2), 99-113.

*Lindberg, L. D. (2011). Unintended pregnancy among women in the US military. *Contraception, 84*(3), 249-251.

*Lindstrom, K. E., Smith, T. C., Wells, T. S., Wang, L. Z., Smith, B., Reed, R. J., Goldfinger, W.E., & Ryan, M. A. (2006). The mental health of US military women in combat support occupations. *Journal of Women's Health, 15*(2), 162-172. doi:10.1089/jwh.2006.15.162

**Lovering, M. E., Proctor, S. P., & Heaton, K. J. (2013). A retrospective study of anxiety disorder diagnoses in the military from 2000 to 2009. *Journal of Anxiety Disorders, 27*(1), 25-32. doi:10.1016/j.janxdis.2012.10.003

*Lowe, N. K., & Ryan-Wenger, N. A. (2006). Factors associated with vaginal douching in military women. *Military Medicine, 171*(10), 1015-1019.

**Luxton, D. D., Skopp, N. A., & Maguen, S. (2010). Gender differences in depression and PTSD symptoms following combat exposure. *Depression and Anxiety, 27*(11), 1027-1033. doi:10.1002/da.20730

*Magann, E. F., Evans, S. F., Chauhan, S. P., Nolan, T. E., Henderson, J., Klausen, J. H., & Morrison, J. C. (2005). The effects of standing, lifting and noise exposure on preterm birth, growth restriction, and perinatal death in healthy low-risk working military women. *Journal of Maternal-Fetal and Neonatal Medicine, 18*(3), 155-162.

*Magann, E. F., & Nolan, T. E. (1991). Pregnancy outcome in an active-duty population. *Obstetrics & Gynecology, 78*(3), 391-393.

*Magann, E. F., Winchester, M. I., Carter, D. P., Martin Jr, J. N., Bass, J. D., & Morrison, J. C. (1995). Factors adversely affecting pregnancy outcome in the military. *American Journal of Perinatology, 12*(6), 462-466.

*Magann, E. F., Winchester, M. I., Carter, D. P., Martin, J. N., Nolan, T. E., & Morrison, J. C. (1996). Military pregnancies and adverse perinatal outcome. *International Journal of Gynecology & Obstetrics, 52*(1), 19-24.

*Magann, E. F., Winchester, M. I., Chauhan, S. P., Nolan, T. E., Morrison, J. C., & Martin Jr, J. N. (1994). Marital status and military occupational specialty: Neither factor has a selective adverse effect on pregnancy outcome. *Journal of Perinatology, 15*(5), 372-374.

**Maguen, S., Luxton, D. D., Skopp, N. A., & Madden, E. (2012). Gender differences in traumatic experiences and mental health in active duty soldiers redeployed from Iraq and Afghanistan. *Journal of Psychiatric Research, 46*(3), 311-316. doi:10.1016/j.jpsychires.2011.11.007

*Mao, C. Y., Narang, S., & Lopreiato, J. (2012). Breastfeeding practices in military families: A 12-month prospective population-based study in the national capital region. *Military Medicine, 177*(2), 229-234. doi:10.7205/MILMED-D-11-00181

Marsac, M. L., Kassam-Adams, N., Delahanty, D. L., Widaman, K., & Barakat, L. P. (2014). Posttraumatic stress following acute medical trauma in children: A proposed model of bio-psycho-social processes during the peri-trauma period. *Clinical Child and Family Psychology Review, 17*(4), 399-411. doi: 10.1007/s10567-014-0174-2

**Martin, L. (2000). Personality characteristics that increase vulnerability to sexual harassment among US Army soldiers. *Military Medicine, 165*(10), 709-713.

**Martin, L., Rosen, L. N., Durand, D. B., Knudson, K. H., & Stretch, R. H. (2000). Psychological and physical health effects of sexual assaults and nonsexual traumas among male and female United States Army soldiers. *Behavioral Medicine, 26*(1), 23-33. doi:10.1080/08964280009595750

**Marx, B. P., Doron-Lamarca, S., Proctor, S. P., & Vasterling, J. J. (2009). The influence of pre-deployment neurocognitive functioning on post-deployment PTSD symptom outcomes among Iraq-deployed Army soldiers. *Journal of the International Neuropsychological Society, 15*(06), 840-852.

**McCabe, M. S., & Board, G. (1976). Stress and mental disorders in basic training. *Military Medicine*, *141*(10), 686-688.

**McCarroll, J. E., Thayer, L. E., Liu, X., Newby, J. H., Norwood, A. E., Fullerton, C. S., & Ursano, R. J. (2000). Spouse abuse recidivism in the US Army by gender and military status. *Journal of Consulting and Clinical Psychology*, *68*(3), 521-525. doi:10.1037/0022-006X.68.3.521

**McCarroll, J. E., Ursano, R. J., Fan, Z., & Newby, J. H. (2004). Patterns of mutual and nonmutual spouse abuse in the US Army (1998–2002). *Violence and Victims*, *19*(4), 453-468.

**McDonald, D. G., Beckett, M. B., & Hodgdon, J. A. (1991). Psychological predictors of physical performance and fitness in US Navy personnel. *Military Psychology*, *3*(2), 73-87. doi:10.1207/s15327876mp0302_1

**McNeil, J. G., Brundage, J. F., Gardner, L. I., Wann, Z. F., Renzullo, P. O., Redfield, R. R., ... & Miller, R. N. (1991). Trends of HIV seroconversion among young adults in the US Army, 1985 to 1989. The Journal of the American Medical Association, 265(13), 1709 1714.

*McNulty, P. A. (1997). Prevalence and contributing factors of eating disorder behaviors in a population of female Navy nurses. *Military Medicine, 162*(10), 703-706.

*McNulty, P. A. F. (2001). Prevalence and contributing factors of eating disorder behaviors in active duty service women in the Army, Navy, Air Force and Marines. Military Medicine, 166(1), 53-58.

*Messersmith-Heroman, K., Heroman, W. M., & Moore, T. R. (1994). Pregnancy outcome in military and civilian women. *Military Medicine, 159*(8), 577-579.

**Mitchener, T. A., & Canham-Chervak, M. (2010). Oral–maxillofacial injury surveillance in the Department of Defense, 1996–2005. *American Journal of Preventive Medicine*, *38*(1), S86-S93.

**Murdoch, M., Pryor, J. B., Polusny, M. A., & Gackstetter, G. D. (2007). Functioning and psychiatric symptoms among military men and women exposed to sexual stressors. *Military Medicine, 172*(7), 718-725.

**Mysliwiec, V., McGraw, L., Pierce, R., Smith, P., Trapp, B., & Roth, B. J. (2013). Sleep disorders and associated medical comorbidities in active duty military personnel. *Sleep, 36*(2), 167-174. doi:10.5665/sleep.2364

National Institutes of Health. (2015). PTSD: A growing epidemic. Retrieved from http://www.nlm.nih.gov/medlineplus/magazine/issues/winter09/articles/winter09pg10-14.html

*Nguyen, S., LeardMann, C. A., Smith, B., Conlin, A. M. S., Slymen, D. J., Hooper, T. I., Ryan, M.A.K., & Smith, T.C., for the Millennium Cohort Study Team, T. C. (2013). Is military deployment a risk factor for maternal depression? *Journal of Women's Health, 22*(1), 9-18. doi:10.1089/jwh.2012.3606.

*O'Boyle, A. L., O'Boyle, J. D., Magann, E. F., Rieg, T. S., Morrison, J. C., & Davis, G. D. (2008). Anorectal symptoms in pregnancy and the postpartum period. *The Journal of Reproductive Medicine, 53*(3), 151-154.

*O'Boyle, A. L., Magann, E. F., Ricks Jr, R. E., Doyle, M., & Morrison, J. C. (2005). Depression screening in the pregnant soldier wellness program. *Southern Medical Journal, 98*(4), 416-418.

*O'Campo, P., Kub, J., Woods, A., Garza, M., Jones, A. S., Gielen, A. C., Dienemann, J., & Campbell, J. (2006). Depression, PTSD, and comorbidity related to intimate partner violence in civilian and military women. *Brief Treatment and Crisis Intervention, 6*(2), 99-110. doi:10.1093/brief-treatment/mhj010

**O'Malley, P. G., Jones, D. L., Feuerstein, I. M., & Taylor, A. J. (2000). Lack of correlation between psychological factors and subclinical coronary artery disease. *New England Journal of Medicine, 343*(18), 1298-1304.

**Orr, J. D., Dawson, L. K., E'Stephan, J. G., & Kirk, K. L. (2011). Incidence of osteochondral lesions of the talus in the United States military. *Foot & Ankle International, 32*(10), 948-954.

**Owens, B. D., Mountcastle, S. B., Dunn, W. R., DeBerardino, T. M., & Taylor, D. C. (2007). Incidence of anterior cruciate ligament injury among active duty US military servicemen and servicewomen. *Military Medicine, 172*(1), 90-91.

Patten, E., & Parker, K. (2011). Women in the U.S. Military: Growing share, distinctive profile. Retrieved from http://www.pewsocialtrends.org/files/2011/12/women-in-the-military.pdf

*Pierce, P. F., Antonakos, C., & Deroba, B. A. (1999). Health care utilization and satisfaction concerning gender-specific health problems among military women. *Military Medicine, 164*(2), 98-102.

*Pierce, P. F., Lewandowski-Romps, L., & Silverschanz, P. (2011). War-related stressors as predictors of post-deployment health of Air Force women. *Women's Health Issues, 21*(4), S152-S159. doi:10.1016/j.whi.2011.04.017

**Porter, C. K., Gormley, R., Tribble, D. R., Cash, B. D., & Riddle, M. S. (2011). The incidence and gastrointestinal infectious risk of functional gastrointestinal disorders in a healthy US adult population. *The American Journal of Gastroenterology, 106*(1), 130-138.

**Powell, K. E., Fingerhut, L. A., Branche, C. M., & Perrotta, D. M. (2000). Deaths due to injury in the military. *American Journal of Preventive Medicine, 18*(3), 26-32.

*Ramirez, G., Grimes, R. M., Annegers, J. F., Davis, B. R., & Slater, C. H. (1990). Occupational physical activity and other risk factors for preterm birth among US Army primigravidas. *American Journal of Public Health, 80*(6), 728-730.

* Rauh, M. J., Macera, C. A., Trone, D. W., Shaffer, R. A., & Thompson, K. R. (2008). Risk factors for shin splint injury among female Marine recruits. *Journal of Orthopaedic and Sports Physical Therapy, 38*(1), A75-A76.

*Rennix, C. P., Quinn, M. M., Amoroso, P. J., Eisen, E. A., & Wegman, D. H. (2005). Risk of breast cancer among enlisted Army women occupationally exposed to volatile organic compounds. *American Journal of Industrial Medicine, 48*(3), 157-167.

**Renzullo, P. O., McNeil, J. G., Wann, F. Z., Burke, D. S., & Brundage, J. F. (1995). Human immunodeficiency virus type-1 seroconversion trends among young adults serving in the United States Army, 1985-1993. *Journal of Acquired Immune Deficiency Syndromes, 10*(2), 177-185.

**Rice, V. J. B., Mays, M. Z., & Gable, C. (2009). Self-reported health status of students in processing into military medical advanced individual training. *Work: A Journal of Prevention, Assessment and Rehabilitation, 34*(4), 387-400.

*Rishel, P. E., & Sweeney, P. (2005). Comparison of breastfeeding rates among women delivering infants in military treatment facilities with and without lactation consultants. *Military Medicine, 170*(5), 435-438.

**Robbins, A. S., Chao, S. Y., Fonseca, V. P., Snedecor, M. R., & Knapik, J. J. (2001). Predictors of low physical fitness in a cohort of active-duty US Air Force members. *American Journal of Preventive Medicine, 20*(2), 90-96.

*Robbins, A. S., Chao, S. Y., Frost, L. Z., & Fonseca, V. P. (2005). Unplanned pregnancy among active duty servicewomen, US Air Force, 2001. *Military Medicine, 170*(1), 38-43.

**Robbins, A. S., Chao, S. Y., Russ, C. R., & Fonseca, V. P. (2002). Costs of excess body weight among active duty personnel, US Air Force, 1997. Military Medicine, 167(5), 393-397.

**Robinson, M. E., Teyhen, D. S., Wu, S. S., Dugan, J. L., Wright, A. C., Childs, J. D., Yang, G., & George, S. Z. (2009). Mental health symptoms in combat medic training: A longitudinal examination. *Military Medicine*, *174*(6), 572-577. doi:10.7205/MILMED-D-02-4108

**Rock, N. L. (1988). Suicide and suicide attempts in the Army: A 10-year review. *Military Medicine*, *153*(2), 67-69.

**Rosen, L. N., & Martin, L. (1996). Impact of childhood abuse history on psychological symptoms among male and female soldiers in the US Army. *Child Abuse & Neglect*, *20*(12), 1149-1160. doi:10.1016/S0145-2134(96)00112-3

**Rosen, L. N., & Martin, L. (1998). Childhood maltreatment history as a risk factor for sexual harassment among US Army soldiers. *Violence and Victims*, *13*(3), 269-286.

**Rosen, L. N., Parmley, A. M., Knudson, K. H., & Fancher, P. (2002). Gender differences in the experience of intimate partner violence among active duty US Army soldiers. *Military Medicine*, *167*(12), 959-963.

**Rowan, A. B. (1996). Demographic, clinical, and military factors related to military mental health referral patterns. *Military Medicine*, *161*(6), 324-328.

**Rowan, A. B., & Campise, R. L. (2006). A multisite study of Air Force outpatient behavioral health treatment-seeking patterns and career impact. *Military Medicine*, *171*(11), 1123-1127.

*Rychnovsky, J., & Beck, C. T. (2006). Screening for postpartum depression in military women with the Postpartum Depression Screening Scale. *Military Medicine*, *171*(11), 1100-1104.

*Rychnovsky, J. D. (2007). Postpartum fatigue in the active-duty military woman. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *36*(1), 38-46. doi:10.1111/j.1552-6909.2006.00112.x

Sadler, A. G., Booth, B. M., Cook, B. L., & Doebbeling, B. N. (2003). Factors associated with women's risk of rape in the military environment. *American Journal of Industrial Medicine*, *43*, 262-273. doi:10.1002/ajim.10202

**Scher, D. L., Belmont, P. J., Mountcastle, S., & Owens, B. D. (2009). The incidence of primary hip osteoarthritis in active duty US military service members. *Arthritis Care & Research*, *61*(4), 468-475.

**Seña, A. C., Miller, W. C., Hoffman, I. F., Chakraborty, H., Cohen, M. S., Jenkins, P., & McKee, K. T. (2000). Trends of gonorrhea and chlamydial infection during 1985–1996 among active-duty soldiers at a United States Army installation. *Clinical Infectious Diseases, 30*(4), 742-748.

**Shaffer, R. A., Rauh, M. J., Brodine, S. K., Trone, D. W., &. Macera, C. A. (2006). Predictors of stress fracture susceptibility in young female recruits. *The American Journal of Sports Medicine, 34*(1), 108-115. doi:10.1177/0363546505278703

**Shen, Y. C., Arkes, J., & Williams, T. V. (2012). Effects of Iraq/Afghanistan deployments on major depression and substance use disorder: analysis of active duty personnel in the US military. *American Journal of Public Health*, *102*(S1), S80-S87.

**Smith, G. S., Lincoln, A. E., Wong, T. Y., Bell, N. S., Vinger, P. F., Amoroso, P. J., & Lombardi, D. A. (2005). Does occupation explain gender and other differences in work-related eye injury hospitalization rates? *Journal of Occupational and Environmental Medicine, 47*(6), 640-648.

*Smith, T. C., Jacobson, I. G., Smith, B., Hooper, T. I., Ryan, M. A., & Millennium Cohort Study Team. (2007). The occupational role of women in military service: validation of occupation and prevalence of exposures in the Millennium Cohort Study. *International Journal of Environmental Health Research*, *17*(4), 271-284.

**Smith Slep, A. M., Foran, H. M., Heyman, R. E., & Snarr, J. D. (2011). Risk factors for clinically significant intimate partner violence among active-duty members. Journal of Marriage and Family, 73(2), 486-501. doi:10.1111/j.1741-3737.2010.00820.x

**Smoley, B. A., Smith, N. L., & Runkle, G. P. (2008). Hypertension in a population of active duty service members. *The Journal of the American Board of Family Medicine*, *21*(6), 504-511.

**Snarr, J. D., Heyman, R. E., & Slep, A. M. S. (2010). Recent suicidal ideation and suicide attempts in a large-scale survey of the US Air Force: Prevalence and demographic risk factors. *Suicide and Life-Threatening Behavior*, *40*(6), 544-552. doi:10.1521/suli.2010.40.6.544

*Spandorfer, S. D., Graham, E., & Forouzan, I. (1996). Pregnancy outcome in active duty seagoing women. *Military Medicine, 161*(4), 214-216.

*Stevens, K. V., & Janke, J. (2003). Breastfeeding experiences of active duty military women. *Military Medicine, 168*(5), 380-384.

*Stinson, J. C., & Lee, K. A. (2003). Premature labor and birth: Influence of rank and perception of fatigue in active duty military women. *Military Medicine*, *168*(5), 385-390.

**Stretch, R. H., Knudson, K. H., & Durand, D. (1998a). Effects of premilitary and military trauma on the development of post-traumatic stress disorder symptoms in female and male active duty soldiers. *Military Medicine, 163*(7), 477-470.

**Stretch, R. H., Knudson, K. H., & Durand, D. (1998b). Psychological health and trauma in male and female soldiers. *Military Medicine, 163*(6), 363-367.

*Sulsky, S. I., Mundt, K. A., Bigelow, C., & Amoroso, P. J. (2002). Risk factors for occupational knee related disability among enlisted women in the US Army. *Occupational and Environmental Medicine, 59*(9), 601-607.

**Thomsen, C. J., Stander, V. A., McWhorter, S. K., Rabenhorst, M. M., & Milner, J. S. (2011). Effects of combat deployment on risky and self-destructive behavior among active duty military personnel. *Journal of Psychiatric Research, 45*(10), 1321-1331.

**Trent, L. K. (1991). Prevalence of elevated serum cholesterol in personnel of the US Navy. *Public Health Reports, 106*(2), 167.

**Trent, L. K., & Hurtado, S. L. (1997). Longitudinal trends and gender differences in physical fitness and lifestyle factors in career US Navy personnel (1983-1994) (No. NHRC-97-13). Naval Health Research Center: San Diego.

*Tucker, M. M., & Kelley, M. L. (2009). Social support and life stress as related to the psychological distress of single enlisted Navy mothers. *Military Psychology, 21*, S82-S97.

**Vanecek, M. R. J., Talcott, C. G. W., Tabor, C. A., McGeary, D. D., Lang, C., & Ohrbach, R. (2011). Prevalence of TMD and PTSD symptoms in a military sample. *Journal of Applied Biobehavioral Research, 16*(3-4), 121-137. doi:10.1111/j.1751-9861.2011.00069.x

**Visco, R. (2009). Postdeployment, self-reporting of mental health problems, and barriers to care. *Perspectives in Psychiatric Care, 45*(4), 240-253.

**Wallace, R. F., Wahi, M. M., Hill, O. T., & Kay, A. B. (2011). Rates of ankle and foot injuries in active-duty US Army soldiers, 2000-2006. *Military Medicine, 176*(3), 283-290.

Washington, D. L., Bean-Mayberry, B., Riopelle, D., & Yano, E. M. (2011). Access to care for women veterans: Delayed healthcare and unmet need. *Journal of General Internal Medicine, 26*(2), 655-661. doi:10.1007/s11606-011-1772-z

*Wiesen, A. R., & Gunzenhauser, J. D. (2004). Laboratory-measured pregnancy rates and their determinants in a large, well-described adult cohort. *Military Medicine, 169*(7), 518-521.

**Withers, B. G., Kelley, P. W., McNeil, J. G., Cowan, D. N., & Brundage, J. F. (1992). A brief review of the epidemiology of HIV in the US Army. *Military Medicine, 157*(2), 80-84.

Witvliet, C. V. O., Phillips, K. A., Feldman, M. E., & Beckham, J. C. (2004). Posttraumatic mental and physical health correlates of forgiveness and religious coping in military veterans. *Journal of Traumatic Stress, 17*(3), 269-273.

**Wright, J., Albright, T. S., Gehrich, A. P., Dunlow, S. G., Lettieri, C. F., & Buller, J. L. (2006). Sexually transmitted diseases in Operation Iraqi Freedom/Operation Enduring Freedom. *Military Medicine, 171*(10), 1024-1026.

Wright, L. M., Watson, W. L., & Bell, J. M. (1996). *Belief: The heart of healing in families and illness*. New York: Basic Books.

**Yamane, G. K. (2006). Cancer incidence in the US Air Force: 1989-2002. *Aviation, Space, and Environmental Medicine, 77*(8), 789-794.

**Yamane, G. K., & Butler, J. L. (2009). Suicide burden in the US Air Force: 1990-2004. *Military Medicine, 174*(10), 1019-1023. doi:10.7205/MILMED-D-04-7108

**Zhou, J., Enewold, L., Zahm, S. H., Devesa, S. S., Anderson, W. F., Potter, J. F., & Zhu, K. (2011). Melanoma incidence rates among whites in the US Military. *Cancer Epidemiology Biomarkers & Prevention, 20*(2), 318-323.

**Zhu, K., Devesa, S. S., Wu, H., Zahm, S. H., Jatoi, I., Anderson, W. F., & McGlynn, K. A. (2009). Cancer incidence in the US military population: comparison with rates from the SEER program. *Cancer Epidemiology Biomarkers & Prevention*, *18*(6), 1740-1745.

Figure 1. Literature synthesis methodology.

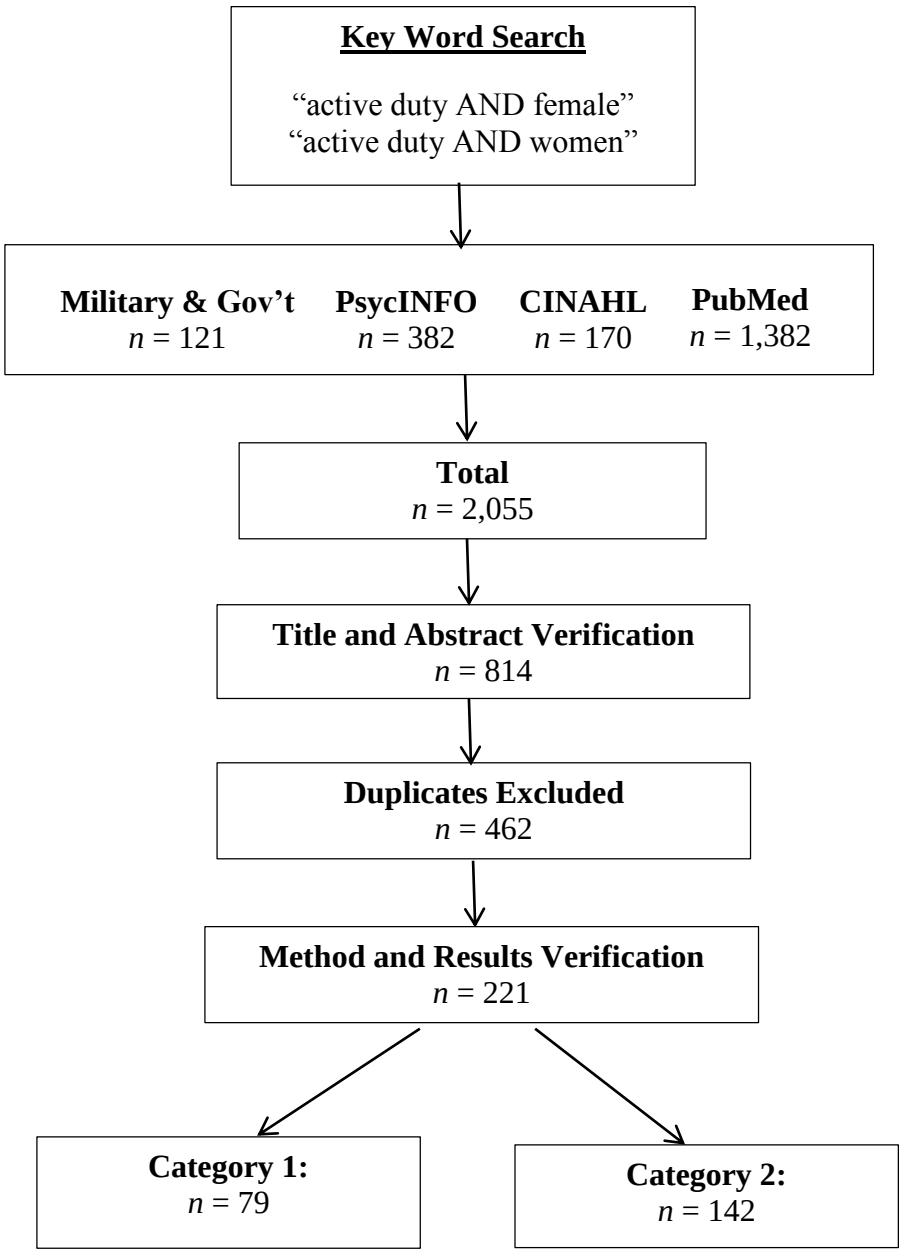


Figure 2. Data extraction flowchart.

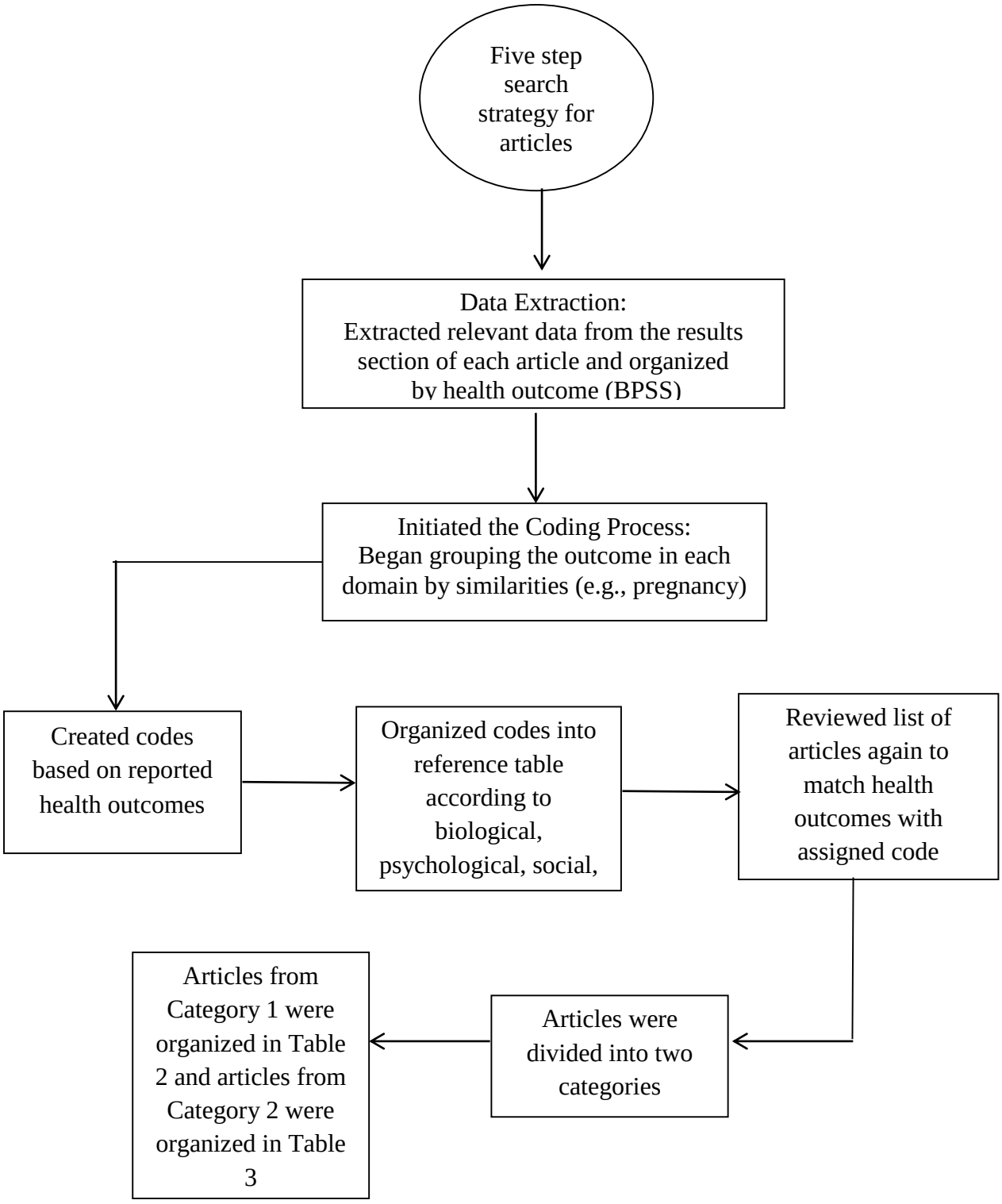


Table 1

Code Key for Articles included in Table 2

AD: Active duty military
ADJ: Adjustment
AF: Air Force
ANG: Anger
AN: Anorexia nervosa
ANX: Anxiety
ARMY: Army
BF: Breastfeeding practices
BN: Bulimia nervosa
BOD: Body fat
CARD: Cardiovascular health
CONF: Confusion
CG: Coast Guard
CORR: Marine Corps Recruits
DEP: Depression
DIAB: Diabetes
DIS: Disability
ED: Eating disorder behaviors
EFFI: Self-efficacy
FATG: Fatigue
FIT: Fitness and weight standards
FUNC: Social functioning
GNRL: General health issues
HARA: Harassment
INJ: Injury
IPV: Intimate partner violence
MARI: Marital status
MUSC: Muscle mass
NAVY: Navy
NG: Activated National Guard
NOS: Eating disorder not specified
OR: Original research
PHOSP: Psychiatric hospitalization
PN: Pain
PREG: Pregnancy
PPD: Postpartum depression
PTS: Post-traumatic stress symptoms
QUANT: Quantitative method
QUAL: Qualitative method
R: Activated Reserves
SEC: Secondary research
SEXB: Sex behaviors
STI: Sexually transmitted infections
STRS: Stress
SUPP: Social support
URIN: Urinary health
USMC: Marine Corps
WHLTH: Women's health

Table 2

Articles included in Category 1

Name, year	Sample size	Branch	Method	Code	Results
Biological Health Outcomes					
1. Albright, 2005	138	ARMY	QUANT	URIN	Women with dysuria were more likely to report fluid restriction and to postpone urination throughout the duty day.
2. Albright, 2007	77	AD	QUANT	PREG; WHLTH	Amenorrhea was the most common complaint at gynecological visits while deployed in Kuwait.
3. Anderson, 2014	629	ARMY	QUANT	FIT, BOD	22% of women exceeded the Army's standard for body fat.
4. Armed Forces Health Surveillance Center, 2011	11,931	AF, ARMY, CG, NAVY, USMC	QUANT	WHLTH	Older, non-Hispanic black active duty women are at an increased risk for uterine fibroids.
5. Armitage, 2012	107	AF	QUANT	FIT, PREG	There was a significantly lower pass rate for fitness standards at 6-months postpartum compared to the pre-pregnancy time frame.
6. Armitage, 2014	14	AF	QUAL	FIT, PREG	The most common issue reported in preparing for fitness exams was related to perinatal body changes.

Biological Health Outcomes (continued)

7. Bales, 2012	254	AD	QUANT	BF	31% of active duty patients met their breastfeeding goal and 39.5% were able to breastfeed for six months or more.
8. Biggs, 2009	415	AF, ARMY, USMC, NAVY,	QUANT	PREG	Most women reported that pregnancy did not change their career plans; singles did not consider their commands to be supportive during pregnancy and 75% of singles required WIC financial support; 82% of pregnancies were unplanned.
9. Boling, 1988	6,456	ARMY	QUANT	WHLTH	Active duty women missed an average of 15 work days per year for endometriosis-related issues.
10. Buller, 2007	77	ARMY, NG, R	QUANT	PREG	77% of the women became pregnancy while in theatre (in Kuwait) while 23% of women were pregnant before arrival in theatre.
11. Buttemiller, 1984	3,461	AF	QUANT	PREG	Race was the only variable significantly related to active duty gravida.
12. Catterson, 1993	476	ARMY	QUANT	STI	8.2% of women tested positive for chlamydia and gonorrhea. None of these women reported symptoms and their pelvic exams were normal.

Biological Health Outcomes (continued)

13. Chauhan, 2013	1,009	NAVY	QUANT	FIT, PREG	Six months after child birth, 48% of women were within Navy body weight standards and 32% had a BMI greater than 25. BMI at first visit and cesarean delivery significantly influenced the percentage of women who met the Navy weight standards at 6 months.
14.Davis, 1999	563	ARMY	QUANT	URIN	31% of women indicated that they commonly experienced urinary incontinence during duty and/or training that interfered with job performance, hygiene, or was embarrassing.
15.Enewold, 2012	15,667	AF, ARMY, NAVY	QUANT	WHLTH	The prevalence of mammography screening during the study period was 61%. Screening mammography also increased with age, was highest in the Navy, and higher among officers than enlisted personnel.
16. Evans, 1997	345	AF, ARMY, NAVY, USMC	QUANT	PREG	Rank was the only significant predictor of whether participants believed there was a good time to become pregnant; Participants who planned their pregnancies and had their pregnancies occur in the time frame planned reported the greatest psychological well-being.

Biological Health Outcomes (continued)

17. Farrell, 1973	444	AF	QUANT	GNRL, WHLTH	Women who flew in jet aircrafts compared to propeller aircraft were significantly more likely to report changes associated with the menstrual function (frequency, flow, and dysmenorrhea), with bruising of thighs and legs, and in bowel habits, sleep patterns, and weight.
18. Fischer, 1999	274	AF	QUANT	URIN	The overall prevalence of incontinence was found to be 26.3% and88.9% stated that it had occurred off-duty, 31.9% stated that it had occurred on-duty (not flying), and 18.1% stated that it had occurred while flying. Risk factors for incontinence included crew position, vaginal parity, and age.
19. Fox, 1977	692	AD	QUANT	PREG	Active duty women had twice the risk of toxemia, five times the risk of premature labor and anemia, and six times the risk of an abnormal Papanicolaou smear compared to non-active duty women.
20. Friedl, 1992	1,630	ARMY	QUANT	INJ	Current smoking, history of menses absent greater than 6 months, and known family history of osteoporosis were significantly associated with self-reported stress fractures, while black ethnic origin was a protective factor.

Biological Health Outcomes (continued)

21. Frommelt, 2000	6,715	AF	QUANT	WHLTH	There were no statistical difference in cervical pathology between Gulf War veterans who experienced a deployment compared to active duty women of the same time period who did not deploy.
22. Greer, 2012	228	NAVY, USMC	QUANT	FIT, PREG	72% of women were out of weight standards 6 months postpartum. The likelihood of a spontaneous vaginal delivery was significantly higher for women in the USMC versus the USN. Similar prevalence for breast feeding in both groups. The USMC women had lower BMIs at all measurement points, but women in both groups gained similar amounts of weight during pregnancy.
23. Hatch, 2006	500	AD	QUANT	CARD, PREG	The risk of pre-term delivery is 6.2% for white women and 13.9% for black active duty women. Black women exhibited more cardiac reactivity than white women.
24. Hill, 2013	3,288	AD	QUANT	FIT, PREG	Pre-pregnancy BMI for active duty women significantly increased from 1999 to 2006.

Biological Health Outcomes (continued)

25. Hourani, 2000	1,032	NAVY	QUANT	PREG	Pregnant active-duty women reported more exposures to petroleum products, solvents, and heavy metals at work and experienced higher frequency of preterm labor compared to civilian women. Paternal exposure to pesticides at work also predicted preterm delivery.
26. Irwin, 1994	6,987	NAVY, USMC	QUANT	PREG	First time black mothers had an increased risk for pregnancy-induced hypertension and non-first black mothers had an increased risk for pregnancy induced hypertension and pre-eclampsia compared to nulliparous and parous white mothers.
27. Irwin, 1994	5,605	NAVY	QUANT	PREG	First -time mothers had an increased rate of pregnancy-induced hypertension, but had a significantly decreased rate of pregnancy induced hypertension if their jobs required high levels of physical activity.
28. Irwin, 1996	3, 603	NAVY	QUANT	PREG	Cesarean births were not associated with active duty women' rank.

Biological Health Outcomes (continued)

29. Lauder, 2000	185	ARMY	QUANT	INJ	Women with stress fractures had significantly higher exercise intensity minutes/week and were more likely to be enlisted. Exercise intensity and BMI had a significant positive effect on bone mineral density of the femoral neck and lumbar spine, yet both were associated with an increased probability of stress fractures.
30. Lehavot, 2012	280,276	AF, ARMY, NAVY, USMC	QUANT	WHLTH	Active duty women reported greater access to health care, better physical health, less risky health behaviors, and an increased likelihood of have a recent Pap examination.
31. Lindberg, 2011	3,745	AF, ARMY, NAVY, USMC	QUANT	PREG	54% of active duty women reported that their pregnancies were unintended. Younger enlisted women with lower education levels were more likely to report unintended pregnancies.
32. Magaan, 1991	1,549	USMC	QUANT	PREG	Active duty women had higher rates of primary cesarean births, preterm complications, pregnancy induced hypertension, and intrauterine growth retardation compared to non-active duty women.

Biological Health Outcomes (continued)

33. Magann, 1996	105	AD	QUANT	PREG	Active duty single women had more cesarean births when compared to forceps and vacuum or spontaneous vaginal delivery; active-duty women who gained less than 25 pounds during pregnancy developed preterm labor more often.
34. Magann, 1995	300	AD	QUANT	PREG	51% of women had an adverse pregnancy outcome (e.g., cesarean birth, growth restriction, preterm labor). The risk factors were advancing maternal age and tall stature with a maternal weight gain of more than 42 pounds.
35. Magann, 2005	814	AD	QUANT	PREG	Standing for extended periods of time at work increased the risk for pre-term labor and pre-term birth.
36. Mao, 2012	253	AF, ARMY, NAVY, USMC	QUANT	BF	Mothers on active duty were equally likely to breastfeed than non–active duty mothers. Officer mothers were 3 times more likely to breastfeed compared to enlisted mothers.
37.O'Boyle, 2008	75	AD	QUANT	PREG	Straining to defecate, hard or lumpy stools, incomplete emptying, incontinence of gas or stool, and unpreventable soilage of underwear were reported by women before and after delivery.

Biological Health Outcomes (continued)

38. Pierce, 1999	525	AD	QUAN	GNRL	Active duty women used health care services more frequently than those in the Reserves or Guard.
39. Ramirez, 1990	6,674	ARMY	QUANT	PREG	First time mothers working in physically high demanding jobs were at a greater risk for preterm delivery.
40. Rauh, 2008	683	CORR	QUANT	INJ, WHLTH	51% of recruits had a confirmed shin splint injury. Risk factors were slow run time, left ankle dorsiflexion, left hind foot eversion, having menses more than 36 days apart, and women with a Q-angle greater than or equal to 20 degrees.
41. Rennix, 2005	274, 596	ARMY, AD	QUANT	WHLTH	Active duty women younger than 35 had higher rates of breast cancer compared to the same age group in the general U.S. population. Active duty women working in areas with high exposure to volatile organic compounds had a 48% increased chance of breast cancer compared to active duty women with no or low exposure.
42. Rishel, 2005	261	AD	QUANT	BF	At hospital discharge, 80.4% of active duty mothers were breastfeeding, at four months after discharge 33.3% were still breastfeeding, and at six months 29.4% were still breastfeeding.

Biological Health Outcomes (continued)

43. Robbins, 2005	2, 348	AF	QUANT	PREG	12% of women became pregnant in 2001 and 54% of these pregnancies were unplanned.
44. Shaffer, 2006	2,962	CORR	QUANT	INJ, WHLTH	5.1% of recruits had lower extremity stress fractures. Slower run time and no menses were significantly related to stress fractures during training.
45. Spandorfer, 1996	140	NAVY	QUANT	PREG	There was an increased rate of urinary tract infections, pregnancy induced hypertension, and preterm deliveries in active duty women.
46. Stinson, 2003	359	AF, NAVY, ARMY,	QUANT	FATG, PREG	Preterm labor was associated with lower perceived fatigue severity and more negative life events. Officer rank was related to preterm labor and delivery.
47. Stevens, 2003	9	AF	QUAL	BF	Women reported that breastfeeding while working in the military was a positive experience; women breastfeed for an average of six months and felt supported by work to overcome challenges related to BF.
48. Sulsky, 2002	2,808	ARMY	QUANT	INJ	Active duty women who were older, single, and higher ranked had an increased risk for disability discharge due to knee injuries.

Biological Health Outcomes (continued)					
49. Wiesen, 2004	5,578	AD	QUANT	PREG	Although the rate of pregnancies and births for active duty women and women in the general U.S. population are the same, active duty women became pregnant at an earlier age.
Psychological Health Outcomes					
50. Hourani, 1999	782	NAVY, USMC	QUANT	DEP; PTS	Active duty women were five times more likely to develop PTSD and two times more likely to experience a major depressive episode compared to active duty males.
51. Lauder, 1999	423	ARMY	QUANT	ED	33.6% of women met the screening criteria for being at risk for abnormal eating behaviors, but no women met the criteria for the female athlete triad (i.e. the presence of abnormal eating behaviors, menstrual cycle irregularities, and osteoporosis).
52. Lauder, 1999	423	ARMY	QUAN	ED	8% of the sample met the criteria for an eating disorder. Women with an ED exercised more, felt dissatisfied about their weight, and felt pressure about their weight compared to women without an ED.

Psychological Health Outcomes (continued)					
53. Lindstrom, 2006	73,777	NAVY, USMC	QUANT	PHOSP	Women working in combat-support roles were less likely to be hospitalized for mental health issues than women working in non-combat support roles.
54. McNulty, 1997	706	NAVY	QUANT	ED	1.1% of nurses met the criteria for AN, 12.5% for BN, 36% for NOS
55. Nguyen, 2013	1,660	AF, ARMY, CG, NAVY, USMC	QUANT	PPD	Active duty who experienced combat exposure after giving birth had a higher risk for maternal depression, but the depression appeared to be more related to combat experiences than related to the childbirth.
56. Rychnovsky, 2006	109	AF, ARMY, NAVY, USMC	QUANT	PPD	Women reported the greatest difficulties in sleeping and eating disturbances; approximately 50% of women scored positive for PPD symptoms after delivery and 40% still reported symptoms six weeks after delivery.
57. Vinokur, 1999	525	AF	QUANT	STRS	For active duty mothers, parenting stress directly influenced family-work conflict rather than occupational stress.
Social Health Outcomes					
58. Kirstein, 1978	98	AD	QUANT	ADJ	Active duty women reported a more positive social adjustment to military life compared to active duty males.

Social Health Outcomes (continued)					
59. Abel, 1998	165	NAVY	QUANT	SEXB	41% of women reported having more than one partner and 45% of women reported their partner not using a condom; single women whose partner did not use a condom reported lower self-esteem scores compared to women whose partners did use a condom.
60. Bostock, 2007	2,018	AF	QUANT	HARA	The lifetime prevalence rape of active duty women (28%) was more than twice as high as civilians (13%); Half of the sample had been the victims of rape, molestation, or attempted sexual assault. The majority of initial rapes (75%) and most recent rapes (56%) involved assault by civilians prior to military service; family members perpetrated 29% of initial rapes; 33% of most recent rapes; 14% of first time victims were raped by a military member; 26% of multiple-time victims were raped by a military member; 31.8% of military women were harassed by a military supervisor; 26.7% of military women were sexually harassed by a coworker.
61. Campbell. 2003	616	AF, ARMY, NAVY, USMC	QUANT	IPV, MARI	30% of women reported a lifetime rate of IPV and 21.6% reported IPV during military service. Risk factors for IPV were marital status (e.g. being single, married, or divorced/separated), being widowed, having a single child or three or more children, and being enlisted.

Biological AND Psychological Health Outcomes

62. O'Boyle, 2005	82	AD	QUANT	DEP; PREG	24% of active duty women screened positive on the Edinburgh Postnatal Depression Scale during pregnancy and 11% of those women reported suicidal ideation; 19% of women scored positive for depression postpartum and 15% of those women reported suicidal ideation.
63. Haas, 2005	279	AD	QUANT	PREG; STRS	Being pregnant significantly predicted higher stress levels.
64. Haas, 2007	463	AD	QUANT	PREG; STRS	Being active duty was associated with increased stress during pregnancy compared to civilian women married to active duty males.
65. Lieberman, 2008	50	USMC	QUANT	ANG, ANX, CONF, DEP; BOD, FATG, MUSC	Initially, levels of depression, anxiety, anger, fatigue, and confusion were higher for recruits than the control. By the end of training, these levels were lower than the control group, muscle mass increased, and body fat decreased.
66. McNulty, 2001	1,278	AF, ARMY, NAVY, USMC	QUANT	ED; FIT	1.1% screened positive for AN, 8.1% for BN, and 62.8% for NOS for all branches, but Marine women had significantly higher rates for AN, BN, NOS and the use of laxatives, diuretics, diet pills, vomiting and fasting to meet fitness standards.

Biological AND Psychological Health Outcomes (continued)					
67. Rychnovsky, 2007	109	NAVY	QUANT	ANX, PPD; FATG	Women reported being moderately fatigue across time; no change in fatigue levels were found for 2 to 6 weeks after delivery; maternal anxiety predicted fatigue 6 weeks after delivery; more than half of women regained full functional status when they returned to work and 40% still reported postpartum depression and anxiety symptoms.
Biological AND Social Health Outcomes					
68. Borsay-Trindle, 1991	112	ARMY	QUANT	WHLTH, PREG, SEXB	Younger women reported more sexual partners and intercourse, less use of birth control, and less knowledge about reproductive health compared to older women soldiers.
69. Lowe, 2006	1,432	AF, ARMY, NAVY	QUANT	WHLTH; SEXB	54.5% of women reported douching at least once in their lifetime, 63.5% douched in the past year, and 45.8% douched in the past six months; Being African American, using tampons, being sexually active, having more than one sexual partner per month, using spermicides, and being enlisted or NCO were associated with more douching behaviors.

Biological AND Social Health Outcomes (continued)					
70.Magaan, 1995	312	AD	QUANT	PREG; MARI	There was no significant difference between pregnancy complications and marital status.
71. Pierce, 2011	1,114	AF	QUANT	FUNC; GNRL	Active duty women deployed to theatre operations reported more physical health and social functioning issues, enlisted women reported more health issues than officers, and women parent reported greater interference with social functioning.
72. Rosen, 2000	350	ARMY, NAVY, AF, USMC	QUANT	PREG; MARI	Among single women, 26% had preterm deliveries, compared with 11% of married women and 37% of divorced or separated women. Marital status was a more significant predictor of preterm delivery than number of medical conditions.
Psychological AND Social Health Outcomes					
73. Appolonio, 2008	87	AF, ARMY, NAVY, NG, R	QUANT	ANX, DEP, PPD, STRS; SUPP, MARI	19.5% of participants scored positive for PPD. Low self-esteem, prenatal anxiety, prenatal depression, history of depression, social support, poor marital satisfaction, life stress, child care stress, difficult infant temperament, and maternity blues were associated with PPD.

Psychological AND Social Health Outcomes (continued)

74. Dutra, 2010	54	ARMY	QUANT	PTS; HARA	More than 50% reported sexual harassment during deployment; military sexual harassment was identified as the only unique significant predictor of PTSD symptoms.
75. Forgey, 2010	284	ARMY	QUANT	DEP; IPV, MARI	Women experiencing severe bidirectional violence were more depressed and had a history of child sexual abuse. Women perpetrating unilateral violence toward their spouses were found to be as satisfied in their marriages as nonviolent couples and less depressed than the women experiencing bidirectional violence.
76. Hourani, 2004	6,026	AF, ARMY, NAVY, USMC	QUANT	WHLTH;STRS	Premenstrual symptoms for active duty women was predicted by being younger, trying to lose weight, reporting poorer health, more job stress, and heavy drinking.
77. Kelley, 2002	120	NAVY	QUANT	ADJ, ANX, DEP; SUPP, MARI	Single deployed women reported the highest levels of depressive symptoms. Single women deploying and married women who were not preparing for deployment reported the highest levels of anxiety. Perceptions of social support from friends and spouses, length of military service, length of the most recent separation from families, and marital status predicted adjustment.

Psychological AND Social Health Outcomes (continued)					
78. O'Campo, 2006	2,450	AD	QUANT	DEP, PTS; IPV	Active duty women reported less mental health symptoms than civilian women. The prevalence of a co-morbid diagnosis of PTSD and depression was 4.6% for abused military women and 19.7% for civilian abused women.
79. Tucker, 2009	50	NAVY	QUANT	ANX, DEP, STRS; SUPP	Higher levels of support from friends and fewer negative life events stressors predicted fewer depressive symptoms; Higher social support in the workplace and fewer negative life events stressors predicted fewer symptoms of anxiety and lower levels of maternal guilt.

Table 3

Category 2: Mixed Samples

Health Outcomes	*n*	**%**
BIOLOGICAL	**74**	**52.1**
Infections and Disease	27	36.4
Injuries	22	29.7
Body Weight and Fitness Standards	10	13.5
Cancer	5	6.7
STIs	3	4.0
Death	3	4.0
Sleep	2	2.7
Health QoL	1	1.3
Healthcare Utilization	1	1.3
PSYCHOLOGICAL	**35**	**24.6**
Suicide	11	31.4
Mental Health tx and Utilization	7	20.0
Psychiatric Hospitalization	5	14.2
Depression	3	8.5
PTSD	3	8.5
Seasonal Affective Disorder	2	5.7
Mental Health Scores	2	5.7
Co-morbidities	1	2.8
Anxiety	1	2.8
SOCIAL	**23**	**16.2**
Interpersonal Trauma	10	43.4
Workplace Harassment	3	13.0
Home or Work Stress	3	13.0
Marital Status	3	13.0
Sex Behaviors	3	13.0
Attachment	1	4.3
SPIRITUAL	**1**	**0.7**
Mental Health tx from Chaplain	1	100.0
BIOLOGICAL and PSYCHOLOGICAL	**1**	**0.7**
Obesity and Depression	1	100.0
BIOLOGICAL and SOCIAL	**2**	**1.4**
BMI, Hypertension, and Job Stress	1	0.5
Knee Injury and Marital Status	1	0.5
PSYCHOLOGICAL and SOCIAL	**4**	**2.8**
Suicide and Interpersonal trauma	2	0.5
Suicide and Social Support	1	0.2
PTSD, Anxiety, Depression and Sexual Trauma	1	0.2
BIOLOGICAL,PSYCHOLOGICAL,SOCIAL	**2**	**1.4**
Physical and Psychological Symptoms and Sexual Assault	1	0.5
Injury, Depression, PTSD, and Military Sexual Trauma	1	0.5

CHAPTER 4: METHODOLOGY

Approximately 15% of the U.S. active duty military force is made up of women (Department of Defense [DoD], 2012) and although the percentage of women continues to increase, much of the research that exists is not inclusive of active duty women. In addition, of the research that does exist on active duty women, little is known about the interface of the biopsychosocial-spiritual health issues that influence her life. The biopsychosocial systems metatheory (Anchin, 2008), with the addition of spirituality (Wright, Watson, & Bell, 1996), is the framework best suited to explore the overall health factors that active duty women experience because it encompasses a holistic approach to health (i.e., it considers the relationships within each domain and the interconnectedness of biological, psychological, social, and spiritual health factors) that may influence her readiness for duty.

Thus, the purpose of this exploratory study was to gain a deeper understanding of the biopsychosocial-spiritual (BPSS) factors that contribute to the health of active duty women, who are enlisted or officers in the U.S. military. To date, there are no studies that explore the interconnectedness of active duty women's biological, physical, social, and spiritual health experiences, even though researchers have found health disparities in many biological, psychological, and social realms of health for this population (Aldous et al., 2011; Cross, Johnson, Wenke, Bosse, & Ficke, 2011; Lindberg, 2011). Since this study was exploratory, researchers did not feel confident in selecting a particular health condition (e.g., PTSD or sexual violence) to predict BPSS health outcomes. In fact, Suls and Rothman (2004) cautioned researchers from selecting particular variables to focus on because they are then "cutting the pie into slices" (p. 123).

Additionally, Suls, Krantz, and Williams (2013) reported that even though researchers may conduct biopsychosocial research, they are only partially devoted to the domain(s) that are not represented by their field; medical scientists often engage in 'hand waving' techniques regarding psychosocial concerns and social scientists use 'hand waving' methods regarding physical processes to give the illusion of a BPSS approach. Thus, in an effort to aim for a more in-depth understanding of the relationships between the domains and to capture the complexity of the health of active duty women, military related demographics, such as length of time in the service and deployment, were used to better understand the intra and inter BPSS health factors that are most relevant for active duty women (See Figures 3 and 4). The information gathered from this study was used to gain a deeper understanding of the factors that most influence active duty women's overall health, shedding light on the interactive biopsychosocial-spiritual strengths and challenges of health in relation to active duty service.

Hypotheses

Since this was an exploratory study, the goal of the study was to (a) determine if there are significant relationships within and between BPSS domains and (b) test the following specific hypotheses:

Biological Health Domain

1. There will be significant positive relationships between BMI, waist circumference, her number of physical health diagnoses, how often she sought out medical treatment in the past year, and her reported level of current pain.

Psychological Health Domain

2. There will be significant positive relationships between reported depressive symptoms (via PHQ), reported anxiety symptoms (via GAD), reported traumatic experiences (via TEQ), reported alcohol use (via AUDIT), her number of mental health diagnoses, and how often she sought mental health treatment in the past year.

Social Health Domain

3. There will be significant negative relationships between reported sexual harassment (via each of the SEQ subscales) and reported levels of social support (via each of the MSPSS subscales).

Spiritual Health Domain

4. There will be significant positive relationships between religious involvement subscales (via each of the DUREL subscales).

Systemic Hypotheses

5. There will be significant positive relationships between biological (i.e., BMI, waist circumference, pain level, physical health diagnoses, and the number of times she sought medical treatment), psychological health variables (e.g. PHQ, GAD, AUDIT, TEQ, mental health diagnoses, and the number of times she sought mental health treatment), and social health (only the SEQ subscales) variables.
6. There will be significant negative relationships between psychological, social (only the MSPSS subscales), and spiritual health variables.

Hypotheses for Conceptual Model

7. Psychological health variables will act as mediators between deployments and biological health variables.
8. Social support variables will act as moderators between deployments and biological health variables.
9. Spiritual health variables will act as moderators between deployments and biological health variables.
10. Psychological health variables will act as a mediator between length of time in the service and biological health variables.
11. Social support variables will act as moderators between length of time in the service and biological health variables.
12. Spiritual health variables will act as moderators between length of time in the service and biological health variables.

Study Design

The primary aim of this study was to explore the biopsychosocial-spiritual factors that most influence the health of active duty women and how these BPSS factors interact with one another. To address the hypotheses that are outlined above, a quantitative cross-sectional research design was employed; as such, data was collected at one point in time (Creswell, 2009) from active duty women who accessed one of the recruitment options (see below) and provided consent to participate in the study. The survey included approximately 130 questions that offered a response that was either dichotomous, on a Likert-type scale, or open ended. Each question selected for the survey was aligned with the BPSS systems metatheory and grounded in BPSS needs that were realized through the systematic review provided in Chapter 3. The electronic

self-report survey was disseminated through Qualtrics (Qualtrics, 2015), a survey software program, in order to capture information from active duty women who were stationed all over the world.

Participants

The inclusion criteria for this study included: a) identifying as female, b) being active duty status in the U.S. military at the time of the study (enlisted and officers included), and c) having access to the Internet. Controlling for and comparisons between military branches was determined based on the sample size of each branch since the differences between military branches could be considered a confounding variable.

Recruitment

After IRB approval (See Appendix A), active duty women were recruited via social media sites (e.g., Facebook, Twitter, and blogging website) and through snowball sampling procedures (Creswell, 2009). In order to ensure that a diverse sample of women from different ranks and duty locations were present in the sample, various social media sites were used to promote recruitment (e.g., U.S. Army Women Facebook pages). On social media sites, the PI provided a brief description of the purpose of the project and a link to the Qualtrics (Qualtrics, 2015) survey. Also, the PI created a Facebook page for this project that included pertinent information about the study, contact information for the PI, and a link to the survey. Using social media sites increased the likelihood of capturing women stationed all over the world. The PI also used professional resources, such as the newsletter for the Alliance of Military and Veteran Family Behavioral Health Providers and relationships formed on military bases across the nation to post recruitment information about the study as well as the link to the survey.

Measures

The measures used in this study were intended to capture the biological, psychological, social, and spiritual health experiences of active duty women. The data were collected through self-report questionnaires from active duty women. The measures included in this study assessed participants' demographics, biomarkers, mental health, physical health, trauma history, social support, and spirituality. The measures were selected because each variable was identified via a systematic review focused on active duty women (Lacks, Lamson, Rappleyea, Russoniello, & Littleton, 2016) or because the measure had been previously used with military populations.

Demographic Questionnaire. The first measure was a demographic questionnaire that sought out information about participants' military experiences (e.g., rank, job type, length of time in the service, deployments, combat exposure) and personal life factors (e.g., relationship status and childfree versus parent; See Appendix B).

Biomarkers. Participants were asked to provide their current height and weight in order to assess body mass index (BMI). In addition, participants were asked to report their current waist circumference based on what it was at her last physical fitness exam. Even though BMI and waist circumference are interrelated, waist circumference is an additional predictor of risk to biological health for individuals categorized with underweight, normal, or overweight BMI scores (Janssen, Katzmarzyk, & Ross, 2004). The waist circumference for military women is measured at each fitness exam (at least annually), thus making it an appropriate biological health variable for this study. Additional biological health questions are also included in the survey (e.g., questions related to injuries, pregnancies, pain, and medical diagnoses; See Appendix B).

Patient Stress Questionnaire (PSQ; University of Massachusetts Medical School, 2011). The PSQ is a survey that that consolidates four screening tools that attend to mental

health: Patient Health Quesstionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006), Primary Care PTSD Screen (PC-PTSD; Prins et al., 2003), and the Alcohol Use Disorders Identification Test (AUDIT; World Health Organization, 2001). Each of these tools has been found to have good reliability in the general population. It does not appear that this particular assessment has been used with a military sample, but each of these screening tools have separately been used with military populations (Ford, Ruzek, & Niles, 1996; Gates, Duffy, Moore, Howell, & McDonald, 2007; McPherson & McGraw, 2013; Wells, Horton, Leardmann, Jacobson, & Boyko, 2013). This set of measures was appropriate for this study, because it assesses for behavioral and psychological health symptoms that are commonly referenced as areas of concern in the military-based literature (See Appendix C).

PHQ-9. The PHQ-9 (Kroenke et al., 2001) is a brief measure of depression severity, consisting of nine items and a Cronbach's alpha of .89 for the general population (American Psychological Association, 2015). Each item is scored 0-3; 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. PHQ-9 scores can range from 0 to 27, with depression severity scores falling into the following categories: 0-4 = none, 5-9 = mild, 10-14 = moderate, 15-19 = moderately severe, and 20-27 = severe symptoms of depression. This assessment has been used with military samples (Gorman, Blow, Kees, Valenstein, Jarman, & Spira, 2014) and is one of the most cited assessments in relation to depressive symptoms.

GAD-7. The GAD-7 (Spitzer et al., 2006) is a 7-item measure of generalized anxiety disorder severity and has a Cronbach's alpha of .89 for the general population (Lowe et al., 2008). Like the PHQ-9, each item is scored 0-3; 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. GAD-7 scores can range from 0 to 21, with generalized

anxiety disorder severity scores falling into the following categories: 0-4 = none, 5-9 = mild, 10-14 = moderate, and 15-21 = severe symptoms of anxiety. Previous researchers have used this measure with military samples to gauge presence of anxiety (McPherson & McGraw, 2013).

PC-PTSD. The PC-PTSD (Prins et al., 2003) is a 4-item PTSD screen designed for use in primary care, has been used with military populations (Ford, Ruzek, & Niles, 1996), and has a Cronbach's alpha of .83 (Spoont et al., 2013). Respondents answer each question with "yes" or "no," and three affirmative responses are indicative of a positive screen. A positive screen can be used to determine when a more thorough assessment is warranted.

AUDIT. Participants completed the AUDIT (World Health Organization, 2001) to assess risk related to alcohol. This 10-item assessment has a Cronbach's alpha of .72 to.87 in the general population (Sheilds & Caruso, 2004). Each item has a score of zero to four. The AUDIT suggests that people who score from 8-15 should receive education in relation to drinking; scores from 16-19 suggest that the person receive brief counseling; and a score of 20 or more warrants a full evaluation on substance use. This assessment was selected because it had been cited in previous military-based research (Gates et al., 2007).

Traumatic Events Questionnaire (TEQ; Vrana & Lauterbach, 1994). This 13-item scale assesses eleven events (e.g., experiencing a serious accident, receiving news about a serious injury or death of someone, and being a victim of abuse). The TEQ is scored by frequency of traumatic events. Severity is gauged by the number of traumatic events respondents select from the measure. This scale also included an area for an unspecified traumatic event to be reported. Participants were asked to respond "yes" or "no" to each item, and for endorsed items, respondents were asked to report the frequency, age at the time(s) of the event, degree of injury, degree of life threat, and degree of how traumatizing the event is currently. Each of the degree

questions was scored on a Likert-scale from 1 (“not at all”) to 7 (“extremely”). For the purposes of this study, researchers used the frequency of traumatic events for data analyses. The military version of this scale included questions about being in a combat zone. For a civilian population, researchers have reported that this scale has good test-retest reliability over a two-week period (Cronbach’s alpha was .91 for number of events and the occurrence of specific events ranged from .72 to 1.0; Lauterbach & Vrana, 1994; See Appendix D).

Sexual Experiences Questionnaire-Department of Defenses (SEQ-DoD-s; Stark, Chernyshenko, Lancaster, Drasgow, & Fitzgerald, 2002). The SEQ-DoD-s is a 16-item scale that was adapted and shortened from the original Sexual Experiences Questionnaire (Fitzgerald et al., 1988) for military personnel. The SEQ-DOD-s contains four subscales of work-related sexual harassment: sexist hostility (e.g., sexist remarks), sexual hostility (e.g., rude, offensive, or discriminatory behavior), unwanted sexual attention (e.g. inappropriate sexual advances and pressure to go on dates), and sexual coercion (e.g. using threats of punishment and rape). Participants respond to how often each item has occurred in the past 12 months ranging from “never occurred” to “always occurred.” Researchers summed each subscale individually to measure specific types of sexual harassment and also summed all of the subscales together for an overall sexual harassment score. Higher scores for both the subscales and overall scale indicate a greater occurrence of sexual harassment experiences. The SEQ-DoD-s has been found to have good internal reliability for all four subscales within active duty women populations (Cronbach’s alphas ranging from .83 to .92) (Stark et al., 2002) (See Appendix E).

Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS is a 12-item scale that assesses social support from family, friends, and significant others, each of which is a subscale of this measure. Participants were asked to

respond to each item on a 7-point Likert scale from "very strongly disagree" to "very strongly agree." Each subscale consists of four items. Participant responses are averaged for each subscale, as well as for the total score, with higher scores indicating higher levels of perceived social support. Although this scale has been used with a military population (Woodworth, 2013), psychometrics have only been reported with non-military samples (Cronbach's alpha = .88; Zimet et al., 1988; See Appendix F).

The Duke University Religion Index (DUREL; Koenig, Parkerson, Meador, 1997). The DUREL is a five-item scale and assesses three major dimensions of religious involvement; organizational activities (e.g., prayer groups), non-organizational activities (e.g., scripture reading), and intrinsic or subjective religiosity (i.e., personal religious commitment). Respondents can score between 5 and 27, though each subscale can be scored and examined independently. For organizational activities, participants can score between 1 and 6, between 1 and 6 for non-organizational activities, and between 3 and 15 for intrinsic or subjective religiosity. Higher scores are indicative of higher religiosity. This scale was appropriate for this study because Koenig (2008) found that the dimensions assessed have been related to participants' reports of depression, physical health, and social support. Also, this scale has been found to have good internal consistency with the general population and in military populations (Cronbach's alpha .91 for all five items in both populations; Koenig, 2008; See Appendix G).

Strengths and Challenges. At the conclusion of this survey, participants were asked to report on the three greatest strengths and three greatest challenges they have faced being an active duty woman (See Appendix B).

Procedures

After IRB approval, participant recruitment began by sending the link to the Qualtrics (Qualtrics, 2015) survey to various social media sites (e.g., Facebook, Twitter, and blogs). The window for data collection was designated as November, 2015 until March, 2016. Reminder emails were sent to the social media sites at least once a month during the data collection window. No incentive was offered to participants, because active duty members are not allowed to be incentivized for research purposes. Data from the completed surveys were periodically transferred from the Qualtrics (Qualtrics, 2015) site into an SPSS file kept on a password-protected computer in a locked office. The surveys did not contain any identifying information.

Data Analysis

The data was analyzed using SPSS statistical software. First, descriptive statistics were run in order to capture the frequencies, means, and standard deviations from the demographic questions. Researchers examined the data for outliers (three standard deviations from the mean) for continuous and scaled variables, but no responses met the criteria nor were removed for analysis. Next, Pearson correlations were used to explore the relationships within and between domains (i.e., biological factors with biological factors, psychological factors with psychological factors as well as biological with social factors). Then, to better understand the relationships between BPSS domains (i.e. biological factors and psychological factors, psychological factors and spiritual factors, etc.) and military factors (e.g. number of deployments and length of time in the service), a series of regression analyses were used. SPSS PROCESS macro (Hayes, 2013) was used for the moderation and mediation analyses. PROCESS uses an ordinary least squares or logistic regression-based path analysis to estimate mediator and moderator models (Hayes, 2013).

Summary

The methodology proposed for this exploratory study was constructed in order to gain more information about how the biopsychosocial-spiritual health factors of active duty women contribute to her health. This methodology was grounded in the BPSS systems metatheory (Anchin, 2008) and included measurements that assessed each of the four health domains. Researchers used correlations and regression analyses to explore the relationships within and between domains as well as to examine how military factors (e.g., deployments and time in the service) influence the BPSS health of active duty women.

REFERENCES

Aldous, W. K., Robertson, J. L., Robinson, B. J., Hatcher, C. L., Hospenthal, D. R, Conger, N. G., & Murray, C. K. (2011). Rates of gonorrhea and chlamydia in U.S. military personnel deployed to Iraq and Afghanistan (2004–2009). *Military Medicine, 176*(6), 705–710. doi:10.7205/MILMED-D-10-00218

American Psychological Association. (2015). Patient Health Questionnaire. Retrieved from http://www.apa.org/pi/about/publications/caregivers/practice-settings/assessment/tools/patient-health.aspx

Anchin, J. C. (2008). Pursuing a unifying paradigm for psychotherapy: Tasks, dialectical considerations, and biopsychosocial systems metatheory. *Journal of Psychotherapy Integration, 18*(3), 310-349. doi:10.1037/a0013557

Andresen, E. M., Catlin, T. K., Wyrwich, K. W., & Jackson-Thompson, J. (2003). Retest reliability of surveillance questions on health related quality of life. *Journal of Epidemiology & Community Health, 57*, 339-343.

Boehmer, T. K., Boothe, V. L., Flanders, W. D., & Barrett, D. H. (2003). Health-related quality of life of U.S. military personnel: A population-based study. *Military Medicine, 168*(11), 941-947.

Centers for Disease Control and Prevention. (2011). CDC Health-Related Quality of Life (HRQOL). Retrieved from http://www.cdc.gov/hrqol/hrqol14_measure.htm

Cohen, J. (1988). *Statistical power analysis for the behavior sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* Thousand Oaks, CA: SAGE Publications.

Cross, J. D., Johnson, A. E., Wenke, J. C., Bosse, M. J., & Ficke, J. R. (2011). Mortality in female war veterans of operations Enduring Freedom and Iraqi Freedom. *Clinical Orthopaedics and Related Research, 469*(7), 1956–1961. doi:10.1007/s11999-011-1840-z

Department of Defense (DoD). (2012). Demographics report. Retrieved from http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*, 129-136. doi:10.1126/science.847460

Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137*, 535-544.

Fitzgerald, L. F., Magley, V. J., Drasgow, F., & Waldo, C. R. (1999). Measuring sexual harassment in the military: The Sexual Experiences Questionnaire (SEQ-DoD). *Military Psychology, 11*(3), 243-263.

Fitzgerald, L. F, Shullman, S. L., Baily, N., Richards, M., Swecker, J., Gold, Y. …Weitzman, L. (1988). The incidence and dimensions of sexual harassment in academia and the workplace. *Journal of Vocational Behavior, 35*, 309-326.

Ford, J. D., Ruzek, J. I., & Niles, B. L. (1996). Identifying and treating VA medical care patients with undetected sequelae of psychological trauma and post-traumatic stress disorder. *National Center for PTSD Clinical Quarterly, 6*(4), 77-82.

Forgey, M. A., & Badger, L. (2010). Patterns of intimate partner violence and associated risk factors among married enlisted female soldiers. *Violence and Victims, 25*, 45–61.

Gates, T., Duffy, K., Moore, J., Howell, W., & McDonald, W. (2007). Alcohol screening instruments and psychiatric evaluation outcomes in military aviation personnel. *Aviation, Space, and Environmental Medicine, 78*(1), 48-51.

Janssen, I., Katzmarzyk, P. T., & Ross, R. (2004). Waist circumference and not body mass index explains obesity-related health risk. *The American Journal of Clinical Nutrition, 79*(3), 379-384.

Koenig, H.G. (2008). *Medicine, Religion and Health*. Philadelphia, PA: Templeton Press.

Koenig, H. G., Parkerson, G. R., & Meador, K. G. (1997). Religion index for psychiatric research. *The American Journal of Psychiatry, 154*(6), 885-886.

Kroenke, K., Spitzer, R. L., Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606-613.

Lacks, M., Lamson, A., Rappleyea, D., Russoniello, C., & Littleton, H. (2016). *A systematic review of the biopsychosocial-spiritual health for active duty women.* Manuscript submitted for publication.

Lindberg, L. D. (2011). Unintended pregnancy among females in the US military. *Contraception, 84*(3), 249–251. doi:10.1016/j.contraception.2011.01.017

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P.Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care, 46*(3), 266-274. doi:10.1097/MLR.0b013e318160d093

McPherson, F., & McGraw, L. (2013). Treating generalized anxiety disorder using complementary and alternative medicine. *Alternative Therapies in Health and Medicine, 19*(5), 45-50.

Patten, E., & Parker, K. (2011). Women in the U.S. Military: Growing share, distinctive profile. Retrieved from http://www.pewsocialtrends.org/files/2011/12/women-in-the-military.pdf

Prins, A., Ouimette, P., Kimerling, R., Cameron, R. P., Hugelshofer, D. S., Shaw-Hegwer, J., … Sheikh, J. I. (2003). The primary care PTSD screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry, 9,* 9-14.

Qualtrics. (2015). Qualtrics. Retrieved from http://www.qualtrics.com

Shields, A. L., & Caruso, J. C. (2004). Reliability generalization of the Alcohol Use Disorders Identification Test. *Educational and Psychological Measurement, 63,* 404-415.

Spitzer, R. L., Kroenke, K., Williams, .J. B., & Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine, 166,* 1092-1097.

Spoont, M., Arbisi, P., Fu, S., Greer, N., Kehle-Forbes, S., Meis, L., & Rutks, I. (2013). Screening for Post-Traumatic Stress Disorder (PTSD) in primary care: A systematic review. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK126691/pdf/Bookshelf_NBK126691.pdf

Straus, M. A., Hamby, S. L., Buncy-McCoy, S., & Sugarman, D. B. (1996). The revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues, 17*(3), 283-316.

Suls, J., Krantz, D. S., & Williams, G. C. (2013). Three strategies for bridging different levels of analysis and embracing the biopsychosocial model. *Health Psychology, 32*(5), 597-601. doi: 10.1037/a0031197.

Vrana, S. R. & Lauterbach, D. (1994). Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress, 7,* 289-302.

Wells, T. S., Horton, J. L., Leardmann, C. A., Jacobson, I. G., & Boyko, E. J. (2013). A comparison of the PRIME-MD PHQ-9 and PHQ-8 in a large military prospective study. *Journal of Affective Disorders, 148*(1), 77-83. doi:10.1016/j.jad.2012.11.052

Woodworth, J. (2013). Relationship between Marine Corps wives' stress and perceived social support. Retrieved from http://search.proquest.com.jproxy.lib.ecu.edu/docview/1328401310?accountid=10639

World Health Organization. (2001). The alcohol use disorders identification test guidelines for use in primary care. Retrieved from http://www.talkingalcohol.com/files/pdfs/WHO_audit.pdf

Wright, L. M., Watson, W. L., & Bell, J. M. (1996). *Belief: The heart of healing in families and illness.* New York: Basic Books.

Zimet, G.D., Dahlem, N.W., Zimet, S.G. & Farley, G.K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*, 30-41.

Figure 1. Conceptual model where psychological variables mediate the relationship between length of time in the service and biological health variables.

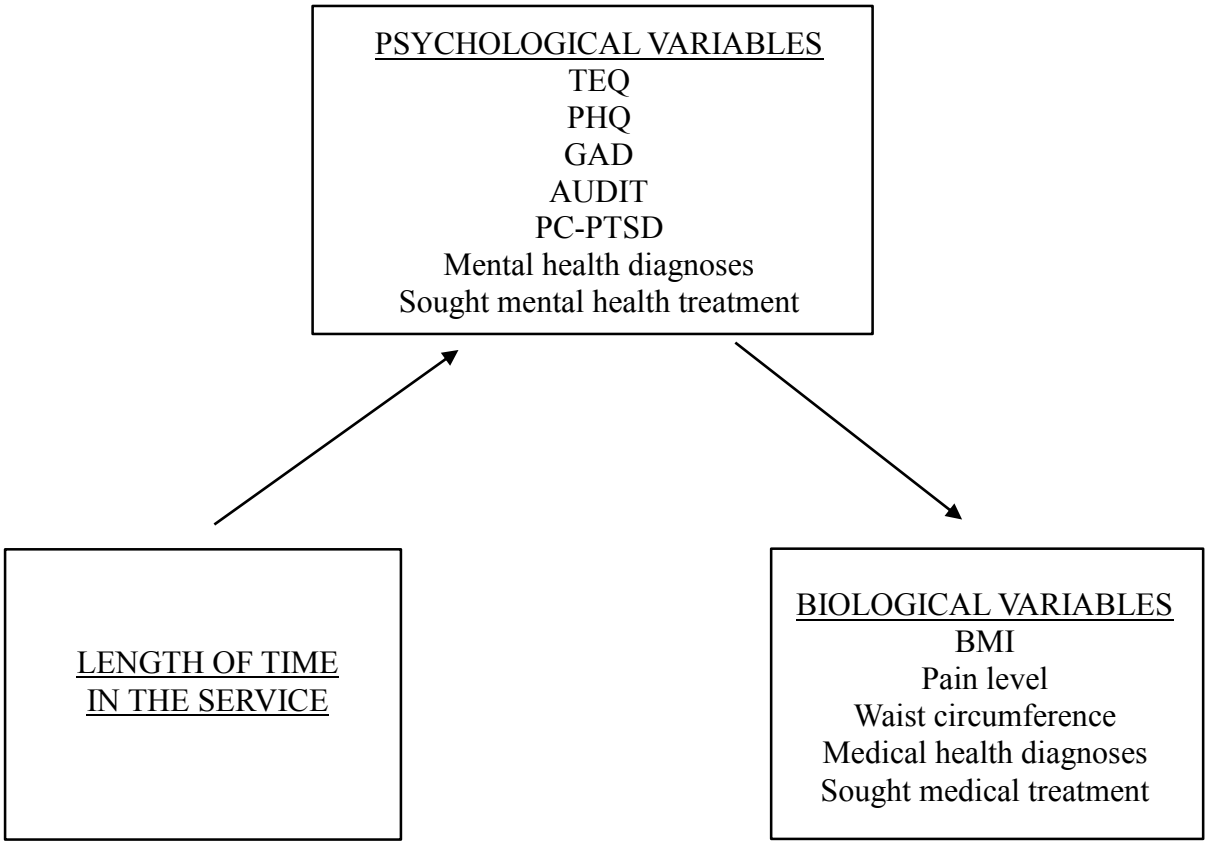


Figure 2. Conceptual model where social variables moderate the relationship between length of time in the service and biological health variables.

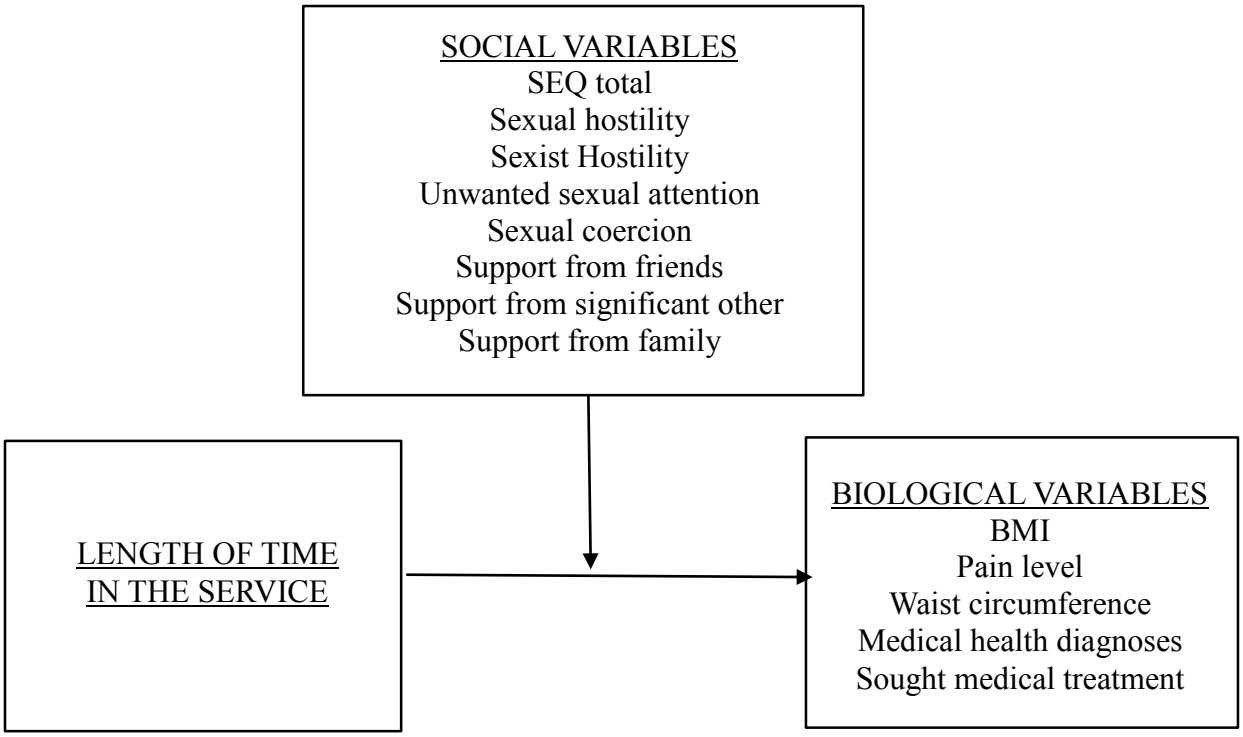


Figure 3. Conceptual model where spiritual variables moderate the relationship between length of time in the service and biological health variables.

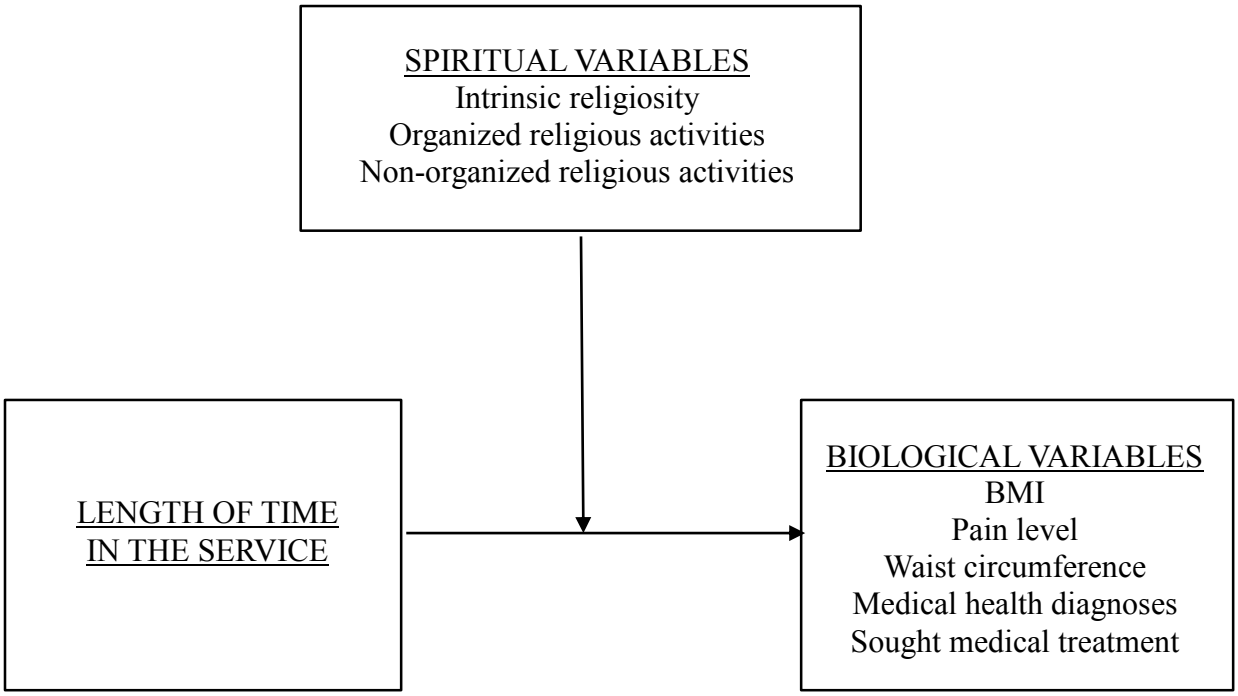


Figure 4. Conceptual model where psychological variables mediate the relationship between deployments and biological health variables.

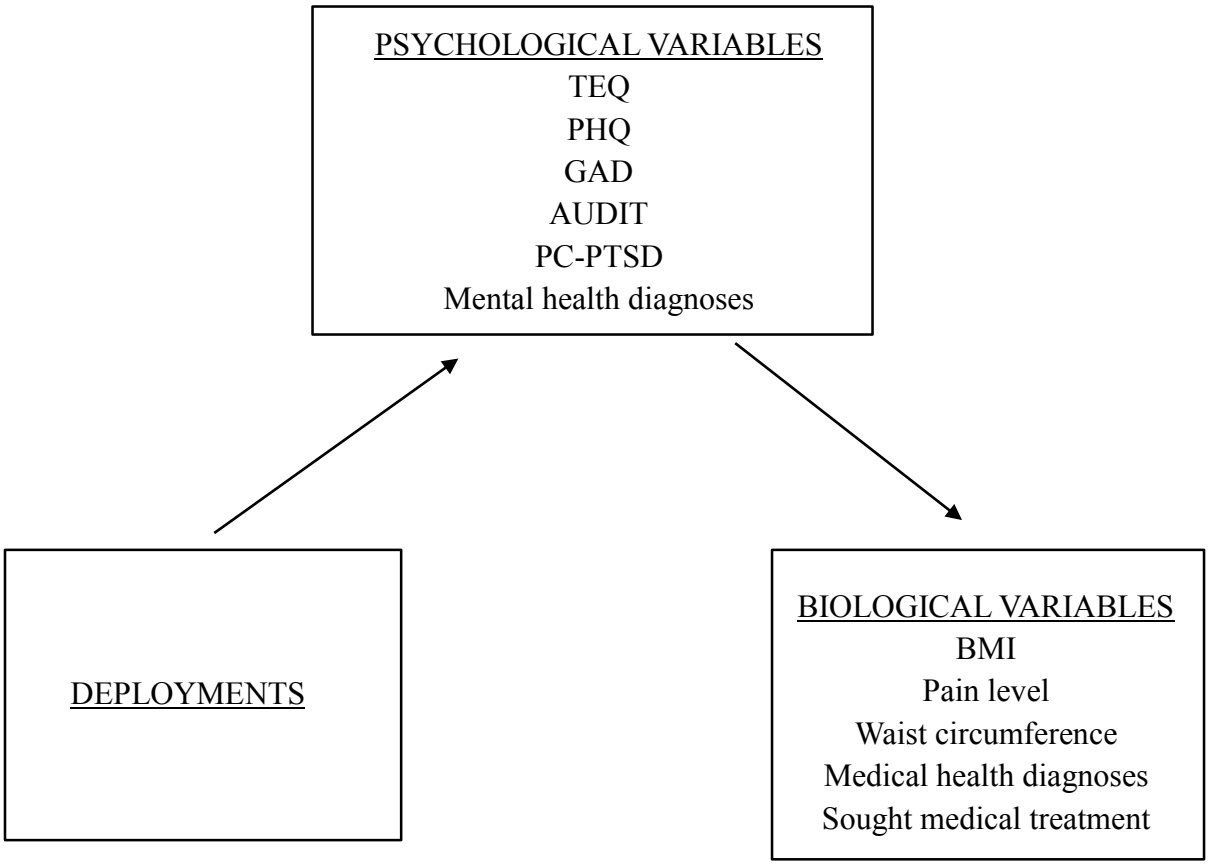


Figure 5. Conceptual model where social variables moderate the relationship between deployments and biological health variables.

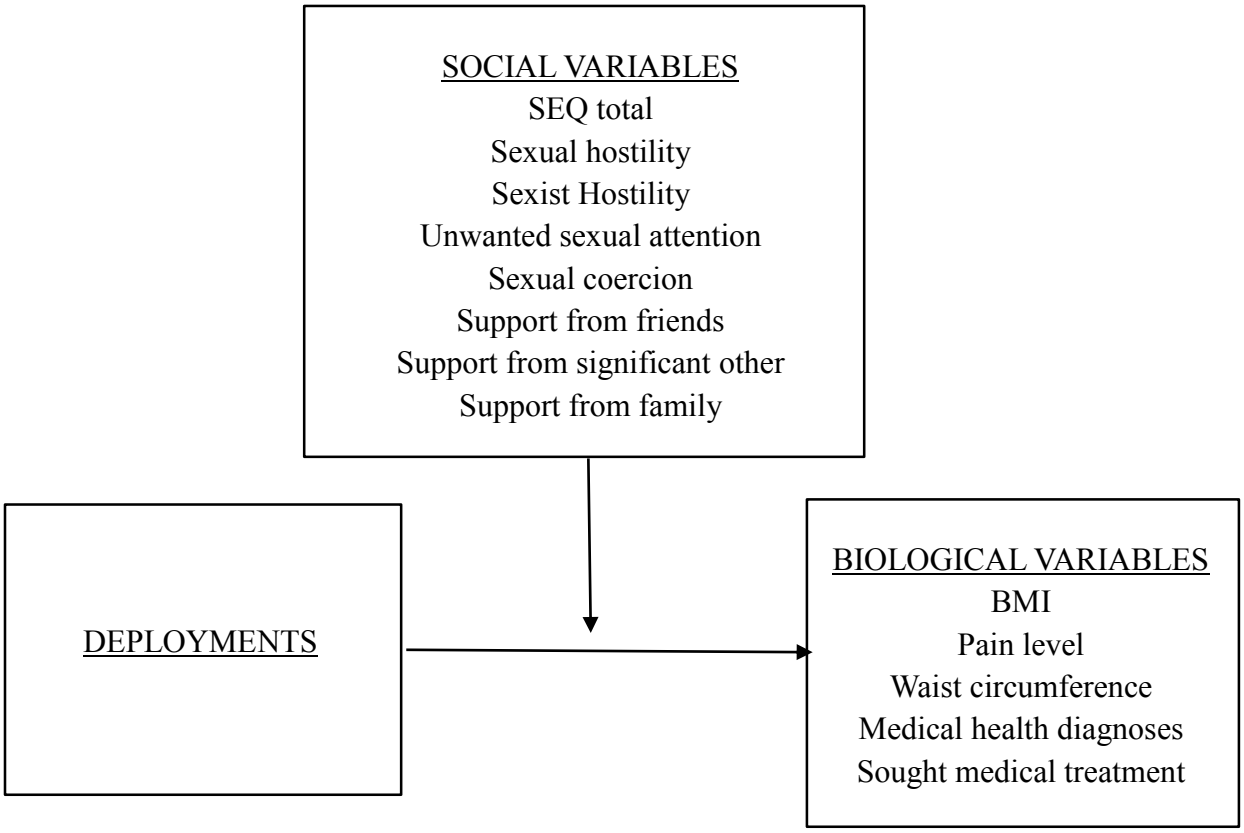
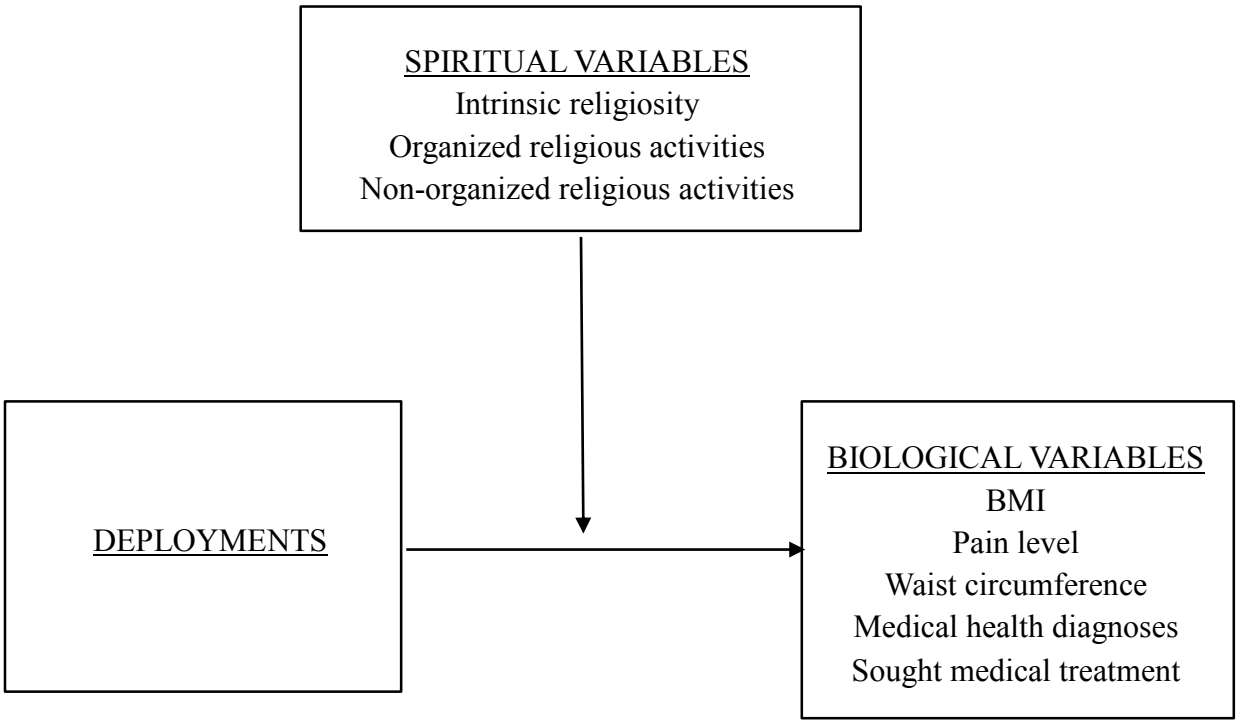


Figure 6. Conceptual model where spiritual variables moderate the relationship between deployments and biological health variables.



CHAPTER 5: THE INTERPLAY OF THE BIOLOGICAL, PSYCHOLOGICAL, SOCIAL, AND SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN

Women make up over 15% of the active duty military force in the U.S. and this number continues to increase (Department of Defense [DoD], 2014). Even though more women are enrolling in active duty service, there is very limited research that focuses solely on the health of active duty women, especially that includes her biological, psychological, social, and spiritual health (Lacks, Lamson, Rappleyea, Russoniello, & Littleton, 2016). While researchers have recognized women's contributions to unit readiness, cohesion, and morale (Harrell & Miller, 1997), attention has not been given to their unique biological, psychological, and social health challenges compared to military men and civilian women. In fact, much of what has been published about the health of active duty women has been reduced to topics pertaining to reproductive health (Lacks et al., 2016).

Certainly, active duty women deserve to have their health considered in a more systemic nature than just gynecologic and obstetric experiences and diagnoses. After all, the death rates for military women are greater than for men who deployed to Operation Enduring Freedom (35.9% and 17%, respectively) and Operation Iraqi Freedom (14.5% and 12%, respectively) (Cross, Johnson, Wenke, Bosse, & Ficke, 2011). These disparities are more salient now than ever before since women are able to occupy more dangerous jobs, and fulfill missions that have the potential to impact their long-term health status (Roulo, 2013). Recently, researchers have found that women experience health consequences simply by working in the military, a male-dominated career field, because the size of personal protective gear and body armor worn during deployments is not designed for women's body types. The armor is not inclusive of all women's sizes and some women have been forced to choose gear that is too big for their stature, leading to

chafing, bruising, abrasions, and limited mobility (Defense Advisory Committee on Women in the Services [DACOWITS], 2009).

A better understanding of the unique health experiences of active duty women is essential to the U.S. military in order to sustain a mission ready workforce. Having a culture that respects women's well-being, not only helps to ensure her readiness and job retention (Goodman et al., 2013), but also helps to promote a healthier veteran in the future. The purpose of this article is to (a) present the biopsychosocial-spiritual metatheory that grounds this study, (b) provide the reader with a history of the literature that focuses on the biological, psychological, social, and spiritual health of active duty women, (c) share the study's design and results in relation to active duty women's biopsychosocial-spiritual health, and (d) extend a series of recommendations for providers, researchers, and policy makers on how to better meet the unique health needs of active duty women based on the outcomes from this study.

The Biopsychosocial-Spiritual Metatheory

The biopsychosocial (BPS) systems metatheory (Anchin, 2008) was used as the framework best suited for this study, because it captures the complexity and systemic factors that influence a person's life. Anchin (2008) argued that in order to fully understand the whole person, the biopsychosocial systems metatheory should be used because it honors systems theory (i.e., the whole is greater than the sum of its parts) (von Bertalanffy, 1968) and the biopsychosocial approach (i.e., the biological, psychological, and social health experiences of an individual must be considered to accurately assess and treat) (Engel, 1977, 1980). An additional domain that influences health (spirituality) was added to the framework (Wright, Watson, & Bell, 1996), based on its frequent presence in holistic health research (Aamar, Lamson, & Smith, 2015; Prest & Robinson, 2006). Since the purpose of this study was to gain a deeper

understanding of the interconnectedness of active duty women's BPSS health, assessing her spiritual health was equally important to her biological, psychological, and social health.

The BPSS systems metatheory encompasses a holistic approach to health (i.e., it considers the complexity within each domain, such as multiple acute and chronic symptoms that intersect in one's biological health, while also honoring the interaction between domains, such has how psychological health can influence social relationships) that when applied, has the capacity to enhance a woman's BPSS health and her readiness for duty. Perhaps more complex, is designing studies that are grounded in BPSS metatheory, due to the complexity and interlinking of BPSS health domains.

It is important to note that since this study is exploratory and no other study has ever addressed the biopsychosocial-spiritual (BPSS) health of active duty women (simultaneously), there wasn't one specific health factor that was deemed as the focus of the study (e.g. BPSS domains pertaining to post-traumatic stress or reproductive health wasn't the focal point). In fact, previous researchers (Suls & Rothman, 2004) cautioned against selecting particular variables to focus on when conducting biopsychosocial research, because there is a great risk in "cutting the pie into slices" (p. 123) rather than fully capturing the systemic health experiences of a particular population. As such, this study aimed for a more in-depth understanding of the intra and inter-relationships between the BPSS health domains in order to capture the complexity of the BPSS health of active duty women.

The Biopsychosocial-Spiritual Health of Active Duty Women

It is surprising that more attention has not been given to the BPSS health of active duty women, particularly since over 20,000 women have served during the recent conflicts in Afghanistan and Iraq and over 140 women have sacrificed their lives during these wars (National

Center for Veterans Analysis and Statistics, 2011). Along with that, the 1994 Direct Combat Exclusion Rule that once prohibited women from holding certain jobs (such as ground combat and Special Forces) has since been lifted, thereby placing women into a continuum of complex and potentially dangerous positions (Roulo, 2013). In fact, since 2013, over 14,000 new roles have opened up for active duty women (DoD, 2013). While this policy has afforded women many new opportunities within the military, integrating into some of these new positions has resulted in the potential for change to her biological, psychological, social, and spiritual health.

When considering active duty women's biological health, most researchers have simplified her health to only issues pertaining to reproductive and sexual health experiences or concerns and how they impede her mission readiness (See examples in Lacks et al., 2016). For example, researchers have focused on ways in which pregnancies influence her military career or ability to meet military fitness standards (post pregnancy) (Armitage, 2012; Greer, 2012). Women who are active duty and experience pregnant risks, such as preterm labor (Hatch et al., 2006; Hourani & Hilton, 2000; Magann et al., 2005) and pregnancy-induced hypertension (Irwin, Savitz, Hertz-Picciotto, & St André, 1994; Magann & Nolan, 1991) are common examples of limited biological health research within active duty women populations.

Although a large portion (76%) of research on active duty women's biological health is related to her reproductive health (Lacks et al., 2016), there are additional concerns regarding her physical health that should be attended to. The other research that exists on her biological health, but to a lesser degree pertains to common injuries (Friedl, Nuovo, Patience, & Dettori, 1992; Rauh, Macera, Trone, Shaffer, & Thompson, 2008; Sulsky, Mundt, Bigelow, & Amoroso, 2002). While some researchers have found that active duty women are twice as likely to have musculoskeletal injuries during combat-related training and have higher rates of non-battle

related injuries compared to their men counterparts (United Kingdom Ministry of Defense, 2014) almost no research exists on the concerns or solutions that can improve the biological health of active duty women.

Not only do active duty women experience unique physical health challenges, but they also report that balancing their roles as mothers, partners, and active duty members influences their psychological health (Naclerio, Stola, Trego, & Flagerty, 2011). Researchers have found that active duty women report more mental health diagnoses after they return from deployment as compared to pre-deployment (Armed Forces Health Surveillance Center, 2009). In addition, compared to men who are active duty, active duty women are five times more likely to develop post-traumatic stress disorder and two times more likely to experience a major depressive episode following a deployment (Hourani & Yuan, 1999). These psychological health concerns are not just for women who have deployed; researchers have also found psychological health concerns surrounding pregnancy, labor, and delivery (Nguyen et al., 2013). After delivering a baby, approximately 50% of active duty women scored positive for post-partum depression symptoms right after delivery and 40% still reported symptoms six weeks after delivery (Rychnovsky & Beck, 2006). Unfortunately, so little research has ever been done with regard for the psychological health of active duty women and most of what exists is limited to her experiences surrounding deployment and pregnancy or delivery (Lacks et al., 2016).

Equally absent from the literature are the social health strengths or challenges faced by active duty women. In a study of over 2,000 active duty women, Bostock and Daley (2007) found that active duty women experience a lifetime prevalence of rape more than twice as high as civilian women and nearly half of the women in the study reported being the victims of rape, molestation, or attempted sexual assault. The same authors reported that 31.8% of active duty

women were sexually harassed by a military supervisor and 26.7% of women reported being sexually harassed by a military co-worker. Other researchers have found a high prevalence of domestic violence; Campbell et al. (2003) found that 21.6% of active duty women reported intimate partner violence present in their home life.

Although there is research that focuses strictly on the biological, psychological, and social health of active duty women, there is no research that exists on the spiritual health or wellbeing of active duty women and very limited research published with multiple health domains assessed simultaneously (e.g., biological and psychological health assessed in the same study). Examples of some of the multiple domain research includes studies focused on active duty women who have a higher prevalence of binge drinking (psychological health) and new/multiple sexual partners as compared to civilian women (social health) (Stahlman, Javanbakht, Cochran, Shoptaw, Hamilton, & Gorbach, 2015). Not surprisingly, single deployed women (social health) report higher levels of depressive symptoms (psychological health) compared to married women (Kelley, Hock, Jarvis, Smith, Gaffney, & Bonney, 2002). Another example, has shown that divorced or separated women (social health) have the highest rate of preterm labor (37%) (biological health), followed by single women (26%) (social health), and then married women (11%) (social health) (Evans & Rosen, 2000).

Although some research exists on the interconnectedness between biological and psychological health, biological and social health, and psychological and social health, this current study appears to be the first that focuses on active duty women while assessing biological, psychological, social, and spiritual health simultaneously. Even further, this is the first known study to examine the spiritual health of active duty women and how her BPSS health interfaces with her military service. The research questions posed for this study are: What are the

relationships between variables across biological, psychological, social, and spiritual health domains for active duty women and how do military traits (i.e., length of time in the service and her total number of deployments) influence the BPSS health of active duty women?

Method

The primary aim of this study was to explore the ways in which biopsychosocial-spiritual domains most influence the health of active duty women and how BPSS domains (in relation to this population) interact with one another. To address the hypotheses that are outlined below, a quantitative cross-sectional research design was employed; as such, data was collected at one point in time (Creswell, 2009) from active duty women who accessed one of the recruitment options (as described in the recruitment procedure section) and provided a consent to participate in the study. The electronic self-report survey was disseminated through Qualtrics (Qualtrics, 2015), a survey software program, in order to capture information from active duty women who were stationed all over the world.

Participants

The inclusion criteria for this study comprised of active duty women who: a) identified as a woman, b) had active duty status in the U.S. military at the time of the study (enlisted and officers included), and c) had access to the internet or a smart phone device. Since women of all ranks were eligible to participate in this study, rank was controlled for in all analyses included in this article.

Recruitment Procedures

After receiving IRB approval, active duty women were recruited via social media sites (e.g. Facebook, Twitter, and website forums) and through snowball sampling procedures (Creswell, 2009). In order to ensure that a diverse sample of women from different ranks and

duty locations were present in the sample, various social media sites were used (e.g. U.S. Army Women Facebook pages). A brief description of the purpose of the project and a link to the Qualtrics (Qualtrics, 2015) survey was provided on all selected social media sites. The primary investigator (PI) also created a Facebook page for this project that included pertinent information about the study, contact information for the PI, and a link to the survey. The use of social media sites was selected as a recruitment mechanism in order to increase the likelihood of reaching women stationed all over the world.

The PI also used professional resources, such as the newsletter for the Alliance of Military and Veteran Family Behavioral Health Providers and relationships formed on military bases across the nation to post recruitment information and the link for the study. Reminder emails were sent frequently to the social media sites during the data collection window. No incentive was offered to participants, because active duty members are not allowed to be incentivized for research purposes.

Measures

The measures used in this study were selected in order to best explore the biological, psychological, social, and spiritual health experiences of active duty women. The data for this study were collected through self-report questionnaires from active duty women. The measures included in this study assessed participant's demographics, physical health, psychological health, physical and psychological trauma history, social support, sexual harassment, and spirituality. The measures were selected because each variable was identified via a systematic review focused on active duty women (Lacks, Lamson, Rappleyea, Russoniello, & Littleton, 2016) or because the measure had been previously used with military populations.

Demographic Questionnaire. The first measure was a demographic questionnaire that included information about participants' military experiences (e.g. rank, job type, length of time in the service, deployments, combat exposure) and social factors (e.g. relationship status and childfree versus parent) not otherwise assessed via the standard measures for social health (See Appendix B).

Physical Health. Participants were asked to provide their current height and weight in order to assess body mass index (BMI). In addition, participants were asked to report their waist circumference based on what it was at her last physical fitness exam. Even though BMI and waist circumference are interrelated, waist circumference is an additional predictor of risk for biological health, particularly for individuals categorized with underweight or overweight BMI scores (Janssen, Katzmarzyk, & Ross, 2004). The waist circumference for military women is measured at each fitness exam (at least annually), thus making it an appropriate biological health variable for this study. Additional biological health questions included in the survey were related to injuries, pregnancies, their current level of pain, and medical diagnoses) (See Appendix B).

Psychological Health. Psychological health was measured by assessing for a variety of psychological health diagnoses that have been reported in military-based research. The following were assessed in this study: depression, anxiety, alcohol use, trauma, and the number of traumatic events experienced.

Patient Stress Questionnaire (PSQ; University of Massachusetts Medical School, 2011). The PSQ is a survey that that consolidates four screening tools that attend to mental health: Patient Health Quesstionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006), Primary Care PTSD Screen (PC-PTSD; Prins et al., 2003), and the Alcohol Use Disorders Identification

Test (AUDIT; World Health Organization, 2001). Each of these tools has been found to have good reliability in the general population. It does not appear that this particular assessment has been used with a military sample, but each of these screening tools have separately been used with military populations (Ford, Ruzek, & Niles, 1996; Gates, Duffy, Moore, Howell, & McDonald, 2007; McPherson & McGraw, 2013; Wells, Horton, Leardmann, Jacobson, & Boyko, 2013). This assessment was appropriate for this study because it assesses for behavioral and psychological health symptoms that are commonly referenced in military-based literature (See Appendix C).

PHQ-9. The PHQ-9 (Kroenke et al., 2001) is a brief measure of depression severity, consisting of nine items and a Cronbach's alpha of .89 for the general population (American Psychological Association, 2015). Each item is scored 0-3; 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. PHQ-9 scores can range from 0 to 27, with depression severity scores falling into the following categories: 0-4 = none, 5-9 = mild, 10-14 = moderate, 15-19 = moderately severe, and 20-27 = severe symptoms of depression. This assessment has been used with military samples (Gorman, Blow, Kees, Valenstein, Jarman, & Spira, 2014). The Cronbach's alpha score for the PHQ in this study is .85.

GAD-7. The GAD-7 (Spitzer et al., 2006) is a 7-item measure of generalized anxiety disorder severity and has a Cronbach's alpha of .89 for the general population (Lowe et al., 2008) and is .83 for the current study. Like the PHQ-9, each item is scored 0-3; 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. GAD-7 scores can range from 0 to 21, with generalized anxiety disorder severity scores falling into the following categories: 0-4 = none, 5-9 = mild, 10-14 = moderate, and 15-21 = severe symptoms of anxiety.

Previous researchers have used this measure with military samples (McPherson & McGraw, 2013).

PC-PTSD. The PC-PTSD (Prins et al., 2003) is a 4-item PTSD screen designed for use in primary care for post-traumatic symptoms (as aligned with the DSM-IVTR) and has a Cronbach's alpha of .83 from previous studies (Spoont et al., 2013) and .84 for the current study. Respondents answer each question with "yes" or "no," and three affirmative responses are indicative of a positive screen. This screening has been used with military populations (Ford, Ruzek, & Niles, 1996).

AUDIT. Participants completed the AUDIT (World Health Organization, 2001) to assess risk related to alcohol. This 10-item assessment has a Cronbach's alpha of .72 to.87 in the general population (Sheilds & Caruso, 2004). The Cronbach's alpha for the current study was .84. Each item has a score of zero to four. The AUDIT suggests that people who score from 8-15 should receive education in relation to drinking; scores from 16-19 suggest that the person receive brief counseling; and a score of 20 or more warrants a full evaluation on substance use. This assessment has been used previously in military populations (Gates et al., 2007).

Traumatic Events Questionnaire (TEQ; Vrana & Lauterbach, 1994). This 13-item scale assesses eleven events (e.g., experiencing a serious accident, receiving news about a serious injury or death of someone, and being a victim of abuse). The TEQ is scored by frequency of traumatic events. Severity is gauged by the number of traumatic events respondents select from the measure. This scale also included an area for an unspecified traumatic event to be reported. Participants were asked to respond "yes" or "no" to each item, and for endorsed items, respondents were asked to report the frequency, age at the time(s) of the event, degree of injury, degree of life threat, and degree of how traumatizing the event is currently. Each of the degree

questions was scored on a Likert-scale from 1 ("not at all") to 7 ("extremely"). For the purposes of this study, the frequency of traumatic events was used for data analyses. The military version of this scale included questions about being in a combat zone. For a civilian population, researchers have reported that this scale has good test-retest reliability over a two-week period (Cronbach's alpha was .91 for number of events and the occurrence of specific events ranged from .72 to 1.0; Lauterbach & Vrana, 1994; See Appendix D). For this study, the Cronbach's alpha score was .64.

Social Health. The variables used to measure social health included four subscales of a work-related sexual harassment questionnaire and three subscales of an assessment that measured social support.

Sexual Experiences Questionnaire-Department of Defense-s (SEQ-DoD-s; Stark, Chernyshenko, Lancaster, Drasgow, & Fitzgerald, 2002). The SEQ-DoD-s is a 16-item scale that was adapted and shortened from the original Sexual Experiences Questionnaire (Fitzgerald et al., 1988) for military personnel. The SEQ-DOD-s contains four subscales of work-related sexual harassment: sexist hostility (e.g., sexist remarks), sexual hostility (e.g., rude, offensive, or discriminatory behavior), unwanted sexual attention (e.g. inappropriate sexual advances and pressure to go on dates), and sexual coercion (e.g. using threats of punishment and rape). Participants respond to how often each item has occurred in the past 12 months ranging from "never occurred" to "always occurred." For the purpose of this study, each subscale was summed individually to measure specific types of sexual harassment. A total sum was also calculated for all of the subscales together in order to identify an overall sexual harassment score. Higher scores for both the subscales and overall scale indicate a greater occurrence of sexual harassment experiences. The SEQ-DoD-s has been found to have good internal consistency for all four

subscales within active duty women populations (Cronbach's alphas ranging from .83 to .92) (Stark et al., 2002). The Cronbach's alpha score for the overall sexual harassment measure per this study was .89 and ranged from .72 to .88 for the subscales (See Appendix E).

Multidimensional Scale of Perceived Social Support* (*MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS is a 12-item scale that assesses social support from family, friends, and significant others, each of which is a subscale of this measure. Participants were asked to respond to each item on a 7-point Likert scale from "very strongly disagree" to "very strongly agree." Each subscale consists of four items. Participant responses are averaged for each subscale, as well as for the total score, with higher scores indicating higher levels of perceived social support. Although this scale has been used with a military population (Woodworth, 2013), psychometrics have been reported with non-military samples (Cronbach's alpha was .88; Zimet et al., 1988). For the current study, Cronbach's alpha scores ranged from .94 to .95 for the subscales (See Appendix F).

Spiritual Health. The variables used to measure spiritual health included questions about intrinsic religiosity, the attendance of organized religious activities, and the attendance of non-organized religious activities.

The Duke University Religion Index (DUREL; Koenig, Parkerson, Meador, 1997). The DUREL is a five-item scale and assesses three major dimensions of religious involvement; organizational activities (e.g., prayer groups), non-organizational activities (e.g., scripture reading), and intrinsic or subjective religiosity (i.e., personal religious commitment). Respondents can score between 5 and 27, though each subscale can be scored and examined independently. For organizational activities, participants can score between 1 and 6, between 1 and 6 for non-organizational activities, and between 3 and 15 for intrinsic or subjective

religiosity. Higher scores are indicative of higher religiosity. This scale was appropriate for this study because Koenig (2008) found that the dimensions assessed have been related to participants' reports of depression, physical health, and social support. Also, this scale has been found to have good internal consistency in the general population and in military populations (Cronbach's alpha .91 for all five items in both populations; Koenig, 2008) and was .92 for the current study (See Appendix G).

Procedure

The IRB for this study was approved in November of 2015 and upon approval, data collection began in December, 2015 and concluded in February, 2016. The PI followed all recruitment procedures and disseminated the survey widely to social medial networks, newsletters, and through active duty military personnel. All measures were completed through Qualtrics (Qualtrics, 2015). Data from the completed surveys were periodically transferred from the Qualtrics site to an IBM SPSS software (Version 22) file kept on a password-protected computer in a locked office. The surveys did not contain any identifying information.

Hypotheses

Since this was an exploratory study, the goal of the study was to (a) determine if there are significant relationships within and between BPSS domains and (b) test the following specific hypotheses:

Biological Health Domain

1. There will be significant positive relationships between BMI, waist circumference, her number of physical health diagnoses, how often she sought out medical treatment in the past year, and her reported level of current pain.

Psychological Health Domain

2. There will be significant positive relationships between reported depressive symptoms (via PHQ), reported anxiety symptoms (via GAD), reported traumatic experiences (via TEQ), reported alcohol use (via AUDIT), her number of mental health diagnoses, and how often she sought mental health treatment in the past year.

Social Health Domain

3. There will be significant negative relationships between reported sexual harassment (via each of the SEQ subscales) and reported levels of social support (via each of the MSPSS subscales).

Spiritual Health Domain

4. There will be significant positive relationships between religious involvement subscales (via each of the DUREL subscales).

Systemic Hypotheses

5. There will be significant positive relationships between biological (i.e., BMI, waist circumference, pain level, physical health diagnoses, and the number of times she sought medical treatment), psychological health variables (e.g. PHQ, GAD, AUDIT, TEQ, mental health diagnoses, and the number of times she sought mental health treatment), and social health (only the SEQ subscales) variables.
6. There will be significant negative relationships between psychological, social (only the MSPSS subscales), and spiritual health variables.

Hypotheses for Conceptual Model

7. Psychological health variables will act as mediators between deployments and biological health variables.
8. Social support variables will act as moderators between deployments and biological health variables.
9. Spiritual health variables will act as moderators between deployments and biological health variables.
10. Psychological health variables will act as a mediator between length of time in the service and biological health variables.
11. Social support variables will act as moderators between length of time in the service and biological health variables.
12. Spiritual health variables will act as moderators between length of time in the service and biological health variables.

Data Analysis

The data was analyzed using IBM SPSS statistical software (Version 22). First, descriptive statistics were run in order to capture the frequencies, means, and standard deviations from the demographic questions. We examined the data for outliers (three standard deviations from the mean) for continuous and scaled variables, but no responses met the criteria nor were removed for analysis. Next, Pearson correlations were used to explore the relationships within and between domains (i.e., biological factors with biological factors, psychological factors with psychological factors as well as biological with social factors). Then, to better understand the relationships between BPSS domains (i.e. biological factors and psychological factors, psychological factors and spiritual factors, etc.) and military factors (e.g. number of

deployments and length of time in the service), a series of regression analyses were used. SPSS PROCESS macro (Hayes, 2013) was used for moderation and mediation analyses. PROCESS uses an ordinary least squares or logistic regression-based path analysis to estimate mediator and moderator models and utilizes listwise deletion to account for missing data (Hayes, 2013). We used G*Power (Version 3.1) to test if the sample size was sufficient to test the hypotheses for this study and it demonstrated that the sample was satisfactory; the achieved power with the sample size is adequate at.83 (O'Keefe, 2007). The survey consisted of 140 questions and took participants approximately 28 minutes to complete.

Results

Seventy six active duty women participated in this study. The majority of the women in the sample were Non-Hispanic White (71.1%), with fewer responses from African American or Black women (9.2%), and an additional 9.2% who identified as Biracial. Asian and Asian Americans, Hispanic and Latinos, and Hawaiian and Other Pacific Islanders were also represented in this sample (5.3%, 3.9%, and 1.3%, respectively). The average age of women in the study was 30.25 (*SD* = 6.62). For religious affiliation, 33.3% of active duty women in this study were Protestant, 20% were Catholic, 11.8% were Agnostic, and 10.5% of women were Atheist (See Table 1 for full demographics). The average length of time that women had been in the military was 9.11 years (*SD* = 6.27) and four service branches were represented: Air Force (57.9%), Army (22.5%), Marine Corps (7.9%), Navy (6.6%), and Activated Navy Reserves (1.3%). Also, 44.3% of the women in this sample were Officers and 43.4% of women were in dual military relationships (i.e., relationships where both she and her partner are in the military). Over thirty-three percent of women in this sample had experienced at least one combat-related deployment and 30.3% had experienced at least one noncombat-related deployment, 47.4% of

women had never deployed. Generally speaking, this sample was relatively healthy. In regard to body size, the mean BMI and waist circumference scores were less than the cut off scores for overweight as determined for military fitness standards. In addition, the sample also reported low levels of pain and few mental and physical health diagnoses. The mean scores for anxiety indicated less than mild anxiety and the average scores for depression indicated mild levels of depressive symptoms. Lastly, this sample reported high levels of social support from friends, family, and significant others, almost everyone in the sample had at least some college education (93.4%), and almost 70% of women were either married or cohabitating with a significant other.

Results from Hypotheses

Biological Health Hypotheses. Pearson correlations were run in order to examine the relationship within the biological health domain (e.g. body mass index (BMI), waist circumference, number of physical health diagnoses, how often medical treatment was sought out in the past year, and level of current physical pain). The analysis revealed a significant positive relationship between current level of pain and number of physical diagnoses, $r(54) = .483$, $p = .000$; as the number of physical diagnoses increased, so did the likelihood for a higher rating on the pain scale. Although it would not be surprising in a civilian population to see a positive correlation between BMI and waist circumference, it was a bit more surprising to see a positive correlation in a military population whereby BMI can be overinflated due to higher volume of muscle mass (Dayton, 2014) and thus would likely be aligned with a smaller WC. For this sample, a significant positive correlation was found between waist circumference and BMI, $r(58) = .629$, $p = .000$.

Psychological Health Hypotheses. Correlations were also run in order to examine the relationship between variables within the psychological health domain (e.g. PHQ-9, GAD-7,

TEQ, AUDIT, PC-PTSD, how often mental health treatment was sought in the past year, and number of mental health diagnoses). Several significant relationships were found. A significant positive correlation was found between women's number of reported mental health diagnoses and how many times she sought mental health treatment in the past year, $r(48) = .314$, $p = .030$. In addition, significant positive relationships were found between women's number of reported mental health diagnoses and her report of severity with depressive symptoms, $r(41) = .416$, $p = .007$, as well as with reported severity of anxiety symptoms, $r(40) = .364$, $p = .021$. Women's report of depressive and anxiety symptoms were significantly and positively related to how often she sought mental health treatment in the past year, ($r(55) = .274$, $p = .043$ and $r(53) = .527$, $p = .000$, respectively). In addition, women's report of trauma symptoms was significantly and positively related to her number of mental health diagnoses $r(40) = .479$, $p = .000$, how often she sought mental health treatment $r(53) = .496$, $p = .000$, her reported anxiety symptoms, $r(53) = .574$, $p = .000$, and her reported depressive symptoms, $r(54) = .592$, $p = .000$. Lastly, women's report of severity with anxiety symptoms was significantly and positively related to her reported severity of depressive symptoms, $r(53) = .711$, $p = 000$, and with an increase in the number of traumatic events she has experienced, was also an increase in her reported severity of anxiety symptoms $r(43) = .383$, $p = .011$.

Social Health Hypotheses. Pearson correlations were run to examine the relationship within the social health domain (e.g., sexist hostility, sexual hostility, unwanted sexual attention, and sexual coercion subscales from the SEQ, the SEQ sum total score and the friend, family, and significant other subscales from the MSPSS). Several significant correlations were found for the social support subscales. Results showed a significant, positive relationship between social support from friends and significant others $r(43) = .907$, $p = .000$ and between friends and family

r(43) =.714, *p* =.000. Also, significant, positive correlations were found between reports of family support and reports of support from significant others, *r*(43) = .784, *p* = 000. These findings indicate that those who reported high social support from friends, also reported high social support from family and their significant others.

Also, there were significant relationships identified for the SEQ total scale and subscales. The total SEQ scale was positively related to each of the four subscales; sexual coercion, *r*(41) = .624, *p* = .000, unwanted sexual attention, *r*(41) = .593, *p* = .000, sexual hostility *r*(41) = .916, *p* = .000, and sexist hostility, *r*(41) = .922, *p* = .000. Also, the unwanted attention subscale was positively and significantly related to the sexual hostility, *r*(42) = .389, *p* = .011, and sexist hostility, *r*(42) = .377, *p* = .014, subscales. Also, the sexual hostility subscale was found to have a significant, positive relationship with the sexual coercion, *r*(41) = .642, *p* =.000, and sexist hostility, *r*(42) = .772, *p* = .000, subscales. Lastly, sexist hostility and sexual coercion were significantly and positively correlated, *r*(41) = .480, *p* = .001.

Spiritual Health Hypotheses. In regard to the spiritual health variables, significant relationships were found between the three subscales of the Duke University Religion Index. First, significant, positive correlations were reported between intrinsic religiosity and organized religious activity, *r*(43) = .818, *p* =.000, and non-organized religious activities, *r*(43) = .664, *p* =.000. Next, a significant, positive correlation was found between organized and non-organized religious activities, *r*(43) = .628, *p* =.000.

Systemic Hypotheses and the Relationships between Biological, Psychological, Social, and Spiritual Domains. The last set of Pearson correlations were run to explore the relationships between variables across the four domains. Several significant positive relationships emerged from the findings. See Table 5 for all systemic correlations.

Biological and psychological domains. A statistically significant positive relationship was found between how often women sought medical care in the last year and her report of depressive symptoms, $r(56) = .310$, $p = .020$, anxiety symptoms, $r(54) = .361$, $p = .007$, and how many traumatic events she has experienced, $r(44) = .528$, $p = .000$. In addition, women's report of depressive symptoms was also positively related to her current level of pain, $r(54) = .404$, $p = .002$). Women's reports of trauma symptoms was also positively related to her reported level of pain, $r(54) = .404$, $p = .002$.

Biological, psychological, and social domains. The findings also revealed several significant BPS correlations. For example, the level of reported sexual harassment (SEQ, based on sum score) was positively related to her waist circumference size, $r(35) = .459$, $p = .006$, her current level of pain, $r(41) = .629$, $p = .000$, her report of depressive symptoms, $r(41) = .551$, $p = .000$, and her report of anxiety symptoms, $r(40) = .426$, $p = .006$. This indicates that as reports of sexual harassment in the workplace increased, so did her waist circumference, current level of pain, and severity of depressive and anxiety symptoms. More specific relationships emerged regarding sexual harassment for women. First, women's reports of unwanted sexual attention and her waist circumference was found, $r(37) = .417$, $p = .01$. Also, as women's reports of sexual coercion increased, so did her reported level of pain, $r(41) = .387$, $p = 012$, her number of mental health diagnoses, $r(33) = .494$, $p = .004$, her report of anxiety symptoms, $r(40) = .422$, $p = .007$, her report of depressive symptoms, $r(41) = .406$, $p = .008$, and her overall sexual harassment score, $r(41) = .624$, $p = .000$. As women's reports of unwanted sexual attention increased so did her reports of traumatic experiences, $r(42) = .453$, $p = .003$.

Furthermore, as women reported higher levels of pain, she also reported higher rates of experiencing sexual hostility $r(42) = .590$, $p = .000$, and sexist hostility, $r(43) = .642$, $p = .000$.

As women reported higher levels of sexual hostility, she also reported a higher waist circumference $r(36) = .469$, $p = .004$ and higher BMI $r(41) = .356$, $p = .02$. There was also a significant positive relationship between women's reports of sexist hostility and her report of anxiety $r(42) = .396$, $p = .009$, and depressive symptoms $r(43) = .530$, $p = .000$. Her reports of post traumatic symptoms were positively correlated with her sexual harassment total scale, $r(41) = .686$, $p = .000$, as well as each of the four subscales, sexual coercion, $r(41) =. 547$, $p = .000$, unwanted sexual attention, $r(42) = .511$, $p = .001$, sexual hostility, $r(42) = .653$, $p =.000$, and sexist hostility $r(43) = .555$, $p = .000$.

Psychological, social, and spiritual domains. Several significant correlations also emerged between the three subscales of the Duke University Religion Index (i.e., organizational religious activity [ORA], non-organized religious activity [NORA], and intrinsic religiosity [IR]) and the other variables. First, there was a significant negative relationship between intrinsic religious beliefs and the number of mental health diagnoses women reported, $r(34) = -.423$, $p = .013$. This indicates that the more women reported a strong personal commitment or motivation to their spiritual beliefs the fewer mental health diagnoses she reported. Also, as report of traumatic experiences increased, so did her report of non-organized religious activities, $r(43) = .329$, $p = .031$. This finding could indicate that as women increased their non-organized religious activities that they also gained greater social support. Perhaps, too, the more traumatic experiences she had encountered, the greater her likelihood for spending time in private religious activities and prayer. Lastly, as women's reports of having higher social support from friends increases, so does her report of practicing non-organized religious activities, $r(43) = .321$, $p = .03$. Women who reported high support from their families indicated higher activity with organized religious activities, $r(43) = .375$, $p = .01$.

Mediating and Moderating Model Hypotheses. A series of regressions were run to examine the conceptual models. First, we tested whether the psychological variables (i.e., TEQ, PHQ-9, AUDIT, GAD-7, number of mental health diagnoses, and the number times she sought mental health treatment in the past year) mediated the relationship between the number of deployments women experienced and her biological health (i.e., BMI, waist circumference, level of current pain, number of medical diagnoses, and the number of times she sought medical treatment in the past year). Then, we examined whether women's psychological variables mediated the relationship between length of time in the service and her biological health variables. Women's rank was controlled for in all analyses. No significant mediation relationships were found with these variables.

Moderation models with deployment. Next, a series of models were run to examine if the social (i.e., SEQ sum score and subscales and MSPSS subscales) and spiritual (i.e., NORA, ORA, and IR) variables moderated the relationships between deployment and her biological health variables. In the first model, intrinsic religiosity (IR) was tested as a moderating variable between deployments and waist circumference. In the first step of the regression, women's number of deployments was found to significantly predict her waist circumference, $F(4,32) = 2.66$, $p = .05$. In this model, 25% of the variance for women's waist circumference size was explained by the predictors (i.e. deployment and IR). Then, the interaction term computed from the product of IR and deployments was entered into the model, along with the other predictors (i.e., IR and deployments). The main effect for deployments significantly predicted women's waist circumference, $b = 1.36$, $t(32) = .45$, $p = .005$, and the interaction coefficient was also significant and explained a 14% increase in variance in waist circumference, $b = -.12$, $t(32) = .05$, $p = .02$. In order to interpret the interaction, the conditional effects were examined to see

how deployments predicted waist circumference at each level of IR. For low levels of IR (one standard deviation below the mean) there was a significant, positive relationship between waist circumference and deployments $b = .778$, $t(32) = 3.22$, $p = .002$. At the low level of IR, having a high number of deployments is significantly related to higher waist circumference. The conditional effect was also examined for the mean and high (one standard deviation above the mean) levels of IR, and there were no significant moderation effects at those levels. This means that low IR positively and significantly impacts the relationship between deployments and waist circumference, but mean and high levels of IR do not significantly impact the relationship.

In the next model, support from her significant other was tested as a moderator between deployments and her waist circumference. In the first step of the regression, women's number of deployments significantly predicted her waist circumference, $F(4,32) = 3.24$, $p = .02$. In this model, 28% of the variance for women's waist circumference size was explained by the predictors (i.e. deployment and support from her significant other). Then, the interaction term computed from the product of social support and deployments was entered into the model, along with the other predictor variables (i.e., social support and deployments). The main effect for deployments significantly predicted waist circumference, $b = 1.69$, $t(32) = .54$, $p = .004$ and the interaction coefficient was also significant and accounted for an additional 16% of variance, $b = -.24$, $t(32) = .54$, $p = .004$. In order to interpret the interaction, the conditional effects were examined to see how deployments predicted waist circumference at each level of social support from a significant other. For low levels of support (one standard deviation below the mean) there was a significant, positive relationship between waist circumference and deployments $b = .1924$, $t(32) = 3.25$, $p = .002$. At the low level of support, having a high number of deployments is positively and significantly related to higher waist circumference. The conditional effect was

also examined for the mean and high (one standard deviation above the mean) levels of social support, and there were no significant moderation effects at those levels. This means that low support from a significant other significantly impacts the relationship between deployments and waist circumference, but mean and high levels of support do not significantly impact this relationship.

In the third model, unwanted sexual attention from co-workers was tested as a moderator between women's number of deployments and her waist circumference. In the first step of the regression, women's number of deployments did significantly predict her waist circumference, $F(4,31) = 3.92$, $p = .01$. In this model, 33% of the variance for women's waist circumference size was explained by the predictors (i.e. deployment and unwanted sexual attention). Then, the interaction term computed from the product of unwanted sexual attention and deployments was entered into the model, along with the other predictor variables (i.e., unwanted sexual attention and deployments). The interaction coefficient was significant and accounted for an additional 33% of variance, $b = .27$, $t(31) = .1248$, $p = .03$. In order to interpret the interaction, the conditional effects were examined to see how deployments predicted waist circumference at each level of unwanted sexual attention. For low (one standard deviation below the mean) and average levels of unwanted attention there was not a significant relationship between waist circumference and deployments. The conditional effect was also examined for the high (one standard deviation above the mean) levels of unwanted attention and there was a significant, positive effect at that level, $b = .4869$, $t(31) = 2.64$, $p = .01$. This means that low and average levels of unwanted sexual attention do not impact the relationship between deployments and waist circumference, but high levels of unwanted attention do positively and significantly impact this relationship.

Moderations with length of time in the service. In the next series of models, we examined whether the social and spiritual variables moderated the relationship between women's length of time in the service and her biological health variables while controlling for rank. In the first model, women's report of sexual harassment was tested as a moderator between her length of time in the service and her BMI. In the first step, the overall model showed that women's length of time in the service did significantly predict her BMI, $F(4,35) = 4.57$, $p = .004$. In this model, 34% of the variance for women's BMI was explained by the predictors (i.e., time in the service and sexual harassment). Then, the interaction term computed from the product of sexual harassment and length of time in the service was entered into the model, along with the other predictors (i.e., length of time in the service and sexual harassment). The interaction coefficient was significant and accounted for an additional 10% of variance, $b = .02$, $t(35) = .009$, $p = .02$. In order to interpret the interaction, the conditional effects were examined to see how length of time in the service predicted BMI at each level of sexual harassment. The conditional effect was examined for the low (one standard deviation below the mean) levels of sexual harassment and there was not a significant interaction at that level. However, for average and high (one standard deviation above the mean) levels of sexual harassment there were significant, positive relationships between BMI and time in the service, $b = .16$, $t(35) = 2.28$, $p = .02$ and $b = .34$, $t(35) = 3.62$, $p = .009$, respectively. At the average and high levels of sexual harassment, having been in the military longer is significantly related to higher BMI. This means that average and high reports of sexual harassment significantly impact the relationship between length of time in the service and BMI, but low levels of sexual harassment do not significantly impact the relationship between time in the service and BMI.

In the next model, support from her significant other was tested as a moderator between length of time in the service and her BMI. In the first step of the regression, women's length of time in the service did significantly predict her BMI, $F(4,36) = 3.03$, $p = .02$. In this model, 25% of the variance for women's BMI was explained by the predictors (i.e., time in the service and support from a significant other). Then, the interaction term computed from the product of social support and time in the service was entered into the model with the other predictor variables (i.e., time in the service and support from a significant other). Both of the main effects for support from a significant other and time in the service significantly predicted BMI, $b = 1.33$, $t(36) = .6498$, $p = .04$, and $b = .9237$, $t(36) = .3665$, $p = .01$, respectively. In addition, the interaction coefficient was significant and accounted for an additional 8% of variance, $b = -.1170$, $t(36) = .0581$, $p = .05$. The conditional effects were examined to see how length of time in the service predicted BMI at each level of support. The conditional effect was examined for the low (one standard deviation below the mean) and average levels of support and there were significant interactions at those levels, $b = .4404$, $t(36) = 3.15$, $p = .003$ and $b = .23$, $t(36) = 3.19$, $p = .002$, respectively. However, for high (one standard deviation above the mean) levels of support there was no significant interaction. This means that at the low and average levels of support, having been in the military longer is significantly related to higher BMI, but high reports of support do not significantly impact the relationship between length of time in the service and BMI.

In the last model, reports of sexual coercion from co-workers was tested as a moderator between length of time in the service and BMI. In the first step of the regression, women's length of time in the service did significantly predict her BMI, $F(4,35) = 3.34$, $p = .02$. In this model, 27% of the variance for women's BMI was explained by the predictors (i.e., time in the service and sexual coercion). Then, the interaction term computed from the product of sexual coercion

and length of time in the service was entered into the model with the other predictors (i.e., length of time in the service sexual coercion). While neither main effect was statistically significant, the interaction coefficient was significant and accounted for an additional 9% of variance, b =.3130, $t(35) = .1425$, $p = .03$. In order to interpret the interaction, the conditional effects were examined to see how length of time in the service predicted BMI at each level of sexual coercion. The conditional effect was examined for the low (one standard deviation below the mean), average, and high (one standard deviation above the mean) levels of sexual coercion and results showed significant interactions at all levels, b =.1870, $t(35) = 2.56$, $p = .01$, $b = .2261$, $t(35) = 3.11$, $p = .003$, and b =.4024, $t(35) = 3.53$, $p = .001$, respectively. This means that at all levels of sexual coercion, having been in the military longer is significantly related to higher BMI.

Discussion

The purpose of this study was to examine the relationship between biological, psychological, social, and spiritual variables with a sample of active duty military women. Previous researchers had called for more investigations to test the relationships across health domains (Anchin, 2008) and this study sought to answer that call. This study specifically explored the relationships within the BPSS domains, between the BPSS domains, and how the relationship between the women's BPSS health domains and military traits such as, deployments and length of time in the service, impact her overall health.

This is the first known study that has examined the relationships between biological, psychological, social, and spiritual variables simultaneously for active duty women. The results of this study revealed many new contributions to the literature and have numerous research, clinical, and policy implications for the future. First, a discussion about the results from each

hypothesis is presented in this section. Then, the significant contributions, limitations, and implications are provided.

Results from Hypotheses

This section discusses the findings from this study and are organized by each hypothesis. The following findings are discussed based on whether they (1) concur with previous literature, (2) contradict previous findings, or (3) contribute new findings to the literature.

Biological health domain. This series of hypotheses posited that there would be significant positive relationships between BMI, waist circumference, number of physical health diagnoses, how often she sought medical treatment in the past year, and her reported level of pain. The results support the hypotheses regarding the relationship between pain and number of physical health diagnoses. It does not appear that previous researchers have explored the relationship between pain level and physical health diagnoses for active duty women before this study. However, BMI and waist circumference were significantly related in this study which confirms findings from previous researchers who also found that waist circumference and BMI are positively related to one another in a sample of active duty women (Heinrich et al., 2008). This finding is not unusual, however one may elucidate that active duty military could have a high body mass index with a low waist circumference (based on fitness), however this positive correlation instead suggests that military populations may be trending similarly to the general population in relation to overweight or possibly even obesity.

Psychological health domain. The hypotheses in this domain stated that there would be significant positive relationships between depressive symptoms, anxiety symptoms, reported traumatic experiences, reported alcohol use, her number of mental health diagnoses, and how often she sought mental health treatment in the past year. There was a positive significant

relationship between the number of mental health diagnoses and the number of times she sought out mental health treatment. This finding appears to be a new contribution to the literature on active duty women regarding her mental health experiences. In addition, this study revealed that the more traumatic events women experienced, the greater depression and anxiety symptoms she reported. It does not appear that this specific relationship has been tested with active duty women prior to this study; most of the research in this area for military women is focused on a specific type of trauma, such as combat exposure (Wells et al., 2010) or military sexual trauma (Lutwak & Dill 2013).

Social health domain. Hypotheses in this domain stated that there would be significant negative relationships between reported work-related sexual harassment (via each of the SEQ subscales) and levels of support from friends, family, and significant others. The results revealed that the SEQ subscales were significantly related to one another and that the social support subscales were also significantly related. This finding is not surprising, since the measures were found to have good internal consistency for the current study. However, the predictions regarding the relationships between sexual harassments and social support were not significant.

Spiritual health domain. It was predicted that there would be significant positive relationships between religious involvement on the intrinsic religiosity, non-organized religious activities, and organized religious activities subscales. Results revealed that all of these subscales were found to be significantly correlated to one another. Again, this finding is not surprising given it had good internal consistency in this study.

Systemic hypotheses. These hypotheses explored the relationships between variables across the BPSS domains. It was predicted that there would be significant positive relationships between biological (i.e., BMI, waist circumference, pain level, physical health diagnoses, and the

number of times she sought medical treatment), psychological health variables (i.e., depressive and anxiety symptoms, alcohol use, traumatic experiences, mental health diagnoses, and the number of times she sought mental health treatment), and social (i.e., all sexual harassment subscales) health variables. In addition, it was predicted that there would be significant negative relationships between the psychological, social (i.e., support from friends, family, and significant others), and spiritual (i.e., intrinsic religiosity, non-organized religious activities, and organized religious activities) health variables.

Through the initial analyses, relationships were found between biological and psychological variables (e.g., times medical treatment was sought out with anxiety, depressive, and trauma symptoms), which supports previous findings with non-military samples (Trivedi, 2004). Further, researchers have found that veteran women who have a specific diagnosis related to trauma (i.e., post-traumatic stress disorder [PTSD]) seek more health care services than women without this diagnosis (Cohen, Gima, Bertenthal, Kim, Marmar, & Seal, 2010).

Along with that, significant biological and social relationships were found in this study. Waist circumference and pain were positively related to women's overall reports of sexual harassment. This study found that as reports of sexual harassment increased, so did her waist circumference and pain level. It does not appear that these findings have been reported with active duty women samples, but these findings do support previous research with veteran women where women with a history of military sexual trauma were more likely to be obese (Frayne, Skinner, Sullivan, & Freund, 2003).

In addition, several social health variables and psychological health variables were found to be related. First, we found that women's reports of sexual harassment increased as her reported levels of anxiety and depressive symptoms increased. These results are similar to

previous findings regarding military-related sexual trauma being associated with increased anxiety symptomology (Kimerling et al., 2010).

Next, spirituality and psychological health variables were found to be related (i.e., intrinsic religious beliefs and number of mental health diagnoses) which adds to previous research on veteran women, whereby findings demonstrated how religiosity acted as a buffer for negative mental health experiences (Chang, Skinner, & Boehmer, 2001). Our study also found that the more traumatic events women experienced, the more she was involved in non-organized religious activities. Past researchers have explored this relationship one step further in non-military samples and found that low levels of non-organized religious activity were related to fewer posttraumatic stress symptoms at moderate to high reports of traumatic exposure (Bentley, Ahmad, & Thoburn, 2014). These contradictory findings could indicate that military women have unique spiritual health experiences compared to other populations.

Lastly, this study demonstrated relationships between spiritual and social health variables. First, women who reported having greater social support from friends also reported greater involvement in non-organized religious activities. This finding confirms previous research with non-military samples, in which Bible use and prayer were positively associated with social support (Koenig, Hays, George, Blazer, Larson, & Landerman, 1997). Furthermore, women who reported greater social support from family also reported more participation in organized religious activities. Although it appears (based on published literature) that this particular finding is a new contribution to the research, investigators have reported the importance of considering the role that religion plays in building support systems for non-military samples (Merino, 2014).

Moderating and mediating hypotheses. Since this study demonstrated that there are relationships that exist between health domains, the next step was to further examine ***how*** these domains relate to one another, along with variables that describe her military experiences through regression analyses. First, it was predicted that the psychological health variables would act as mediators between deployments and biological health variables and between length of time in the service and biological health variables, but there were no significant findings through the mediation models. Next, it was predicted that social support variables and spiritual health variables would act as moderators between deployments and biological health variables and between length of time in the service and biological health variables.

The results revealed several significant interaction effects that help shed light on how health domains are related to one another for this population. For example, intrinsic religiosity, support from a significant other, and unwanted sexual attention from co-workers had moderating effects on deployment and her reported waist circumference. These findings demonstrate the interconnectedness between biological, social, and spiritual health experiences and offer unique contributions to the current literature with active duty women. Although it does not appear that any previous researchers have examined how all of these variables are related to one another for military women until the present study, previous researchers have reported significant findings from regression models with social support and biological health variables; researchers found that non-military women's level of social support predicted her waist circumference (Hankonen, Konttinen, & Absetz, 2014). Sadly, there is a significant chasm in the research on indicators of biological health pertaining to negative experiences such as sexual harassment or assaults, or positive experiences such as support from a significant other.

Overall experiences of sexual harassment, support from a significant other, and reports of feeling sexually coerced by co-workers had moderating effects on length of time in the service and her BMI scores. These results regarding the interactions between length of time in the service, social health experiences, and BMI scores appear to offer unique contributions to the current military literature that has not been assessed before this study. The relationships between these variables are especially important when considering potentially dangerous physical health outcomes such as eating disorders and obesity that could be exacerbated over length of time in the service.

Significant Contributions

There are several unique contributions that this study brings to the current literature based on the BPSS health of active duty women. First, this is the only known empirical research study grounded in the BPSS systems metatheory with active duty women. The results from this study demonstrate that biological, psychological, social, and spiritual health variables are related to and even influence one another, which is valuable given that previous researchers (Lacks et al., 2016) have reported that there are no articles that focus on active duty women's biological, psychological, social, and spiritual health. More specifically, the results from this study support the notion that the BPSS metatheory is a useful way to understand holistic health of active duty women through examining within and between the four health domains.

Second, even though over half (51.3%) of the women in this sample had at least one child, this study provided evidence that women have additional health concerns other than her reproductive or sexual health. Previous research with active duty women has focused primarily on her reproductive or sexual health (Lacks et al., 2016), but the results from this study indicate that additional physical health variables, such as, waist circumference and BMI, and frequency of

primary care visits are valuable in understanding the overall health experiences of this population.

Third, this is the first known study to incorporate spirituality with the BPS systems metatheory and results showed that spirituality was related to psychological and social health variables for this sample, even though the current sample included more religious diversity (i.e., more 'agnostic,' 'atheist,' and 'don't know' reports) than previous military demographics had reported (Military Leadership Diversity Commission, 2010). These results act as a call to clinicians and researchers about the importance of including spirituality variables that assess different types of belief systems in their work, especially since it is known that studies that assess the spiritual health of active duty women is lacking (Lacks et al., 2016).

Lastly, since this is the first study to assess the biopsychosocial-spiritual health of active duty women, this study offers a unique contribution regarding useful assessments for clinicians and researchers working with active duty women. A conceptual model presented in Figure 1 illustrates the variables from the BPSS assessments that were significantly related to one another. As such, this study is able to contribute information regarding assessments that may be useful for researchers and clinicians who work with active duty women. For example, the findings from this study revealed that the SEQ-DOD-s was a psychometrically sound measure to assess sexual harassment experiences (representing the social health domain) of active duty women, however, to measure social support, an assessment that focuses on support from significant others rather than from friends and family may be more helpful in the future. Also, assessing for the number of mental and medical health diagnoses, alcohol use via the AUDIT, and current level of pain (via the pain scale) were not as helpful at describing the mental and physical health of this sample as was the GAD, PHQ, BMI, and waist circumference. Although this study brings several

unique contributions to the current literature, there were limitations that should be addressed by future researchers who conduct studies with this population.

Limitations

The method for this study was carefully considered, yet there are limitations worth noting. First, since this study took approximately thirty minutes to complete, attrition was a concern for this study; 83 women clicked on the anonymous survey link, 76 women completed nearly all of the survey (140 questions). Although attrition was a factor in this study, the percentage of women who dropped out before completing all questions did not exceed the recommended percentage for indicating a fatal flaw in the survey (Amico, 2009). With that being said, the small sample size of this study should be considered when generalizing these findings to the general military population.

Next, the majority of this sample identified as white non-Hispanic (71.1%) which is similar to the general active duty population at 71.0% (DoD, 2014), but having a more ethnically diverse sample may have resulted in different BPSS outcomes. This sample did contain a greater percentage of officers compared to the general military population (44.3% and 16.7%, respectively), which is relevant, because Sherman et al. (2012) reported that military officers have lower levels of stress and anxiety compared to non-officers given that they have a greater sense of control in their jobs. This could indicate that the current sample is healthier than the general military population of active duty women. Also, the Air Force has the highest overall percentage of women in the active duty force (18.9%; DoD, 2014) and the Air Force was the largest service branch represented in this sample, again more representation from the other branches may have offered different results when comparing one branch to another. Lastly, since

this study was cross-sectional, readers should be cautious to infer causality in the findings from this study.

Research Implications

Based on the results of this study, more research is needed using the framework of the BPSS systems metatheory in order to give rise to BPSS as something other than just a conceptual framework. This metatheory posits that researchers should attend to variables within health domains and across health domains in order to gain a more thorough and systemic understanding of overall health. This study demonstrates the importance of acknowledging the relationships within domains, while also gaining a more complete understanding of active duty women by assessing the interactions between her biological, psychological, social, and spiritual health variables. For example, by un-siloing the health domains, we were able to see how social support (provided by a significant other) could serve as a protective factor against higher BMI, particularly the longer that she was in the military. Health and illness do not occur in a biological, psychological, social, or spiritual box (e.g., a bout with the flu, has social ramifications when one has to miss work), so future researchers need to take each of these domains into context (together) in order to construct research that is more relevant and reflective of health and healthcare.

In addition, future researchers should consider how psychological variables relate to the other health domains, since this study did not find any significant regressions with psychological variables. Perhaps psychological health experiences act as moderators between military traits and biological health experiences. This study did not find any significant regressions with psychological variables acting as mediators, which is surprising since there were several significant correlations between psychological health and the other domains. Thus, future

researchers should examine how psychological health variables moderate, rather than mediate, the relationships between military traits and biological health outcomes.

From this study, two specific recommendations are offered. First, more original research is needed on the BPSS systems metatheory with active duty women to better learn about their BPSS health and healthcare needs. This research would help to build a common assessment tool for primary care, mental health, behavioral health, or spiritual health providers. Second, researchers should assess for the spiritual health of active duty women in order to avoid overlooking an important aspect of her overall health experience.

Clinical Implications

Primary care, mental health care, behavioral health care, and chaplaincy providers who work with active duty women all have something that can be applied to their everyday interactions with patients, based on the findings from this study. In particular, providers should assess patient health in relation to all four BPSS health domains, particularly due to the interconnectedness in findings between biological, psychological, and social symptoms. Results from our study indicate that a woman's degree of work-related sexual harassment and degree of social support from friends, family, and her significant other have the ability to impact her BMI and waist circumference. Thus, providers should determine which BPSS assessments would be best indicated for their patients and then include BPSS assessments as part of their standard procedures. In fact, previous researchers (Stewart et al., 2000) have found that incorporating psychosocial questions during medical visits leads to improved health outcomes and higher patient satisfaction.

Often forgotten in the military health literature is the importance of chaplains in relation to mental and physical health outcomes. The findings from this study suggest that intrinsic

religiosity and non-organized religious activities are related to mental health, thus, it would be beneficial for assessments conducted by chaplains and other providers to extend beyond traditional questions about attending religious events (e.g., church) as a way to measure religious beliefs and instead, include questions that align with spirituality or belief systems (e.g., use of prayer, meditation, meaning-making in relation to BPSS health) to paint a more complete picture of how she experiences her biopsychosocial and spiritual health. This study relied upon the Duke University Religion Index due to Kroenig's long-standing research in religion and health, however other measures may be equally valuable.

A final clinical recommendation is that, medical clinics, family clinics, and places of worship all exist on or near bases and yet often do not offer a high level of collaboration between the contexts or the providers. A clinical recommendation based on this study supports the need to seek out providers in other disciplines who can help to supplement one's practice. That is, providers should work to ensure that assessments, diagnoses, and treatments for psychological, social, and spiritual health are just as important as health care for biological health conditions.

Policy Implications

Based on the findings from this study, the greatest policy awareness should be aimed at the unique health and health care needs of active duty women. The findings from this study reveal that active duty women have far more to offer and experience illness and health concerns beyond what has been showcased in previous literature (i.e., mostly concerns pertaining to sexual or reproductive health). A policy aim could include a mandate for integrated care within primary care systems on base, whereby mental/behavioral health and physical health providers work in tandem during health visits, so that her experiences with anxiety, trauma, relational concerns,

beliefs about health, and weight management are equally likely to be a common part of assessment within the practice.

Also, the Department of Defense (DoD) or the command of each military branch must begin to acknowledge and address the challenges that women face in the work place and create policies that ensure a safe work environment regardless of her age, rank, duty location, or her occupation. Leaders in the DoD should create policies that reduce the stigma associated with reporting sexual harassment in the workplace. Further, leaders must begin to see sexual harassment as a range of events on a continuum (i.e., sexist remarks, unwanted sexual attention, sexual remarks), rather than only considering physical harassment or abuse as the problem (Morral et al., 2015). It is clear from our findings that biopsychosocial and spiritual health are all influenced by these serious matters and have the capacity then to influence her readiness for duty or longevity in the military.

Summary

This is the first known study to assess the BPSS health of active duty women. Through a series of BPSS measures, many significant relationships were uncovered within and between the BPSS domains that hadn't previously existed in the literature. Based on the findings from this study, multiple implications were able to be constructed for future researchers, clinicians, and policy makers. It is time to take a stance on the BPSS health of active duty women in order to maximize care that is sensitive to her healthcare needs.

REFERENCES

Aamar, R. O., Lamson, A. L., & Smith, D. (2015). Qualitative trends in biopsychosocial-spiritual treatment for underserved patients with Type 2 Diabetes. *Contemporary Family Therapy, 37*(1), 33-44.

Amico, K. R. (2009). Percent total attrition: A poor metric for study rigor in hosted intervention designs. *American Journal of Public Health, 99*(9), 1567–1575. http://doi.org/10.2105/AJPH.2008.134767

Anchin, J. C. (2008). Pursuing a unifying paradigm for psychotherapy: Tasks, dialectical considerations, and biopsychosocial systems metatheory. *Journal of Psychotherapy Integration, 18*(3), 310-349. doi:10.1037/a0013557

Armed Forces Health Surveillance Center. (2009). Health of women after deployment in support of Operation Enduring Freedom/Operation Iraqi Freedom. *Medical Surveillance Monthly Report, 16*(10), 2-9.

Armitage, N. H., & Smart, D. A. (2012). Changes in Air Force fitness measurements pre-and post-childbirth. *Military Medicine, 177*(12), 1519-1523. doi:10.7205/MILMED-D-12-00248

Bentley, J., Ahmad, Z., & Thoburn, J. (2014). Religiosity and posttraumatic stress in a sample of east African refugees. *Mental Health, Religion & Culture, 17*(2), 185-195. doi:10.1080/13674676.2013.784899

Bostock, D. J., & Daley, J. G. (2007). Lifetime and current sexual assault and harassment victimization rates of active-duty United States Air Force women. *Violence Against Women, 13*(9), 927-944. doi:10.1177/1077801207305232

Campbell, J. C., Garza, M. A., Gielen, A. C., O'campo, P., Kub, J., Dienemann, J.,…, & Jafar, E. (2003). Intimate partner violence and abuse among active duty military women. *Violence Against Women, 9*(9), 1072-1092. doi:10.1177/1077801203255291

Chang, B., Skinner, K. M., & Boehmer, U. (2001). Religion and mental health among women veterans with sexual assault experience. *The International Journal of Psychiatry in Medicine, 31*(1), 77-95. doi:10.2190/0NQA-YAJ9-W0AM-YB3P

Cohen, B. E., Gima, K., Bertenthal, D., Kim, S., Marmar, C. R., & Seal, K. H. (2010). Mental health diagnoses and utilization of VA non-mental health medical services among returning Iraq and Afghanistan veterans. *Journal of General Internal Medicine, 25*(1), 18–24. http://doi.org/10.1007/s11606-009-1117-3

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* Thousand Oaks, CA: SAGE Publications.

Cross, J. D., Johnson, A. E., Wenke, J. C., Bosse, M. J., & Ficke, J. R. (2011). Mortality in female war veterans of operations Enduring Freedom and Iraqi Freedom. *Clinical Orthopaedics and Related Research, 469*(7), 1956–1961. doi:10.1007/s11999-011-1840-z

Defense Advisory Committee on Women in the Services [DACOWITS], 2009
DOD 2014. Demo report http://download.militaryonesource.mil/12038/MOS/Reports/2014-Demographics-Report.pdf

Department of Defense (DoD). (2013). Defense Department rescinds direct combat exclusion rule; Services to expand integration of women into previously restricted occupations and units. Retrieved from http://www.defense.gov/Releases/Release.aspx?ReleaseID=15784

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196,* 129-136. doi:10.1126/science.847460

Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137,* 535-544.

Evans, M. A., & Rosen, L. N. (2000). Demographic and psychosocial risk factors for preterm delivery in an active duty pregnant population. *Military Medicine, 165*(1), 49-53.

Fitzgerald, L. F, Shullman, S. L., Baily, N., Richards, M., Swecker, J., Gold, Y., …Weitzman, L. (1988). The incidence and dimensions of sexual harassment in academia and the workplace. *Journal of Vocational Behavior, 35,* 309-326.

Ford, J. D., Ruzek, J. I., & Niles, B. L. (1996). Identifying and treating VA medical care patients with undetected sequelae of psychological trauma and post-traumatic stress disorder. *National Center for PTSD Clinical Quarterly, 6*(4), 77-82.

Friedl, K. E., Nuovo, J. A., Patience, T. H., & Dettori, J. R. (1992). Factors associated with stress fracture in young army women: indications for further research. *Military Medicine, 157*(7), 334-8.

Gates, T., Duffy, K., Moore, J,, Howell, W., & McDonald, W. (2007). Alcohol screening instruments and psychiatric evaluation outcomes in military aviation personnel. *Aviation, Space, and Environmental Medicine, 78*(1), 48-51.

Goodman, P., Turner, A., Agazio, J., Throop, M., Padden, D., Greiner, S., & Hillier, S. L. (2013). Deployment of military mothers: Supportive and nonsupportive military programs, processes, and policies. *Military Medicine, 178,* 729-734. doi:10.7205/MILMED-D-13-00501

Gorman, L., Blow, A., Kees, M., Valenstein, M., Jarman, C., & Spira, J. (2014). The effects of wounds of war on family functioning in a National Guard sample: An exploratory study. In S. M. Wadsworth & D. S. Riggs (Eds.), *Military deployment and its consequences for families* (pp.241-258). New York, NY: Springer.

Greer, J. A., Zelig, C. M., Choi, K. K., Rankins, N. C., Chauhan, S. P., & Magann, E. F. (2012). Return to military weight standards after pregnancy in active duty working women: Comparison of Marine Corps vs. Navy. *Journal of Maternal-Fetal and Neonatal Medicine, 25*(8), 1433-1437.

Hankonen, N., Konttinen, H., & Absetz, P. (2014). Gender-related personality traits, self-efficacy, and social support: How do they relate to women's waist circumference change? *Journal of Health Psychology, 19*(10), 1291-1301.

Harrell, M., & Miller, L. (1997). *New opportunities for military women: Effects upon readiness, cohesion, and morale.* Santa Monica, CA: RAND Corp.

Hatch, M., Berkowitz, G., Janevic, T., Sloan, R., Lapinski, R., James, T., & Barth Jr, W. H. (2006). Race, cardiovascular reactivity, and preterm delivery among active-duty military women. *Epidemiology, 17*(2), 178-182.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis.* New York: The Guilford Press.

Heinrich, K. M., Jitnarin, N., Suminski, R. R., Berkel, L., Hunter, C. M., Alvarez, L. … Poston, W. S. (2008). Obesity classification in military personnel: A comparison of body fat, waist circumference, and body mass index measurements. *Military Medicine, 173*(1), 67-73. doi:10.7205/MILMED.173.1.67

Hourani, L., & Hilton, S. (2000). Occupational and environmental exposure correlates of adverse live-birth outcomes among 1032 US Navy women. *Journal of Occupational and Environmental Medicine, 42*(12), 1156-1165.

Hourani, L. L. & Yuan, H. (1999). The mental status of women in the Navy and Marine Corps: Preliminary findings from the 1995 Perceptions of Wellness and Readiness Assessment. *Military Medicine, 164*(3), 174-181.

Irwin, D. E., Savitz, D. A., Hertz-Picciotto, I., & St André, K. A. (1994). The risk of pregnancy induced hypertension: black and white differences in a military population. *American Journal of Public Health, 84*(9), 1508-1510.

Janssen, I., Katzmarzyk, P. T., & Ross, R. (2004). Waist circumference and not body mass index explains obesity-related health risk. *The American Journal of Clinical Nutrition, 79*(3), 379-384.

Kelley, M. L., Hock, E., Jarvis, M. S., Smith, K. M., Gaffney, M. A., & Bonney, J.F. (2002). Psychological adjustment of Navy mothers experiencing deployment. *Military Psychology, 14*(3), 199-216. http://dx.doi.org/10.1207/S15327876MP1403_2

Kimerling, R., Street, A. E., Pavao, J., Smith, M. W., Cronkite, R.C., Holmes, T. H., & Frayne, S.M. (2010). Military-related sexual trauma among Veterans Health Administration patients returning from Afghanistan and Iraq. *American Journal of Public Health, 100*(8), 1409-1412. doi: 10.2105/AJPH.2009.171793

Koenig, H.G. (2008). *Medicine, Religion and Health*. Philadelphia, PA: Templeton Press.

Koenig, H. G., Hays, J. C., George, L. K., Blazer, D. G., Larson, D. B., & Landerman, L. R. (1997). Modeling the cross-sectional relationships between religion, physical health, social support, and depressive symptoms. *The American Journal of Geriatric Psychiatry, 5*(2), 131-144. doi:10.1097/00019442-199700520-00006

Koenig, H. G., Parkerson, G. R., & Meador, K. G. (1997). Religion index for psychiatric research. *The American Journal of Psychiatry, 154*(6), 885-886.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606-613.

Lacks, M., Lamson, A., Rappleyea, D., Russoniello, C., & Littleton, H. (2016). *A systematic review of the biopsychosocial-spiritual health for active duty women.* Manuscript submitted for publication.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P.Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care, 46*(3), 266-274. doi: 10.1097/MLR.0b013e318160d093.

Lutwak, N., & Dill, C. (2013). Military sexual trauma increases risk of post-traumatic stress disorder and depression thereby amplifying the possibility of suicidal ideation and cardiovascular disease. *Military Medicine, 178*(4), 359-61.

Magann, E. F., Evans, S. F., Chauhan, S. P., Nolan, T. E., Henderson, J., Klausen, J. H., & Morrison, J. C. (2005). The effects of standing, lifting and noise exposure on preterm birth, growth restriction, and perinatal death in healthy low-risk working military women. *Journal of Maternal-Fetal and Neonatal Medicine, 18*(3), 155-162.

Magann, E. F., & Nolan, T. E. (1991). Pregnancy outcome in an active-duty population. *Obstetrics & Gynecology*, *78*(3), 391-393.

McPherson, F., & McGraw, L. (2013). Treating generalized anxiety disorder using complementary and alternative medicine. *Alternative Therapies in Health and Medicine, 19*(5), 45-50.

Merino, S. M. (2014). Social support and the religious dimensions of close ties. *Journal for The Scientific Study of Religion, 53*(3), 595-612. doi:10.1111/jssr.12134

Military Leadership Diversity Commission. (2010). Religious diversity in the U.S. military. Retrieved from http://secular.org/files/mldc-ripsdemographics_0.pdf

Morral, A. R., Gore, K. L., Schell, T. L., Bicksler, B., Farris, C., Ghosh-Dastidar, B, … Williams, K. M. (2015). Sexual Assault and Sexual Harassment in the U.S. Military. Retrieved from http://www.rand.org/pubs/research_reports/RR870z2.html

Naclerio, A., Stola, J., Trego, L. & Flagerty, E. (2011). The concerns of women currently serving in the Afghanistan theater of operations. Retrieved from http://usarmy.vo.llnwd.net/e2/c/downloads/262501.pdf

National Center for Veterans Analysis and Statistics. (2011). America's women veterans. Retrieved from http://www.va.gov/vetdata/docs/specialreports/final_womens_report_3_2_12_v_7.pdf

Nguyen, S., LeardMann, C. A., Smith, B., Conlin, A. M. S., Slymen, D. J., Hooper, … Smith, T.C. (2013). Is military deployment a risk factor for maternal depression? *Journal of Women's Health, 22*(1), 9-18. doi:10.1089/jwh.2012.3606.

O' Keefe, D. J. (2007). Post hoc power, observed power, a priori power, retrospective power, prospective power, achieved power: Sorting out appropriate uses of statistical power analyses. *Communication Methods and Measures, 1*(4), 291-299.

Patten, E., & Parker, K. (2011). Women in the U.S. Military: Growing share, distinctive profile. Retrieved from http://www.pewsocialtrends.org/files/2011/12/women-in-the-military.pdf

Prest, L. A., & Robinson, W. D. (2006). Systemic assessment and treatment of depression and anxiety in families: The BPSS Model in practice. *Journal of Systemic Therapies, 25,* 4-24. doi: 10.1521/jsyt.2006.25.3.4

Prins, A., Ouimette, P., Kimerling, R., Cameron, R. P., Hugelshofer, D. S., Shaw-Hegwer, J., … Sheikh, J. I. (2003). The primary care PTSD screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry, 9,* 9-14.

Qualtrics. (2015). Qualtrics survey software. Retrieved from http://www.qualtrics.com

Rauh, M. J., Macera, C. A., Trone, D. W., Shaffer, R. A., & Thompson, K. R. (2008). Risk factors for shin splint injury among female Marine recruits. *Journal of Orthopaedic and Sports Physical Therapy, 38*(1), A75-A76.

Roulo, C. (2013). *Defense Department expands women's combat role.* Retrieved from http://www.defense.gov/news/newsarticle.aspx?id=119098

Rychnovsky, J., & Beck, C. T. (2006). Screening for postpartum depression in military women with the Postpartum Depression Screening Scale. *Military Medicine, 171*(11), 1100-1104.

Sadler, A., Booth, B., Mengeling, M., & Doebbeling, B. (2004). Life span and repeated violence against women during military service: Effects on health status and outpatient utilization. *Journal of Women's Health, 13*, 799-811.

Sherman, G. D., Lee, J. J., Cuddy, A., Renshon, J., Oveis, C., Gross, J., & Lerner, J. (2012). Leadership is associated with lower levels of stress. *Proceedings of the National Academy of Sciences, 109*(44), 17903-17907. doi:10.1073/pnas.1207042109

Shields, A. L., & Caruso, J. C. (2004). Reliability generalization of the Alcohol Use Disorders Identification Test. *Educational and Psychological Measurement, 63*, 404-415.

Smith, R. C., Fortin, A. H., Dwamena, F., & Frankel, R. M. (2013). An evidence-based patient-centered method makes the biopsychosocial model scientific. *Patient Education and Counseling, 91*(3), 265-270. doi:10.1016/j.pec.2012.12.010

Spitzer, R. L., Kroenke, K., Williams, .J. B., & Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine, 166*, 1092-1097.

Spoont, M., Arbisi, P., Fu, S., Greer, N., Kehle-Forbes, S., Meis, L., & Rutks, I. (2013). Screening for Post-Traumatic Stress Disorder (PTSD) in primary care: A systematic review. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK126691/pdf/Bookshelf_NBK126691.pdf

Stahlman, S., Javanbakht, M., Cochran, S., Shoptaw, S., Hamilton, A. B., & Gorbach, P. M. (2015). A comparison of self-reported sexual risk behaviours between US civilian and active duty military women. *Sex Health, 12*(3). doi: 10.1071/SH14211

Stark, S., Chernyshenko, O.S., Lancaster, A.R., Drasgow, F., & Fitzgerald, L. F. (2002). Toward standardized measurement of sexual harassment: Shortening the SEQ-DoD using item response theory. Military Psychology, 14, 49 – 72.

Stewart, M., Brown, J.B., Donner, A., McWhinney, I.R., Oates, J., Weston, W.W., & Jordan, T. (2000). The impact of patient-centered care on outcomes. *The Journal of Family Practice, 49*(9), 796–804.

Suls, J. & Rothman, A. (2004). Evolution of the biopsychosocial model: Prospects and challenges for health psychology. *Health Psychology, 23*(2), 19-125.

Sulsky, S. I., Mundt, K. A., Bigelow, C., & Amoroso, P. J. (2002). Risk factors for occupational knee related disability among enlisted women in the US Army. *Occupational and Environmental Medicine, 59*(9), 601-607.

Trivedi, M. (2004). The link between depression and physical symptoms. *Journal of Clinical Psychiatry, 6*, 12-16.

United Kingdom Ministry of Defense. (2014). Women in ground close combat (GCC) review paper. Retrieved from https://www.gov.uk/government/publications/women-in-ground-close-combat-gcc-review-paper.

von Bertalanffy, L. (1968). *General System Theory: Foundations, Development, Applications.* New York: George Braziller.

Vrana, S. R. & Lauterbach, D. (1994). Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress, 7*, 289-302.

Wells, T. S., Horton, J. L., Leardmann, C. A., Jacobson, I. G., & Boyko, E. J. (2013). A comparison of the PRIME-MD PHQ-9 and PHQ-8 in a large military prospective study. *Journal of Affective Disorders, 148*(1), 77-83. doi:10.1016/j.jad.2012.11.052

Wells, T. S., LeardMann, C. A., Fortuna, S. O., Smith, B., Smith, T. C., Ryan, M. A. … Millennium Cohort Study Team. (2010). A prospective study of depression following combat deployment in support of the wars in Iraq and Afghanistan. *American Journal of Public Health, 100*(1), 90-99. doi:10.2105/AJPH.2008.155432

Woodworth, J. (2013). Relationship between Marine Corps wives' stress and perceived social support. Retrieved from http://search.proquest.com.jproxy.lib.ecu.edu/docview/1328401310?accountid=10639

World Health Organization. (2001). The alcohol use disorders identification test guidelines for use in primary care. Retrieved from http://www.talkingalcohol.com/files/pdfs/WHO_audit.pdf

Wright, L. M., Watson, W. L., & Bell, J. M. (1996). *Belief: The heart of healing in families and illness.* New York: Basic Books

Zimet, G.D., Dahlem, N.W., Zimet, S.G. & Farley, G.K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*, 30-41.

Table 1

Demographic Information for Active Duty Women

Indicators	Frequency(%) or Mean(SD)
Age	30.25(6.62)
Time in the Service (Years)	9.11(6.27)
Race	
Non-Hispanic White	54(71.1%)
African American or Black	7(9.2%)
Biracial	7(9.2%)
Asian or Asian American	4(5.3%)
Hispanic or Latino	3(3.9%)
Hawaiian or Other Pacific Islander	1(1.3%)
Education	
GED/HS Diploma	5(6.6%)
Some College	29(38.2%)
College Graduate	20(26.3%)
Graduate School	22(28.9%)
Religious Affiliation	
Protestant	25(33.3%)
Catholic	15(20.0%)
Agnostic	9(11.8%)
Atheist	8(10.5%)
Mormon	1(1.3%)
Buddhist	1(1.3%)
Don’t know	5(6.7%)
Other	12(16%)
Sexual Orientation	
Heterosexual	64(84.2%)
Gay or Lesbian	3(3.9%)
Bisexual	4(5.3%)
Asexual	1(1.3%)
Other	4(5.3%)
Relationship Status	
Single, never married	9(12.8%)
Married or civil union	47(61.8%)
Cohabitating with partner	4(5.3%)
Divorced	12(15.8%)

Table 1

Demographic Information for Active Duty Women Cont.

Dual Military	33(43.4%)
Service Branch	
Air Force	44(57.9%)
Army	17(22.5%)
Marine Corps	6(7.9%)
Navy	5(6.6%)
Activated Navy Reserves	1(1.3%)
Unknown	3(3.9%)
Rank	
Enlisted	40(52.6%)
Officer	33(44.3%)
Unknown	3(3.9%)
Deployment Experience	
Combat	24(33.3%)
Noncombat	23(30.3%)
Never Deployed	36(47.4%)

Note: Combat and Noncombat frequencies may contain duplicates.

Table 2

Mean Scores and Standard Deviations for All Indicators

Item	M	SD
Military Factors		
Time In Service	9.11	6.27
Deployments	1.68	4.81
Biological Health Factors		
BMI	24.69	3.15
WC	31.36	14.48
Pain Level	1.31	1.91
PH Dx	.91	1.37
Medical Tx	1.78	2.63
Psychological Health Factors		
MH Dx	.67	.87
MH Tx	1.12	3.65
GAD	3.66	4.77
AUDIT	3.16	3.81
TEQ	2.27	2.11
PC-PTSD	.77	1.31
PHQ	9.71	4.23
Social Health Factors		
Length of Relationship	6.95	4.41
MSPSS (Significant Other)	5.88	1.69
MSPSS (Friends)	5.47	1.61
MSPSS (Family)	5.65	1.50
SEQ (Total)	23.70	8.17
SEQ (Sexist Hostility)	8.13	4.05
SEQ (Sexual Hostility)	6.04	3.16
SEQ (Unwanted Sexual Attention)	5.16	1.93
SEQ (Sexual Coercion)	4.12	.55
Spiritual Health Factors		
DUREL (IR)	9.00	4.32
DUREL (ORA)	2.42	1.62
DUREL (NORA)	2.26	1.69

Table 3

Key for Variables found in Table 4 and in Figure 1

WC: Waist circumference

MH Dx: Mental health diagnoses

Med Tx: Sought medical treatment

Pain: Pain level

BMI: Body mass index

GAD: Generalized Anxiety Disorder Scale

TEQ: Traumatic Events Questionnaire

IR: Intrinsic religiosity

ORA: Organized religious activities

NORA: Non-organized religious activities

FAM: Family support

PHQ: Patient Health Questionnaire

SEQ: Sexual Experiences Questionnaire

COER: Sexual coercion

UNWAN: Unwanted sexual attention

HOST: Sexual hostility

SEXIST: Sexist hostility

PTSD: PC-PTSD

Table 4

Bivariate Correlations for Systemic Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. WC	_																	
2. MH Dx	-.06	_																
3. Med Tx	-.08	.21	_															
4. Pain	-.02	.18	.21	_														
5. BMI	.62**	.16	.00	.06	_													
6. GAD	-.01	.36*	.36**	.27	-.05	_												
7. TEQ	-.15	.00	.52**	.05	.05	.38*	_											
8. IR	.04	-0.4	.04	.13	-.06	.08	.03	_										
9. ORA	.05	-.33	-.06	.07	-.04	-.02	-.05	.81**	_									
10. NORA	.08	-.16	.09	-.05	.11	.29	.32*	.66**	.68**	_								
11. FAM	-.13	-.25	-.02	-.13	.16	-.18	.18	.27	.375*	.30	_							
12. PHQ	-.02	.41**	.31*	.40**	.15	.71**	.29	-.14	-.13	.07	-.22	_						
13. SEQ	.45**	.28	.17	.62**	.30	.42**	.23	-.15	-.06	-.07	-.15	.55**	_					
14. COER	.13	.49**	.25	.38*	.01	.42**	.11	-.08	.02	.04	-.02	.40**	.62**	_				
15. UNWAN	.41*	.02	.19	.25	.08	.08	.45**	-.21	-.12	-.06	-.14	.23	.59**	.28	_			
16. HOST	.46**	.31	.16	.59**	.35*	.46**	.14	-.06	.06	-.01	-.06	.54**	.91**	.64**	.38*	_		
17. SEXIST	.30	.23	.13	.64**	.23	.39**	.14	-.07	-.06	-.10	-.13	.53**	.92**	.48**	.37*	.77**	_	
18. PTSD	.01	.47**	.13	.40**	.19	.57**	.29	-.13	-.07	.13	-.20	.59**	.68**	.54**	.51**	.65**	.55**	_

*p < .05. **p < .01.

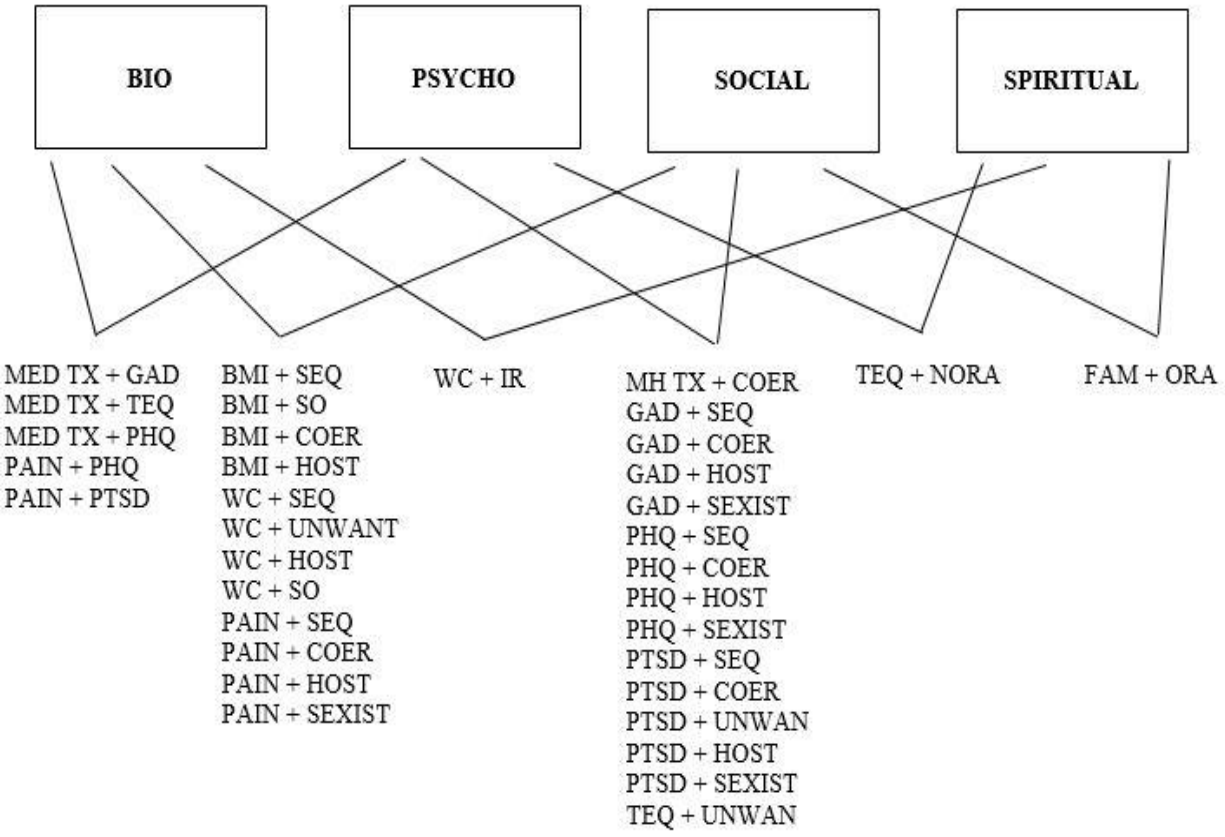
Table 5

Moderation Regressions

		B	*T*	*P*	R^2
Model 1: Moderated regression analysis					
Main effects	Intrinsic religiosity	0.18	1.34	0.18	
	Deployments	1.36	2.98	>.01	
Interaction	Intrinsic religiosity x Deployments	-0.12	-2.40	0.02	0.14
Model 2: Moderated regression analysis					
Main effects	Significant Other	0.27	0.63	0.52	
	Deployment	1.69	3.09	>.01	
Interaction	Significant other x Deployment	-0.24	-2.68	0.01	0.16
Model 3: Moderated regression analysis					
Main effects	Unwanted attention	0.44	1.37	0.17	
	Deployments	-1.44	-1.80	0.07	
Interaction	Unwanted attention x Deployments	0.27	2.19	0.03	0.09
Model 4: Moderated regression analysis					
Main effects	Sexual harassment	-0.13	-1.20	0.23	
	Time in the service	-0.36	-1.40	0.15	
Interaction	Sexual harassment x Time in the service	0.02	2.30	0.02	0.10
Model 5: Moderated regression analysis					
Main effects	Significant other	1.33	2.10	0.04	
	Time in the service	0.92	2.50	0.01	
Interaction	Significant other x Time in the service	-0.11	-2.01	0.05	0.08
Model 6: Moderated regression analysis					
Main effects	Sexual coercion	-2.22	-1.60	0.10	
	Time in the service	-1.06	-1.80	0.07	
Interaction	Sexual coercion x Time in the service	0.31	2.19	0.03	0.09

R^2 = Variance increase from the interaction.

Figure 1. Conceptual model illustrating the interconnectedness of significant variables between the BPSS domains.



CHAPTER 6: IMPLICATIONS FOR ADDRESSING THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN

As a Medical Family Therapist (MedFT), I am deeply connected with the roots of my field, which began as a way extending care to families from a biopsychosocial (BPS) (Engel, 1977; 1980) and family systems (von Bertalanaffy, 1968) approach. I am equally connected to the more recent addition of spirituality in relation to biopsychosocial care (Wright, Watson, & Bell, 1996) and the advancement of MedFT beyond a clinical practice to include roles in leadership, training, supervision, research, and policy (Hodgson, Lamson, Mendenhall, Crane, 2014). My approach to healthcare, research, training, and policy are sourced by the BPSS and systems metatheory regardless of the population or context in which I function. The practice, research, training, and policy making conducted through MedFT gives rise to the importance of collaboration between and among people in any context or stage of development in life. As a MedFT, I have been trained to be an endorser of agency (respecting the voice of the patients, research participants, students I have worked with and the opportunity to collaborate with them on the needs in their lives) and communion (my accountability to extend the best indicated care, treatment, training, research, and policies for the people that I work with). Through these core aspects of MedFT and as a MedFT, I have come to whole-heartedly believe that the best way to understand one's health is through the biopsychosocial-spiritual systems metatheory. The cultivation of my passion as a MedFT and my desire to work with and make a difference in the lives of military members and families has led me to answer the call for more research, with this population, and most particularly with the BPSS health of active duty women.

The purpose of this dissertation was to learn more about the biopsychosocial-spiritual (BPSS) health of active duty women, particularly understanding the relationship within and

between BPSS health factors as they pertain to this population. To begin, this dissertation opened up with a chapter on the history of the roles that women have carried in the military since before the American Revolution. It was clear through the historical review, that many new opportunities have recently emerged for women in the military, yet the history and presence of women in the military is commonly marginalized. The stage was also set within the introductory chapter for the biopsychosocial-spiritual systems metatheory, which was used to punctuate the reality that women are biopsychosocial-spiritual systems, that the overall health of active duty women is important for their readiness for duty and personal well-being, and that this metatheory is necessary in order to strengthen the design, implementation, and dissemination of research that relates to the overall health of any population.

When looking through the historical timeline of active duty women's presence in the military, it became clear that a literature search and subsequent literature review was necessary in order to better understand what, if any research existed specific to active duty women. In chapter two of this dissertation, a literature review was conducted and organized by the biological, psychological, social, and spiritual health experiences of active duty women as compared to civilian women and military men. This review revealed a commonality to the findings on women's presence in the military, disparities exist. That is, women in the military experience biopsychosocial health disparities when compared to military men and civilian women (Lindberg, 2011; Aldous et al., 2011). Recommendations in this chapter suggested that researchers, clinicians, and policy makers must better attend to the biopsychosocial-spiritual needs of active duty women in order to support her readiness and fit for duty and best honor the service she has provided to our country.

It was through the identification of trends when conducting the literature review that sparked a need for a systematic review that could identify the previously published research on the biological, psychological, social, or spiritual health of active duty women, including publications that reported more than one of the biopsychosocial-spiritual health domains within the same article. The systematic review highlighted that (1) there were approximately twenty articles throughout history that collected original data (i.e., not using data from a secondary analysis) focusing strictly on active duty women, (2) most research on active duty women is focused on her physical health, more specifically, her reproductive health, (3) there are no research studies that simultaneously address the bio, psycho, social, and spiritual health of active duty women, and (4) there are no studies that incorporate the spiritual health and beliefs of active duty women. The results from the systematic review were staggering, because the outcomes highlighted that active duty women have received very little attention in the research, which commonly results in a lack of indicated clinical practice and lack of policies to ensure that she is receiving access to research informed treatment for diverse biological, psychological, social, and spiritual health needs.

The integration of findings from the historical roles of women in the military and the biopsychosocial health research with active duty women along with the theoretical foundation of the biopsychosocial-spiritual systems metatheory came together to form the method for an empirical research study with this population. Developing and narrowing the method for this study was most challenging because of the dearth of research that existed in relation to biopsychosocial-spiritual health with this population. Using the BPSS systems metatheory as a guide, I began building an original study that included items found in previous military research, but also incorporated variables that had never been identified in this particular population (i.e.,

spirituality variables). Since this study was exploratory, I wanted to ensure that my assessments had respected psychometrics and had been used with military populations. Then, I began compiling the most appropriate assessments that fit within the bio, psycho, social, and spiritual domains. I also created a demographic survey that asked about several of the significant findings from previous literature (e.g., questions about pregnancy history). Through these processes and the foundation of the BPSS systems metatheory, hypotheses for the relationships within and across domains were formed.

Through the design outlined in the methodology chapter, I implemented an exploratory study using the BPSS systems metatheory, with active duty women, in order to showcase what can and should be done to better serve the women who have served our nation. From a theoretical stance, I worked to implement a study using what some have called a conceptual framework (Epstein & Borrell-Carrio, 2005) and what others have developed as a metatheory (Anchin, 2008) in order to highlight that (1) research is not quality research unless it is grounded in theory, and (2) that by recognizing core tenants of a theory and honoring the tenants and assumptions of that theory through research gives more credibility to the theory (or in this case, the metatheory) and to the research. I believe that more work must be done to move BPSS from a hierarchical cluster of concepts or a conceptual framework to a continuum of constructs that can be measured and used to strengthen the kind of research that is needed when designing health related studies.

Furthermore, this study sought out to examine (1) the significant relationships within and between BPSS health variables and (2) the interactions between military traits (i.e., number of deployments and length of time in the service) and BPSS health factors. There were several unique findings from this study that contribute to the current literature. First, the results

demonstrated the interconnectedness between biological, psychological, social, and spiritual health factors for active duty women through correlation analyses. Then, regression models indicated that women's length of time in the service and deployments influence her waist circumference and BMI while social support and sexual harassment act as moderators for these relationships. Also, since this was the first study to incorporate the spiritual beliefs of active duty women, this article offers new information to the literature about the interconnectedness between spiritual, biological, psychological, and social health. Research, clinical, and policy recommendations were all provided at the close of the previous chapter, below is an additional reflection on what is needed, but this time capturing implications based on findings from the entire dissertation.

Research Implications

Based on the literature and research presented throughout this dissertation, several implications emerged that point to the need for future research when working with active duty women. First, researchers should continue to use the BPSS systems metatheory as a thorough foundation that encompasses all aspects of one's health. Attention needs to be equally paid to the theoretical foundation for the research, research design, relevance to the community who serve as participants, and the dissemination of research back to the community of interest as well as to others (e.g., providers, researchers, policy makers) who influence the services provided for the population.

BPSS Systems Metatheory

Previous researchers have critiqued the use of the biopsychosocial approach in research for being too general and with concepts that lack clear operational definitions (Smith, Fortin, Dwamena, & Frankel, 2013) while other researchers acknowledge that traditional approaches

(i.e., the biomedical approach) to understanding the complexity of the human health experience are not sufficient (Suls, Krantz, & Williams, 2013). The results from the systematic review and from the empirical study (in this dissertation) responded to these critiques by using the BPSS systems metatheory, which allows researchers to examine the relationships between health variables within each domain, but also accounts for the systemic relationship between health domains by addressing the complex relationships that are commonly comorbid (i.e. activate more than one domain of health simultaneously).

Future researchers should consider using this framework to better understand the health experiences of active duty women because it embraces the complex relationship between the biological, psychological, social, and spiritual health factors that make up an individual's overall health. In fact, findings from article two (i.e., chapter five) demonstrate that the BPSS systems metatheory is an appropriate framework to make meaning of the health of active duty women, because of the interconnectedness between her bio, psycho, social, and spiritual health. This dissertation serves as call to action for future researchers to further establish a well informed and well defined theory of BPSS health in order to strengthen the integrity of BPSS research that is conducted in our world.

Systemic Interactions between BPSS Variables

Along with providing support for the BPSS systems metatheory, results from this dissertation illustrate how future researchers should address the systemic relationships between variables. This recommendation goes beyond simply asking researchers to encompass bio, psycho, social, and spiritual items in their questionnaires, but speaks to the methodology of the study and the analysis used in future projects. Researchers should consider using statistical analyses that account for the interconnectedness between variables across domains rather than

only running analyses within the siloed domains. The results from the study in article two (i.e., chapter 5) demonstrate that researchers need to account for how variables across these health domains influence one another to impact the overall health experiences of active duty women. This all-inclusive perspective is especially important for military populations, since article two also demonstrated that military traits (i.e., deployments and length of time in the service) impact the health of military women. The unique contributions that are offered from article two reveal the importance of researchers acknowledging the systemic relationship between the health domains of military women and ignoring these relationships (or suggesting that the study is simply too complex by incorporating BPSS variables) would do a disservice to her because it would not accurately describe her health needs. Well informed theories help in constructing well developed research and well developed research help to offer well informed clinical practice.

Clinical Implications

In addition to the research implications discussed above, there are several clinical implications that emerged due to findings from this dissertation. First, there are several mental health outcomes that warrant attention from clinicians who work with active duty women populations. Second, due to the findings on her mental and physical health and the clear influence of biological health symptoms on psychological, social, and spiritual health outcomes and vice versa, BPSS assessments and treatments are a necessity in medical and mental health care.

Mental Health Outcomes

The results from articles one and two demonstrate the severity of the mental health needs for military women, especially in regard to anxiety and depressive symptoms. These findings illustrate the need for additional attention on the mental health of military women, regardless of

their rank and occupation within the military. In addition, the findings presented in this dissertation illustrate the need for assessing anxiety and depression for military women to be just as essential as caring for her primary health care needs. Furthermore, the dissertation highlighted the importance of better understanding her social health experiences, such as, work-related sexual harassment and her organized or non-organized religious needs in relation to her physical, psychological, and social health.

Biopsychosocial-Spiritual Assessments

It is clear throughout this dissertation that physical and mental health are not the only health domains relevant for military women. Women's reports of work-related sexual harassment are extremely eye-opening and concerning, because it not only influences additional mental health symptoms and her physical health, but it could impact her career trajectory and desire to stay in the military. Medical and mental health providers must acknowledge the influence of these domains on one another and the influence of social and spiritual factors on her health. Providers should use assessments that not only inquire about physical and mental health symptoms, but also incorporate questions regarding her social and spiritual health in order to understand the systemic nature of her health and how these factors will influence her treatment options and further treatment adherence. Military women deserve to receive healthcare services that honor how their bio, psycho, and social health experiences simultaneously influence her personal and professional life. In a world of hierarchy within medicine and military, little can be done if it is not moved toward policy.

Policy Implications

There are several policy implications that can be put forth based on the results from this dissertation. First, military leaders should consider implementing policies regarding the use of

BPSS assessments in mental and medical health care, as discussed above. Since the military is a hierarchical system, the support from military leaders is crucial in making substantial changes in how healthcare is being delivered to military members. In addition, military leaders should create protocols that include psychological (e.g., depression, anxiety, and trauma symptoms), social (e.g., sexual harassment and degree of social support) and spiritual health assessments during regular primary care visits. Protocols must be written for how to provide the necessary treatment options (e.g., referrals) to women if they report any mental health or social health concerns. Active duty women must feel that access to care is available to them, and that stigma for that care is removed. Her psychological, social, and spiritual care must be acknowledged must rise to the importance of her physical health care and cannot be limited to recognizing only her sexual or reproductive health needs. Lastly, given the reports of work-related sexual harassment in article two and its detrimental effects on health, military leaders should create policies that encourage women to report sexual harassment without fear of repercussions. Women should be able to work around their chain of command in instances of work-related sexual harassment in order to continue to feel safe at their workplace.

Medical Family Therapy Implications

The findings from this dissertation have implications for MedFTs, because of our unique skillset for using the biopsychosocial-spiritual approach while also honoring relational/systemic research, training, assessment, treatment, and policy. MedFTs are prepared to address the research implications discussed in this dissertation because of our training in developing and implementing research projects that are grounded in theory and honor the systemic relationships within and between different domains of health. Based on the results of this dissertation, MedFTs must begin to recognize the vast need for research-informed care for active duty women and

therefore, should become more involved in military research and training. There are an abundance of opportunities for MedFTs to work with military populations through training, clinical work, research, and teaching and through the findings presented in this dissertation, we now additional outcomes that showcase the need for research informed practices and policies, especially as it relates to active duty women and her BPSS experiences with sexual harassment.

This is a call to action for MedFTs to use their expertise in conducting research projects that target the reduction of health disparities and help meet the unique needs of the military women in this country. Further, MedFTs must work hard to translate findings from research into best practices and treatment protocols based on the outcomes. This piece is a crucial area for change in military populations, because policies are typically enforced based off of tradition, not research. In addition, MedFTs must receive training in assessing and analyzing patients' spiritual beliefs regarding their health and illness, which was a clear influence on the health of military women in this study. MedFTs should aim to capture spiritual health in research projects, assessment protocols, and treatment plans in order to strengthen it as a research and clinical outcome, thus growing the potential to expand our knowledge of all four health domains.

Conclusion

The research presented in this dissertation has illustrated the interconnectedness within and between biological, psychological, social, and spiritual domains for active duty women. This research has led to several implications for researchers, clinicians, and policy makers that encourage the expansion of "health" from merely physical to also include psychological, social, and spiritual variables. Active duty women sacrifice aspects of her BPSS health in order to serve this country and it is our duty to ensure that she receives the comprehensive and inclusive health care that she deserves.

REFERENCES

Aldous, W. K., Robertson, J. L., Robinson, B. J., Hatcher, C. L., Hospenthal, D. R, Conger, N. G., & Murray, C. K. (2011). Rates of gonorrhea and chlamydia in U.S. military personnel deployed to Iraq and Afghanistan (2004–2009). *Military Medicine, 176*(6), 705–710. doi:10.7205/MILMED-D-10-00218

Anchin, J. C. (2008). Pursuing a unifying paradigm for psychotherapy: Tasks, dialectical considerations, and biopsychosocial systems metatheory. *Journal of Psychotherapy Integration, 18*(3), 310-349. doi:10.1037/a0013557

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196,* 129-136. doi:10.1126/science.847460

Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137,* 535-544.

Epstein, R. M., & Borrell-Carrio, F. (2005). The biopsychosocial model: Exploring six impossible things. *Families, Systems, & Health, 23*(4), 426 – 431. doi: 10.1037/1091-7527.23.4.426

Hodgson, J., Lamson, A., Mendenhall, T., & Crane, R. (Eds.) (2014). *Medical Family Therapy: Advanced Applications.* New York: Springer.

Lindberg, L. D. (2011). Unintended pregnancy among women in the US military. *Contraception, 84*(3), 249–251. doi:10.1016/j.contraception.2011.01.017

Smith, R. C., Fortin, A. H., Dwamena, F., & Frankel, R. M. (2013). An evidence-based patient-centered method makes the biopsychosocial model scientific. *Patient Education and Counseling, 91*(3), 265-270. doi:10.1016/j.pec.2012.12.010

Suls, J., Krantz, D. S., & Williams, G. C. (2013). Three strategies for bridging different levels of analysis and embracing the biopsychosocial model. *Health Psychology, 32*(5), 597-601. doi: 10.1037/a0031197.

Wright, L. M., Watson, W. L., & Bell, J. M. (1996). *Belief: The heart of healing in families and illness.* New York: Basic Books.

von Bertalanffy, L. (1968). *General System Theory: Foundations, Development, Applications.* New York: George Braziller.

APPENDIX A: IRB APPROVAL LETTER

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · **www.ecu.edu/irb**

Notification of Initial Approval: Expedited

From:	Social/Behavioral IRB
To:	Meghan Hohn
CC:	Angela Lamson
Date:	11/16/2015
Re:	UMCIRB 15-001638 The BPSS Health of Active Duty Women: Service Members in Need of Service

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 11/12/2015 to 11/11/2016. The research study is eligible for review under expedited category # 7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).
The approval includes the following items:

Name	Description
There are no items to display	
BPSS Health of AD Women_FLYER.docx	Recruitment Documents/Scripts
BPSS Health of AD Women_Informed Consent	Consent Forms
BPSS Health of AD Women_Methodology	Study Protocol or Grant Application
BPSS Health of AD Women_Permission.docx	Recruitment Documents/Scripts
BPSS Health of AD Women_Survey	Surveys and Questionnaires

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

APPENDIX B: INFORMED CONSENT DOCUMENT

Informed Consent to Participate in Research

Title of Research Study: THE BIOPSYCHOSOCIAL-SPIRITUAL HEALTH OF ACTIVE DUTY WOMEN: SERVICE MEMBERS IN NEED OF SERVICE

Principal Investigator: Meghan H. Lacks
Institution, Department or Division: East Carolina University: College of Health and Human Performance, Department of Human Development and Family Science
Address: 108 Rivers Building, East Carolina University
Greenville, NC 27858-4353
Telephone #: 252-328-4273

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?
The purpose of this research is to explore the biopsychosocial-spiritual health of active duty women. You are being invited to take part in this research because you are currently a woman on active duty service. The decision to take part in this research is yours to make. By doing this research, we hope to learn about the overall health experiences of active duty women.

If you volunteer to take part in this research you will be about one in 100 active duty women to do so.

Are there reasons I should not take part in this research?
I understand that I should not take part in this study if I am not on active duty service or am under 18 years of age.

What other choices do I have if I do not take part in this research?
You can choose not to participate.

Where is the research going to take place and how long will it last?
The research will take place via an online survey that you can complete at your convenience. The survey should take approximately 45 minutes to complete.

What will I be asked to do?
You will be asked to do the following: You will be asked to complete a questionnaire about your

biopsychosocial-spiritual health experiences. Questionnaires will ask about demographics (age, relationship status, ethnicity, military experiences, etc.) and your biological, psychological, social, and spiritual well-being. Your name will not be attached to the questionnaire.

What might I experience if I take part in the research?
Other people who have taken part in this type of research have experienced some increased stress or embarrassment from sharing information regarding their military experiences, health experiences, and other pertinent personal information. While there may not be physical risks from participating in this study, some of the questions asked on the questionnaire could cause some emotional distress. You are welcome to stop at any time.

If any part of this study causes you discomfort (whether during the study or in the days following), the researchers will provide you with medical or behavioral health recommendations. If this happens in the days following, please call the primary researcher (Meghan Lacks) at the ECU Family Therapy Clinic at 252-737-1415.

Will I be paid for taking part in this research?
No, active duty personnel cannot be incentivized to take part in research.

Will it cost me to take part in this research?
It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?
ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- The University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your welfare during this research and may need to see research records that identify you.

How will you keep the information you collect about me secure? How long will you keep it?
This signed consent form and survey will be kept on a password protected computer in a locked office. The only people who will see this information will be the research team (researcher and other research assistants at the Medical Family Therapy Research Academy. There will be no information on the paperwork that will identify you). This paperwork will be kept for three years and stored in a confidential and locked location on-site.

Information gathered from this study will be used to publish potential findings in scientific communities and/or report these results to government agencies, funding agencies, or manufacturers. However, strict guidelines regarding confidentiality will be enforced and no identifying information will be published.

What if I decide I don't want to continue in this research?
You can stop at any time throughout the research process. There will be no consequences if you choose to stop.

Who should I contact if I have questions?
The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact the primary researcher (Meghan Lacks) at 252-737-1415, Monday through Friday, from 8:00am to 12:00pm. If you have questions about your rights as someone taking part in research, you may call the Office of Research Integrity & Compliance (ORIC) at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971.

Are there any Conflicts of Interest I should know about?
There are no conflicts of interest.

I have decided I want to take part in this research. What should I do now?
The person obtaining informed consent will ask you to read the following and if you agree, you should select the option to participant in the current study.

- I have read all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By electronically signing this informed consent form, I am not giving up any of my rights.
- I know that I can print a copy of this consent form and it is mine to keep.
- I know I will not gain access to the survey without first confirming the following statements:

By selecting the following option I am consenting to the eligibility requirements.

○ I am over 18 years of age.

○ I am an active duty woman in the U.S. military.

By selecting the following option, I am consenting to participate in this study.

○ I have read all of the above information, asked questions and have received satisfactory answers in areas I did not understand.

APPENDIX C: DEMOGRAPHIC QUESTONNAIRE

1. What is your current age? _____
2. What month was your last birthday_____
3. How do you describe yourself?
    a. American Indian or Alaska Native
    b. Hawaiian or Other Pacific Islander
    c. Asian or Asian American
    d. African American
    e. Black
    f. Hispanic or Latino
    g. Non-Hispanic White
    h. Other _____
4. What is your religious affiliation?
    a. Protestant
    b. Catholic
    c. Mormon
    d. Jehovah' Witness
    e. Jewish
    f. Muslim
    g. Buddhist
    h. Hindu
    i. Atheist
    j. Agnostic
    k. Don't know
    l. Other _____
5. What is the highest grade you have completed in school?
    a. No formal education
    b. Grades 1-8 (elementary)
    c. Grades 9-11 (some high school)
    d. Grade 12 or GED (high school graduate)
    e. College 1 year – 3 years (some college or technical school)
    f. College 4 years (college graduate)
        i. What was your major in college:
    g. Graduate School (advanced degree):
        i. What program did you receive your degree in:

<u>Military-specific Questions</u>

6. What branch of the military are you employed by?
    a. Air Force
    b. Army
    c. Coast Guard
    d. Marine Corps
    e. Navy
    f. Activated Guard or Reservists
        i. Which branch?_____

7. How long have you been employed by the military? _____
8. What is your current rank? _____
9. What is your current job in the military? _____
10. Do you live on or off base?_____
11. Where are you currently stationed? _____
12. Are you currently deployed?
    a. Yes
    b. No
13. Have you ever been deployed to a combat zone?
    a. Yes
        i. How many have you experienced?
        ii. When was the month and year of your first deployment?
        iii. When was the month and year of your last deployment?
    b. No
14. Have you ever been deployed to a non-combat zone?
    a. Yes
        i. How many have you experienced?
        ii. When was the month and year of your first deployment?
        iii. When was the month and year of your last deployment?
    b. No

Relational Questions

15. Do you think of yourself as:
    a) Heterosexual or straight
    b) Gay or lesbian
    c) Bisexual
    d) Transgender
    e) other
        if other allow to identify
16. What is your current relationship status?
    a. Single, never married
    b. Married or civil union
        i. If married, how many times?
        ii. How long have you been in your current relationship?
        iii. Are you part of dual-military relationship/marriage?
    c. Cohabitating with a relationship partner
        i. How long have you been in your current relationship?
        ii. Are you part of dual-military relationship?
    d. Widowed
    e. Divorced
    f. Legally Separated
17. Are there any questions in the section above that were not asked that you think would better describe your demographics?_____

Reproductive Questions

18. Do you have any children (include all biological, adoptive, step, foster, etc.)?
    a. Yes
        i. Age of Child1 :
        ii. Age of Child 2:
        iii. Age of Child 3:
        iv. Age of Child 4
        v. Age of Child 5:
    b. No
19. Are you currently pregnant?
    a. Yes
        i. Was this pregnancy planned?
    b. No
20. How many of the following have you experienced?
    a. Live birth(s)
        i. Prior to your military career
        ii. During military career
    b. Miscarriage(s) (a fetal loss in weeks 1-20 of pregnancy)
        i. Prior to your military career
        ii. During military career
    c. Stillbirth(s) (a fetal loss in weeks 20-42 of pregnancy)
        i. Prior to your military career
        ii. During military career
    d. Spontaneous or selected abortion(s)
        i. Prior to your military career
        ii. During military career
21. Have you ever not passed a fitness test following a pregnancy/delivery?
22. Have you been diagnosed with any sexually transmitted infections in the past year?
        i. Were any due to unwanted/coerced sexual interactions?

Biological Health Information

23. What is your current height?
24. What is your current weight?
25. What is your current waist circumference (or what was it at your last fitness assessment)?
26. In thinking about your current physical health, what medical conditions/diagnoses would you and/or your provider list for you?
27. Have you experienced any major work related injuries during your military career?
    a. Have you ever missed work due to your the injury(s)? How many days in total have you lost due to injury from work?
    b. Were you put on a profile due to the injury? For how long?
28. In the last year, how often have you sought medical treatment for an illness or injury?
    a. Did you feel supported by your supervisor/command to do so?
29. In the last year, how often have you sought mental health treatment?
    a. Did you feel supported by your supervisor/command to do so?

30. In the last year, how often have you sought out substance abuse treatment?
    a. Did you feel supported by your supervisor/command to do so?

Other Questions

31. If any, what is your biggest concern related to your physical/biological health?
32. If any, what is your biggest concern related to your psychological/emotional/mental health concern?
33. If any, what is your biggest concern related to your social life/support?
34. If any, what is your biggest concern related to your religion, faith, or spirituality?
35. As you think about your overall health what percentage do you attribute to:

    a. Physical/biological health:
    b. Psychological/emotional/mental health:
    c. Social life/support:
    d. Religion/faith/spirituality:

    Note: You may put 0% for either a,b,c, or d, but the total must still equal 100%.

Strengths and Challenges Questions

36. What are the three greatest strengths you have faced being an active duty woman?
37. What are the three greatest challenges you have faced being an active duty woman?

38. Would you be willing to allow us to follow up with you in the future? If so, please provide your email or phone number.

APPENDIX D: PATIENT STRESS QUESTIONNAIRE

Patient Stress Questionnaire*

Name: _____

Date:_____ **Birthdate**_____

Over the ***last two weeks***, how often have you been bothered by any of the following problems?
(please circle your answer & **check the boxes that apply to you**)

	Not at all	Several days	More than half the days	Nearly Every day	
1. Little interest or pleasure in doing things	0	1	2	3	
2. Feeling down, depressed, or hopeless	0	1	2	3	
3. ☐ Trouble falling or staying asleep, or ☐ sleeping too much	0	1	2	3	
4. Feeling tired or having little energy	0	1	2	3	
5. ☐ Poor appetite or ☐ overeating	0	1	2	3	
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down	0	1	2	3	
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3	
8. ☐ Moving or speaking so slowly that other people could have noticed, or ☐ the opposite - being so fidgety or restless that you've been moving around a lot more than usual	0	1	2	3	
9. ☐ Thoughts that you would be better off dead, or ☐ hurting yourself in some way	0	1	2	3	**Total**
(10)		add columns:			

1. Feeling nervous, anxious or on edge	0	1	2	3	
2. Not being able to stop or control worrying	0	1	2	3	
3. Worrying too much about different things	0	1	2	3	
4. Trouble relaxing	0	1	2	3	
5. Being so restless that it is hard to sit still	0	1	2	3	
6. Becoming easily annoyed or irritable	0	1	2	3	
7. Feeling afraid as if something awful might happen	0	1	2	3	**Total**
(8)		add columns:			

*adapted from PhQ 9, GAD7, PC-PTSD and AUDIT 1/24/11

Please also complete back side →

Provider:_____

Are you currently in any physical pain?	No	Yes

In your life, have you ever had any experience that was so frightening, horrible, or upsetting that, ***in the past month*** , you:

1. Have had nightmares about it or thought about it when you did not want to?	No	Yes
2. Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?	No	Yes
3. Were constantly on guard, watchful, or easily startled?	No	Yes
4. Felt numb or detached from others, activities, or your surroundings?	No	Yes

(3)

Drinking alcohol can affect your health. This is especially important if you take certain medications. We want to help you stay healthy and lower your risk for the problems that can be caused by drinking.

These questions are about your drinking habits. We've listed the serving size of one drink below.

Please circle your answer	0	1	2	3	4
How often do you have one drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4+ times per week
How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
How often do you have four or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
How often during the ***last year*** have you.....					
...found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
...failed to do what was normally expected from you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
...needed a first drink in the morning to get yourself going after heavy drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
...had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
...been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
	0		2		4
Have you or someone else been injured as a result of your drinking?	No	Yes, but not in the last year			Yes, during the last year
Has a relative, friend, doctor or other health worker been concerned about your drinking or suggested you cut down?	No	Yes, but not in the last year			Yes, during the last year

(8)

Total:

Standard serving of one drink:

12 ounces of beer or wine cooler
1.5 ounces of 80 proof liquor
5 ounces of wine
4 ounces of brandy, liqueur or aperitif

APPENDIX E: TRAUMATIC EVENTS QUESTIONNAIRE

Participant #_____._____

DIRECTIONS: This questionnaire is comprised of a variety of traumatic events which you may have experienced. For each of the following "numbered" questions, indicate whether or not you experienced the event. If you have experienced one of the events, circle "Yes" and complete the "lettered" items immediately following it that ask for more details. If you have not experienced the event, circle "No" and go to the next "numbered" item.

No Yes **1. Have you been in or witnessed a serious industrial, farm, or car accident, or a large fire or explosion?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **<u>was</u>** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **<u>is</u>** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

g. What was the event? _____

No Yes **2. Have you been in a natural disaster such as a tornado, hurricane, flood or major earthquake?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **<u>was</u>** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **<u>is</u>** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

g. What was the event? _____

Participant #_____._____

No Yes **3. Have you been a victim of a violent crime such as rape, robbery, or assault?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd____ 3rd____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

g. What was the crime? _____

No Yes **4. As a child, were you the victim of either physical or sexual abuse?**

a. How old were you when it began? _____

b. How old were you when it ended? _____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

g. Check all categories that describe the experience…

✂ physical abuse

✂ sexual abuse

Participant #_____._____

No Yes **5. <u>As an adult</u>, have you had any unwanted sexual experiences that involved the threat or use of force?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **<u>was</u>** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **<u>is</u>** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

No Yes **6. <u>As an adult</u>, have you ever been in a relationship in which you were abused either physically or otherwise?**

a. How old were you when it began? _____

b. How old were you when it ended? _____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **<u>was</u>** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **<u>is</u>** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

Participant #_____._____

No Yes **7. Have you witnessed someone who was mutilated, seriously injured, or violently killed?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

No Yes **8. Have you been in serious danger of losing your life or of being seriously injured?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

g. What was the event? _____

No Yes **9. Have you received news of the mutilation, serious injury, or violent or unexpected death of someone close to you?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. What relation was this person to you? _____

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

No Yes **10. Have you ever had any other very traumatic event like these?**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

g. What was the event? _____

No Yes **11. Have you had any experiences like these that you feel you can't tell about (note: you don't have to describe the event).**

a. How many times? once ✂ twice ✂ three + ✂

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

Participant #_____._____

If you answered "Yes" to one or more of the questions above, which was the **MOST** traumatic thing to have happened to you? Fill in the number of the question (e.g., #2 for natural disaster). _____

Did you answer **Yes** to more than one question above while thinking about the same event?

Yes❑ No❑

If yes, which items refer to the same event? _____

_____

If you answered "No" to all questions, describe briefly the most traumatic thing to happen to you._____

a. How many times? once ❑ twice ❑ three + ❑

b. How old were you at that time(s)? 1st ____ 2nd ____ 3rd ____

c. Were you injured?

Not at all ---------- Severely

1 2 3 4 5 6 7

d. Did you feel your life was threatened?

Not at all ---------- Extremely

1 2 3 4 5 6 7

e. How traumatic **was** this for you at that time?

Not at all ---------- Extremely

1 2 3 4 5 6 7

f. How traumatic **is** this for you now?

Not at all ---------- Extremely

1 2 3 4 5 6 7

APPENDIX F: SEXUAL EXPERIENCES QUESTIONNAIRE-S

16 Items Retained in the SEQ-DoD-s Arranged by Subscale

Sexist Hostility (sexist behavior)	
e	Treated you "differently" because of your sex?
h	Displayed, used, or distributed sexist or suggestive materials?
i	Made offensive sexist remarks?
k	Put you down or was condescending to you because of your sex?
Sexual Hostility (crude or offensive behavior)	
a	Repeatedly told sexual stories or jokes that were offensive to you?
c	Made unwelcome attempts to draw you into a discussion of sexual matters?
f	Made offensive remarks about your appearance, body, or sexual activities?
e	Made gestures or used body language of a sexual nature which embarrassed or offended you?
Unwanted Sexual Attention	
j	Made unwanted attempts to establish a romantic sexual relationship with you despite your efforts to discourage it?
n	Continued to ask you for dates, drinks, dinner, etc., even though you said "No"?
q	Touched you in a way that made you feel uncomfortable?
r	Made unwanted attempts to stroke, fondle, or kiss you?
Sexual Coercion	
o	Made you feel like you were being bribed with a reward to engage in sexual behavior?
p	Made you feel threatened with some sort of retaliation for not being sexually cooperative?
s	Treated you badly for refusing to have sex?
t	Implied faster promotions or better treatment if you were sexually cooperative?

Note. SEQ-DoD-s = Shortened Sexual Experiences Questionnaire–Department of Defense.

APPENDIX G: MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

SOCIAL SUPPORT ASSESSMENT

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Very Strongly Disagree 1	Strongly Disagree 2	Mildly Disagree 3	Neutral 4	Mildly Agree 5	Strongly Agree 6	Very Strongly Agree 7

1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2.	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
3.	My family really tries to help me.	1	2	3	4	5	6	7
4.	I get the emotional help and support I need from my family.	1	2	3	4	5	6	7
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
6.	My friends really try to help me.	1	2	3	4	5	6	7
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7

APPENDIX H: DUKE UNIVERSITY RELIGION INDEX

(1) How often do you attend church or other religious meetings? (ORA)
1 - Never; 2 - Once a year or less; 3 - A few times a year; 4 - A few times a month; 5 - Once a week; 6 - More than once/week

(2) How often do you spend time in private religious activities, such as prayer, meditation or Bible study? (NORA)
1 - Rarely or never; 2 - A few times a month; 3 - Once a week; 4 - Two or more times/week; 5 - Daily; 6 - More than once a day

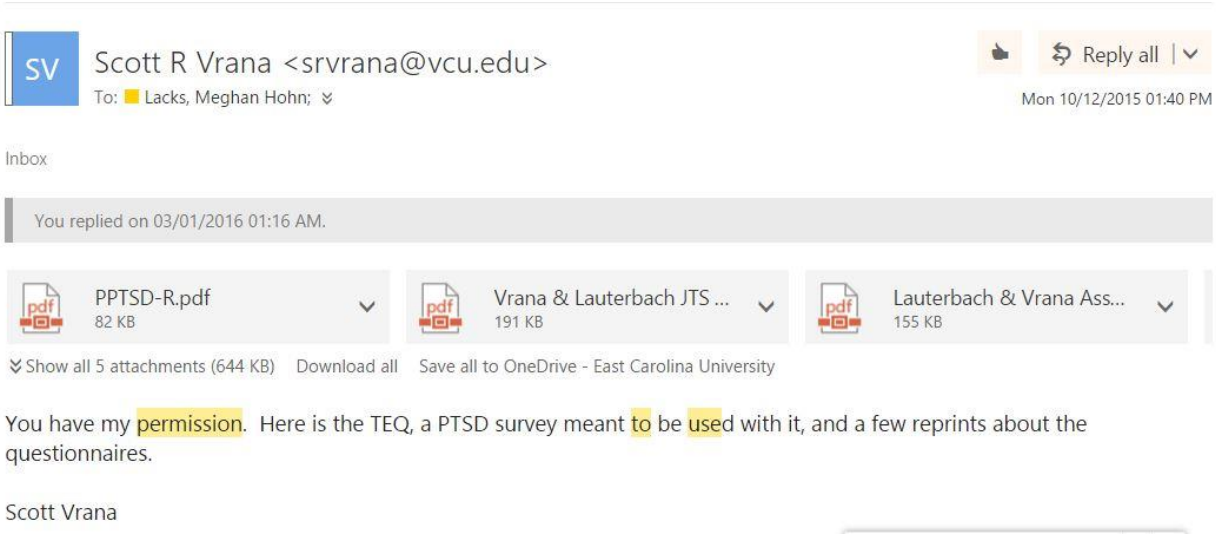
The following section contains 3 statements about religious belief or experience. Please mark the extent to which each statement is true or not true for you.

(3) In my life, I experience the presence of the Divine (*i.e.*, God) - (IR)
1 - Definitely *not* true; 2 - Tends *not* to be true; 3 - Unsure; 4 - Tends to be true; 5 - Definitely true of me

(4) My religious beliefs are what really lie behind my whole approach to life - (IR)
1 - Definitely *not* true; 2 - Tends *not* to be true; 3 - Unsure; 4 - Tends to be true; 5 - Definitely true of me

(5) I try hard to carry my religion over into all other dealings in life - (IR)
1 - Definitely *not* true; 2 - Tends *not* to be true; 3 - Unsure; 4 - Tends to be true; 5 - Definitely true of me

APPENDIX I: PERMISSION TO USE MEASURES



SV Scott R Vrana <srvrana@vcu.edu>
To: Lacks, Meghan Hohn;

Reply all
Mon 10/12/2015 01:40 PM

Inbox

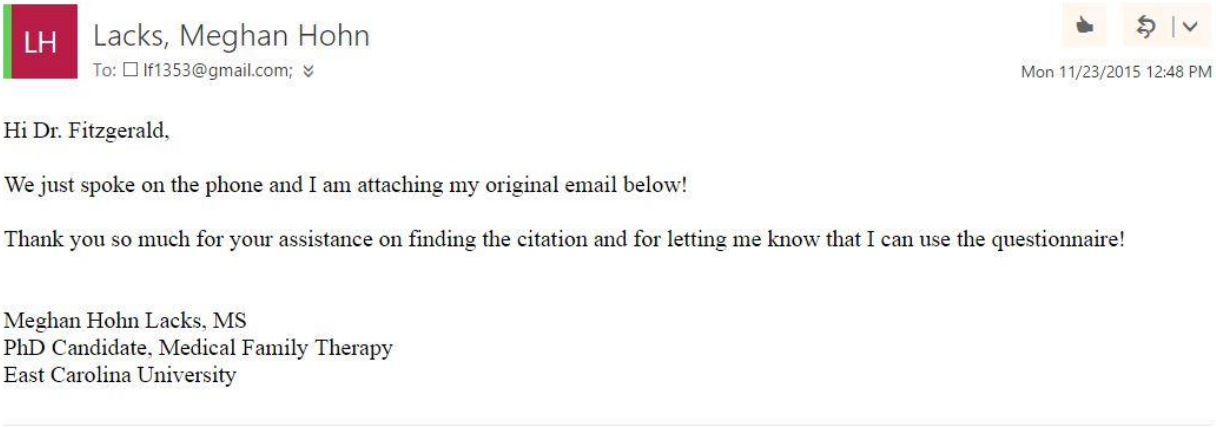
You replied on 03/01/2016 01:16 AM.

PPTSD-R.pdf 82 KB
Vrana & Lauterbach JTS ... 191 KB
Lauterbach & Vrana Ass... 155 KB

Show all 5 attachments (644 KB) Download all Save all to OneDrive - East Carolina University

You have my permission. Here is the TEQ, a PTSD survey meant to be used with it, and a few reprints about the questionnaires.

Scott Vrana



LH Lacks, Meghan Hohn
To: lf1353@gmail.com;

Mon 11/23/2015 12:48 PM

Hi Dr. Fitzgerald,

We just spoke on the phone and I am attaching my original email below!

Thank you so much for your assistance on finding the citation and for letting me know that I can use the questionnaire!

Meghan Hohn Lacks, MS
PhD Candidate, Medical Family Therapy
East Carolina University

RE: Permission to use the DoD-SEQ-s

DF Drasgow, Fritz <fdrasgow@illinois.edu>
To: Lacks, Meghan Hohn;

Reply all | Thu 03/10/2016 04:15 PM

Inbox

Hi Meghan,

We would be very happy to have you use the DoD-SEQ-s.

Yes, you can score it by subscale or as an overall measure. We've used it both ways, depending on our purpose. Obviously, as a summary total of a woman's overall experiences, the overall score is best. But the subscales really do get at different types of experiences, so in some studies we used one or more subscales.

Best of luck with your dissertation.

Fritz

From: Lacks, Meghan Hohn [mailto:HOHNM11@students.ecu.edu]
Sent: Thursday, March 10, 2016 3:11 PM
To: fdrasgow@uiuc.edu
Subject: Permission to use the DoD-SEQ-s

Hi Dr. Drasgow,

My name is Meghan Lacks and I am a PhD student at East Carolina University conducting my dissertation under the direction of Dr. Angela Lamson. My research pertains to the biopsychosocial-spiritual health of active duty women. I am writing to you regarding the use of the shortened version of the Sexual Experiences Questionnaire-DoD as one of my measures of psychological health. I spoke with Dr. Fitzgerald who referred me to Dr. Stark who referred me to you!

It is my understanding that the survey can be scored by subscales or as an overall measure of sexual harassment. Is that correct?

Thank you and please let me know if you need additional information!

Meghan Hohn Lacks, MS
PhD Candidate, Medical Family Therapy
East Carolina University

LINKS TO MEASURES WITH PUBLIC ACCESS

1. http://www.phqscreeners.com/sites/g/files/g10016261/f/201412/PHQ-9_English.pdf
2. http://www.phqscreeners.com/sites/g/files/g10016261/f/201412/GAD-7_English.pdf
3. http://gzimet.wix.com/mspss
4. http://www.ibhp.org/uploads/file/Audit%20screener%20for%20alcohol.pdf
5. http://www.ibhp.org/uploads/file/Mental%20Health%20Screener%20by%20UMass(1).pdf
6. http://homepage.westmont.edu/bsmith/documents/koenig_and_bussing.pdf