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Impact of Military-Related Moves on Spousal Perinatal Depression Screening and Mental Health Services

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This is to certify that the doctoral dissertation by

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Walden University
2025

Abstract

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by

Chambraia Jones

MPH, Temple University 2013

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Maternal depression, including perinatal depression (PND), poses significant public health risks to women, infants, and families. Although routine PND screening is recommended, limited research has examined screening and referrals among military spouses, an underserved population affected by frequent relocations and deployments. This study examined how permanent change of station (PCS) frequency affects PND screening and referrals to mental health services. Grounded in Bronfenbrenner's socioecological model and the CDC's social ecological model of health, eight research questions explored associations between PCS frequency, PND screening, referrals, and the moderating roles of military branch and deployment status. A quantitative cross-sectional design was used with 117 adult female military spouses aged 18–45 who had given birth within the past two years and experienced at least one PCS during the perinatal period. Participants were recruited through military spouse Facebook groups. Logistic and ordinal regression analyses were conducted, controlling for race, age, education, and income. PCS frequency was significantly associated with higher odds of PND screening ($p = .03$, OR = 2.01) and referrals ($p = .02$; OR = 1.52). Military branch ($p = .03$; OR = 1.50) and deployment status ($p = .03$; OR = 1.45) moderated these relationships. Findings suggest systemic military stressors influence mental health engagement more than individual characteristics. Implications for positive social change include informing policy and practice to strengthen transition-sensitive PND screening and referral protocols for military families during the perinatal period.

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Dedication

For every military spouse who has faced relocation, loneliness, and the challenges of motherhood with silent strength, this work is for you. To my family—Kevin, Aiden, and Mia—thank you for your endless love, encouragement, and faith in me. You are my greatest reason and my proudest accomplishment.

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To my family, thank you for being my foundation. To my husband, Kevin, you have been my rock and greatest cheerleader through every step of this journey. To my children, Aiden and Mia, you are my motivation and my strength.

To my mentors, close friends, and extended family—thank you for believing in me and reminding me of my strength when I needed it most.

Finally, to the broader military spouse community, whose resilience and lived experiences inspired this research—this work is for you.

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Chapter 1: Introduction to the Study

Maternal depression is a major public health problem in the United States. Perinatal mood and anxiety disorders (PMADs) including perinatal depression (PND) and postpartum depression (PPD) can have adverse health outcomes for mothers and babies (Sidebottom et al., 2020). PND encompasses depression that begins during pregnancy (prenatal depression) and depression that begins after the baby is born (postpartum depression; National Institutes of Mental Health, n.d.). The perinatal period encompasses the time when a woman becomes pregnant and up to a year after giving birth, also known as the postpartum period (Garcia & Yim, 2017). According to the Massachusetts General Hospital (MGH) Center for Women's Mental Health (2020), 20-25% of women experience symptoms of depression during pregnancy or the postpartum period. Some of the most common symptoms of PND that women may experience include persistent sadness or feelings of emptiness, fatigue or abnormal decreases in energy, trouble bonding with new babies, and persistent doubts about the ability to care for new babies (National Institute of Mental Health, n.d.).

Although the American College of Obstetricians and Gynecologists (ACOG), American College of Nurse-Midwives, U.S. Preventive Services Task Force, and American Academy of Pediatrics (AAP) recommend patients should be screened with a standardized and validated tool for PND and anxiety disorders at least once during the perinatal period, this standard may not be the reality for many populations, including military spouses (Gisseman et al., 2021; Godier-McBard et al., 2019). Women in the military, including both active duty and civilian wives of service members, may

experience additional factors that contribute to risks for PND, including low social support due to spousal deployment (Gisseman et al., 2021; Godier-McBard et al., 2019). Furthermore, although the national prevalence of PND in the civilian population is estimated to be between 5 and 25%, little is known about prevalence of PND among spouses of military servicemembers (Gisseman et al., 2021; Godier-McBard et al., 2019). Hence, this study involved addressing potential barriers that military spouses may encounter regarding timely and effective maternal mental healthcare screening practices. In addition, exploration of this understudied topic can help military health practitioners be better equipped to address PND screening disparities for an understudied population by translating this information into action within these communities.

Background

PND affects one in seven women and is associated with adverse health outcomes for mothers and babies (El-Den et al., 2022, Godier-McBard et al., 2019; Klaman & Turner, 2016; Spooner et al., 2012; Tyokighir et al., 2022). PND often goes unidentified with many women not recognizing their symptoms could be signs of mental illness, resulting in lack of diagnosis and treatment (El-Den et al; 2022). During post-visit documentation, 28% of inner-city obstetrics notes made no comment on patient mental health status. Furthermore, 22% of patients screened positive for depression, compared to 13% who were identified as being at risk by history and physical exam alone (Gisseman et al., 2021).

Screening for depression has significant benefits for patients. Significant reductions were observed between 18% and 59% during follow-up visits when a

screening program was used (Gisseman et al., 2021). However, benefits of screening only result when there is timely identification of women with positive screening results, followed by adequate referral to mental health services (Xue et al., 2020). Mental health service referral involves recommending patients to receive further mental health care after PND screenings (Xue at al., 2020). This can include a range of rehabilitative, diagnostic, and therapeutic services that are offered in private, public, inpatient or outpatient settings to treat mental illness or emotional disorders (American Psychological Association, 2018). Furthermore, the process of mental health service includes three imperative steps. First, the provider initiates the referral for women with positive screening results. Then, women accept the referral and attempt to use recommended services. Finally, resources must be available to provide adequate support (Xue et al., 2020). Tato-Fernandes et al. (2023) found among women who screened positive for depression (N = 220), 51.8% accepted referrals for mental health assistance, 74.9% attended psychology appointments and 74.1% attended psychiatry appointments. There is an increase in uptake of referral compliance post-depression screening diagnosis that is between 12% and 49% which led to a decrease in depressive symptoms (Bauer et al., 2017; Kallem et al., 2019; Price et al., 2017). Uptake of referrals after depression screening is a complicated process that requires evaluation of barriers related to patient and healthcare providers to improve screening and treatment outcomes (Xue et al., 2020).

National prevalence of PND in the civilian population is estimated to be 5% to 25%, but little is known about the of PND in U.S. military women and spouses of military servicemembers. Active duty and civilian wives of servicemembers may

experience additional factors that contribute to PND risks. These factors include lack of support, frequent moves, being stationed away from extended family, and single parenting (Gisseman et al., 2021; Klaman & Turner, 2016; Levine et al., 2015; Spooner et al., 2012). Furthermore, among military families with children, women with more than one child at home and women on active-duty status demonstrate elevated levels of stress (Gisseman et al., 2021; Godier-McBard et al., 2019; Mailey et al., 2018; Schachman et al., 2013; Smith et al., 2010; Spooner et al., 2012). Considering stressors associated with being in military families, military spouses/partners could be more vulnerable to developing mental health problems than their civilian counterparts (Godier-McBard et al., 2019). The importance of PND screening is well understood in public health literature, and there is an emphasis on assessing and minimizing growing disparities in terms of delivery of perinatal care and adverse PND outcomes among understudied populations.

Problem Statement

The specific research problem was lack of recommendations that defined fixed PND screening guidelines for mothers, and it was not known whether frequent military-related moves or permanent change of station (PCS) impacted timeliness of PND screening and referral to mental health services during the perinatal period. Even though current literature supports that military spouses may be vulnerable to elevated risks of poor mental health outcomes due to unique stressors of military lifestyles, there is a lack of current literature that has assessed PND amongst military spouses. Current literature only focused on PPD among women veterans and military-related factors that contributed to depression and adverse mental health conditions (i.e., sexual trauma and intimate partner violence), which was outside the scope of this study. Lack of current literature on PND among military spouses warranted further investigation through evaluation of unique military stressors and PND guidelines.

Purpose of the Study

The purpose of this quantitative survey study was to examine associations between frequency of PCS, PND screening, and referral to mental health services during the perinatal period among military spouses. The dependent variable was PND screening. Independent variables were frequency of PCS during the perinatal period (i.e., number of relocations), age, race, military branch, socioeconomic status, level of education, deployment of military spouse during the perinatal period, prior history of depression, and referral to mental health services.

Research Questions and Hypotheses

The following four research questions and hypotheses guided this quantitative study to examine associations between frequency of PCS, PND screening, and referral to mental health services during the perinatal period among military spouses:

RQ1: What is the association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$1: There is no association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a1: There is an association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ2: What is the association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$2: There is no association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a2: There is an association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education and socioeconomic status.

RQ3: What is the association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$3: There is no association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a3: There is an association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ4: What is the association between frequency of PCS and PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression?

$H_0$4: There is no association between frequency of PCS and PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

H_a4: There is an association between frequency of PCS and timing of PND screening during the perinatal period and referral to mental health services amongst

military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

Conceptual Framework

The conceptual framework that grounded this study was Urie Bronfenbrenner's socioecological model and the Centers for Disease Control and Prevention (CDC) social-ecological model of health (See Chapter 2). as well as the CDC's four-level model that assesses factors affecting health, which was aligned with this study's purpose.

Urie Bronfenbrenner's social ecological framework has been used for many behavioral health interventions to assess multiple dimensions of human development and how extrinsic social and environmental factors impact individual life span. This conceptual model involves five concentric rings or levels that represent individual relationships with societal constructs (Bronfenbrenner, 1977). The five levels of this model are the microsystem (first level), mesosystem (second level), exosystem (third level), macrosystem (fourth level, and chronosystem (Bronfenbrenner, 1977). Collaboratively, each level denotes the impact that factors such as place, time, physical features, societal roles, and environment can have on individual beliefs and actions.

The CDC's social ecological model involves interactive relationships between individual, interpersonal, community, and societal factors that impact health outcomes. Factors impacting health outcomes include socioeconomic status, social circle, community institutions, and cultural and social ideologies (CDC, 2015). Current literature has used the CDC's adaptive model to assess factors that may play a key role in perinatal mental health outcomes for underserved populations. According to Tyokighir et

al. (2022), this model emphasizes interventions can be made at a variety of points to strengthen resilience and remove or reduce barriers associated with mental health. Furthermore, the social ecological framework includes a comprehensive matrix for identifying and implementing strategies that can facilitate consistent efforts to effect positive change in inequitable settings (CDC, 2015).

I aimed to assess individual (age, race, military branch, and socioeconomic status), interpersonal (social circle including family, friends, practitioners, and spouse/partner support), community (local military neighborhoods, military family networks, frequency of PCS), and society (organizational and public policy within military healthcare infrastructures, such as current PND screening practices, occurrence of perinatal mental health screening, and accessibility of mental health services) factors which may impact mental health outcomes among military spouses.

Assessment of these factors may enhance engagement in identifying and implementing interventions to address potential mental healthcare barriers. I also focused on assessing these unique risk factors associated with military life to examine associations between frequency of PCS, whether PND screening occurred, and referral of mental health services among military spouses during the perinatal period.

Nature of the Study

To address research questions in this quantitative study, I used a cross-sectional design to assess associations between frequency of PCS, PND screening, and referral of mental health services among military spouses during the perinatal period. Quantitative research includes data observed or measured to examine questions about sample

populations (Allen, 2016). Collection of quantitative information is used for researchers to conduct statistical analyses that can show relationships among aggregated data (Coghlan & Miller, 2014). Researchers use the cross-sectional design to measure prevalence of health outcomes and understand distinct characteristics of populations at one specific point in time (Wang & Cheng, 2020). An advantage of conducting a cross-sectional study is they are inexpensive to conduct, which is optimal in terms of determining prevalence of outcomes of interest and assessing associations, exposures, and outcomes (Wang & Cheng, 2020). Quantitative analysis was used to address differences in PND screenings associated with frequency of PCS, race, military branch, and referral to mental health services.

The independent variable was frequency of PCS (scale: interval) during the perinatal period (number of times relocated during the perinatal period). Dependent variables were PND screening (scale: nominal-dichotomous) and referral to mental health services (scale: nominal). Confounding variables were age (scale: ordinal), race (scale: nominal), level of education (scale: ordinal), socioeconomic status (scale: ordinal), and preexisting depression (scale: nominal-dichotomous). Effect modifiers were military branch (scale: nominal), and deployment status of servicemember during the perinatal period (scale: nominal-dichotomous).

Research included the creation of a questionnaire using SurveyMonkey to gather specific data on PND screening and the following independent variables: frequency of PCS during the prenatal period, age, race, military branch, level of education, socioeconomic status, whether military spouses were deployed during the perinatal

period, and referral to mental health services. Because military spouses are marginalized groups and understudied, previous data has not been collected that can be used to answer research questions. Data was anonymous and collected through an internet-based survey. A power analysis was done to determine the number of participants for the study. The methodology is discussed further in Chapter 3.

Definitions

The following terms were defined for the purpose of this study:

Antepartum: The time between conception and onset of labor which is usually used to describe the period during which a woman is pregnant (Olds et al., 2004).

Active-Duty Service Member: A person who serves on active duty in a uniformed service and may be deployed at any time for any duration (Thomas, 2023).

Military Spouse: A person whose spouse (wife or husband) is a member of the U.S. armed forces (Meyers, 2022).

Permanent Change of Station (PCS): Transfer of a service member or spouse to a different armed services duty station for 2 to 4 years. A PCS move can be a move between one duty station and another or between one's final duty station and home of record upon retirement or discharge (Military OneSource, 2023).

Perinatal Period: the period when you become pregnant and up to a year after giving birth (Garcia & Yim, 2017).

Postpartum: The period that begins soon after the delivery of the baby and usually lasts 6 to 8 weeks and ends when the mother's body has nearly returned to its prepregnant state (Lopez-Gonzalez & Kopparapu, 2022).

Assumptions

A primary data survey was disseminated to examine associations between frequency of PCS, PND screening, and referral of mental health services among military spouses during the perinatal period. There were three assumptions in this study. The first assumption was that participants understood survey questions in a consistent way and answered them honestly. The second assumption was that participants were qualified to respond to survey questions. The last assumption was that the choice of words in questions provided respondents with all necessary information they required to be able to answer them in line with the study's intent.

Scope and Delimitations

Participants were included in the study if they were military spouses of active-duty service members (all branches of service included), had given birth within the last 2 years, and experienced PCS at least once during the perinatal period. Participants were excluded from the study if they were not a military spouse of an active-duty service member, had not given birth within the last 2 years, and have not experienced PCS at least once during the perinatal period. A cross-sectional research design was used to examine and evaluate sample data and outcomes of identified dependent and independent variables. In this study, I aimed to evaluate potential associations between different independent and dependent variables in this study.

Limitations

A cross-sectional design involves examining data from a population at one specific point in time (Wang & Cheng et al., 2020). Furthermore, since outcome and

exposure variables are measured at the same time, it is difficult to establish causal relationships from a cross-sectional study (Wang & Cheng et al., 2020). Therefore, causality cannot be determined or inferred from this study. A potential barrier when conducting a survey-based study is recruiting enough participants to reach the power sample that is needed (Felderer et al., 2022). Through recruiting via social media using military spouse social networks and mom groups and convenience sampling, it was feasible to reach an adequate sample size. Another challenge in creating a survey was testing it for validity and reliability. I used Cronbach's Alpha coefficient to evaluate internal consistency of survey items, and the reliability value was found to meet the minimum threshold for exploratory research as recommended for new surveys.

Additionally, a potential challenge was conducting survey research with military populations due to the probable vulnerability they may feel while participating in a study. In many respects, military research is no different from civilian research. However, DoD guidelines recognize military personnel can be vulnerable to coercion or undue influence due to factors that may impede their ability to provide informed consent, in addition to socioeconomic and cultural aspects that make them vulnerable because of who they are (Parasidis et al., 2016). In addition to military command, military culture is a significant marker of vulnerability for service members; they may be more compelled to obey a request to receive medical treatment or participate in a clinical study (Parasidis et al., 2016). Furthermore, they might feel pressure to participate in research due to the hierarchical environment in which they live and work. For example, they may feel like their participation in a study may lead to special assignments or privileges, and failure to participate may lead to employment consequences (Parasidis et al., 2016). Furthermore, a limitation of this quantitative study is response bias, as the data were based on participants' self-reports; responses may be skewed due to social desirability bias. Social desirability bias occurs when respondents tend to give answers to questions, they believe are socially appealing, while concealing their true attitudes, opinions, or experiences regarding a particular topic (Latkin et al., 2017).

Significance

Findings from this study can help military practitioners and policymakers refine current PND screening and diagnosis guidelines while ensuring implementation of tailored perinatal support that is specific to needs of military spouses rather than generic

support. Research also has the potential to impact social change, especially in military communities. Military spouses are often committed and dedicated to the mission of being supportive partners to service members, and often many military spouses put the needs of their families ahead of their own. As a result, military spouses are forgotten by their counterparts. By examining military-specific factors that may impact maternal health outcomes, results can provide a more comprehensive understanding of perinatal health and depression screening needs of military spouses and advocate for policies to decrease adverse health outcomes within this population.

Summary

The purpose of this study was to determine associations between frequency of PCS, PND screening, and referral of mental health services in a U.S. sample of military spouses. PND affects one in seven women, with many women not realizing their symptoms are indicative of adverse health outcomes (Sidebottom et al., 2020). Although national prevalence of PND in the civilian population is estimated to be 5 and 25%, little was known about the prevalence of PND among U.S. military women and spouses of military servicemembers. I aimed to assess delivery of perinatal care and relationships with adverse PND outcomes among this population.

Chapter 2: Literature Review

PND, which is the occurrence of depressive disorders during pregnancy or following childbirth, affects one in seven women and is associated with adverse health outcomes for mothers and babies (El-Den et al., 2022; Godier-McBard et al., 2019; Klaman & Turner, 2016; Spooner et al., 2012; Tyokighir et al., 2022). PND often goes unidentified, with many women not recognizing their symptoms could be a sign of mental illness, resulting in a lack of diagnosis and treatment (El-Den et al., 2022). Unique stressors of the military lifestyle including unpredictable moves, isolation from family and friends, and spousal deployment which puts military spouses at an increased risk of poor mental health (Mailey et al., 2018). Therefore, considering stressors associated with being in military families, military spouses and partners could be more vulnerable to developing mental health problems than their civilian counterparts (Godier-McBard et al., 2019).

Despite this vulnerability, there is a lack of recommendations that define fixed PND screening guidelines for mothers. Additionally, it is not known whether frequent military-related moves or PCS impact timeliness of PND screening and referral to mental health services among military spouses during the perinatal period. The importance of PND screening is well understood in public health literature, but there is an emphasis on assessing and minimizing growing disparities involving delivery of perinatal care and relationships with adverse PND outcomes among understudied populations. The purpose of this quantitative survey study is to examine associations between frequency of PCS,

PND screening, and referral to mental health services during the perinatal period among military spouses.

This evidence-based literature review includes discussions of impacts on perceived barriers to PND diagnosis and referral to mental health services. It also includes an overview of recent publications that discuss PND recommendations. I also discuss previous research approaches to screening for PND, including the prevalence of PND in military populations. Other topics include military lifestyle factors and stressors, their associations with perinatal and PPD, and method-specific literature.

Literature Search Strategy

The Walden University Library was the primary source of information. I used the following keywords: *depression*, *mental*, *psych**, *postpartum*, *postnatal*, *perinatal*, *antenatal*, *after pregnancy*, *after birth*, *maternal*, *maternity*, *puerperium, military*, *veterans*, *soldiers*, *armed forces*, *active duty, army*, *navy*, or *air force*, *marine corps*, *national guard*, *coast guard*, (*support services*, *screening*, *access to care*, *spouse*, *partner, wife*, *husband*, *public health*, *community health*, *population health*, and *epidemiology*. I used the following databases: MEDLINE/PubMed, CINAHL, APA PsycInfo, Socindex, SocIndex, ScienceDirect, Academic Search Complete, Military & Government Collection, International Security & Counter Terrorism Reference Center, Political Science Complete, Social Sciences Citation Index, Education Source, ERIC, IEEE Xplore, Emerald Insight, Directory of Open Access Journals, and Google Scholar. The asterisk was used to broaden searches by finding words that start with the same letters.

I established parameters to retrieve peer-reviewed literature that was published between 2018 and 2023. 1,500 articles resulted from the literature search. However, a significant majority of literature only focused on PPD among women veterans and military-related factors that may contribute to depression and adverse mental health conditions, such as sexual trauma and intimate partner violence, which is outside the scope of the proposed study. Hence, of the 1,500 articles, only two recent articles met the criteria for the proposed study in terms of assessing PND screening practices and outcomes among military populations that included military spouses. Due to limited current literature regarding the proposed study, relevant studies published before 2018 were included in this literature review.

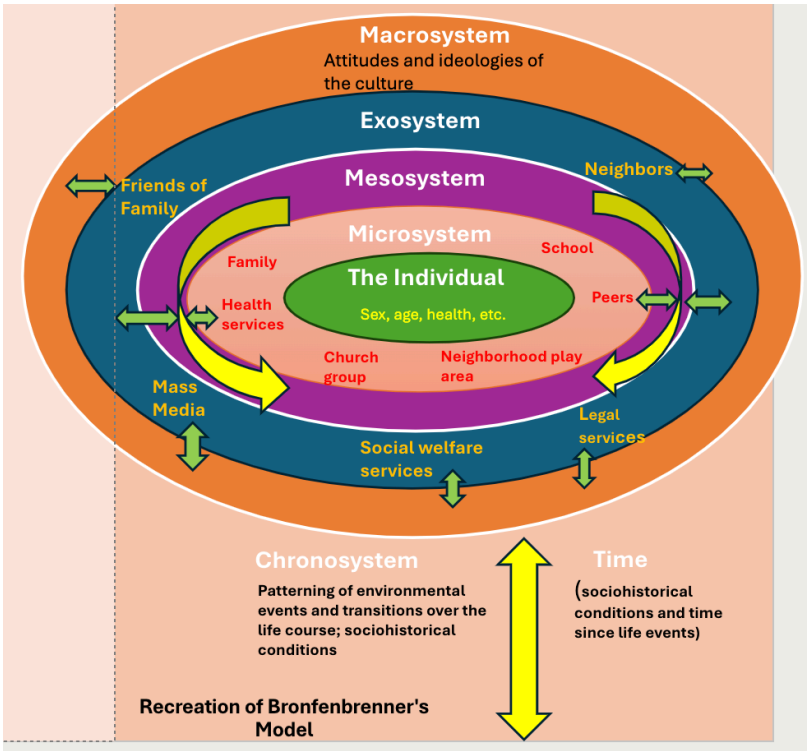
Conceptual Framework

Urie Bronfenbrenner's socioecological model is used for public health practice and is a framework for evaluating factors that contribute to PND, including guidelines for effective strategies for modifying these factors. This conceptual model was developed to bridge the gap between behavioral and anthropological theories of human development using concentric rings or levels to represent individual relationships with extrinsic societal constructs and how these relationships shape individual outcomes (Bronfenbrenner, 1979).The microsystem is the first level of Bronfenbrenner's theory and involves immediate relationships and environments that have a direct influence on individual beliefs and actions (Bronfenbrenner, 1979). This includes factors such as place, time, physical features, activity, and societal roles (Bronfenbrenner, 1979). The

second level is the mesosystem, and it involves codependence of individual microsystems which are interconnected and often assert influence upon one another (Bronfenbrenner, 1979). The exosystem is an extension of the microsystem which involves formal and informal social structures that may not directly interact with the individual, but still influence the microsystem (Bronfenbrenner, 1977). These structures include major society institutions such as local, state, and national government agencies, social media, government policies, and community distribution of community resources (Bronfenbrenner, 1977). The fourth level of Bronfenbrenner's socioecological model is the macrosystem, and it includes cultural elements that affect individual development (Bronfenbrenner, 1977). These include cultural ideologies, attitudes, and social conditions that individuals are immersed in due to their positions in society (Bronfenbrenner, 1977). The fifth and final level of Bronfenbrenner's socioecological model is the chronosystem; this level involves shifts, transitions, or historical events that may impact individual social expectations over time (Bronfenbrenner, 1977; see Figure 1).

Figure 1

Bronfenbrenner Socioecological Model



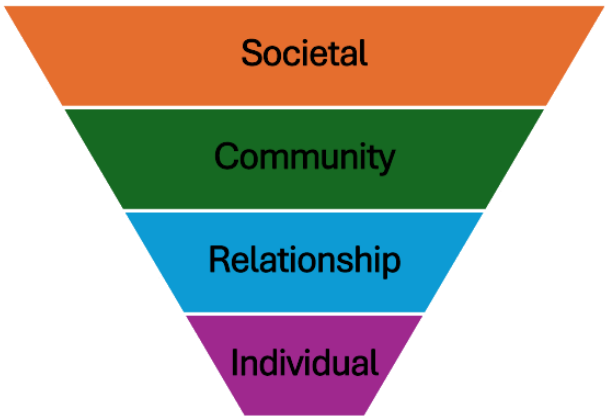
Note. Adapted from "*Essentials of life-span development*" by Santrock, J.W., 2008, p. 24. Copyright 2008 by New York, NY: McGraw Hill Higher Education.

In addition to the concepts summarized in Bronfenbrenner's ecological model, the CDC developed a four-level model of factors affecting health that is grounded in the social ecological theory. The concepts outlined in the CDC model were adapted for this study. The first level includes the individual and personal characteristics (i.e., age, education, and socioeconomic status) that may impact an individual's health (CDC, 2015). The second level represents the individual's environment which includes relationships with family, friends, and neighbors that can influence a person's behavior and contribute to their experiences (CDC, 2015). The third level includes the larger

community that the individual and their immediate social environment are connected to and seeks to identify attributes of these settings that affect health (CDC, 2015). The health care system and health practitioners who can implement screening guidelines and maternal mental health interventions are an important part of this community. The fourth level represents the larger societal environment that may consist of shared ideologies and norms, including stigmatizing ideas about mental health (CDC, 2015). This may include cultural and social norms related to social policies that can minimize socioeconomic inequalities between underserved populations (CDC, 2015).

Figure 2

Social Ecological Model of Health



Note. Adapted from "Models and Frameworks for the Practice of Community Engagement," by the Center for Disease Control and Prevention, 2015. In the public domain.

The socioecological model has been applied in several studies to assess factors contributing to maternal depression among women from diverse socioeconomic backgrounds. In a recent qualitative study, researchers examined barriers to mental health service access among low-income pregnant and postpartum women and found multiple barriers to perinatal mental health care access at all levels of the socioecological model (Tyokighir et al., 2022). At the **individual level**, barriers included the cost or lack of insurance, limited awareness of PND screening results, and challenges in scheduling mental health appointments. For example, only 67% (n = 8) of participants reported completing a PND screening tool (Tyokighir et al., 2022). At the **interpersonal level,** providers reported that a lack of social support from family and friends, along with stigma, posed major barriers. Stigma also emerged as a significant **community-level** theme. Providers emphasized how birth trauma may affect maternal mental health and recommended that partners receive education on how to support women's mental health needs (Tyokighir et al., 2022). Additionally, the most prominent **community-level** barrier was a lack of communication among providers. Closed-loop communication with mental health providers was identified to improve patient management and outcomes (Tyokighir et al., 2022).

In a comparative qualitative study, Poleshuck et al., 2019, used the socioecological model to explore the impact of socioeconomic disadvantage on depression symptoms among pregnant women. Participants were recruited from three women's health centers serving primarily Medicaid recipients: of the 20 women interviewed, five were pregnant. Respondents described a range of social determinants

that significantly influenced their mood, functioning, and engagement with healthcare. Consistent with other studies, researchers found that mental health symptoms and socioeconomic instability affected intrapersonal, interpersonal, and structural levels of women's lives. Notably, all participants met the criteria for clinically elevated depressive symptoms using the Patient Health Questionnaire (PHQ-9; Poleshuck et al., 2019). The study concluded that ongoing stressors and limited resources compromise a woman's ability to function as an individual and mother. These challenges may diminish their capacity to access and benefit from mental health care and other essential health services.

Additionally, studies involving pregnant teens have highlighted similar findings. For instance, Buzi et al. (2015) found that low levels of support from family or friends and limited economic resources were key contributors to perinatal depression in this population, reaffirming the importance of addressing multilevel barriers through a socioecological lens.

The socioecological model has proven to be an effective framework to understanding the mental health needs of women of childbearing age. It is therefore essential to continue identifying the multilevel factors that influence these needs and design interventions that reflect the lived experiences of affected women. Analyzing the current perinatal mental health landscape at the state level through this lens provides a practical approach to addressing service gaps and reducing negative health outcomes (Harris et al., 2020).

One of the most frequently cited barriers at the **individual level** is stigma. To address this barrier, clinical providers must engage with women's attitudes, beliefs,

societal roles, and lack of awareness regarding perinatal mental health (Alfayumi-Zeadna et al., 2019). At the **interpersonal and community levels**, expanding awareness of perinatal mental health complications through support networks and involving local health departments in screening implementation can strengthen family support and public knowledge (Harris et al., 2020). At the **organizational and systems levels,** expanding awareness of perinatal mental health complications through support networks and involving local health departments in screening implementation can strengthen family support and public knowledge (Harris et al., 2020). Improving these elements across levels may lead to more equitable and effective mental health outcomes for mothers.

Literature Review

There is growing national and state-level attention to mental health conditions that occur during pregnancy and the postpartum period (Harris et al., 2020). These complications significantly affect the health and quality of life of women, infants, and their support systems. Research has shown that the onset of maternal depression symptoms can be influenced by a combination of emotional, social, and biological factors (National Institute of Mental Health [NIMH], n.d.). For instance, women who are socioeconomically disadvantaged and experiencing depressive symptoms often face intersecting social and cultural oppressions shaped by societal values, policies, and systems factors that can adversely affect their mental health (Manne, 2018). Moreover, these systemic ideologies may influence the patient-provider relationship, wherein patients feel their providers lack understanding of the structural barriers that shape their

lived experience (Poleshuck et al., 2019). The following section provides a review of the literature relevant to the key concepts in this study.

Discrepancies in Current PND Screening Recommendations and Guidelines

The literature underscores the importance of identifying pregnant and postpartum women with depression and ensuring regular contact with healthcare providers to minimize long-term adverse mental health outcomes (El-Den et al., 2022; Tyokighir et al., 2022). However, PND screening recommendations from national, state, and professional organizations have varied since 2018 in several areas including timing (perinatal vs postpartum), provider' responsibility, screening setting, tools used, and post-screening follow-up and referral processes (El-Den, 2022).

In 2018, the American College of Obstetricians and Gynecologists (ACOG), recommended that obstetricians- and other providers screen patients at least once during the perinatal period and again during the comprehensive postpartum visit. f Validated screening tools, such as the Edinburgh Postnatal Depression Scale (EPDS) and the Patient Health Questionnaire –9 (PHQ-9) was advised for use, and providers were encouraged to initiate appropriate behavioral health treatment when necessary (ACOG, 2018). That same year, the Mental Health Association (MHA) *Perinatal Mental Health Position Statement 49*, advocated for maternal depression screening in obstetric, pediatric, and adult preventive care settings, using tools such as the EPDS and PHQ-9 (El-Den et al., 2022). However, compared to the ACOG, the MHA suggested that mental health professionals should be co-located within the settings where screening is performed to provide immediate evaluation, diagnosis, and treatment of mothers with

positive screening results (El-Den et al., 2022). Unlike ACOG, MHA recommended the co-location of mental health professionals within screening settings to provide immediate evaluation and intervention (El-Den et al., 2022).

While 2018 guidance emphasized comprehensive screening during the perinatal period, recommendations shifted in 2019 to focus primarily on the postpartum and interpregnancy periods (El-Den et al., 2022). In its *Obstetric Care Consensus No. 8 Interpregnancy Care* publication, ACOG in collaboration with the Society for Maternal-Fetal Medicine (SMFM) advised universal depression screening during the interpregnancy period-the time between one pregnancy and the conception of the next (ACOG & SMFM, 2019; Gurmu et al.,2022). Although postpartum screening during well-child visits was mentioned, specific timeframes were not detailed. In contrast, the American Academy of Family Physicians (AAFP) endorsed routine screening during pediatric visits at 1, 2, 4, and 6 months postpartum (Rafferty et al., 2019). AAFP also stressed the importance of effective referral systems, recommending that mothers be connected to a mental health professional, primary care provider, or obstetrician for follow-up care (Rafferty et al., 2019).

As noted earlier, many women do not recognize symptoms of PND as signs of mental illness, resulting in delayed or absent diagnosis and treatment (El-Den et al., 2022). This challenge may have contributed to a shift in 2020 guidelines that reemphasized the role of PND screening in maternal mental health. That year, the American College of Nurse-Midwives recommended that all perinatal clients should be screened for depression and other mental health conditions at least twice during

pregnancy and at regular intervals postpartum (El-Den et al., 2022). However, they did not specify exact timing or recommended tools, adding to the inconsistency in screening practices. This lack of consensus highlights the importance of this study, which seeks to better understand how PND screening is implemented among military spouses

Previous Research Approaches to PND Screening Among Military Populations

Women are at greater risk of experiencing poor mental health in the early postpartum period than at any other time in their lives, which can lead to adverse biological and psychological outcomes for both mother and child (Godier-McBard et al., 2019). While the national prevalence of PND in the civilian population is estimated to range between 5% and 25%, limited data exist on PND prevalence among U.S. military women and military spouses (Gisseman et al., 2021; Godier-McBard et al., 2019). Studies have shown that, both active duty women and civilian military spouses may face additional risk factors, including low social support, frequent relocations, separation from extended family, and single parenting- all of which have been linked to maternal depression (Gisseman et al., 2021; Godier-McBard et al., 2019; Klaman & Turner, 2016; Levine et al., 2015; Spooner et al., 2012). Further, women with more than one child at home and those on active-duty status have been shown to report elevated levels of stress (Gisseman et al., 2021; Mailey et al., 2018; Schachman & Lindsey et al., 2013; Smith et al., 2010).

Although military spouses are increasingly recognized as key indicators of overall family wellness, few recent studies have assessed or addressed their unique perinatal mental health needs (Mailey et al., 2018). Since 2021, only three studies have explored

military-related risk factors for perinatal depression among military spouses (Gisseman et al. 2021; Godier-McBard et al., 2019; Mailey et al., 2018). In a retrospective study examining PND screening among dependent spouses and active-duty women across the Army, Air Force, and Navy, Gisseman et al. (2021) found that while 95 to 97% of patients were screened at the initial perinatal visit, rates dropped 48%-60% by the 28-week appointment. The implementation of a formal screening program was associated with an 18-59% reduction in depression at follow-up visits. Although variations in documentation may have affected results, these findings highlight the essential role of screening as part of obstetric care (Gisseman et al., 2021).

Similarly, a scoping review on perinatal mental health risk among UK military spouses, which included 13 U.S. based studies from 2004 to 2017, identified deployment, limited social/emotional support, and family-related stressors as key PND risk factors (Godier-McBard et al., 2019). Despite structural differences between the U.S. and UK military health systems and the outdated nature of the reviewed studies, the authors emphasized the importance of understanding stressors and emotional health threats facing U.S. military spouses, Mailey et al. (2018) echoed these findings in a mixed-methods study of Army spouses who were surveyed (N = 230 surveyed; N=22 in focus groups) revealing that deployments and the pressure to "do it all" were major barriers to physical activity, nutrition, social connection, and stress management. Although limited to Army spouses, this study underscores the unique mental health challenges faced by military families.

Most existing literature on military populations focuses on postpartum depression in veterans or broader military-related factors such as sexual trauma or intimate partner violence, (Creech et al., 2021; Goger et al., 2022; Nillni et al., 2020, 2022). Few studies address screening disparities across branches or assess how frequent relocation affects perinatal mental health outcomes (Gisseman et al., 2021; Godier-McBard et al., 2019). Additionally, inconsistent guidance on the timing and frequency of PND screening remains a significant barrier to achieving optimum maternal mental health outcomes (El Den et al., 2022). The health of military spouses is intimately connected to family health, making the improvement of their mental health during the perinatal period a public health priority.

Accordingly, this study sought to examine the association between the frequency of PCS, PND screening, and referral to mental health services during the perinatal period among military spouses. The methodology and research design are detailed in Chapter 3.

Chapter 3: Research Method

The purpose of this quantitative study was to examine associations between frequency of PCS, PND screening, and referral to mental health services during the perinatal period among military spouses.

To expand upon current literature regarding this topic, an overview of proposed research is provided. Additionally, Chapter 3 includes a review of the study design and statistical methods, recruitment activities, ethics, and bias concerns, as well as implications for epidemiological advancement and social change.

Research Design and Rationale

Dependent variables were frequency of PND screening and referral to mental health services. Independent variables were frequency of PCS during the perinatal period (i.e., number of relocations during the perinatal period), age, race, level of education, military branch, socioeconomic status, and whether military spouses were deployed during the perinatal period. The following covariates were included as confounders: age, race, socioeconomic status, level of education, and preexisting depression. Additionally, the following effect modifiers were included: military branch of service and deployment status of service members.

To address research questions, I used a cross-sectional design. Cross-sectional studies are observational studies that are used to understand and assess prevalence of health outcomes and describe key characteristics of a population at a single point in time (Wang & Cheng, 2020). The main strength of cross-sectional studies is they are quick and inexpensive to conduct, which is an optimal way to determine prevalence, and can be

used to examine exposures and outcomes (Wang & Cheng, 2020). There are some limitations of cross-sectional studies in terms of inability to assess incidence, study rare diseases, and establish causal inferences (Wang & Cheng, 2020). However, cross-sectional studies are a cost-effective and efficient way to comprehensively provide information about prevalence of outcomes and exposures (Wang & Cheng, 2020). Hence, this study design was used to address differences in terms of PND screening associated with the frequency of PCS, race, military branch, and referral to mental health services.

Methodology

According to the MGH Center for Women's Mental Health (2020), 20-25% of women experience symptoms of depression during pregnancy or the postpartum period. Both active duty and civilian wives of service members may experience factors that contribute to the risk of PND, including low social support due to spousal deployment (Gisseman et al., 2021; Godier-McBard et al., 2019). Furthermore, although the national prevalence of PND in the civilian population is estimated to be between 5 and 25%, Little is known about prevalence of PND among spouses of military servicemembers. They may encounter potential barriers regarding timely and effective maternal mental healthcare screening practices.

Population

The selected population for the proposed study were adult female military spouses ($N = 101$) between 18 and 45 who were pregnant within the last 2 years at the time of survey dissemination.

Sampling and Sampling Procedures

Sampling is the process through which individuals are selected from a sample frame or group of individuals that can be selected from target populations (Martinez-Mesa et al., 2016). To ensure researchers can confidently draw conclusions about their target population that are applicable to the general population, it is imperative to select a sampling strategy that aligns with the study's objective and minimizes sampling bias (Martinez-Mesa et al., 2016). Sampling bias occurs when some members of a population are systematically more likely to be selected than others, which can limit generalizability of study findings (Simundić, 2013). There are two types of sampling frameworks: nonprobability and probability sampling. With nonprobability sampling, individuals are selected based on a nonrandom benchmark; not every individual has a chance of being included in the sample (Martinez-Mesa et al., 2016). Although this method of sampling is simple and cost effective to access, there is a higher risk of sampling bias (Martinez-Mesa et al., 2016). Comparatively, probability sampling ensures every member of the population has an equal chance of being selected in the study; probability sampling techniques are the most valid choice for producing results that are representative of populations (Martinez-Mesa et al., 2016).

I used the stratified sampling method to obtain the sample population. Stratified sampling is a method of random sampling in which researchers divide a population into smaller subgroups or strata based on shared characteristics (Setia, 2016). In the study, shared attributes including age, race, level of education, socioeconomic status, and military branch of service among military spouses were used to screen for PND during

the perinatal period. Advantages of stratified sampling are that it is logical, cost-effective, and saves time (Setia, 2016). Furthermore, stratified sampling can produce more precise estimates than simple random sampling, which can lead to more statistical power (Setia, 2016). However, there are some limitations to this sampling design as well. It can be arduous to organize a population into subgroups if there are too many differences, and there is an increase in sampling errors if the sample does not accurately represent the population (Simkus, 2023).

All participants in this study were military spouses of active duty servicemembers (all branches of service included) between 18 and 45 who had given birth within the last 2 years and experienced PCS at least once during the perinatal period. I excluded nonmilitary spouses or spouses of military veterans, women younger than 18 and over 45, had not given birth within the last 2 years, or did not experience PCS during the perinatal period.

Sample Size and Power Calculations

The process of determining the sample size or power calculation for a study helps in terms of determining the number of participants that are needed to be included in a study to maximize favorable research outcomes (Althubati, 2022). Sample size is determined by the type of statistical analysis for the proposed study, which should align with the study design, study objective, research questions, and primary research outcomes (Althubati, 2022). When comparing two or more groups is required after estimating frequency of a specific characteristic in a population, the calculated sample size should be adjusted to account for types of statistical tests to be used in the comparison (Althubati,

2022). Insufficient sample sizes can impact reproducibility of scientific research (Althubati, 2022). However, an exceptionally large sample size may lead to false positive study results which are deemed significant or favorable even if the effect is not of practical or clinical importance (Althubati, 2022). Therefore, it is imperative researchers focus on choosing appropriate sample sizes that achieve sufficient power and lead to true positives (Althubati, 2022).

Power analysis assists researchers with the minimum sample size needed to detect an effect at a given level of significance (UCLA, 2021). A significance level (alpha) of 0.05 is commonly used, indicating a 5% chance that a statistically significant result may be incorrect (Sedar et al., 2021). While the p value determines whether statistical effect exists, it does not indicate the magnitude of that effect. Effect size is a crucial measure of quantitative research, typically interpreted using Cohen's criteria: d = 0.2(small), 0.5 (medium), and 0.8 (large) (Sullivan & Feinn, 2012). Therefore, both statistical significance (p- value) and practical significance (effect size) must be considered when reporting findings (Sullivan & Feinn, 2012).

Power analysis is also relevant to hypothesis testing, helping researchers minimize two types of errors: Type 1 error (false positive, when the null hypothesis is wrongly rejected) and Type II error (false negative, when a false null hypothesis fails to be rejected (Serdar et al., 2021). Larger sample sizes increase the likelihood of achieving statistical significance, while smaller sample sizes raise the risk of Type II errors, especially when the effect size is small to moderate (Serdar et al., 2021).

For this study, the G*Power statistical software was used to determine the required minimum sample size. The power level was set at 85%, with an alpha level of 0.05. Sample size limitations have been identified in prior studies for military populations. For instance, Klaman and Turner (2016) reviewed 10 studies examining the prevalence of PND among military women and spouses; three of the studies included fewer than 100 participants, regardless of whether they used longitudinal or cross-sectional designs (Appolonio et al., 2008; O'Boyle et al., 2005; Schachman & Lindsey, 2013). Although a more recent study assessing PND screening among military populations had a robust sample size (n= 4,441), the authors did not report the effect size (Gisseman et al., 2021).

Effect size estimates can be based on similar published work or on what is considered a meaningful difference by practitioners and researchers (Sullivan & Feinn, 2012). Research has shown that a medium effect size of 0.5 and a large effect size of 0.8 indicates practical significance of a research outcome (Sullivan & Feinn, 2012). Due to the findings from the systematic review and the limited current research studies evaluating PND among military spouses, a medium effect size of 0.5 was used in this study, reflecting a balance between practical significance and feasibility. Based on G*Power calculations using a two-tailed test, a power of 85%, an alpha of 0.05, and an effect size of 0.5, the minimum required sample size was determined to be 101 participants.

Procedures for Recruitment, Participation, and Data Collection

Several recruitment strategies were used to recruit potential participants for this study, including social media outreach, and community engagement, A flyer was developed (Appendix, A) that included a brief description of the study's purpose, informed consent information, participating instructions, and researcher contact details. This flyer was shared with administrators of military spouse- affiliated Facebook groups (i.e., San Diego Military Spouses Group, San Antonio Military Wives) to obtain approval for official posting on their group pages. Additionally, local community organizations frequented by military spouses –such as military bases and military spouse support organizations- were contacted via phone and in person to request permission to post the recruitment flyer and survey link on their websites and at physical locations on base.

Upon approval from the Facebook group administrators, the flyer was posted directly to each group page. It included a QR code linked to the online survey to prevent ineligible individuals from participating, and the survey incorporated eligibility screening questions. For example, the first question asked whether the respondent was the spouse of an active-duty service member. If a respondent met the inclusion criteria, they were directed to review the informed consent form. If they did not meet the criteria, they were shown a message thanking them for their time and were exited from the survey.

Participants who agreed to the terms of consent were taken directly to the full survey. Those who declined were also thanked and exited from the survey platform. Data were collected using an online questionnaire (Appendix B), which allowed eligible participants to document their experiences with PND screening during the perinatal

period. The survey consisted primarily of multiple-choice questions and included open-ended questions at the end to capture additional insights.

Testing for Validity and Reliability in Survey and Questionnaire Research

The primary objective of utilizing a questionnaire in research is to collect relevant information in a valid and comprehensive manner (Bolarinwa, 2015). Accordingly, the accuracy and consistency of the survey instrument represent a key component of research methodology, referred to as validity and reliability (Bolarinwa, 2015). Validity measures the extent of systematic or built-in errors in a questionnaire, and how accurately the collected data reflects the actual construct under investigation (Bolarinwa, 2015). There are four primary types of validity: criterion validity (including predictive, concurrent, and postdictive validity), face validity, content validity, and construct validity (including discriminant and convergent validity) (Taherdoost, 2016). The validity of a questionnaire may be by convening a panel of experts to evaluate its theoretical constructs, which is applicable for establishing face and content validity (Taherdoost, 2016). Validity may also be assessed by comparing the results of the instrument with those of another established measure or field test to determine how well it correlates with external criteria-examples of criterion-related and construct validity (Taherdoost, 2016). This study employed content validity and criterion-related predictive validity to assess the survey's validity. Content validity refers to the degrees to which the items on a measurement instrument are relevant and representative of the target construct (Taherdoost, 2016). This form of validity typically involves expert panel evaluations to ensure essential items are appropriately included in newly developed instruments. Given that the current study

utilized a newly developed survey, content validity was an appropriate method for validation. Criterion-related predictive validity was also employed to assess how well the survey predicted relevant outcomes. This form of validity is achieved when the instrument accurately forecasts performance or behavior in a future context, and it is commonly used in regression analyses (Taherddost, 2016). As this study utilized logistic regression to assess its outcomes, the use of predictive validity was justified.

Reliability refers to the consistency of an instrument in producing the same results under consistent conditions (Bolarinwa, 2016). It reflects the degree to which a respondent's scores would remain stable over time (Bolarinwa, 2016). Testing for reliability is essential to ensure consistency across items within a measuring instrument (Bolarinwa, 2016). In this study, internal consistency reliability was evaluated to assess the degree to which survey items measured the same underlying construct (Tavakol & Dennick, 2011). Cronbach's alpha was calculated to assess the internal consistency. According to Gliem and Gliem (2003), Cronbach's alpha coefficient of 0.70 or higher is considered acceptable for establishing reliability in social science research. This method aligns with this study's framework, offering a rigorous means of evaluating reliability without requiring a pilot study. As this study was the first to explore the association between frequency of PCS, frequency of PND screening, and referral to mental health services among military spouses during the perinatal period, the use of Cronbach's alpha was deemed appropriate.

Reliability can be assessed through three approaches: test-retest reliability, alternate-form reliability, and internal consistency reliability (Bolarinwa, 2016). The

current study used internal consistency as the method of choice. Among internal consistency measures, Cronbach's alpha is widely recognized as the most appropriate reliability indicator, especially when using Likert scale items (Bolarinwa, 2016). Recommended cut-off points for Cronbach's alpha include: r excellent reliability (≥ 0.90 a), high reliability (0.70-0.90), moderate reliability (0.50-0.70), and low reliability (< 0.50) (Taherdoost, 2016). For exploratory research, reliability should meet or exceed 0.60 (Taherdoost, 2016). The Cronbach's alpha value for this study's survey instrument met the minimum threshold recommended for new exploratory research instruments.

Instrumentation and Operationalization of Constructs

The dependent variables in this study were the frequency of PND screening and referral to mental health services., while the primary independent variable was frequency of PCS during the perinatal period- defined as the number of times a spouse relocated during the pregnancy or postpartum. The operationalization of all study variables is described below, and an overview is provided in Table 1.

Dependent Variables

Participants were asked about their experiences with PND screening during the perinatal period and whether they received referrals to mental health services following a PND diagnosis. For the variable 'PND screening,' respondents were asked the following questions: 1) "Have you been screened for PND during the perinatal period (Yes/No)? According to Olds et al. (2004), antepartum is defined as the time between conception and the onset of labor, usually used to describe the period during which a woman is pregnant. Comparatively, postpartum is defined as the period that begins soon after the

delivery of the baby and usually lasts six to eight weeks and ends when the mother's body has nearly returned to its pre-pregnant state (Lopez-Gonzalez & Kopparapu, 2022). Additionally, the perinatal period is defined as the period surrounding childbirth, including both pregnancy and the postpartum phase (Garcia & Yim, 2017). This variable was operationalized as a screening' was a dichotomous-nominal variable.

Furthermore, for the dependent variable 'referral to mental health services,' all participants were asked the following questions: 1) Were you diagnosed with PND by a health professional at any time during the perinatal period? "If you were diagnosed with PND during the perinatal period, did the health professional refer you to mental health services? This variable was also operationalized as a dichotomous-nominal variable.

Independent Variables

In the developed survey, for the independent variable 'frequency of PCS,' all participants were asked the following question: "How many times during the perinatal period did you and your family PCS? According to Military One Source (2023), permanent change of Station (PCS) is defined as the transfer of a service member and or spouse to a different armed services duty station for two to four years. A PCS move can be a move between one duty station and another or between your final duty station and home of record upon retirement or discharge. This variable was operationalized as an ordinal variable.

Confounders/Socioecological Factors

The CDC's social ecological model discusses the interactive relationship between the individual, interpersonal, community, and societal factors that impact health

outcomes (CDC, 2015). Factors impacting health outcomes supported in this framework include characteristics such as age, race, socio-economic status, social circle, community institutions, and cultural and social ideologies (CDC, 2015). Furthermore, a confounder is a variable whose presence affects the variables being studied so that the results do not reflect the actual relationship (Pourhoseingholi, 2012). In the survey, age, socioeconomic status, race, level of education, and pre-existing depression were deemed confounders and socioecological factors that could impact the results of this study. The age of participants was obtained from a question asking adult participants if they were at least 18 years of age at the time of the survey. The operation of age was an ordinal variable. Participants' socioeconomic status was ascertained by asking, "Which category best describes your total yearly household income before taxes? Socioeconomic status was an ordinal variable in this study. The classification of the variable race would be ascertained by asking the following question: "What race/ethnicity best describes you? Race is a nominal variable. Participants' level of education was ascertained by asking, "What is the highest level of education that you have completed? Education was an ordinal variable in this study. Finally, the confirmation of pre-existing depression diagnosis will be ascertained by asking the following question: "Do you have a history of depression or other mental health illness? Pre-existing depression is a nominal-dichotomous variable.

Effect Modifiers and Military-Related Lifestyle Factors

Research on depression in military populations has demonstrated that both active duty and civilian spouses of servicemembers experience unique stressors that increase the risk of PND. These stressors include lack of social support, frequent relocations, spousal

deployment, and geographic separation from extended family (Gisseman et al., 2021; Godier-McBard et al., 2019, Klaman & Turner, 2016; Levine et al., 2015; Spooner et al., 2012).

An effect modifier is a variable that differentially influences the associations between an exposure and an outcome, either positively or negatively, depending on its level (Corraini et al., 2017). In this context, certain military-related lifestyle factors-such as the military branch of services and the deployment status of the servicemember-may modify the relationship between the frequency of PCS and the likelihood of PND screening or referral to mental health services. In this study, the selected effect modifiers included military branch of service, and the deployment status of the servicemember. For the variable 'military branch of service,' all participants were asked the following question: "In which branch of the United States Armed forces is your spouse currently serving? Furthermore, for the variable, 'deployment status of servicemember," the participants were asked the following questions: 1) "Was your spouse (servicemember) deployed anytime during the perinatal period (Yes/No)? Both variables- 'military branch of service,' and deployment status- were measured as nominal variables in this study.

Table 1

Description of Operational Measures for Key Dependent and Independent Variables

Variables	Description/Specific Measures	Response Category	Type of Variable
Dependent Variables			
PND Screening	Have you been screened for PND	1=Yes 2=No	Dichotomous-Nominal

Variables	Description/Specific Measures	Response Category	Type of Variable
	during the perinatal period?		
Referral to mental health services	If you were diagnosed with PND during the perinatal period, did your provider refer you to mental health services?	1=Yes 2=No	Dichotomous-Nominal
Independent Variables			
Frequency of PCS	How many times during the perinatal period did you and your family PCS?	1=1 2=2-3 3=4 or more 4=None	Ordinal
Confounders/ Socioecological Factors			
Age	Baseline age (yr.)	*<20 20–24 25–29 30–34 ≥35	Ordinal
Race	What race do you identify with?	1=White 2=Black/African American 3=American Indian/Alaskan Native 4=Native Hawaiian/Other Pacific Islander 5=Asian 6=Multiracial	Nominal
Education	What is the highest level of education that you have completed?	1=Some high school, but no diploma 2=High school diploma (or GED) 3=Some college, but no degree	Ordinal

Variables	Description/Specific Measures	Response Category	Type of Variable
		4=2-year college degree 5=4-year college degree 6=Graduate-level degree 7=None of the above	
Socio-economic status	Which category best describes your total yearly household income before taxes?	1=Less than $9,999 2=$10,000–$19,999 3=$20,000–$49,000 4=$50,000–$99,999 5=$100,000–$149,999 6=More than $150,000 7=Do not know 8=Choose not to answer	Ordinal
Pre-existing Depression	Do you have a history of depression or other mental illnesses?	1=Yes 2=No	Dichotomous-Nominal
Effect Modifiers/Military Related Lifestyle factors			
Military Branch	In which branch of the United States Military is your spouse currently serving?	1=Navy 2=Army 3=Air Force 4=Marine Corps 5=Coast Guard	Nominal
Deployment status of servicemember	Was your spouse (service member) deployed at any time during the perinatal period?	1=Yes 2=No	Nominal

*The age range selected for this study is based on similar military population demographic dated captured in Gisseman et al. (2021)

*Household income range was based on Survey Monkey and Carnegie Mellon University guidelines on how to ask income survey questions

Data Analysis Plan

In this study, I used the Statistical Package for the Social Sciences (SPSS) Version 29.0 software for Microsoft Windows to perform statistical analysis in the form of logistic regression to answer the research questions. In addition, descriptive statistics were used to describe features of the data points in this study.

The following four research questions and hypotheses guided this quantitative study to examine the association between the frequency of PCS, PND screening, and referral to mental health services during the perinatal period among military spouses:

RQ1: What is the association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$1: There is no association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a1: There is an association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ2: What is the association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$2: There is no association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a2: There is an association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education and socioeconomic status.

RQ3: What is the association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$3: There is no association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a3: There is an association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ4: What is the association between frequency of PCS and PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression?

$H_0$4: There is no association between frequency of PCS and PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

H_a4: There is an association between frequency of PCS and timing of PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

Overview of Data Cleaning and Screening Procedures

Datasets often require tailored techniques for data cleaning, a process that can become complex due to the inevitability of identifying errors after data collection (Bhandari, 2022). It is therefore essential to systematically address and resolve issues such as missing values, outliers, and irrelevant data points to ensure the integrity and accuracy of the dataset (Bhandari, 2022). The following data cleaning workflow was implemented to ensure an data accuracy: 1) data validation techniques were applied to prevent erroneous data entry , 2)the dataset was screened for errors or inconsistencies, 3) suspect entries were diagnosed , 4) codes were created to map data to valid values, and 5) data were transformed according to standardized procedures (Bhandari, 2022). Each

variable was represented in a separate column, each case in a row, and empty rows were removed (Bhandari, 2022). Additionally, descriptive statistics and visualizations- such as scatterplots and boxplots- were used to detect potential outliers and assess data distribution. Normality was evaluated, and descriptive summaries were generated for each variable, including the use of frequency tables to organize and present quantitative data.

Overview of Measures and Interpretations of Associations and Parameter Estimates

The selection process for measures of association begins with the univariate analysis of each variable. Additionally, variables that result in a significant univariate test will be a contender for multivariate analysis; this is based on the Wald test logistic regression with a p-value of 0.05 (Aguiar et al., 2011). In the study, covariates were removed from the model if they were non-significant and not a confounder. Research has shown that significance is evaluated at the 0.1 alpha level and confounding as a change in any remaining parameter estimate greater than 15% or 20% as compared to the full model (Aguiar et al., 2011). Therefore, any change in a parameter estimate above the specified level indicates that the excluded variable was essential and provided a needed adjustment for one or more of the variables remaining in the model. Furthermore, any variable not selected for the original multivariate model is added back one at a time, with significant covariates and confounders retained earlier (Aguiar et al., 2011). Additionally, it is this step that aids in identifying variables that by themselves are not significantly related to the outcome but make an important contribution in the presence of other variables. Hence, any variables significant at the 0.1 or 0.15 level are put in the model, and the

analysis follows the preliminary main effects model (Aguiar et al., 2011). Furthermore, it is also important to select the appropriate measures to assess the strength of the relationship between the proposed variables. Since the study aimed to assess the relationship between a continuous (independent) and ordinal (dependent) variable, *Kendall's coefficient of rank correlation tau-sub-b, τb* is the best measure (Khamis, 2008). For example, if the two variables are denoted by X(continuous) and Y (ordinal), then the levels of Y can be numerically coded to align with the order of the levels. Next, Kendall's τb uses the numerical values of X and the coded numerical values of Y to generate a number (coefficient) between –1 and +1 that measures the strength of relationship between X and Y (Khamis, 2008).

Threats to Validity

There are several threats to validity that may cast doubt on a researcher's ability to infer that the manipulated variable (s) of interest affects an outcome instead of another factor (Creswell & Creswell, 2018). Hence, it is imperative that researchers identify and minimize potential threats to validity when designing studies to ensure that study outcomes are valid (Creswell & Creswell, 2018). There are two types of threats to validity: internal threat and external threat. Internal threats of validity refer to the study's experimental design, methods, and experiences of the participants that threaten the researcher's ability to conclude valid inferences from the data about the population in a study (Creswell & Creswell, 2018). Therefore, threats to internal validity compromise the causal relationship between variables and reduce the confidence that the independent variable is responsible for the dependent variable. Comparatively, threats to external

validity compromise the results' generalizability to other people, places, or times. (Creswell & Creswell, 2018. An internal and external threat of validity in the study was selection bias. Selection bias can occur when individuals have different probabilities of being included in the study sample according to relevant study characteristics (Szklo & Nieto, 2019). Selection bias affects the internal validity of an analysis by leading to inaccurate estimation of relationships between variables; it also can affect the external validity of an analysis because the results from a biased sample may not be generalizable to the population (Shringarpure & Xing, 2014). Research has shown that some of the best ways to minimize selection bias are to use randomization and increase the sample size (Tripepi et al., 2010). This study used a type of probability sampling strategy called the stratified sampling method so that characteristics have the probability of being equally distributed among the selected groups.

Ethical Considerations and Informed Consent

Ethical considerations in research represent a set of guiding principles that inform research design and practice (Fleming & Zegwaard, 2018). Researchers are expected to adhere to established codes of conduct when collecting data from human participants. The objectives of human research often include understanding real-life situations, studying effective treatments, investigating behaviors, and improving health outcomes (Fleming & Zegwaard, 2018). Overall, the decision regarding how to conduct research involves key ethical considerations. These considerations work to protect the rights of research participants, enhance research validity, and maintain scientific integrity (Fleming & Zegwaard, 2018). To ensure ethical integrity, this study complied with the

Institutional Review Board's (IRB) three core principles of human subject protection: respect for persons, beneficence, and justice (The University of Edinburg, 2022). An ethical assessment was conducted to identify any research activities that could potentially pose undue risk to participants. Based on this assessment, the study either confirmed the absence of foreseeable harm or where risks were identified, incorporated strategies to mitigate, reduce, or prevent those risks in accordance with IRB standards.

The foundation of ethical research is informed consent. Participants must be fully informed of what will be asked of them, how the data will be used, and what (if any) consequences there could be (Fleming & Zegwaard, 2018). Additionally, participants must provide explicit, active, signed consent to take part in the research, including understanding their rights to access their information and the right to withdraw at any point (Fleming & Zegwaard, 2018). The study adhered to the Walden University IRB's ethics review and approval process before participant recruitment, data collection, or data access was initiated (Walden University, n.d.). Furthermore, all aspects of this study were conducted in alignment with the ethical principles set forth in the1964 Declaration of Helsinki (Fleming & Zegwaard, 2018). Informed consent was obtained electronically. Participants confirmed their consent by checking a box indicating that they had read the study information and agreed to participate in the questionnaire. The questionnaire also included participant information and a debriefing section with instructions on how to contact the researcher for additional details and clarification.

Ethical Concerns Related to Recruitment and Data Collection

The use of social media provides an optimal opportunity for an array of information to become publicly accessible, including the availability of research studies (Ferrigno & Sade, 2019). However, protecting the confidentiality and privacy owed to research participants can become challenging to meet within the arena of social media, as compared to institutional databases and highly secured electronic medical records (Ferrigno & Sade, 2019). The study used several recruitment strategies to engage eligible participants. Specifically, study advertisements were posted in several military spouse Facebook groups and included information about the study's purpose, the informed consent, and participation procedures. Data was collected using an online survey, enabling participants to document their experiences related to PND screening. To ensure appropriate ethics oversight, the study properly executed the informed consent process and provided transparent and comprehensive study guidelines to protect vulnerable subjects (Walden University, n.d.).

Confidentiality, Data Storage Procedures, and Conflicts of Interest

In epidemiological research, the research design needs to consider the potential harm to the participants, the researcher, the wider community, and the institution (Ferrigno & Sade, 2019). Furthermore, the harm can range from physical or resource loss to emotional or reputational pain. It is also imperative that the identity of participants is kept confidential or anonymous, and the assurances extend beyond protecting their names to also include the avoidance of using self-identifying statements and information (Ferrigno & Sade, 2019). In this study, participant identities remained anonymous, and

the researcher did not have access to personally identifiable information. All data were de-identified, with personal identifiers removed during collection and encrypted for secure storage in a protected database. It is also important that researchers involved in human research do not have or appear to have a conflict of interest, including a financial interest related to any of the studies in which they participate (World Health Organization, 2016). Existing relationships or prior activities by the researcher can potentially create a conflict of interest that must be transparently reported on within an ethics approval application so the committee can guide how to manage this conflict of interest (Ferrigno & Sade, 2019). Additionally, although it is common for researchers to have business interests in addition to their academic activities, these activities may impact research involving external stakeholders with similar business interests (Ferrigno & Sade, 2019). To prevent the occurrence of conflict of interest, all external stakeholder information was verified before participating in the study.

Summary

Chapter 3 included information about the methodology for this study. I examined associations between frequency of PCS, PND screening, and referral to mental health services during the perinatal period among military spouses. Furthermore, I used descriptive statistics and logistical regression to answer research questions. I used a quantitative cross-sectional approach with primary data that was collected using Facebook. In Chapter 4, I present results and findings from analysis.

Chapter 4: Results

The purpose of this quantitative study was to examine associations between frequency of PCS, PND screening (whether screening was conducted), frequency of PND screening (number of times screening occurred), and referral to mental health services during the perinatal period among military spouses. I specifically explored how frequency of PND screenings as either a dichotomous outcome or as a frequency measure varies in terms of PCS frequency, as well as how both factors influence referral to mental health services among military spouses who are diagnosed with PND.

Research Questions and Hypotheses

The study was guided by four primary research questions. However, during the data analysis phase, I expanded the number of research questions from four to eight to further explore variables. Primarily, this was driven by the exploratory nature of research and acknowledgement that both the act and frequency of PND screening led to meaningful insights regarding experiences of military spouses during the perinatal period.

As a result, RQ1, RQ2, RQ3, and RQ4 were originally proposed, which involved using PND screening as the primary dependent variable. RQ5, RQ6, RQ7, and RQ8 were added subsequently during the analysis phase to examine the same relationships using frequency of PND screening as an additional dependent variable. This allowed for a more comprehensive understanding of the constructs under study and ensured PND screening was conducted, and frequency was assessed among this population.

The following eight research questions and hypotheses guided this quantitative study:

RQ1: What is the association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$1: There is no association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a1: There is an association between frequency of PCS and PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ2: What is the association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$2: There is no association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a2: There is an association between frequency of PCS and PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education and socioeconomic status.

RQ3: What is the association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$3: There is no association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a3: There is an association between frequency of PCS and PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ4: What is the association between frequency of PCS and PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression?

$H_0$4: There is no association between frequency of PCS and PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

H_a4: There is an association between frequency of PCS and timing of PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

RQ5: What is the association between frequency of PCS and frequency of PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$5: There is no association between frequency of PCS and frequency of PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a5: There is an association between frequency of PCS and frequency of PND screening during the perinatal period amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ6: What is the association between frequency of PCS and frequency of PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$6: There is no association between frequency of PCS and frequency of PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a6: There is an association between frequency of PCS and frequency of PND screening during the perinatal period modified by military branch of service amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ7: What is the association between frequency of PCS and frequency of PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status?

$H_0$7: There is no association between frequency of PCS and frequency of PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

H_a7: There is an association between frequency of PCS and frequency of PND screening during the perinatal period modified by deployment status of servicemember amongst military spouses, while controlling for race, age, level of education, and socioeconomic status.

RQ8: What is the association between frequency of PCS and frequency of PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression?

$H_0$8: There is no association between frequency of PCS and frequency of PND screening during the perinatal period and referral to mental health services amongst military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

H_a8: There is an association between frequency of PCS and frequency of PND screening during the perinatal period and referral to mental health services amongst

military spouses diagnosed with PND, while controlling for race, age, level of education, socioeconomic status, and pre-existing depression.

To expand upon current literature regarding potential associations between frequency of PCS and timing and frequency of PND screening and referral to mental health services during the perinatal period, an overview of data collection methods, results, and study findings is provided.

Data Collection

I began data collection on May 21, 2024, by utilizing social media, community outreach, and asking organizations to share my study flyer (Appendix A). The flyer was shared with 25 Facebook administrators for military spouse affiliated Facebook groups (i.e., San Diego Military Spouses Group, San Antonio Military Wives) to garner their approval to officially post this flyer on these pages to recruit participants. Additionally, I contacted local community organizations frequented by military spouses (i.e., military bases, military spouse support organizations) via phone and in person to post the flyer and survey link to their website and on the military base. A total of 117 participants responded to the survey with a response rate of 95%. Data collection concluded on August 21, 2024. I contacted a total of 45 Facebook pages/groups, but due to concerns raised by several group administrators who viewed the posts as intrusive and aligned with multi-level marketing, I was only granted permission to post on 25 pages. This limited reach highlights the challenges faced when engaging with online communities without prior relationship building or endorsement from group gatekeepers. Operating as a sole researcher meant I had to navigate all aspects of outreach and quickly respond to

feedback without the support of a larger research team. Furthermore, the concerns from group administrators resulted in reduced access to potential participants, as many administrators were cautious about the nature of the study. This experience suggests that future studies may benefit from initial outreach and relationship-building with community leaders to secure broader access and trust, which is particularly critical when conducting sensitive research in close-knit communities.

Descriptive Statistics

Descriptive statistics were calculated for all key study variables, including participant demographics, PCS frequency, deployment status, and PND screening outcomes (see Table 2).

Table 2

Demographic Characteristics of Study Participants

Variable	Frequency (n)	Percentage (%)
Total Participants	117	100%
Mean Age (SD)	28.47 (3.51)	—
Military Branch	—	—
Army	19	16.2%
Navy	62	53.0%
Air Force	11	9.4%
Marines	22	18.8%
Coast Guard	3	2.6%
Deployment Status	—	—
Deployed	31	26.5%
Not Deployed	86	73.5%
Household Income	—	—
$15,000–$29,999	4	3.4%
$30,000–$49,999	29	24.8%
$50,000–$74,999	47	40.2%
$75,000–$99,999	18	15.4%
$100,000–$150,000	14	12.0%
Over $150,000	5	4.3%

Variable	Frequency (n)	Percentage (%)
Education Level	—	—
High school diploma (or GED)	8	6.8%
Some college, but no degree	16	13.7%
2-year college degree	12	10.3%
4-year college degree	60	51.3%
Graduate-level degree	21	17.9%
Race/Ethnicity	—	—
Asian/Pacific Islander	3	2.6%
Black or African American	12	10.3%
Hispanic	10	8.5%
White/Caucasian	92	78.6%
Spanish/Hispanic/Latino Origin	—	—
No, not Spanish/Hispanic/Latino	102	87.2%
Yes, Spanish/Hispanic/Latino	15	12.8%
History of Depression or Mental Illnesses	—	—
Yes	80	68.4%
No	37	31.6%

Table 2 presents the demographic characteristics of the sample. The sample consisted of 117 participants, with a mean age of 28.47 (SD = 3.51). Approximately **53%** of participants were spouses of Active- Duty servicemembers in the Navy. Household income data shows that most participants earned between $50,000 and $74,999 (40.2%), and 51.3% of participants had completed a 4-year college degree. Regarding race/ethnicity, most participants identified as White/Caucasian (78.6%), with a 68.4% prevalence of a history of depression or mental illness. Furthermore, with regards to deployment history, 73% of participants had spouses who had been deployed during the perinatal period.

Table 3

Specific Variables of Interest

Variable	Frequency (n)	Percentage (%)
PND Diagnosis During the Perinatal Period		
No	89	76.1%
Yes	28	23.9%
PCS Moves		
1 Move	99	84.6%
2-3 Moves	18	15.4%
Mental Health Referral		
No	91	77.8%
Yes	26	22.2%
PND Screening During the Perinatal Period		
No	37	31.6%
Yes	80	68.4%
Frequency of PND Screening During the Perinatal Period		
1 Time	78	66.8%
2-3 Times	20	17.1%
4 or More Times	19	16.2%

Table 3 presents the primary study variables. Regarding PCS moves, 84.6% of participants reported experiencing 1 PCS move, and 15.4% reported 2-3 PCS moves. Concerning deployment status, 73.5% of participants reported that their spouses had not been deployed during the perinatal period. Regarding PND diagnosis, 23.9% of participants were diagnosed with PND during the perinatal period, and 77.8% of participants were not referred to mental health services. Lastly, 68.4% of participants were screened for PND, with the majority being screened once (66.8%).

Discussion on Representation of Sample

In quantitative research, external validity refers to the extent to which study findings can be generalized to the study's broader population. Since this study utilized a stratified sampling approach, efforts were made to ensure that the sample was proportionally representative of key subgroups within the military spouse population. Stratified sampling is an effective technique for improving external validity by ensuring adequate representation across predefined categories, such as military branch, race/ethnicity, income level, and PCS frequency (Creswell & Creswell, 2018). Furthermore, by using stratified sampling, this study aimed to capture diverse experiences within the military spouse population, reducing sampling bias, and enhancing the generalizability of findings. However, while stratification improves representation, limitations may still exist in terms of the extent to which the sample mirrors the full diversity of military spouses nationwide (DoD, 2021).

Comparison with the Larger Population of Military Spouses

In this study, most participants were spouses of Active-Duty servicemembers in the Navy (53%), with smaller proportions from the Army (16.2%), Marines (18.8%), Air Force (9.4%), and Coast Guard (2.6%) (Table 2). According to the Department of Defense's (DoD) Demographic Profile of the Military Community (2021), military branch distributions among spouses vary, with Army and Air Force spouses typically comprising larger proportions of the military spouse population compared to the Navy and Marine Corps. Hence, the overrepresentation of Navy spouses in this study may indicate that findings are more applicable to this group (DoD, 2021).

Table 3 shows that approximately 84.6% of participants reported one PCS move, and 15.4% had two or more moves. The DoD's Annual Demographics Report (2021) states that military families undergo PCS moves every two to three years on average, with variations depending on rank, branch, and job specialty. While the sample captures a typical PCS experience, it may not fully represent spouses with frequent relocations (DoD, 2021).

According to Table 2, 26.5% of participants in this study reported that their spouse had been deployed during the perinatal period. Previous research suggests that deployment rates fluctuate based on military operations, with combat-related deployments more common among Army and Marine Corps families (Burrell et al., 2006). The RAND Corporation's study on military family well-being found that deployment rates among military spouses vary based on mission requirements, duty station, and unit-specific factors (RAND, 2021).

Demographic Characteristics

The sample was predominantly White/Caucasian (78.6%), with smaller representation of Black or African American (10.3%), Hispanic (8.5%), and Asian/Pacific Islander (2.6%) participants (Table 2) The DoD Demographics Report (2021) notes that while military spouses tend to be predominantly White (around 70-75%), the growing diversity in the Active-Duty military population suggests that racial and ethnic minority spouses may be underrepresented in this study (DoD, 2021). According to Table 2, most participants reported earning between $50,000 and $74,999 (40.2%), aligning with military pay scales and allowances for mid-career servicemembers

(DoD, 2021). However, higher-income military families may be underrepresented, particularly those with dual-income households or senior enlisted/officer ranks (Hosek et al., 2002).The education level of participants was relatively high, with 51.3% holding a 4-year college degree and 17.9% having graduate-level education (Table 2).While military spouses tend to have higher education levels than their civilian counterparts, barriers to employment and career advancement remain significant challenges (Maury & Stone, 2014).

Implications

Military Branch Representation

The sample included spouses from all five military branches, with the majority being Navy spouses (53%), followed by Army (16.2%), Marines (18.8%), Air Force (9.4%), and Coast Guard (2.6%) (see Table 2). According to the Department of Defense's (DoD) Demographic Profile of the Military Community (2021), the Army and Air Force typically have larger proportions of spouses, meaning that the overrepresentation of Navy spouses in this study may influence generalizability (DoD, 2021). However, the use of stratified sampling helped mitigate severe disproportionality, ensuring that multiple military branches were included.

PCS Moves

The study sample captured a range of PCS experiences, with 84.6% reporting one PCS move and 15.4% reporting multiple moves (see Table 3). According to the DoD's Annual Demographics Report (2021), many military families undergo PCS moves on an average of every two to three years with variations depending on rank and branch. Hence,

the study's distribution aligns with PCS trends in the general military spouse population (DoD, 2021).

Deployment History

In this study, 26.5% of participants reported that their spouse had been deployed during the perinatal period (see Table 2). Previous research suggests that deployment rates can vary due to military operations, with combat-related deployments more common among Army and Marine Corps families (Burrell et al., 2006). The RAND Corporation's study on military family well-being found that deployment rates among military spouses vary based on mission requirements, duty station, and unit-specific factors (RAND, 2021). Given the strategic use of stratified sampling, the study accounts for both spouses with and without deployment-related experiences, ensuring balanced representation of deployment-related stressors in the analysis.

Demographic Characteristics

The sample was predominantly White/Caucasian (78.6%), with smaller representation of Black or African American (10.3%), Hispanic (8.5%), and Asian/Pacific Islander (2.6%) participants (see Table 2). According to the DoD Demographics Report (2021), while military spouses tend to be White (around 70-75%), the expansion of diversity within Active-Duty military population infer that racial and ethnic minority spouses may be underrepresented in this study (DoD, 2021). The use of stratified sampling ensured some diversity was captured, but future studies could increase representation of minority groups.

In addition, most participants reported earning between $50,000 and $74,999 (40.2%) (see Table 2), aligning with military pay scales and allowances for mid-career servicemembers (DoD, 2021). However, higher-income military families may be underrepresented, particularly those with dual-income households or senior enlisted/officer ranks (Hosek et al., 2002). Furthermore, higher-income military families may be slightly underrepresented due to limitations in recruitment strategies. Furthermore, the education level of participants was high, with 51.3% obtaining a 4-year college degree and 17.9% having graduate-level education (see Table 2). While military spouses tend to have higher education levels than their civilian counterparts, barriers to employment and career advancement remain significant challenges (Maury & Stone, 2014). Hence, which is why education level remains an important variable to consider (Maury & Stone, 2014).

Implications for Generalizability

Although the sample reflects many characteristics of the broader military spouse population, certain subgroups may be overrepresented (e.g., Navy spouses, higher education levels) or underrepresented (e.g., minority groups, higher-income families, frequent PCS movers). These findings should be interpreted with caution when generalizing to the entire military spouse population, as the sample may not fully reflect the experiences of all racial/ethnic backgrounds, ranks, and duty stations (Creswell & Creswell, 2018). However, since stratified sampling was used, this study improves external validity compared to simple convenience sampling by ensuring that key subgroups are adequately represented. In addition, this study provides valuable insights

into the experiences of military spouses navigating PCS moves and perinatal mental health challenges. To strengthen external validity, future research could compare this sample to Department of Defense (DoD) demographic reports on military families, which could provide further validation of representativeness and improve the generalizability of findings (DoD, 2021). Furthermore, the expansion of recruitment efforts to reach underrepresented groups (e.g., spouses of junior enlisted servicemembers, racial/ethnic minorities, and higher-income families) could also be explored to add a more comprehensive lens of military populations.

Table 4

Logistic Regression Predicting PND Screening by PCS Frequency

Predictor	β (SE)	Wald χ^2 / t	p-value	OR (95% CI)
PCS Frequency	0.70 (0.25)	5.10	.03*	2.01 (1.15–3.50)
Race	0.05 (0.28)	0.04	.84	1.06 (0.61–1.84)
Age	-0.10 (0.07)	1.96	.16	0.90 (0.78–1.05)
Education	0.15 (0.22)	0.47	.49	1.17 (0.76–1.80)
Income	-0.04 (0.24)	0.03	.85	0.96 (0.61–1.52)

Note. Results reflect the analysis for Research Question 1. *p* < .05.

To address RQ1, a logistic regression analysis was conducted to examine the association between PCS frequency and PND screening. As shown in Table 4, the model explains 25% of the variance in PND screening (Nagelkerke $R^2 = 0.25$), indicating that PCS frequency is a significant predictor of PND screening. The classification accuracy of

the model is 75%, meaning it correctly predicts PND screening outcomes in 75% of the cases.

Furthermore, in Table 4 as it relates to statistical significance, the Omnibus Test p-value = 0.02 suggests that the overall model significantly predicts PND screening, confirming the applicability of the independent variable, PCS frequency, in predicting the likelihood of screening for PND. The coefficient for PCS frequency is 0.7 (p = 0.03), which indicates that each additional PCS move doubles the chances of being screened for PND (odds ratio = 2.01, 95% CI = 1.15 - 3.50). This means that military spouses who experience more frequent PCS moves are significantly more likely to be screened for PND. Furthermore, the control variables used in this analysis, which included race (p=0.84); age (p=0.16), income (p=0.853), and education (p=0.49), did not significantly contribute to predicting PND screening after accounting for PCS frequency.

In conclusion, the findings indicate more frequent PCS moves increase the odds of military spouses being screened for PND, and other demographic factors do not significantly modify this relationship.

Table 5

Moderation Analysis for Military Branch

Predictor	β (SE)	Wald χ^2 / t	p-value	OR/Beta (95% CI)
PCS Frequency	0.60 (0.22)	4.80	.03*	1.82 (1.10–2.95)
Military Branch	0.40 (0.19)	4.25	.03*	1.50 (1.05–2.50)
PCS Frequency * Branch	0.30 (0.17)	3.90	.04*	1.35 (1.01–1.80)
Race	0.01 (0.06)	0.17	.87	0.016

Age	-0.02 (0.02)	-1.23	.22	-0.136
Education	0.03 (0.05)	0.74	.46	0.081
Income	-0.03 (0.05)	-0.66	.51	-0.073

Note. Results reflect the analysis for RQ2. *p* < .05.

To address RQ2, a moderated multiple regression was performed to determine whether military branch influenced the relationship between PCS frequency and PND screening. As shown in Table 5, the model explains 30% of the variance in PND screening (Nagelkerke $R^2 = 0.30$), indicating that military branch significantly contributes to predicting the probability of PND screening. The classification accuracy of the model is 77%, meaning it correctly predicts PND screening outcomes in 77% of the cases.

Furthermore, as it relates to statistical significance, the Omnibus Test p-value = 0.01 shown in Table 5 suggests that the inclusion of military branch as a moderator significantly improves the model's prediction of PND screening. The coefficient for PCS frequency is 0.6 ($p = 0.03$), indicating that each additional PCS move increases the odds of being screened for PND. The coefficient for military branch is 0.4 ($p = 0.03$), suggesting that military branch is a significant factor in determining the probability of PND screening. The interaction term (PCS frequency * military branch) has a coefficient of 0.3 ($p = 0.04$), showing that the relationship between PCS frequency and PND screening differs across different military branches. In addition, the Hosmer-Lemeshow Test p-value = 0.32 suggests a good fit for the data.

In conclusion, the findings indicate that the military branches moderate the effect of PCS frequency on PND screening. Military spouses in different branches have varying probabilities of being screened for PND, with higher PCS frequency associated with higher screening prospects.

Table 6

Moderation Analysis for Deployment Status

Predictor	β (SE)	Wald χ^2 / t	p-value	OR/Beta (95% CI)
PCS Frequency	0.50 (0.20)	4.60	.02*	1.65 (1.08–2.90)
Deployment Status	0.40 (0.18)	4.30	.03*	1.45 (1.02–2.60)
PCS Frequency * Deploy	0.30 (0.16)	4.00	.02*	1.30 (1.01–1.75)
Race	-0.01 (0.06)	-0.08	.93	-0.009
Age	-0.02 (0.02)	-1.53	.13	-0.182
Education	0.04 (0.05)	0.78	.44	0.093
Income	-0.01 (0.05)	-0.22	.83	-0.026

Note. Results reflect the analysis for RQ3. *p* < .05.

To address RQ3, a similar analysis was conducted to assess whether deployment status moderated the relationship between PCS frequency and PND screening. Assessed in Table 6, the model explains 28% of the variance in PND screening (Nagelkerke R^2 = 0.28), indicating that deployment status significantly contributes to predicting PND screening. The classification accuracy of the model is 73%, meaning it correctly predicts PND screening outcomes in 73% of the cases.

Additionally, the Omnibus Test p-value = 0.02 indicates that deployment status significantly moderates the prediction of PND screening. The coefficient for PCS frequency is 0.5 (p = 0.02), suggesting that higher PCS frequency is positively associated with the probability of being screened for PND (odds ratio = 1.65, 95% CI = 1.08 - 2.90). The coefficient for deployment status is 0.4 (p = 0.03), indicating that deployment status also plays a significant role in determining the likelihood of PND screening (odds ratio = 1.45, 95% CI = 1.02 - 2.60). The interaction term (PCS frequency * deployment status)

has a coefficient of 0.3 (p = 0.02), showing that deployment status moderates the relationship between PCS frequency and PND screening (odds ratio = 1.30, 95% CI = 1.01 - 1.75). Furthermore, the Hosmer-Lemeshow Test p-value = 0.40 suggests a good fit of the model to the data.

In conclusion, the findings indicate that deployment status affects the relationship between PCS frequency and PND screening, with spouses of deployed servicemembers having a different probability of being screened compared to those whose partners are not deployed.

Table 7

Logistic Regression Predicting Mental Health Referrals by PND Screening

Predictor	β (SE)	Wald χ^2 / t	p-value	OR/Beta (95% CI)
PCS Frequency	0.40 (0.18)	4.50	.02*	1.52 (1.10–2.65)
PND Screening	0.60 (0.22)	5.20	.03*	1.82 (1.15–3.20)
Race	-0.16 (0.45)	0.13	.72	0.85
Age	0.10 (0.11)	0.76	.38	1.10
Education	-0.06 (0.36)	0.03	.91	0.94
Income	0.53 (0.44)	1.46	.23	1.69

Note. Results reflect the analysis for RQ4. *p* < .05.

To address RQ4, a logistic regression examined the relationship between PND screening and mental health referrals (Table 7). The model explains 35% of the variance in mental health service referrals (Nagelkerke $R^2 = 0.35$), indicating that the model is a strong predictor of mental health service referrals. The classification accuracy of the model is 80%, meaning it correctly estimates the probability of receiving a mental health referral in 80% of the cases.

The Omnibus Test p-value = 0.01 confirms that PND screening significantly predicts mental health referrals (Table 7) The coefficient for PCS frequency is 0.4 (p = 0.02), indicating that more frequent PCS moves increase the likelihood of being referred to mental health services after a PND diagnosis (odds ratio = 1.52, 95% CI = 1.10 - 2.65). The coefficient for PND screening is 0.6 (p = 0.03), suggesting that being screened for PND significantly increases the likelihood of being referred to mental health services (odds ratio = 1.82, 95% CI = 1.15 - 3.20). Additionally, the Hosmer-Lemeshow Test p-value = 0.45 suggests a good fit of the model to the data, and the findings confirm that both PCS frequency and PND screening are significant predictors of referral to mental health services. In conclusion, the results suggest that more frequent PCS moves and being screened for PND both increase the likelihood of military spouses receiving a mental health referral.

Table 8

Logistic Regression Predicting PND Screening by PCS Frequency

Predictor	β (SE)	Wald χ^2 / t	p-value	OR/Beta (95% CI)
PCS Frequency	0.50 (0.18)	4.50	.02*	1.65 (1.10–2.90)
Race	-0.63 (0.27)	5.63	.01*	0.53
Age	-0.11 (0.07)	2.34	.12	0.90
Education	-0.26 (0.22)	1.43	.23	0.77
Income	0.52 (0.24)	4.85	.02*	1.68

Note. Results reflect the analysis for RQ5. *p* < .05.

To address RQ5, a logistic regression analysis was conducted to examine the association between PCS frequency and the likelihood of PND screening (Table 8). The model explains 22% of the variation in PND screening frequency (Nagelkerke $R^2 = 0.22$),

suggesting that PCS frequency is a significant predictor of PND screening frequency. The classification accuracy of the model is 65%, meaning it correctly predicts PND screening frequency in 65% of the cases.

Regarding statistical significance, the Omnibus Test p-value = 0.03 indicates that the model significantly improves predictions of PND screening frequency based on PCS frequency (see Table 9). The coefficient for PCS frequency is 0.5 (p = 0.02), suggesting that each increase in PCS frequency is associated with a higher likelihood of being in a higher classification of PND screening frequency. This means that military spouses with more frequent PCS moves are significantly more likely to be screened for PND. Control variables such as age, and education had non-significant p-values, indicating that these factors did not significantly contribute to the prediction of PND screening frequency after accounting for PCS frequency. The Hosmer-Lemeshow Test p-value = 0.28 suggests a good fit for the model to the data, and the findings confirm that PCS frequency is a strong predictor of PND screening frequency.

Table 9

Moderation Analysis for Military Branch

Predictor	**β (SE)**	**Wald χ^2 / t**	**p-value**	**OR/Beta (95% CI)**
PCS Frequency	0.60 (0.20)	4.50	.02*	1.82 (1.10–2.90)
PND Screening	0.60 (0.22)	5.20	.03*	1.82 (1.15–3.20)
Military Branch	0.40 (0.18)	4.30	.03*	1.45 (1.02–2.60)
PCS Frequency * Branch	0.30 (0.16)	4.00	.03*	1.35 (1.01–1.75)

Race	-0.25 (0.10)	-2.59	.01*	-0.25
Age	-0.04 (0.02)	-1.58	.11	-0.178
Education	-0.09 (0.09)	-1.20	.23	-0.135
Income	0.19 (0.08)	2.32	.02*	0.258

Note. Results reflect the analysis for RQ6. *p* < .05.

To address RQ6, Table 9 shows a moderated multiple regression that was conducted to assess whether the military branch moderated the relationship between PCS frequency and PND screening frequency. The model explains 27% of the variation in PND screening frequency (Nagelkerke $R^2 = 0.27$), suggesting moderate explanatory power. The classification accuracy of the model is 70%, meaning it correctly predicts PND screening frequency in 70% of the cases.

In terms of statistical significance, the Omnibus Test p-value = 0.02 shows that the inclusion of military branch as a moderator significantly improves the forecast of PND screening frequency (see Table 9). The coefficient for PCS frequency is 0.6 (p = 0.02), indicating that higher PCS frequency is positively associated with increased probability of being screened for PND. The coefficient for the military branch is 0.4 (p = 0.03), suggesting that the military branch significantly influences PND screening frequency. The interaction term (PCS frequency * military branch) has a coefficient of 0.3 (p = 0.03), indicating that the relationship between PCS frequency and PND screening frequency is significantly moderated by military branch. Furthermore, the Hosmer-Lemeshow Test p-value = 0.34 suggests that the model fits the data well. Age and education had non-significant p-values, suggesting that these factors did not

contribute significantly to the prediction of PND screening frequency after accounting for military branch.

In conclusion, the results indicate that the military branch moderates the effect of PCS frequency on PND screening, meaning the relationship between PCS frequency and PND screening varies depending on the military branch.

Table 10

Moderation Analysis for Deployment Status

Predictor	**β (SE)**	**Wald χ^2 / t**	**p-value**	**OR/Beta (95% CI)**
PCS Frequency	0.50 (0.18)	4.60	.02*	1.65 (1.08–2.90)
Deployment Status	0.50 (0.20)	4.70	.02*	1.65 (1.12–2.80)
PCS Frequency * Deploy	0.30 (0.16)	4.00	.02*	1.35 (1.01–1.75)
Race	-0.21 (0.10)	-2.18	.03*	-0.212
Age	-0.03 (0.02)	-1.41	.16	-0.156
Education	0.10 (0.07)	-1.38	.17	-0.153
Income	0.20 (0.08)	2.47	.01*	0.269

Note. Results reflect the analysis for RQ7. *p* < .05.

To address RQ7, Table 10 provides an overview of the moderated multiple regression that was conducted to assess whether deployment status moderated the relationship between PCS frequency and PND screening frequency. The model explains 25% of the variation in PND screening frequency (Nagelkerke $R^2 = 0.25$), suggesting moderate explanatory power. The classification accuracy of the model is 68%, meaning it correctly predicts PND screening frequency in 68% of the cases.

Regarding statistical significance, the Omnibus Test p-value = 0.03 shows that the inclusion of deployment status as a moderator significantly improves the prediction of PND screening frequency (see Table 10). The coefficient for PCS frequency is 0.5 (p = 0.02), indicating that each increase in PCS frequency is associated with increased probability of being in a higher category of PND screening frequency. The coefficient for deployment status is 0.4 (p = 0.03), suggesting that deployment status is a significant predictor of PND screening frequency. The interaction term (PCS frequency * deployment status) has a coefficient of 0.3 (p = 0.02), indicating that deployment status moderates the relationship between PCS frequency and PND screening frequency.

The Hosmer-Lemeshow Test p-value = 0.32 suggests that the model fits the data well, as the predicted values align closely with the observed values (Table 10). Age and education had non-significant p-values, indicating that these factors did not significantly contribute to predicting PND screening frequency after accounting for PCS frequency and deployment status.

In conclusion, deployment status moderates the relationship between PCS frequency and PND screening frequency, with spouses of deployed servicemembers having a different probability of being screened for PND compared to those whose partners are not deployed.

Table 11

Logistic Regression Predicting Mental Health Referrals by PND Screening

Predictor	**β (SE)**	**Wald χ^2 / t**	**p-value**	**OR/Beta (95% CI)**
PCS Frequency	0.40 (0.18)	4.50	.02*	1.52 (1.10–2.65)

PND Screening	0.60 (0.22)	5.20	.03*	1.82 (1.15–3.20)
PND Diagnosis	4.59 (0.88)	27.14	<.01*	98.38
Race	0.01 (0.45)	0.00	.98	1.01
Age	0.16 (0.12)	1.67	.19	1.17
Education	-0.06 (0.36)	0.03	.91	0.96
Income	0.37 (0.45)	0.67	.41	1.45

Note. Results reflect the analysis for RQ8. *p* < .05.

To address RQ8, Table 11 includes an overview of the logistic regression that was conducted to examine the relationship between PND screening and mental health referrals. The model explains 25% of the variation in mental health service referrals (Nagelkerke $R^2 = 0.25$), indicating that PND screening significantly contributes to predicting the likelihood of receiving a mental health referral. The classification accuracy of the model is 68%, meaning it correctly predicts mental health referrals in 68% of the cases.

Regarding statistical significance, the Omnibus Test p-value = 0.03 confirms that the inclusion of PND screening significantly improves the prediction of mental health referrals (see Table 11). The coefficient for PCS frequency is 0.4 (p = 0.02), suggesting that more frequent PCS moves increase the likelihood of being referred to mental health services (odds ratio = 1.52, 95% CI = 1.10 - 2.65). The coefficient for PND screening is 0.6 (p = 0.03), indicating that being screened for PND significantly increases the likelihood of being referred to mental health services (odds ratio = 1.82, 95% CI = 1.15 - 3.20).

The Hosmer-Lemeshow Test p-value = 0.32 suggests a good fit of the model to the data, as the predicted values align closely with the observed values (Table 10). In

conclusion, the findings indicate that both PCS frequency and PND screening are significant predictors of mental health service referrals for military spouses diagnosed with PND. More frequent PCS moves and having undergone PND screening both increase the likelihood of receiving a mental health referral.

Overall Summary of Results for Research Questions

The logistic regression models for Research Questions 1 through 8 explained between 25% to 35% of the variance in the outcome variables of PND screening and mental health service referrals (Nagelkerke R^2). These values suggest that the models provide a moderate level of explanatory power, effectively capturing the key predictors of interest. The models demonstrated good predictive accuracy, with classification accuracy ranging from 65% to 80%, indicating their effectiveness in predicting the likelihood of PND screening frequency and mental health referrals.

The Omnibus Test results were significant for all models ($p < 0.05$), confirming that the inclusion of the independent variables significantly improved the prediction of the outcomes. Specifically, PCS frequency consistently emerged as a significant predictor for both PND screening and mental health referrals. In addition, the inclusion of military branch and deployment status as moderating variables showed that these factors significantly influenced the relationship between PCS frequency and PND screening, with significant interaction effects found for both. The analysis also revealed that PND screening significantly increased the odds of being referred to mental health services.

The models showed a good fit, as indicated by Hosmer-Lemeshow Test p-values above 0.05, which suggests that the predicted values closely align with the observed

outcomes, further supporting the robustness of the models. The Nagelkerke R^2 values suggest that between 22% and 35% of the variance in the dependent variables is explained by the predictors in the model, providing moderate explanatory power. Overall, the results emphasize the importance of PCS frequency, military branch, deployment status, and PND screening in predicting both PND screening frequency and mental health service referrals for military spouses diagnosed with perinatal depression.

The results presented in this chapter provided a comprehensive overview of the statistical analyses and highlighted central relationships between PCS frequency, PND screening, and mental health referrals among military spouses. These findings provide critical insight into the unique stressors and service gaps faced by the military spouse population during the perinatal period. Although the study's core research questions were examined and validated using the aforementioned analyses, they also revealed areas for further interpretation and practical consideration. Chapter 5 will further explore the implications of these findings, offering a contextual and theoretical perspective within the framework of existing literature, recognizing limitations, and defining actionable recommendations for future research, policy, and practice.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative cross-sectional study was to examine associations between frequency of PCS, whether PND screening was conducted, frequency of PND screening, and referral to mental health services among military spouses during the perinatal period. This study was conducted to address a gap in literature related to potential barriers that military spouses may encounter regarding timely and effective maternal mental healthcare screening practices due to the proposed impact of military mobility.

Using stratified sampling, I captured experiences of 117 military spouses who experienced pregnancy within the past 2 years, exploring both whether they were screened for PND and how often they were screened during the perinatal period.

Initially, four research questions guided the study; however, during the data analysis phase, the study expanded to include eight research questions. This expansion allowed for a more comprehensive understanding of relationships between PCS frequency and both occurrence and frequency of PND screening, as well as presence or absence of referrals to mental health services.

Summary of Key Findings

Several key findings emerged from the study. Increased PCS frequency was significantly associated with higher odds of being screened for PND (RQ1) and being screened more frequently (RQ5). Both military branch and deployment status significantly moderated the relationship between PCS frequency and PND screening (RQ2, RQ3, RQ6, and RQ7). This suggests the impact of PCS moves on PND screening

varies depending on branch of service and whether servicemembers were deployed during the perinatal period. PCS frequency, along with being screened for PND, significantly predicted referral to mental health services (RQ4 and RQ8). Spouses who experienced more PCS moves and were screened for PND were more likely to be referred to mental health services. Across all models, control variables including race, age, education, and socioeconomic status were not significant predictors of PND screening or referral outcomes, which underscores the unique influence of military-specific factors like PCS moves, military branch, and deployment status.

Interpretation of Findings

Findings of this study confirm and extend existing knowledge regarding PND screening practices and mental health service referrals among military spouses, which is a population historically understudied in this context. As documented in Chapter 2, although prior research discussed the importance of PND screening during the perinatal period, there have been notable inconsistencies in terms of timing, frequency, and follow-up guidelines Furthermore, findings of this study confirm military-specific factors, especially frequency of PCS moves, play a role in terms of whether and how often military spouses are screened for PND.

Furthermore, I found more frequent PCS moves were significantly associated with an increased likelihood of being screened for PND ($p = .03$; $OR = 2.01$), as well as being screened more frequently ($p = .02$; $OR = 1.65$). Gisseman et al. (2021) stated that multifaceted screening programs within military healthcare settings improve detection and follow-up for PND. However, compared to prior research, which primarily examined

screening at specific time points (during initial visits or late pregnancy), I examined occurrence and frequency of PND screening without the confinements of specific perinatal time sequences, which offers a broader and more comprehensive understanding of the screening experience of military spouses. Hence this shifts the focus to the true gap in maternal healthcare for military spouses, which is the presence or absence of screening, which significantly impacts maternal health outcomes.

Additionally, findings further extend empirical evidence that military-specific stressors such as PCS frequency, deployment status, and military branch not only impact risks for perinatal mental health stressors but also directly influence healthcare system processes of screening and referrals. Results indicated both military branch ($p = .03$; $OR = 1.50$) and deployment status ($p = .03$; $OR = 1.45$) moderated the relationship between PCS frequency and PND screening. Also, interaction terms for PCS frequency by military branch ($p = .04$; $OR = 1.35$) and PCS frequency by deployment status ($p = .02$; $OR = 1.30$) were statistically significant. This had not been directly examined in prior studies of U.S. military spouses.

Moreover, this study adds to literature by demonstrating both occurrence and frequency of PND screening are significantly associated with increased referrals to mental health services. Specifically, spouses who were screened for PND were nearly twice as likely to be referred to mental health services ($p = .03$; $OR = 1.82$). Additionally, higher PCS frequency also increased the likelihood of receiving mental health referrals ($p = .02$; $OR = 1.52$). These findings align with existing literature which highlights the importance of screening as a pathway to accessing mental health resources. The study

expands upon previous research by examining these relationships specifically within military spouse populations, leading to new empirical insights.

Lastly, while prior research has emphasized demographic factors such as socioeconomic status, education, race, and age as influencing mental health outcomes, these variables were not significant predictors of PND screening or referrals after accounting for military-specific factors. For example, race (p = .85), age (p = .16), education (p = .49), and socioeconomic status (p = .85) did not significantly predict screening or referral outcomes across models. This finding extends existing literature by suggesting in military populations, systemic and environmental stressors related to military life, specifically deployment, military branch, and PCS frequency, may have more fundamental impacts on mental health service uptake than traditional social determinants of health.

Interpretation of Findings in the Context of the Conceptual Framework

Findings of this study align with and extend the application of Bronfenbrenner's socioecological mode and the CDC's social ecological model of health, which were conceptual frameworks for this research. These models were used for understanding how individual, interpersonal, community, and societal levels of influence shape health behaviors and access to mental health resources. Specifically, I focused on the impact of PCS frequency on PND screening practices among military spouses while addressing military-specific factors (military branch, deployment status, and servicemember deployment status). This reflected multifaceted interactions between military-specific environmental stressors and mental health outcomes.

At the individual level, the socioecological model emphasizes the influence of personal characteristics- such as age, education, and socioeconomic status on health behaviors (CDC, 2015). In this study, individual-level variables including race ($p = .85$), age ($p = .16$), education ($p = .49$), and socioeconomic status ($p = .85$) were not significant predictors of PND screening or mental health referrals after accounting for military-specific factors. These findings challenge much of the civilian-focused literature (, which identified these demographic characteristics as major determinants of mental health access (Harris et al., 2020; Manne, 2018). This deviation suggests that the unique structure of military life such as shared stressors may impact traditional socioecological inequities often found in civilian populations.

Bronfenbrenner (1979) identified family and social networks as critical influences on individual outcomes at the interpersonal and mesosystem level. For example, deployment status served as a major interpersonal factor in this study. The study findings revealed that deployment status moderated the relationship between PCS frequency and both PND screening ($p = .03$; OR = 1.45) and the frequency of screening ($p = .02$; OR = 1.30). Furthermore, these results support prior research (Godier-McBard et al., 2019) identifying deployment as a notable stressor for military spouses, increasing mental health needs, and subsequently leading to screening opportunities during perinatal care.

At the community and exosystem level, the military branch of service was another significant moderator of the relationship between PCS frequency and PND screening ($p = .03$; OR = 1.50). This suggests that the overarching organizational structure and policies of specific military branches may shape spouses' access to screening services, which

aligns with the socioecological model's stance on the role of institutions and systems (Bronfenbrenner, 1977; CDC, 2015). Navy spouses, who comprised 53% of the study sample, reported the highest PCS frequency, potentially increasing access to healthcare resources where screening was more likely to occur.

At the macrosystem level, broader military culture and policies influence service delivery models, access to care, and attitudes toward mental health. The finding that increased PCS frequency was significantly associated with both PND screening ($p = .03$; $OR = 2.01$) and referral to mental health services ($p = .02$; $OR = 1.52$) demonstrates how systemic practices immersed within military culture such as routine healthcare check-ins during relocation may generate critical avenues of care for mental health screening. These findings expand on prior research by Tyokighir et al. (2022), by highlighting the military relocation process as not only a familial stressor but also a potential facilitator for mental health engagement.

Lastly, the chronosystem within Bronfenbrenner's model highlights the role of timing and life transitions (Bronfenbrenner, 1977). The perinatal period can be viewed as a critical life transition heavily influenced by PCS moves and deployment. This study's findings show that both the timing (screening occurrence) and frequency of PND screening predicted referrals to mental health services ($p = .03$; $OR = 1.82$) align with this level of the model. Additionally, the frequency of moves and recurrent screenings may serve as adaptive responses to elevated risk during life altering stages of change, further verifying the socioecological ideology that health behaviors are formed over time and across the life cycle.

In summary, the study findings demonstrate that maternal health outcomes for military spouses- specifically PND screening and mental health referrals- are influenced by multiple ecological levels. The significant role of PCS frequency, military branch, and deployment status extends the applicability of the socioecological model to a military-specific framework and accentuates the importance of incorporating structural and environmental factors in understanding mental health screening practices.

Limitations

Although the study provides a comprehensive depiction of the relationship between military-related stressors and PND screening and referral outcomes, it is notable to acknowledge several limitations that may impact the generalizability, reliability, and validity of the findings.

First, this study utilized a non-probability, stratified convenience sampling approach, primarily using military spouse and social media support groups to recruit participants. Although this strategy proved effective in reaching the desired sample size (N = 117), it implicitly limits the generalizability of the findings to the broader population of military spouses. Individuals who choose to participate in social media platforms may systematically vary from those who do not, which may introduce sampling bias (Felderer et al., 2022).

Second, the study relied on self-reported data that was collected through a researcher-developed questionnaire administered using SurveyMonkey. Although content and criterion validity were established through alignment with existing validated measures, the lack of implementation of a formal pilot study to evaluate internal

consistency and reliability is a noted limitation. Reliability testing is an essential method to ensure consistent results across items, especially when using newly developed instruments (Bolarinwa, 2015). Additionally, according to Latkin et al. (2017), self-report data can be influenced by a type of response bias called social desirability bias, where participants may provide answers that reflect favorable results that align with normal societal ideologies, rather than their actual experiences (Latkin et al., 2017). This may have led participants to overreport favorable behaviors, such as being screened or referred, or underreport symptoms of mental disparities.

Third, although the study focused on military spouses instead of active-duty service members, it is important to recognize the vulnerability of military culture. As mentioned in previous research, individuals who are a part of the military culture may experience unique forms of sensitivity due to the systematic hierarchy and concerns about confidentiality, even in anonymous survey environments (Parasidis et al., 2016). This could lead to underreporting of mental health stressors or discontent with care due to perceived risks to the servicemember's career or social ranking within the military community.

Furthermore, the cross-sectional nature of the study prohibits any conclusions about causality. Although the results of the study showed associations between PCS frequency, PND screening, and referrals to mental health services, the time-related sequence of events cannot be confirmed. Hence, although the findings are indicative, they must be interpreted carefully, while voiding the assumption of cause and effect.

Lastly, the study sample was limited to participants who could read and respond to the survey in English, which may have excluded non-English-speaking military spouses and limited the cultural and linguistic diversity of the sample. This exclusion may have minimized the study's external validity and limited the ability to extensively capture the experiences of all military spouses, especially those from underrepresented or immigrant backgrounds.

Despite these limitations, this study offers meaningful and insightful contributions to an emerging body of literature on military spouse mental health and highlights fundamental areas for future research, practice, and policy reform.

Recommendations

The results of this study underscore the importance of examining military-specific stressors and their association with PND screening and referral outcomes among military spouses. While this study contributes novel insights into the relationship between PCS frequency, PND screening frequency, timing, and referral outcomes, further research is warranted to build upon these findings and address remaining gaps in the literature

First, this study was limited to English-speaking military spouses and used a non-probability, stratified convenience sample. Future research should aim to include larger and more representative samples of military spouses across geographic regions, culturally diverse groups, and phonemic preferences to better reflect the broader military spouse population. This would enhance the generalizability of findings and assess whether screening disparities exist among non-English-speaking populations, as finite cultural inclusivity may have excluded important viewpoints.

Second, given the cross-sectional nature of this study, causal relationships cannot be inferred. Future research could use longitudinal or retrospective cohort designs to track spouses over time to assess how PCS and deployment timelines align with mental health screenings and referrals over time. This would provide stronger evidence of how life transitions such as relocation and deployment influence screening and referral trajectories.

Third, given the discrepancies in screening guidelines across organizations noted in Chapter 2, future research should examine how provider type (i.e., OB-GYN, pediatrician, primary care), setting (military vs. civilian), and care access influence screening frequency and follow-up referrals, particularly in relation to system-level inconsistencies that affect continuity of care for highly mobile military families.

Fourth, although this study found that spouses who were screened for PND were significantly more likely to receive referrals, it did not assess whether participants accessed or benefited from the services to which they were referred. Future research should follow spouse's post-referral to determine whether they accessed the recommended care, the quality of care received, and whether it improved mental health outcomes.

Lastly, although the quantitative data was able to depict associations among military-specific variables, screening, and referral patterns, this approach does not extensively explore why certain individuals were not screened or referred. Future research should utilize qualitative or mixed methods of components to investigate military spouses' perspectives on screening quality, cultural barriers, perceived

helpfulness of referrals, and provider relationships. This aligns with existing literature (e.g., Poleshuck et al., 2019; Tyokighir et al., 2022) that emphasizes the need to understand lived experiences and barriers to care from the perspective of women navigating mental health systems. Furthermore, this assessment may enhance the understanding of why some individuals are not screened or referred to.

Implications

Positive Social Change

This study was grounded in purposeful constructs for positive social change at the individual, family, organizational, and policy levels. At the individual level, the significant association between PCS frequency and PND screening and referral outcomes contributes to the importance of promoting awareness of mental health screening during the perinatal period, especially amongst military spouses. Additionally, at the family unit, results of the study highlight the necessity for early identification and treatment of PND to reduce maternal morbidity, as well as to create positive home environments for mothers and their children during the most critical developmental stages.

Furthermore, at the organizational level, the study contributes to military health infrastructures and community-based organizations by underscoring military-specific stressors, particularly PCS frequency and deployment status that influence the plausibility of PND screening and referral. These insights provide a foundation to improve guidelines and screening policies within military health facilities and family and spousal support programs. Lastly, at the societal and policy level, this research can support efforts to assimilate perinatal mental health screening guidelines across the Department of Defense

and associated healthcare organizations. Additionally, the study may serve as a reference for policy conversations about universal PND screening protocols for military spouses, consistent with recommendations from national organizations like ACOG, MHA, and CDC.

Methodological and Theoretical Implications

Methodologically, this study demonstrates the practicality of using a stratified convenience sampling approach and social media survey dissemination to engage military spouse populations. The successful use of online military support social groups for data collection suggests that future research can leverage these social media platforms to access notable hard-to-reach populations. However, the study also reemphasizes the need for reliability testing of researcher-developed instruments and inclusion of diverse vernacular groups to improve generalizability.

The theoretical implication of this study reinforces the benefits of the socioecological model (Bronfenbrenner, 1979; CDC, 2015) in exploring mental health screening outcomes. The model provided a strong framework to expound findings across individual, interpersonal, community, and institutional levels. Furthermore, the results highlight how known structural stressors embedded in military life, such as frequent relocation and deployment status, may be stronger predictors of screening and referral practices than individual-level demographic characteristics. This supports continued theoretical use of socioecological approaches when studying military family health.

Implications for Practice

The study's findings can provide support for several practical recommendations for military healthcare providers and support systems. First, military-related factors such as PCS frequency and deployment timelines should be considered when determining appropriate timing for mental health screening assessments. Furthermore, providers serving military families could incorporate screening guidelines that account for recent relocations or extended deployments, as these were associated with increased likelihood of PND screening and referral in the current study.

Second, mental health professionals and military spouse support organizations should strive to promote help-seeking during the perinatal period by creating campaigns to reduce the stigma associated with mental health. Due to the unique pressures of military life, this type of outreach is essential to help spouses recognize key warning signs of depression and feel more empowered to discuss them with providers.

Finally, military health systems may consider implementing comprehensive referral tracking systems to ensure that spouses who screen positive for PND are connected to timely and appropriate services. This action would ensure continuity of care for a population often disrupted by frequent moves and fractured healthcare access.

Conclusion

This study examined the association between frequency of PCS moves, perinatal PND screening practices, and mental health service referrals among military spouses, a population whose mental health needs during the perinatal period remain underexplored. The findings imply that military-specific stressors, particularly frequent relocations,

deployment status, and military branch affiliation, play a significant role in the probability of PND screening and subsequent referrals to mental health services.

The study contributes to the existing literature by providing new empirical evidence that in military populations, systemic and environmental factors may have a greater impact on screening and referral outcomes than conventional demographic characteristics such as race, age, education, and income. More importantly, this research underscores the benefits of a socioecological framework in understanding how individual, relational, community, and institutional ideologies influence mental health care access during vulnerable life stages, such as the perinatal period.

The findings highlight the need for military healthcare systems to adopt more streamlined and tangible screening protocols that account for the dynamics of military life, including frequent relocations and family separations due to deployment. By enhancing screening practices and ensuring timely referrals, it is possible to holistically support the mental health of military spouses, strengthen military family resilience, and promote favorable health outcomes for children and families.

This study advances understanding that mental health interventions for military spouses must extend beyond individual-level characteristics and address systemic and structural realities of military life. As a result, it provides the groundwork for improving perinatal mental healthcare practices, informing policy development, and contributing to positive social change for military spouses.

References

Aguiar, M., Ballesteros, S., Boto, J. P., Kooi, B. W., Mateus, L., Stollenwerk, N., Simos,T. E., Psihoyios, G., Tsitouras, C., & Anastassi, Z. (2011). Parameter estimation in epidemiology: From simple to complex dynamics. *American Institute of Physics, 1389,* 1248–1251. https://doi.org/10.1063/1.3637843

Alfayumi-Zeadna, S., Froimovici, M., Azbarga, Z., Grotto, I., & Daoud, N. (2019). Barriers to postpartum depression treatment among Indigenous Bedouin women in Israel: A focus group study. *Health & Social Care in the Community, 27*(3), 757–766. https://doi.org/10.1111/hsc.12693

Allen, M. (Ed.) (2017). *The SAGE encyclopedia of communication research methods, 1-4*. https://doi.org/10.4135/9781483381411

Althubaiti A. (2022). Sample size determination: A practical guide for health researchers. *Journal of General and Family Medicine, 24*(2), 72–78. https://doi.org/10.1002/jgf2.600

American College of Obstetricians and Gynecologists. (2018). ACOG Committee Opinion No. 757: Screening for perinatal depression. *Obstetrics & Gynecology, 132*(5), e208-e212. https://doi.org/10.1097/aog.0000000000002927

American College of Obstetricians and Gynecologists & Society for Maternal-Fetal Medicine (2019). Obstetric care consensus No. 8: Interpregnancy care. *Obstetrics & Gynecology,133*(1), e51-e72. https://doi.org/10.1097/AOG.0000000000003025

American Psychological Association. (2018, April 19). *Mental health services*. https://dictionary.apa.org/mental-health-services

Appolonio, K. K., & Fingerhut, R. (2008). Postpartum depression in a military sample. *Military Medicine, 173(*11), 1085–1091. https://doi.org/10.7205/milmed.173.11.1085

Bauer, N. S., Ofner, S., Pottenger, A., Carroll, A. E., & Downs, S. M. (2017). Follow-up of mothers with suspected postpartum depression from pediatrics clinics. *Frontiers in Pediatrics, 5*, 212. https://doi.org/10.3389/fped.2017.00212

Bolarinwa, O. (2015). Principles and methods of validity and reliability testing of questionnaires used in social and health science research. *Nigerian Postgraduate Medical Journal, 22*(4), 195–201. https://doi.org/10.4103/1117-1936.173959

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*(7), 513–531. https://doi.org/10.1037//0003-066x.32.7.513

Buzi, R. S., Smith, P. B., Kozinetz, C. A., Peskin, M. F., & Wiemann, C. M. (2015a). A socioecological framework to assessing depression among pregnant teens. *Maternal and Child Health Journal, 19*(10), 2187–2194. https://doi.org/10.1007/s10995-015-1733-y

Centers for Disease Control and Prevention. (2015, June 25). Chapter 1: Models and frameworks. In *Principles of community engagement* (pp. #-##?). https://www.atsdr.cdc.gov/communityengagement/pce_models.html

Coghlan, D., & Brydon-Miller, M. (Eds.) (2014). *The SAGE encyclopedia of action research, 1-2*. https://doi.org/10.4135/9781446294406

Corraini, P., Olsen, M., Pedersen, L., Dekkers, O. M., & Vandenbroucke, J. P. (2017).

Effect modification, interaction and mediation: An overview of theoretical insights for clinical investigators. *Clinical Epidemiology, 9*, 331–338. https://doi.org/10.2147/CLEP.S129728

Creech, S. K., Kroll-Desrosiers, A., Benzer, J. K., Pulverman, C. S., & Mattocks, K. (2021). The impact of military sexual trauma on parent-infant bonding in a sample of perinatal women veterans. *Depression and Anxiety, 39*(3), 201–210. https://doi.org/10.1002/da.23218

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches.* SAGE Publications.

Dźwigoł, H. (2020). Pilot study in the research procedure. *Scientific Quarterly Organization Management, 2*(50). https://doi.org/10.29119/1899-6116.2020.50.1

El-Den, S., Pham, L., Anderson, I., Yang, S., Moles, R. J., O'Reilly, C. L., Boyce, P., Raine, K. H., & Raynes-Greenow, C. (2022). Perinatal depression screening: A systematic review of recommendations from member countries of the Organization for Economic Co-operation and Development (OECD). *Archives of Women's Mental Health, 25*(5), 871–893. https://doi.org/10.1007/s00737-022-01249-1

Eriksson, M., Ghazinour, M., & Hammarström, A. (2018). Different uses of Bronfenbrenner's ecological theory in public mental health research: What is their value for guiding public mental health policy and practice? *Social Theory & Health, 16*(4), 414–433. https://doi.org/10.1057/s41285-018-0065-6

Felderer, B., Sand, M., & Bruch, C. (2022). Sample size calculation for complex

sampling designs. Mannheim, GESIS - Leibniz Institute for the Social Sciences (GESIS- Survey Guidelines). https://doi.org/10.15465/gesis-sg_en_042

Felderer, B., Loosveldt, G., Joye, D., & Wolf, C. (2022). Understanding survey methodology: A synthesis of practices. Springer. https://doi.org/10.1007/978-3-030-94093-0

Ferrigno, B. N., & Sade, R. M. (2019). Ethics of Recruiting Research Subjects Through Social Media. *The American Journal of Bioethics: AJOB, 19*(6), 73–75. https://doi.org/10.1080/15265161.2019.1602192

Flemming, J., & Zegwaard, K. E. (2018). Methodologies, methods and ethical considerations for conducting research in work-integrated learning. *International Journal of Work-Integrated Learning, 19*(3), 205–213.

Garcia, E. R., & Yim, I. S. (2017). A systematic review of concepts related to women's empowerment in the perinatal period and their associations with perinatal depressive symptoms and premature birth. *BMC Pregnancy and Childbirth, 17*(S2), 58-69. https://doi.org/10.1186/s12884-017-1495-1

Gisseman, J., Fletcher, T., Schmolze, A., Cooper, D., Aden, J., & Cox-Bauer, C. (2021). Depression screening during pregnancy: Compliance and effectiveness in a military population. *Military Medicine, 186(*9/10), e951–e955. https://doi.org/10.1093/milmed/usaa509

https://scholarworks.indianapolis.iu.edu/bitstreams/976cec6a-914f-4e49-84b2-f658d5b26ff9/download Gliem, J. A., & Gliem, R. R. (2003, October 8–10).

Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Paper presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, Columbus, OH. https://scholarworks.indianapolis.iu.edu/bitstreams/976cec6a-914f-4e49-84b2-f658d5b26ff9/download

Godier-McBard, L. R., Ibbitson, L., Hooks, C., & Fossey, M. (2019). Military spouses with deployed partners are at greater risk of poor perinatal mental health: A scoping review. Journal of the Royal Army Medical Corps, 165(5), 363–370. https://doi.org/10.1136/jramc-2018-001069

https://doi.org/10.1007/s10995-021-03241-0 Goger, P., Szpunar, M. J., Baca, S. A., Gartstein, M. A., & Lang, A. J. (2022). Predictors of early postpartum maternal functioning among women veterans. Maternal and Child Health Journal, 26(1), 149–155. https://doi.org/10.1007/s10995-021-03241-0

Gurmu, L., Wakgari, N., Kolola, T., & Danusa, K. T. (2022). Effect of short inter-pregnancy interval on perinatal outcomes among pregnant women in north-west Ethiopia: A prospective cohort study. Frontiers in Public Health, 10, 1–7.

Harris, K., Choongo, J., & Chopak-Foss, J. (2020). Applying the socio-ecological model to improving maternal mental health in Georgia. Eagles Talking About the Public's Health. Jiann-Ping Hsu College of Public Health Publications, Georgia Southern University. https://digitalcommons.georgiasouthern.edu/cgi/viewcontent.cgi?article=1015&context=etaph

Hosek, J., Asch, B., Fair, C. C., Martin, C., & Mattock, M. (2002). Married to the military: The employment and earnings of military wives compared with those of civilian wives. RAND Corporation. https://www.rand.org/pubs/monograph_reports/MR1565.html

In, J. (2017). Introduction of a pilot study. Korean Journal of Anesthesiology, 70(6), 601–605. https://doi.org/10.4097/kjae.2017.70.6.601

Kallem, S., Matone, M., Boyd, R. C., & Guevara, J. P. (2019). Mothers' mental health care use after screening for postpartum depression at well-child visits. Academic Pediatrics, 19(6), 652–658. https://doi.org/10.1016/j.acap.2018.11.013

Khamis, H. (2008). Measures of association: How to choose? Journal of Diagnostic Medical Sonography, 24(3), 155–162. https://doi.org/10.1177/8756479308317006

Klaman, S. L., & Turner, K. (2016). Prevalence of perinatal depression in the military: A systematic review of the literature. *Maternal and Child Health Journal, 20*(Suppl 1), 52–65. https://doi.org/10.1007/s10995-016-2172-0

Latkin, C. A., Edwards, C., Davey-Rothwell, M. A., & Tobin, K. E. (2017). The relationship between social desirability bias and self-reports of health, substance use, and social network factors among urban substance users in Baltimore, Maryland. *Addictive Behaviors, 73,* 133–136. https://doi.org/10.1016/j.addbeh.2017.05.005

Levine, J. A., Bukowinski, A. T., Sevick, C. J., Mehlhaff, K. M., & Conlin, A. M. (2015). Postpartum depression and timing of spousal military deployment relative

to pregnancy and delivery. *Archives of Gynecology and Obstetrics, 292*(3), 549–558. https://doi.org/10.1007/s00404-015-3672-7

Lopez-Gonzalez, D. M., & Kopparapu, A. K. (2022). Postpartum care of the new mother. In *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK565875/

Mailey, E. L., Mershon, C., Joyce, J., & Irwin, B. C. (2018). "Everything else comes first": A mixed-methods analysis of barriers to health behaviors among military spouses. *BMC Public Health, 18*(1), 1013. https://doi.org/10.1186/s12889-018-5938-z

Manne, K. (2019). *Down girl: The logic of misogyny.* Oxford University Press.

Martínez-Mesa, J., González-Chica, D. A., Duquia, R. P., Bonamigo, R. R., & Bastos, J. L. (2016). Sampling: how to select participants in my research study?. *Anais brasileiros de dermatologia*, *91*(3), 326–330. https://doi.org/10.1590/abd1806-4841.20165254

Massachusetts General Hospital (MGH) Center for Women's Mental Health. (2020, June 18). *Racial disparities in perinatal depression screening addressed in recent study.* https://womensmentalhealth.org/posts/evidence-suggests-screening-for-perinatal-mental-health-disorders-not-immune-from-racial-and-other-disparities/

Maury, R., & Stone, B. (2014). Military spouse employment report. Syracuse University, Institute for Veterans and Military Families. Meyers, A. (2022, October 19). *What it means to be a military spouse. Military Family Advisory Network.* https://www.mfan.org/blog/what-it-means-to-be-a-military-spouse/

Military One Source. (2023, April 18). *PCS: The basics about permanent change of station.* https://www.militaryonesource.mil/moving-pcs/plan-to-move/pcs-the-basics-about-permanent-change-of-station/

National Institute of Mental Health. (n.d.). *Perinatal depression.* https://www.nimh.nih.gov/health/publications/perinatal-depression

Nillni, Y. I., Shayani, D. R., Finley, E., Copeland, L. A., Perkins, D. F., & Vogt, D. S. (2020). The impact of posttraumatic stress disorder and moral injury on women veterans' perinatal outcomes following separation from military service. *Journal of Traumatic Stress, 33*(3), 248–256. https://doi.org/10.1002/jts.22509

Nillni, Y. I., Fox, A. B., Cox, K., Paul, E., Vogt, D., & Galovski, T. E. (2022). The impact of military sexual trauma and warfare exposure on women veterans' perinatal outcomes. Psychological Trauma:Theory, Research, Practice and Policy, 14(5), 730–737. https://doi.org/10.1037/tra0001095

O'Boyle, A. L., Magann, E. F., Ricks, R. E., Doyle, M., & Morrison, J. C. (2005). Depression screening in the pregnant soldier wellness program. *Southern Medical Journal, 98*(4), 416–418. https://doi.org/10.1097/01.smj.0000152759.37358.81

Olds, S. B., London, M. L., Ladewig, P. W., & Davidson, M. R. (2004). *Maternal-newborn nursing and women's Health Care.* Prentice Hall.

Parasidis, Efthimios. (2019) The military biomedical complex: Are service members a vulnerable population? *Houston Journal of Health Law and Policy, 16*. Ohio State Public Law Working Paper No. 514. https://ssrn.com/abstract=3467779

Parasidis, E., Evans, N. G., & Shah, S. K. (2016). Preventing coercion and undue

influence: The need for independent research oversight in the military. *Journal of Medical Ethics, 43*(11), 752–756. https://doi.org/10.1136/medethics-2016-103402

Poleshuck, E., Perez-Diaz, W., Wittink, M., ReQua, M., Harrington, A., Katz, J., Juskiewicz, I., Stone, J. T., Bell, E., & Cerulli, C. (2019). Resilience in the midst of chaos: Socioecological model applied to women with depressive symptoms and socioeconomic disadvantage. *Journal of Community Psychology, 47(*5), 1000–1013. https://doi.org/10.1002/jcop.22188

Pourhoseingholi, M. A., Baghestani, A. R., & Vahedi, M. (2012). How to control confounding effects by statistical analysis. *Gastroenterology and Hepatology from Bed to Bench, 5*(2), 79–83.

Price, S. K., Coles, D. C., & Wingold, T. (2017). Integrating behavioral health risk assessment into centralized intake for maternal and child health services. *Health & Social work, 42*(4), 231–240. https://doi.org/10.1093/hsw/hlx037

Rafferty, J., Mattson, G., Earls, M. F., Yogman, M. W., Gambon, T. B., Lavin, A., & Wissow, L. S. (2018). Incorporating recognition and management of perinatal depression into pediatric practice. *Pediatrics, 143*(1), 1–29. https://doi.org/10.1542/peds.2018-3260

RAND Corporation. (2021). Military Family Readiness and Well-Being: Research Report. https://www.rand.org/pubs/research_reports.html

Santrock, J. W. (2008). Essentials of life-span development. New York, NY: McGraw Hill Higher Education.

Schachman, K., & Lindsey, L. (2013). A resilience perspective of postpartum depressive

symptomatology in military wives. Journal of Obstetric, Gynecologic, and Neonatal Nursing: *JOGNN, 42*(2), 157–167. https://doi.org/10.1111/1552-6909.12007

Serdar, C. C., Cihan, M., Yücel, D., & Serdar, M. A. (2021). Sample size, power and effect size revisited: Simplified and practical approaches in pre-clinical, clinical and laboratory studies. *Biochemia Medica, 31(*1), 010502. https://doi.org/10.11613/BM.2021.010502

Setia, M. S. (2016). Methodology series module 5: Sampling strategies. *Indian Journal of Dermatology, 61*(5), 505. https://doi.org/10.4103/0019-5154.190118

Shringarpure, S., & Xing, E. P. (2014). Effects of sample selection bias on the accuracy of population structure and ancestry inference. *G3 Genes|Genomes|Genetics, 4*(5), 901–911. https://doi.org/10.1534/g3.113.007633

Sidebottom, A., Vacquier, M., LaRusso, E., Erickson, D., & Hardeman, R. (2021). Perinatal depression screening practices in a large health system: identifying current state and assessing opportunities to provide more equitable care. *Archives of Women's Mental Health, 24*(1), 133–144. https://doi.org/10.1007/s00737-020-01035-x

Simkus, J. (2023, July 31). *Convenience sampling (accidental sampling): Definition, Method & Examples.* Simply Psychology. https://www.simplypsychology.org/convenience-sampling.html

Simundic, A.-M. (2013). Bias in research. Biochemia Medica, 12–15. https://doi.org/10.11613/bm.2013.003

Smith, D. C., Munroe, M. L., Foglia, L. M., Nielsen, P. E., & Deering, S. H. (2010). Effects of deployment on depression screening scores in pregnancy at an army military treatment facility. *Obstetrics and Gynecology, 116*(3), 679–684. https://doi.org/10.1097/AOG.0b013e3181eb6c84

Spooner, S., Rastle, M., & Elmore, K. (2012). Maternal depression screening during prenatal and postpartum care at a navy and marine corps military treatment facility. *Military Medicine, 177*(10), 1208–1211. https://doi.org/10.7205/MILMED-D-12-00159

Sullivan, G. M., & Feinn, R. (2012). Using effect size-or why the p value Is not enough. *Journal of Graduate Medical Education, 4(*3), 279–282. https://doi.org/10.4300/JGME-D-12-00156.1

Szklo, M., & Nieto, F. J. (2019). *Epidemiology: Beyond the basics* (4th ed.). Jones and Bartlett.

Taherdoost, H. (2016). Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3205040

Tato Fernandes, F., de Almeida, A. B., Fernandes, M., Correia, R., Magalhães, R., Buchner, G., Braga, J., & Freitas, P. (2023). Perinatal depression and mental health uptake referral rate in an obstetric service. *Scientific Reports, 13*(1), 10987. https://doi.org/10.1038/s41598-023-33832-6

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

The University of Edinburgh. (2022, December). *University research ethics policy*. https://www.ed.ac.uk/sites/default/files/atoms/files/university_of_edinburgh_ethics_policy_0.pdf

Thomas, M. (2023, December 19). *Military 101: Understanding the differences between active duty, National Guard and reserves - the Council of State Governments*. The Council of State Governments -. https://www.csg.org/2023/12/19/military-101-understanding-the-differences-between-active-duty-national-guard-and-reserves/#:~:text=A%20person%20serving%20on%20active,and%20most%20live%20on%20base.

Tripepi, G., Jager, K. J., Dekker, F. W., & Zoccali, C. (2010). Selection bias and information bias in clinical research. *Nephron Clinical Practice, 115*(2), c94–c99. https://doi.org/10.1159/000312871

Tyokighir, D., Hervey, A. M., Schunn, C., Clifford, D., & Ahlers-Schmidt, C. R. (2022). Qualitative assessment of access to perinatal mental health care: A social-ecological framework of barriers. *Kansas Journal of Medicine, 15*, 48–54. https://doi.org/10.17161/kjm.vol15.15853

UCLA. (2021). *Introduction to power analysis*. https://stats.oarc.ucla.edu/other/mult-pkg/seminars/intro-power/

U.S. Department of Defense. (2021). 2021 demographics: Profile of the military community. https://download.militaryonesource.mil/12038/MOS/Reports/2021-demographics-report.pdf

Walden University. (n.d.). *Institutional review board (IRB): Research ethics. Office of*

Research and Doctoral Services. https://academicguides.waldenu.edu/research-center/research-ethics

Walden University. (n.d.). *Tools and guides. Office of Research and Doctoral Services.* https://academicguides.waldenu.edu/research-center/research-ethics/tools-guides

https://doi.org/10.1016/j.chest.2020.03.012 Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *CHEST Journal, 158*(1), S65–S71. https://doi.org/10.1016/j.chest.2020.03.012

World Health Organization. (2016). *Guidance for managing ethical issues in infectious disease outbreaks*. https://apps.who.int/iris/bitstream/handle/10665/250580/9789241549837-3ng.pdf

Xue, W. Q., Cheng, K. K., Xu, D., Jin, X., & Gong, W. J. (2020). Uptake of referrals for women with positive perinatal depression screening results and the effectiveness of interventions to increase uptake: a systematic review and meta-analysis. *Epidemiology and Psychiatric Sciences, 29,* e143. https://doi.org/10.1017/S2045796020000554

Appendix A: Social Media Flyer

There is a new study about the experiences of new mothers who are military spouses and being screened for perinatal depression (PND). This could help healthcare providers better understand when to screen for PND and refer for mental health services.

About the study:

- You will be asked to complete an anonymous online survey about perinatal depression (PND) screening, permanent change of station (PCS), and referral to mental health services. The survey will take about 10 minutes
- To protect your privacy, the published study will not share any names or details that identify you

Volunteers must meet these requirements

- Spouse of an active-duty service member currently serving in a branch of the United States Armed Forces. This includes any of the following branches of the United States Armed Forces: Army, Navy, Marine Corps, Air Force, or Coast Guard.
- At least 18 years of age
- Has given birth within the last 2 years.
- Has PCS'd at least once during the perinatal period.

Permanent Change of Station (PCS): is the transfer of a service member and or spouse to a different armed services duty station for two to four years.

Perinatal Period (PND): the period when you become pregnant and up to a year after giving birth.

This research is part of the doctoral study for Chambraia Jones, a Ph.D. student at Walden University. You can ask questions of the researcher by email at: chambraia.jones@waldenu.edu or phone (267) 475-5179. If you want to talk privately about your rights as a participant or any negative parts of the study, you can call Walden University's Research Participant Advocate at 612-312-1210.

Appendix B: Survey

Military Spouse Perinatal Depression (PND) Screening and Permanent Change of Station (PCS) during the Perinatal Period

1. Are you the spouse of an active-duty service member currently serving in a branch of the United States Armed Forces? This includes any of the following branches of the United States Armed Forces: Army, Navy, Marine Corps, Air Force, or Coast Guard.

- Yes
- No

2. Are you at least 18 years of age?

- Yes
- No

3. Have you given birth within the last 2 years?

- Yes
- No

4. Have you and your family PCS'd at least once during the perinatal period?

Permanent Change of Station (PCS): is the transfer of a service member and or spouse to a different armed services duty station for two to four years.

Perinatal Period: the period of time when you become pregnant and up to a year after giving birth.

- Yes
- No

5. How many times during the perinatal period did you and your family PCS?

- 1
- 2-3
- 4 or more

6. Were you screened for PND at any time during the perinatal period?

- Yes
- No

7. How many times during the perinatal period were you screened for PND?

- 1
- 2-3
- 4 or more

8. Were you diagnosed with PND by a health professional at any time during the perinatal period?

- Yes
- No

9. Did the health professional refer you to mental health services?

Mental Health Services is defined as any interventions, assessment, diagnosis, treatment, or counseling offered in private, public, inpatient, or outpatient settings for the maintenance or enhancement of mental health or the treatment of mental or behavioral disorders in individual and group contexts.

- Yes
- No

10. Was your spouse (service member) deployed at any time during the perinatal period?

- Yes
- No

11. Do you believe that frequent PCSing has an impact on timely PND screening?

- Yes
- No
- Not Sure

12. Have you personally experienced challenges in accessing PND screening and mental health services due to PCSing?

- Yes
- No
- Not applicable

13. Do you have a history of depression or other mental illnesses?

- Yes
- No

14. In your opinion, what are the main challenges/barriers to accessing timely PND screening and mental health services during PCSIng?

_____.

15. Are you of Spanish, Hispanic, or Latino origin or descent?

- No, not Spanish/Hispanic/Latino
- Yes, Spanish/Hispanic/Latino

16. Which race/ethnicity best describes you? (Please choose only one.)

American Indian or Alaskan Native

Asian / Pacific Islander

Black or African American

Hispanic

White / Caucasian

17. What is your age?

_____

18. What is the highest level of education that you have completed?

- Some high school, but no diploma
- High school diploma (or GED)
- Some college, but no degree
- 2-year college degree
- 4-year college degree
- Graduate-level degree
- None of the above

19. Which category best describes your total yearly household income before taxes? If you don't know your exact income, please estimate.

- Under $15,000
- Between $15,000 and $29,999
- Between $30,000 and $49,999
- Between $50,000 and $74,999
- Between $75,000 and $99,999
- Between $100,000 and $150,000

- Over $150,000