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Postpartum Fatigue in the Active Duty Military Woman

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Abstract

Up to 16,000 military women annually experience the birth of a child. Barring complications, regulations require a return to work 42 days postpartum, making them susceptible to the effects of postpartum fatigue. The purpose of this descriptive, longitudinal study of 109 military women was to describe fatigue levels across the first 6-8 weeks postpartum; to describe the relationship among selected psychological, physiological, and situational variables of fatigue; and to examine the relationship between predictor variables, fatigue levels, and performance after childbirth. The majority of the sample were married or partnered enlisted women in the U.S. Navy with a mean age of 25 (±5) years. Descriptive statistics, repeated measures ANOVA, correlation, and regression were used to analyze the data. Women were found to be moderately fatigued across time and there was no change in fatigue levels from 2 to 6-8 weeks postpartum. Study variables of type of delivery, lactogenesis, depression, anxiety, maternal sleep, and infant temperament correlated with fatigue during hospitalization and at 2 weeks postpartum. Depression, anxiety, maternal sleep, and performance correlated with fatigue at 6-8 weeks postpartum. Regression analyses indicated that maternal anxiety during hospitalization and at 2 weeks postpartum explained 6% and 20% of the variance in fatigue at 6-8 weeks postpartum. Over half of the women had not regained full functional status when they returned to work and 40% still displayed symptoms of postpartum depression and anxiety. Future research is needed to examine issues surrounding depression and anxiety of military women, including exploration of its causes in both the prenatal and postpartum periods. Designing interventions to reduce fatigue symptoms among military postpartum women may result in improved parenting,

decreased healthcare costs, workplace accidents, increased job satisfaction, breastfeeding rates, and physical readiness. Reducing fatigue in this population has the potential benefit of a significant cost-savings to the United States government as well as an improved quality of life for military families.

Dedication

This project is dedicated to all military mothers.

Preface

People often ask why I, a Pediatric Nurse Practitioner (PNP) would be researching an obstetric topic. During my years practicing as a PNP, the struggles of combining a successful military career with motherhood became apparent. The PNP spends exceptionally more time with the new mother in the first year after delivery than obstetric providers. Since the mother's performance ultimately affects the infant, maternal issues become paramount when considering the infant's well being.

That said, this project came to fruition due to the vision of my teacher, friend, and mentor, Dr. Allen Orsi. We met on a historical day, September 11, 2001. From that day, he never faltered, providing guidance, insight, and suggestions that allowed me to develop this project into one that could help military women. He teaches not by intimidation and arrogance, but with kindness, encouragement, and mutual respect. I never left his office or ended a phone call with him without a smile on my face and the feeling of excitement to carry on with this project.

My sincere thanks to Dr. Susan Instone, a kindred spirit and fellow PNP, whose love of children and passion for her specialty inspires me to continue contributing to nursing endeavors that improve the lives of children. Since the day I walked on the University of San Diego campus, she has been there for me as an advisor, mentor, and role model.

I am also genuinely thankful and indebted to Dr. Janice Stinson, Captain, United States Naval Reserve, for the unique insights given to me during this project. Her vast experience in researching and caring for pregnant women and women in the military provided guidance, structure, and a focus that would have otherwise not been present.

I stumbled onto Dr. Donna Agan late in the project, and am only sorry I didn't meet her sooner. Her assistance with statistical analysis, editing, and manuscript preparation is responsible for the quality work herein. To my fellow computer nerd, thank you for the belly laughs, your calming and supportive ways, your general expertise, and your friendship.

I am deeply indebted to the United States Navy, for not only funding my second graduate degree, but for allowing me the opportunity to focus fully on the project without the distractions of work. I am also deeply grateful to the TriService Nursing Research Program (TSNRP) and the National Association of Nurse Practitioners (NAPNAP) Foundation for funding this project, and for teaching me the process of grant writing and grant management.

And finally, to my remarkable family: My husband Steve, children Greg, Patrick, and Claire, parents Don and Glenna, and brother and sister, Chris and Paula. You have supported my military career and this project, making new friends, feeling the absences from family events, responding to pleas to turn down the television, the separations and moves, and the many days when I was present in body but not in mind because my brain was busy thinking, working, and formulating ideas about this project. I couldn't dream of a better family.

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CHAPTER 1

Introduction

Currently, over 212,000 women serve on active duty in the armed forces (Department of Defense, 2002). This compares to 33,000 women that served in World War I, and 350,000 women in World War II (WWII; Harrell & Miller, 1997). Even though a larger number of women served during WWII than do presently, dealing with pregnancy and the postpartum period was not a concern then, as women found to be pregnant during that time were automatically discharged. In 1943, policy stated a woman who *is or has been* pregnant would be given an honorable discharge "for the convenience of the government" (Ebbert & Hall, 1993, p. 78). During out-processing, if a woman was found no longer pregnant she was allowed to remain in the military if she chose.

Military pregnancy policy remained virtually unchanged until the 1970s. With the feminist movement of the 1960s making employment for women more socially acceptable, along with the rising cost of living, military women began to find their voice, questioning the pregnancy discharge policy. In September 1969, a Senior Chief Personnelman married for over 10 years with nearly 18 years U.S. Navy service discovered an unplanned pregnancy. Current policy mandated her immediate discharge, making her ineligible for the retirement benefits she would have earned in just over two years. Her situation came to the attention of one of the first eight women to be promoted to Captain in the U.S. Navy, and after assuring the government that her mother-in-law

would care for the baby, she was allowed to remain on active duty until her retirement (Ebbert & Hall, 1993).

In the spring of 1970, a female sailor engaged to another sailor became pregnant but miscarried before her wedding date. Her commanding officer moved to discharge her, stating that allowing her to remain on active duty would be condoning pregnancy out-of-wedlock. With the assistance of the American Civil Liberties Union (ACLU), the female sailor filed suit, claiming it was unconstitutional for the U.S. Navy to force her out of the service without doing the same for the male responsible for her pregnancy. Her case was dropped and she was allowed to continue serving on active duty (Ebbert & Hall, 1993).

On July 16, 1970, the U.S. Navy gave approval for a pregnant Lieutenant Commander with 13 years of service permission to remain on active duty, allowing her to take five months leave after the birth of her baby. She was instructed to submit an irrevocable request for voluntary retirement when she reached twenty years of service, making her ineligible for promotion to Commander (Ebbert & Hall). Times changed, and this officer, Jordine von Wantoch, eventually became one of the first women in the U.S. Navy to be assigned a command, retiring with the rank of Captain in 1986 (University of Albany, 2001).

The Navy suspended the pregnancy discharge policy in 1971. On a case-by-case basis, pregnant women were allowed to remain on active duty if they would agree to use twelve weeks of earned vacation time for recovery. In June 1974, discharge for pregnancy and parenthood became voluntary. In 1976, the Second Circuit Court (Crawford vs. Cushman) ruled that involuntary separation of a servicewoman solely on the grounds of pregnancy violated due process guaranteed by the Fifth Amendment.

Pregnant Navy women were issued maternity uniforms beginning in 1977 (Ebbert & Hall, 1993).

The policy continued to evolve into the 1980s. In 1982, certain pregnant women found themselves unable to separate from the military voluntarily if they held critical skills or if they owed obligated service for educational benefits, flight training, or medical residency. In 1989, pregnancy was not accepted as a reason to release a female from obligated service. Although some critics felt that time lost from work by females for pregnancy, childbirth, and recovery impacted readiness, reported evidence showed that readiness was more compromised by higher male rates of absenteeism for brawling, intoxication, and incarceration (Holm, 1992). Another study performed by the Navy Personnel Research and Development Center reported that men and women lost the same amount of time from work each month for illness, discipline, or pregnancy (Ebbert & Hall, 1993).

Postpartum Fatigue in Military Women

Up to 16,000 women serving on active duty in the United States military annually experience the birth of a child (Institute of Medicine, 1998). Without medical complications, current regulations require these women to return to work 42 days postpartum. This early return to work presents many problems not faced by civilian women. Long shifts, overnight duty, rigid work schedules, fleet assignments, and deployments factor into the unique difficulties these military mothers face. After childbirth, military women return to duty in a male dominated workforce, expected to perform on the job and in their roles at home to their maximum potential, making them vulnerable to the debilitating influences of fatigue.

The symptom of fatigue affects the well being of mothers and their infants by causing an overwhelming and sustained sense of exhaustion in the mother, leading to a decreased capacity for both physical and mental work. This sense of exhaustion can impact performance outcomes such as influencing breastfeeding duration, functional status, coping behavior, levels of physical energy, parenting outcomes, job skills, and the assumption of and taking pleasure in the role of mothering (Milligan, Lenz, Parks, Pugh, & Kitzman, 1996; Pugh & Milligan, 1993).

The study of fatigue in the military population is important because fatigue ultimately affects performance. The military woman has a multitude of tasks to complete during her six-week convalescent period. Most of these mothers are young and separated geographically from their families who might otherwise serve as social support and assist the new mother with tasks around the home. The military mother must recover physically, 25% from a Cesarean section, learn the basics of infant care and/or tend to other children in the home, find full-time daycare that can accommodate her sometimes erratic work schedule, rearrange finances to pay for child care, and complete birth certificate and convalescent leave paperwork. She then must update her will, health insurance information, and military personnel page, schedule and attend a minimum of three medical appointments for her and the baby, purchase new uniforms if her pre-pregnancy attire no longer fits, and complete guardianship paperwork for the infant if she is single. If she is breastfeeding, she must purchase a breast pump and begin storing breast milk. If she qualifies financially, she might spend an entire day applying for the Women, Infants & Children (WIC) program, a plan that will help purchase infant formula or groceries for breastfeeding women.

Data on non-military women show that fatigue levels are compounded at the 6-week postpartum deadline when the military woman must return to duty, by variables such as breastfeeding, depression, poor sleep, stress, and having a temperamental infant (Milligan, 1989; Wambach, 1998; Webster, 1994). If military health care providers can gain a better understanding of this phenomenon at intervals when the mother is likely to seek care from the pediatric community for her infant, intervention programs can be tailored to this unique population.

Understanding postpartum fatigue as it relates to military women is the first step toward reducing its impact on the health and well being of military women and their infants. Knowledge obtained from descriptive studies of postpartum fatigue in this population will provide empirical direction vital to designing intervention studies. Only then should programs be planned to meet the needs of mothers in the postpartum period based on their individual situations. For example, in studies by Milligan (1989) and Hantos (1993), civilian breastfeeding women were found to have higher fatigue levels than non-breastfeeding women, leading to early termination of breastfeeding. Based on these findings, Milligan, Flenniken, and Pugh (1996) developed a nursing intervention program to teach breastfeeding mothers alternative positions to breastfeed their infants, ultimately decreasing fatigue and increasing breastfeeding duration.

Although it has been determined that postpartum fatigue does exist, researchers have not agreed about when fatigue levels are at their highest after delivery because the multiple variables that predict or contribute to fatigue do not affect women equally (Hantos, 1993; Milligan, 1989; Wambach, 1998; Webster, 1994). To this date, it is

unknown if the current research on postpartum fatigue can be generalized to military women.

Pediatric advanced practice nurses and pediatricians completing Well Baby checkups after hospital discharge, and at 2 and 6-8 weeks of age may be the ideal providers to assess maternal fatigue levels and initiate intervention strategies. Studying fatigue from this perspective will add much to the body of knowledge surrounding the complex phenomenon of fatigue in the military woman.

Purpose and Aims

The purpose of this study is to examine fatigue levels in military women across time, and to examine the relationship among selected physiological, psychological, situational, and performance factors on the symptom of postpartum fatigue. The specific aims of the project are:

Aim 1

*Ex*amine fatigue levels of military postpartum women across the first 6-8 weeks postpartum.

Aim 2

Examine the relationship among the physiological factors of type of delivery (i.e., surgical or vaginal), degree of lactogenesis (i.e., breastfeeding), and fatigue levels in military women across the first 6-8 weeks postpartum.

Aim 3

Examine the relationship among the psychological factors of maternal depression, anxiety, and fatigue in military women across the first 6-8 weeks postpartum.

Aim 4

Examine the relationship among the situational factors of maternal sleep, infant temperament, and fatigue in military women across the first 6-8 weeks postpartum.

Aim 5

Examine the relationship between fatigue and performance in military women at the time they are scheduled to return to work (i.e., 6-8 weeks postpartum).

Theoretical Definitions

Fatigue

Fatigue is defined as "an overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work at usual level " (North American Nursing Diagnosis Association, 2001, p. 79). Some characteristics of this diagnosis include the inability to restore energy even after sleep, a lack of energy or inability to maintain usual levels of physical activity, an increase in rest requirements, feelings of tiredness, a verbalization of an unremitting and overwhelming lack of energy, an inability to maintain usual routines, lethargic or listlessness, an increase in physical complaints, feelings of drowsiness, and decreased performance.

Postpartum

The term postpartum is defined in medical dictionaries as a generic term encompassing the period after a woman gives birth, with no time line delineated. Milligan, Parks, Kitzman, and Lenz (1997) defined postpartum fatigue as occurring in the first three months after delivery. For the purposes of this paper, the postpartum period will be the entire period of data collection, 6 to 8 weeks after delivery.

Postpartum Fatigue

Using the North American Nursing Diagnosis definition for fatigue, Pugh and Milligan (1993) also stated that postpartum fatigue was an etiologically complex phenomenon that caused a woman to feel negative, uncomfortable, and less efficient than usual, and was a symptom that might last for a few weeks or may be inescapable during the postpartum months.

CHAPTER 2

Review of the Literature

The purpose of this chapter is to offer a historical review of the development of the postpartum fatigue model, which stemmed from early studies of fatigue in the medical, industrial, ergonomic, and psychological literature, and to provide an overview of the theoretical development of the model. A review of the literature regarding previous studies on postpartum fatigue will be presented, including the measurement of fatigue and the many associated variables. Lastly, a discussion of the difficulties facing researchers who tested this model will be presented with a discussion of inherent flaws with measurement and generalizability.

Fatigue

Fatigue is a common symptom, a normal physiological and psychological response to stress. The best definition for postpartum fatigue is one that considers its consequences on physiological and psychological functioning, along with social and cultural factors. Fatigue is defined as, "an overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work at usual level" (North American Nursing Diagnosis Association, 2001, p. 79). Generally, fatigue is classified as either acute or chronic. Acute fatigue is characterized as a protective mechanism, usually from a single cause, that has a rapid onset, short duration, and is alleviated by rest, diet, exercise, and stress management. It usually has a limited effect on one's quality of life. Problems arise when normal fatigue becomes pathological, a chronic problem that affects physical

performance and mental health. Chronic fatigue usually has an unknown cause or purpose, an insidious onset, persists over time, and is not ameliorated by restorative techniques. Activities of daily living and quality of life are affected (Piper, 1989).

Postpartum fatigue fits neither of these categories. It is not an acute process because it usually is caused by multiple factors, may persist over months, and affects quality of life. Conversely, postpartum fatigue is not characteristic of chronic fatigue because it has a known cause, is relived by time (e.g., a matter of months), and does respond to intervention. Researchers must work not only toward understanding the unique dimensions of fatigue in the postpartum period, but also must find the most effective, accessible, and cost-effective interventions through experimental research.

Postpartum Fatigue: A Theoretical Overview

Although researchers have written about the concept of fatigue for decades, the notion of fatigue as a distinct characteristic of pregnancy, childbirth, and the postpartum period was not addressed as a unique and separate measurable concept from a theoretical standpoint until the 1980s. In earlier descriptive studies, Guillot (1964) interviewed 131 women at four weeks postpartum and found that 40% experienced tiredness. The article focused on the necessity of mothers needing help in the postpartum period, primarily rendered by the maternal grandmother. Gruis (1977) wrote that postpartum women had needs that related to four tasks of the puerperium: physical restoration, learning to care for and meet the needs of a dependent infant, establishment of a relationship with the infant, and alteration of lifestyle and relationships to accommodate a new family member. She found that fatigue was the fourth major concern during the puerperium, and that

fatigue after delivery was in part due to the incessant care demanded by the infant along with the physiological changes to the body during and after delivery.

Mercer (1985) studied the process of maternal role attainment in three different age groups of women over the first year of motherhood. At one month postpartum, she found that 44% of women in the teenage group, 27% of the women in the 20- to 29-year-old group, and 35% of women in the older group described fatigue due to lack of sleep. This complaint decreased incrementally over the first year, with only 4-8% describing the symptom one year after delivery.

In a cross-sectional study of 70 married couples investigating the type and frequency of physical and psychological symptoms experienced by pregnant and postpartum women and their spouses, Fawcett and York (1986) found that 65% of postpartum women felt tired. Nurse researchers were becoming aware that fatigue in the postpartum period was a concept that required further exploration and quantification.

In 1989, Milligan conducted her doctoral dissertation on maternal fatigue occurring within the first three months after delivery. Milligan extracted the data for this study from a larger project by Parks and Lenz, which investigated predictors of maternal behavior and infant development. The purpose of Milligan's study was to determine which aspects of new mothers' lives predicted postpartum fatigue, to describe postpartum fatigue over time, and to develop a model of postpartum fatigue. From this study, a beginning framework developed including predictors, timing, and characteristics of postpartum fatigue. In 1993, Pugh and Milligan described the framework of postpartum fatigue. To develop this framework, they used findings from previous studies along with information from maternity textbooks, clinical journals, and reports of research about

childbearing fatigue. They found their framework to be consistent with classic works on fatigue by Bartley and Chute (1947), Grandjean (1970), Kinsman and Weiser (1976), and nursing fatigue studies by Potempa, Lopez, Reid, and Lawson (1986), Aistars (1987) and Piper (1991). Pugh and Milligan based their framework on the middle-range Theory of Unpleasant Symptoms (Lenz, Pugh, Milligan, Gift, & Suppe, 1997; Lenz, Supp, Gift, Pugh, & Milligan, 1995). Three major components encompassed this middle-range theory: the symptom (i.e., fatigue); the factors that affected the symptom experience (i.e., physiological, psychological, situational variables); and the consequences of the symptom experienced (i.e., performance outcomes). Figure 1 represents the most updated diagram of the middle-range theory of unpleasant symptoms.

The original model (Lenz et al., 1995) included only one symptom. Now, symptoms occasionally occur alone, but more often, multiple symptoms are experienced concurrently. Each symptom is a multidimensional experience measured separately or with other symptoms. Common to all symptoms are the strength, timing, level of distress perceived, and quality. The theory recognizes that symptoms are influenced by variables and these variables can impact the severity of the symptom experience.

The influencing factors are categorized into physiological, psychological, and situational variables. Examples of physiological factors are level of energy, the existence of infection, and trauma. Psychological variables refer to the individual's mental state or mood (e.g., depression or anxiety). Situational factors include aspects of the social and physical environment (e.g., employment, housing, social support). The final component of the theory is performance. Performance is the *outcome* or *affect* of the symptom

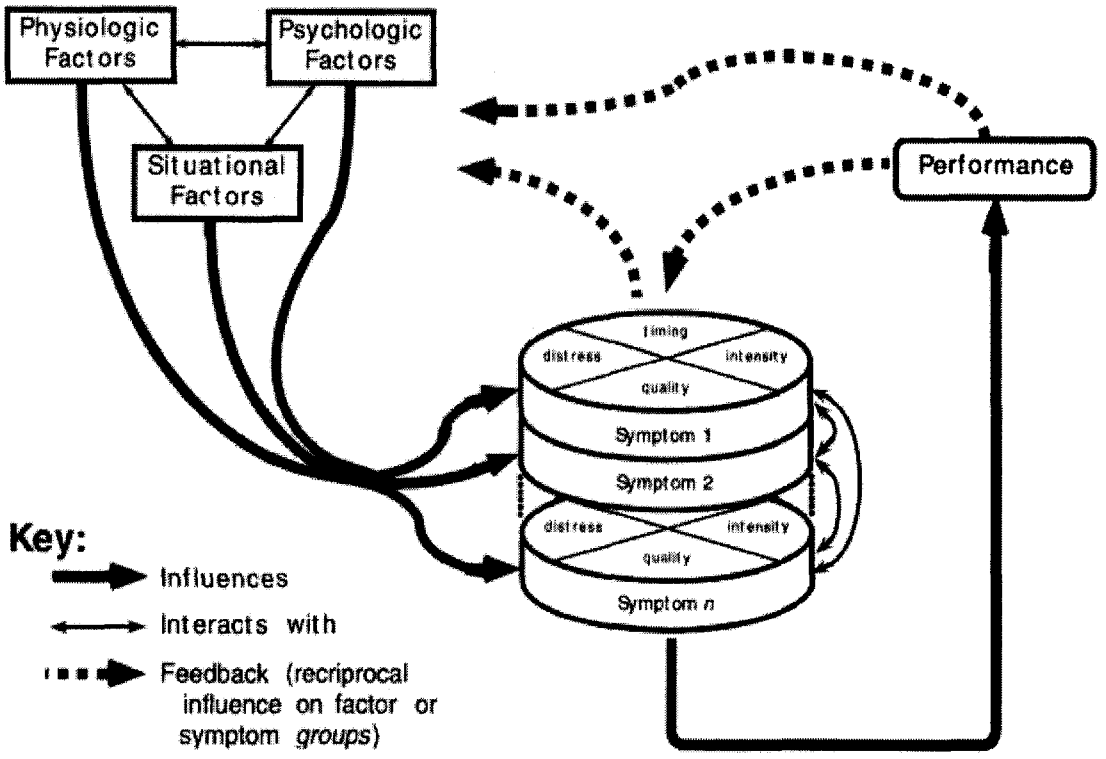

Figure 1. An updated middle-range theory of unpleasant symptoms[1]

[1] From The middle-range theory of unpleasant symptoms: An update, by E. R. Lenz, L. C. Pugh, R. A. Milligan, A. Gift, & F. Suppe, 1997, *Advances in Nursing Science, 19*(3), p. 16. Copyright 1997 by Lippincott, Williams, & Wilkins. Reprinted with permission. (Appendix A)

experience. Examples of performance include functional status, role performance, and quality of life (Lenz et al., 1997).

The Measurement of Postpartum Fatigue

The measurement of *fatigue* has challenged researchers for decades. Because fatigue held a variety of definitions, efforts to measure fatigue usually were adapted to the situation in which the fatigue was studied (Aaronson, et al., 1999). A review of postpartum fatigue studies revealed that a variety of instruments have been used to measure the concept. Because each tool or method measured different aspects of fatigue, comparisons and replications of studies could be challenging. This section presents a review of postpartum fatigue studies with an emphasis placed on general findings and instrumentation.

Milligan (1989) used three instruments, the Symptoms Checklist, the Milligan Visual Analog Scale, and a 10-point rating scale to measure postpartum fatigue. Two instruments were used at each data collection point to help understand the dimensions of the fatigue experience and to validate the level of fatigue during data analysis. The Symptoms Checklist is a 30-item multidimensional tool adapted and modified from the Yoshitake Symptoms Checklist, a well-known general fatigue instrument developed from an extensive study of Japanese industrial workers (Yoshitake, 1978). The checklist, translated into English, included three pilot studies conducted to ensure correct wording. Reliability, concurrent validity, and construct validity were established through the pilot studies.

The second instrument, the Milligan Visual Analog Scale, supported the validity of the Symptoms Checklist instrument. Postpartum women were asked to rate their

overall tiredness on a 100 millimeter visual analog scale from the point, *I am not tired at all* to *I could not be any more tired.* Milligan (1989) reported the reliability of the visual analog scale along with construct validity.

The final tool used was the Fatigue Rating Scale. In this study, Milligan (1989) collected data at the 6-week postpartum point by telephone. Because it was impossible for subjects to visually determine levels of fatigue on the Milligan Visual Analog Scale via telephone, they were asked to rate their fatigue levels from one, *least tired,* to ten, *most tired.* Use of this rating scale supported the validity of the Symptoms Checklist ($p < .001$). The highest fatigue levels in this study were found to occur six weeks after delivery, a score of 7.31, compared to 6.46 after delivery, and 5.86 at 3 months postpartum.

Gardner (1991) used the Rhoten Fatigue Scale to measure postpartum fatigue in a sample of 35 women with vaginal deliveries of healthy newborns. This tool, developed in 1982 by Rhoten, assessed fatigue in post-surgical patients. Subjects intuitively rated their fatigue levels on a 0-to-10 Likert scale, from *not tired* (0) *to total exhaustion* (10). At the time of the study, reliability and validity for this scale were not reported, although correlations with objective observations of fatigue, general appearance, communication activity, and attitude were present (Rhoten, 1982). Test-retest reliability for the study was -.21 at 2 weeks and .10 at 6 weeks. The low scores were attributed to the change occurring in the sample over time. Subjects in the study were found to be mildly fatigued at 2 days, 2 weeks, and 6 weeks postpartum.

In 1993, Hantos studied fatigue levels in 74 first-time mothers with vaginal deliveries of healthy newborns, using the 18-item Lee Visual Analog Scale for Fatigue

(Lee VAS-F) and the Profile of Mood States (POMS) Fatigue-Inertia and Vigor-Activity subscales. The original authors (Lee, Hicks, & Nino-Murcia, 1991) reported acceptable reliability and validity of the VAS-F. The VAS-F was found to have internal reliability. In a test both before and after one night's sleep on 75 healthy males and females, aged 18-55, and 57 males and females that were being medically evaluated for sleep disorders with a major complaint of fatigue, the Cronbach's alpha coefficient was .91 and .96 for evening data and .96 and .95 for morning data.

The Cronbach's alpha for the five-item Energy subscale for the healthy subjects and patient group was .94 and .96 for evening and .94 for morning. The Fatigue and Energy subscale evening scores were correlated at -.54 for the healthy subjects and -.73 for the patient group. The validity of the VAS-F Fatigue and Energy subscales was established with the corresponding POMS Fatigue and Vigor subscales.

In this study, fatigue levels decreased significantly from hospitalization to 7 weeks postpartum and from 3-7 weeks postpartum. There was negligible change in levels of fatigue from hospitalization to 3 weeks postpartum. Subjects were found to be fatigued throughout all of the first postpartum year.

Gjerdingen and Chaloner (1994) assessed fatigue in a longitudinal study of 436 White, English-speaking, married, and employed, primiparous women at 1, 3, 6, 9 and 12 months postpartum. The researchers used a 76-item checklist of physical symptoms (Gjerdingen & Froberg, 1991), including a subscale that considered fatigue as a separate variable. Reliability and validity of this instrument was not reported. Women were found to have significant fatigue across the first year of life at all measurement points.

Webster (1994) used the Maternal Piper Fatigue Scale (MPFS) to measure fatigue in 48 primiparous women who experienced vaginal deliveries of healthy term infants. The MPFS was adapted for this study from the Piper Fatigue Scale (PFS; Piper et al., 1989). The original 45-item PFS was modified to contain 28 horizontal visual analogue items and six open-ended questions. Internal consistency reliabilities (i.e., Cronbach's alpha) at the two-week postpartum measurement were adequate at .88 and .91. Concurrent, criterion-related validity was tested by comparing scores from each subscale to the Profile of Mood States Instruments. The criterion-related validity estimates between the instrument subscales were acceptable ($p < .001$). Fatigue intensity was relatively high at two days and two weeks postpartum. Levels were reported as relatively normal by six weeks, although 25% of the mothers were still reporting severe fatigue at the six-week postpartum measurement.

In a secondary analysis, Waters and Lee (1996) measured fatigue in 31 low-risk primigravidas and multigravidas though the first 4 weeks postpartum using the VAS-F (Lee et al., 1991). New mothers experienced more fatigue four weeks postpartum than mothers with children, suggesting that maternal role acquisition was more fatiguing than maternal role expansion. Troy and Dalgas-Pelish (1997) used the Lee VAS-F in a study of 36 primiparous mothers who vaginally delivered healthy infants. Internal consistency had been previously established. Discriminant validity was established by finding no significant correlations of the VAS-F subscales with the depression, anger, and tension subscales of the POMS. Coefficients of internal consistency ranged from .94 to .98 for the fatigue subscale, and .84 to .97 for the energy subscale. Results revealed that women had higher levels of morning fatigue across six weeks than reported in previous studies.

The morning fatigue was highest four weeks after delivery. By the sixth week, the morning average fatigue score was negligibly lower on a 100-point scale, signifying that women do not recover from the effects of pregnancy and childbirth by that time.

Wambach (1998) used two instruments to measure fatigue, the Multidimensional Assessment of Fatigue (MAF) and the Lee VAS-F in a pilot study of 41 breastfeeding, first-time mothers. The MAF, a revision of the PFS, is a 16-item scale that measures level, severity, distress, timing, and interference of fatigue on daily living using a one-week time reference. Although subscale measurements could be calculated, global scores were computed for this study. Cronbach's alpha reliability assessment was adequate for all measurement points (.89-.93). The Lee VAS-F had prior evidence of reliability, validity, and demonstrated adequate internal consistency across all measurement points (fatigue .93-.96; vigor .78-.88). Fatigue scores were moderate, peaking at 3 weeks and decreasing at 6 and 9 weeks postpartum. There was a significant decrease in fatigue between 3 and 6 weeks (MAF: $p < .05$, Lee: $p = .001$).

Lee and Zaffke (1999) evaluated fatigue in 42 primiparous and multiparous women using the Lee VAS-F and the POMS subscales for fatigue and vigor (see Hantos, 1993). The subscales had high internal consistency reliability, with Cronbach's alpha coefficients of .96 for the fatigue items and .90 for the energy items. The POMS subscales were found to be internally consistent, with Cronbach's alpha coefficients of .93 for the fatigue subscale and .89 for the vigor subscale. The time of three-to-four weeks after delivery was found to be particularly fatiguing to first time mothers, and fatigue severity remained significantly higher at the third postpartum month than before pregnancy ($p < .01$).

Troy (1999) used the Lee VAS-F to compare fatigue and energy levels at 6 weeks and 14 to 19 months postpartum in a group of 28 primiparous women. Reliability and validity were consistent with previous studies. Results revealed that women were more fatigued and less energetic at 14 to 19 months than they were at 6 weeks postpartum.

In another study, Troy and Dalgas-Pelish (2003) measured fatigue on 68 primarily White, educated, married, primiparous women at 2 and 6-8 weeks postpartum using the Lee VAS-F. They found that fatigue did not appear to resolve at the 6-week period (compared to fatigue levels of non-pregnant, non-parenting women), even though the 6-week mark was a time when women were traditionally thought to have recovered from childbirth.

In summary, researchers have examined fatigue levels across the first 19 months postpartum, finding that some women remain fatigued throughout much of the postpartum period. Study results were conflicted with examination of fatigue level peaks in postpartum women. Fatigue levels after the third month postpartum period were scarcely studied.

Predictor Variables

Physiological Variables

The first groups of factors that contribute to or predict postpartum fatigue are termed physiological factors. Events in this category include any process that predisposes or causes a change in the postpartum woman's physiologic functioning. These events, which led to changes in metabolism and increased energy demands, could be due to normal processes (e.g., hormonal changes after delivery) or abnormal occurrences (e.g., infection).

Labor and delivery issues.

The most commonly tested physiological variables were related to labor and delivery issues and could be further categorized into length of labor, type of delivery, and miscellaneous factors. Postpartum fatigue was higher in women experiencing surgical births than vaginal deliveries (Cummins, Scrimshaw, & Engle, 1988; Garel, Lelong, Marchand, & Kaminski, 1990; Tulman & Fawcett, 1988). Milligan (1989), Hantos (1993) and Wambach (1998) found no relation between length of labor and postpartum fatigue. Troy and Dalgas-Pelish (1997) found that the longer the woman was in labor, the higher she rated her fatigue scores two weeks after delivery.

Milligan (1989) studied the effect of type of delivery (vaginal or surgical) on fatigue 6 weeks and 3 months after delivery and found no relationship. In a study of mothers whom had vaginal deliveries, Hantos (1993) found no relationship between an episiotomy and fatigue levels after delivery. Wambach (1998) found that women who reported an episiotomy, tear, laceration, vacuum or forceps delivery, fetal distress, or meconium stained amniotic fluid did not experience higher fatigue. Hantos (1993) found no relationship between gender or birth weight of infant to fatigue levels but did find that fatigue scores were negatively correlated with post-term births during hospitalization, indicating the more post-term the infant, the lower the maternal fatigue level.

Type of feeding.

Type of infant feeding is the next most frequently tested physiological variable. Although some researchers classified feeding as a situational variable, the framework of childbearing fatigue by Pugh and Milligan (1993) classified it as a physiological variable due to the increased energy demands that lactogenesis places on the woman's body.

Milligan (1989) reported that breastfeeding predicted postpartum fatigue at six-weeks postpartum and that increased social support buffered the effects of fatigue in bottle-feeding mothers. Hantos (1993) found that post delivery (i.e., during hospitalization) breastfeeding mothers had lower energy and higher fatigue scores than bottle-feeding mothers, and that bottle-feeding mothers had higher vigor scores. Three weeks after delivery, she found that women who fed their infants breast milk with formula supplements experienced higher fatigue than breastfeeding-only women. At seven weeks postpartum, mothers supplementing with formula had higher fatigue than breastfeeding or bottle-feeding only mothers.

Troy and Dalgas-Pelish (1997) found no significant differences in fatigue levels between bottle-feeding and breastfeeding mothers. In a study of exclusively breastfeeding first-time mothers, Wambach (1998) found that women with high breastfeeding problem severity scores (e.g., physical breast complaints, latch-on or positioning problems, engorgement, leaking, insufficient milk concerns, social concerns) had more fatigue at all four data collection points between delivery and nine weeks postpartum than those with lower breastfeeding severity.

Anemia.

Anemia, defined as a reduction in the blood concentration of hemoglobin, results in a decreased oxygen-carrying capacity of blood. Anemia is characterized by a decrease in hematocrit as well as a decrease in the total number of circulating erythrocytes in the blood. During the third trimester of pregnancy, anemia is defined as hemoglobin of less than 11.0 g/dL or hematocrit of less than 33% (Centers for Disease Control, 1998). During pregnancy, anemia is caused by the increased dilution of blood. After pregnancy,

anemia can be caused or worsened by blood loss experienced during and after childbirth (Szaflarski, 1996).

Anemia is a well-known cause of fatigue in the general population. Milligan (1989) evaluated pre-delivery hematocrit and estimated blood loss after delivery as a predictor of postpartum fatigue, finding no relationship at delivery, 6-8 weeks, and 3 months postpartum. Pre-delivery hematocrits ranged from 20.0% to 45.9% (0 = 37). Estimated blood loss was categorized into three groups: 0-3.5% decrease in hematocrit (18.5% of women), 3.6-7% (13.5% of women), and 7.1-10.5% (3.1% of women). Data were not available for the remaining two-thirds of the sample.

Lee and Zaffke (1999) reported that fatigue one month after delivery related to low third-trimester ferritin levels, and postpartum fatigue at 3 months related to low ferritin and hemoglobin levels. They also examined thyroid function, progesterone, vitamin B12, and folic acid levels, finding no association with postpartum fatigue.

Maternal illness.

Hantos (1993) evaluated maternal health as a predictor of fatigue levels. Hantos asked each subject to indicate whether she experienced any health problem during labor and delivery, while in the hospital, or during the three weeks after delivery. If the subject experienced a problem, she was to describe her ailment. Responses showed a wide range of conditions (e.g., forceps delivery, blood loss, high blood pressure, low blood pressure, back pain, manual extraction of the placenta, fever, pre-eclampsia, blood clots, rash, flu, cold, uterine infection, cystitis, mastitis, sore knees, throat infections). This research saw no relationship between fatigue and a positive answer of experiencing maternal health problems.

Troy and Dalgas-Pelish (1997) reported than women who phoned their obstetrician for undefined maternal problems had less morning fatigue at the fourth week postpartum than those who did not call. Further details regarding the reason for calling the obstetrician were not detailed. Wambach (1998) evaluated maternal illness from delivery to nine weeks postpartum. A general survey tool collected data on maternal illness through forced choice and open-ended questions. Correlations of illness to fatigue levels were non-significant at the 3-day, 3-week, and 6-week periods, but maternal illness positively correlated with fatigue levels at the 9-week measurement point.

Pain/discomfort.

Only two researchers have studied the relationship of pain or discomfort on postpartum fatigue levels. Hantos (1993) did not find a relationship between fatigue and discomfort interfering with sleep at any measurement point. Webster (1994) found that pain intensity positively correlated with fatigue at two days postpartum.

In summary, breastfeeding and pain increased fatigue levels in the first week after birth (Hantos, 1993; Wambach, 1998; Webster, 1994). In the second week postpartum, a long labor was indicative of higher fatigue levels (Troy & Dalgas-Pelish, 1997). Breastfeeding and combining breast and bottle-feeding resulted in higher fatigue levels 3 weeks postpartum (Hantos, 1993; Wambach, 1998). One and 3 months after delivery, anemic women were more fatigued (Lee & Zaffke, 1999). In the second month postpartum, breastfeeding and combination feedings were associated with fatigue (Hantos, 1993; Milligan, 1989; Wambach, 1998). At nine weeks postpartum, maternal illness predicted fatigue (Wambach, 1998).

Psychological Variables

Psychological factors are the second category of events that can predispose and predict the postpartum woman's fatigue levels. Depression and anxiety are considered well-known antecedents of fatigue in both the general fatigue model and postpartum fatigue framework. Included in this category are feelings of negativity and reactions to the childbearing state (Pugh & Milligan, 1993).

The presence of depression is the only psychological variable examined to predict or explain fatigue. Although some believe that fatigue is a symptom of depression, Milligan (1989) measured maternal depression only to control for fatigue, not specifically to study depression as a psychological variable in fatigue. In later research, Milligan, Lenz, et al. (1996) determined that levels of fatigue and depression showed dissimilar patterns of change over time, supporting the notion that each concept is unique.

Gardner (1991) used the Beck Depression Inventory (BDI) to measure depression in postpartum women. Split-half reliability for the BDI was reported. To establish validity, inventory scores were compared with a clinician's judgment rating of the presence or absence of depression (D. [Gardner] Huber, personal communication, October 27, 2003). Cronbach's alpha coefficients were .83, .74, and .75 at 2 days, 2 weeks, and 6 weeks postpartum. Results showed depression to be positively correlated with fatigue at 2 days and 2 weeks after delivery, but not at 6 weeks. Noting that the BDI contained three items that assessed fatigue, a repeated measures analysis of variance of the BDI items minus the three fatigue items was analyzed. Results indicated that the significance previously found was not present with the fatigue questions absent,

indicating that the significant difference was due to fatigue rather than clinical depression.

Depression, as measured by Webster (1994), used the depression subscale of the POMS. The internal consistency reliability of .95 was reported. Test-retest reliability, assessed twice, was found to be .74 after a median of 20 days and .47 at 6 weeks. Concurrent validity estimates between the POMS depression subscale and the Hopkins Symptom Distress scales were .83 for female patients. Depression scores were related significantly to fatigue intensity at 6 weeks postpartum.

Troy (1999) measured depression using the Center for Epidemiological Studies Depression Scale (CES-D Scale) with a Cronbach's alpha of .86. Women in this study were not assessed as being clinically depressed. Mood levels did correlate with measurements of morning energy, indicating that the more depressed a woman's mood, the less morning energy she had.

Wambach (1998) also used the CES-D Scale. Internal consistency reliability was adequate across the measurement points, with a range of .77 to .85. Depression scores ranged from zero at the 3 days, 3-, 6-, and 9-weeks, to a high of 36 out of a possible 60 after discharge. Using the score of 16 as a cutoff for high and low depressive symptoms, *t*-test results showed significantly higher fatigue levels in the more depressed group. Positive moderate relationships were calculated between at all measurement points. Most subjects had mild and decreasing symptoms of depression over time.

In summary, depression has been found to be a predictor for postpartum fatigue across the first 9 weeks postpartum. Because postpartum depression afflicts 10-15% of

childbearing women (Tam, Newton, Dern, & Parry, 2002), this is an important association to understand and study.

Situational Variables

The final category, situational factors, encompasses any environmental or personal condition in the postpartum woman's life that can cause fatigue. For the purpose of this paper, variables will be categorized into demographics, hospitalization, sleep, employment, occupation, infant factors, household, stress, and social support.

Demographics.

The relationship of maternal age to fatigue has been studied frequently. Milligan (1989), Hantos (1993), Webster (1994), and Lee and Zaffke (1999) all found no relationship between maternal age and fatigue levels. Gardner (1991) reported that older mothers had lower fatigue levels at 6 weeks postpartum. Troy and Dalgas-Pelish (1997) reported opposite findings, that older participants had more evening fatigue at 5 weeks postpartum and less energy at 4 weeks postpartum. Wambach (1998) found that younger women have more fatigue at 3-, 6-, and 9-weeks post-delivery.

Level of education had no bearing on fatigue levels in studies by Hantos (1993), Webster (1994), Troy and Dalgas-Pelish (1997), Wambach, (1998), and Lee and Zaffke (1999). Gardner (1991) found that the more educated a mother was, the less fatigue she experienced at 6 weeks postpartum. Neither race nor ethnicity was a predictor of fatigue in studies by Troy and Dalgas-Pelish (1997) and Wambach (1998).

Milligan (1989) used the Hollingshead Four Factor Index of Social Status to measure the socioeconomic status of her population. For this study, reliability and validity scores supplied by the Hollingshead were considered adequate. Scores indicated

that socioeconomic status was not related to maternal fatigue levels at time of delivery or 6 weeks postpartum, but women with a lower socioeconomic status were more fatigued at 3 months postpartum. By evaluating income levels, Hantos (1993), Troy and Dalgas-Pelish (1997), and Wambach (1998) did not find socioeconomic status to be a predictor of fatigue in their studies. Along with socioeconomic status, Hantos (1993) and Troy and Dalgas-Pelish (1997) found marital status was not a predictor of fatigue.

Hospitalization.

Several researchers tested the relationship between fatigue and hospitalization issues after delivery. Hantos (1993) found no relationship in fatigue levels between day of hospital discharge after delivery and the mother's rooming in with the infants. Troy and Dalgas-Pelish (1997) found no significance between length of hospital stay and postpartum fatigue.

Sleep.

Sleep was the most commonly tested situational variable. Milligan (1989) found no relationship between total amount of sleep in 24 hours and fatigue. Hantos (1993) had subjects rate their disruption of sleep the previous night as *yes*, *no*, or *undecided*, finding significant differences in fatigue scores in women who rated their sleep more disrupted than usual at three weeks postpartum. Using a sleep diary to measure total hours of sleep per 24 hours and the number of sleep interruptions, Webster (1994) found no relationship between sleep disruptions and fatigue.

Quantity and quality of sleep were measured by Wambach (1998) using the Verran Snyder-Halpern Sleep Scale (Snyder-Halpern & Verran, 1987). With the exception of the supplementation subscale, Cronbach's alpha reliability coefficients were

satisfactory. Wambach reported that maternal sleep-disturbance positively correlated with fatigue at 3 days, 3 weeks, 6 weeks, and 9 weeks postpartum, and that maternal sleep-effectiveness correlated with fatigue at 3 weeks and 6 weeks postpartum.

Using the modified Richards-Campbell Sleep Questionnaire (RCSQ-M; Richards, 1987), Troy (1999) found that quality and length of sleep did not correlate with fatigue at 14 to 19 months postpartum. Reliability and validity were not reported.

Lee and Zaffke (1999) considered sleep a physiological factor, although the postpartum fatigue framework addressed it as a situational factor. Using polysomnographic records for two consecutive nights of home monitoring at each data collection point (first and third month postpartum), they found that fragmented sleep correlated with fatigue 3 months after delivery. Sleep tapes were analyzed by trained scorers with established interrater reliability that was blind to the study's protocol (Lee, Zaffke, McEnany, & Hoehler, 1994).

Employment.

Milligan (1989) found that employment before or after delivery did not influence postpartum fatigue levels. Hantos (1993) found that employment (i.e., number of hours worked per week, when the mother returned to work, the number of months the mother was employed during pregnancy) had no relationship with postpartum fatigue levels. Troy and Dalgas-Pelish (1997) studied fatigue in a sample of 28 first-time mothers, 27 of whom were employed, and found no relationship between fatigue and employment. In Wambach's (1998) study, the majority of participants were on maternity leave during the 9-week study. She found that return-to-work status did not correlate with fatigue at the 6- or 9-week period, but fatigue levels showed positive correlations with women

experiencing problems combining work with breastfeeding at both measurement points (6 and 9 weeks postpartum). Lee and Zaffke (1999) stated that paid employment did not influence the perception of fatigue, but since 86.5% of her sample were employed, lack of a control group of unemployed women puts this conclusion in question. Troy (1999) studied 28 women, 89% of whom were employed.

The Inventory of Functional Status After Childbirth (IFSAC; Fawcett, Tulman, & Myers, 1988) was used to evaluate the resumption of previous role functions, one being employment responsibilities. The IFSAC scores showed no correlation with fatigue. While employment was used to describe the sample, it was not directly compared to fatigue levels.

Occupation.

Hantos (1993) collected data on maternal occupation according to the Pineo-Porter-McRoberts socioeconomic classification (Pineo, 1984, as cited by Hantos, 1993). Mothers were asked to write their occupation on a data collection sheet. Then, jobs were assigned to categories (i.e., self-employed professional, employed professional, high level management, semi-professional, technician, middle management, skilled clerical or sales, semi-skilled clerical or sales, student, unemployed). Hantos found no relationship between occupation and fatigue levels. Troy and Dalgas-Pelish (1997) found no relationship between fatigue and certain occupational categories (i.e., professional, managerial, clerk, sales, crafts, technician, unemployed).

Infant factors.

Several researchers have evaluated infant behavior as a cause or predictor of fatigue. Milligan (1989) used the fussy-difficult subscale of the Bates Infant

Characteristics Questionnaire (ICQ) to measure infant difficulty (Bates, Freeland, & Lounsbury, 1979). This subscale measured four aspects of infant temperament: difficulty, inadaptability, dullness, and unpredictability. The internal consistency reliability was acceptable with reported alphas of .81 and .84. Construct validity was also reported. Milligan found that infant difficulty was a predictor of postpartum fatigue at the six-week and three-month postpartum measurements.

Hantos (1993) surveyed mothers by asking if, overall and in the past 24 hours, their baby was fussy and cried more or less often than expected. She found that increased fussiness and crying in the past 24-hour period correlated positively with fatigue levels 3 weeks after delivery. Hantos also reported that that the health of the infant, the introduction of solid foods, and the ability to take a break from the baby did not predict fatigue in the postpartum patient. Wambach (1998) also employed the ICQ to measure infant temperament, reporting the internal consistency of the subscale to be adequate (alpha = .83 and .86). She found the infant temperament scores to be positively correlated with fatigue at 6- and 9-weeks postpartum.

Household.

Milligan (1989) found the presence of a young sibling in the home (i.e., less than 30 months of age) was not a contributing factor to fatigue levels after delivery, or at 3- and 6-months postpartum. Gardner (1991) studied the effects of childcare problems and availability of household help on fatigue levels. She found that women who experienced childcare problems 2 days after delivery had higher levels of fatigue. Troy and Dalgas-Pelish (1997) surveyed mothers to determine if they were responsible for all, most, or one-half of the household and infant care responsibilities. Over half of mothers were

responsible for most of the care, but no relationship existed between this burden and fatigue levels. Lee and Zaffke (1999) found no correlation between the number of persons in the home and fatigue levels.

Stress.

Two researchers measured stress that resulted from situational variables. Gardner (1991) used the Maternal Adjustment and Maternal Attitude (MAMA) Questionnaire to measure stress or family crisis. This instrument, developed by Kumar, Robson, and Smith (1984), measured maternal adjustment and maternal attitudes as a way of assessing changes in maternal physical and mental health. The five subscales of this instrument measured the mother's perceptions of her body, somatic symptoms, the marital relationship, attitudes toward sex, and attitudes toward pregnancy and the baby. Kumar et al. reported the test-retest and split-half reliability and criterion-related validity by Cronbach's alpha coefficients for the study at .95, .91, and .81 at 2 days, 2 weeks, and 6 weeks postpartum respectively. Results from the MAMA questionnaire did not correlate with fatigue scores at any measurement point.

The Perceived Stress Scale (PSS), used by Wambach (1998), assessed how mothers rated various life events as stressful at each data-collection point (3 days, 3-, 6-, and 9-weeks postpartum). Cronbach's alpha coefficients for the sample ranged from .83 to .86 across all four periods. Perceived stress correlated positively with fatigue across time.

Social support.

Milligan (1989) measured the adequacy of social support with the Social Support for Parenting Interview (Lenz, Parks, Jenkins, & Jarrett, 1986). Along with a global

measurement for social support, two subscales of the Social Support for Parenting Interview were total instrumental support (i.e., the provision of material aid and services by members of the mother's social network) and partner's instrumental support with childcare (i.e., rating her partner's ability to help care for the baby). Reliability for this tool had not been established as this study was the first time the tool had been used. Internal consistency (i.e., Cronbach's alpha) was found to be adequate. The instrument development process supported content validity. Significant correlations supported construct validity. Although no relationship between social support and fatigue was found, social support was found to buffer the fatiguing effects of bottle-feeding at the 6-week postpartum measurement.

In summary, there were multitudes of situational variables found to influence fatigue levels. In the first month after delivery, problems with childcare, sleep disturbance and disruption, stress, a fussy infant, and younger maternal age were found to predict increased fatigue (Gardner, 1991; Hantos, 1993; Wambach, 1998). In the second month, an older maternal age, having a difficult infant, less effective maternal sleep, and mothers who were more educated were more fatigued (Gardner; Milligan, 1989; Troy & Dalgas-Pelish, 1997; Wambach). By three months, Wambach found that maternal sleep disturbance, combining employment with breastfeeding, stress, a temperamental infant, and a younger mother predicted increased fatigue. Milligan found that a difficult infant, fragmented sleep, and a lower socioeconomic status predicted fatigue levels at 4 months postpartum.

Performance

The most important but least studied component of the postpartum fatigue model was performance. Fatigue in the postpartum patient, influenced by certain physiological, psychological, and situational factors, could have an effect on maternal performance (Pugh & Milligan, 1993; Lenz et al., 1997). After delivery, the postpartum woman was expected to perform in a variety of roles. She would find herself functioning in the role of mother to the new baby and possibly older children, and might assume the role of spouse, employee, daughter, and community member. The postpartum subjects in Ruchala and Halstead's (1994) study reported the postpartum period as being "hectic", with too little time to "get everything done" (p. 85). Investigations into decreasing fatigue and improving performance during this busy time have only begun.

Milligan, Flenniken, et al. (1996) found that women who were taught to breastfeed in the side-lying position experienced less fatigue, ultimately leading to increased duration of breastfeeding. Pugh and Milligan (1998) reported that a home nursing and lactation support program offered to breastfeeding mothers reduced fatigue at the 2-week postpartum period and increased breastfeeding duration. In a pilot study of 41 women, Wambach (1998) measured performance using the Multidimensional Assessment of Fatigue-Interference subscale to assess the degree to which fatigue interfered with activities of daily living. Added items assessed the impact of fatigue on breastfeeding, infant care activities, and evaluated the relationship between fatigue and return to pre-pregnant physical status. The impact of fatigue on activities of daily living and maternal role activities were nonsignificant.

Parks, Lenz, Milligan, and Han (1999) found that persistent fatigue might have a negative effect on the performance outcomes of maternal and infant health and infant development. Maternal and infant health were measured by having the mother rate her own health and the health of her baby in the month before data was collected on a scale of 1, *very poor*, to 7, *excellent*. In addition, health was measured by having the mother mark indicators of illness from a list of minor illnesses (e.g., flu) and major illnesses (e.g., cancer). Infant development was measured by a trained test administrator using the Griffiths Scales (Griffiths, 1970, referenced by Parks et al., 1999). Researchers found a significant difference in maternal health for mothers who were persistently fatigued compared with those not fatigued ($p < .01$). There were no significant differences noted in the infant health of fatigued mothers, but a significant difference was found in infant development of both mentally fatigued and physically fatigued mothers ($p < .05$).

Thome (1999) conducted an intervention study testing the effect of a telephone support program on postpartum fatigue in 76 Icelandic mothers. She found that an intervention of empathetic listening and advice to postpartum mothers using the principles of cognitive-behavioral therapy could be effective at reducing postpartum fatigue, hence improved maternal performance.

Troy and Dalgas-Pelish (2003) tested a self-care intervention to reduce fatigue on a group of 68 primiparous, primarily White, married, and educated women. Use of the Tiredness Management Guide (TMG), a pamphlet that explained causes of fatigue and offered suggestions or techniques to manage fatigue, was found to reduce morning fatigue between the second and fourth week postpartum in the experimental group of 32

participants. Although performance was not measured, it was postulated that reduced fatigue would ultimately improve performance.

How postpartum fatigue interferes with the mother's physical recovery, self-care ability, relationships, ability to care for her infant, and functioning on the job requires additional research.

Syntheses of Literature Review

Studies on postpartum fatigue indicated that stress, childcare problems, sleep issues, breastfeeding, pain, depression, lengthy labor, a fussy or temperamental infant, combined breast and bottle feeding, age (i.e., both younger and older), anemia, combined employment with breastfeeding, lower socioeconomic status, education level, social support, phone contact with physician, and maternal illness all predicted fatigue levels, although other studies presented conflicting results. Testing the postpartum fatigue framework proved a complicated endeavor. Only eight studies could be found since 1989 that tested the postpartum fatigue model, including the predictor variables, and many inconsistencies existed between these studies. The following section includes a discussion on the problems with categorization of variables, sample size, and the measurement of variables.

Issues Surrounding Variable Categorization

There were over 60 identified physiological, psychological, and situational variables considered when testing this model of postpartum fatigue. Because some researchers used different models, selected variables could be placed into different categories. Lee and Zaffke (1999) considered parity to be a physiological variable, even though the postpartum fatigue framework categorized it as a situational variable. The

factor clearly fit both categories based on context. For example, a mother who cared for a new infant along with other children at home might experience situational fatigue, while a mother experiencing her third delivery was prone to medical complications that might predispose her to physiological fatigue.

Sleep was another variable listed as a situational factor, but Lee and Zaffke (1999) considered it a physiological variable. Again, this variable arguably could belong in the physiological category as well because the lack of uninterrupted sleep disrupted many physiological processes in the body. However, if the lack of uninterrupted maternal sleep were due to a fussy infant or lack of household support to assist with infant care, it would be more appropriately assessed as a situational variable. It appeared that maternal age, a situational factor, could be considered a physiological factor since advancing age might contribute to fatigue levels on a physiological level more than a situational level. This could become an issue of consistency when researchers try to replicate studies or compare findings.

Issues Surrounding Sampling

Testing multiple variables requires a large sample size. Of the studies reviewed in this paper, only Milligan (1989), Hantos (1993), and Webster (1994) used an adequate sample size for the number of variables tested. However, these three studies were unpublished master's theses or doctoral dissertations. Because small sample sizes were the norm in most of the studies, questions arose regarding the degree to which results could be applied to the general population of postpartum women. Deciding on an appropriate sample size for a study to test the framework of postpartum fatigue could be tricky if the researcher does not clearly state in the study design how demographic data

will be utilized. If information such as age, ethnicity, parity, socioeconomic status, employment, level of education, and marital status were used solely to describe the sample, these variables do not need to be considered when calculating sample size. If these variables were used to predict or measure fatigue levels as situational factors, sample sizes must be adjusted accordingly.

In addition, these studies were performed primarily on White, married women. Studies are needed for women from differing ethnic and socioeconomic backgrounds. The majority of participants also experienced vaginal deliveries. According to Martin, Hamilton, Ventura, Menacker, and Park (2002), 23% of women in the United States experience a surgical birth (i.e., Cesarean section). As such, information on fatigue patterns in this population should be studied.

Issues Surrounding Measurement

Choosing an instrument or tool to measure the chosen physiological, psychological, and/or situational factors is an important decision. In several studies, variables were measured using different methods or with poorly selected tools, making replication of studies and comparisons difficult. For example, Gardner (1991) used the BDI to measure depression, an inferior selection since the instrument has items that also measure fatigue. A better choice might be the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden & Sagovsky, 1987) or the Postpartum Depression Screening Scale (PDSS; Beck & Gable, 2001), tools designed specifically for postpartum women.

All studies measured sleep measured differently. Hantos (1993) measured sleep by a questionnaire asking the mother if her sleep was disrupted more than usual the previous night and how many times she awoke with the baby at night. Webster (1994)

evaluated sleep disturbance by having mothers record their total hours of sleep in a 24-hour period and the number of times sleep was interrupted between 9:00 p.m. and 9:00 a.m. Wambach (1998) used the Verran Snyder-Halpern Sleep Scale to measure sleep characteristics of disturbance, effectiveness, and sleep supplementation. This scale, developed by Snyder-Halpern and Verran (1987), was designed to measure sleep in healthy, non-hospitalized patients, and did not appear to have established validity in postpartum patients. Lee and Zaffke (1999) used polysomnographic recordings to evaluate total sleep time, deep sleep stages, and wake time. The modified Richards-Campbell Sleep Questionnaire (RCSQ-M), used by Troy (1999), measured the amount and quality of sleep.

What is Known

According to Troy and Dalgas-Pelish (2003), "antecedents of postpartum fatigue and measures to reduce it have barely been discussed in the literature and lack imperial support" (p. 38). Using the above referenced studies, the researcher created a timeline to visually assess which variables predicted fatigue at certain points after delivery (see Figure 2). Even though problems existed with the reviewed studies, much information could be found when reviewing this timeline. Breastfeeding, breastfeeding problems, depression, sleep disturbance, stress, and temperamental infants were recurring themes that should be validated in well-designed studies

Research Variables of Interest for this Study

There are no published studies on postpartum fatigue in the military population. Results from previous studies primarily have been conducted on White, married, middle-class women, and cannot be generalized to the population at large or to the unique

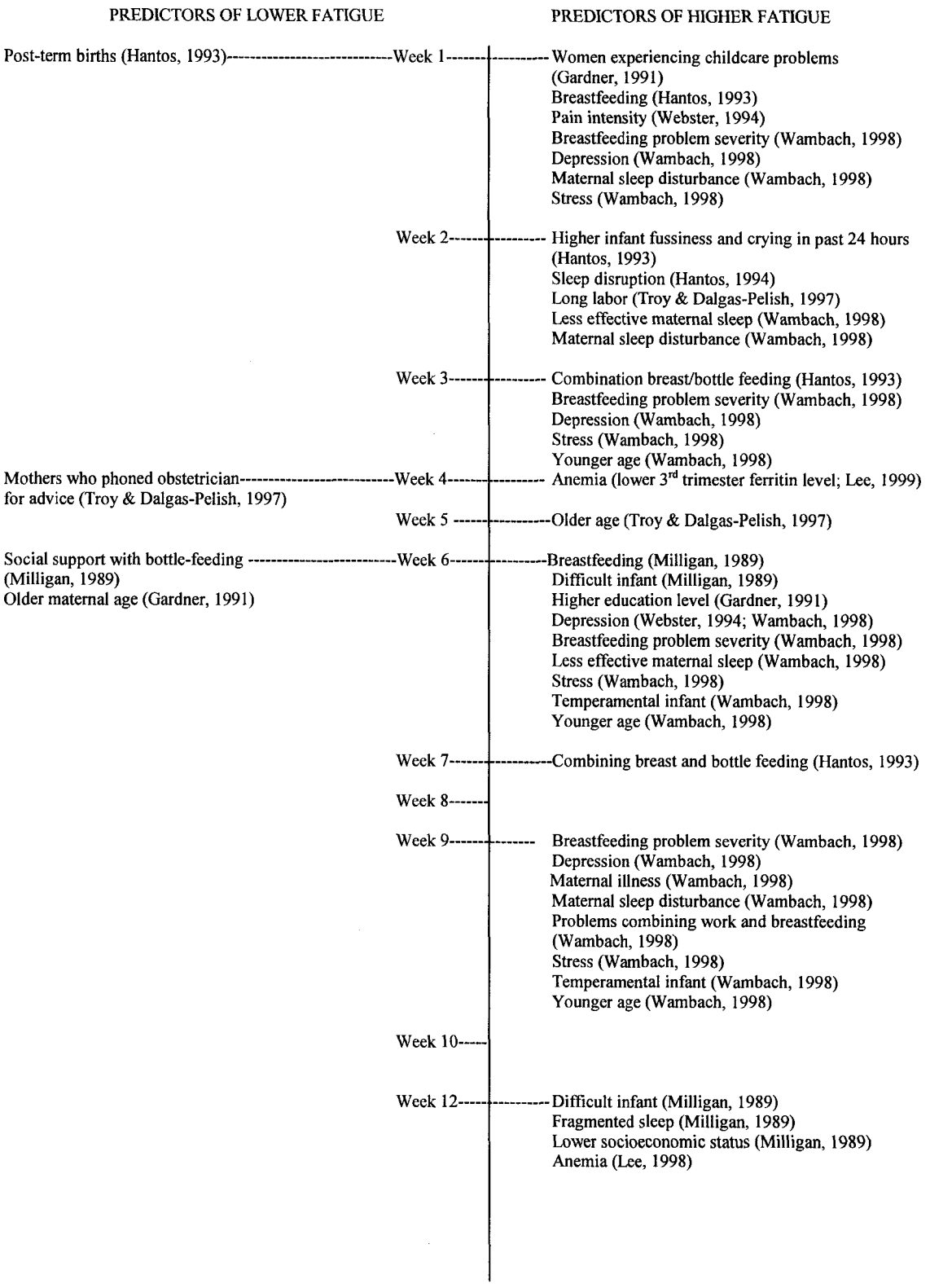

Figure 2: Predictors of lower and higher levels of postpartum fatigue in non-military women.

population of military women. This study will evaluate postpartum fatigue patterns, along with selected variables and a performance outcome, in military postpartum women. Postpartum fatigue is not just an obstetric problem. To say likewise would fail to reflect on and acknowledge the complexities of the concept. Both pediatric and obstetric healthcare providers play a role in identifying and intervening in issues related to postpartum fatigue. Each specialty offers a unique perspective that complements the other. A primary focus of pediatricians and pediatric nurse practitioners is to help parents function more effectively. From a pediatric perspective, this study will evaluate how the variables of lactogenesis, type of delivery, maternal depression, anxiety, sleep, and infant temperament, influence fatigue levels and affect maternal performance. The variables chosen for this study have particular interest to the researcher as a pediatric advanced practice nurse (APN).

Lactogenesis

Inarguably, breast milk provides optimal infant nutrition, but the manner in which the mass media has convinced women that breastfeeding is easier for mothers than formula feeding is disputable. Auerbach (1984) found that fatigue was the main concern for one-third of employed breastfeeding mothers with children less than 3 years old.

The United States Recommended Dietary Allowance (USRDA) suggests that lactating women increase their average caloric intake by 500 kcal per day (National Research Council, 1989). In a national survey of 528 pregnant and lactating women in the United States, an increased caloric intake for lactating women was found to be lower than recommended for both early (i.e., less than 90 days after delivery) and late lactation periods (Murphy & Abrams, 1993). While an insufficient intake of calories could explain

some of the fatigue experienced by lactating women, fatigue caused by the breastfeeding process is complicated by more than inadequate nutrition.

The average baby breastfeeds 10-12 times per day in the first month of life, compared to formula fed infants feeding every 3 to 4 hours. At times, formula feeding a baby can be faster for the mother than breastfeeding. Even though the breastfeeding infant drinks the majority of milk from each breast in the first 5-10 minutes of feeding, it is not uncommon for the baby to suckle for 30-45 minutes. Formula feeding is faster; once the infant drains the bottle the feeding is finished. A non-breastfeeding mother also has the support of a family member or friend to feed the baby while the mother rests. Preparing formula is not as time consuming as it once was. Ready-to-feed or concentrated formulas are quick to prepare and sterilization is no longer recommended for bottles, nipples, and water. Baby bottles and nipples are washed easily in the dishwasher.

Breastfeeding can be a fatiguing experience, but a rarely explored phenomenon is how the impact of mixed formula and breastfeeding or feeding pumped breast milk from a bottle impacts fatigue levels. Many mothers who report a combination of formula and breastfeeding are doing so because of lactation problems such as sore nipples, inadequate milk supply, or problems with latch-on. Hantos (1993) reported that women who fed their infants breast milk and formula supplements experienced higher fatigue than breastfeeding-only women did 3 weeks after delivery. At 7-weeks postpartum, mothers supplementing with formula had higher fatigue than breastfeeding or bottle-feeding-only mothers.

Mothers who pump breast milk to feed by bottle were doing so primarily due to inadequate latch-on. Pumping breast milk or combining breast and formula feeding can

be an exhausting and time-consuming experience. Fatigue and feeding method will be evaluated in this study by using a self-report of feeding method according to standardized terminology on breastfeeding behavior used by Hill, Hummenick, Argubright, and Aldag (1997), as adapted from Labbok and Krasovec (1990). This tool assesses percentage of breast and formula feeding, along with an additional category to differentiate mothers who are exclusively feeding breast milk from the breast versus those feeding pumped breast milk.

Type of Delivery

A Cesarean section, whether elective or performed on an emergency basis, is a surgical procedure. The literature abounds with evidence of the correlations of surgical procedures to increased fatigue levels. Post-operative complications from a Cesarean section include infection, hemorrhage, damage to the bladder or intestines, and blood clots. Postpartum fatigue has been higher in women experiencing surgical births than vaginal deliveries (Cummins et al., 1988; Garel et al., 1990; Tulman & Fawcett, 1988). Cesarean section patients stay in the hospital only one day longer than vaginal delivery patients stay and may find themselves caring for an infant with little social support or help once discharged. Breastfeeding after Cesarean section is more difficult due to positioning problems and pain. Military women who experience a Cesarean section delivery are expected to return to work 6 weeks after delivery, the same as women with vaginal deliveries. Further exploration of fatigue levels in these patients in the first two months after delivery is needed.

Postpartum Depression and Anxiety

Psychological fatigue, defined as a state of weariness related to reduced motivation (Lee et al., 1991), is viewed as a response to internal or external demands exceeding available resources. Testing the variables of anxiety and depression on fatigue levels is confusing because of the interconnectedness of the concepts. The DSM-IV-TR criteria used by healthcare providers for psychological diagnostic guidance lists fatigue or loss of energy nearly every day as one of the symptoms of postpartum depression (American Psychiatric Association, 2000). Milligan (1989) found that depression and fatigue were related but demonstrated distinct, separate concepts because of their dissimilar pattern of change over time. Women were able to differentiate between the feelings depression and fatigue.

Gjerdingen and Chaloner (1994) examined changes in women's mental health and factors associated with mental health over the first year postpartum. They found significant changes in overall mental health, depression, and anxiety experienced by women up to one year after delivery, with the first month postpartum having the least favorable outcomes. One variable associated with poor mental health throughout the entire first year was fatigue.

Pugh and Milligan (1993) found that anxiety and depression might contribute to fatigue. During pregnancy, fatigue was dependent upon depression and anxiety. Increasing fatigue levels correlated with anxiety and symptoms of depression, which led to a viscous cycle of repeated circular emotions.

Postpartum depression afflicted 10-15% of childbearing women (Tam et al., 2002). Many women did not seek intervention for their depression because they

minimized their own symptoms, were unaware of treatment options, or suffered in silence because of the social stigma associated with the diagnosis of depression (Beck, 2001; Ugarriza, 2002). Astute pediatric caregivers often recognize depressed and anxious mothers who access the healthcare system for a problem with their infant or during a Well Baby visit. Pediatric providers could be the one responsible for initiating help for the mother, so it is imperative that this phenomenon be better understood.

Maternal Sleep

Rubin (1961) stated, "If a new mother does not obtain a sufficient amount of sleep, she might develop *sleep hunger* which can affect her physical and emotion well being" (p. 684). The quality and quantity of maternal sleep as it relates to fatigue is a particularly specific pediatric problem, because interrupted sleep is usually related to childcare obligations and being awakened by the infant (Ugarriza, 2002). Pediatricians and nurse practitioners who can assist parents with calming techniques, feeding issues, and altered infant sleep patterns causing the infant to awaken at night may well decrease maternal fatigue levels.

Fatigue and normal tiredness are different concepts. Fatigue is defined as "the awareness of a decreased capacity for physical and/or mental activity due to an imbalance in the availability, utilization, and/or restoration of resources needed to perform activity" (Aaronson, et al., 1999, p. 47). Fatigue is more severe, is a negative feeling, and is not as easily relieved as tiredness (Milligan, Lenz, et al., 1996). Improved sleep quantity alone might not alleviate fatigue, but it would alleviate tiredness (Morris, 1982).

Campbell (1986) conducted a descriptive study of mother-baby sleep patterns and found that, while postpartum patients obtained as much sleep as they did before delivery,

their sleep during the second and fourth postpartum weeks was subjected to many interruptions causing them to feel tired in two ways, emotionally and physically. Unlike other mothers, military women who returned to workplace or have busy daytime schedules in preparation for returning to work do not have the time to catch up on sleep by napping.

Infant Temperament

Parenting a temperamental or difficult infant is fatiguing for many reasons, with several theories on why difficult infants contribute to the fatigue experienced by postpartum mothers. According to Bate's Infant Characteristics Questionnaire, difficult infants are harder to calm, have less predictable sleep and eating cycles, are fussy and irritable, respond negatively to new people, are easily upset, and exhibit a more serious mood. When more time and worry are required to care for a difficult infant, the mother has less time for rest and relaxation, affecting fatigue. The mother of a difficult infant is likely to seek help from pediatric providers. As an example, colic, which affects 700,000 infants in the United States each year, is a common problem that causes infants to be classified as difficult or temperamental (Gupta, 2002). Pediatric providers frequently see infants for this condition, making its relationship to maternal fatigue an important one to understand.

Depressed and anxious mothers perceived their infants as more difficult (Forsyth, Leventhal, & McCarthy, 1985; Webster-Stratton & Hammond, 1988; Power, Gershenhorn, & Stafford, 1990). Beck (1996) found depressed women to be less responsive to infant cues. First time mothers might perceive their infants as more difficult as they learned to *read* their infant as a developing individual (Sullivan, 1997). Whether

the mother had a difficult infant or perceived that her infant was difficult because she was experiencing depression, anxiety, or the process learning and adapting to the maternal role, the extra time and care she gave this infant impacted her fatigue levels. Further evaluation of maternal perception of infant temperament in this population of military-employed women is necessary.

Performance

The outcome of the fatigue experience is performance, and military women may find postpartum fatigue interfering with their functioning on the job and in their personal lives. Performance is conceptualized to include functional activities (i.e., physical activity, activities of daily living, social activities, interaction) and cognitive activities (i.e., concentrating, thinking, problems solving). Improving the performance of military women is the final goal of understanding fatigue patterns. Military women no longer function in safe and traditional female roles. They now hold high risk, demanding, and dangerous jobs such as firefighters, jet pilots, operational intelligence officers, divers, construction workers, flight nurses, engineers, and security officers.

For this study, performance will be evaluated using the Inventory of Functional Status after Childbirth (Fawcett, Tulman, & Myers, 1988). This instrument has five subscales designed to measure the mother's readiness to assume infant care and to resume self-care, household, social and community, and occupational activities following childbirth.

In summary, little is known about the patterns of postpartum fatigue in military women. This descriptive, longitudinal study will examine fatigue levels in military women across time and examine the relationship among the selected physiological

factors of lactogenesis and type of delivery, the selected psychological factors of anxiety and postpartum depression, the selected situational factors of infant temperament and maternal sleep, and the performance factor of functional status on the symptom of postpartum fatigue.

CHAPTER 3

Methods

Research Design and Method

A descriptive, longitudinal, prospective design was used to study postpartum fatigue in active duty military women. A convenience sample of military active duty women was recruited from the Naval Medical Center San Diego, the largest military medical treatment facility in southern California. The population of military postpartum women open for recruitment included members of the Army, Navy, Marine Corps, National Guard, and Air Force.

Sample

Data were collected from women serving on active duty military in the United States. To determine sample size, a power analysis was performed using the Sample-Power™ SPSS Release 2.0 software by Borenstein, Rothstein, and Cohen (2001). For a study using multiple regression with eight variables and a medium effect, a sample size of 109 was required for a power of 0.82.

Because the TriService Nursing Research Program reports an attrition rate of 22.28% for healthy populations, (R. Flowers, personal communication, May 02, 2003), a sample of 130 was initially planned for recruitment. As the study progressed, the attrition rate was nearing 30%, so the decision was made to recruit 155 subjects. Recruitment took place from September 02, 2003 to December 23, 2003, and follow-up data were collected

through February 01, 2004. Demographic information was gathered from the subject at the first data collection point.

Since postpartum complications and sick neonates could affect levels of fatigue in postpartum women, inclusion criteria for the study included women who were:

1. Serving on active duty in the United States Navy, Air Force, Army, Coast Guard, National Guard, or Marine Corps, but not Reserve duty.
2. On shore duty.
3. Delivering term infants (i.e., 37 to 42 weeks by dates) and did not experience complications that prevented mother/infant rooming in.
4. Who delivered a well child (i.e., no Neonatal Intensive Care Unit stay greater than 8 hours, no intravenous antibiotics prohibiting rooming-in, afebrile, receiving oral feedings).
5. Women who were considered well (i.e., afebrile, intravenous antibiotics, pregnancy-induced hypertension requiring treatment with Magnesium Sulfate, postpartum hemoglobin > 10).

Exclusion criteria were women:

1. With multiple births.
2. Undergoing surgical procedures (e.g., tubal ligation) after delivery, unless the surgery was completed at the same time of a cesarean section.
3. Planning to relocate, deploy, or separate from the military prior to the 8-week postpartum period.
4. With a chronic illness (e.g., insulin dependent diabetes) that might predispose them to being more fatigued than the average postpartum patient.

The researcher determined inclusion/exclusion criteria by a review of the postpartum chart and an interview with the subject.

Setting

The setting for the first data collection point was the Postpartum Ward of the Naval Medical Center, San Diego, CA (NMCSD). The NMCSD has an active duty delivery rate of 65-70 births per month.

The setting for the second and third data collection points was either the Pediatric Clinic at NMCSD, one of the branch clinics, or a location of the subject's choosing (e. g., Obstetric Clinic, patient's home, work site). All attempts were made to gather data for the second and third collection points in person; however, when this was not possible, surveys were mailed to the subject for completion. Data were collected three times over a 6 to 8 week period, consistent with the study design. The periods were labeled as follows: Time 1, after delivery but before hospital discharge; Time 2, two weeks postpartum; and Time 3, six-to-eight weeks postpartum.

Instruments

Fatigue

Fatigue was measured at Times 1, 2, and 3 using the Fatigue Continuum Form (FCF), an ordinal, 30-statement tool requesting a response to a sentence such as, *I feel that my head is heavy*, *I feel tired in my legs*, and *I feel unable to concentrate* (see Appendix B). Responders could choose from the options of: *not at all*, *sometimes*, *moderately so*, or *very much so* with the scoring ranges from a low of 30 to a high of 120. Subjects for the first data collection point were asked to rate their fatigue symptoms since delivery. For the second and third data collection points, subjects were asked to mark

each statement by referring to how they felt in the past week. Subjects could complete the instrument in 5-10 minutes. Milligan granted permission to use this instrument.

Internal consistency reliability for the FCF was reported as .82 during postpartum hospitalization, .95 two weeks postpartum, and .82 six weeks postpartum. Lenz et al. (1997) tested convergent validity by examining relationships between fatigue and the variables hypothesized to correlate with fatigue based on their Theory of Unpleasant Symptoms. In their study, all five of the selected variables (i.e., depression, type of delivery, sleep, infant difficulty, parity) correlated at one or more data collection points, supporting consistency with the theory.

Levels of fatigue were determined by totaling all item responses. Low levels of fatigue were any total score ≤ 38.5, moderate fatigue between a total score of 38.6-64.4, and high fatigue for a total score ≥ 64.5 (Pugh, Milligan, Parks, Lenz, & Kitzman, 1999).

Lactogenesis

The variable of lactogenesis was measured at Time 1, 2, and 3 by maternal self-report of feeding method according to standardized terminology on breastfeeding behavior used by Hill et al. (1997), adapted from Labbok and Krasovec (1990; see Appendix C). Because the term, *breastfeeding*, was insufficient to describe the many types of breastfeeding behaviors, these guidelines were developed by a panel of experts in an attempt to increase the accuracy of data collected and to ease the comparisons of data between studies. This tool demonstrated face validity (P. D. Hill, personal communication, June 4, 2003).

This tool distinguished full from partial breastfeeding, subdivided full breastfeeding into categories of exclusive and almost exclusive, differentiated among levels of partial breastfeeding, and allowed for a category of token breastfeeding that may have little to no nutritional benefit to the infant. One additional category was added to differentiate mothers who were exclusively feeding breast milk from the breast versus those feeding pumped breast milk. This tool took less than one minute to complete. Mothers were asked which pattern best fit how they fed their baby over the past week.

Type of Delivery

Information regarding the second physiological variable, type of delivery (surgical or vaginal), was obtained at Time 1 by asking the mother to mark one of two categories on the demographic portion of the Postpartum Depression Screening Scale (PDSS). If the Cesarean category was marked, the mother was asked whether it was a planned or unplanned surgical delivery.

Postpartum Depression

Maternal depression was measured at Time 1, 2, and 3 using the PDSS. The PDSS was a 35-item Likert-type self-report scale with summative scoring and took approximately 5 to 10 minutes to complete. Each statement was a description of how the mother may feel after giving birth to a baby. This instrument was designed after extensive grounded theory and phenomonenological research by Beck (1992; 1993; 1996). Due to copyright laws, a facsimile of this instrument could not be included. To review one selected item from each subscale, see Appendix D.

Content validity was based upon a review of the literature, a panel of experts in postpartum depression and mood disorders, and a focus group of postpartum women.

Internal consistency reliability for the subscales ranged from a low of .83 for *Anxiety/Insecurity* and *Sleeping/Eating Disturbances* to a high of .94 for the *Loss of Self* subscale. Overall scale reliability was .97 (Beck & Gable, 2002). Construct validity was supported by a Tucker-Lewis index of .87 and a root mean square residual of .05. Likert response category-fit statistics indicated that responses were spread evenly across all options. Confirmatory factor analysis revealed the standardized weights for the five items assigned to each of the seven dimensions were high with a minimum *t*-value of 14.79, indicating that all items fit the hypothesized seven-factor model.

The PDSS has been found to correlate strongly with the commonly used Beck Depression Inventory-II (BDI-II; $r = .81$), and EPDS ($r = .79$). There were only two instruments designed to specifically measure depression in postpartum patients, the PDSS and EPDS. The PDSS was chosen for this study because it had the advantage of being written in the context of new motherhood and addressed the themes of loss of control, obsessive thinking, loss of self, loneliness, and cognitive impairment that the EPDS did not. Readability of the instrument was found at the 3rd-grade-level. The PDSS is a copyrighted instrument sold through Western Psychological Services.

In order to avoid confusing *postpartum blues* (i.e., normal transitory mood swings after delivery) from postpartum depression, the PDSS was designed for administration to mothers in the clinical setting no earlier than two weeks postpartum. For research purposes (i.e., to obtain a baseline assessment), the PDSS can appropriately be used on new mothers before hospital discharge (C.T. Beck, personal communication, August 20, 2003).

Maternal Anxiety

Anxiety was measured at Time 1, 2, and 3 using the Anxiety/Insecurity subscale of the PDSS. The loading matrix correlation between the anxiety/insecurity subscale and the discriminant function was reported to be .88 (Beck & Gable, 2001). Internal consistency reliability was .83 (Beck & Gable, 2002). This five-item subscale asked the mother questions relating to feeling anxious about her infant, feeling overwhelmed, having physical symptoms of anxiety, feelings of being alone, and feeling like she had to keep moving or pacing. Total anxiety subscale scores could range from a low of 5 to a maximum of 35.

Maternal Sleep

Maternal sleep was measured at Time 1, 2, and 3 using the disturbance subscale of the VSH Sleep Scale (see Appendix E), an instrument designed to subjectively measure 16 sleep characteristics that evaluate the concepts of sleep disturbance, sleep effectiveness, and sleep supplementation. Subjects were asked to respond to items by placing a vertical mark across a 100 mm response line at a point that best described their opinion regarding the item. Reliabilities were reported for four groups: healthy, insomnia, hospitalized-United States, and hospitalized-Taiwan. Although this instrument did not have documented validity in postpartum patients, it has been a commonly used instrument with documented validity in healthy populations, making it a suitable choice for postpartum women (Snyder-Halpern & Verran, 1987).

The most current reliability figures show theta coefficients ranging from .45, *supplementation*, to .86, *disturbance*, for healthy individuals and .72, *effectiveness*, to .82, *disturbance*, for hospitalized patients in the United States. The computed theta was .82,

indicating adequate reliability. Validity was established by factor analysis, which supported the factors of disturbance and effectiveness as appropriate dimensions of sleep quality. Convergent construct validity was established by comparing the VSH Sleep Scale to two other sleep quality measures. All correlations were at least .50 except the sleep log measure of sleep latency (Snyder-Halpern & Verran, 1987). Written permission to use this scale was obtained from Snyder-Halpern. The instrument took approximately 10 minutes to complete.

Infant Temperament

Infant temperament was measured at Time 2 and 3 using the mood subscale of the Carey's Early Infant Temperament Questionnaire (EITQ), an instrument designed for infant's age 1-4 months. The mothers completed the instrument in approximately 5-10 minutes. The scale consists of 76 items describing different aspects of infant behavior. Questions were grouped to give total scores that described nine New York Longitudinal Study temperament characteristics: activity, rhythmicity, approach, adaptability, intensity, mood, persistence, distractibility, and threshold. This instrument is copyrighted and can be purchased through Behavioral-Developmental Initiatives.

Because no caretaker-administered scales existed to measure temperament in a 2-week old infant, the decision was made to use the EITQ at both the 2-week and 6-8 week data collection points. Items on the instrument that did not pertain to a 2-week old infant (e.g., *the infant repeats vocalization for several minutes*) could be skipped and the skipped items were factored into the automatic scoring system of the scale. Due to copyright laws, only the first two pages of the instrument could be included (see Appendix F).

Test-retest scores completed 2 to 3 weeks after the initial rating were found to be .43 to .87, with increasing retest levels in the older age group. Internal consistencies for the nine subscales reportedly ranged from .42 to .76 (Medoff-Cooper, Carey, & McDevitt, 1993). Specifically, internal consistency reliability for the mood subscale in infant's age 1-2 months was .70, with a test-retest reliability of .72 (Carey Temperament Scales, 2003). Because the raw scores were weighted differently in each category, it was not recommended that a total temperament score be calculated from the subscale scores. Instead, each subscale should be analyzed individually (S. McDevitt, personal communication, February 11, 2004).

Scoring of this instrument was performed by inputting raw data into *The Carey Temperament Scales iReport Writer*, a Behavioral-Developmental Initiatives internet-based scoring system. When the researcher entered data, a report was generated giving both a category score, from 1 to 6, and a *Z* score for each temperament category.

Performance

Performance was measured at Time 3 using the IFSAC (see Appendix G). This instrument contained five subscales designed to measure the mother's readiness to assume infant care and to resume self-care, household, social/community, and occupational activities following childbirth. Content validity was established at 96.7%. Cronbach's alpha internal consistency reliability coefficients ranged from 0.56-0.98 for the five subscales (Fawcett et al., 1988). Written permission to use this instrument was obtained from Fawcett. Only the *House*, *Social/Community*, *Infant*, and *Personal Care* subscales were used for this study. The fifth subscale, *Occupational*, was not used since the subjects had not been back to work for a minimum of two weeks by Time 3. The possible

mean range scores for each subscale and the total IFSAC was 1 to 4, with higher scores reflecting greater functional status.

Sampling Procedure

Data collection points for the specific variables are outlined in Table 1. Institutional Review Board approval was obtained from the University of San Diego (USD; see Appendix H), NMCSD (see Appendix I), and the Uniformed Services University of the Health Sciences (USU; see Appendix J). Subjects were recruited on the first or second postpartum day, not the day of delivery, from the Postpartum Ward of NMCSD. The hospital's computer system provided access to a daily ward roster. Active duty status was verified by the patient's medical record prefix of *20.*

The researcher approached and presented an overview of the study to potential subjects. If the subject indicated an interest in participating, informed consent was obtained (see Appendix K), a subject file was created, and a unique identifying number was assigned. If the subject did not wish to participate, the reason for refusal was recorded. Each subject was required to read and sign the *Patient Authorization to Use and/or Disclose Protected Health Information for Research (HIPAA*; see Appendix L), and the *Privacy Act* (see Appendix M) to comply with Department of Defense policy. A copy of the consent form, along with a copy of the *California Experimental Subject's Bill of Rights* (see Appendix N) was given to each subject. Subjects were allowed as much time as desired to read the consent form, ask questions, and make an informed decision regarding participation. Care was taken to administer the instruments at a convenient time for the subject.

Table 1

Instruments Utilized for Data Collection

Model Component	Variable (Instrument)	Data Collection Point #1	Data Collection Point #2	Data Collection Point #3
		Before hospital discharge	2 weeks after delivery	6-8 weeks after delivery
Symptom	Fatigue (Fatigue Continuum Form)	X	X	X
Physiological Factors	Lactogenesis (feeding survey)	X		
	Type of delivery (demographic portion of PDSS)	X	X	X
Psychological Factors	Depression/Anxiety (PDSS combined instrument)	X	X	X
Situational Factors	Infant Temperament (EITQ)	--	X	X
	Maternal Sleep (VSH Sleep Scale)	X	X	X
Performance	Functional Status (IFSAC)			X
	Total time to complete instruments	20-30	25-40	30-50

Because the subjects were serving on active duty in the military, regulations prohibited financial compensation. The demographic portion of the PDSS was used to obtain the subject's age, gravity, parity, ethnicity, marital status, education, type of delivery, and history of depression. The hospital computer system and United States Department of the Navy Directory Service (United States Navy, 2004) were used to gather information on branch of service and pay grade.

The hospital computer system or personal contact with the subject was made to determine when the infant's 2-week Well Baby visit and the subject's 6-week postpartum visits were scheduled. Data collections at these points were chosen to coincide with the subject's pediatric wellness visit and the subject's return to work. If the subject's infant had an appointment with a civilian medical provider or was otherwise not able to schedule appointments at the prescribed data collection points, arrangements were made to meet the subject at a location of her choosing or to mail the questionnaires to the subject for completion.

First Data Collection Point

Data for the first collection point were gathered from subjects in the postpartum period before hospital discharge. Four instruments were administered (i.e., lactogenesis, fatigue, depression/anxiety, sleep). Subjects were given time to complete the instruments at their leisure. Questionnaires were given to the subject on a clipboard with a pen and collected several hours later.

Second Data Collection Point

For the second data collection point, questionnaires were mailed to the subject approximately two days prior to the scheduled 2-week Well Baby appointment. The packet included instruments to measure lactogenesis, depression/anxiety, maternal sleep, infant temperament, and fatigue. The researcher telephoned each subject the evening prior to, or the morning of, the Well Baby appointment to remind her to complete the forms and bring them to the appointment. The principal investigator (PI) met the subject in the Pediatric Clinic to retrieve the completed forms. If the mother forgot to bring the forms or planned to receive her follow-up care at an alternative location, a self-addressed,

stamped envelope was given to the subject with instructions to mail the instruments to the PI.

Third Data Collection Point

For the third data collection point, questionnaires were mailed to the subject approximately two days prior to the scheduled postpartum visit. This packet included instruments to measure lactogenesis, depression/anxiety, maternal sleep, infant temperament, functional status, and fatigue. A phone call was made to the subject the evening prior to, or the morning of, the postpartum appointment to remind her to complete the forms and bring them to the appointment. The subject was met by the PI in the Postpartum Clinic to retrieve the completed forms. If she forgot to bring the forms, planned to receive her follow-up care at an alternative location, or had the appointment scheduled at a later time, a self-addressed, stamped envelope was given to the subject with instructions to mail the instruments to the PI.

Protection of Human Subjects

All efforts were made to maintain the privacy of the participating subjects. All data, including logbooks, will be kept for a minimum of five years stored in a locked file cabinet. When the data is no longer needed, it will be shredded or destroyed. Subject identity on all instruments was via a unique identifying code. Except for the logbook, consent forms, Privacy Act, and HIPAA form, no patient names were recorded on any paperwork. All computers storing confidential data were, are, and will be password protected.

Subjects were informed that they could discontinue participation in the study at any time and that no consequences would arise from their decision. The potential risks

for the subject were the inconvenience to complete the surveys and any emotional response the subject may experience during data collection. Care was taken to not inconvenience the subject. The potential benefits for the subject were the presence of a nurse taking an interest in her, her infant, and factors related to the challenges of being a working mother. If significant findings of depression or suicidal ideation were discovered during data collection, the researcher discussed options for treatment and referral with the subject. Prior to obtaining consent to participate in the study, the subject was made aware that all data received was confidential and would remain private between the PI and the subject except the following:

1. Any indication of postpartum depression evidenced by a total category score of either *significant symptoms of postpartum depression* or *major postpartum depression* on the PDSS.
2. Any indication of suicidal ideation, evidenced by a score of response of *3, 4*, or *5* on the following PDSS questions:
    a. *Started thinking that I would be better off dead.*
    b. *Have thought that death seemed like the only way out of this living nightmare.*
    c. *Wanted to hurt myself.*
    d. *Feel that my baby would be better off without me.*
    e. *Just wanted to leave the world.*

If intervention was indicated, an immediate referral was made to the study's designated point of contact, Dr. Michael Cardenas, Staff Physician, Obstetrics Clinic,

NMCSD, or the patient's primary care manager or obstetrician. The principal investigator worked closely with Dr. Cardenas to ensure the appointment was kept.

CHAPTER 4

Results

Sample

One hundred sixty-one active duty women were approached to ascertain their interest in study participation. Six subjects declined to participate in the study because they were already participating in similar survey (1), were too busy (3), did not like the paperwork (1), or were ready for hospital discharge and did not have time to complete surveys (1).

One hundred fifty-five subjects were recruited from the Postpartum Ward of NMCSD from September 02, 2003 to December 23, 2003. The attrition rate for this sample was 30%, resulting in a final sample size of 109. Subjects were omitted from data analysis for various reasons, as outlined in Table 2 below.

Table 2

Reasons for Subject Attrition

Number of Subjects	Reason for Omission
41	Failed to complete or return surveys in a timely manner
2	Infant admitted to hospital to rule out sepsis
1	Subject readmitted to hospital for mastitis
1	Child abuse case; infant removed from home
1	Subject incarcerated

All subjects recruited into this study were serving on active duty in the United States military. Over 94% were members of the U.S. Navy with the majority (88%) enlisted personnel. The age of the subjects ranged from 18 to 38 years with a mean age of 25 years. Over half (51%) were between the ages of 21 and 25 years. The majority of the subjects were married (60%), nulliparous before this delivery (66%), 99% had a minimum of a high school education, and 39% had some college education in addition to their high school diploma. Twenty-three percent were single and 9% considered themselves *partnered.* Ninety-two percent of the subjects had no prior history of depression. For details of study demographics, see Table 3.

Data were collected three times over a 6- to 8-week period, consistent with the study design outlined in Chapter 3. The time periods were labeled as follows: Time 1, after delivery but before hospital discharge; Time 2, two weeks postpartum; and, Time 3 six to eight weeks postpartum. For Time 1, data were collected on the first, second, or third hospital day, but never on the day of delivery. Seventy-nine percent of data at Time 1 were collected on the first day after delivery.

For Time 2, attempts were made to capture data to coincide with the 2-week Well Baby Visit. The majority of data (87%) were collected from 12 to 17 days postpartum. At Time 3, data were gathered to coincide with the subject's return to work date. Seventy-four percent of data were collected between 42 and 56 days postpartum. A summary of data collection times is presented in Table 4.

Statistical analyses were performed using the SPSS for Windows Version 11.0.1. To evaluate the accuracy of data entered into the software program, frequencies were run first to look for outliers. Of the 59,732 items of data entered in the demographic file and

Table 3

Subject Demographics

		Number	Percent
Age	Under 21	14	(12.8%)
	21-25 years	56	(51.4%)
	26-30 years	21	(19.3%)
	31-35 years	12	(11.0%)
	Over 35	6	(5.5%)
Education	GED	2	(1.8%)
	High School Graduate	48	(44.0%)
	Some College	42	(38.5%)
	4-Yr. College Degree or more	17	(15.6%)
Race	White	64	(58.7%)
	Black or African American	19	(17.4%)
	Hispanic or Latino	13	(11.9%)
	Asian	9	(8.3%)
	American Indian or Alaskan	2	(1.8%)
	Other	2	(1.8%)
Marital Status	Single	25	(25%)
	Married	66	(66%)
	Partnered	10	(10%)
	Divorced	4	(4%)
	Separated	4	(4%)
History of Depression	Yes	11	(10.1%)
	No	98	(89.9%)
Previous Treatment for Depression	Yes	9	(8.3%)
	No	100	(91.7%)
Number of Children	1	72	(66%)
	2	32	(29.4%)
	3	4	(3.7%)
	4	1	(0.9%)
Military Pay Grade	Enlisted	96	(88.1%)
	Officer	13	(11.9%)
Branch of Service	Navy	102	(93.6%)
	Marine Corps	6	(5.5%)
	Air Force	1	(0.9%)

Table 4

Day Postpartum When Data Collection Occurred

Postpartum Day	Number of Subjects	Percentage of Subjects
Time 1		
Day 1	86	(78.9%)
Day 2	21	(19.3%)
Day 3	2	(1.8%)
Time 2		
Day 11	2	(1.8%)
Day 12	8	(7.3%)
Day 13	26	(23.9%)
Day 14	24	(22.0%)
Day 15	17	(15.6%)
Day 16	11	(10.1%)
Day 17	8	(7.3%)
Day 18	4	(3.7%)
Day 19	4	(3.7%)
Day 20	1	(0.9%)
Day 21	1	(0.9%)
Day 24	1	(0.9%)
Day 25	1	(0.9%)
Day 26	1	(0.9%)
Time 3		
Day 36	1	(0.9%)
Day 37	1	(0.9%)
Day 38	2	(1.8%)
Day 39	3	(2.8%)
Day 40	5	(4.6%)
Day 41	11	(10.1%)
Day 42	20	(18.3%)
Day 43	10	(9.2%)
Day 44	15	(13.8%)
Day 45	9	(8.3%)
Day 46	8	(7.3%)
Day 47	4	(3.7%)
Day 48	3	(2.8%)
Day 49	4	(3.7%)
Day 50	1	(0.9%)
Day 52	2	(1.8%)
Day 53	3	(2.8%)
Day 54	1	(0.9%)
Day 55	1	(0.9%)
Day 57	2	(1.8%)
Day 61	1	(0.9%)
Day 63	1	(0.9%)
Day 67	1	(0.9%)

the three data collection files, seven incorrectly keyed items were noted and corrected, (e.g., the number one incorrectly keyed as 11 for a scale with a range of 1-6). Then, 11 sets of data, or 33 total, from each of the three data collection points were selected at random. Data entered into the computer were compared to the raw data to look for incorrectly keyed items. Of the 6,028 items of data entered into the selected 33 files, three errors were noted and corrected.

A post hoc power analysis was calculated using GPOWER Version 2.0 computer software (Faul & Erdfelder, 1992). Using multiple regression analyses with a sample size of 109 and three data collection points, study results reveal a power of .99, alpha .05, with a medium effect size (0.25).

Instrument Reliability and Validity

Because the instruments used in this study had limited use in military women, Cronbach's alpha reliabilities and tests for validity were conducted and compared to reported data. A synopsis of instrument reliabilities can be found in Table 5.

Fatigue

Fatigue was measured using the FCF. For this study, internal consistency reliability was found to be .92, .93, and .93 at Times 1, 2, and 3 respectively.

Postpartum Depression

Internal consistency reliability for the overall depression scoring was .93, .95, and .95 at Time 1, 2, and 3. To address validity, the Inconsistent Responding Index (INC) of the PDSS was used to determine the extent that the subject was able to read the questionnaire, understand the questionnaire, or pay attention while answering each question on the instrument from start to finish. To be considered valid, the INC score

Table 5

Instrument Reliability in Military Postpartum Women

Instrument	Measure	Reported α	α for present study
FCF	Fatigue	.82, .95, .82 (Time 1, 2, and 3)	.92 .93, .93 (Time 1, 2, and 3)
PDSS	Depression	.97	.93, .95, .95 (Time 1, 2, and 3)
PDSS	Anxiety	.83	.67, .76, .77 (Time 1, 2, and 3)
VSH	Sleep	.86	.77, .71, .82 (Time 1, 2, and 3)
EITQ	Infant mood	.70 (1-2 months of age)	.63, .66 (Time 2 and 3)
IFSAC	Performance	.96	.97 (Time 3)

should be between 0-3. If the INC is 4, there is an 85% likelihood that the PDSS items were not answered in a manner that consistently reflects the test's content (Beck & Gable, 2002). For an INC score of 5, there is a 94% likelihood, and if the INC is 6, there is a 97% likelihood. Therefore, if the INC is $\geq$4, the scoring manual recommends that, in a clinical setting, the provider assess depression by other methods such as a clinical interview.

For the first data collection point, 94% of the PDSS responses calculated an INC score of $\leq$3, compared to 92% at Time 2 and 96% at Time 3. Refer to Table 6 for a complete report of INC scores at all data collection points. Overall, the reported INC scores indicated acceptable validity for these subjects.

Table 6

PDSS Inconsistent Responding Index Scores for PDSS Use in Military Women

Data Collection Point	INC Score < 4 (Total/Percent)		INC Score 4 (Total/Percent)		INC Score 5 (Total/Percent)		INC Score 6 (Total/Percent)		INC Score 7 (Total/Percent)	
Time 1	102	(93.6%)	4	(3.7%)	2	(1.8%)	1	(0.9%)	0	(0%)
Time 2	100	(91.7%)	7	(6.4%)	1	(0.9%)	0	(0%)	1	(0.9%)
Time 3	105	(96.3%)	2	(1.8%)	0	(0%)	1	(0.9%)	1	(0.9%)

Anxiety

For this study, internal consistency reliability was .67, .76, and .77 at Times 1, 2, and 3 respectively. Reliabilities calculated with items deleted showed increased alpha's at Time 1 (.72) and Time 3 (.81) when item number two, *I got anxious over even the littlest things that concerned my baby*, were deleted.

Maternal Sleep

For this study, internal consistency reliability for the disturbance subscales (i.e., items 1, 6, 7, 8, 9, 10, and 11) was .77, .71, and .82 for the three data collection points. Inter-rater reliability for instrument scoring was determined by having a nurse who was not involved with the project score 33 sleep scales (10%). A 98.5% agreement was found between total scores.

Infant Temperament

The 11 mood items (i.e., questions 6, 15, 24, 33, 42, 51, 58, 65, 70, 74, and 76) of the EITQ were selected as the measure of infant temperament. Reliabilities for the mood subscale of the EITQ were analyzed and found to be .63 at Time 2 and .66 at Time 3.

Reliabilities calculated with items deleted changed negligibly at both data collection points.

Each scored EITQ report generated a validity check that listed the number of missing items, along with the social desirability profile. The EITQ instructions directed the subject to skip items that did not pertain to the infant they were rating; a report was considered complete data if 10 or fewer items are skipped. If 11 or more items were skipped, results were to be interpreted with caution. At Time 2, 100 of the 109 subjects skipped ten or less items, resulting in 92% of the instruments considered to have complete data. At Time 3, 108 out of the 109 subjects skipped 10 or less items, resulting in 99.8% of the instruments considered to have complete data.

The social desirability profile reported the levels of consistency to item responses and showed whether there was a balanced profile of high and low scores. At Time 2, 103 of the 109 respondents (94%) showed appropriate levels of consistency and a balanced profile of high and low scores, indicating that the professional could be relatively confident that these ratings represent an accurate view of the infant's temperament profile. Of the six inconsistent reports, two subjects reported significantly lower scores for nearly all of the areas of temperament assessed, indicating that the infant might be extremely easy-going, the rater was in denial about the temperament of the infant, or a combination of the two. The remaining four reports showed significant elevations on nearly all of the areas of temperament assessed, a pattern that might be associated with an extremely difficult infant, a rater who was overwhelmed, or some combination of the two (Behavioral-Developmental Initiatives, 2003).

At Time 3, 101 of the 109 respondents (93%) showed appropriate levels of consistency and a balanced profile of high and low scores, indicating that the professional could be relatively confident that these ratings represent an accurate view of the infant's temperament profile. Of the eight inconsistent reports, seven subjects reported significantly lower scores for nearly all of the areas of temperament assessed, indicating that the infant may be extremely easy-going, the rater is in denial about the temperament of the infant, or a combination of the two. The remaining one report showed a significant elevation on nearly all of the areas of temperament assessed, a pattern that might be associated with an extremely difficult infant, a rater who was overwhelmed, or some combination of the two (Behavioral-Developmental Initiatives, 2003). Mothers of these infants were allowed to continue participating in the study.

Performance

For data analysis, performance was measured using a total score derived from summing the House, Social/Community, Infant, and Self-Care subscales of the IFSAC. Cronbach's alpha reliability for subscale and total scores are reported in Table 7. The low Self-Care reliability alpha of .52 for this study is similar to the subscale reliability of .56 reported by Fawcett et al. (1988). Reliability analysis with items deleted was evaluated to see if a certain item in this subscale was decreasing overall reliability for use of this scale in military women. Cronbach's alpha reliability increased to .60 if the item, *walk slowly*, was deleted.

Table 7

IFSAC Cronbach's Alpha Reliability

Scale	Subscale α	Total α
Household	.8577	
Social/Community	.9333	
Infant	.7766	
Self-Care	.5269	
Total IFSAC Score		.9683

Measures of Central Tendency

Postpartum Fatigue

Coded responses to the FCF were entered into SPSS as 1, *not at all*; 2, *somewhat*; 3, *moderately so*; and 4, *very much so*. Mean fatigue scores were found to be the highest after delivery (50.72, ± 13.52), dropped by Time 2 (43.31, ± 11.94), and remained virtually unchanged from Time 2 to Time 3 (42.57, ± 11.64). Levels of fatigue were determined by totaling all item responses on the FCF, then labeling fatigue into three categories consistent with Pugh et al. (1999). Low levels of fatigue were considered any total score ≤ 38.5, moderate fatigue between a total score of 38.6-64.4, and high fatigue for a total score ≥ 64.5. Detailed fatigue frequencies can be found in Table 8.

To test for differences between fatigue means, a one-way analysis of variance was conducted, $F(2, 324) = 14.400$, $p < .001$. A Tukey's post hoc analysis compared fatigue patterns over time. Results showed a significant difference in fatigue scores from Time 1 to Time 2 ($p < .001$) and Time 1 to Time 3 ($p < .001$), but showed no significant

Table 8

Fatigue Scores at All Data Collection Points

Data Collection Point	Time 1	Time 2	Time 3
Low level of fatigue (≤ 38.5)	(20.2%)	(45.9%)	(46.8%)
Moderate level of fatigue (38.6-64.4)	(61.5%)	(47.7%)	(46.8%)
High level of fatigue (≥ 64.5)	(18.3%)	(6.4%)	(6.4%)
Totals	(100%)	(100%)	(100%)

difference from Time 2 to Time 3 ($p = .898$), indicating that fatigue levels were unchanged from 2-weeks to 6-8 weeks postpartum. Refer to Table 9 for detailed post hoc analysis data.

Type of Delivery

Eighty-nine subjects (81.7%) experienced a vaginal birth, four women (3.7%) had a planned surgical delivery, and 16 (14.7%) had an unplanned surgical delivery. An analysis of variance (ANOVA) was conducted to determine if there were differences in fatigue levels by type of delivery, finding significance at Time 1, $F(2, 106) = 8.603$, $p < .001$, but not at Time 2, $F(2, 106) = 1.312$, $p = .274$, or Time 3, $F(2, 106) = .285$, $p = .752$. For Time 1, a Scheffe's post hoc analysis showed a significant difference in fatigue levels between women who delivered vaginally and those with an unplanned surgical delivery ($p < .001$), but not between vaginal and planned surgical deliveries ($p = .967$) or between planned and unplanned surgical deliveries ($p = .211$).

Table 9

Tukey's Post Hoc Test Comparing Mean Fatigue Scores over Time

Time	Contrast	Value of Contrast	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	2	7.40*	1.679	.000	3.45	11.36
	3	8.15*	1.679	.000	4.19	12.10
2	1	-7.40*	1.679	.000	-11.36	-3.45
	3	.74	1.679	.898	-3.21	4.70
3	1	-8.15*	1.679	.000	-12.10	-4.19
	2	-.74	1.679	.898	-4.70	3.21

*. The mean difference is significant at the .05 level

Lactogenesis

During hospitalization, 70% of women indicated that breast milk was providing 80% or more of their baby's nutrition. By Time 2, this rate dropped to 51%, and by Time 3, only 40% of women indicated that breast milk was their infant's primary source of nutrition. Refer to Table 10 for feeding summaries over time.

Postpartum Depression

Responses to the PDSS were coded into SPSS for data analysis (i.e., 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). Total depression scores could range from a low of 35 to a high of 175.

Once totaled, the PDSS score groups the subjects' depressive symptoms into categories of normal adjustment ($\leq$ 59), significant symptoms of postpartum depression (60-79), and a positive screening for major postpartum depression ($\geq$ 80). Almost half of the subjects in this study scored either significant postpartum depressive symptoms or a positive screening for postpartum depression after delivery. This number remained virtually unchanged at Time 2. By Time 3, 40% of women still reported depressive

Table 10

Lactogenesis Rates over Time

	Time 1		Time 2		Time 3	
Only breast milk from the breast	58	(53.2%)	32	(29.4%)	14	(12.8%)
Only breast milk from the breast or pumped and fed through bottle	5	(4.6%)	14	(12.8%)	20	(18.3%)
> 80% breast milk	13	(11.9%)	10	(9.2%)	9	(8.3%)
50-80% breast milk	6	(5.5%)	12	(11.0%)	5	(4.6%)
20-49% breast milk	2	(1.8%)	1	(0.9%)	3	(2.8%)
< 20% breast milk	4	(3.7%)	9	(8.3%)	3	(2.8%)
Token breast milk	6	(5.5%)	2	(1.8%)	0	0
No breast milk (formula only)	15	(13.8%)	29	(26.6%)	55	(50.5%)
	n=109	(100%)	n=109	(100%)	n=109	(100%)

symptoms (see Table 11). To test for differences between depression means, a one-way analysis of variance was conducted, $F(2, 324) = 1.519$, $p = .220$.

Table 11

Postpartum Depression Scores over Time

	Time 1		Time 2		Time 3	
Normal Adjustment (PDSS $\leq$ 59)	57	(52.3%)	55	(50.5%)	65	(59.6%)
Significant Symptoms of Depression (PDSS 60-79)	42	(38.5%)	39	(35.8%)	32	(29.4%)
Positive Screening for Depression (PDSS > 80)	10	(9.2%)	15	(13.8%)	12	(11.0%)
Total	n=109	(100%)	n=109	(100%)	n=109	(100%)

Per IRB protocol, subjects whose scores indicated either significant symptoms of postpartum depression or a positive screening for postpartum depression were screened and referred to a mental health provider or the subject's primary care provider. During this study, sixteen subjects were referred to their obstetric provider for evaluation, four to the Mental Health Clinic, and two to the Active Duty Obstetric Social Worker. All subjects with depressive symptoms were allowed to continue participating in the study.

Anxiety

Anxiety subscale responses of the PDSS were coded into SPSS for data analysis (i.e., 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). Total scores for this study ranged from 5 to 20 at Time 1, and 5 to 22 at Time 2, and 5 to 23 at Time 3. Mean anxiety scores over time were 10.26 (± 3.33), 10.14 (± 3.7), and 9.61 (± 3.65) at data collection Times 1, 2, and 3 respectively. To test for

differences between anxiety means, a one-way analysis of variance was conducted, $F(2, 324) = 1.000, p = .369$.

Maternal Sleep Disturbance

Mean sleep disturbance scores were 440 (± 121) at Time 1. Scores at Time 2 improved to a mean of 337 (± 132), and further improved to a mean of 288 (± 134) at Time 3 (see Table 12). To test for differences between sleep disturbance means, a one-way analysis of variance was conducted, F (2, 324) = 39.657, p = .000. To compare sleep disturbance levels over time, a Tukey's post hoc analysis was run. Results show a significant difference in sleep disturbance between Time 1 and Time 2 (p = .000), from Time 1 to Time 3 (p =.000), and from Time 2 to Time 3 (p = .014).

Table 12

Maternal Sleep Disturbance Descriptive Statistics

	Time 1	Time 2	Time 3
Mean	440	337	288
SD	121	132	134
Range	200-696	49-647	2-629

Infant Mood

Mean infant mood scores were 3.02 (± .67) at Time 2, and 2.92 (± .67) at Time 3 (see Table 13). At Time 2, most infants (75%) reportedly had midrange mood scores of 2.0 to 3.9, indicating an infant who generally had a balance of positive and negative expression of emotion. At Time 3, this number rose to 87%. Comparison of group means, however, showed no significant difference between mood at Time 2 and Time 3, $F(1, 216) = 1.067, p = .303$.

Table 13

EITQ Mood Scores at Time 2 and 3

Mood Score	Time 2 2-Weeks Postpartum		Time 3 6-8 Weeks Postpartum	
	Number	%	Number	%
1-1.9	2	(2.7%)	8	(7.3%)
2-2.9	20	(17.5%)	51	(46.8%)
3-3.9	63	(57.8%)	44	(40.4%)
4-4.9	23	(21.1%)	6	(5.5%)
5-5.9	1	(0.9%)	0	(0%)
6	0	(0%)	0	(0%)
Totals	$n = 109$	(100%)	$n = 109$	(100%)

Performance

The Inventory of Functional Status was used to measure performance at Time 3. The possible mean range scores for each subscale and the total IFSAC was 1 to 4. Higher scores reflect greater functional status. Items 1-24 were coded into SPSS for analysis (i.e., 1 = not at all, 2 = just beginning, 3 = partially, and 4 = fully). Items 30 and 32 were coded into SPSS for analysis (i.e., 1 = never, 2 = sometimes, 3 = most of the time, and 4 = all of the time). Items 25-29 and 31 were reverse coded (i.e., 1 = all of the time, 2 = most of the time, 3 = sometimes, and 4 = never).

Mean subscales scores for resumption of household activities was 3.40 (± .50), resumption of social and community activities 3.08 (± .79), care of infant 3.67 (± .36), and resumption of personal self-care activities 2.95 (± .39). The total IFSAC mean score was 3.29 (± .33). Women are not considered to have fully resumed their functional status

until their score reached 3.5 (L. Tulman, personal communication, February 28, 2004). A summary of mean scores for interval level data can be found in Table 14 .

Table 14

Mean Scores for Interval Data at Time 1, 2, and 3

	Time 1	Time 2	Time 3
Fatigue	50.72 (± 13.515)	43.31 (± 11.944)	42.57 (± 11.637)
Depression	58.76 (± 16.028)	61.05 (± 19.589)	56.75 (± 18.784)
Anxiety	10.26 (± 3.326)	10.14 (± 3.711)	9.61 (± 3.651)
Sleep	440 (± 121)	337 (± 132)	288 (± 134)
Infant Mood	--	3.02 (± .666)	2.9225 (± .67212)
Performance	--	--	3.2892 (± .33)

Correlations

To examine the relationships between variables, a Spearman rho (ρ) correlation analysis was performed for data collected at all three measurement points. At Time 1, all variables correlated with fatigue levels ($p < .05$). All correlations indicated a positive linear relationship except feeding method ($r = -.230$, $p = .008$), showing that lactating women have higher fatigue levels than non-lactating women. A detailed correlation matrix can be found in Table 15.

Table 15

Spearman Rho Correlation Coefficients at Time 1

Variable	Fatigue	Lactogenesis	Type of Delivery	Depression	Anxiety	Maternal Sleep
Fatigue	1.000	-.230*	.338*	.516*	.490*	.348*
Lactogenesis		1.000	-.107	.036	.005	-.231*
Type of Delivery			1.000	.181*	.203*	-.048
Depression				1.000	.878*	.275*
Anxiety					1.000	.237*
Maternal Sleep						1.000

* p = < .05

At Time 2, all variables correlated with fatigue levels ($p < .05$). Again, all correlations indicated a positive linear relationship except feeding method ($r = -.167$, $p = .042$). Refer to Table 16 for a detailed correlation matrix for this period.

Table 16

Spearman's Rho Correlation Coefficients at Time 2

Variable	Fatigue	Lacto-Genesis	Type of Delivery	Depression	Anxiety	Maternal Sleep	Infant Mood
Fatigue	1.000	-.167*	.162*	.557*	.512*	.275*	.196*
Lactogenesis		1.000	-.036	.059	.048	-.116	.131
Type of Delivery			1.000	.064	.043	.072	.055
Depression				1.000	.870*	.342*	.299*
Anxiety					1.000	.409*	.176*
Maternal Sleep						1.000	.255*
Infant Mood							1.000

* $p < .05$

At Time 3, four variables (i.e., depression, anxiety, maternal sleep, performance) correlated with fatigue ($p < .05$). Of these four variables, only performance calculated as a negative linear relationship ($r = -.233$, $p = .007$), indicating that women with a lower level of functional status demonstrated higher fatigue levels. Three variables (i.e., feeding method, type of delivery, infant mood) did not correlate with fatigue levels at this point. See Table 17 for a detailed correlation matrix.

In order to be certain the final data outcomes will have predictive validity, the correlation matrices were examined carefully for evidence of multicollinearity. The highest correlation noted was at the first data collection point between the variables anxiety and feeding method ($r = .479$). This value is well below Burns and Grove (1997) agreement that criteria of $r \leq .65$, demonstrating no existence of multicollinearity.

Table 17

Spearman Rho Correlation Coefficients at Time 3

Variable	Fatigue	Lactogenesis	Type of Delivery	Depression	Anxiety	Maternal Sleep	Infant Mood	Performance
Fatigue	1.000	-.025	.150	.477*	.515*	.338*	.047	.233*
Lactogenesis	-	1.00	-.094	.234*	.249*	.095	-.008	.077
Type of Delivery			1.000	.123	.140	.089	-.037	-.190
Depression				1.000	.887*	.434*	.256*	-.144
Anxiety					1.000	.352*	.178*	.180*
Maternal Sleep						1.000	.145	-.069
Infant Mood							1.00	-.114
Performance								1.00

* $p < .05$

Multiple Regression

Multiple regression analyses were performed to determine which variables at Time 1 and 2 predicted fatigue levels at Time 3, the scheduled time when military postpartum women return to work. Using a stepwise method, two separate analyses were run. The overall findings showed that maternal anxiety at Time 1 explained 6% of the variance in fatigue at Time 3, and maternal anxiety explained 20% of the variance in fatigue at Time 3. Refer to Tables 18 and 19 for detailed information.

Table 18

Regression Analysis of Time 1 Predictors of Fatigue at Time 3 (6-8 Weeks Postpartum)

	Full Model		Final Model	
	Unstandardized Coefficients		Unstandardized Coefficients	
	Beta	SE	Beta	SE
Intercept (Fatigue Time 3)	34.646	5.760	33.056	3.515
Type of Delivery	.107	1.583		
Lactogenesis Time 1	-.370	.432		
Depression Time 1	-4.438E-02	.149		
Anxiety Time 1	1.121	.178	.927*	.326
Maternal Sleep Time 1	2.352E-06	.010		
Adjusted R^2	.034		.062	

SE = standard error.

* $p < .05$

Table 19

Regression Analysis of Time 2 Predictors of Fatigue at Time 3 (6-8 Weeks Postpartum)

	Full Model		Final Model	
	Unstandardized Coefficients		Unstandardized Coefficients	
	Beta	SE	Beta	SE
Intercept (Fatigue Time 3)	29.940	5.425		
Lactogenesis Time 2	-.138	.365		
Depression Time 2	-4.786E03	.109		
Anxiety Time 2	1.448	.565	1.457**	.268
Maternal Sleep Time 2	5.636E-03	.009		
Infant Mood Time 2	-1.025	1.665		
Adjusted R^2	.185		.209	

SE = standard error.

** $p < .001$

CHAPTER 5

Findings

Summary

This longitudinal study was designed to investigate postpartum fatigue patterns in the military woman and to examine if selected variables in the postpartum fatigue model, based on the Theory of Unpleasant Symptoms, could be used to explain postpartum fatigue. Performance was also evaluated and studied in relation to fatigue levels at the time when military women return to full duty.

This study supports the findings in the literature that indicate fatigue does not resolve by 6 to 8 weeks postpartum (Gardner, 1991; Gjerdingen & Chaloner, 1994; Hantos, 1993; Lee & Zaffke, 1999; Milligan, 1989; Troy & Dalgas-Pelish, 2003; Wambach, 1998; Waters & Lee, 1996; Webster, 1994). In this study, over one-half of all military women were found to have moderate to high levels of fatigue at all data collection points. During hospitalization, the mean fatigue score of military postpartum women was 50.72, similar to the score of 51.5 for non-military women (Pugh et al., 1999). Fatigue was found to decrease significantly from Time 1 to Time 2 ($p < .001$), but was unchanged from Time 2 to Time 3 ($p = .898$), indicating that military women have no change or improvement in their fatigue scores from the second to sixth week of their convalescent leave, and that they are moderately fatigued when they return to duty. Findings from this study support previous research showing a relationship between

breastfeeding and fatigue during hospitalization and at 2-weeks postpartum (Hantos, 1993; Wambach, 1998; Webster, 1994). Breastfeeding was not associated with higher fatigue levels at 6-8 weeks postpartum, conflicting with Milligan's (1988) study. This could be because such a large number of military women in this study had stopped breastfeeding by this time. Military women fell far behind the Healthy People 2010 goals that strive for 50% breastfeeding at 6 months of age (Department of Health and Human Services, 2000). The majority of subjects initially chose breastfeeding as the method to feed their infant; only 14% of subjects bottle-fed in the hospital. Two weeks later, one-fourth of the women were bottle-feeding. At Time 3, over half of the women in this study were bottle-feeding. At Times 1 and 2, fatigue levels negatively correlated with the lactogenesis measure, indicating that women who were breastfeeding had more fatigue.

Previous studies suggested that postpartum fatigue was higher in women experiencing surgical births compared to vaginal deliveries (Cummins et al., 1988; Garel et al., 1990; Tulman & Fawcett, 1988). Milligan (1989) studied the effect for type of delivery (vaginal or surgical) on fatigue 6 weeks and 3 months after delivery and found no relationship. In this study, type of delivery positively correlated with fatigue at Time 1 and Time 2, but not at Time 3. Most of the women (82%) had a vaginal delivery. This vaginal delivery rate was slightly higher than the national average for vaginal deliveries of 77% (Martin et al, 2002), presumably because only full-term pregnancies with uncomplicated maternal and infant outcomes were included in the sample. Women that experienced an unplanned surgical delivery were more fatigued than women delivering vaginally or by a planned surgical delivery were at Time 1, but not at Time 2 or 3.

Physiologically, the military determined that women were physically healed and prepared to return to work after either type of delivery at 6-weeks postpartum. During this short maternity leave, the military mother must bond with and learn to care for her baby. If mothers who experienced a surgical delivery were more fatigued during the early postpartum period, she may experience a delay in this important work and be less prepared to return to work than the mother who delivered vaginally. Physiologic factors clearly influence fatigue and this fatigue may have consequences for mother-infant bonding.

Results of this study support findings by Gardner (1991), Wambach (1998) and Webster (1994), that depression and fatigue show a relationship throughout the 6-8 week postpartum period. For this study, an instrument specifically designed to screen postpartum fatigue was used to measure the depression variable. A majority of the women either experienced symptoms of or had postpartum depression. Women displaying scores indicative of a diagnosable postpartum depression were 9-13%, consistent with the national average of 10-15% of childbearing women (Tam et al., 2002). What is more concerning is the large percentage of women who scored in the category of significant symptoms of postpartum depression. Approximately one-third of women reported depressive symptoms in this category at each data collection point. Because these women most likely do not present with clinical depression, they may go unnoticed and untreated. Depressive symptoms untreated can lead to increased fatigue and possible complications when returning to active duty. Performance could be greatly impaired in women with significant depressive symptoms.

No previous postpartum studies have evaluated symptoms of anxiety and their relationship to fatigue, although Pugh and Milligan (1995) found that anxiety and depression might contribute to fatigue during pregnancy. In this study, anxiety correlated with fatigue at all data collection points as well as predicted fatigue levels at the time military mothers were scheduled to return to work. Women in this study displayed symptoms of anxiety and that anxiety level did not change over time. The PDSS anxiety subscale did not indicate categories for anxiety scores, but using the same scoring criteria ratios as used with the PDSS total scale, low anxiety would be scores ≤ 7, symptomatic of anxiety ≤ 9, and a positive anxiety screening would be scores ≥ 10. Subjects in this study had a mean anxiety level of 10.26 at Time 1, 10.14 at Time 2, and 9.61 at Time 3. If anxiety could be diagnosed and treated early, fatigue levels in this population could be dramatically decreased or avoided. Anxiety not only predicted fatigue levels, but also correlated with most study variables at all data collection points. Decreasing anxiety could result in not only decreased fatigue, but also improved sleep, less depressive symptoms, longer breastfeeding, more successful parenting, and improved performance.

Maternal sleep disturbance in this study was found to decrease over time, indicating that the older the infant, the more the mother's sleep improved. However, sleep disturbance positively correlated with fatigue at all data collection points. This supported findings by Hantos (1993), who found significant differences in fatigue scores and sleep disruption at 3 weeks postpartum, and by Wambach (1998) who found that maternal sleep-disturbance positively correlated with fatigue at 3 days, 3 weeks, and 6 weeks postpartum.

Although it is commonly assumed that sleep disturbance in postpartum women is due to the infant's frequent nighttime wakening, further analysis of a question on the postpartum depression-screening tool (PDSS) indicated this might not be so. The question, *I had trouble sleeping even when my baby was asleep*, was answered with either the response *agree* or *strongly agree* by 58% of women at Time 1, 34% at Time 2, and 28% at Time 3, indicating that issues other than the baby being awake were contributing to sleep disturbance. This sleep difficulty may be related to feelings of anxiousness in new mothers. Anxiety correlated with sleep disturbance at all data collection points. Anxiety may play a larger role in the psychological well being of the postpartum mother than previously thought.

In this study, infant temperament was evaluated at Time 2 and 3 using the mood subscale of the EITQ. Most infants had midrange mood scores of 2.0 to 3.9, indicating a balance of positive and negative expression of emotion. Infant mood positively correlated with fatigue at Time 2 and were similar to findings by Hantos (1993), who evaluated this concept at 3-weeks postpartum. Infant temperament did not show a relationship to fatigue at 6 to 8 weeks postpartum, which conflicted with findings by Milligan (1989) and Wambach (1998).

Subjectively measuring perceptions of infant temperament in the neonate was problematic. There are no caregiver-administered instruments to assess infant temperament at the 2-week period. The instrument used for this study was designed for infants aged 1 to 4 months, and contained items that might not capture the temperament of the neonate. Further studies on how infant temperament influences maternal fatigue levels could be assessed by using objective temperament measurements administered by

trained professionals. This might capture infant mood more objectively, furthering the knowledge of infant mood and maternal fatigue.

The IFSAC was used to measure performance in this group of military postpartum women at Time 3 to coincide with their return to work date. As shown in Table 20, only one-half of military women had resumed their normal level of household activities at Time 3, compared to 75% of non-military women. The social and community activities were resumed at about the same level. Military women resumed less of the infant care responsibilities at 6 to 8 weeks postpartum than non-military women. Several women made notes on the instrument that their spouse or baby's father helped with infant care, or that infant responsibilities were shared between the mother and other caregivers if the mother had returned to work. Military women resumed a much larger percentage of their normal self-care functioning at Time 3 compared to non-military women, although the number was still low. By nature of the military occupation and emphasis on physical fitness and readiness, military women may resume self-care activities (e.g., exercise) earlier because the current military climate stresses physical fitness and return to body standards in order to be successful and remain employed in this field. At Time 3, functional status positively correlated with fatigue levels, indicating more fatigue was associated with lower functional status. The ramifications of untreated fatigue are large. That is, fatigue may negatively influence active duty women's performance.

Table 20

Percentage of Military Women Reporting Full Functional Status at 6-Weeks Postpartum Compared to Civilian Counterparts

Activity	Tulman, Fawcett, Groblewski, & Silverman (1990)	Present Study
Household	75.3%	45.9%
Social/Community	28.9%	33.0%
Infant Care	75.3%	59.6%
Self-Care	3.1%	26.6%

Predicting Fatigue Levels in Military Women

If predictors of fatigue at 6 to 8 weeks postpartum can be identified early in the postpartum period, interventions can be developed to prevent, rather than treat, fatigue. When evaluating all Time 1 and 2 variables to fatigue levels at Time 3, anxiety explained 6% and 20% of the variance in fatigue at Time 3. This is an important finding for Pediatric Nurse Practitioners and supports the trend for pediatric caregivers to understand better maternal mental health and/or provide mental health screenings at pediatric visits (Olson et al., 2002; Tam et al., 2002). An estimated 30% of women experience some type of anxiety disorder in their lifetime (Kessler et al., 1994), and military women, separated geographically from support systems and facing an early return-to-work, might experience even higher rates than the general population. Clearly, anxiety is associated with postpartum fatigue levels in military women, and knowing that the postpartum period is a time of particular vulnerability to anxiety symptoms (Levine, Oandasan,

Primeau, & Berenson, 2003), treating these symptoms has the potential of dramatically improving the military woman's quality of life.

Overall, this sample is representative of military women with one unique caveat (Table 21). Since the study was conducted in a region with a large naval base, there are some differences when compared to other branches of the military. In this study, the percentage of subjects under the age of 25 was somewhat higher than the reported ages of enlisted Navy members (64% compared to 47%; Office of the Under Secretary of Defense, Personnel and Readiness, 2003). The most probable explanations for having a higher percentage of younger subjects in this study was that the region where this study took place housed a large population of young sailors to man the many aircraft carriers, ships, and squadrons assigned to the region.

In the Navy, 92% of enlisted members reportedly have a minimum of a high school education compared to 98% of the subjects in this study who reported a minimum of a high school education. No data were available concerning military members who attended some college after high school, although it is known that 6% of military enlisted members have a 2-year college degree in addition to their diploma (Office of the Under Secretary of Defense, Personnel and Readiness, 2003). In this study, 38.5% of the subjects had attended some college courses after high school.

Reported race/ethnicity data for this study was almost exactly as reported by the Bureau of Naval Personnel (2002) for females serving on Active Duty. Sixty-six percent of the subjects in this study were married. This is consistent with 69% of Navy enlisted women who remained in the Navy after delivering at naval hospitals between 1991 and 1994 (Center for Naval Analyses, 1996).

Table 21

Summary of Selected Study Demographics Compared to U.S. Navy Enlisted Statistics

Demographic	Criteria	Reported	This study
Age	< 25	46.7%	64%
Education	High school diploma	92%	98%
Race/Ethnicity	White	58.8%	58.7%
	Black	20.9%	17.4%
	Hispanic	10.6%	11.9%
	Asian/Pacific Islander	6.6%	8.3%
	Native American	2.2%	1.8%
	Other/Unknown	.3%	1.8%
Marital status (pregnant women)	Married	69%	66%
Pay grade	Enlisted	84%	88%
	Officer	16%	12%

In this study, 88% of the women were enlisted and 12% came from the officer ranks. This rate was similar to 84% of the Navy reporting it's 377,639 members to be enlisted and 16% officers (United States Navy, 2004). The demographics indicate these findings can be generalized to active military women.

Study Reliability and Validity

Reliability of Measures in Military Women

Because these instruments had rarely, if ever, been used in the military population, reliability in this population was uncertain. Reliabilities for the FCF were impressive (.92 to .93) when used to rate fatigue in military women. This instrument was easy for the subject to read and complete and there was no cost to the researcher to use the tool. Scoring the FCF was done by using the *compute* function in SPSS to calculate a sum score. This tool should be useful to researchers in future military studies.

The feeding survey used for this study was a quick, useful, and economical method of obtaining infant feeding data. The tool took less than one minute for the mother to complete. It differentiated between total, partial, and token breastfeeding, as well as bottle-feeding. This tool can also be used in studies where infants are eating solid food (i.e., baby food) in addition to breast milk or formula.

The PDSS was an exceptionally reliable tool for use in military postpartum women to measure postpartum depression. Total scale reliability across time ranged from .93 to .95. The form was easy and quick for the mother to complete and easy for the researcher to score. One barrier to using this instrument for some researchers may be the cost; approximately $1.20 per instrument. Use of the anxiety subscale of the PDSS was a rapid way to gather data on anxiety levels from an instrument being used for another purpose. Reliability for the anxiety subscale in the military postpartum patient ranged from .67 to .77,

The disturbance scale of the VSH Sleep Scale proved to be an economical way to measure different dimensions of maternal sleep. Disturbance scale reliability ranged from .71 to .82 and inter-rater reliability for consistency in scoring the instrument was high. Overall, this form would be useful for future studies in military postpartum women.

Somewhat problematic in this study was the EITQ, which contains 85 statements for the mother to read, reflect upon, and answer. Many subjects complained that the tool took too long to complete. The instrument was somewhat costly to purchase and score. For this study, the instruments were scored using the CTS iReport Writer, an internet based scoring system which provided an informative three page report, including raw and

z-scores for each temperament dimension. The cost of purchasing and scoring the instrument ranged from $2 to $6 per subject, depending on quantity ordered.

Reliability for the mood subscale was .63 at 2-weeks and .66 at 6-8 weeks. This was slightly lower than the author's reliability of .70 and .72 for 1-2 month old infants. Considering that few instruments exist that rate caregiver's perceptions of temperament, this was a fairly reliable and useful tool to use in this population.

The IFSAC reliability in military subjects was consistent with those reported in the literature. Six subjects (3%) indicated that they did not participate in any of the social/community activities listed in Part II of the instrument prior to the infant's birth. These activities referred to socializing with friends, relatives, and participating in church, community, social, and professional organizations. This omission was discussed with Fawcett, one of the instrument's authors. She could not recall any women in her studies failing to complete this section. One explanation is that military women are socially isolated from family and friends due to frequent geographical relocations. It often takes months-to-years to identify and resume social support systems and activities. This is an area that requires further exploration and research.

Internal Validity

Subject mortality was a concern during this study. TriService Nursing Research Program reports an attrition rate of 22.28% for healthy populations (R. Flowers, personal communication, May 02, 2003), but this study reached a rate of 30%. A researcher must question if subjects who dropped out of this study tended to do so for a particular reason. If dropout subjects were too tired to continue study participation, then fatigue levels might be showing lower values than are the norm for military postpartum women.

Another threat was concern regarding the Hawthorne effect of studying fatigue. Because of the extensive informed consent process, subjects were aware that the study was to evaluate levels of fatigue. One wonders if the women rated their fatigue as higher because of the suggestion or assumption that postpartum women should be fatigued.

The Principal Investigator for this study was a military uniformed officer, primarily studying a population of enlisted subjects (88%). To be successful in a military environment, it is not uncommon for sailors and soldiers to want to please their superiors, to show their competence in all areas of their work and personal life. The researcher must question whether the women in this study underrepresented their levels of fatigue and other struggles in an attempt to show that they can handle the challenges they face as a military members and mothers.

This study took place during a significant time of military conflict between the United States and Iraq. The military women in this study were pregnant during Operation Iraqi Freedom, which transpired from March 20, 2003 to May 1, 2003. After Operation Iraqi Freedom ended, conflict between the United States and Iraq continued throughout the subject's pregnancy and postpartum period. Troops continued to deploy overseas and there were casualties. Although these factors may have influenced this study, the findings have furthered the knowledge base concerning fatigue in active duty military women.

Recruiting active duty women from the postpartum ward of a large military medical treatment facility was challenging at times. Patients with uncomplicated vaginal deliveries were normally discharged in 24-hours unless a social or medical issue required a longer stay. Routine Cesarean section patients were discharged on the third postpartum day. Because these women could not be approached on the day of delivery, or if they still

had an intravenous line or urinary catheter, many of them were recruited on the day of discharge.

The day of discharge is a busy one. Many times the subject was unavailable for recruitment because she was busy receiving discharge instructions from the nursing and medical staff, meeting with hospital personnel to complete the birth certificate, having the infant's picture taken, taking a shower, meeting with the pediatrician and newborn audiologist, eating a meal, or feeding her baby. The best time to meet with the subject was during the time the infant was in the nursery for a circumcision, hearing test, or a discharge physical.

Most subjects recruited in the hospital seemed eager to participate in the study, and many wanted to help others by sharing their experiences. By the second data collection point at 2-weeks postpartum, most subjects in the study seemed tired and overwhelmed. Many would forget to bring their paperwork, or bring it only partially completed. Collecting the final set of instruments was the most challenging. Subjects around Time 3 were very busy preparing to return to work and would often fail to keep their postpartum appointment.

Strategies to decrease attrition were implemented early in the study (e.g., a making a reminder call the evening prior to the appointment; giving the subject a stamped, addressed envelope to mail the questionnaires if she forgot to bring them to her appointment; sending reminder postcards). As a nurse and a researcher, the PI had to remain cognizant of how any personal contact with the subject could be serving as an intervention in and of its own, influencing study outcomes. Efforts were made to engage in minimal personal conversation with the subjects.

Usefulness of Model

The postpartum fatigue model, based on the Theory of Unpleasant Symptoms (Figure 1) was an appropriate model to guide the design and implementation of this study in military women. The unpleasant symptom of fatigue was influenced by numerous causes, all of which could be labeled as either a physiological, psychological, or situational factors. Use of this theory allows researchers to evaluate the contributors or predictors of the symptom, which will aid in designing interventions to decrease or avoid it.

Research using the updated version of this middle-range theory can go beyond the design of this study to explore further ways in which multiple symptoms occur together because of a single event. The authors recognized that an unpleasant symptom could be experienced simultaneously with other symptoms, and that "the concurrence of multiple symptoms is likely to result in an experience that is multiplicative rather than additive" (Lenz et al, 1997, p. 15). Instead of researchers studying fatigue as an isolated symptom influenced by outside factors (i.e., physiological, psychological, situational), future studies might focus on what other unpleasant symptoms, combined with fatigue, act as a catalyst to worsen fatigue.

The model could also be used to guide research concerning how the correlated predictor variables not only influence fatigue, but also compound the severity of the variables. For example, anxiety and depression correlated at each data collection point, along with anxiety and sleep, infant mood and depression, and sleep and depression. Further exploration of these relationships and interventions to reduce their impact could significantly influence postpartum fatigue levels.

Conclusions

The purpose of this study was to examine fatigue levels in military women across time and to examine the relationship among selected physiological, psychological, situational, and performance factors on the symptom of postpartum fatigue. Military postpartum women had moderate-to-high levels of fatigue at all data collection points. Fatigue levels improved by 2-weeks postpartum, but remained unchanged from 2-weeks postpartum until 6-8 weeks postpartum. Almost half of all military postpartum women in this study were moderately fatigued when they returned to work. All study variables correlated with fatigue at the time of hospitalization and at 2-weeks postpartum. Depression, anxiety, maternal sleep, and functional status correlated with fatigue at 6-8 weeks postpartum. Anxiety during hospitalization and at 2-weeks postpartum was the strongest predictor of fatigue at 6-8 weeks postpartum.

Based on findings from this study, early identification and treatment of maternal anxiety might reduce fatigue in the postpartum military woman. After delivery, the new mother has contact with the labor and delivery nurse, as well as the lactation consultant, the pediatric nurse for her infant, possibly a home or public health nurse, and a telephone triage nurse. Nurses could be the key to intervening and promoting positive outcomes. This interaction between mother and nurse serves as an opportunity for the nurse to assess the patient's anxiety level, listen empathetically, and provide nursing interventions specific to the problems the mother is facing. Nurses in the obstetric clinic can also assist by identifying anxious patients, educating them about available resources that might decrease anxiety, and by communicating their nursing assessment to the physician, midwife, or nurse practitioner for follow-up.

Policy Implications

By instruction, military women are granted 42 days leave after the birth of a child. Many subjects in the study mentioned that eight weeks would be a more appropriate maternity leave. Future research is indicated to gather data on fatigue levels after the military woman returns to duty before policy change recommendations are made. Several subjects stated they pre-arranged to have an eight-week maternity leave by using two weeks accrued annual leave in addition to their maternity leave. Military women could be allowed to liberally use accrued leave to lengthen their maternity leave where possible.

Future policy research could also focus on the possibility of military women using the Family and Medical Leave Act (FMLA) to lengthen their maternity leave. This 1993 law entitles most Federal employees (but not military members) a total of up to 12 work weeks of unpaid leave during any 12-month period for the birth and care of a child.

The military stresses *readiness* as the key to successful performance, both in the workplace and in the field. Military nursing research could focus on *return-to-work readiness* as a concept to prepare a mother to return to the workplace at the highest functional status possible. This can only be done through early assessment and intervention during the pregnancy and early postpartum period. Currently, the postpartum patient does not see her obstetric provider until 6 weeks after delivery. Future studies could focus on outcomes of a multidisciplinary clinic approach where, at 2 weeks postpartum, the mother-infant pair could be seen by pediatrics, obstetrics, social work, nutrition, lactation, and a mental health professional, if needed.

Military women have proven their value in all branches of military service. Decreasing fatigue in military postpartum women has the potential benefit of a significant

cost-savings to the United States government, improved quality of life for military families, and increased readiness of female troops.

Recommendations for Further Research

The concept of postpartum fatigue is complicated due to its relationship with multiple variables and because diverse populations experience fatigue differently. Military women may be particularly vulnerable to fatigue because they have limited support systems and must return to full duty at 6 weeks postpartum. Study findings suggest that assessment of and treatment for the psychological finding of maternal anxiety might reduce fatigue levels in military women at the time they are scheduled to return to work. The Postpartum Fatigue Model can be used as a guideline to extend the study of postpartum fatigue. Studying military women after their return to work may provide useful data to enhance early postpartum interventions.

The finding that anxiety symptoms during hospitalization and two-weeks postpartum predicted postpartum fatigue at 6-8 weeks requires further exploration. Future research could focus on anxiety levels during all stages of pregnancy to determine if the symptoms of anxiety are present prenatally, antenatally, or if they present only in the postpartum period. Psychological stress can include mood changes, anxiety, fear, and changes in identity (Bialobok & Monga, 2000) and have been found to cause negative outcomes in the pregnant woman. Rodriguez, Bohlin, and Lindmark (2001) determined that psychological stress contributed to the prevalence and frequency of physical symptoms during pregnancy. Dayan et al. (2002) reported that anxiety and depression, when combined with biomedical factors, were associated with preterm labor. Stinson (2003) found that negative life events were predictive of preterm labor in a group of

military women. Cohen, Sichel, Dimmock, and Rosenbaum (1994) found that women taking medication to treat panic disorders during their third trimester of pregnancy improved or did not suffer a worsening of their anxiety symptoms after delivery.

Research could also concentrate on why and when military women begin to experience symptoms of anxiety so that interventions can be tailored to the cause. For example, if the military woman is anxious because she does not feel competent caring for her baby, infant care classes, a visiting nurse, or integrating programs such as Brazelton's Touchpoints (Percy & McIntyre, 2001) could be used to increase her comfort level. If her anxiety stems from lack of social support, a common problem with military members separated geographically from extended family (Knox & Price, 1995), interventions to decrease isolation and increase support may decrease anxiety.

In this study, the rates for a positive screening for postpartum depression, as evidenced by a PDSS score > 80, were similar to those in the civilian community, but what was concerning was the large number of subjects whose scores indicated they were experiencing significant symptoms of postpartum depression. This finding requires further investigation. Little is known about postpartum depression in military women, but women married to military men were found to have higher rates of postpartum depression than women not married to military members (Landsverk & Lindsey, 1995). Nurses can explore why women have higher depression rates so that intervention programs can be more efficacious.

Who is best to implement a maternal psychosocial assessment is unclear. Pediatric providers have the opportunity to assess the mother during the 2-week Well Baby visit, but have limited training in this area. There are also time constraints surrounding the 2-

week Well Baby visit; the pediatric provider may find it difficult or impossible to incorporate this assessment into a 15-minute appointment.

One final area open to further research is the concept of social isolation in military women. Military members are socially isolated from family and friends due to frequent geographical relocations, which can lead to psychological distress. It may take months-to-years to identify and resume social support systems and activities after a move or change of duty station. Young single women who are pregnant may also find it difficult to establish friendships and support systems because they do not socialize at dance clubs, bars, or parties as their friends may do. This phenomena may be unique to military women. Future research focused on the distinct context of the military woman's prenatal and postpartum period may add substantially to our knowledge of this population.

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Appendix A

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Appendix B

FATIGUE CONTINUUM FORM

Directions: Listen to each statement and mark the number that indicates how you have generally felt since delivery. There are no right or wrong statements. Do not spend too much time thinking about each item, but give the best answer for how you have generally felt in the past week.

1 = not at all

2 = somewhat

3 = moderately so

4 = very much so

1. I feel that my head is heavy. ____
2. I feel tired all over my whole body. ____
3. I feel tired in my legs. ____
4. I feel like yawning. ____
5. I feel like my brain is hot and muddled. ____
6. I feel drowsy. ____
7. I feel like my eyes are strained. ____
8. I feel clumsy when moving. ____
9. I feel unsteady when standing. ____
10. I feel I want to lie down. ____
11. I feel I cannot think. ____
12. I feel I am weary of talking. ____
13. I feel nervous. ____
14. I feel unable to concentrate. ____
15. I feel I am unable to take an interest in things. ____
16. I feel I am apt to forget things. ____
17. I feel that I lack self-confidence. ____
18. I feel anxious. ____
19. I feel I am unable to straighten my posture. ____
20. I feel that I have no patience.
21. I feel like I have a headache. ____
22. I feel stiff in the shoulders. ____
23. I feel a pain in my back. ____
24. I feel oppressed in my breathing. ____
25. I feel thirsty. ____
26. I feel like my voice is husky. ____
27. I feel dizzy. ____
28. I feel like I have spasms of the eyelids. ____
29. I feel like I have tremors in my limbs. ____
30. I feel ill. ____

Appendix C

FEEDING SURVEY

Mark the one category below that best describes how your baby was fed over the last week.

_____1. Only breastmilk from the breast.

_____2. Only breastmilk fed from the breast or pumped milk through a bottle.

_____3. Over 80% breastmilk combined with less than 20% formula or solids.

_____4. Between 50% and 80% breastmilk and the rest formula or solids.

_____5. Between 20% and 49% breastmilk and the rest formula or solids (5 out of 8 of every 10 feedings is formula or solids, or 17-24 oz. formula per day.

_____6. Less than 20% of food from breastmilk (over 8 out of every 10 feedings is formula/solids).

_____7. Occasional, irregular, or token breastfeeding.

_____8. Formula only with no breastmilk or breastfeeding.

Appendix D

Sample PDSS Questions (reprinted with permission)

Sleeping/Eating Disturbances (#22): I tossed and turned a long time at night trying to fall asleep.

Anxiety/Insecurity (#2): I got anxious over even the littlest things that concerned my baby.

Emotional Lability (#17): I cried a lot for no real reason.

Mental Confusion (#25): I had a difficult time making even a simple decision.

Loss of Self (#19:) I did not know who I was anymore.

Guilt/Shame (#34): I felt like a failure as a mother.

Suicidal Thoughts (#35): I just wanted to leave this world.

Appendix E

13

VISUAL ANALOG SLEEP SCALES

Scale #_____(34)

Directions: Answer each question by placing a vertical mark across the answer line at a point which BEST REFLECTS YOUR OPINION.

Example: Happy _____|_____ Sad

Answer all of the following questions about your last night's sleep. Consider the night's sleep to begin from the time you first tried to go to sleep to the time you were finally "up" in the morning.

1. Did not awaken	_____	Was awake ten hours	___ ___ ___ (35-37)
2. Had no sleep	_____	Excluding time awake, had ten hours of sleep	___ ___ ___ (38-40)
3. Did not sleep during the day yesterday	_____	Slept ten hours during the day	___ ___ ___ (41-43)
4. Did not sleep yesterday morning	_____	Slept off and on yesterday morning	___ ___ ___ (44-46))
5. Did not sleep yesterday evening	_____	Slept off and on yesterday evening	___ ___ ___ (47-49)
6. Fell asleep immediately	_____	Did not fall asleep	___ ___ ___ (50-52)
7. Slept lightly	_____	Slept deeply	___ ___ ___ (53-55)
8. Had no trouble with disrupted sleep	_____	Had a lot of trouble with disrupted sleep	___ ___ ___ (56-58)
9. Didn't wake at all	_____	Was awake off and on all night	___ ___ ___ (59-61)
10. Had no trouble falling asleep	_____	Had a lot of trouble falling sleep	___ ___ ___ (62-64)
11. Didn't move	_____	Tossed all night	___ ___ ___ (65-67)
12. Awoke exhausted	_____	Awoke refreshed	___ ___ ___ (68-70)
13. After morning awakening, stayed awake	_____	After morning dozed off and on	___ ___ ___ (71-73)
14. Had a bad night's sleep	_____	Had a good night's sleep	___ ___ ___ (74-76)
15. Had enough sleep	_____	Did not have enough sleep	___ ___ ___ (77-79)

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Appendix F

Early Infancy Temperament Questionnaire

for 1-to-4-month-old infants

by Barbara Medoff-Cooper, PhD, William B. Carey, MD, and Sean C. McDevitt, PhD

Infant's Name _____ **Gender** _____

Infant's Date of Birth ___/___/___ **Present Age** _____
Month Day Year

Rater's Name _____

Rater's Relationship to Infant _____

Date of Rating ___/___/___
Month Day Year

Instructions

1. There are no right or wrong or good or bad answers, only descriptions of your infant.
2. Please base your rating on your infant's recent and current behavior (the last four to six weeks).
3. Rate each question separately. Some items may seem alike but are not the same.
   Do not purposely try to present a consistent picture of your infant.
4. Use extreme ratings where appropriate. Try to avoid rating only near the middle of each scale.
5. Rate each item quickly. If you cannot decide, skip the item and come back to it later.
6. Rate every item. Please skip any item that you are unable to answer due to lack of information or any item that does not apply to your infant.
7. Consider only your own impressions and observations of the infant.

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Using the scale below, please darken the circle in the space that tells how often the infant's recent and current behavior has been like the behavior described by each item.

1 = ALMOST NEVER 2 = RARELY 3 = VARIABLE, USUALLY DOES NOT 4 = VARIABLE, USUALLY DOES 5 = FREQUENTLY 6 = ALMOST ALWAYS

		ALMOST NEVER					ALMOST ALWAYS
1. The infant lies still (little squirming) when held in mother's arms between feedings.	1	①	②	③	④	⑤	⑥
2. The infant's fussy period occurs at about the same time of day (morning, afternoon, night).	2	①	②	③	④	⑤	⑥
3. For the first few minutes in a new place or situation (new store or home) the infant is fretful.	3	①	②	③	④	⑤	⑥
4. The infant accepts face washing at any time without protest.	4	①	②	③	④	⑤	⑥
5. The infant's hungry cry is a scream rather than a whimper.	5	①	②	③	④	⑤	⑥
6. The infant cries when awake and left alone.	6	①	②	③	④	⑤	⑥
7. The infant repeats vocalization (coos, babbles) for several minutes.	7	①	②	③	④	⑤	⑥
8. The infant continues to fuss during diaper change in spite of efforts to distract him/her with patting or singing.	8	①	②	③	④	⑤	⑥
9. The infant indicates discomfort (fusses or squirms) when diaper is soiled with bowel movement.	9	①	②	③	④	⑤	⑥
10. The infant lies still (little squirming) during hair brushing.	10	①	②	③	④	⑤	⑥
11. The infant gets sleepy about the same time each evening (within 1/2 hour).	11	①	②	③	④	⑤	⑥
12. The infant appears bothered (cries, squirms) when first put down to sleep in a different place than usual.	12	①	②	③	④	⑤	⑥
13. The infant resists (squirms, pulls away) hair brushing.	13	①	②	③	④	⑤	⑥
14. The infant vigorously cries when sleepy.	14	①	②	③	④	⑤	⑥
15. The infant smiles, or coos during nail cutting.	15	①	②	③	④	⑤	⑥
16. The infant will continuously look at mobile or toy in crib for 5 minutes or more.	16	①	②	③	④	⑤	⑥
17. The infant continues to resist when getting dressed and undressed despite efforts to distract him/her (singing, talking).	17	①	②	③	④	⑤	⑥
18. The infant reacts even to gentle touch (startles, laughs, wiggles).	18	①	②	③	④	⑤	⑥
19. The infant moves about much (kicks, waves arms, squirms) during dressing and undressing.	19	①	②	③	④	⑤	⑥
20. The infant wants and takes milk feedings at about the same times (within 1 hour) from day to day.	20	①	②	③	④	⑤	⑥
21. The infant objects (cries, frets) if someone other than main caregiver gives care.	21	①	②	③	④	⑤	⑥
22. The infant adjusts to change in sleep time within 2 to 3 days.	22	①	②	③	④	⑤	⑥
23. The infant displays much feeling (vigorous smile or cry), during dressing and undressing.	23	①	②	③	④	⑤	⑥
24. The infant is fussy during a bath (cries, frowns).	24	①	②	③	④	⑤	⑥
25. The infant will continuously watch parents during diaper changing.	25	①	②	③	④	⑤	⑥
26. If fussing in bath, infant will continue to protest despite efforts to quiet him (talking, singing to him/her).	26	①	②	③	④	⑤	⑥
27. The infant reacts (startles, stares) to sudden change in lighting (turning on light).	27	①	②	③	④	⑤	⑥
28. The infant lies still (little kicking, splashing) in bath.	28	①	②	③	④	⑤	⑥
29. The infant's time of waking in the morning varies greatly (by 1 hour or more) from day to day.	29	①	②	③	④	⑤	⑥
30. The infant turns head away and looks for mother when held by new person.	30	①	②	③	④	⑤	⑥
31. The infant adjusts to change in place of sleeping within 2 or 3 days.	31	①	②	③	④	⑤	⑥
32. The infant displays much feeling (vigorous smile or cry) during diapering.	32	①	②	③	④	⑤	⑥
33. The infant is fussy when put down for sleep (cries, frets).	33	①	②	③	④	⑤	⑥
34. The infant continuously watches parents during changing of clothes.	34	①	②	③	④	⑤	⑥
35. The infant's hunger cry can be stopped for over a minute by picking up or giving pacifier.	35	①	②	③	④	⑤	⑥

Appendix G

INVENTORY OF FUNCTIONAL STATUS AFTER CHILDBIRTH

PLEASE THINK ABOUT THE TIME SINCE THE BIRTH OF YOUR BABY, AND THEN RESPOND TO THE FOLLOWING ITEMS.

PART I.
Please check all the usual household responsibilities you had prior to the baby's birth and then indicate to what extent you have resumed these responsibilities since the baby was born.

Prior to the baby's birth, my usual responsibilities included:	I have resumed this activity: NOT AT ALL	JUST BEGINNING	PARTIALLY	FULLY
1.__ Care of family members	1	2	3	4
2.__ Cleaning the house	1	2	3	4
3.__ Tidying the house (making beds, picking up things, etc.)	1	2	3	4
4.__ Laundry	1	2	3	4
5.__ Doing dishes	1	2	3	4
6.__ Cooking	1	2	3	4
7.__ Household business (paying bills, banking, etc.)	1	2	3	4
8.__ Grocery shopping	1	2	3	4
9.__ Shopping, other than groceries	1	2	3	4
10.__ Doing errands	1	2	3	4
11.__ Heavy housework, maintenance work (seasonal cleaning, painting, etc.)	1	2	3	4
12.__ Caring for pets	1	2	3	4

Comments:

PART II.
Please check all the usual social and community activities you did prior to the baby's birth and then indicate to what extent you have resumed these responsibilities since the baby was born.

Prior to the baby's birth, my usual responsibilities included:	I have resumed this activity:			
	NOT AT ALL	JUST BEGINNING	PARTIALLY	FULLY
13.__ Community service organizations	1	2	3	4
14.__ Professional organizations	1	2	3	4
15.__ Religious organizations	1	2	3	4
16.__ Socializing with friends	1	2	3	4
17.__ Socializing with relatives	1	2	3	4
18.__ Social clubs	1	2	3	4

Comments:

PART III.
Please circle the number that indicates to what extent you have assumed your part of the following aspects of the baby's care.

	NOT AT ALL	JUST BEGINNING	PARTIALLY	FULLY
19. Daytime feedings	1	2	3	4
20. Night feedings	1	2	3	4
21. Bathe the baby	1	2	3	4
22. Change diapers	1	2	3	4
23. Change the baby's clothes	1	2	3	4
24. Play with the baby	1	2	3	4

Comments:

PART IV.

Please respond to the following phrases based on how your life has been during the past week or two.

	NEVER	SOMETIMES	MOST OF THE TIME	ALL THE TIME
25. Spend much of the day lying down	1	2	3	4
26. Sit during much of the day	1	2	3	4
27. Spend much of the day sleeping or dozing	1	2	3	4
28. Stand for only short periods of time	1	2	3	4
29. Spend most of the day in my nightgown/bathrobe	1	2	3	4
30. Take walks	1	2	3	4
31. Go up and downs stairs	1	2	3	4
32. Walk slowly	1	2	3	4

Comments:

Appendix I

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5 Aug 03

From: Head, Clinical Investigation Department (CID)

To: **Jacqueline Rychnovsky, CDR, NC, USN, Department of Pediatrics**, for Research Study CIP #S-03-0110, "Postpartum Fatigue in the Active Duty Woman"

OFFICIAL APPROVAL OF CLINICAL INVESTIGATION PROGRAM (CIP) STUDY

Ref: (a) NAVMEDCEN SDIEGOINST 6500.9
(b) NSHSBETHINST 6000.41B

Encl: (1) **Approved Version of CIP Study**
(2) **IRB Approved Consent Forms**
(3) **Adverse Event (AE) Reports**
(4) **Travel Information**
(5) **Revisions to the Protocol**

1. Your research protocol (enclosure (1)) has been approved for initiation as of this date. Your protocol has met the requirements of references (a) and (b) was approved by the Institutional Review Board (IRB) at its **9 July 2003** meeting.

Next Continuing Review Date: June 2004
IRB Approval Expiration Date: 9 July 2004

2. Enclosure (2) is the approved informed consent with the IRB stamp of approval. You may not make changes to this document without prior review and approval by the IRB and endorsement by the CO. **You are required to keep copies of all signed consent forms in your records and place the original signed consents in the patient's record.** All drugs administered and the procedures performed must also be included in the patient's records. Each patient must receive a copy of the signed informed consent, a signed Privacy Act statement and the California Experimental Subject's Bill of Rights.

3. All adverse reactions, complications, or other unexpected occurrences should be reported to CID, IRB, and Drug/Device

sponsors within 48 hours. **All subject deaths will be reported to CID and the IRB Chair within 24 hours of the event.** Enclosure (3) should be used to report any adverse reaction to investigational drugs or devices.

4. Requests for travel funds for presentations related to your protocol must be processed through Medical Editing and include your CIP #. Travel funds are allocated by Naval Medical Education and Training Command (NMETC), Bethesda, MD and are available on a first come first served basis. The information needed to apply for TAD funded by NMETC is in enclosure (4).

5. Articles/abstracts for publication must be submitted to the CID Medical Editing staff. They will assist in their preparation, will ensure proper acknowledgment of BUMED as sponsor, will obtain command approval and submit them to journals and publications.

6. Changes to the protocol (i.e., increasing/decreasing subjects or budgets, addition/deletion of investigators, any changes in protocol procedures) must be submitted to CID, enclosure (5), for approval prior to initiation.

7. Please note that although your study has been locally approved and you may begin, the Navy Clinical Investigation Program (CIP) includes a second level review process by the CIP office at the Naval Medical Education and Training Command, Bethesda, MD. This review may generate concerns, which will require a response from you to CID within 14 days.

8. Sincere best wishes for a successful research project. For assistance, please contact the Research Program Administration office at (619) 532-8125/36/9927

W. Lockette, M.D.

Appendix J

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4799

August 12, 2003

MEMORANDUM FOR CDR JACQUELINE D. RYCHNOVSKY, NC, USN,
TRISERVICE RESEARCH NURSING PROGRAM

SUBJECT: USUHS Acceptance of USD IRB Approval of Protocol **TSNRP (N03-010) [2003-06-109]** for Human Research Participation

In accordance with DoD Directive 3216.2 dated 25 March 2002, USUHS accepts the 3 July 2003 approval by the University of San Diego (USD) Institutional Review Board (IRB) of the research protocol entitled ***"Postpartum Fatigue in the Active Duty Woman"*** under your direction.

The purpose of this study is to examine, within the context of the Theory of Unpleasant Symptoms, the relationships among selected physiological, psychological, and situational factors (type of delivery, degree of lactogenesis, anxiety, depression, sleep, and infant temperment) and fatigue levels in military women before hospital discharge and at 2 weeks and 6-8 weeks postpartum. A convenience sample of up to 109 volunteer subjects will be recruited from postpartum active duty women with uncomplicated pregnancies presenting at the NMCSD Postpartum Ward. The results of this study may permit military nurses to develop intervention programs to decrease postpartum fatigue which, in turn, could lead to greater job satisfaction, decreased workplace accidents, higher breastfeeding rates, improved physical readiness, decreased maternal and infant health costs, and improved parenting behaviors. This memo also recognizes USD's approval of a change in recruitment approved by NMCSD permitting direct contact of possible volunteer subjects by the PI rather than through the provider.

You are required to submit amendments to this protocol, changes to the consent form, continuing reviews, adverse event reports, and other pertinent information relative to human research protections for this project to this office for review.

If you have any questions regarding this action, please call me at 301-295-3303 or contract me at rlevine@usuhs.mil.

Richard R. Levine, Ph.D.
Assistant Vice President for Research

cc: Director, TSNRP
File

TSNRP 14 AUG '03

Printed on Recycled Paper

Appendix K

NAVAL MEDICAL CENTER
SAN DIEGO, CALIFORNIA 92134-5000

CONSENT BY A *SUBJECT* FOR VOLUNTARY PARTICIPATION IN A CLINICAL INVESTIGATION (RESEARCH) STUDY

1. You, _____, have been asked to voluntarily participate in a research project entitled, **"Postpartum Fatigue in the Active Duty Military Woman"** being conducted at the Naval Medical Center, San Diego by medical researchers from the Department of Obstetrics and Pediatrics, in collaboration with the University of San Diego.

2. WHY IS THE STUDY BEING DONE?

The purpose of this research project is to find out how active duty women are functioning after the birth of their baby. Information will be gathered to determine if you are fatigued, how your baby was delivered (vaginal or Cesarean section), how you are feeding your baby, how you are sleeping, and how fussy your baby is. You will also be asked questions to see if you are depressed or anxious. Finding out more about how you are functioning after delivery is important so that the military can develop programs to improve the health and functioning of military women and their babies after delivery.

3. HOW LONG WILL YOU BE PARTICIPATING IN THE STUDY?

You will be asked to complete a set of questionnaires three times in the 8 weeks after delivery of your baby (once before discharge from the hospital, and again at 2 weeks and 6-8 weeks after delivery).

4. WHAT IS INVOLVED IN THE STUDY?

The study will last 8 weeks. You will be asked to complete questionnaires three times (after delivery, at 2 weeks, and at 6-8 weeks after delivery). The questionnaires will be used to measure your levels of fatigue, depression and anxiety, as well as the temperament of your baby, how you are sleeping, and how you are functioning in the home. It will take approximately 20-50 minutes to complete the surveys each time. You can complete the questionnaires at a place that is convenient to you, such as the Postpartum Ward, Pediatric or Obstetric clinic, your house, or by mail. You will be contacted by phone to arrange how and when the follow-up surveys will be completed. If you cannot be reached by phone, a letter will be mailed to you.

Subject's Initials: _____

IRB Approval Stamp/Seal Required

IRB APPROVED DATE 7/18/03 INT EXP JUL 09 2004 NAVAL MEDICAL CENTER SAN DIEGO

5. WHAT IS THE EXPERIMENTAL PART OF THE STUDY?

The experimental part of this study is gathering data about how you are functioning after the birth of your baby.

6. HOW MANY PEOPLE WILL TAKE PART IN THE STUDY?

Approximately 110 active duty women will participate in the study at the Naval Medical Center San Diego.

7. WHAT ARE THE RISKS OF THE STUDY?

The risks or discomforts that are possibly related to your participation in this study is as follows: You may feel inconvenienced by taking the time to complete the questionnaires. You may feel emotional discomfort while answering questions on the surveys, as they address issues of fatigue, depression, anxiety, sleep problems, and infant temperament.

8. WILL THERE BE ANY UNFORESEEN RISKS?

If findings of depression or thoughts of suicide are discovered during data collection, the researcher will have an ethical obligation to discuss options for treatment and referral with you. Depending on the findings, you may be required to seek help from a doctor in the OB/GYN clinic, or other mental health provider. All information will remain private and confidential between you, the researcher, and the referring provider. If findings or suspicions of child abuse arise, the researcher will be required by law to report the findings to the authorities. This will not remain confidential.

9. ARE THERE BENEFITS TO TAKING PART IN THE STUDY?

Your participation in this research project may not be of direct benefit to you personally. However, the results of this study may help the investigator gain important knowledge about how active duty women are functioning after the birth of their baby or aid in the future medical evaluation or treatment of other patients.

10. WHAT OTHER OPTIONS ARE THERE?

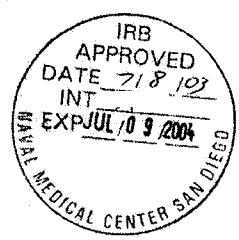
This research study is not designed to treat any medical condition that you may have. Therefore, there are no alternative procedure(s) or course of treatment that would be advantageous to you.

11. WILL YOU BE PAID TO PARTICIPATE?

You will not be financially compensated for your participation in this study.

Subject's Initials: _____

IRB Approval Stamp/Seal Required



12. WHAT IF YOU ARE INJURED AS A RESULT OF PARTICIPATION IN THIS STUDY?

If you suffer any injury directly related to your participation in this research study, immediate medical attention is available at the Naval Medical Center, San Diego, or at another closer medical treatment facility, if applicable. Any injury resulting from your participation in this study will be evaluated and treated in keeping with the benefits or care to which you are entitled under applicable Navy, other Department of Defense, and other state or Federal regulations.

13. WHAT ABOUT CONFIDENTIALITY?

In all publications and presentations resulting from this research study, information about you or your participation in this project will be kept in the strictest confidence and will not be released in any form identifiable to you personally. However, authorized personnel from the Navy Medical Department and from the Food and Drug Administration (FDA), where applicable, may have access to your research file in order to verify that your rights have been adequately protected. The investigator may access your phone number(s) and/or address in the hospital's CHCS data base computer system to arrange for follow-up data collection.

14. WHOM DO YOU CALL IF YOU HAVE QUESTIONS OR PROBLEMS?

If you have any questions regarding this research study, you may contact **CDR Jacqueline Rychnovsky, NC, USN, at (619) 934-4760**, email jdrychnovsky@nmcsd.med.navy.mil, or **Dr. Allen Orsi, at (619) 260-4688,** email aorsi@sandiego.edu.

If you have any questions about your rights as an individual while participating in a research study at the Naval Medical Center, San Diego, you may contact **CAPT George Ulrich, MC, USN, Chairman, Institutional Review Board at (619) 532-8125, or Dr. Warren Lockette, Head, Clinical Investigation Department at (619) 532-8127.**

If you believe that you have been injured as a result of your participation in this research study, you may contact **CDR Lynn McNees, JAGC, USN, Naval Medical Center, San Diego, Legal Department, at (619) 532-6475.**

15. WHAT ARE YOUR RIGHTS AS A PARTICIPANT?

Your participation in this project is entirely voluntary. Your decision not to participate will involve no penalty or loss of benefits to which you are entitled under applicable regulations. If you choose to participate, you are free to ask questions or to withdraw from the study at any time. If you should decide to withdraw from the research project, you will notify **CDR Jacqueline Rychnovsky at (619) 934-4760** to ensure your timely removal from the study. Your withdrawal will involve no prejudice to your future health care or any loss of rights or benefits to which you are otherwise entitled. Any new significant finding developed during the course of this study, which might affect your willingness to continue participation will be communicated to you.

Subject's Initials: _____

IRB Approval Stamp/Seal Required

16. CAN YOU BE TERMINATED FROM THE STUDY?

The investigator may terminate your participation in this study if you fail to comply with study procedures. Examples of this might be:

- If you fail to complete the questionnaires.
- If you become ill with a condition that might make you more tired than the average postpartum woman.
- If your baby becomes ill with a condition that might make you, while caring for the baby, more tired than the average postpartum woman.
- If you move or cannot be contacted.

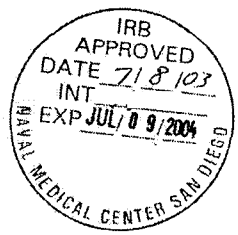
17. SIGNATURE

You are making a decision whether or not to participate in the research project above. Your signature indicates that you have had this information presented to you, have had the opportunity to ask questions about the research and your participation, and agree to participate in the study. Further, your signature indicates that you have been provided with a copy of this consent document and a copy of a document entitled, "California Experimental Subject's Bill of Rights."

SIGNATURES AND **DATE** SIGNED:		**PRINTED** OR **TYPED IDENTIFICATION:**
Patient / Subject	(Date)	Name / Status / Sponsor's SSN
Witness	(Date)	Name / Grade or Rank
Researcher/Investigator	(Date)	Name / Grade or Rank

Subject's Initials: _____

IRB Approval Stamp/Seal Required



Appendix L

PATIENT AUTHORIZATION TO USE AND/OR DISCLOSE PROTECTED HEALTH INFORMATION FOR RESEARCH (HIPAA)

(In Keeping with the Health Insurance Portability and Accountability Protection Act)

What is Confidentiality of records all about?

The Naval Medical Center San Diego makes every effort to maintain the confidentiality of protected health information we obtain about you. However, we cannot absolutely guarantee confidentiality because other people may need to see your information in the course of this research study. Most people and organizations will protect the privacy of your information, but may not be required to do so by the law. Also, if the results of this research study are presented at meetings or are published, your name will not be used.

What is HIPAA all about?

The Health Insurance Portability and Accountability Act (HIPAA) requires that we get your permission to use protected health information about you that is either created by or used in connection with this research study. This permission is called an Authorization. The information we use includes your entire research record and supporting information from your medical records, results of laboratory test, X-rays, MRIs, CT scans and observations made by a physician or nurse which are both clinical and research in nature.

For this study, your medical record will be reviewed to make sure your are eligible to participate. The investigator will gather data regarding how much blood you lost after surgery and how your baby was delivered (vaginally or by Cesarean section). Your past medical history will be briefly reviewed to see if you have any chronic medical problems such as insulin-dependent diabetes, pre-eclampsia, or heart conditions. The hospital computer system (CHCS) will be used to obtain telephone and/or mailing information to contact you for follow-up data collection.

What will we do with this information?

Your protected health information will be collected and used during the course of the research study, to monitor your health status, to measure the effects of drugs or devices or procedures, to determine research results, and to possibly develop new tests, procedures, and commercial products.

Your research doctor will use this information to report the results of research to sponsors and federal agencies, like the Food and Drug Administration (FDA). The information may also be reviewed when the research study is audited for compliance. When the study is over, you have the right to see the information and copy it for your records.

IRB APPROVED DATE 7/8/03 INT____ EXP JUL 09 2004 NAVAL MEDICAL CENTER SAN DIEGO

Who will we share your information with?

Your information may be shared with any of the following:

- The sponsor of the study, or its agents, such as data repositories
- Other medical centers, institutions, or research investigators outside of the Naval Medical Center San Diego, participating in this research study
- State and Federal agencies which have authority over the research, the Naval Medical Center San Diego or patients. Good examples are: the Department of Health and Human Services (DHHS), the Food and Drug Administration (FDA), the National Institute of Health (NIH), the Office of Human Research Protections (OHRP), and the Department of Social Services (DSS) or other.
- This hospital or clinic.

- Accrediting agencies, such as JCAHO.
- A data safety monitoring board, if applicable
- Clinical staff who may not be involved directly in the research study, but who may become involved in your care, if it is possibly related to treatment

For this research study, the study investigator may share this authorization form and records, which identify you, to comply with regulatory requirements or for purposes related to this research with:

1. Dr. Terry Harrison, Department Chair, Obstetrics/Gynecology, Medical Monitor for this study at the Naval Medical Center, San Diego.
2. Judy Carol, Sub-Investigator, who will participate on a part-time basis collecting data and obtaining consent forms.

What if you want to revoke or cancel away your Authorization?

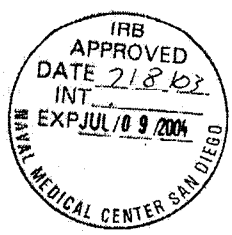
If you decide to participate in this research study, your Authorization for this study will not expire unless you revoke or cancel it in writing to the research doctor. If you revoke your Authorization, you will also be removed from the study, but standard medical care and any other benefit to which you are entitled will not be affected in any way.

Revoking your Authorization only affects the use and disclosure (sharing) of information after your written request has been received. Federal law requires sending study information to the FDA for studies it regulates, like studies of drugs and devices. In a case like this, your information may need to be reported to them and cannot be removed from the research records once it is collected.

Do you have to sign this form?

You have the right to refuse to sign this Authorization form and not be a part of this study. You can also tell your study doctor you want to withdraw from the study at any time without revoking the Authorization to use your health information. By signing this research Authorization form, you authorize the use and/or disclosure of your protected health information described above.

SIGNATURE AND **DATE** SIGNED:		**PRINTED** OR **TYPED IDENTIFICATION:**
Patient/Subject	(Date)	Name/Status/Sponsor's SSN
Witness	(Date)	Name/Grade or Rank
Researcher/investigator	(Date)	Name/Grade or Rank



Appendix M

Postpartum Fatigue; P.I. Rychnovsky, J.; CIP# S-03-110

PRIVACY ACT STATEMENT

1. Authority. 5 USC 301

2. Purpose. Medical research information will be collected to enhance basic medical knowledge or to develop tests, procedures, and equipment to improve the diagnosis, treatment, or prevention of illness, injury, or functional impairment.

3. Use. Medical research information will be used for statistical analysis and reports by the Department of the Navy, the Department of Defense, and other U.S. Government agencies, provided this use is compatible with the purpose for which the information was collected. Use of the information may be granted to non-Government agencies or individuals by the Chief, Bureau of Medicine and Surgery in accordance with the provisions of the Freedom of Information Act.

4. Disclosure. I understand that all information contained in this Consent Statement or derived from the medical research study described herein will be retained permanently at Naval Medical Center, San Diego and salient portions thereof may be entered into my health record. I voluntarily agree to its disclosure to agencies or individuals identified in the preceding paragraph. I have been informed that failure to agree to such disclosure may negate the purposes for which the research study was conducted.

SIGNATURES AND DATE SIGNED: PRINTED OR TYPED IDENTIFICATION:

_____ _____

Patient / Subject (Date) Name / Status / Sponsor's SSN
(if Applicable)

_____ _____

Parent / Guardian (Date) Name / Status
(if Applicable)

_____ _____

Witness (Date) Name / Grade or Rank

Appendix N

Postpartum Fatigue; P.I. Rychnovsky, J.; CIP# S-03-110

CALIFORNIA EXPERIMENTAL SUBJECTS BILL OF RIGHTS

Any person who is requested to consent to participate as a subject in a research study involving a medical experiment, or who is requested to consent on behalf of another, has the right to:

1. Be informed of the nature and purpose the experiment;

2. Be given an explanation of the procedures to be followed in the medical experiment, and any drug or device to be used;

3. Be given a description of any attendant discomforts and risks reasonably to be expected from the experiment;

4. Be given an explanation of any benefits to the subject reasonably to be expected from the experiment, if applicable;

5. Be given a disclosure of appropriate alternative procedures, drugs, or devices that might be advantageous to the subject with their relative risks and benefits;

6. Be informed of the avenues of medical treatment, if any, available to the subject after the experiment if complications should arise;

7. Be given an opportunity to ask any questions concerning the experiment or the procedures involved;

8. Be instructed that consent to participate in the medical experiment may be withdrawn at any time, and the subject may discontinue participation in the medical experiment without prejudice;

9. Be given a copy of a signed and dated written consent form when one is required;

10. Be given the opportunity to decide to consent or not to consent to a medical experiment without the intervention of any element of force, fraud, deceit, duress, coercion, or undue influence on the subject's decision; and

11. Be assured that the subject's confidentiality will be preserved and his/her name will not be released without his/her permission.

Any questions regarding this research study should be directed to the principal investigator or associate investigators. Information is available from the Chairman, Institutional Review Board, established for the protection of volunteers in research projects at this facility by calling (619) 532-8125 or writing the Chairman, Committee for the Institutional Review Board at Naval Medical Center, Clinical Investigation Department (Code KCA), San Diego, CA 92134-5000.